
Stabilis

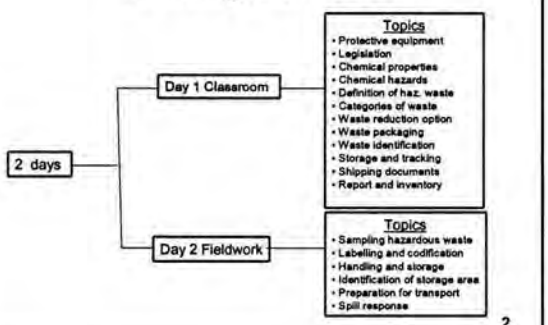
Hazardous Waste Management
Training Program

Hazardous Waste Management Training Program

Katívik Regional Government

1

Training Schedule



2

Course Outline

- Part 1 - Hazardous Waste in your Community
- Part 2 - Potential Risks and Hazards Associated with Hazardous Waste
- Part 3 - Chemical Hazards
- Part 4 - Hazardous Waste Regulatory Requirements
- Part 5 - Transport of Dangerous Goods (TDG)
- Part 6 – Documentation
- Part 7 - Identification of Hazardous Materials for Transport

3

Objectives of the hazardous waste (HW) management program

- Reduce potential hazard for humans and the environment
- Reduce risk of injury during handling, transport and storage
- Compliance with environmental storage and transport regulations

4

Part 1

Hazardous Waste in your Community

5

Production of HW in your community

- Municipal garage and maintenance shop
- School lab, water treatment plant
- Domestic use (house)
- Fuel and gasoline storage site
- Power plant
- Others (outfitters, small industries, etc.)

6

Types of hazardous waste (HW)
Garage and maintenance shops

- Municipality, airport, mechanical shop
  - Waste oil
  - Oily sludge
  - Filters (fuel and oil)
  - Oil cans and plastic bottles
  - Contaminated rags and absorbent material
  - Waste antifreeze
  - Batteries
  - Paint
  - Spray paint, aerosol
  - Lacquer
  - Solvent

7

Types of hazardous waste (HW)
Laboratory chemicals

- School (large diversity, small volumes)
  - Flammable liquid
  - Corrosive liquid
  - Toxic agent (Specimen preservation)
  - Water reactive solids (reactive salts)

8

Types of hazardous waste (HW)
Domestic use

- Waste oil
- Waste antifreeze
- Car batteries
- Small batteries
- Paint
- Solvent
- Spray paint
- Toxic detergent, strong cleaning products
- Glue
- Spent medication
- Propane tank

9

Types of hazardous waste (HW)
Fuel and gasoline storage

- Waste fuel and gasoline
- Contaminated rags and absorbent
- Filters
- Contaminated soil
- Contaminated empty drums

10

Types of hazardous waste (HW)
Power plant

- All managed by Hydro-Québec

11

★ possible partnership to help finance used oil furnace.

Types of hazardous waste (HW)
Other potential HW generators

- Outfitters
  - Waste oil
  - Empty drums
  - Contaminated soil
  - Propane tank

12

Propane tanks → training to empty & ship south.

Part 2

Potential Risks and Hazards Associated with Hazardous Waste

13

Potential Environmental Hazard of Waste

Source → Pathway → Receptors

- Source (spills, fire)
- Pathways
  - Soil and groundwater
  - Surface water (streams, rivers, lakes, ocean)
  - Air (contaminant dispersion)
- Receptors
  - Plants, Animals, Humans

14

Sources of Environmental Contamination

15

Sources of Contamination in your Community

- Spills and leaks
  - Liquid and vapours

- Fire
  - Toxic smoke and dust

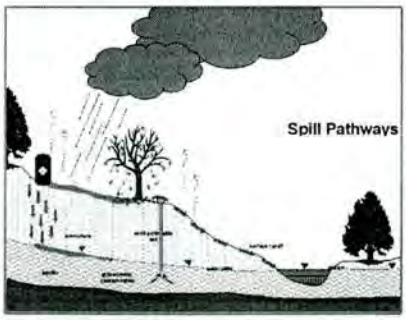
16

Spill or leak?

- Spill: one volume spilled during one episode
- Leak: continuous leaking of small volumes (*e.g.*, drops) during a long period of time
  - Causes:
    - Accidental release
    - Carelessness
    - Vandalism
    - Sub-standard handling procedures and equipment
    - Sub-standard storage procedures
    - Old, corroded, damaged or inappropriate containers
    - Defective container, tank, piping, valves, bungs, caps
    - No secondary containment

17

Dispersion of Contaminants in the Environment



18

Risks Associated with Commonly used HW

- Waste oil (most common, large volume)
  - May contain heavy metals and other toxic compounds (PAH, PCB)
  - Contamination of soil
    - Will limit vegetation growth
    - Will increase heavy metal concentrations in vegetation
    - Wildlife may become sick from eating contaminated vegetation

19

cadmium
lead.

Risks Associated with Commonly used HW

- Waste oil …
  - Contamination of surface water
    - Will stop the transfer of oxygen from air to water
    - Will increase presence of toxic compounds and affect fish spawning
    - May affect some birds (*Anatidae*) and mammals by damaging their plumage or their fur

20

Risks Associated with Commonly used HW

- Waste oil…
  - Contamination of groundwater
    - May affect plant life
    - May spread on the water table and increase the area of contamination
    - Contamination may be transferred to surface water

21

Risks Associated with Commonly used HW

- Waste vehicle batteries
  - Will induce high concentration of lead in the environment
  - Sulphuric acid may affect the surrounding pH

- Small batteries
  - Contain high levels of toxic metals such as cadmium, lithium, and nickel
  - Potassium hydroxide may affect the surrounding pH

22

lead acid

Risks Associated with Commonly used HW

- Waste antifreeze, detergents, cleaning agents, lacquer, paint, solvents, medication
  - These products contain many different toxic compounds, and most are water-soluble
  - Disposal in an inappropriate site will increase the risk of surface and ground water contamination.
  - Some chemicals can change the equilibrium of aquatic ecosystems

23

Part 3

Chemical Hazards

24

Basic Notions of Chemistry

Some definitions:

- Physical state
  - State of a substance at ambient temperature (20°C): gas, liquid or solid
    - solid: steel
    - liquid: gasoline
    - gas: propane

25

Basic Notions of Chemistry

- **Density**
  - Weight of a specific volume of product
    - Example:
      - density of water = 1 kg/l
      - density of gasoline = 0.7 kg/l
  - A product with a density < (less than) 1 kg/l <u>floats</u> on water
  - A product with a density > (greater than) 1 kg/l <u>sinks</u> in water

26

Basic Notions of Chemistry

- **pH**
  - Numeric value (between 1 and 14) indicating whether a solution is acidic or alkaline.
  - Example:
    - Water pH = 6 to 8
    - Javex bleach pH = 12.5
    - Sulphuric acid pH = 2.1

27

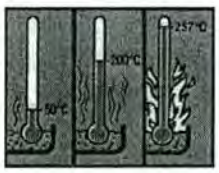
Basic Notions of Chemistry

- **Flash point**
  - Lowest temperature at which a sufficient amount of vapour is given off to create a flammable mixture with air (if presence of a flame or spark).
  - The lower the flash point of a liquid, the greater the risk of fire.
  - Flash point of diesel is 34°C
  - Flash point of gasoline is -48°C

28

Basic Notions of Chemistry

- Auto-ignition temperature
  - Lowest temperature at which spontaneous combustion of a product begins in the absence of any flame or spark.
  - Example: Diesel has an auto-ignition temperature of 257°C, thus, it will not ignite by itself at ambient temperature.



29

Basic Notions of Chemistry

- Explosibility - Sensitivity to electrostatic discharges
  - Indicates whether there is a risk of explosion in case of static discharges. If so, grounding may be required.
  - Gasoline accumulates electric charges when stirred, flowing through pipes, or when transferred from one container to another.

30

Basic Notions of Chemistry

- Combustion by-products
  - Chemical products emitted in smoke when a substance burns may present certain risks. (Ex.: carbon monoxide, cyanide, etc.)
- Fire extinguishing
  - Type(s) of fire extinguishers (A, B, C, D, etc.) or extinguishing agents (water, carbon dioxide, dry chemicals, foam, etc.) used to fight a fire.

31

Chemical Reactions

- Incompatibility
  - Two (2) incompatible substances, when mixed, may cause
    - a fire
    - an explosion
    - a violent reaction
  - Or release
    - heat
    - toxic vapours

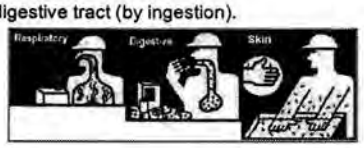
Ex.: Javex bleach & acids are incompatible; mixing them together will cause the release of toxic chlorine vapours.

32

Toxicity of Chemicals

- Absorption pathways

  Contact → Absorption → Effect
- 3 pathways into the organism
  - respiratory tract (by inhalation);
  - skin (by absorption);
  - digestive tract (by ingestion).



33

Toxic Effects

- Contact → Absorption → Effect
  - Acute effects
    - Symptoms appear within a relatively short period of time (minutes, hours, day), following exposure to a substance.
  - Chronic effects
    - Symptoms appear after a relatively long period of time (after several months or years), following repeated or prolonged exposure to a substance.

34

Personal Protective Equipment (PPE)

- When handling hazardous chemicals, always wear:
  - Safety glass
  - Protective gloves (Neoprene, latex, PVC)
- For respiration protection:
  - Wear an organic vapour mask for volatile compounds (Ex.: Solvent)
  - Wear a dust mask when working with light particles such as sandblast

35

Material Safety Data Sheet (MSDS)

- The hazard associated with a waste product can be determined by referring to the Material Safety Data Sheet (MSDS) of the original product .
  - 1. Product identification and use
  - 2. Hazardous ingredients
  - 3. Physical and chemical properties
  - 4. Fire and explosion hazards
  - 5. Stability and reactivity
  - 6. Toxicological information
  - 7. Preventive measures
  - 8. First aid measures
  - 9. Company information

36

Material Safety Data Sheet (MSDS)

- Most of the MSDS will indicate the regulatory requirements for labelling and transport
  - Ex : Varsol (solvent used for cleaning parts)
    - Class 3 (flammable liquid)
    - UN1268
- Make sure to request MSDS from supplier every time you order a new chemical

37

(fire dept.) (Inventory)
Safety personnel → have list of all chem. products in community & should have MSDS of each chem.

Part 4

Hazardous Waste
Regulatory Requirements

38

Identification and Tracking of HW in Storage and shipping

- 3 regulations will apply:
  - Regulation respecting Hazardous materials (Québec)
  - Transport of Dangerous Goods (TDG) (Canada)
  - Code for the maritime transport of a dangerous goods (IMDG code) (international)

39

Identification and Tracking of HW Regulatory Requirements

- Regulation respecting Hazardous materials (Québec)
  - Waste codification and identification
  - Storage requirements
  - Inventory and report
  - Spill or environmental accident reporting
  - Contract with disposal facility
  - Use of waste oil for heating

40

Inventory: every 3 months

Regulation respecting Hazardous materials (Québec)

- Waste codification
  - Appendix 4 - Categories of hazardous waste
    - A01 Waste oil with PCB = 3 mg/kg
    - A02 Waste oil with PCB = 3mg/kg = 50 mg/kg
    - A03 Oily water
    - A04 Grease
    - B04 Oily sludge
    - C02 Flammable solvent (acetone, Varsol, etc)
    - D01 Waste antifreeze
    - E15 Vehicle batteries (lead)
    - E16 Small batteries
    - L02 Contaminated drums and containers
    - O01 Contaminated soil

41

Regulation respecting Hazardous materials (Québec)

- Hazardous waste - Storage requirements
  - A shelter used for the storage of HW must:
    - Be identified with a placard for categories and emergency number
    - Protected on, at least, 3 sides
    - Floor must be sealed and impermeable
      - No drain, spill containment (25% of the total volume)
    - Accessible in case of emergency
    - Inspection every 3 months with a register
    - Label on each drum with:
      - Type of HW
      - Provincial code
      - Date of storage

42

Regulation respecting Hazardous materials (Québec)

- Hazardous waste - Storage requirements
  - Containers for HW storage


43

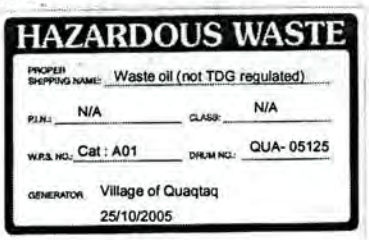
Regulation respecting Hazardous materials (Québec)

- Some important considerations for the setup of a HW storage site:
  - Away from:
    - Any sensitive area such as school, health care center, daycare
    - Sewer, stream, lake
    - The topography of the land should be such as to avoid any spill reaching an aquatic environment

44

Regulation respecting Hazardous materials (Québec)

- Hazardous waste - Storage requirements
  - Labels



45

Regulation respecting Hazardous materials (Québec)

46

Regulation respecting Hazardous materials (Québec)

- Inventory and report
  - Inventory of hazardous waste with an update every 3 months
    - Codification
    - Quantity stored at the end of the period
    - Quantity disposed, treated or processed
    - Information kept with the generator site for 2 years

	Storage Log					Shipping Log				
Identification	Transfer Date			Type of containers	Weight	Shipping Date			Manifest No.	Destination
	YY	MM	DD			YY	MM	DD		
J 0 1	05	05	14	Drums	200 kg	05	10	25	A-12345	Cinyx

47

an extra column for provincial code

Hazardous Waste Annual Report							
Prepared by :	Year _____						
Categories of hazardous waste	Code RMD	Quantity (kg) stored 1 January	Quantity (kg) stored 31 December	Quantity (kg) disposed during year per consignee 1	2	3	Total Disposed (kg)
Used oil	A01						
Oily water	A03						
Paint	D02						
Solvents	H12						
Acid	C01						
Caustic	H11						
Batteries (lead)	E15						
Small batteries	E16						
Contaminated soil	E04						
Waste fuel and gasoline	H48						
Laboratory waste	E07						
Aerosol	L02						
Waste antifreeze	D01						
Glue	D02						
	Consignee 1	Consignee 2		Consignee 3			

48

Report should be done every year (April) to be given to: Minister of ENV.

Regulation respecting Hazardous materials (Québec)

- Spill or environmental accident reporting
  - Article 9
    - Minister needs to be advised immediately in case of a spill that may affect environment
    - The owner must take action to limit the impact of the spill
  - Article 11
    - A contract must be signed between the disposal facility and the waste generator
  - Use of waste oil in furnace

49

Regulation respecting Hazardous material (Quebec)

- Use of waste oil for furnace heating
  - For Nunavik, a furnace needs at least 3 MW and should respect quality criteria from appendix 6

Parameters	Limit (mg/kg)
Arsenic	5
Cadmium	2
Chrome	10
Lead	50
Chlorinated agent	1500
PCB	3
Flash Point	> 38 °C
Water content	< 20 %
Sulfur	< 1.5 %

50

Regulation respecting Hazardous materials (Québec)

Waste oil burners

Reuse the waste oil as heating fuel for the municipal garage
Company Clean Burn
1-800-824-4115

Part 5

Transport of Dangerous Goods (TDG)

52

Transport Canada regulation

Specific Objectives

- Following Part 5, the participant will be able to:
  - Understand the following terms:
    - Shipping name;
    - UN number;
    - Primary class, subsidiary class;
    - Packing group.
  - Classify dangerous goods

53

Classification

- The term "classification" means, for dangerous goods, as applicable,
  - The shipping name;
  - The primary class;
  - The compatibility group;
  - The subsidiary class;
  - The UN Number;
  - The packing group; and
  - The risk group.

54

Transport des Marchandises Dangereuses

GUIDE DE CLASSIFICATION

CLASSE 1 Explosifs

1.1 - Explosion en masse
1.2 - Risques de projection
1.3 - Risques d'incendie

1.4 - Pas de risques notables

1.5 - Matières très peu sensibles avec risque d'explosion en masse

1.6 - Objets extrêmement peu sensibles sans risque d'explosion en masse

** - Indiquer la division
* - Indiquer le groupe de compatibilité

* - Indiquer le groupe de compatibilité

CLASSE 2 Gaz

2.1 - Gaz inflammables

2.2 - Gaz ininflammables, non toxiques

2.3 - Gaz toxiques

GAZ COMBURANTS
UN1072
UN1073
UN3156
UN3157

CLASSE 3 Liquides inflammables

CLASSE 4

4.1 - Solides inflammables

4.2 - Matières sujettes à l'inflammation spontanée

4.3 - Matières qui, au contact de l'eau, dégagent des gaz inflammables, hydroréactives

CLASSE 5

5.1 - Matières comburantes

5.2 - Peroxydes organiques

CLASSE 6

6.1 - Matières toxiques

6.2 - Matières infectieuses (Étiquette)

6.2 - Matières infectieuses (Plaque)

CLASSE 7 Matières radioactives

(Étiquettes)

(Plaque)

CLASSE 8 Matières corrosives

CLASSE 9 Machandises dangereuses diverses

Produits, matières ou organismes divers

Groupes d'emballage

I Danger élevé
II Danger moyen
III Danger faible

PLAQUE
"Chargement mixte"

Manières d'apposer le numéro UN

Étiquette

ou

UN1203

Plaque

ou

Autres marques

Marque de polluant marin

Signe pour le transport à température élevée

Signe de fumigation

Étiquettes de manutention

Classification

- How to find the chemical components of a commercial product
  - Use MSDS (WHMIS reference)
  - Use information provided by supplier

55

Classification

- Example of the classification of a commercial product
  - Varsol (thinner)
    - Shipping name : PETROLEUM DISTILLATES, N.O.S. (Varsol)
    - UN 1268
    - Class 3
    - PG III

56

Classification

- 2.7 A substance is a marine pollutant if...
  - letter "P" or "PP" column 10, Schedule 1
  - Listed in Appendix 1, Part 2
  - Identified as a marine pollutant in the IMDG Code

  A mixture or a solution is a marine pollutant if it contains...
  - 1% of a severe marine pollutant (PP), or
  - 10% of a marine pollutant (P)

  Potential marine pollutant "•" column 10, Schedule 1

57

Classification

- Assignment of packing groups for classes 3, 4, 5.1, 6.1, 8 and 9
- Packing group I - Great Danger
- Packing group II - Moderate Danger
- Packing group III - Minor Danger

58

Class 2

- Gases, have 3 divisions :
  - 2.1 : Flammable gases (*e.g.*, propane)
  - 2.2 : Non-flammable and non-toxic gases
  - 2.3 : Toxic gases

59

Class 2

- Oxidizing Gases
  - OXYGEN, COMPRESSED (UN 1072)
  - OXYGEN REFRIGERATED LIQUID (UN 1073)
  - COMPRESSED GAS OXIDIZING, N.O.S. (UN 3156)
  - LIQUIFIED GAS, OXIDIZING, N.O.S. (UN 3157)

60

Class 3

- Flammable liquids (*e.g.*, diesel, gasoline)

61

Class 3

- A liquid with a flash point less than or equal to 60.5°C (closed-cup test method).
- A liquid is not considered flammable if:
  - It has a flash point greater than 35°C and does not sustain combustion;
  - It has a fire point greater than 100°C;
  - Is a water-miscible solution (water content greater than 90% by mass).

62

Class 3

- Packing Groups

Packing Groups	Flash Point (°C)	Boiling Point (°C)
I	---	≤ 35°C
II	< 23° C	> 35°C
III	23°C ≤ *x* ≤ 60.5°C	> 35°C

63

Class 4

- Class 4.1 : Flammable Solids (*e.g.*, matches)

64

Class 4

- Class 4.2 : Substances Liable to Spontaneous Combustion (*e.g.*, oily cotton rags)

65

Class 4

- Class 4.3 : Water-reactive Substances (*e.g.*, lithium, magnesium)
  - Check column 7 of Schedule 1 or 3 to determine if substances are subjected to an ERAP index in the new Regulations

66

Class 6

- Class 6.1 : Toxic Substances (*e.g.*, arsenic, cyanide)
  - Label and placard of PG III eliminated;
  - Method used to calculate the toxicity of mixtures has been revised.

67

Class 7

68

Class 8

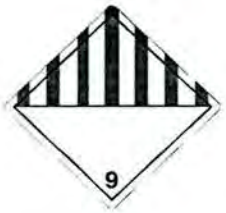
- Corrosives
  - Substances known to destroy the epidermis, living tissue and/or accelerate the corrosion of certain metals.

(*e.g.*, sulphuric acid)

69

Class 9

- Miscellaneous Dangerous Goods



70

ex. contaminated soils

Marine Pollutant

- Identification of marine pollutants

71

Chapter 2.10

- Marine Pollutants
  - "A marine pollutant is a substance which can bio-accumulate in food and marine organisms or which presents a high degree of toxicity for aquatic life"

72

Chapter 2.10

- Marine Pollutants (continued)
  - Marine pollutants identified by the letter "P" in column "PM" of the index (Volume 2) or in column 4 of the List of Dangerous Goods
  - Marine pollutants which present extremely high hazard levels (severe risk) are identified by "PP".
  - The symbol "•" indicates an N.O.S. substance which contains products considered marine pollutants
  - A substance which contains 10% or more of a marine pollutant ("P") is considered a marine pollutant

73

Chapter 2.10

- Marine Pollutants (continued)
  - A substance which contains 1% or more of a severe marine pollutant ("PP") is considered a marine pollutant
  - A substance which meets none of the hazard criteria listed for classes 1 to 8 but which contains either 1% of a severe marine pollutant or 10% of a marine pollutant must be identified as follows:
    - "Environmentally Hazardous Substance, solid (or liquid, accordingly), N.O.S." and becomes a Class 9 substance
      - *e.g.*, PCB contaminated absorbent material

74

Part 6

Documentation

75

Documentation

- Consignor responsibilities

  Article 3.1

  - Must prepare and give to the carrier a shipping document that contains the information required by these Regulations.

  An electronic copy of the document may be provided.

76

Documentation

- What information is required on a shipping document?

  Article 3.5

  - Name and address of the consignor
  - Date prepared or transferred to carrier
  - Description of the dangerous goods :
    - Shipping name (technical name, if required);
    - Class;
    - If explosives, compatibility group letter;
    - Subsidiary class, in parentheses, if applicable;
    - UN number;
    - Packing group;
    - If infectious substances, risk group.

77

Documentation

- A few examples of product information on the shipping document…

  Article 3.5

  - GASOLINE, Class 3, UN 1203, II
  - FLAMMABLE LIQUIDS, N.O.S. (hexane), Class 3, UN 1993, II
  - ISOBUTYLAMINE, Class 3 (8), UN 1214, II

78

Use Emergency Response Handbook to find UN # (ID #) (Blue pgs)

Documentation

- Other information to be provided on the shipping document…
  Article 3.5
  - Quantity (metric).
  - If small means of containment, indicate number.
  - The words « 24-hour number » and the telephone number where the consignor can be reached
  - CANUTEC's number if the product is registered.
  - If the means of containment is empty (less than 10 % of the maximum fill limit), the words « Residue - Last Contained » followed by the shipping name of the dangerous goods must be shown on the means of containment.

79

Documentation

- Other information…
  Article 3.6
  - If required, reference number of the emergency response assistance plan (ERP, ERAP or PIU);
  - Marine transportation
    - Flash point (Class 3)
    - Marine pollutant, if required.
  - Conserve documents for 2 years (article 3.11)

  In the case of multiple deliveries, the information on the shipping document must be adjusted for every change in quantity

80

Part 7

Identification of Hazardous Materials for Transport

81

Safety Marks

- The consignor is responsible for…
  Article 4.4
  - Displaying the required safety marks on each small means of containment or on a large means of containment.
  - Providing the carrier with the safety marks (placards), except if:
    - they are already displayed on a large means of containment;
    - are not the correct ones to display because of the presence of other dangerous goods in the large means of containment.

82

Safety Marks

- The carrier is responsible for…
  Article 4.5
  - Ensuring that the required dangerous goods safety marks remain displayed on the small means of containment in transport;
  - Displaying the required dangerous goods safety marks on the large means of containment;
  - Providing and displaying, or removing, the dangerous goods safety marks if the requirements change while the dangerous goods are in transport.

83

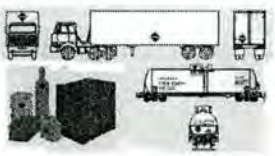
Safety Marks

- Label and placard figures and norms (article 4.6)
  - Colours – refer to article 4.6 c) (i)
  - Dimensions
    - labels (100 mm X 100 mm);
    - placards (250 mm x 250 mm).
- When to display
  - Immediately before the loading of the shipment

84

Safety Marks

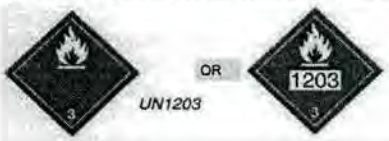
- How to display
  - Against a background of contrasting colour
  - As a square on a point
  - Single location on small means of containment (except Cl.7)
  - All 4 sides on a large means of containment



85

Safety Marks

- Displaying information on small means of containment
  - Shipping name
    - Next to the primary class label;
    - Technical name (primary class) in parentheses (special provision 16).
  - UN number, 2 possible ways to display
    - Close to the label (with the prefix UN) or;
    - In a white rectangle, inside the label (without the prefix UN).



UN1203

86

Safety Marks

- Displaying information on a small means of containment

87

Safety Marks

- Remember…
  - For marine transport…
    - The flash point must be indicated on the means of containment for Class 3 dangerous goods (next to the shipping name)
    - If the dangerous good is a marine pollutant, display the label on the means of containment (next to the primary or subsidiary class)

88

Safety Marks

- When can the labels and placards be removed?
  - When the small means of containment has been cleaned or purged;
  - When all the dangerous goods have been unloaded from the large means of containment.

89

Safety Marks

- In the case of a compartmentalized large means of containment
  - The placards and the UN number must be displayed:
    - On each side of each compartment;
    - On each end of the compartment, for all products.
  - If the products are Class 3 Flammable Liquids, only the UN number of the product with the lowest flash point must be displayed.

90

Safety Marks

- Marine pollutant mark
  - Not required if in a small means of containment and:
    - Quantity less than 5 L (liquid) or 5 kg (solid) for a marine pollutant;
    - Quantity less than 500 ml (liquid) or 500 g (solid) for a severe marine pollutant;

91

Single Packaging

92

Combination Packaging

93

Overpack

94

Inner Packagings

95

Outer Packaging (4G)

96

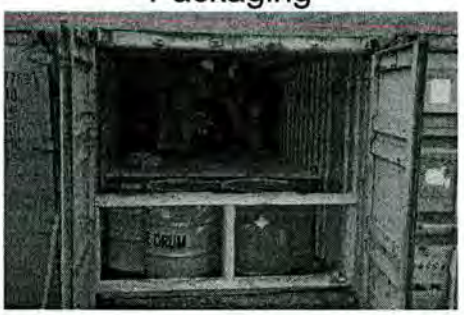
Intermediate Bulk Container (IBC)

97

Salvage Drum

98

Packaging



99

Packaging

100

101

IMO Shipping Document

102

EXERCISES

PART 1 – Hazardous Waste in your Community

1.1 Are rechargeable batteries considered hazardous waste? And why?

Yes. Lead & acid.

1.2 How is waste oil generated?

Mechanical work - vehicles.

1.3 What is the hazard associated with a spray paint can?

Explosive. Aerosol → air pollution.

1.4 Why are empty drums and containers considered hazardous waste?

Residue oil / waste

PART 2 – Potential risks and hazards associated with hazardous waste

2.1 What will create more contamination a spill or leakage?

2.2 What is secondary containment? And give an example.

2nd level of protection. Reduce speed of spill

Spill containment @ airport? KRG transport
Air Init / FCNR

EXERCISES

PART 3 – Chemical hazards

3.1 Is gasoline a liquid or a gas?

Liquid

3.2 Why does waste oil float on water?

Lower density

3.3 What is more corrosive, an acid or an alkaline (caustic) product?

depends the PH

3.4 Is cancer an acute or a chronic effect of exposure to a contaminant?

PART 5 – Transport of Dangerous Goods

5.1 What is the difference between these 2 HW labels?

Class 2

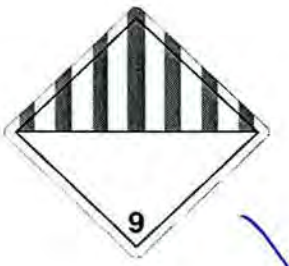
Class 3

Gas

Liquid

EXERCISES

5.2 Join the labels (left) to the proper type of hazard (right)



A) Flammable gas

B) Oxydizing gas

C) Corrosive

D) Flammable solid

E) Miscellaneous Dangerous Goods

F) Substances liable to spontaneous combustion

PART 7 - Identification of Hazardous Materials for Transport

What is the difference between a label and a placard? Where would you place both these marks?

_____

_____

How many labels are required on a drum? _____

How many placards are required on a marine container? _____

In what situation is a salvage drum used?

_____

Consultation
Service
Formation
en environnement

3333, Queen Mary, Bureau 580
Montréal (Québec) H3V 1A2
Téléphone : 514.940.1230
Télécopieur : 514.940.3435
www.stabilis.ca
info@stabilis.ca

Stabilis

KATIVIK REGIONAL GOVERNMENT

WASTE MANAGEMENT TRAINING PROGRAM

Presented to :

Kativik Regional Government

November 30th, 2009

Stabilis

INTRODUCTION

The issue of hazardous waste management and disposal is an acute environmental concern in northern and isolated communities. While the issue is often pressing, the tools and knowledge that are necessary to ensure that hazardous waste does not pose a threat to the environment are not always mastered at the local level. The Hazardous Waste Management Training Program was instituted by Kativik Regional Government (KRG) in order to solve this problem and empower local managers and decision makers to properly and safely manage the hazardous waste produced by municipal operations.

The process of safe hazardous waste management involves many components, including inventorying, proper packaging, identification, labelling and disposal of the waste.

Training was provided to available municipal employees in the fourteen (14) communities of Nunavik. Training sessions were scheduled to last eight (8) hours, including 4 hours of theoretical, in-class training and 4 hours of practical training. In-class training comprised the following sections :

- Types of hazardous waste often encountered in northern communities;
- Risks associated with hazardous waste (health & safety, property damage, environmental);
- Risk prevention and source removal;
- Provincial regulations regarding hazardous waste : storage, identification and packaging;
- Federal regulations regarding hazardous waste : transport, identification and packaging;
- Spill response procedures.

Field training involved basic inventorying and sampling of the waste, packaging, labelling and shipping procedures.

The training team was comprised of Philippe Alary-Paquette, trainer from Stabilis Inc., and Eli Angiyou, environmental technician at KRG. Most topics and technical demonstrations were covered by Philippe Alary-Paquette, while Eli Angiyou was responsible for teaching the spill response procedures. The 14 northern villages were visited between September 21st, 2009, and October 30th, 2009.

The following report is a day-to-day report of the trainers' visits to the various communities. Although it was not specifically required by our mandate, a basic assessment of the waste management situation was made for every community and recommendations are made accordingly, in order to improve hazardous waste management for that community. When possible, pictures of the current waste management practises were taken and attached to the present report, in Appendix 1. Appendix 2 lists disposal options for hazardous waste coming from northern communities. Finally, the list of the participants who took part in the training sessions is provided in Appendix 3.

Stabilis

MONDAY, SEPT. 21ST

- FA flight slightly late. Arrival to **Kuujjuak** before noon;
- Afternoon : class session, then drove around main waste storage sites with Nancy Dea (KRG Project Coordinator, Abandoned Mineral Exploration Site Rehabilitation);
- Attendance : 8 people. Group interesting and interested in the course.

TUESDAY, SEPT. 22ND

- Field part of the training in **Kuujjuak**;
- Morning : mostly barrel sampling, some labelling and very basic inventorying of waste. Location : garage;
- Afternoon : demonstrations of spill kit and waste wranglers, filling of battery wrangler near garage. More barrel sampling behind garage, at dump and at the used oil storage site (for future incineration);
- Findings :
    - Garage :
        - pretty good used oil segregation. Mention of a project to install more waste drums indoors to segregate all types of waste in separate drums.
        - Storage of hazardous waste is not centralized.
        - One leaking drum found at the back of garage.
    - Used oil storage site : still lots of sampling to do to ensure that drums contain waste oil. We found at least 2 drums that were filled with waste water.
    - Dump : burning was taking place on Monday, while wind was blowing smoke towards the community. Some barrels of waste oil, waste antifreeze, waste water, etc. were at the dump site, probably left there while site was unattended.
    - Amount of waste stored :

- Roughly 200 barrels at Hydro-Quebec site. Many other barrel caches (FCNQ, garage, dump, etc.) Estimate of maybe 150 barrels scattered in those scattered caches. Presence of other storage sites that were not visited is possible;
- Batteries : Filled on Quatrex bag in plywood shelter. Other batteries remained, maybe for one or two other bags. Presence of other battery storage sites is possible.

- **Recommendations :**
  - Go forward with the waste segregation project in garage;
  - Build shelter or use marine containers for storage of hazardous waste. If impossible, at least make sure that drums are mounted on pallets to prevent rusting;
  - Centralize storage of hazardous waste;
  - Transfer contents of leaking/damaged/non-compliant drums into other drums or insert in salvage drums;
  - Sample all drums destined to incineration to segregate waste oil from other types of waste;
  - Avoid trash burning when wind is blowing towards community;
  - Keep having a guardian at the dump as often as possible to prevent illegal disposal of hazardous waste at the dump. When dump is unguarded, close gate to prevent access.
  - Finish waste inventory, repackaging, labelling and manifesting. When budget available, ship for disposal or reuse.

WEDNESDAY, SEPT. 23RD

- Day spent in **Kuujjuak**. No room on the plane to Aupaluk in early afternoon, we took the evening flight. Arrival in **Aupaluk** around 19h30.

Stabilis

THURSDAY, SEPT. 24TH

- Training in **Aupaluk**. Due to limited number of municipal workers, NV Municipal Manager asked that the training to be shortened. In-class training : 10h00-12h00. Field training : 15h30-17h30.
- Good participation and interest during field training.
- Findings :
    - Storage of hazardous waste is well centralized, next to municipal garage;
    - Many heavily rusting barrels, some already leaking. Almost all barrels are directly on the ground. Many spill spots on the ground, including a very important one coming from the biggest pile of barrels;
    - Found some new-looking oil and new-looking varsol in rusty barrels stored outside;
    - Amount of waste stored :
        - Roughly 50-75 barrels at main storage site. Very few other barrel caches;
        - Batteries : currently stored in garage. Roughly the equivalent of 1.5-2 Quatrex bags.

- **Recommendations :**
    - Bring new products inside garage and use them when possible;
    - Urgent need for empty barrels in good condition, to transfer the contents of those that are currently rusting outside;
    - Build simple shelter or purchase marine containers for better waste storage; if impossible, start by installing all barrels on pallets so that they no longer are in direct contact with the ground;
    - Finish waste inventory, repackaging, labelling and manifesting. When budget available, ship for disposal or reuse.

FRIDAY, SEPT. 25TH

- Office day in **Kuujjuak**, preparation for the Greenhouse Gas (GHG) Inventory Project meeting in morning, meeting in early afternoon, then debriefing and drafting of trip report;
- Travel to Mtl, departure at 21h00, arrival at 11h00.

MONDAY, SEPT. 28TH

- Travel day, departure from Mtl at 8h00, arrival in Kuujuak at about 10h30, left Kuujjuak at 14h00, arrived in **Kangiqsujuaq** in late afternoon.

TUESDAY, SEPT 29TH

- Training day in **Kangiqsujuaq**. Attendance of 9 students. About half of them very interested in the course and in the possibilities of improvement to the management of hazardous waste in the community.
- Hazardous waste storage situation :
    - Most waste stored at outdoor site at the outer limit of the community;
    - Two stacks of barrels, most of them with no reference as to their contents. Some lay directly on the ground, others are placed on pallets;
    - Some barrels are badly rusted, some badly dented. At least 4-5 of them are already leaking, with traces of hydrocarbons at the base of the pile;
    - No possibility to inspect barrels on the inside of the pile. Possibility of more spills;
    - Two barrels, on top layer, are open-top with no lid, completely open to precipitations. Were not sampled during training, contents unknown but seems to be wastewater. One had what looks like excrements floating at surface;
    - Presence of a sewage truck, a large excavator and a large bulldozer. Not drained of all liquids (signs of leaks beneath all three of them);

- Barrels that were sampled during training all contained mixed products;
- Amount of waste stored :
  - Roughly 150 barrels at main storage site. Some small barrel caches elsewhere;
  - Batteries : no inventory has been made, found some scattered ones but no main storage site.

- **Recommendations :**
  - Improve waste segregation at the source. Would greatly enhance potential for waste oil incineration, and would also reduce costs of disposal;
  - Transfer contents of leaking or about-to-leak barrels into ones in better condition;
  - Use of marine containers could allow for better waste storage. If impossible, install all barrels on pallets to avoid direct contact with the ground;
  - Change configuration of barrel pile so that it is possible to visually inspect all barrels it contains;
  - Drain old vehicles of all liquids;
  - Finish waste inventory, repackaging, labelling and manifesting. When budget available, ship for disposal or reuse.
  - One of the students (Peter Arngak) mentioned possibility to use ATV & Skidoo maintenance garage that is about to be abandoned for storage of hazardous waste and to set up a dropping point for household hazardous waste. ATV & Skidoo maintenance activities are about to be moved to another garage that has just been built. Visited the "old" building at the end of the field session, and it could definitely be suitable for those purposes. Not very big, but the most dangerous waste could be stored there to be sheltered from adverse weather, and a simple drop-off facility could be designed inside of it. Would improve the current situation. Floor is made of concrete.

- See Appendix 1 : pictures.

Stabilis

WEDNESDAY, SEPTEMBER 30TH

- Travel & training day. Left Kangiqsujuaq at 9h35, arrived at hotel in **Quaqtaq** at around 10h20. Neither NV nor students were ready to begin training, which could only be started at 13h00. Students were not interested in staying later than 17h00;
- Attendance : 11 people. Constant comments from garage employee (Willy), complaining that labels and packaging equipment was not provided. Took some time during in-class session;
- Wrapped theory by 15h30, then left for garage. Field session was very short but went well nevertheless;
- Findings :
    - Hazardous waste somewhat scattered on garage lot;
    - We had very limited time to sample the waste but I got the impression that it is already quite well segregated. Found some barrels with homogenous contents;
    - Found very little signs of leaks or spills. Found one barrel lying on the side with a hole in it. Recommended to pump contents into other barrel;
    - Garage employees told me that they already have some inventory made of their waste. They sent a full seacan last year (mixed contents, not packaged properly but shipping company took it nonetheless). Following the comments of the shipping company, they started some inventory and waste management;
    - Some barrels are in direct contact with the ground;
    - Estimate of amount of waste :
        - Roughly 50-75 barrels at the garage. Maybe more in other locations, but we did not have time to go around the community;
        - Batteries : equivalent of two Quatrex bags stored in seacan. Maybe more in other locations.

- **Recommendations :**
  - Clarification of NV's responsibility for purchasing of labels & packaging seemed pertinent during class training;
  - Finish inventory of the waste in the community, repackaging, labelling and manifesting. When budget available, ship for disposal or reuse;
  - Improve waste segregation at the source. Would greatly enhance potential for waste oil incineration, and would also reduce costs of disposal;
  - Transfer contents of leaking or about-to-leak barrels into ones in better condition;
  - Purchase of seacans could allow for better waste storage. If impossible, install all barrels on pallets to avoid direct contact with the ground;

- See Appendix 1 : pictures.

THURSDAY, OCT. 1ST

- Travel and training day. Arrived in **Kangirsuk** in late morning, went directly to municipal office to set up in-class training and make photocopies for student material;
- Many trainees showed up, and lasted a full 4 hours. Went well.

FRIDAY, OCT. 2ND

- Field training day in **Kangirsuk**. Waste vehicle battery packaging & labelling, filled a true shipping document for this wrangler. Also some barrel sampling.
- Findings :
  - Garage people already sort their waste very well. Barrels inside garage each contained only one kind of waste;
  - Waste storage : somewhat scattered around community, many barrels laying directly on the ground;

- Main barrel storage area has already been sorted by KRG and the MDDEP (Quebec Ministry of Environment), although new waste being brought in is not identified;
- Found some barrels with holes & leaking;
- Estimate of amount of waste :
  - Roughly 150 barrels, one main storage location but other scattered barrel caches as well;
  - Batteries : one filled quatrex bag, maybe one or two others could be filled.

- **Recommendations** :
  - Finish inventory of the waste in the community, repackaging, labelling and manifesting. When budget available, ship for disposal or reuse;
  - Transfer contents of leaking or about-to-leak barrels into ones in better condition;
  - Install all barrels on pallets to avoid direct contact with the ground. When possible, set up proper shelter.

MONDAY, OCTOBER 5TH

- Travel day. Arrival in **Salluit** in late afternoon. No room at hotel, slept in private house (Annie Alaku's);

TUESDAY, OCTOBER 6TH

- Training day in **Salluit** (in-class and field. Many trainees showed up. Among them, Michael Cameron, current fire chief and former mayor, is a major asset. Lead a hazwaste shipping campaign a few years ago. Already knowledgeable in hazwaste management and very interested in learning more;
- Field session : went well, very little waste to be managed since lots of it has already been sent out and Salluit already has a used oil incinerator;

- Findings :
    - Garage : waste oil all goes in a one single tank for future incineration. Some barrels are present in garage, one contains only waste antifreeze and three others contain mixes (used oil, water, antifreeze, grease);
    - Few barrels outside garage (around 8). Some contain only one type of waste, others contain new products, others mixed waste. All have been identified with their contents; people already sort their waste very well. Barrels inside garage each contained only one kind of waste;
    - Waste vehicle batteries are stored in fridges and freezers, themselves inside marine container along with waste tires. Location : garage lot. Approx 5 fridges full of batteries. We filled one Quatrex full of batteries;
    - Found no leaky barrels;
    - All waste on garage lot or in garage;
    - Estimate of amount of waste :
        - Roughly 10 barrels, all either inside garage or on garage lot;
        - Batteries : one filled quatrex bag, maybe two or three others could be filled;
        - Fridges and freezers : approx. 5-6.

- **Recommendations** :
    - Finish complete community waste inventory;
    - Set up a habit to ship waste out regularly;
    - See if incinerator has capacity to accept more used oil, from other communities. May become revenue.
    - Otherwise, keep up the good work.

WEDNESDAY, OCTOBER 7TH

- Travel and training day. Left Salluit at 8h30, arrived in **Tasiujaq** at 13h30. Training started at 15h00, went well but finished at 17h00. First and only community where the presentation needed to be translated in Inuktitut.

THURSDAY, OCTOBER 8TH

- Returned to class training at 9h00. Finished contents in roughly one hour, then went straight to field training;
- Findings :
    - Most sampled drums contained mixed flammable liquids. Presence of all types of liquid waste (waste water & waste antifreeze, waste oil, waste fuel/gasoline, waste varsol…). Seems like waste is never segregated in garage;
    - Waste storage: scattered around community, barrels lay in many places. Many houses have a few barrels close by (were not checked to see if they were full or empty);
    - Two garages in town. One has limited amounts of waste (see pictures), main garage has main waste storage area. Most drums stored directly on the ground;
    - Found some barrels with holes & leaking;
    - Estimate of amount of waste :
        - Roughly 100 barrels overall, one main storage location but other scattered barrel caches as well;
        - Batteries : one filled quatrex bag, not very many others;
        - Empty gas cylinders : at least 20-25.

- **Recommendations** :
    - Implement waste segregation procedures;
    - Inventory all waste in the community, repackage and label. When budget available, ship for disposal or reuse;

- Transfer contents of leaking or about-to-leak barrels into ones in better condition;
- Install all barrels on pallets to avoid direct contact with the ground. When possible, set up proper shelter;

- See Appendix 1 : pictures.

FRIDAY, OCTOBER 9TH

- Class & field training on the same day in **Kangiqsuallujjuaq**;
- Findings :
  - Clean community. Waste storage is centralized at garage;
  - Waste already very well managed. Regular shipments (once every 2-3 years) and very little amounts of waste stored in community;
  - NV uses Quatrex marine container for storage and shipment of waste. Came back every time they used it;
  - Waste segregation is very effective. In garage, many drums are at the disposal of mechanics and sorting is done. Some drums contained small amounts of waste antifreeze but could be inevitable due to broken engines;
  - Found 4 Quatrex battery wranglers that were delivered a few years ago. Cardboard sidewalls & pad are saturated with water and could not be used, but the rest of the bags is intact. Mechanics will make plywood sidings;
  - Found no leaky or badly damaged barrels;
  - KRG signs were set up at dump. Poses risk that some hazardous waste ends up being burned by mistake with the rest of the waste, especially waste paint and waste batteries;
  - Estimate of amount of waste :
    - Roughly 20 barrels overall, all stored either indoors or in marine container;
    - Batteries : one filled quatrex bag, possibility to fill one or two more;
    - Empty gas cylinders : maybe 10.

- **Recommendations** :
  - Kangiqsuallujuaq could be used as an example for other communities;
  - Inventorying of waste could be completed;
  - Set up hazardous waste drop-off point elsewhere than at the dump, so as to reduce the risk that some hazardous waste ends up being burned with the rest of the trash (especially for waste paint, waste batteries and liquid waste). For example, signs could be placed at the garage;
  - Keep up the good work;

- See Appendix 1 : pictures.

MONDAY, OCTOBER 19TH

- Travel & training day. Arrived in **Inukjuak** around 1:00PM, class training started around 2:30PM;
- 4 trainees, all others could not come. Afternoon training went well but decided to give about one hour of class training on the following day for the trainees that did not attend Monday class.

TUESDAY, OCTOBER 20TH

- Class training started around 9h20, until 10h30. Then went on to field session. 6 trainees attended;
- Findings :
  - Quite clean community;
  - Used oil : Have had a used oil furnace for a number of years . Very good at segregating their waste, at least used oil. They already ship south what they cannot burn. Water, antifreeze and sludge collected from used oil by decantation and shipped south for disposal;
  - Barrels are almost all stored indoors (next to furnace, in old community garage);

- Batteries : almost all stored in Quatrex marine container, next to new community garage, in crates and plastic barrels. Some have been retrieved from community dump, half burned… Marine container is almost full, would be time to ship south.
- Small batteries : mention of an existing battery collection spot, but no further information has been obtained
- Estimate of amount of waste :
  - Very limited amounts of liquid waste, roughly 20 barrels overall, almost all stored indoors. Lacked time to sample those stored outdoors, but found some that were not empty close to new garage. Also one pile next to old garage (don't know if full or empty)
  - Batteries : Filled one Quatrex bag, would need at least 10 more to put them all in.
  - Empty gas cylinders : lacked time to count them, but actually never really saw any.
- Employees responsible for waste management have all been employed by NV for many years (same as in George River). Employee stability seems to be key to having good management.

- **Recommendations** :
  - Capacity to accept used oil from other communities?;
  - Inventorying of waste could be completed;
  - Dispose of vehicle batteries.

- See Appendix 1 : pictures.

WEDNESDAY, OCTOBER 21ST

- Training day in **Umiujaq**. Group of 14 with limited interest, except from Noah Inukpuk, NV manager;
- Findings :

- Waste storage : mostly centralized around garage, but very poorly organized. Had difficulty finding barrels of waste, which were mixed in with new products. Many barrels lying directly on the ground. Mechanic did not attend afternoon session;
- Barrel cache near airport (approx 20-25 barrels). Not checked.
- Most sampled drums contained new products, in drums that are rusting away. Those who contained waste contained mixed products;
- Found some barrels with holes & leaking;
- Significant amount of vehicle batteries, some stored outdoors in wooden crates, some in broken and open crates;
- Estimate of amount of waste :
  - Difficult to estimate how many barrels of waste are present in community, since most of the barrels found contained new products and mechanics were not there to orient us. 50 is probably a conservative estimate;
  - Batteries : one filled quatrex bag, possibility of 6-7 others;
  - Empty gas cylinders : found a couple in front of garage.

- **Recommendations** :
  - Inventory all waste in the community, repackage and label. Store properly, away from new products. When budget available, ship for disposal or reuse;
  - Transfer contents of leaking or about-to-leak barrels into ones in better condition;
  - Install all barrels on pallets to avoid direct contact with the ground. When possible, set up proper shelter;

- See Appendix 1 : pictures

THURSDAY, OCTOBER 22ND

- Training day in **Kuujjuaraapik**. Good group, very cheerful & interested;

- Comment on the fact that Desgagnés refused to accept paletted barrels, even if strapped properly. However, we later found out that those barrels were not strapped properly, see below;
- Class training started almost 45 min. late because mechanics, FCNQ and lanholding were not there. Otherwise, went well and we went on to field training;
- Findings :
    - Waste storage : mostly centralized around garage, but not organized;
    - Community tried to send waste oil away this summer, but Desgagnés refused to take it. About 30 barrels, strapped on pallets, waiting by the river in the dock area. Sorting of barrels was done very poorly, some of them are completely empty, others contain one third to one half of their capacity. The strapping itself does not comply with regulatory requirements either. Straps are sometimes loose, sometimes located incorrectly; no wood pieces have been placed to prevent the straps from slipping. Would have to be done over again;
    - Barrel dump near garage also very poorly maintained. Supposed to contain only empty barrels, yet most of them are full and should have been the ones taken to the dock. Large pad of pallets, yet most barrels are lying all around it, directly on the ground. Numerous ones are full. Some of them are full of new products;
    - Most sampled drums contained mixed flammable liquids. Presence of all types of liquid waste (waste water & waste antifreeze, waste oil, waste fuel/gasoline, waste varsol…). Head mechanic (Scott Evans) mentioned that they learned just this year that mixing waste was not good practice. However, even barrels inside garage contain flammable liquids mixed with used oil and antifreeze;
    - Fresh snow covers the ground, hiding spill stains. However, leaky barrels are highly probable;
    - Quatrex marine container is at garage. Used for storing new materials;
    - Estimate of amount of waste :
        - Roughly 100 barrels, counting only those around garage and dock;
        - Batteries : one filled quatrex bag, possibility to fill roughly two other ones;

- Empty gas cylinders : found only a couple, most other have been shipped out in previous years;
- Use the Quatrex container as a depot for hazardous waste rather than a storage unit for new material.

- **Recommendations** :
  - Implement better waste segregation procedures;
  - Inventory all waste in the community, repackage and label. Properly sort barrels around garage and docks. When budget available, ship for disposal or reuse;
  - Transfer contents of leaking or about-to-leak barrels into ones in better condition;
  - Install all barrels on pallets to avoid direct contact with the ground. When possible, set up proper shelter;

- See Appendix 1 : pictures.

FRIDAY, OCTOBER 23RD

- Standby day in Kuujjuaraapik.

MONDAY, OCTOBER 26TH

- Travel & training day in **Akulivik**.
- Training begun around 14h30 due to time of plane arrival. Went well, although time was limited. Mentions and comments during training session make me believe that waste management could be significantly improved in Akulivik (tried to ship waste 2 years ago, was altogether refused by shipping company. Also mentioned that vehicle batteries were dumped in landfill and burned up to a few days ago).

TUESDAY, OCTOBER 27TH

- Field training day in **Akulivik**.
- Findings :
  - Waste storage : mostly centralized around garage, but not organized;
  - Vehicle batteries' management : only 3 batteries that were not yet at the dump… seems like until our coming in this community, batteries were all sent directly to the dump;
  - Sorting of liquid waste in garage : not sorted at all. Filled one drum at a time with all liquid waste produced. Often use plastic drums, unsuitable for mixed flammable liquids. Contents will have to be transferred to metal drums for the shipping company to accept them;
  - Took two empty drums from outside garage to start setting up something more effective. For now only one barrel for all flammable liquids because lacked other empty steel drums;
  - Gas cylinders : found one pallet, but improperly packaged because contains flammable gases and oxygen. Cylinders not properly secured either;
  - Tried to ship out their liquid waste a couple years ago. Transport company refused. Drums were not mounted on pallets, not labelled, not sorted, etc.
  - Barrel dump near garage very poorly maintained. All drums lay directly on the ground, many on their sides. Found one with a hole. Almost all sampled barrels contain mixed flammable liquids, but also found a drum of new varsol and new hydraulic fluid;
  - Fresh snow covers the ground, hiding spill stains. However, leaky barrels are highly probable;
  - Estimate of amount of waste :
    - Roughly 100 barrels, counting only those around garage;
    - Batteries : 3 units. All others have been landfilled or burned;
    - Empty gas cylinders : found only one pallet. Maybe others.

- **Recommendations** :
    - Immediately stop sending batteries to dump;
    - Implement better waste segregation procedures. Add more steel drums in garage, one for every kind of flammable liquids;
    - Inventory all waste in the community, repackage and label. Properly sort barrels around garage and docks. When budget available, ship for disposal or reuse;
    - Transfer contents of leaking or about-to-leak barrels into ones in better condition;
    - Install all barrels on pallets to avoid direct contact with the ground. When possible, set up proper shelter;
    - Presence of many empty open-top drums outside garage. Use some of them to collect vehicle filters, oily rags, oil containers, gas filters, etc.

- See Appendix 1 : pictures.

WEDNESDAY, OCTOBER 28TH

- All day training in **Ivujivik**;
- Morning : training started only around 10:00 because of late attendance;
- Could not cover all material in morning. Many discussions on relevant subjects. Attendees very interested in improving waste management conditions;
- Points mentioned :
    - Drop-off points could be set up at Coop : sales point for batteries and medication, could be practical for customers to bring back their old batteries and spent medication;
    - Availability of drums is a problem. Would appreciate to have shipment of drums, or contact information to buy drums. Concerns about rusting drums in drum yard, mention of spill stains;
    - Mention that POV has a fluorescent tube crusher. Possibility to move it around in all communities year-round? Communities could collect unbroken tubes and hazmat team could properly dispose of tubes.

- Findings during field training :
    - Although great interest during training, situation on the field is in the low average, except for vehicle batteries which are, on average, stored properly;
    - Waste storage : mostly centered around garage but unorganized;
    - Vehicle batteries : mostly stored in Quatrex container. Two battery wranglers already full (poles not covered by duct-tape). Two empty battery wranglers available, and new battery wrangler was filled. Enough batteries to fill at least the two remaining wranglers, and probably a couple more;
    - Presence of 4-5 batteries lying directly on the ground, and frozen there. Not possible to move them inside container without risking to break them and cause a spill of acid;
    - Sorting of waste in garage : non existent, only one barrel for everything. Mechanic (Saima Mark) affirms that garage is not big enough to have more than one drum for liquid waste and that anyways there are not enough empty drums to implement waste segregation in garage. I strongly suggested to find a way to implement those changes;
    - Barrel dump near garage very poorly maintained. According to Saima Mark, some of those drums have been there for 20 years… Many drums are very old, heavily rusted, opened some only to find that they had emptied on the ground. Many drums lay directly on the ground, some on their sides. Many sampled barrels contain mixed flammable liquids, but also found a drum of new varsol and some with very old unused oil. Many barrels show signs of high pressure (rounded tops & bottoms);
    - Fresh snow covers the ground, hiding spill stains. However, many signs of leaky barrels;
    - Estimate of amount of waste :
        - Roughly 40 barrels, counting only those around garage;
        - Batteries : 3 filled Quatrex bags. Possibility to fill at least 2-3 others;
        - Empty gas cylinders : did not see any. Maybe others.

- **Recommendations** :
    - Implement better waste segregation procedures. Add more steel drums in garage, one for every kind of waste;
    - Inventory all waste in the community, repackage and label. Properly sort barrels around garage. When budget available, ship for disposal or reuse;
    - Transfer contents of leaking or about-to-leak barrels into ones in better condition;
    - Immediately install all barrels on pallets to avoid direct contact with the ground. When possible, set up proper shelter;
    - When possible, transfer all vehicle batteries in the available battery wranglers, and use marine container for storage of liquid waste;

- See Appendix 1 : pictures.

THURSDAY, OCTOBER 29TH

- Travel to **POV** and class training in afternoon. Went relatively well, although group was not the one showing the most interest since the beginning of the trip (except for NV municipal manager, Peter Nacartuk, who had worked at Hydro-Qc for 10 years and already knew most of the course material);

FRIDAY, OCTOBER 30TH

- Field training in morning in **POV**;
- Findings :
    - Waste storage : decentralized. Lots of waste around garage (propane cylinders, some drums, batteries, etc. but the main barrel storage area is at the other side of town. Inventory of barrel contents has already been undertaken by NV officials;
    - Vehicle batteries : mostly stored in wooden crates, probably too large to respect the maximum weight for sealift loaders. Will have to be

transferred to other containers. Quatrex bags and posters did not make it to garage, only spill kit. Pallet was probably taken apart during airlift, therefore it was not possible to demonstrate how to assemble and fill the battery wrangler;

- Sorting of waste in garage: non existent, only one barrel for everything. We set up a couple more barrels to implement source segregation of liquid waste in garage (used oil, waste antifreeze, flammables). Suggested to add more to further segregate flammables;
- Barrel dump near wharf:
  - All drums mounted on pallets, but some are visibly and continuously leaking. Overall, situation is pretty good. Most drums are even numbered because they prepared to ship them out;
  - Snow covers the ground, hiding spill stains. However, many signs of leaky barrels;
- Propane cylinders (coming from zamboni): crated and tightly secured. Labelling remains to be done but seems likely that will be accepted as is by sealift;
- No time to take pictures;
- Estimate of amount of waste :
  - Roughly 200 barrels, counting those around garage and main storage area;
  - Batteries : Possibility to fill roughly 4-5 wranglers;
  - Empty gas cylinders: many propane cylinders. Mentions of welding cylinders too, but not seen them.

- **Recommendations** :
  - Implement better waste segregation procedures. Add more steel drums in garage, one for every kind of flammable liquids;
  - Inventory all waste in the community, repackage when necessary and label. When budget available, ship for disposal or reuse;

- Transfer contents of leaking or about-to-leak barrels into ones in better condition, especially those at wharf site;
- When possible, set up proper shelter for hazardous waste or purchase marine containers;
- When possible, transfer all vehicle batteries in battery wranglers;

- Peter Nacartuk showed interest in getting Transportation of Dangerous Goods (TDG) certification training. Stabilis could provide that, by correspondence. Could be extended to all NV managers.

Stabilis

APPENDIX 1

PICTURES

Stabilis

Kangiqsujuaq

Picture 1 : general view of the hazardous waste storage area, Kangiqsujuaq

Picture 2 : leaking barrels in barrel storage pile, Kangiqsujuaq

Picture 3 : hydrocarbon leak from scrapped bulldozer, Kangiqsujuaq

Quaqtaq

Picture 4 : punctured and leaking barrels (were lying on the side), Quaqtaq

Picture 5 : hydrocarbon stain near decentralized barrel storage, Quaqtaq

Picture 6 : Damaged liquid waste barrels (not suitable for shipping), Quaqtaq

Tasiujaq

Picture 7 : Barrel and gas cylinder storage area with hydrocarbon stain, Tasiujaq

Picture 8 : Main hazardous waste storage area, Tasiujaq

Picture 9 : Improper empty gas cylinder packaging, Tasiujaq (incompatible gases mixed together, not properly secured and crated)

Stabilis

Kangiqsuallujuaq

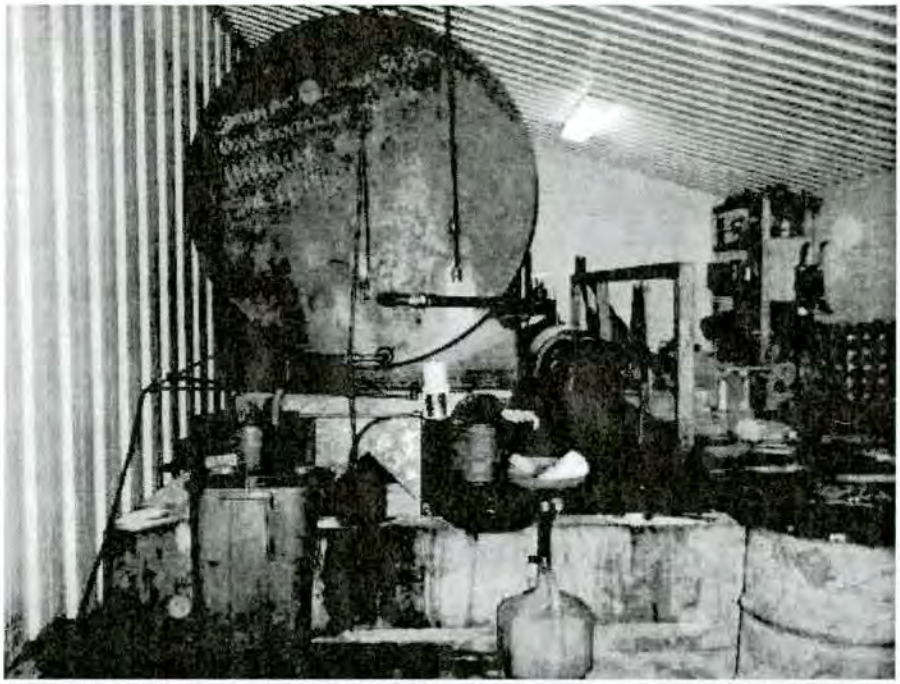
Picture 10 : Waste battery disposal sign posted at dump site, Kangiqsuallujuaq

Picture 11 : Waste barrel disposal sign posted at dump site, Kangiqsuallujuaq

Inukjuak

Picture 12 : Waste oil incinerator, Inukjuaq

Picture 13 : Waste oil storage site (prior to incineration), Inukjuaq



Picture 14 : Waste oil reservoir, Inukjuaq (water and antifreeze drain at bottom)

Picture 15 : Barrels (not empty), battery and other types of waste near garage, Inukjuaq

Umiujaq

Picture 16 : Barrel storage site, Umiujaq

Picture 17 : Barrel storage site, Umiujaq

Picture 18 : Current battery storage practise, Umiujaq

Kuujjuaraapik

Picture 19 : Barrel storage at dock, Kuujjuaraapik (refused by Desgagnés)

Picture 20 : Barrel storage near garage, Kuujjuaraapik

Picture 21 : Barrel storage near garage, Kuujjuaraapik

Picture 22 : Leaking barrel in garage barrel storage, Kuujjuaraapik

Akulivik

Picture 23 : Barrel storage area near garage, Akulivik

Picture 24 : Other small barrel storage area near garage, Akulivik

Picture 25 : Improperly packaged empty gas cylinders, Akulivik (mix of incompatible gases, not safely crated)

Ivujivik

Picture 26 : Hazardous waste/dangerous goods storage near garage, Ivujivik

Picture 27 : Damaged barrels near garage, Ivujivik

Picture 28 : Barrel storage area near garage, Ivujivik

Picture 29 : Battery storage container, near garage, Ivujivik

Stabilis

APPENDIX 2

WASTE DISPOSAL OPTIONS

Type of waste	Disposal company	Contact	Contact Information
Contaminated soil	Horizon Environnement Inc.	Éric Paquin	Phone : (450) 430-8778 Cell : (514) 497-0308 Fax : (450) 430-6130 epaquin@horizonenviro.com
Waste oil	Ecolocycle Inc.	Frédéric Dozois	Phone: (450) 796-6060 Toll free: 1-800-363-1067 Fax: (450) 796-4525 fdozois@ecolocycle.com
All other types of waste (antifreeze, vehicle batteries, oily rags, vehicle filters, paint and paint thinner, etc.)	Veolia services à l'environnement	Stéphan Dagenais	Phone: (514) 645-1045 #349 Fax: (514) 645-0762 stephan.dagenais@veoliase.com

Stabilis

APPENDIX 3

LIST OF PARTICIPANTS

Kuujjuaq (Sept. 21st & 22nd)

Nancy Dea	Environmental Project Manager, KRG
Mélissa Gagnon	Environmental Specialist, KRG
Paul Gordon	Water Plant Operator
Benoit Arsenault	Mechanic, Municipal Garage
Jr May	NV Manager
Richard Jones	NV Fire Department
Kelly Davies	KMHB, Dire Department
Luc Cormier	

Aupaluk (Sept. 24th)

Edward Igiyuk	Garbage Collector
Haukai Akpahatak	Water Truck Driver
Tommy Grey	FCNQ
Joanasie Annahatak	Fire Department
Jobie Cain	Sewage Truck
David Angutinguak	NV Manager

Kangiqsuallujaq (Sept. 29th)

Bobby Qamugaaluk	Pingaluit Park Warden
Nweleaya Jaaba	Mechanic
Juusipi Qisiiq	Small Engine Mechanic
Mark Tuukak	
Jaaka Qisiiq	Mechanic
Jimmy Qamugaluk	Garbage Truck Driver
Johnny Tertiluk	Maintenance
Peter Arngak	Machine Man
Juupi Koneak	Pingaluit Park Warden

Quaqtaq (Sept. 30th)

Henry Ooraut	
Kumak Ooraut	Garbage Truck
Johnny Tukkiapik	First Responder
Willie Tukkiapik	Mechanic
Elijah Angnatuk	Mechanic
Paul Dumont	Fire Fighter
Johnny Angnatuk	FCNQ
Putulik Puttayuk	Fire Fighter
Vallee Angnatuk	Fire Fighter

Jimmy Ooraut	KMHB Maintenance
George Angnatuk	

Kangirsuk (Oct. 1st & 2nd)

Jimmy Annahatak	Kativik Transport – Airport Maintainer
Markusie Kudluk	KMHB Housing Maintenance
Matthew Thomassie	KMHB Housing Maintenance
Etua Kaukai	NV Project Coordinator
Etua Putulik	NV Manager
Bobby Annahatak	NV Head Mechanic
Sammy Nassak	NV Mechanic
Billy Augiak	NV Mechanic
Jobie Simiunie	Fire Chief
Charlie Airo	Fireman volunteer
George Airo	Fireman volunteer/Garbage Truck Drivier
Angutinguaq Tuniq	NV Hunter Support
Bobby Grey	NV Hunter Support
Aloupa Augiak	FCNQ
Jobie Tukkiapik	FCNQ

Salluit (Oct. 6st)

Katsuak Mark	Water Plant Operator
A. Ittualuk Saviadjuk	Water Plant Operator
Michael Cameron	Fire Chief
Murray Keatainak	Grease Monkey (that's what he wrote…)
Bobby Parr	Fire Department
Masiu Alaku	Fire Department
Robert Côté	Mechanic/Fire Department
Nina Kiatainak	Land Use Planner
Ronald Porter	Landholding Corp.
Paul Okituk	Landholding Manager
Peter Jaaka	Fire Department

Tasiujak (Oct. 7th & 8th)

Tommy Annanack	FCNQ
Tomassie Munsu	KMHB
Tommy Nayomi	
Sandy Angnatuk	Heavy Equipment Mechanic
Peter Angnatuk	Mayor
Peter Cain	Mechanic
Mark Angnatuk	First Responder

Matiusie Augiak	Water Truck / First Responder
Sandy Krittik	Garbage Truck Driver
Martha Annanack	Secretary-treasurer

Kangiqsuallujuaq (Oct. 9th)

Jim Stewart	NV Manager
Claude St-Aubin	FCNQ
Matthew Emudluk	FCNQ
Tommy Emudluk	Fire Department / Gas Station
Carl Karpik	Fire Chief
David Baron	NV Mechanic
Adamie Annanack	Gas Station
Johnny Ittulak	Garage Manager / Mechanic
Tommy Snowball	Garbage Collector

Inukjuak (Oct. 19th & 20th)

Simeonie Oweetaluktuk	Airport Maintainer
Andy Weetaluktuk	NV Mechanic
Eli Elijasialuk	NV Mechanic
Moses Alaqulaaluk	NV Mechanic
Peter Samusack	Public Security Officer
Paulausie Aunutuq	Gas Station
Inukpuk Ishaluk	Gas Station

Umiujaq (Oct. 21st)

Noah Inukpuk	NV Manager
Davidee Aragutak	Sewage Truck
Joe Tookalook	Fuel Truck Driver
Jaco Niviaxie	Water Truck Driver
Shooha Inukpuk	Sewage Truck Driver
Paul Tookalook	Water Plant Operator
Ernest Tookalook	Water Truck Driver
Annisee Papialuk	Sewage Truck Driver
Josie Cookie	Small Engine Mechanic
Zack Niviaxie	Gas Station
Joseph Napartuk	Municipal Foreman
Angusa Cookie	Fire Department / Coop Store
Saruwillie Anowak	Fire Department

Kuujjuaraapik (Oct. 22nd)

Charlie Calvin	First Responder/Fire Department
Tukasie Brown	First Responder/Fire Department
Nicholas Cookie-Simard	First Responder/Fire Department
Dave Beaumont Vaillancourt	First Responder/Fire Department
Daniel Roussel	First Responder/Fire Department
John Ittoshat	First Responder/Fire Department
Cynthia Cookie-Simard	First Responder/Fire Department
Salamiua D. Weetaltuk	First Responder/Fire Department
Scott Evans	NV Mechanic
Caleb Sandy	FCNQ
Robbie George	FCNQ
Willie Novalingu	NV Mechanic
Jimmy Amidlak	FCNQ

Akulivik (Oct. 26th & 27th)

Willia Nappatuk	NV Manager
Juna Alayco	Garbage Collector
Lucassie Angiyou	Mechanic
Lucassie Nappatuk	Fire Department
Peter Aliqu	FCNQ
Nulukie Qinuajuak	Fire Department
Jusipi Amamatuak	Fire Department

Ivujivik (Oct. 28th)

Josepie Padlayat	NV Manager
Mususi Audlaluk	Fire Chief
Uqittuk Iyaituk	Fire Department
Saima Kanarjuak	Fire Department & Garbage Collector
Pitajusie Audlaluk	FCNQ
Saima Mark	Foreman & Head Mechanic

Puvirnituq (Oct. 29th & 30th)

Tukalak Allie	Fire Department
Josie Unaluk	Mechanic
Peter Nacartuk	NV Manager
Tivi Angutiguluk	Maintenance
Johnny Kenuajuak	Maintenance
Kaitak Ainalik	Assistant NV Manager
Tamusi Kiatainaq	Fire Chief
Peter Qauritaiyuk	FCNQ/Coop

Jobie Novalinga	Assistant Fire Chief
Paul Roger Aupalu	FCNQ/Coop

Hazardous Waste Management Training Program

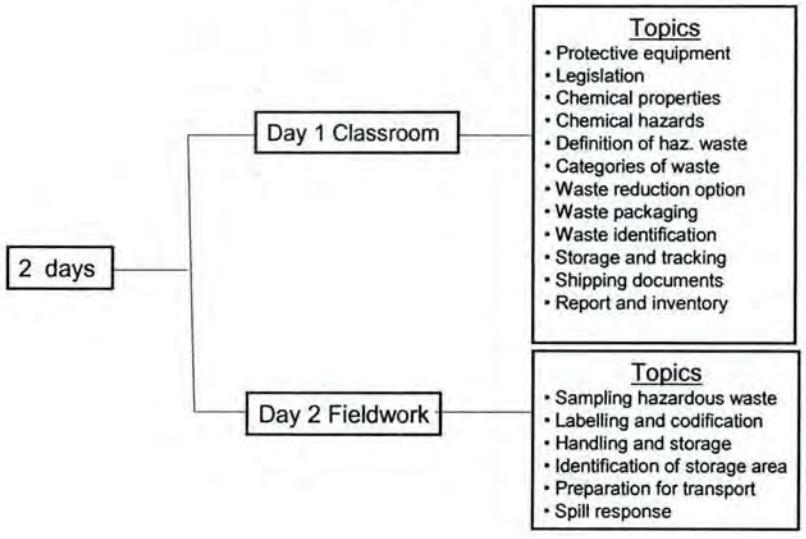
Kativik Regional Government

Hazardous Waste Management Training Program

Kativik Regional Government

1

Training Schedule



2

Course Outline

- Part 1 - Hazardous Waste in your Community
- Part 2 - Potential Risks and Hazards Associated with Hazardous Waste
- Part 3 - Chemical Hazards
- Part 4 - Hazardous Waste Regulatory Requirements
- Part 5 - Transport of Dangerous Goods (TDG)
- Part 6 – Documentation
- Part 7 - Identification of Hazardous Materials for Transport

3

Objectives of the hazardous waste (HW) management program

- Reduce potential hazard for humans and the environment
- Reduce risk of injury during handling, transport and storage
- Compliance with environmental storage and transport regulations

4

Part 1

Hazardous Waste in your Community

5

Production of HW in your community

- Municipal garage and maintenance shop
- School lab, water treatment plant
- Domestic use (house)
- Fuel and gasoline storage site
- Power plant
- Others (outfitters, small industries, etc.)

6

Types of hazardous waste (HW) Garage and maintenance shops

- Municipality, airport, mechanical shop
  - Waste oil
  - Oily sludge
  - Filters (fuel and oil)
  - Oil cans and plastic bottles
  - Contaminated rags and absorbent material
  - Waste antifreeze
  - Batteries
  - Paint
  - Spray paint, aerosol
  - Lacquer
  - Solvent

7

Types of hazardous waste (HW) Laboratory chemicals

- School (large diversity, small volumes)
  - Flammable liquid
  - Corrosive liquid
  - Toxic agent (Specimen preservation)
  - Water reactive solids (reactive salts)

8

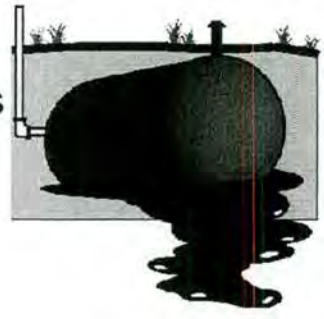
Types of hazardous waste (HW) Domestic use

- Waste oil
- Waste antifreeze
- Car batteries
- Small batteries
- Paint
- Solvent
- Spray paint
- Toxic detergent, strong cleaning products
- Glue
- Spent medication
- Propane tank

9

Types of hazardous waste (HW) Fuel and gasoline storage

- Waste fuel and gasoline
- Contaminated rags and absorbent
- Filters
- Contaminated soil
- Contaminated empty drums



10

Types of hazardous waste (HW) Power plant

- All managed by Hydro-Québec

11

Types of hazardous waste (HW) Other potential HW generators

- Outfitters
  - Waste oil
  - Empty drums
  - Contaminated soil
  - Propane tank

12

Part 2

Potential Risks and Hazards Associated with Hazardous Waste

13

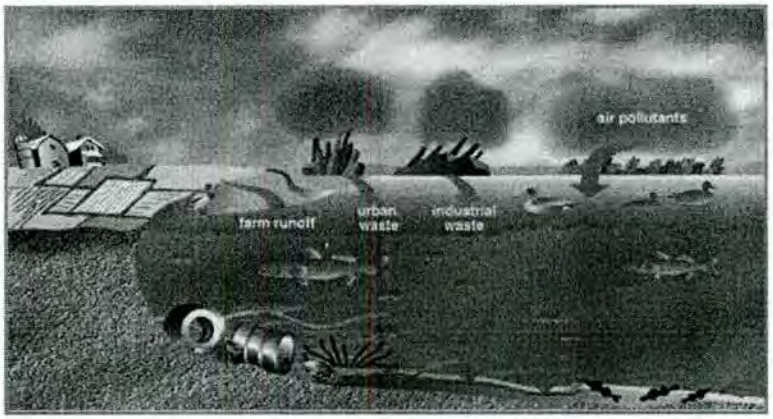
Potential Environmental Hazard of Waste

Source → Pathway → Receptors

- Source (spills, fire)
- Pathways
  - Soil and groundwater
  - Surface water (streams, rivers, lakes, ocean)
  - Air (contaminant dispersion)
- Receptors
  - Plants, Animals, Humans

14

Sources of Environmental Contamination



15

Sources of Contamination in your Community

- Spills and leaks
  - Liquid and vapours

- Fire
  - Toxic smoke and dust

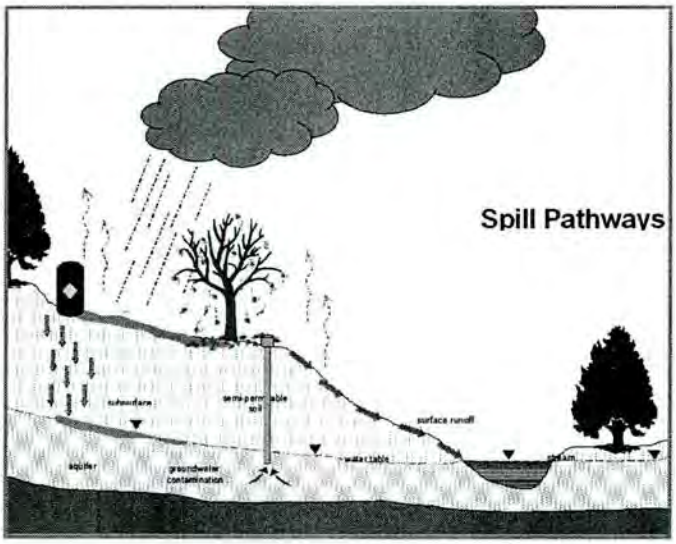
16

Spill or leak?

- Spill: one volume spilled during one episode
- Leak: continuous leaking of small volumes (*e.g.*, drops) during a long period of time
  - Causes:
    - Accidental release
    - Carelessness
    - Vandalism
    - Sub-standard handling procedures and equipment
    - Sub-standard storage procedures
    - Old, corroded, damaged or inappropriate containers
    - Defective container, tank, piping, valves
    - No secondary containment

17

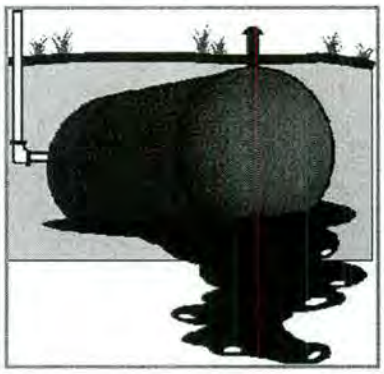
Dispersion of Contaminants in the Environment



18

Risks Associated with Commonly used HW

- Waste oil (most common, large volume)
  - May contain heavy metals and other toxic compounds (PAH, PCB)
  - Contamination of soil
    - Will limit vegetation growth
    - Will increase heavy metal concentrations in vegetation
    - Wildlife may become sick from eating contaminated vegetation



19

Risks Associated with Commonly used HW

- Waste oil …
  - Contamination of surface water
    - Will stop the transfer of oxygen from air to water
    - Will increase presence of toxic compounds and affect fish spawning
    - May affect some birds (*ducks and geese*) and mammals by damaging their plumage or their fur

20

Risks Associated with Commonly used HW

- Waste oil…
  - Contamination of groundwater
    - May affect plant life
    - May spread on the water table and increase the area of contamination
    - Contamination may be transferred to surface water

21

Risks Associated with Commonly used HW

- Waste vehicle batteries
  - Will induce high concentration of lead in the environment
  - Sulphuric acid may affect the surrounding pH

- Small batteries
  - Contain high levels of toxic metals such as cadmium, lithium, and nickel
  - Potassium hydroxide may affect the surrounding pH

22

Risks Associated with Commonly used HW

- Waste antifreeze, detergents, cleaning agents, lacquer, paint, solvents, medication
  - These products contain many different toxic compounds, and most are water-soluble
  - Disposal in an inappropriate site will increase the risk of surface and ground water contamination.
  - Some chemicals can change the equilibrium of aquatic ecosystems

23

Part 3

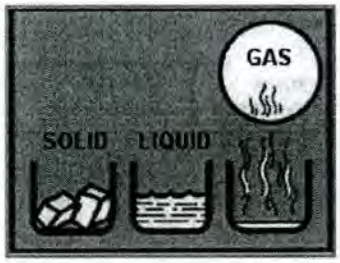
Chemical Hazards

24

Basic Notions of Chemistry

Some definitions:

- Physical state
  - State of a substance at ambient temperature (20°C): gas, liquid or solid
    - solid: steel
    - liquid: gasoline
    - gas: propane



25

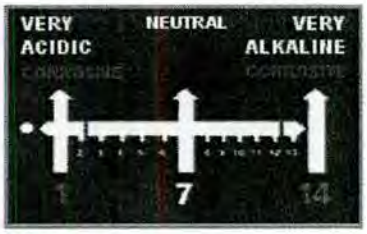
Basic Notions of Chemistry

- **Density**
  - Weight of a specific volume of product
    - Example:
      - density of water = 1 kg/l
      - density of gasoline = 0.7 kg/l
  - A product with a density < (less than) 1 kg/l <u>floats</u> on water
  - A product with a density > (greater than) 1 kg/l <u>sinks</u> in water

26

Basic Notions of Chemistry

- **pH**
  - Numeric value (between 1 and 14) indicating whether a solution is acidic or alkaline.
  - Example:
    - Water pH = 6 to 8
    - Javex bleach pH = 12.5
    - Sulphuric acid pH = 2.1



27

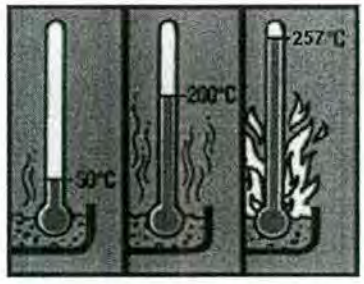
Basic Notions of Chemistry

- **Flash point**
  - Lowest temperature at which a sufficient amount of vapour is given off to create a flammable mixture with air (if presence of a flame or spark).
  - The lower the flash point of a liquid, the greater the risk of fire.
  - Flash point of diesel is 34°C
  - Flash point of gasoline is -48°C

28

Basic Notions of Chemistry

- Auto-ignition temperature
  - Lowest temperature at which spontaneous combustion of a product begins in the absence of any flame or spark.
  - Example: Diesel has an auto-ignition temperature of 257°C, thus, it will not ignite by itself at ambient temperature.



29

Basic Notions of Chemistry

- Explosibility - Sensitivity to electrostatic discharges
  - Indicates whether there is a risk of explosion in case of static discharges. If so, grounding may be required.
  - Gasoline accumulates electric charges when stirred, flowing through pipes, or when transferred from one container to another.

30

Basic Notions of Chemistry

- Combustion by-products
  - Chemical products emitted in smoke when a substance burns may present certain risks. (Ex.: carbon monoxide, cyanide, etc.)
- Fire extinguishing
  - Type(s) of fire extinguishers (A, B, C, D, etc.) or extinguishing agents (water, carbon dioxide, dry chemicals, foam, etc.) used to fight a fire.

31

Chemical Reactions

- Incompatibility
  - Two (2) incompatible substances, when mixed, may cause
    - a fire
    - an explosion
    - a violent reaction
  - Or release
    - heat
    - toxic vapours

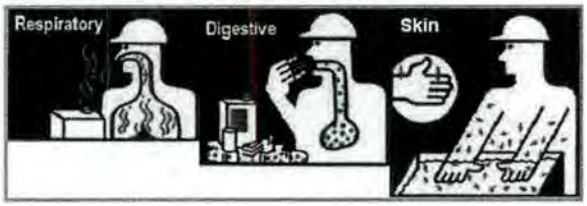
Ex.: Javex bleach & acids are incompatible; mixing them together will cause the release of toxic chlorine vapours.

32

Toxicity of Chemicals

- Absorption pathways

  Contact → Absorption → Effect
- 3 pathways into the organism
  - respiratory tract (by inhalation);
  - skin (by absorption);
  - digestive tract (by ingestion).



33

Toxic Effects

- Contact → Absorption → Effect
  - Acute effects
    - Symptoms appear within a relatively short period of time (minutes, hours, day), following exposure to a substance.
  - Chronic effects
    - Symptoms appear after a relatively long period of time (after several months or years), following repeated or prolonged exposure to a substance.

34

Personal Protective Equipment (PPE)

- When handling hazardous chemicals, always wear:
  - Safety glass
  - Protective gloves (Neoprene, latex, PVC)
- For respiration protection:
  - Wear an organic vapour mask for volatile compounds (Ex.: Solvent)
  - Wear a dust mask when working with light particles such as sandblast

35

Material Safety Data Sheet (MSDS)

- The hazard associated with a waste product can be determined by referring to the Material Safety Data Sheet (MSDS) of the original product .
  - 1. Product identification and use
  - 2. Hazardous ingredients
  - 3. Physical and chemical properties
  - 4. Fire and explosion hazards
  - 5. Stability and reactivity
  - 6. Toxicological information
  - 7. Preventive measures
  - 8. First aid measures
  - 9. Company information

36

Material Safety Data Sheet (MSDS)

- Most of the MSDS will indicate the regulatory requirements for labelling and transport
  - Ex : Varsol (solvent used for cleaning parts)
    - Class 3 (flammable liquid)
    - UN1268
- Make sure to request MSDS from supplier every time you order a new chemical

37

Part 4

Hazardous Waste Regulatory Requirements

38

Identification and Tracking of HW in Storage and shipping

- 3 regulations will apply:
  - Regulation respecting Hazardous materials (Québec)
  - Transport of Dangerous Goods (TDG) (Canada)
  - Code for the maritime transport of a dangerous goods (IMDG code) (international)

39

Identification and Tracking of HW Regulatory Requirements

- Regulation respecting Hazardous materials (Québec)
  - Waste codification and identification
  - Storage requirements
  - Inventory and report
  - Spill or environmental accident reporting
  - Contract with disposal facility
  - Use of waste oil for heating

40

Regulation respecting Hazardous materials (Québec)

- Waste codification
  - Appendix 4 - Categories of hazardous waste
    - Waste oil with PCB ≤ 3 mg/kg
    - Waste oil with PCB ≥ 3mg/kg ≤ 50 mg/kg
    - Oily water
    - Grease
    - Oily sludge
    - Flammable solvent (acetone, Varsol, etc)
    - Waste antifreeze
    - Vehicle batteries (lead)
    - Small batteries
    - Contaminated drums and containers
    - Contaminated soil

41

Regulation respecting Hazardous materials (Québec)

- Hazardous waste - Storage requirements
  - A shelter used for the storage of HW must:
    - Be identified with a placard for categories and emergency number
    - Protected on, at least, 3 sides
    - Floor must be sealed and impermeable
      - No drain, spill containment (25% of the total volume)
    - Accessible in case of emergency
    - Inspection every 3 months with a register
    - Label on each drum with:
      - Type of HW
      - Provincial code
      - Date of storage

42

Regulation respecting Hazardous materials (Québec)

- Hazardous waste - Storage requirements
  - Containers for HW storage

43

Regulation respecting Hazardous materials (Québec)

- Some important considerations for the setup of a HW storage site:
  - Away from:
    - Any sensitive area such as school, health care center, daycare
    - Sewer, stream, lake
    - The topography of the land should be such as to avoid any spill reaching an aquatic environment

44

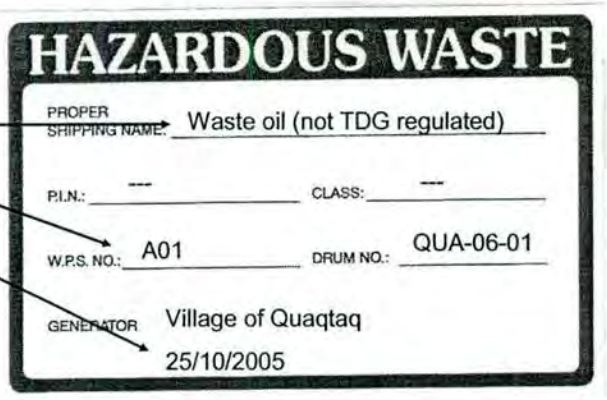
Regulation respecting Hazardous materials (Québec)

- Hazardous waste - Storage requirements
  - Labels

Type of HW

Provincial code

Date of storage



45

Regulation respecting Hazardous materials (Québec)

46

Regulation respecting Hazardous materials (Québec)

- Inventory and report
  - Inventory of hazardous waste with an update every 3 months
    - Codification
    - Quantity stored at the end of the period
    - Quantity disposed, treated or processed
    - Information kept with the generator site for 2 years

	Storage Log					Shipping Log				
Internal Code	Transfer Data			Provincial Code	Weight	Shipping Date			Manifest Waybill No.	Destination
	YY	MM	DD			YY	MM	DD		
TAS-06-01	06	05	14	A01	200 kg	06	10	25	A-12345	Onyx
TAS-06-02	06	05	14	E15	280 kg	06	10	25	A-12345	Nova Pb

47

Hazardous Waste Annual Report							
Prepared by :	Year _____						
Categories of hazardous waste	Code RMD	Quantity (kg) stored 1 January	Quantity (kg) stored 31 December	Quantity (kg) disposed during year per consignees 1	2	3	Total Disposed (kg)
Used oil	A01						
Oily water	A03						
Paint	D02						
Solvents	C02						
Acid	G01						
Caustic	H01						
Batteries (lead)	E15						
Small batteries	E16						
Contaminated soil	E04						
Waste fuel and gasoline	H10						
Laboratory waste	E07						
Aerosol	L02						
Waste antifreeze	D01						
Glue	D02						
	Address of Consignee 1	Address of Consignee 2		Address of Consignee 3			

Regulation respecting Hazardous materials (Québec)

- Spill or environmental accident reporting
  - Article 9
    - Minister needs to be advised immediately in case of a spill that may affect environment
    - The owner must take action to limit the impact of the spill
  - Article 11
    - A contract must be signed between the disposal facility and the waste generator

49

Regulation respecting Hazardous material (Quebec)

- Use of waste oil for furnace heating
  - For Nunavik, a furnace needs at least 3 MW and should respect quality criteria from appendix 6

Parameters	Limit (mg/kg)
Arsenic	5
Cadmium	2
Chrome	10
Lead	50
Chlorinated agent	1500
PCB	3
Flash Point	> 38 °C
Water content	< 20 %
Sulfur	< 1.5 %

50

Regulation respecting Hazardous material (Quebec)

- Drum sampling

51

Regulation respecting Hazardous materials (Québec)

Waste oil burners

Reuse the waste oil as heating fuel for the municipal garage

Company Clean Burn
1-800-824-4115

52

Part 5

Transport of Dangerous Goods (TDG)

53

Specific Objectives

- Following Part 5, the participant will be able to:
  - Understand the following terms:
    - Shipping name;
    - UN number;
    - Primary class, subsidiary class;
    - Packing group.
  - Classify dangerous goods

54

Transport des Marchandises Dangereuses

GUIDE DE CLASSIFICATION

CLASSE 1 Explosifs

1.1 - Explosion en masse
1.2 - Risques de projection
1.3 - Risques d'incendie

** - Indiquer la division
* - Indiquer le groupe de compatibilité

1.4 - Pas de risques notables

1.5 - Matières très peu sensibles avec risque d'explosion en masse

1.6 - Objets extrêmement peu sensibles sans risque d'explosion en masse

* - Indiquer le groupe de compatibilité

CLASSE 2 Gaz

2.1 - Gaz inflammables

2.2 - Gaz ininflammables, non toxiques

2.3 - Gaz toxiques

GAZ COMBURANTS
UN1072
UN1073
UN3156
UN3157

CLASSE 3 Liquides inflammables

CLASSE 4

4.1 - Solides inflammables

4.2 - Matières sujettes à l'inflammation spontanée

4.3 - Matières qui, au contact de l'eau, dégagent des gaz inflammables, hydroréactives

CLASSE 5

5.1 - Matières comburantes

5.2 - Peroxydes organiques

CLASSE 6

6.1 - Matières toxiques

6.2 - Matières infectieuses (Étiquette)

6.2 - Matières infectieuses (Plaque)

CLASSE 7 Matières radioactives

(Étiquettes)

(Plaque)

CLASSE 8 Matières corrosives

CLASSE 9 Machandises dangereuses diverses

Produits, matières ou organismes divers

Groupes d'emballage

I Danger élevé
II Danger moyen
III Danger faible

PLAQUE
"Chargement mixte"

Manières d'apposer le numéro UN

Étiquette

ou

UN1203

Plaque

ou

Autres marques

Marque de polluant marin

Signe pour le transport à température élevée

Signe de fumigation

Étiquettes de manutention

Classification

- The term "classification" means, for dangerous goods, as applicable,
  - The shipping name;
  - The primary class;
  - The subsidiary class;
  - The UN Number;
  - The packing group.

55

Classification

- How to find the chemical components of a commercial product
  - Use MSDS (WHMIS reference)
  - Use information provided by supplier

56

Classification

- Example of the classification of a commercial product
  - Varsol (thinner)
    - Shipping name : PETROLEUM DISTILLATES, N.O.S. (Toluene)
    - UN 1268
    - Class 3
    - PG III

57

Classification

- 2.7 A substance is a marine pollutant if...
  - letter "P" or "PP" column 10, Schedule 1
  - Listed in Appendix 1, Part 2
  - Identified as a marine pollutant in the IMDG Code

  A mixture or a solution is a marine pollutant if it contains...
  - 1% of a severe marine pollutant (PP), or
  - 10% of a marine pollutant (P)

  Potential marine pollutant "•" column 10, Schedule 1

58

Classification

- Assignment of packing groups for classes 3, 4, 5.1, 6.1, 8 and 9
- Packing group I - Great Danger
- Packing group II - Moderate Danger
- Packing group III - Minor Danger

59

Class 2

- Gases, have 3 divisions :
  - 2.1 : Flammable gases (*e.g.*, propane, aerosol, acetylene)
  - 2.2 : Non-flammable and non-toxic gases (Compressed air, nitrogen, argon)
  - 2.3 : Toxic gases (chlorine)

60

Class 2

- Oxidizing Gases
  - OXYGEN, COMPRESSED (UN 1072)
  - OXYGEN REFRIGERATED LIQUID (UN 1073)
  - COMPRESSED GAS OXIDIZING, N.O.S. (UN 3156)
  - LIQUIFIED GAS, OXIDIZING, N.O.S. (UN 3157)

61

Class 3

- Flammable liquids

(*e.g.,* diesel, gasoline, acetone, paint)

62

Class 3

- A liquid with a flash point less than or equal to 60.5°C (closed-cup test method).
- A liquid is not considered flammable if:
  - It has a flash point greater than 35°C and does not sustain combustion;
  - It has a fire point greater than 100°C;
  - Is a water-miscible solution (water content greater than 90% by mass).

63

Class 3

- Packing Groups

Packing Groups	Flash Point (°C)	Boiling Point (°C)
I	---	≤ 35°C
II	< 23° C	> 35°C
III	23°C ≤ ***x*** ≤ 60.5°C	> 35°C

64

Class 4

- Class 4.1 : Flammable Solids (*e.g.,* oily absorbent material)

65

Class 4

- Class 4.2 : Substances Liable to Spontaneous Combustion (*e.g.,* oily cotton rags)

66

Class 6

- Class 6.1 : Toxic Substances (*e.g.*, arsenic, cyanide)

67

Class 8

- Corrosives
  - Substances known to destroy the epidermis, living tissue and/or accelerate the corrosion of certain metals.

  (*e.g.*, sulphuric acid)

68

Class 9

- Miscellaneous Dangerous Goods

69

Marine Pollutant

- Identification of marine pollutants

70

Chapter 2.10

- Marine Pollutants
  - "A marine pollutant is a substance which can bio-accumulate in food and marine organisms or
    which presents a high degree of toxicity for aquatic life"

71

Chapter 2.10

- Marine Pollutants (continued)
  - Marine pollutants identified by the letter "P" in column "PM" of the index (Volume 2) or in column 4 of the List of Dangerous Goods
  - Marine pollutants which present extremely high hazard levels (severe risk) are identified by "PP".
  - The symbol "•" indicates an N.O.S. substance which may contain products considered marine pollutants
  - A substance which contains 10% or more of a marine pollutant ("P") is considered a marine pollutant

72

Chapter 2.10

- Marine Pollutants (continued)
  - A substance which contains 1% or more of a severe marine pollutant ("PP") is considered a marine pollutant
  - A substance which meets none of the hazard criteria listed for classes 1 to 8 but which contains either 1% of a severe marine pollutant or 10% of a marine pollutant must be identified as follows:
    - "Environmentally Hazardous Substance, solid (or liquid, accordingly), N.O.S." and becomes a Class 9 substance
      - *e.g.*, PCB contaminated absorbent material

73

Part 6

Documentation

74

Documentation

- Consignor responsibilities

  Article 3.1

  - Must prepare and give to the carrier a shipping document that contains the information required by these Regulations.

  An electronic copy of the document may be provided.

75

Documentation

- What information is required on a shipping document?

  Article 3.5

  - Name and address of the consignor
  - Date prepared or transferred to carrier
  - Description of the dangerous goods :
    - Shipping name (technical name, if required);
    - Class;
    - Subsidiary class, in parentheses, if applicable;
    - UN number;
    - Packing group;

76

Documentation

- A few examples of product information on the shipping document...

  Article 3.5

  - GASOLINE, Class 3, UN 1203, II
  - FLAMMABLE LIQUIDS, N.O.S. (hexane), Class 3, UN 1993, II
  - ISOBUTYLAMINE, Class 3 (8), UN 1214, II

77

Documentation

- Other information to be provided on the shipping document...

  Article 3.5

  - Quantity (metric).
  - If small means of containment, indicate number.
  - The words « 24-hour number » and the telephone number where the consignor can be reached

78

Documentation

- Other information…

  Article 3.6
  - Marine transportation
    - Flash point (Class 3)
    - Marine pollutant, if required.
  - Conserve documents for 2 years (article 3.11)

79

Part 7

Identification of Hazardous Materials for Transport

80

Safety Marks

- The consignor is responsible for…

  Article 4.4
  - Displaying the required safety marks on each small means of containment or on a large means of containment.
  - Providing the carrier with the safety marks (placards), except if:
    - they are already displayed on a large means of containment;
    - are not the correct ones to display because of the presence of other dangerous goods in the large means of containment.

81

Safety Marks

- The carrier is responsible for…

  Article 4.5
  - Ensuring that the required dangerous goods safety marks remain displayed on the small means of containment in transport;
  - Displaying the required dangerous goods safety marks on the large means of containment;
  - Providing and displaying, or removing, the dangerous goods safety marks if the requirements change while the dangerous goods are in transport.

82

Safety Marks

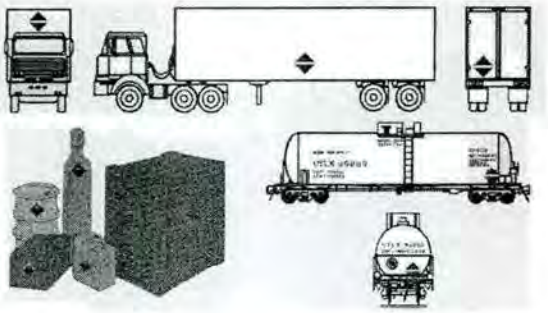
- Label and placard figures and norms (article 4.6)
  - Colours – refer to article 4.6 c) (i)
  - Dimensions
    - labels (100 mm X 100 mm);
    - placards (250 mm x 250 mm).
- When to display
  - Immediately before the loading of the shipment

83

Safety Marks

- How to display
  - Against a background of contrasting colour
  - As a square on a point
  - Single location on small means of containment.

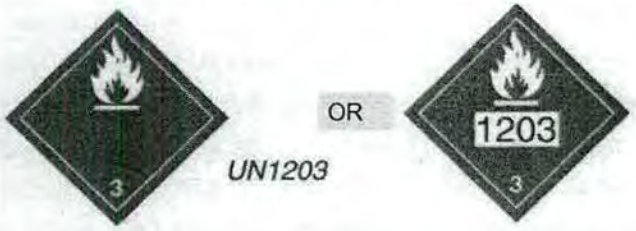
  All 4 sides on a large means of containment



84

Safety Marks

- Displaying information on small means of containment
  - Shipping name
    - Next to the primary class label;
    - Technical name (primary class) in parentheses (special provision 16).
  - UN number, 2 possible ways to display
    - Close to the label (with the prefix UN) or;
    - In a white rectangle, inside the label (without the prefix UN).



UN1203

85

Safety Marks

- Displaying information on a small means of containment

86

Safety Marks

- Remember…
  - For marine transport…
    - The flash point must be indicated on the means of containment for Class 3 dangerous goods (next to the shipping name)
    - If the dangerous good is a marine pollutant, display the label on the means of containment (next to the primary or subsidiary class)

87

Safety Marks

- When can the labels and placards be removed?
  - When the small means of containment has been cleaned or purged;
  - When all the dangerous goods have been unloaded from the large means of containment.

88

Safety Marks

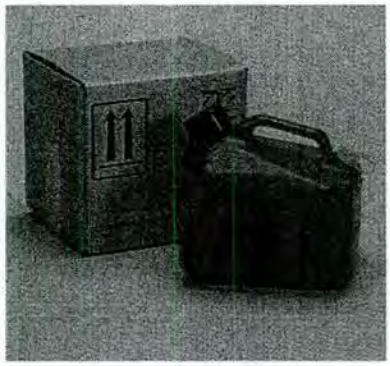
- Marine pollutant mark
  - Not required if in a small means of containment and:
    - Quantity less than 5 L (liquid) or 5 kg (solid) for a marine pollutant;
    - Quantity less than 500 ml (liquid) or 500 g (solid) for a severe marine pollutant;

89

Single Packaging

90

Combination Packaging

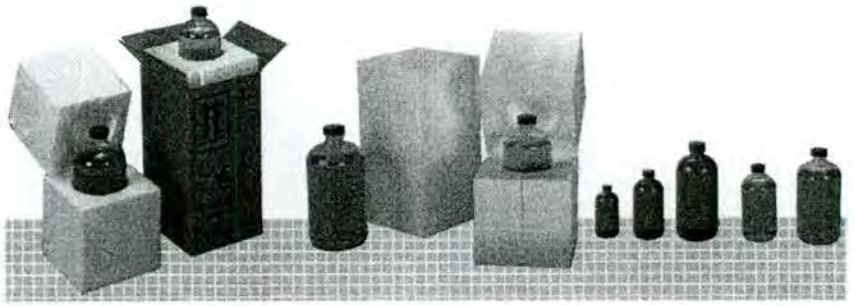


91

Overpack

92

Inner Packagings

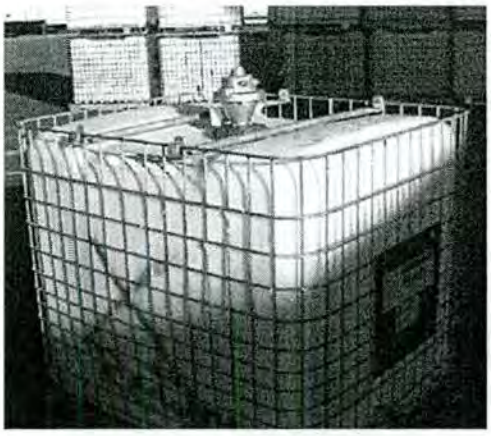


93

Outer Packaging (4G)

94

Intermediate Bulk Container (IBC)



95

Salvage Drum

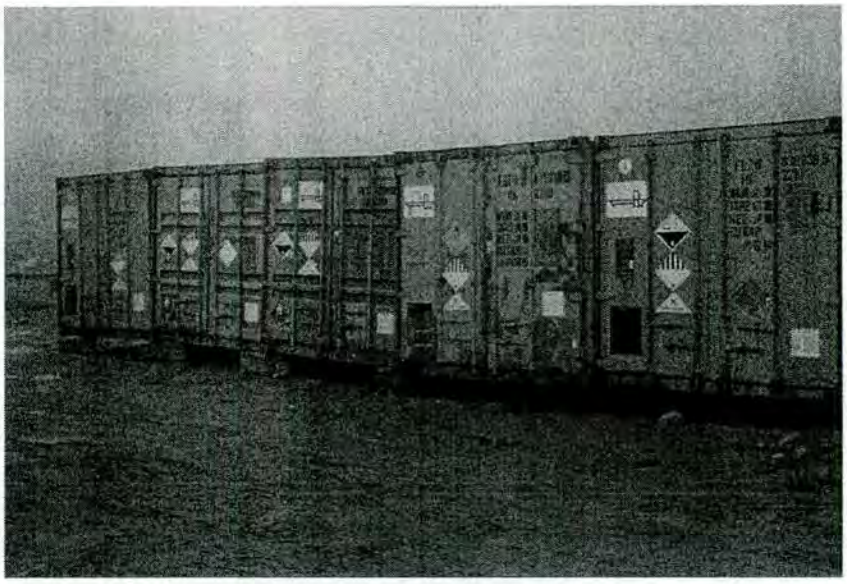
96

Packaging

97

Packaging

98



99

IMO Shipping Document

100

EXERCISES

PART 1 – Hazardous Waste in your Community

1.1 Are rechargeable batteries considered hazardous waste? And why?

_____

_____

1.2 How is waste oil generated?

_____

1.3 What is the hazard associated with a spray paint can?

_____

1.4 Why are empty drums and containers considered hazardous waste?

_____

_____

PART 2 – Potential risks and hazards associated with hazardous waste

2.1 What will create more contamination a spill or leakage?

_____

_____

2.2 What is secondary containment? And give an example.

_____

_____

EXERCISES

PART 3 – Chemical hazards

3.1 Is gasoline a liquid or a gas?

_____

3.2 Why does waste oil float on water?

_____

3.3 What is more corrosive, an acid or an alkaline (caustic) product?

_____

3.4 Is cancer an acute or a chronic effect of exposure to a contaminant?

_____

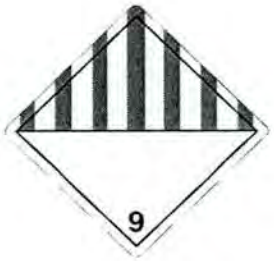
PART 5 – Transport of Dangerous Goods

5.1 What is the difference between these 2 HW labels?

_____

EXERCISES

5.2 Join the labels (left) to the proper type of hazard (right)



A) Flammable gas

B) Oxydizing gas

C) Corrosive

D) Flammable solid

E) Miscellaneous Dangerous Goods

F) Substances liable to spontaneous combustion

PART 7 - Identification of Hazardous Materials for Transport

What is the difference between a label and a placard? Where would you place both these marks?

_____

_____

How many labels are required on a drum? _____

How many placards are required on a marine container? _____

In what situation is a salvage drum used?

_____

paint markers

Tenaquip
Tel.: 1-800-661-2400
Fax: 1-800-661-2212
web: http://www.tenaquip.ca/

---

labels (hazardous waste, transport)
shipping document

Compliance Centre ICC
ICC The Compliance Center Inc.
88 Lindsay Ave
Dorval, QC H9P 2T8
phone 888-977-4834
fax 888-821-0735
web: www.thecompliancecenter.com

---

waste disposal company

Ecolocycle
7950, rue Pion
St-Hyacinthe, QC, J2R-1R9
Tel.: (450) 796-6060
Fax.: (450) 796-4525
Email : ecolocycle@ecolocycle.com
Web: www.ecolocycle.com

---

drum sampling tubes

Quatrex
Stephane Lesage
Tel 450.963.4747
Fax 450.622.5392
email lesages@quatrex.ca
web: www.quatrex.ca

ERE
8529, Lafrenaie
Montreal (QC), H1P 2B3
Tel.: (514) 326-8852
Fax.: (514) 326-8961
E-mail: sales@ereinc.com
web: www.ereinc.com

Type of waste	Provincial storage code	TDG classification
Used oil	A01	Not TDG regulated
Oily water	A03	Not TDG regulated
Paint (oil-based)	D02	Waste Paint, UN1263, Class 3, **PG I**, F.P. X
Solvents	C02	Waste Flammable liquid, N.O.S. (type of solvent), UN1993, Class 3, **PG I**, F.P. X
Battery Acid	G01	Waste Sulphuric acid, UN1830, Class 8, PG II
Caustic (alkaline)	H01	(Various products, corrosive, class 8)
Vehicle batteries (lead)	E15	Waste Batteries, wet, filled with acid, UN2794, Class 8
Small batteries	E16	Waste Batteries, dry, containing potassium hydroxide, solid, UN3028, Class 8, PG III
Contaminated soil	O01	Not TDG regulated
Waste fuel	N10	Waste Diesel fuel, UN1202, Class 3, PG III, F.P. 34 C
Waste gasoline	N10	Waste Gasoline, UN1203, Class 3, PG II, F.P. -40 C
Laboratory waste	E07	(Various products)
Aerosol	L02	(Various products)
Waste antifreeze	D01	Not TDG regulated
Glue	D02	Waste Adhesives, UN1133, Class 3, **PG I**, F.P. X
Varsol	C02	Waste Petroleum distillates, N.O.S. (toluene), UN1268, Class 3, PG II, F.P. X
Mixed oil, antifreeze, Varsol, acid	M07	Waste Flammable liquid, corrosive, N.O.S. (solution of varsol and sulphuric acid), UN2924, Class 3 (8), PG II, F.P. -40 C
Mixed oil, antifreeze, Varsol	M07	Waste Flammable liquid, N.O.S. (solution of varsol), UN1993, Class 3 , PG II, F.P. -40 C
Empty gas cylinders	M07	Waste Acetylene, dissolved (residue - last content), UN1001, Class 2.1
	M07	Waste, Oxygene, compressed (residue - last content), UN1072, Class 2.2 (5.1)
	M07	Waste, Helium, compressed (residue - last content), UN1046, Class 2.2
	M07	Waste, Argon, compressed (residue - last content), UN1006, Class 2.2

Telegraph and Telephone Services	4821 and 4822

The economic activities listed above are those defined in the document Classification des activités économiques du Québec, published in 1990 by the Bureau de la Statistique du Québec.

O.C. 1310-97, Sch. 3.

SCHEDULE 4

(ss. 11, 104, 106, 110, 113, 118, 119, 131, 132, 135, 136 and 137)

CATEGORIES AND IDENTIFICATION OF HAZARDOUS MATERIALS

Section 1

CATEGORIES OF HAZARDOUS MATERIALS

[Q-2R15.2#05, 1997 G.O. 2, 5224]

Code	Category
	Mineral oils and grease
A01	Used oil whose PCB concentration 3 mg/kg
A02	Used oil whose PCB concentration is 3 mg/kg and 50 mg/kg
A03	Oily water / emulsions
A04	Used grease
	Organic solids and sludge
B01	Residues from the distillation, refining or pyrolysis of halogenated organic compounds
B02	Residues from the distillation, refining or pyrolysis of non-halogenated organic compounds
B03	Bottom sludge or bottom sediment sludge from hydrocarbons
B04	Residues from petroleum products and

	hydrocarbons
B05	Organic solids or sludge generated in the treatment of process water or wastewater
B06	Bottom sediment sludge from the wood preserving industry, and reject products
B07	Sludge and residues from the preparation of pharmaceuticals, and reject products
B08	Sludge and solid residues from the production of pesticides, and reject products (200 kg or 200 L)
B09	Sludge and residues from the formulation and use of ink, paint, colouring agents, lacquers and varnishes
B10	Sludge from coking operations
B11	Sludge and residues from the formulation and use of residues, latex plasticizers, glues, adhesives and polymers
B12	Sludge and residues from decarbonization and descaling operations
B13	Other organic sludge and solids not otherwise specified (specify)
	Organic solvents
C01	Halogenated organic solvents (total organic halogen 0.15 %)
C02	Non-halogenated organic solvents (total organic halogen 0.15 %)
C03	CFCs used as solvent or cleaner
	Organic solutions
D01	Antifreeze, brake and hydraulic fluids
D02	Other organic solutions (specify)
	Inorganic solids and sludge
E01	Sludge from surface treatment and plating not otherwise specified
E02	Spent catalysts

E03	Sludge and residues containing metals
E04	Metallic dust
E05	Metallic salts, whether from tempering or not
E06	Non-metallic salts, whether from tempering or not
E07	Spent anodes and cathodes
E08	Ash
E09	Cinders, scum, dross and cakes from primary metal production
E10	Slag
E11	Foundry sand
E12	Filters and filtering mediums
E13	Solids, dust or sludge generated by air scrubbing systems
E14	Inorganic solids or sludge generated by process water or wastewater purification systems
E15	Discarded lead batteries
E16	Batteries and other accumulators
E17	Sludge and residues from the production, formulation and use of inorganic pigments
E18	Calcium fluoride sludge
E19	Used blast sand
E20	Gypsum from industrial processes
E21	Activated glass (cathode-ray and other tubes)
E22	Sludge and solids not otherwise specified (specify)
	Inorganic aqueous solutions
F01	Spent solutions from surface treatment and plating not otherwise specified
F02	Solutions and brimes containing cyanides, sulphides or nitrides

F03	Other inorganic aqueous solutions and brines (specify)
	Acidic hazardous materials (pH 2)
G01	Organic acidic liquids or sludge
G02	Inorganic acidic liquids or sludge
G03	Other acidic materials (specify)
	Caustic hazardous materials (pH 12.5)
H01	Inorganic alkaline liquids or sludge
H02	Organic alkaline liquids or sludge
H03	Other alkaline materials (specify)
	Hazardous materials containing PCBs or contaminated by PCBs
J01	Liquids containing PCBs in a concentration of between 50 mg/kg and 10 000 mg/kg (1 %)
J02	Liquids containing PCBs in a concentration greater than or equal to 10 000 mg/kg (1 %)
J03	Solids containing PCBs in a concentration between 50 mg/kg and 10 000 mg/kg (1 %)
J04	Solids containing PCBs in a concentration greater than or equal to 10 000 mg/kg (1 %)
J05	Substances containing PCBs in a concentration between 50 mg/kg and 10 000 mg/kg (1 %)
J06	Substances containing PCBs in a concentration greater than or equal to 10 000 mg/kg (1 %)
J07	Equipment containing PCBs
J08	Equipment contaminated by PCBs
J09	Exposed metal part contaminated by PCBs
	Hazardous materials from a laboratory
K01	Industrial or commercial R & D laboratory
K02	Laboratory in an educational institution

K03	Other sources (specify)
	Contaminated hazardous materials
L01	Contaminated equipment
L02	Contaminated receptacles
L03	Other contaminated materials
	Other hazardous materials
M01	Reject pharmaceutical preparations, medications and cosmetics
M02	Leather tannery sludge and residues
M03	Explosive materials not otherwise specified
M04	Radioactive materials not otherwise specified
M05	Sludge from the scouring and decontamination of tanks and receptacles not otherwise specified
M06	Reject ion-exchange resins
M07	Other materials not otherwise specified (specify)
	Mixtures (categories reserved for permit holders referred to in section 70.9 of the Environment Quality Act
N01	Acid mixture
N02	Acid mixture to reduce
N03	Neutral mixture
N04	Alkaline mixture
N05	Alkaline/neutral mixture to reduce
N06	Mixture to oxidize
N07	Oxidizing mixture
N08	Low energy fuel
N09	Low energy, halogenated

N10	High energy fuel
N11	High energy fuel, halogenated
N12	Organic solvent mixture
N13	Organic solution mixture
N14	Organic sludge and solids mixture
N15	Inorganic sludge and solids mixture
N16	Organic and inorganic sludge and solids mixture
	Other materials composing a mixture (categories reserved for permit holders referred to in section 70.9 of the Environment Quality Act
O01	Contaminated soil
O02	Non-hazardous materials

SECTION 2

IDENTIFICATION OF HAZARDOUS MATERIALS

The identification of hazardous materials is determined by the code of its category, indicated in section 1 of this Schedule, accompanied by the numbers of its class and division, as assigned under the Transport of Dangerous Substances Regulation (where a hazardous material is not referred to in this Regulation, the code 0.0 shall be used), as well as the code indicating its physical state as determined according to the following table:

[Q-2R15.2#06, 1997 G.O. 2, 5227]

Code	Physical state
L	Liquid
S	Solid
P	Semi-solid (sludge)
G	Gaseous

MATERIAL SAFETY DATA SHEET
ARCTIC HEATING FUEL

I. - GENERAL INFORMATION

TRADE NAME: ARCTIC HEATING FUEL

OTHER NAMES: Diesel, Kerosene, Fuel Oil No. 1, Range Oil, No. 1 Heating Fuel, Heating Oil (Light), Stove Oil,

MANUFACTURER'S NAME: ARCO Alaska, Inc.

EMERGENCY TELEPHONE NUMBER: (800) 424-9300 Chemtrec

ADDRESS: ARCO Alaska, Inc.
700 G. Street
Post Office Box 100360
Anchorage, Alaska 99510-0360

GENERIC NAME: Petroleum Distillate Fuel

CHEMICAL FAMILY: Petroleum hydrocarbon

CAS NUMBER: 8008-20-6

DOT PROPER SHIPPING NAME: Fuel Oil

UN/NA NUMBER: UN 1993 ——→ Transport of Dangerous Goods

DOT HAZARD CLASS: Combustible Liquid

NFPA 704 SYSTEM OF HAZARD IDENTIFICATION:

HEALTH HAZARD RATING: 1, Slightly hazardous
FIRE HAZARD RATING: 2, Moderate, Ignites when moderately heated
REACTIVITY HAZARD RATING: 0, Normally stable

NOTE: Qualifiers and codes used in this MSDS:

EQ = Equal AP = Approximately LT = Less Than
GT = Greater Than TR = Trace UK = Unknown
N/AP = Not Applicable N/DA = No Data Available
N/P = No Applicable information found

IMPORTANT: Read this MSDS before handling and disposing of this product and pass this information on to employees, customers, and users of this product.

DATE OF PREPARATION: 10/1/93
REVISION DATE: 4/17/95

II. - COMPONENTS AND OCCUPATIONAL EXPOSURE LIMITS

SUBSTANCE	CAS NUMBER	AMOUNT VOLUME %	PEL(1) (PPM)	TLV(2) (PPM)	STEL(3) (PPM)
Xylene	1330-20-7	2.2 to 3.8	100	100	OSHA: 150 ACGIH: 150
Decanes Plus	N/AP	93 to 96	N/AP	N/AP	N/AP

(1) 1989 U.S. Department of Labor, Occupational Safety and Health Administration and 1990 State ofAlaska Dept. of Labor 8-hour Time-

Weighted Average (TWA) Permissible Exposure Limits (PEL)

(2) 1992 - 1993 American Conference of Government Industrial Hygienist 8-hour Time-Weighted Average (TWA) Threshold Limit Values (TLV)

(3) OSHA: 1989 U.S. Department of Labor, Occupational Safety and Health Administration 15-minute Short-Term Exposure Limit (STEL); ACGIH: 1992 - 1993 American Conference of Government Industrial Hygienist 15-minute Short-Term Exposure Limit (STEL)

III - SUMMARY OF HAZARDS

DANGER: COMBUSTIBLE! OSHA/NFPA Class-II Combustible Liquid.
Keep away from heat, sparks, and open flame.
Avoid "Switch Loading" hazards (See Section VII.)
Contains petroleum distillates!!

Avoid prolonged or repeated liquid, mist or vapor contact with skin or respiratory tract. May be harmful if inhaled. Exposure to some components of this material may cause headache, dizziness, convulsions, collapse and adverse effects on the heart. Long-term studies show that similar petroleum distillates produced skin tumors and kidney damage in laboratory animals. Some components of this material have been shown to cause adverse reproductive effects (See Section VIII. Chronic Hazards).

Respiratory irritation and reversible pulmonary effects are associated with exposure to diesel exhaust (See Section XIV. Additional Precautions).

IV. - EMERGENCY AND FIRST AID

INHALATION: Immediately remove from contaminated area to fresh air. If necessary, for respiratory distress, give air, oxygen, and/or administer cardiopulmonary resuscitation. Obtain prompt medical attention. Patients should be kept quiet and warm until medical care is obtained.

EYE CONTACT: Flush with clean low-pressure water for at least 15 minutes. If irritation persists, obtain medical attention.

SKIN CONTACT: Thoroughly wash affected skin with mild soap and water. If irritation persists, seek medical attention. Promptly remove contaminated clothing and wash thoroughly before reuse. Discard contaminated leather and rubber items which cannot be cleaned.

INGESTION: Do not induce vomiting, since aspiration into the lungs may cause chemical pneumonia. If ingestion and/or aspiration occurs, promptly obtain medical attention.

EMERGENCY MEDICAL TREATMENT PROCEDURES: See above procedures.

V. - FIRE AND EXPLOSION DATA

FLASH POINT: 101 Degrees F (38.3 Degrees C)
Flash Point Method: ASTM - D-56

FLAMMABLE LIMITS AT NORMAL ATMOSPHERIC TEMPERATURE AND PRESSURE:

Lower (LFL): 0.88% concentration in air
Upper (UFL): 3.82% concentration in air
Explosive Limits Method: ASTM - E-681

AUTOIGNITION TEMPERATURE: 500 Degrees F (260 Degrees C)
Autoignition Temperature Method: ASTM - 659-78

FIRE AND EXPLOSION HAZARDS: Combustible! When heated above the flash point, this material will release vapors, which if exposed to an ignition source can burn in the open or explode in confined spaces. Mists or sprays of this product may be flammable at temperatures below the normal flash point.

EXTINGUISHING MEDIA: The following fire extinguishing agents may be effective in the extinguishment of a fire involving this product:

Dry Chemical
Carbon Dioxide (CO2)
Halon
Foam

(Note: Water spray or fog, if used alone, may be ineffective for extinguishment of a fire involving this product; however, it may be used to cool fire-exposed containers, tanks and structures in the immediate area.)

SPECIAL FIRE FIGHTING PROCEDURES: Do not enter any enclosed or confined space where fuel oil is on fire. Use foam in enclosed or confined space fires. Use personal protective equipment, including self-contained breathing apparatus (positive pressure mode) to protect against the hazardous effects of hydrocarbon combustion products and oxygen deficiencies. Tanks, containers and structures exposed to the fire should be cooled with water. If spill or leak has not ignited, ventilate area and use water spray to disperse vapors and protect personnel attempting to stop the leak. Fire fighting foam may also be used over spilled material to prevent ignition and flammable vapor transmission, depending on the stability and depth of the foam application.

VI. - SPILL AND DISPOSAL

PRECAUTIONS IF MATERIALS ARE SPILLED OR RELEASED: Immediately notify safety/environmental personnel. Remove all potential sources of ignition. Stop flow and contain spill. Ventilate confined spaces. Spill may create slipping hazards. Evacuate all non-essential personnel. Keep out of sewers and deny entry to water bodies if possible. For land or water spills, use sorbents, mechanical techniques or other measures which minimize damage; seek advice from an experienced spill clean-up specialist. Insure clean-up crew wears proper protective equipment. Spills may need to be reported to the National Response Center (800/424-8802) and other agencies. Check local, state and federal reporting requirements that apply to your operations.

WASTE DISPOSAL METHODS: Maximize product recovery for reuse or recycling. Use approved treatment, transporters, and disposal sites in compliance with all applicable laws. If spill is introduced into a wastewater system, the chemical and biological oxygen demand will increase. Spilled material is biodegradable if gradually exposed to microorganisms. Potential disposal methods include incineration and biodegradation.

VII. - HANDLING AND STORAGE PROCEDURES

HANDLING AND STORAGE PROCEDURES: Keep container tightly closed. Keep away from heat, open flame, or other sources of ignition. No smoking. Do not mix

or store with strong oxidants.

Special slow load procedures for "Switch Loading" must be followed to avoid the static ignition hazard that can occur when this material is loaded into tanks that previously contained gasoline or other low flash point products. (See API Publication 2003.)

VIII. - HEALTH HAZARDS

SUMMARY OF ACUTE HAZARDS: Contact with liquid, mist, or vapor can irritate skin and respiratory tract.

ROUTES OF EXPOSURE:

INHALATION: Vapors or mist from this material can irritate the nose, throat and lungs. Depending on concentration and duration of exposure, this material may produce depression of the central nervous system with symptoms such as headache, dizziness, fatigue, incoordination, unconsciousness and possibly coma. Exposure to some components of this material may cause adverse effects on the heart such as irregular heartbeats, cardiac sensitization and cardiac arrest.

EYE CONTACT: Animal studies with materials of similar composition resulted in no eye irritation.

SKIN CONTACT: Animal studies with materials of similar composition resulted in moderate to severe skin irritation following short-term exposure. No significant adverse health effects are expected to occur upon short-term exposure, under normal use conditions.

INGESTION HAZARD: May cause irritation of the mouth, throat and gastrointestinal tract, leading to nausea, vomiting, diarrhea and symptoms of central nervous system depression similar to those seen with inhalation exposure. ASPIRATION HAZARD: This material can enter the lungs during swallowing or vomiting and may cause lung inflammation and damage.

SUMMARY OF CHRONIC HAZARDS: Personnel with pre-existing central nervous system disease, skin disorders, chronic respiratory diseases or impaired kidney function should avoid exposure to this material.

Prolonged or repeated skin contact with similar petroleum distillates have produced skin tumors in laboratory animals. Prolonged dermal and inhalation exposures to similar petroleum distillates have produced kidney damage in laboratory animals.

REPRODUCTIVE RISKS: A component of this material, xylene has been shown to produce fetal toxicity and reduced female reproductive capacity in laboratory animals.

IX. - PROTECTIVE EQUIPMENT / CONTROL MEASURES

RESPIRATORY PROTECTION:

A NIOSH/MSHA-approved air purifying respirator with an organic vapor cartridge may be permissible under certain circumstances where airborne concentrations may exceed the exposure limits in section 3. NOTE: The protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is any potential for an uncontrolled release, if exposure levels are not known, or if concentrations exceed the protection limits of the air purifying respirator. Consult a health and safety professional for guidance in respirator

selection. Respirator use should comply with OSHA 29 CFR 1910.134 and/or applicable state regulations.

EYE PROTECTION: Eye protection such as chemical goggles or a face shield, should be worn whenever there is a likelihood of splashing or spraying liquid. Suitable eye wash water should be available.

SKIN PROTECTION: Avoid skin contact. When contact is likely, use impervious clothing such as gloves, apron, boots, and facial protection should be worn. Nitrile or Viton clothing material is recommended. Non-impervious clothing which becomes contaminated with this material should be removed promptly and not reworn until material is effectively removed from the clothing.

ENGINEERING CONTROLS: Eliminate all ignition sources. No smoking. Ventilate area with explosion-proof equipment to avoid accumulation of explosive levels of vapors, and to control chemical exposures below appropriate occupational exposure limits.

OTHER HYGIENIC PRACTICES: Use good personal hygiene practices. In case of skin contact, wash with mild soap and water or a waterless hand cleaner. Immediately remove soaked clothing and wash thoroughly before reuse. Discard gloves and shoes soaked in this product.

X. - PHYSICAL AND CHEMICAL DATA

BOILING POINT: AP 300 to 572 Degrees F
FREEZING POINT: AP -75 Degrees F
DENSITY: 0.81 gm/cc at 60 Degrees F (H2O = 1 at 68 Degrees F).
VOLATILE CHARACTERISTICS: Appreciable
SOLUBILITY IN WATER: Negligible
VAPOR PRESSURE: AP 0 to 0.5 (REID-PSI at 100 Degrees F)
VAPOR DENSITY (DRY AIR = 1.204 AT 68 DEGREES F): N/DA
HAZARDOUS POLYMERIZATION: Not expected to occur.
OTHER CHEMICAL REACTIVITY: N/P
OTHER PHYSICAL AND CHEMICAL PROPERTIES: Varies with source of crude.

APPEARANCE AND ODOR: Colorless to pale pink colored in appearance. Kerosene odor.
CONDITIONS TO AVOID: Heat, sparks, and open flame.

MATERIALS TO AVOID: Strong oxidants: Such as liquid chlorine, concentrated oxygen, sodium or calcium hypochlorite.

HAZARDOUS DECOMPOSITION PRODUCTS: Burning or excessive heating may result in emission of toxic gases (i.e., CO).

XI. - LABELING AND TRANSPORTATION INFORMATION

SECONDARY CONTAINER LABEL INFORMATION:
CHEMICAL OR TRADE NAME: Arctic Heating Fuel
MANUFACTURER: ARCO Alaska, Inc.
PRECAUTIONS: DANGER
Flammable
Inhalation irritant.
TARGET ORGANS: Skin, Respiratory, Central Nervous System
D.O.T. HAZARDOUS MATERIAL PROPER SHIPPING NAME: Fuel Oil

UN/NA NUMBER: UN 1993

D.O.T. HAZARD CLASS: Combustible Liquid.

XII. - REGULATORY INFORMATION

SUPERFUND AMENDMENT AND REAUTHORIZATION ACT OF 1986 (SARA), TITLE III:

SECTION 311/312 HAZARD CATEGORIES: Delayed (Chronic) Health Hazard
Fire Hazard

SECTION 313: Arctic Heating Fuel is not reportable under SARA Title III, Section 313 and 40 CFR 372. However, the product contains the following chemicals subject to the reporting requirements of SARA Title III, Section 313 and 40 CFR 372:

Toluene Ethyl benzene Naphthalene Benzene (<0.1%)
Xylene

RESOURCE CONSERVATION RECOVERY ACT (RCRA): RCRA standards for flash point and TCLP benzene may apply to waste from unadulterated product.

TOXIC SUBSTANCES CONTROL ACT (TSCA): Diesel and the components listed in this MSDS are listed on the TSCA inventory.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA): This product contains the following chemicals subject to the reporting requirements of CERCLA:

	Reportable Quantity
Xylene	1000 lbs.

PROCESS SAFETY MANAGEMENT: This MSDS contains much, if not all, of the process safety information required for this substance by the OSHA Process Safety Management Standard, 29 CFR 1910.119(d)(1), and the State of Alaska equivalent standard. Process safety information requirements, such as specific hazardous effects of the inadvertent mixing of different materials, must be determined on a process by process basis at each facility.

SPECIFIC STATE AND LOCAL LAW: Additional environmental, safety and health codes may apply to fuel oil and the components listed in this MSDS. Reference specific state and local codes for additional applicable regulations.

XIII. - ADDITIONAL PRECAUTIONS

GENERAL COMMENTS:

The symptoms of overexposure to diesel exhaust may include the following reversible effects:

mucous membrane irritation headaches
lightheadedness nausea
vomiting heartburn
weakness chest tightness
wheezing

These symptoms are reversible on cessation of exposure and do not constitute material impairment of health. Epidemiological studies in diesel-exposed salt miners, potash miners, coal miners, railroad workers, and bus garage workers found no significant association between pulmonary function test results and diesel exhaust exposure.

Lifetime exposure to diesel exhaust has been shown to produce lung tumors in laboratory animals. The exact relationship between these findings and possible human effects is not known.

Materials similar to this product were found to be mutagenic in "in vivo" tests. The exact relationship between these results and possible human effects is not known.

XIV. - SUPPLEMENT

Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or use of toilet facilities. Take a shower after work using soap and water. In case of skin contact, wash with plenty of mild soap and water. Avoid use of solvents (gasoline, kerosene, etc.) and harsh abrasive skin cleaners.

Since specific exposure standards/control limits have not been established for this material, the exposure limits shown in Section II are suggested as exposure control guidelines.

Some of the information presented and conclusions drawn herein are from sources other than direct test data on the mixture itself.

DISCLAIMERS: The information in this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its correctness.

The conditions or methods of handling, storage, use, and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.

This MSDS was prepared and is to be used only for this product. If the product is used as a component in another product, this MSDS information may not be applicable.

This MSDS has been prepared in accordance with the requirements of the OSHA Hazard Communication Standard (29 CFR 1900.1200).

DATE OF PREPARATION: 10/1/93
REVISION DATE: 4/17/94

MATERIAL SAFETY DATA SHEET

MSDS Number	711511
MSDS Name	711-511 SICO SUPREME

SECTION 1 - PRODUCT IDENTIFICATION & COMPANY INFORMATION

MSDS Number	711511
Product Name	
Product Name	711-511 SICO SUPREME
Company identification	SICO PRODUCTION INC. 2505 De la Metropole Longueuil QC J4G 1E5 CANADA
Contact	Service à clientèle / Customer Service
Telephone	450 442-7999
Fax number	450 646-7699
Emergency contact	CANUTEC
Emergency telephone	613 996-6666
HMIS Health Code	1 - Slight Hazard
HMIS Fire Code	1 - Slight Hazard
HMIS Reactivity Code	0 - Minimal Hazard
Type of product	
Type of product	WATER BASED COATING

SECTION 2 - COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Ingredient Name	CAS #	Concentration (w/w)
SILICA, GEL	63231-67-4	5-10%
ETHYLENE GLYCOL	107-21-1	1-5%
CALCINED DIATOMACEOUS EARTH	68855-54-9	1-5%
SILICA, AMORPHOUS HYDRATED	7631-86-9	1-5%

SECTION 3 - HAZARDS IDENTIFICATION

EYE CONTACT

The material is slightly irritating.

The effects are usually reversible.

SKIN CONTACT

The material is slightly irritating.

INHALATION HAZARDS

Slightly irritating for the nose and throat.

INGESTION HAZARDS

Do not swallow.

SECTION 4 - FIRST AID MEASURES

EYE CONTACT

Immediately flush eyes with lukewarm water for at least 15 minutes, holding the eyelids opened.

SKIN CONTACT

Wash the skin thoroughly with plenty of lukewarm water for at least 15 minutes; using a mild and non-abrasive soap.

INHALATION

Remove the victim to fresh air.

INGESTION

Dilute by giving 2 glasses of water or milk.

SECTION 5 - FIRE FIGHTING MEASURES

Flash point:	116 °C (240.8 °F)
Lower flammable limit (%):	Not Available
Upper flammable limit (%):	Not Available

EXTINGUISHING MEDIA

CO2

Dry chemical

Water spray

SECTION 6 - ACCIDENTAL RELEASE MEASURES

CONTAINMENT

Prevent this product or the wash waters from entering the water system or sewers.

CLEAN-UP

Ventilate the area.

Absorb the spill by using an inert material (sand, earth, vermiculite).

Transfer the absorbed material into a waste container.

REPORTING

For Canadian, report to the applicable Provincial Environment Ministry.

SECTION 7 - HANDLING AND STORAGE

HANDLING

Avoid contact with eyes.

Avoid repeated or prolonged contact with the skin.

STORAGE

Keep the containers tightly closed.

Keep away from high heat, freezing and sources of ignition.

Store in a dry, well-ventilated area at a temperature higher than 4°C (39°F) and lower than 30°C (86°F).

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

CAS #	Authority	Type	Dose
63231-67-4	ACGIH	TLV	10 mg/M3
	OSHA	PEL	6 mg/M3
107-21-1	ACGIH	TLV	50 PPM
	ACGIH	TLV-C	50 PPM
	OSHA	PEL	125 mg/M3

68855-54-9	ACGIH	TLV	10 mg/M3
	OSHA	PEL	6 mg/M3
7631-86-9	ACGIH	TLV	10 mg/M3
	OSHA	PEL	6 mg/M3

ENGINEERING CONTROLS

The exhaust air should be filtered to protect the environment.

Keep away from food, drinks and tobacco.

RESPIRATORS

Avoid breathing vapors or spray mist.

Use a dust particle mask when sanding.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Form:	Liquid.
Color:	Colorless or colored.
Odor:	Latex.
pH:	Not Available
Boiling temperature:	100-197 °C (212-386.6 °F)
Evaporation rate:	Unknown
Vapor pressure:	Not Available
Volatile weight (%):	49.14
Volatile Volume (%):	Not Available
Specific gravity (kg/L):	1.33
VOC (g/L):	130.83

SECTION 10 - STABILITY AND REACTIVITY

CONDITIONS TO AVOID

High heat

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide

Carbon dioxide

SECTION 11 - TOXICOLOGICAL INFORMATION

CAS #	Route	Species	Exposure	Dose
63231-67-4	Intravenous	Mouse	LDLo	234 mg/kg
107-21-1	Subcutaneous	Rat, adult	LD50	2800 mg/kg
	Intravenous	Rat, adult	LD50	3260 mg/kg
	Intraperitoneal	Rat, adult	LD50	5010 mg/kg
	Intramuscular	Rat, adult	LDLo	3300 mg/kg
	Oral	Rat, adult	TDLo	12500 mg/kg
	Inhalation	Rat, adult	LC50	10900 mg/kg
	Oral	Rat, adult	LD50	4700 mg/kg
	Intradermal	Rabbit, adult	LD50	4700 mg/kg
	Inhalation	Human	TCLo	10000 mg/M3
	Oral	Human	LDLo	398 mg/kg
	Subcutaneous	Mouse	LDLo	2700 mg/kg
68855-54-9	Intravenous	Mouse	LD50	45 mg/kg
	Subcutaneous	Mouse	LD50	160 mg/kg
	Intraperitoneal	Mouse	LD50	117 mg/kg
	Oral	Mouse	LD50	550 mg/kg
7631-86-9	Oral	Rat, adult	LD50	3160 mg/kg
	Skin	Rabbit, adult	LD50	2000 mg/kg

SECTION 12 - ECOLOGICAL INFORMATION

SECTION 13 - DISPOSAL CONSIDERATIONS

Dispose in accordance with applicable Federal, Provincial, state and municipal regulations.

SECTION 14 - TRANSPORT INFORMATION

Shipping name

Shipping name NOT REGULATED

SECTION 15 - REGULATORY INFORMATION

CANADIAN WHMIS: This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of 16 headings instead of 9.

WHMIS CLASS

D2B - Toxic materials causing other toxic effects

D2A - Very toxic materials causing other toxic effects

SECTION 16 - OTHER INFORMATION

The manufacturer hereby declares that the information disclosed herein have been based on our raw material suppliers' data, information and notification. Such raw materials are being used as components in the manufacturing of the product. The manufacturer has no control over the nature and content of such information. The manufacturer fully reproduces all the information it holds on the constituent of the product, at the time it is manufactured. The manufacturer does not assume any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. By this data sheet, the manufacturer hereby discloses all the potential dangers it has knowledge of and which might be related to the using or manipulation of the product in order to allow the proper care to be brought and use with regard to the product. Materials used may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards which exist and notification is hereby given to the user. The product must be handled with care and it is recommended to use all the required measures in order to ensure the protection and safety of any person using or handling the product. Notice is hereby given that injury can derive therefrom if the foregoing is not respected. The manufacturer assumes no responsibility for personal and/or material damage, lost or injury of whichever nature caused or which may occur following the wrongful, inappropriate, negligent or abusive use or handling of the product or from not having read the herein contained information.

IMO DANGEROUS GOODS DECLARATION

Shipper 1 Northern Village of Aupaluk Aupaluk, QC J0M 1X0	Reference number(s) 2 Page 1 of 1 Pages
Consignee 3 Onyx Industries 2630 Industrial Chambly QC J3L 4V2	Carrier 4 NSSI 6565 Hébert Ste-Catherine, QC J5C 1B5
CONTAINER/VEHICULE PACKING CERTIFICATE 5 DECLARATION I hereby declare that the packing of the goods into the container/vehicle has been carried out in accordance with the applicable provisions of 5.4.2.1. TO BE COMPLETED FOR SHIPMENTS IN CONTAINERS OR VEHICLES	Name/status, company/organization of signatory Place and date Signature on behalf of packer
Vessel No. and date / Port of loading 6 Anna Desgagnés / Aupaluk Port of discharge 8 Ste-Catherine	(Reserved for text, instructions or other matter) 7

Shipping marks	Number and kind of packages; description of goods **	Gross mass (kg)	Net mass (kg)	Cube (m^3)
6 drums	Waste oil (Not TDG Regulated)		1200 Kg	
2 wrangler bags on pallets	Waste Batteries, wet, filled with acid, UN2794, Class 8 PG III		1500 Kg	
2 drums	Waste Gasoline, UN 1203 Class 3, PG III, F.P. -40°C		400 Kg	

Goods delivered as: 9

- [ ] Breakbulk cargo
- [X] Unitized cargo
- [ ] Bulk packages

Type of unit (container, trailer, tank vehicle, etc.)

- [ ] Open
- [ ] Closed

Insert "X" in appropriate box

(This column may be left empty apart from the heading, in which case insert appropriate description)

** See 5.4.1.

The IMDG code page number should not appear on this form.

ADDITIONAL INFORMATION in certain circumstances special information/certificates are required, see IMDG Code Sections 5.4.1

24-Hour Number (Emergency Telephone No.): 1-819-XXX-YYYY 10

DECLARATION

I hereby declare that the contents of this consignment are fully and accurately described above by the Proper Shipping Name and are classified, packaged, marked and labelled/placarded and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Name/status, company/organization of signatory 11
Eli Mark, manager, NVA

Place and date
Aupaluk, July 30, 2006

Signature on behalf of shipper