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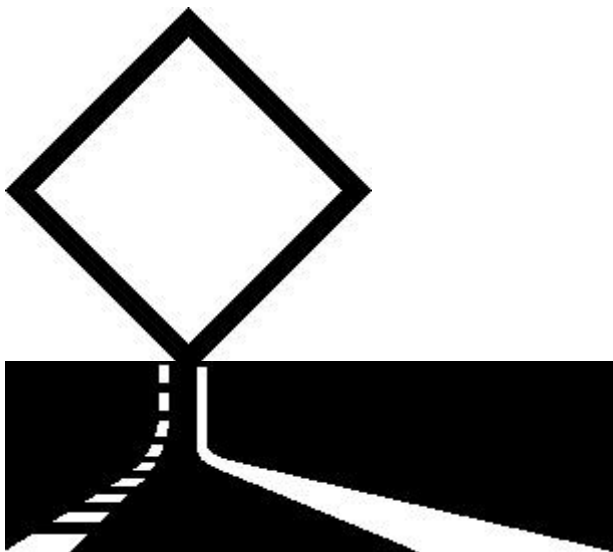
**A Technical Publication
from the Co-ordination
and Information Centre**

Transportation of Dangerous Goods in the Oilpatch

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 Coordination 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).*

INTRODUCTION

Every day in Alberta approximately 150,000 m³ of petroleum crude oil and 360 MM m³ of natural gas are produced. Of these amounts an estimated minimum 10% of the crude, which includes gas condensates (a quantity equal to 15,000,000 l) ends up being transported by road daily.

In addition to this traffic there is also a 'reverse flow' of produced water/brine solution, in quantities approximately the same as the crude, being taken back for disposal down former producing wells. While the brine is not regulated by Transportation of Dangerous Goods (TDG) Regulations (federal), the residue of crude left in the tank **is** regulated.

SURFACE TRANSPORTATION

In the oilpatch there are two major means of transporting oil and gas products, namely by gathering lines / pipelines and by truck from battery to either a distribution point such as a pipeline terminal or a cleaning plant.

Pipeline operations are regulated under the Pipeline Act [RSA 2000]. Road traffic comes under the jurisdiction of the TDG Act and Regulations which are applicable at any time the dangerous goods are in the transportation mode.

PURPOSE OF THE TDG ACT

The purpose of the TDG Act and Regulations is to promote public safety when dangerous goods are being transported by road, rail, sea and air. For instance, if a transport vehicle carrying dangerous goods is involved in an accident, the placards on the vehicle and the dangerous goods documentation (which must be kept in the cab of the vehicle) will help the emergency responders (e.g., fire, police) deal with the situation in the safest manner possible.

24 HOUR EMERGENCY AND INFORMATION LINE

Alberta Transportation, Dangerous Goods and Rail Safety Branch, maintains an emergency and information line. The Co-ordination and Information Centre (CIC) provides technical interpretations of the TDG Regulations as well as assistance in determining proper classification, documentation, safety marks and training requirements. They are available on a 24 hour basis at 422-9600 in Edmonton, or toll free in Alberta at 1-800-272-9600.

PERMITS FOR EQUIVALENT LEVEL OF SAFETY

A Permit for Equivalent Level of Safety may be issued for the handling, offering for transport or transporting dangerous goods in a manner that does not necessarily comply with the Regulations but provides a level of safety equivalent to that required in the Regulations. Permits are only issued if health, safety and the environment are not compromised. It is not necessary to obtain a permit if the TDG Act and Regulations are fully complied with.

There are several associations who have applied for permits on behalf of their members. Examples are:

Canadian Association of Oilwell Drilling Contractors [CAODC]
Canadian Association of Petroleum Producers [CAPP]
Petroleum Services Association of Canada [PSAC]

If you are an active member of an industry association, you can check with the CIC to find out if the association has been issued the permit you require. A copy of the permit would be available from the association. The CIC will not supply a copy of association permits to individuals. We can provide permit information such as the type of permit, expiry date and the association representative's name and phone number.

For more information on the types of permits that are available and how to apply, call the CIC.

WHICH SUBSTANCES ARE REGULATED?

Table 1 on the next page shows some of the dangerous goods commonly transported around the oilpatch. It is not an exhaustive list; if you need assistance in determining if what you are transporting is a dangerous good, call the CIC.

TABLE 1.

Common Name	Shipping Name	UN #	Class	Packing Group
Acetylene	ACETYLENE, DISSOLVED	UN1001	2.1	-
Batteries	BATTERIES, WET, FILLED WITH ACID	UN2794	8	III
	BATTERIES, WET, NON-SPILLABLE	UN2800	8	III
Carbon Dioxide, refrigerated liquid	CARBON DIOXIDE, REFRIGERATED LIQUID	UN2187	2.2	-
Cartridges, Oil Well Servicing	CARTRIDGES, OIL WELL	UN0277	1.3C	II
	CHARGES, SHAPED	UN0439	1.2D	II
Caustic soda	SODIUM HYDROXIDE SOLUTION	UN1824	8	II, III
Compressed Air	AIR, COMPRESSED	UN1002	2.2	-
Corrosive Liquid	CORROSIVE LIQUID, N.O.S.	UN1760	8	I, II, III
Crude Oil & Condensate	PETROLEUM CRUDE OIL	UN1267	3	I, II, III
Diesel	DIESEL FUEL or FUEL OIL	UN1202	3	III
Engine Starting Fluid	AEROSOLS, flammable	UN1950	2.1	-
Flammable Liquids, Unknown Mixture	FLAMMABLE LIQUID, N.O.S.	UN1993	3	I, II, III
Gas Line Antifreeze or Methanol or Methyl Hydrate	METHANOL	UN1230	3 (6.1)	II
Gas	GASOLINE	UN1203	3	II
LPG	LIQUIFIED PETROLEUM GAS	UN1075	2.1	-
Nitrogen, liquid	NITROGEN, REFRIGERATED LIQUID	UN1977	2.2	-
Nitrogen, gas	NITROGEN, COMPRESSED	UN1066	2.2	-
Oxygen	OXYGEN, COMPRESSED	UN1072	2.2 (5.1)	-
Paint and Related Materials	PAINT or PAINT RELATED MATERIAL	UN1263	3	I, II, III
Propane	PROPANE	UN1978	2.1	-
Drilling Fluids	CORROSIVE LIQUID, N.O.S.	UN1760	8	I, II, III
Frac Oil(s)	FLAMMABLE LIQUID, N.O.S.	UN1993	3	I, II, III

DOCUMENTATION

It is the responsibility of the consignor to prepare a proper shipping document when offering dangerous goods for transportation. The document is similar to a standard bill of lading but must contain information needed to describe the dangerous goods. The shipping document is handed over to the initial carrier and must accompany the consignment throughout its journey (Sections 3.1 and 3.2). The consignor and each carrier that transported shall retain a copy of the shipping document for a period of two years (Section 3.11).

When a driver enters a power unit (for example, a tractor) he or she must place the shipping document in a pocket mounted on the driver's door, or within the driver's reach. If the driver leaves the power unit he or she must place the document in the door pocket, on the driver's seat or on a location visible to anyone entering the power unit through the driver's door (Section 3.7).

The following is the minimum required information which must appear on a shipping document:

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. The words "Not Odorized"	For liquefied petroleum gas that has not been odorized	3.5(1)(c)(i)(B)
d. Primary classification	Always	3.5(1)(c)(ii)
e. Compatibility group	For Class 1	3.5(1)(c)(iii)
f. Subsidiary classifications	If Any	3.5(1)(c)(iv)
g. UN number	Always	3.5(1)(c)(v)
h. Packing group (none for compressed gases)	If Any	3.5(1)(c)(vi)
The quantity in the International System of Units (SI) ^{1,2}	Always	3.5(1)(d)
Net explosives quantity	For Class 1	3.5(1)(d)

Shipping Document Information	When Required	Where in The Regulations
The number of containers ²	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 ³	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)

Note:

1. If the quantity of dangerous goods is less than 10% of the container’s capacity then the words “Residue – Last Contained” followed by the shipping name of the dangerous goods last contained in the means of containment may be used to describe the quantity. This does not apply to Class 2 gases in small containers and Class 7 radioactive substances [Section 3.5(4)].
2. 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)].
3. 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)].

Multiple Deliveries

If the quantity of dangerous goods or the number of small means of containment changes during transport, the carrier must show the change in the quantity or the number of small means of containment. The change must be shown on the shipping document or on a separate document attached to the shipping document. How the carrier shows the change in the quantity is the carrier’s choice. The carrier can change the number used to describe the quantity, or show additions or subtractions from the number used to express the quantity [Section 3.5(5)].

Oilfield Waste Manifest

When shipping oilfield production wastes a special waste manifest is used. This document was developed by the Energy Resources Conservation Board (ERCB) and meets the requirements for a waste manifest as specified by Alberta Environment.

For complete details contact your nearest ERCB office:

- Bonnyville, (780) 826-5352
- Drayton Valley, (780) 542-5182
- Grande Prairie, (780) 538-5138
- High Level, (780) 926-5399
- Red Deer, (403) 340-5454
- Midnapore, (403) 297-8303
- St. Albert, (780) 460-3800
- Medicine Hat, (403) 527-3385
- Wainwright, (780) 842-7570

SAFETY MARKS

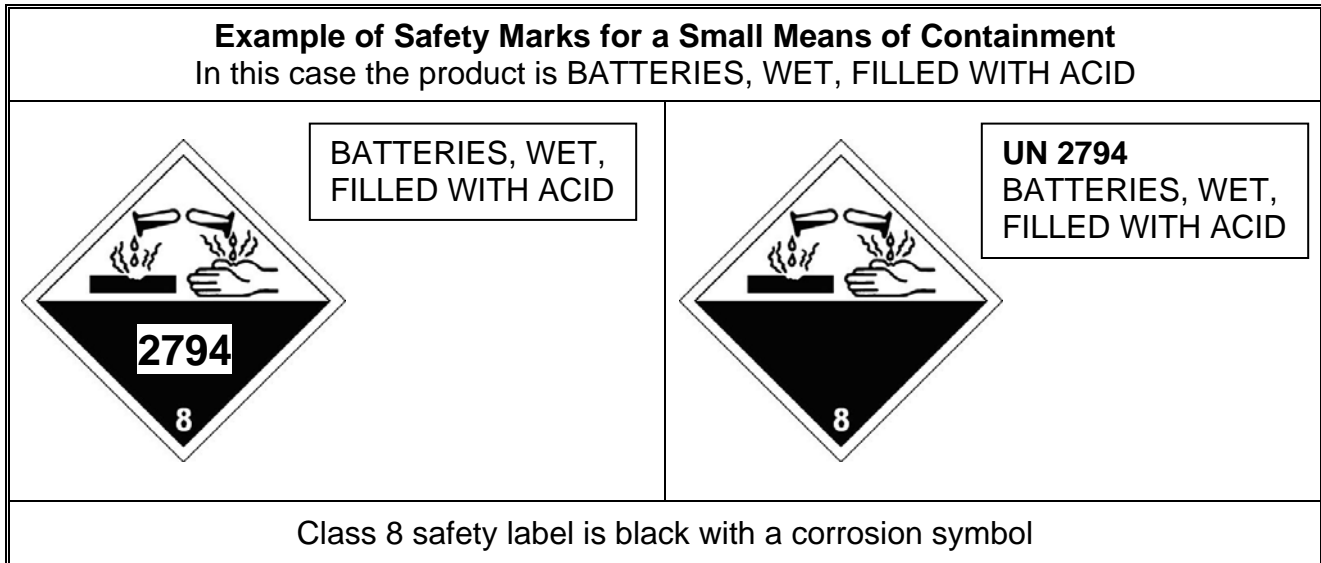
Safety marks are labels, placards, UN numbers and package markings. They are described in Part 4 of the TDG Regulations. The consignor is responsible for displaying safety marks on all means of containment carrying dangerous goods.

The carrier is responsible for making sure that the safety marks remain displayed during transport. The carrier is also responsible for removing or changing the safety marks if the requirements for dangerous goods safety marks change during transport [Section 4.5].

Small Means of Containment

A small means of containment has a capacity of 450 l or less. A small container must display the dangerous goods label(s), the shipping name and the UN number of the product (Sections 4.10 to 4.12). The label is 100 mm in length. If the container is too small or it has an irregular shape, the label can be reduced in size but must not be reduced to less than 30 mm [Section 4.7(2)].

The UN number for a dangerous goods label can be placed inside the label or next to the primary class label as shown below [Section 4.8(1)(b)]. If the UN number is inside the label the letters "UN" must be omitted.



Large Means of Containment

Placards are larger safety marks that are 250 mm in length. A large means of containment has a capacity greater than 450 l and it can be a container such as a bulk tank. According to Subsection 4.15(1) a large means of containment requires placards representing the primary classification if the dangerous goods:

- are in a quantity or concentration that requires an emergency response assistance plan (ERAP),
- are a liquid or a gas in direct contact with the large means of containment (e.g., a tank full of gasoline or propane),
- have a gross mass greater than 500 kg, or
- are in Class 7, radioactive materials, and they require a Category III – Yellow Label
- are included in Class 1.1, 1.2, 1.3 or 1.5 and are not subject to special provision 85 or 86 and exceed 10 kg net explosives quantity or are subject to special provision 85 or 86 and the number of articles exceeds 1000.

Placards must be displayed on all four sides of a large means of containment; one on each side and one on each end. The placard can also be displayed on the frame for the means of transport or any other frame permanently attached to the large means of containment [Section 4.15(2)]. A placard can also be placed at the front of a truck if the leading end of a cargo tank is obscured by the tractor [Section 4.15(3)].

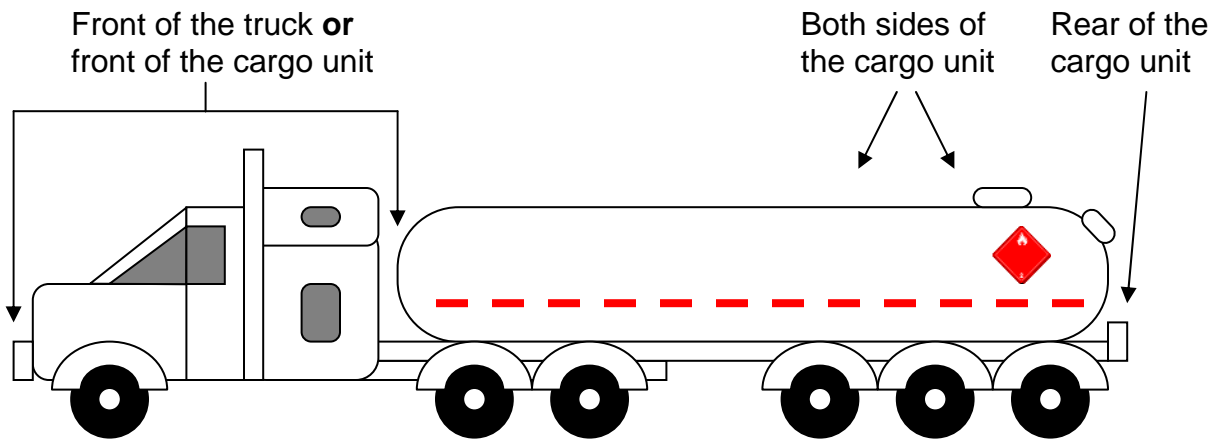
The UN number of the dangerous goods being transported must be displayed inside the placard or on an orange panel next to the placard. The letters “UN” are always omitted [Section 4.8(2)].

Example of Safety Marks for a Large Means of Containment
In this case the product is PETROLEUM CRUDE OIL



Class 3 placards have a red background and a white flame symbol

Placard Locations



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).

EXEMPTIONS

The TDG Regulations provide some partial and total exemptions from compliance with the regulations. Refer to Part 1 of the Regulations for the total list. Some exemptions

Operation of a Means of Transport or a Means of Containment Exemption (Section 1.27)

The TDG Regulations do not apply to dangerous goods on a means of transport that are required for:

- powering the motor vehicle and are intended to remain on board until used or are contained in a permanently installed fuel tank on the motor vehicle, for example, gasoline in the fuel tank of a motor vehicle,
- the safety of individuals on a motor vehicle,
- the operation or safety of the motor vehicle that are installed or likely to be used for purposes related to transport, air bags, air brakes, flares, lighting, shock absorbers or fire extinguishers,
- ventilation, refrigeration or heating units that are needed to maintain environmental conditions within a means of containment in transport on the motor vehicle and are intended to remain with the units or on board until used.

This exemption does not apply to ammunition or dangerous goods being delivered to a destination from which a portion is drawn off to power the motor vehicle. For example, a tank truck delivering liquefied natural gas that uses part of that load of gas to propel the vehicle.

Class 3, Flammable Liquids: General Exemption (Section 1.33)

Part 3 (Documentation), Part 4 (Dangerous Goods Safety Marks), Part 5 (Means of Containment), Part 6 (Training), Part 7 (Emergency Response Assistance Plan), Part 9 (Road) and Part 10 (Rail) of the TDG Regulations do not apply to dangerous goods in Class 3, Flammable Liquids, if the dangerous goods:

- have no subsidiary classification,
- have a flash point above 37.8 °C and Packing Group III, and
- are contained in one or more small containers (450 L or less) that are designed, constructed, filled, closed, secured and maintained so that under normal conditions of transport there will be no accidental release of the dangerous goods.

This exemption is applicable to diesel but **not** to gasoline.

UN1202, Diesel Fuel, or UN1203, Gasoline, Exemption (Section 1.35)

You do not require a dangerous goods shipping document or dangerous goods training certificate when gasoline or diesel is transported by road, in one or more containers if:

- the total capacity of all the containers is not more than 2000 liters;
- each of the containers displays the label or placard required in Part 4 of the TDG Regulations (the UN number is not required on a placard);
- each container is secured to the road vehicle so that the label or at least one placard displayed on each one is visible from outside the vehicle.

A practical application of this exemption is with respect to tidy tanks in the rear of pickup trucks. If the tank has a capacity between 450 liters and 2000 liters then the only requirement is to have at least one flammable liquid placard (Class 3) attached to the tank on the visible side.

Containers of gasoline with a volume of 450 liters or less are considered small containers and need to display the proper label (Class 3). Diesel fuel in containers with a capacity of 450 liters or less is not regulated.

Class 2, Gases, in Small Means of Containment Exemption (Section 1.32.3)

Several gases used for welding and related purposes are exempt from documentation and dangerous goods training requirements of the TDG Regulations when being transported by road. Provided the requirements listed below are followed to the letter, the operator does not require a dangerous goods shipping document or a dangerous goods training certificate if:

- the total quantity is less than or equal to 500 kg gross mass,
- the dangerous goods are contained in not more than 5 cylinders, and
- the labels are visible from the outside of the vehicle.

This exemption applies only to:

- UN 1001, ACETYLENE, DISSOLVED;
- UN 1002, AIR, COMPRESSED;
- UN 1006, ARGON, COMPRESSED;
- UN 1013, CARBON DIOXIDE;
- UN 1060, METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED;

- UN 1066, NITROGEN, COMPRESSED;
- UN 1072, OXYGEN, COMPRESSED; and
- UN 1978, PROPANE

More than 500 kg in more than five containers/cylinders of the above gases and all other gases are subject to the full TDG Regulations.

Class 2, Gases, in Refrigerating Machines Exemption (Section 1.32)

Part 3 (Documentation), Part 4 (Dangerous Goods Safety Marks), Part 5 (Means of Containment), Part 6 (Training), Part 7 (Emergency Response Assistance Plan), Part 8 (Accidental Release Report Requirements), Part 9 (Road) and Part 10 (Rail) of the TDG Regulations do not apply to:

- UN 2857, REFRIGERATING MACHINES, and refrigerating machine components that contain Class 2.2, Non-flammable, Non-toxic gases if the quantity of gas is less than 12 kg; or
- UN 2672, AMMONIA SOLUTIONS, if the quantity of ammonia solutions is less than 12 L (Section 1.32).

This exemption includes refrigerating machines that include air conditioning units and machines or other appliances used specifically for keeping food or other items at a low temperature in an internal compartment.

EMERGENCY RESPONSE ASSISTANCE PLANS (ERAP)

An Emergency Response Assistance Plan (ERAP) is required in instances where dangerous goods are potentially very hazardous when transported in moderate or large quantities. If a large enough amount of these dangerous goods were released, the potential for harm to people and the environment would be great. For this reason Part 7 of the TDG Regulations requires consignors and importers of dangerous goods to register an ERAP if necessary [Section 7.1].

An ERAP is required for the following circumstances:

- A quantity of dangerous goods having the same UN number in one means of containment. If the quantity of dangerous goods exceeds the ERAP limit, an ERAP is required regardless of the size of the means of containment.
- An accumulation of dangerous goods in means of containment that each have a capacity greater than 10 percent of the ERAP limit in Column 7 of Schedule 1; and
- A quantity of one or more dangerous goods from one of the following classes that are in one or more means of containment [Section 7.1(3)]:
 - Class 1, Explosives
 - Class 3, Flammable Liquids with a subsidiary class of 6.1, Toxic Substances
 - Class 4, Flammable Solids
 - Class 5.2, Organic Peroxides, that are Type B or Type C
 - Class 6.1, Toxic Substances, Packing Group 1

An ERAP is necessary whenever a quantity of dangerous goods that have the same UN number exceeds the ERAP limit if the dangerous goods have an index number greater than that listed in Column 7 of Schedule 1 and

- (a) if a solid, have a mass that is greater than the index number when that number is expressed in kilograms;
- (b) if a liquid, have a volume that is greater than the index number when that number is expressed in litres;
- (c) if a gas, including a gas in a liquefied form,
 - (i) are contained in a means of containment that has a capacity greater than the index number when the index number is less than or equal to 100 and is expressed in litres, or
 - (ii) are contained in one or more means of containment at least one of which has a capacity greater than 100 L and the total capacity if all means of containment is greater than the index number when the index number is greater than 100 and expressed in litres [Section 7.1(4)].

In many instances dangerous goods do not require an ERAP; however, consignors and importers of dangerous goods must make sure that the quantities of dangerous goods in a consignment do not exceed the ERAP quantity limits.

If you are not sure whether a consignment of dangerous goods requires an ERAP, you may call the Coordination and Information Centre at 1-800-272-9600. You can obtain an application to register an ERAP by calling CANUTEC at (613) 992-4624.

REPORTING REQUIREMENTS

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) or if there is a possibility of an imminent accidental release. For more information on reporting requirements, refer to 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
- CANUTEC at (613) 996-6666 when the dangerous goods are in Class 1 and Class 6.2 or there was an accidental release from a cylinder that suffered a catastrophic failure.

The information that must be included in the report is:

- the shipping name or UN number of the dangerous goods,
- the quantity of dangerous goods initially loaded into the container,
- the quantity of dangerous goods released,
- a description of the condition of the container and the details of the conditions of transport when the release occurred
- a description of the circumstances that led to a catastrophic failure of a cylinder, if involved in the release,
- the location of the accidental release,
- the number of injuries or deaths, if any occurred,
- an estimate of the number of people evacuated as a result of the accidental release.

A report can also include other information not required by the regulations; for example, any cleanup arrangements, involvement of other emergency response agencies like the police, fire department, Alberta Environment, etc.

After submitting an immediate report, the employer of the person who made the immediate report must submit a 30-day Follow-up Report to the Dangerous Goods Directorate of Transport Canada (Section 8.3). The 30-Day Report must have the following information:

- name, address and telephone number of the place of business of the person submitting the report,
- date, time and location of the accidental release,
- name and address of the place of business of the consignor,
- classification of the dangerous goods,
- estimate of the quantity loaded into the containers before the accidental release and the quantity of dangerous goods released,
- a description of the means of containment involved and a description of the failure or damage including how the release occurred,
- if a catastrophic failure of a cylinder occurred, the cylinder certification markings and a description of the failure,
- number of deaths and injuries resulting from the accidental release,
- an estimate of the number of people evacuated, if any, and
- if an ERAP was activated, the name of the person who responded.

DANGEROUS GOODS SHIPPING DOCUMENT FOR ROAD TRANSPORT

DESTINATION (City-Town)			CONSIGNOR			
Name:			Name:			
Address:			Address:			
Name of Carrier		Prepaid <input type="checkbox"/>	Collect <input type="checkbox"/>	Transport Unit Number		
Point of Origin			Shipping Date		Shipper's No.	
REGULATED DANGEROUS GOODS			24-Hour Number:			
			ERAP Reference _____ and Telephone Number _____			
Shipping Name	Primary Class	Subsidiary Class	UN Number	Packing Group	Quantity	Packages Requiring Labels
This is to certify that the above named articles are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the <i>Transportation of Dangerous Goods Regulations</i> .						
Special Instructions						
NON-REGULATED GOODS						
Packages	Description of Articles				Weight	
Received in apparent good order			_____ Consignee Signature		_____ Shipper's Signature	
Received in Apparent Good Order	Driver's Signature			Driver's No.		

Please note that this sample shipping document contains some information that is not required in the TDG Regulations. The additional information reflects current industry practices.