

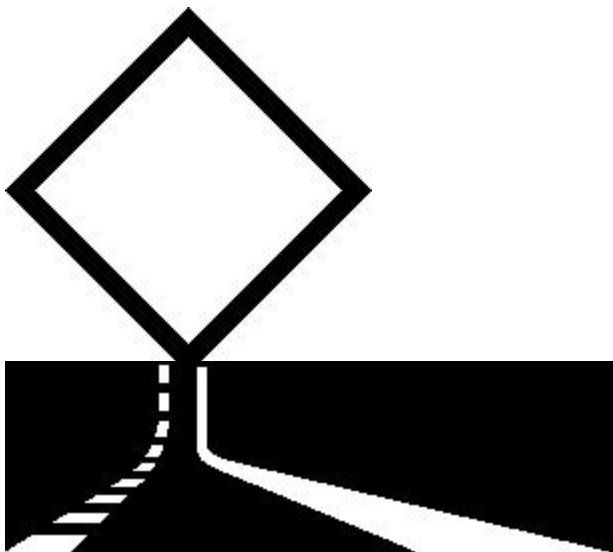
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**A Technical Publication  
from the Co-ordination  
and Information Centre**

# **Transportation of Chemical Waste from School Laboratories**

November 2009

**Dangerous Goods  
And Rail Safety**



**Government  
of Alberta** ■  
Transportation

This material is meant as a guide to certain parts of the Transportation of Dangerous Goods Regulations and is not meant to be a substitute for them. It is the responsibility of handlers, offerers and transporters of dangerous goods to consult the Regulations for the exact requirements. The Co-ordination and Information Centre of Alberta Transportation can provide accurate information regarding the Regulations 24 hours a day.

**Co-ordination and Information Centre**

**Alberta Transportation  
Dangerous Goods and Rail Safety Branch  
Main Floor, Twin Atria Building  
4999 – 98 Avenue  
Edmonton, Alberta, T6B 2X3**

**Tel. Edmonton: (780) 422 – 9600  
Tel. Province-wide: 1 (800) 272 – 9600  
Fax: (780) 427 – 1044**

**These telephone lines are recorded to assist in responding to the emergency (natural/manmade) and/or inquiry regarding dangerous goods and to ensure that the information is accurate. Direct any questions regarding the recording to the Compliance Officer responding to your call or contact the Manager of the CIC at 780-427-8660. *Legal Authority: Dangerous Goods Transportation and Handling Act, Section 13(1).***

## GENERAL

The Transportation of Dangerous Goods (TDG) Regulations regulates the transportation of hazardous chemicals, including wastes, by road, air, rail and marine modes. All the provinces and territories have adopted this legislation for road transportation within their borders.

This bulletin sets out a procedure to safely transport hazardous wastes from schools within Alberta to an acceptable disposal site. Throughout this document "hazardous waste" is intended to mean "wastes which are classified as dangerous goods".

The TDG Regulations should be consulted before you handle, prepare for transport, transport or receive hazardous waste. If you have any questions on the transport of waste chemicals, contact the Dangerous Goods and Rail Safety Branch of Alberta Transportation at (780) 422-9600 or 1-800-272-9600 (toll free within Alberta).

## WHO SHOULD USE THIS GUIDE

The generator of a waste has a responsibility for identifying whether it is a hazardous waste and preparing it for shipment. The carrier is responsible for safely moving the hazardous wastes. The receiver of hazardous wastes is responsible for the disposal of the wastes. This brochure will be useful to anyone who generates, handles, transports, treats, stores or disposes of small quantities of hazardous wastes.

## CLASSIFICATION OF HAZARDOUS WASTE

Part 2 of the TDG Regulations specify nine hazard classes. Several of these classes have divisions within the hazard class based on the specific hazard.

TDG Classes	
Class	Hazard
1	Explosives
2	Compressed Gases
3	Flammable Liquids
4	Flammable Solid, Substances Liable to Spontaneous Combustion, Substances That on Contact with Water Emit Flammable Gases (Water-reactive Substances
5	Oxidizer or organic peroxide
6	Toxic Substances and Infectious Substances
7	Radioactive Materials
8	Corrosives
9	Miscellaneous Products, Substances or Organisms

The examples provided cover the most common situations that laboratory managers encounter.

- a) If the material has not been altered chemically since it was received from the supplier and it still meets the criteria for Classes 1 to 8 then the relevant classification information should be as described on the shipping documentation received from the supplier. For example, if you wish to dispose of a bottle containing Diethylamine then the classification would be:

Shipping Name:	DIETHYLAMINE
UN Number:	UN 1154
Class:	3
Sub-Class:	8
Packing Group:	II

- b) If the material has been diluted or mixed with other regulated chemicals with similar classifications then the classification can be determined. For example, a container of miscellaneous acids has been collected and is now ready for disposal. The mixture contains approximately 30% Hydrochloric Acid, 12% Acetic Acid and the remainder is water. The classification would be:

Shipping Name:	CORROSIVE LIQUID, N.O.S. (Hydrochloric Acid)
UN Number:	UN1760
Class:	8
Sub-Class:	None
Packing Group:	II

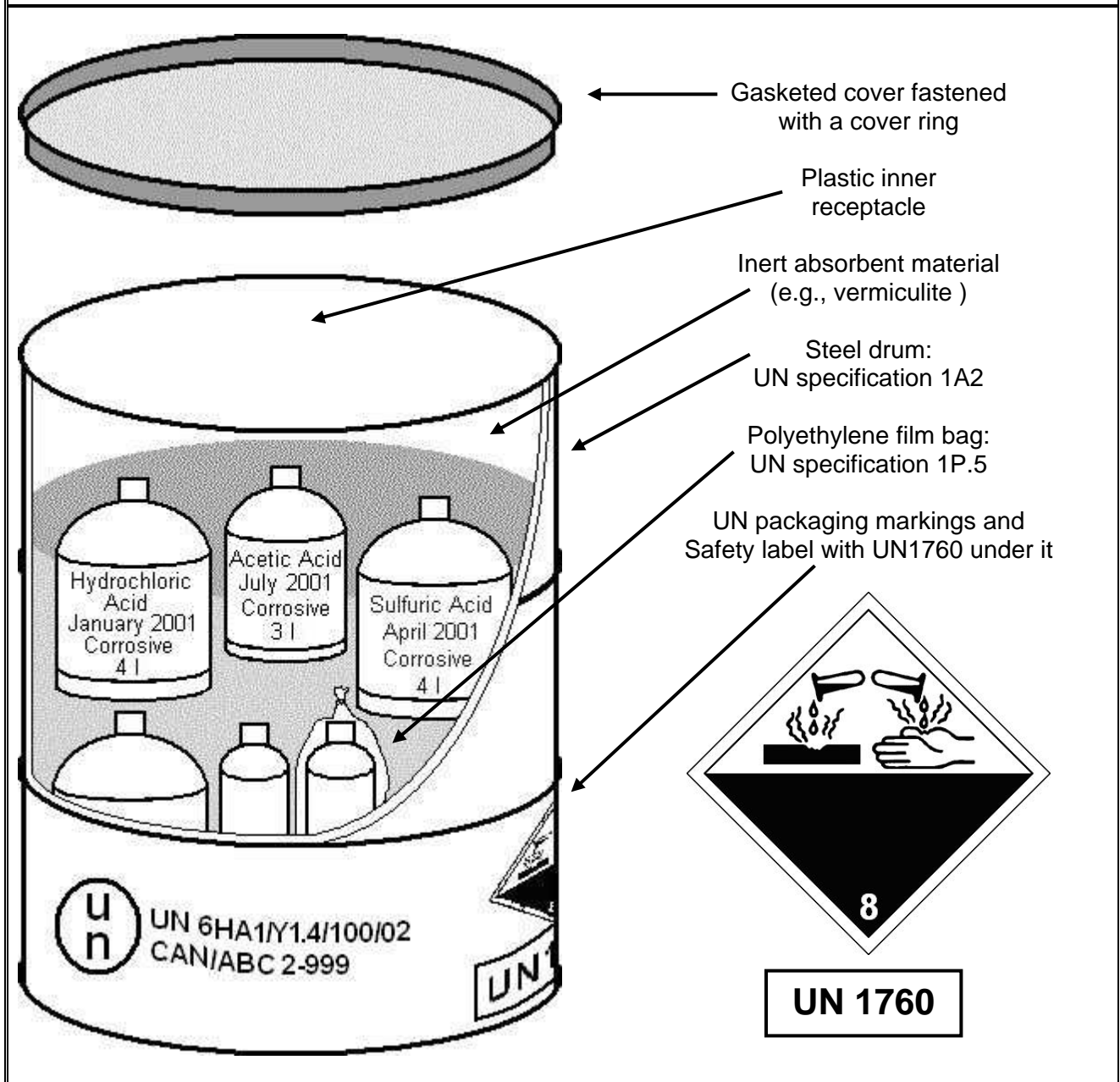
If the product (i.e., UN 1760) has Special Provision 16 attached to it (Column 5 of Schedule 1 of the TDG Regulations), it requires the technical name of the most dangerous goods in the mixture be identified. Therefore, the acid named in brackets after the N.O.S. (Not Otherwise Specified) is required because Hydrochloric Acid represents the largest volume of corrosive material in the mixture. Special Provisions are described in Schedule 2 of the TDG Regulations.

The Packing Group was selected because neither acid in the mixture has a Packing Group less than II as shown in Schedule 1 of the TDG Regulations. Choose the lowest Packing Group of all the constituents so that you represent the worst risk that may be encountered.

## **PACKAGING REQUIREMENTS**

The Dangerous Goods and Rail Safety Branch of Alberta Transportation recommends the use of "Labpacks" for the transportation of small quantities of compatible wastes from school laboratories. A typical "Labpack" might include leftover chemicals, samples, out-of-date material and used (unwashed) containers. It is best if wastes that have different classes are packed in different "Labpacks". Each individual waste must be sealed within an inner container carrying an identifying label. Inner containers are then packed in a steel drum and surrounded by inert filler material. Certain classes of wastes should not be included in "Labpacks". These are: explosives, radioactives, infectious substances, PCBs or unidentified materials. Special packaging and transportation arrangements may also be necessary for shock-sensitive materials.

### Typical Labpack: Packaging with UN specification 6HA1



## IDENTIFICATION OF WASTES

Each inner container should be labeled with a description of its contents. This description should include, whenever possible:

- the specific chemical name and generic name (not a trade name) of the waste;
- its approximate date of purchase;
- its Primary Class and Subsidiary Class (if any); and
- the approximate quantity.

Examples of inner container labels are:

Muriatic Acid (HCl) May, 1988 Class 8, Corrosive Liquid 250 mL	Temik (aldicarb) May, 1988 Class 6.1, Toxic Solid 500 g
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Unknown waste material should be segregated for characterization testing by the treatment organization or a suitable analytical laboratory.

## STORAGE OF WASTES

All wastes awaiting removal in "Labpacks" should be clearly identified as hazardous waste, and stored securely in accordance with provincial and municipal government requirements.

## INNER CONTAINERS

An inner container may be made of metal, glass, plastic, fiber or a material which will not react with its contents. All inner containers should be securely sealed to prevent accidental release of its contents.

Wastes from different Classes must not be physically mixed in one inner container. If it has previously held an incompatible compound, the container must be cleaned before reuse.

## TRANSIT DRUMS

Different classes of waste should be packed in separate open head drums. All drums must have properly secured gasketed covers, complete with cover rings and fastening bolts. Drums should be as described in standard CAN/CGSB-43.150-97. This standard describes drums made according to United Nations recommendations. Modified closed drums with their heads cut out are not acceptable. For details of the CAN/CGSB-43.150-97 standard, contact the Co-ordination and Information Centre (CIC) at 1-800-272-9600.

## **FILLING THE DRUM**

The inner containers, individually labeled, are placed in the appropriate transit drums, surrounded by vermiculite or a similar inert absorbent packaging material. There should be enough absorbent material in a "Labpack" to absorb all the liquid wastes in the containers packed in the drum.

Any small container should be sealed in a heavy plastic bag if there is any doubt about its integrity.

Each transit drum must contain waste from one hazard Class only.

## **DOCUMENTATION**

Each drum should be numbered and labeled, according to the TDG Regulations. In addition, a Dangerous Goods Shipping Document must be prepared to accompany the shipment.

The TDG Regulations for the transportation and handling of hazardous wastes apply to material in "Labpack" form. A waste manifest must be completed and filed with Alberta Environment when a "Labpack" is transported. Obtain copies of the waste manifest form from the Land/Waste Unit, Reclamation Policy Branch of Alberta Environment at (780) 427-0666 (for a toll free call in Alberta dial 310-0000). Information on the waste manifest can be obtained at (780)427-0637. Answers to technical questions can be obtained at (780) 427-0636 or 427-0637.

A waste manifest produced by Environment Canada is an accepted dangerous goods shipping document despite the requirements of Section 3.5 of the TDG Regulations. The waste manifest may be used as a dangerous document because Section 3.5(7) allows that the UN number required in the description of each of the dangerous goods may be included in the shipping document before the shipping name.

The information on a shipping document must be easy to identify, legible and printed in indelible ink. The following table outlines the minimum required information that must appear on a shipping document. [Section 3.4].

Shipping Document Information	When Required	Where in The Regulations
Date	Always	3.5(1)(b)
Name and address of consignor	Always	3.5(1)(a)
Description of goods in the following order		3.5(1)(c)
a. Shipping name	Always	3.5(1)(c)(i)
b. The technical name of the most dangerous substance related to the primary classification	If Provision 16 of Schedule 2 applies	3.5(1)(c)(i)(A)
c. Primary classification	Always	3.5(1)(c)(ii)
d. Compatibility group	For Class 1	3.5(1)(c)(iii)
e. Subsidiary classifications	If Any	3.5(1)(c)(iv)
f. UN number	Always	3.5(1)(c)(v)
g. Packing group (none for compressed gases)	If Any	3.5(1)(c)(vi)
The quantity in the International System of Units (SI) <sup>1</sup>	Always	3.5(1)(d)
The net explosive quantity	For Class 1	3.5(1)(d)
The number of containers <sup>1</sup>	For dangerous goods in small containers requiring safety labels	3.5(1)(e)
The words “24-Hour Number” followed by a telephone number where the consignor can be easily reached <sup>2</sup>	Always	3.5(1)(f)
Emergency Response Assistance Plan (ERAP) number and telephone number to activate it	If Required	3.6(1)
The control and emergency temperatures	For products in Classes 4.1 and 5.2	3.6(3)


1. If the quantity of dangerous goods or the number of small means of containment changes during transport, the carrier must show on the shipping document or on a document attached to the shipping document the change in the quantity of dangerous goods or the number of small containers [Section 3.5(5)].
2. A consignor can also use the telephone number of an agency that is competent to give the technical information on the shipment. For example, it is possible to use CANUTEC as a source of technical information provided that the consignor has received permission in writing from CANUTEC [Section 3.5(2)].

## SAFETY MARKS


The outside of the "Labpack" must show:

- a label for the specific hazard class of waste it contains;
- the Shipping Name of each inner container; and
- the UN number of each inner container; and

A list can be attached to the outside of the "Labpack" showing the Shipping Names and UN numbers of all the different inner containers.

Example of Safety Marks on a Drum Containing Flammable Liquid Waste									
	<table border="1"><tbody><tr><td>UN2056</td><td>TETRAHYDROFURAN</td></tr><tr><td>UN1208</td><td>HEXANES</td></tr><tr><td>UN1155</td><td>DIETHYL ETHER</td></tr><tr><td>UN1294</td><td>TOLUENE</td></tr></tbody></table>	UN2056	TETRAHYDROFURAN	UN1208	HEXANES	UN1155	DIETHYL ETHER	UN1294	TOLUENE
UN2056	TETRAHYDROFURAN								
UN1208	HEXANES								
UN1155	DIETHYL ETHER								
UN1294	TOLUENE								
A Class 3 label has a red background and a white flame symbol									

If the load is greater than 500 Kgs, before any hazardous wastes are loaded onto a vehicle, the person in charge must ensure that the applicable placards are placed where they are clearly visible, one placard on each of the four sides of the vehicle. If the consignment is all of one Class then use the placards for that Class, or if there is more than one Class or UN Number of waste in the consignment, you may use a set of four "DANGER" placards to represent the mixed hazards [Section 4.15].

<b>The Danger Placard</b>	
	<p>The danger placard is red with a white stripe and the word danger in the middle of the placard.</p>

## **TRAINING**

Anyone who handles, offers for transport or transports dangerous goods must have a valid Dangerous Goods Training Certificate or must be under the direct supervision of a trained person [Section 6.1].

A person is adequately trained if the person has sound knowledge of the topics listed below that relate directly to the person's duties [Section 6.2]:

- classification of dangerous goods, shipping names, UN numbers, packing groups;
- shipping documentation;
- Safety marks;
- certification safety marks, safety requirements and safety standards;
- emergency response assistance plan requirements;
- reporting requirements;
- safe handling and transportation practices;
- proper use of equipment; and
- emergency measures to take in case of releases.

The employer issues a training certificate when he/she has reasonable grounds to believe that an employee possesses adequate training. A training certificate must have the following information [Section 6.3]:

- the name and address of the employer,
- the name of the employee,
- the date when the training certificate expires, 36 months after being issued,
- the aspects of handling, offering for transport or transporting dangerous goods for which the employee is trained, and
- the signatures of the employer and the employee

Self-employed people can issue training certificates for themselves. The employer must keep a record of the training that the employee has received and a copy of his/her training certificate [Section 6.6]. The training certificate must be immediately presented to an inspector who requests for it [Section 6.8].

## SPILL REPORTING

In case of an accidental release or imminent accidental release of dangerous goods, the person who has possession of the dangerous goods must report immediately. An immediate report is required when the quantities of dangerous goods released exceed the amounts set out in the following table [Section 8.1 (1)] or for any imminent accidental release. For more information on reporting requirements, request the CIC information bulletin entitled Reporting an Accidental Release of Dangerous Goods.

Class	Quantity
1	Any quantity that (a) could pose a danger to public safety or 50 kg; or (b) is included in Class 1.1, 1.2, 1.3 or 1.5 and is (i) not subject to special provision 85 or 86 but exceeds 10 kg net explosives quantity, or (ii) subject to special provision 85 or 86 and the number of articles exceeds 1000.
2	Any quantity that could pose a danger to public safety or any sustained release of 10 minutes or more
3	200 l
4	25 kg
5.1	50 kg or 50 l
5.2	1 kg or 1 l
6.1	5 kg or 5 l
6.2	Any quantity
7	Any quantity that could pose a danger to public safety; or an emission level greater than the level established in section 20 of the <i>Packaging and Transport of Nuclear Substances Regulations</i> .
8	5 kg or 5 l
9	25 kg or 25 l

In Alberta, the report must be made to:

- the local police,
- Alberta Transportation, Dangerous Goods and Rail Safety Branch at 1-800-272-9600,
- the person's employer,
- the consignor of the dangerous goods,
- the owner, lessee or charterer of the road vehicle involved, and
- for Class 1, Explosives, Class 6.2, Infectious Substances or an accidental release from a cylinder that suffered a catastrophic failure, CANUTEC at 613-996-6666.

## EXEMPTIONS

### 150 kg Gross Mass Exemption (Section 1.15)

(1) Part 3 (Documentation), Part 4 (Dangerous Goods Safety Marks), Part 5 (Means of Containment), Part 6 (Training) and Part 8 (Accidental Release and Imminent Accidental Release Report Requirements) do not apply to the handling, offering for transport or transporting of dangerous goods on a road vehicle, a railway vehicle or a ship on a domestic voyage if

(a) in the case of

(i) dangerous goods included in Class 2, Gases, they are in one or more small means of containment in compliance with the requirements for transporting gases in Part 5, Means of Containment, or

(ii) dangerous goods not included in Class 2, Gases, they are in one or more small means of containment designed, constructed, filled, closed, secured and maintained so that under normal conditions of transport, including handling, there will be no accidental release of the dangerous goods that could endanger public safety;

(b) except for dangerous goods included in Class 2, Gases, the dangerous goods are contained in one or more means of containment each of which has a gross mass less than or equal to 30 kg; and

(c) the gross mass of all dangerous goods

(i) transported on the road vehicle or the railway vehicle is less than or equal to 150 kg, and

(ii) transported on the ship on a domestic voyage is less than or equal to 150 kg, excluding dangerous goods in a road vehicle or railway vehicle being transported on the ship.

(2) Subsection (1) does not apply to dangerous goods that

(a) are in a quantity or concentration that requires an emergency response assistance plan;

(b) require a control or emergency temperature;

(c) are included in Class 1, Explosives, except for

(i) UN numbers UN0044, UN0105, UN0131, UN0161, UN0173, UN0186, UN0191, UN0197, UN0276, UN0312, UN0323, UN0335 if classified as a consumer firework, UN0336, UN0337, UN0351, UN0373, UN0404, UN0405, UN0431, UN0432, UN0454 and UN0499, and

(ii) UN numbers UN0012, UN0014 and UN0055 if the cartridges are for shotguns or, in the case of cartridges for rifles or pistols, the calibre is less than 12.7 mm (50 calibre);

(d) are included in Class 2.1, Flammable Gases, and are in a cylinder with a capacity greater than 46 L;

(e) are included in Class 2.3, Toxic Gases;

(f) are included in Class 4, Flammable Solids, and Packing Group I;

(g) are included in Class 5.2, Organic Peroxides, unless they are allowed to be transported as limited quantities in accordance with section 1.17 and column 6 of Schedule 1;

(h) are liquids included in Class 6.1, Toxic Substances, and Packing Group I;

(i) are included in Class 6.2, Infectious Substances; or

(j) are included in Class 7, Radioactive Materials, and are required to be licensed by the Canadian Nuclear Safety Commission.

### **500 kg Gross Mass Exemption (Section 1.16)**

(1) Part 3 (Documentation), Part 4 (Dangerous Goods Safety Marks) and Part 5 (Means of Containment) do not apply to the handling, offering for transport or transporting of dangerous goods on a road vehicle, a railway vehicle or a ship on a domestic voyage if

(a) in the case of

(i) dangerous goods included in Class 2, Gases, they are in one or more small means of containment in compliance with the requirements for transporting gases in Part 5, Means of Containment, or

(ii) dangerous goods not included in Class 2, Gases, they are in one or more means of containment

(A) each of which has a gross mass less than or equal to 30 kg and that is designed, constructed, filled, closed, secured and maintained so that under normal conditions of transport, including handling, there will be no accidental release of the dangerous goods that could endanger public safety, or

(B) that are drums in compliance with the requirements of section 5.12 of Part 5, Means of Containment, for transporting dangerous goods in drums;

(b) the gross mass of all dangerous goods

(i) transported on the road vehicle or the railway vehicle is less than or equal to 500 kg, and

(ii) transported on the ship on a domestic voyage is less than or equal to 500 kg, excluding the dangerous goods in a road vehicle or railway vehicle being transported on the ship;

(c) each means of containment has displayed on one side, other than a side on which it is intended to rest or to be stacked during transport,

(i) the dangerous goods safety marks required by Part 4, Dangerous Goods Safety Marks, or

(ii) for dangerous goods, other than dangerous goods included in Class 2, Gases, the shipping name of the dangerous goods and the marks required for them in one of the following Acts and regulations, as long as those marks are legible and visible during handling and transporting in the same manner as dangerous goods safety marks:

(A) the "Pest Control Products Act" and its regulations, or

(B) the "Hazardous Products Act" and its regulations;

(d) the dangerous goods are accompanied by a shipping document or document that is located, for a road or railway vehicle or a ship, in accordance with the requirements for location of a shipping document in sections 3.7 to 3.9 of Part 3, Documentation; and

(e) the shipping document or document referred to in paragraph (d) includes the following information in the following order:

(i) the primary class of the dangerous goods, following the word "Class" or " , and

(ii) the total number of means of containment, on which a dangerous goods safety mark is required to be displayed, for each primary class, following the words "number of means of containment".

*For example: Class 3, number of means of containment, 10*

*Class 8, number of means of containment, 12*

(2) Subsection (1) does not apply to dangerous goods that

(a) are in a quantity or concentration that requires an emergency response assistance plan;

(b) require a control or emergency temperature;

(c) are included in Class 1, Explosives, except for

(i) explosives included in Class 1.4S, or

(ii) UN numbers UN0191, UN0197, UN0276, UN0312, UN0336, UN0403, UN0431, UN0453 and UN0493;

(d) are included in Class 2.1, Flammable Gases, and are in a cylinder with a capacity greater than 46 L;

(e) are included in Class 2.3, Toxic Gases;

(f) are included in Class 4, Flammable Solids, and Packing Group I;

(g) are included in Class 5.2, Organic Peroxides, unless they are allowed to be transported as limited quantities in accordance with section 1.17 and column 6 of Schedule 1;

(h) are liquids included in Class 6.1, Toxic Substances, and Packing Group I;

(i) are included in Class 6.2, Infectious Substances; or

(j) are included in Class 7, Radioactive Materials, and are required to be licensed by the Canadian Nuclear Safety Commission.

## **REGISTRATION**

All shippers, carriers and receivers of hazardous wastes must register with the Land/Waste Unit, Reclamation Policy Branch of Alberta Environment at (780) 427-0637 (for a toll free call in Alberta dial 310-0000).

## **APPROPRIATE CONTACTS**

### **Provincial Shipments:**

Dangerous Goods and Rail Safety Branch  
Alberta Transportation  
4999 – 98 Avenue  
Edmonton, Alberta T6B 2X3  
Tel. (Edmonton): (780) 422-9600  
Tel. (Province-wide, 24 hours): 1-800-272-9600  
Fax: (780) 427-1044

Environmental Response Centre  
Alberta Environment  
4999 – 98 Avenue  
Edmonton, Alberta T6B 2X3  
Tel. (Province-wide, 24 hours) 1-800-222-6514  
Fax: (780) 427-3178

Land/Waste Unit  
Reclamation Policy Branch  
Alberta Environment  
4<sup>th</sup> Fl, Oxbridge Place  
9820 – 106 Street  
Edmonton, Alberta T5K 2J6  
Tel. (780) 427-0637

For a toll free call in Alberta dial 310-0000.

### **International / Trans border Shipments:**

Transport Dangerous Goods Directorate  
Transport Canada  
330 Sparks St.  
9th Floor  
Ottawa, Ontario K1A 0N5  
Tel.: (613) 992-4624

Waste Reduction and Management Division  
Environment Canada  
Place Vincent Massey  
351 St. Joseph Blvd.  
Hull, Quebec K1A 0H3  
Tel.: (819) 997-3377 or (819) 953-2171

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