

# Dangerous Goods



# Newsletter

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The background of the central section is a grid of repeating logos. Each logo consists of the text "TDG/TMD" at the top, "2001-2002" in the middle, and "Canada" at the bottom, all within a diamond shape. The logos are semi-transparent and arranged in a pattern that allows the main text to be clearly visible.

# Clear Language Regulations Come into Force

Several colorful fireworks are scattered across the central text, adding a celebratory feel to the announcement. The fireworks are in shades of blue, orange, and pink.

# Content

• Editorial .....	3	• Emergency Response Assistance Plans – How Does Your Technical Advisor Rate? .....	14
• Does the Federal Copyright Provisions Allow for Reproduction of the TDG Clear Language Regulations? .....	3	• Terrorism in Transportation Implications for Dangerous Goods Emergency Response Planning .....	15
<b>Feature</b>		• Road Transportation .....	17
• A Consignment of Dangerous Goods! What Is It? .....	4	• Transportation by Air .....	18
• An Interpretation of Clear Language – When Two Regulations Do Not Say the Same Thing! .....	6	• ERAP Requirements for White or Yellow Phosphorus – UN1381 .....	20
• The Transportation of Dangerous Goods Regulations and the Transportation of Gasoline and Diesel Fuel by Portable Tanks (Slip Tanks and Off-road Tanks) .....	7	• Class 6.2: Infectious Substances .....	23
• When Do Transport Dangerous Goods Inspectors Attend Accidents and What is Their Role .....	10	• A New Program Related to Transportation Terrorist Incidents Involving Chemical, Biological, Radiological, and Nuclear (CBRN) Agents .....	24
• CANUTEC STATS .....	12	• <b>Alert</b> – Requirements Governing Approval Certificates Issued by the Competent State Authority for Radioactive Material, Radioactive Material Packaging and Radioactive Material Shipments. ....	25
• Emergency Response Assistance Plans – Onerous or Bonus? An Industry Perspective .....	13		

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We welcome news, comments or highlights of transportation of dangerous goods activities, announcements of meetings, conferences or workshops. The **Newsletter** carries signed articles from various sources. Such articles do not necessarily represent the views of the Directorate, nor does publishing them imply any endorsement. Material from the **Newsletter** may be used freely with customary credit.

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## Editorial

Welcome to the Summer 2002 Edition of the newsletter. I hope you took some time to enjoy the long, hazy, summer days.....

As you know, on August 15<sup>th</sup> the new Transportation of Dangerous Goods Regulations come into force. Information sessions on the new regulations were given across the country but if you were unable to attend, you may wish to visit our Website at: <http://www.tc.gc.ca/tdg/training.htm> to obtain a listing of training organizations that offer dangerous goods training. The list is available to the general public without any recommendations or endorsement by Transport Canada.

As you will see, this edition is quite impressive with 27 pages of information on a variety of subjects covering the new regulations and other topics. The feature article covers the definition of the word “consignment” in clear language and how it should be interpreted.

There are also some interesting articles on Emergency Response Assistance Plans. Since September 11<sup>th</sup>, much attention has been given to reduce the possible threat of terrorist attacks in Canada. You will find on page 24 an article on a new program being introduced in the TDG Directorate in which industrial emergency response teams will be trained to assist in the response to terrorist incidents involving chemical, biological, radiological and nuclear agents. There is also an article on page 15 on the emergency response planning that is required when transportation of dangerous goods accidents involve acts of terrorism. You will also find on page 13 an article on the Canadian concept of Emergency Response Assistance Plans and why this program continues to be an essential tool in promoting public safety in the transportation of dangerous goods.

Please remember to visit the TDG Web site at <http://www.tc.gc.ca/tdg/menu.htm> for all information pertaining to the new regulations. For assistance, you may click on the Clear Language Interpretations File which was developed to answer questions or clarify specific issues. You may also leave a message on the dedicated information line at 1-888-758-9999 and someone will contact you.

As always, we invite you to send us your comments and suggestions on these articles or future articles you would like to see included.

Enjoy your reading!

*Renée Major*

## Does the Federal Copyright Provisions Allow for Reproduction of the TDG Clear Language Regulations?

We have been receiving enquiries about copyright issues relating to the use of the TDG Act or Regulations downloaded or otherwise obtained from the TDG Web site.

The federal government has a policy that the Crown will claim no copyright as a result of the copying of statutes or regulations. The copier, however, remains responsible for the accuracy of what he copies.

An Order-in-Council (SI/97-5 [http://canada.justice.gc.ca/loireg/crown\\_en.html](http://canada.justice.gc.ca/loireg/crown_en.html)) supports this position and expressly states that: “Anyone may, without charge or request for permission, reproduce enactments and consolidations of enactments of the Government of Canada, .....provided due diligence is exercised in ensuring the accuracy of the materials reproduced and the reproduction is not represented as an official version.”

The Transport Dangerous Goods Directorate has always enunciated the position that legislation (statutes and regulations) should be freely available for distribution and we have made assurances that there would never be a copyright claim resulting from the use of legislative material available at our Web site. As noted above, the federal government has expressly endorsed this position.

Therefore, you may use these materials as you deem proper without concern regarding any possible claim of copyright. In fact, we encourage you to make the legislation available to as many people as possible so that increased public awareness of the TDG program will result.

# FEATURE



## A Consignment of Dangerous Goods! What Is It?

by Jacques Savard

The difference between regulatory text and literary text is not always obvious for someone who is not familiar with the regulatory process. All authors arrange words and sentences and they all try to be understood by their readers. The person drafting regulations, however, is faced with much more restrictive requirements.

The author of a literary work uses a wide variety of words intended to provoke emotions. These words create a rich and living story, one that reveals the author's talent.

The writer of a regulatory text must absolutely avoid the literary approach. In regulations the more meanings a word has, the more vague the text becomes. The text becomes confusing, and this leads to difficulty in interpretation. The writer of regulations strives to achieve a clear text by avoiding synonyms, by using the same words to convey the same meaning, by using clear expressions, and by avoiding superfluous words. In other words, the perfect recipe for a really bad novel.

It is from this viewpoint that we should read the clear language version of the *TDG Regulations*. One of the more challenging exercises undertaken during the development of clear language was the definition of specific terms used in the Regulations. Among those terms, one of the most difficult to develop was that of "consignment", in French "envoi".

In the pre-clear language *TDG Regulations*, a consignment is a quantity of dangerous goods sent from a consignor to a consignee by one or more means of transport. With this understanding, the total quantity may or may not be divided among several means of containment.

The *TDG Regulations* require proper markings on the means of containment. But, which means of

containment should have a label? When is a consignment subject to the requirement to have an Emergency Response Assistance Plan (ERAP)? Which consignment qualifies for the limited quantity exemption?

The *TDG Act* defines a means of containment as a "container or packaging, or any part of a means of transport that is or may be used to contain goods". In fact, while being transported, goods are usually wrapped in many layers of means of containment. The goods may be placed in a bottle, which is wrapped in an absorbing material, which is placed in a bag, which is then placed in a box which could then be placed in a larger box and carried in a closed truck or an airplane. To which of these layers of means of containment do the *TDG Regulations* apply when an ERAP or a label is required?

The above description could be repeated many times with any number of changes each creating new interpretation difficulties. The only option left for clear language was to define the smallest easily identifiable "unit", at the risk of having to develop special rules when a large number of "units" were to be considered. This is how the concepts of "consignment" and "aggregation of consignments" were devised.

The definition of "consignment" in clear language is "a quantity of dangerous goods in transport and the means of containment required for transport." (**envoi**)

A consignment, therefore, is a quantity of dangerous goods and its means of containment. But which means of containment? It is the one **required** in Part 5, Means of Containment, where the standards for the manufacturing and use of means of containment are identified.

Therefore, the reference in the definition of consignment to "means of containment required for transport" means,

when dangerous goods are in a portable tank required or permitted by Part 5, Means of Containment, and the portable tank is being transported in an intermodal means of containment or in a rail box car, that the consignment consists only of the dangerous goods and the portable tank directly in contact with it. The intermodal means of containment and the box car are excluded since they are not required by Part 5 to transport the goods.

The definition of consignment in clear language means that, for example, a consignment does not consist of several drums in a means of containment as in the current regulations. If a means of containment required by clear language – a bottle or a bag – is placed in a larger means of containment – a box – with other means of containment, that is called an “accumulation of consignments”. If there are many drums in a means of transport, that is also called an “accumulation of consignments”. On the other hand, **one over-packed drum in a road vehicle is a single consignment.**

It should be noted that when no specific means of containment is required, there is always an obligation to use a means of containment of proper quality (subsection 5.1(3)). This means of containment will become the one referred to in the definition of “consignment”.

Many of the questions sent to us since the publication of clear language in Part II of the *Canada Gazette* almost a year ago are the result of misunderstanding the definition of “consignment”. Here are two important cases that may clarify the situation.

### Exemption for Limited Quantities

The introduction to subsection 1.17(1) defines “limited quantity” as a consignment of dangerous goods that meets the requirements of the sub-paragraphs following the introduction.

The first requirement in section 1.17 is a limit of 30 kg per “limited quantity” (or consignment) or “accumulation of limited quantities” (or consignments) in the same means of containment. The second is the marking of the outer means of containment containing one or more “limited quantities” (or consignments). Finally, the last requirement is for a shipping document when the accumulation of “limited quantities” (consignments) is 500 kg gross mass or more from one consignor to one destination.

### Emergency Response Assistance Plan (ERAP)

The idea of consignment is also found in Part 7, “Emergency Response Assistance Plan” (ERAP). According to subsection 7.1(1), an ERAP is required if the quantity of dangerous goods in a consignment is larger than the quantity indicated in column 7 of Schedule 1. In most cases, the paragraph applies only to consignments of small means of containment.

Subsection 7.1(2) deals with consignments of the same dangerous goods in more than one large means of containment. In this case, the quantity to be used to determine if an ERAP is required corresponds to the total quantity of the dangerous goods in all the large means of containment in this shipment.

Subsection 7.1(3) refers to the concept of an accumulation of consignments (of explosives) on board a vehicle. However, it requires, like subsection 7.1(2), the consideration of the total quantity on board the vehicle, even if the explosives are in small means of containment. Amendments to clear language will soon be proposed to extend that approach to certain other classes of dangerous goods when they are transported in small means of containment.

### Conclusion

The adoption of this restrictive definition, which is quite different from the current understanding of the term “consignment”, may lead to some initial difficulties in the interpretation of the *TDG Regulations*. However, all the definitions found in section 1.4 were considered very carefully and are intended to eliminate ambiguity. To understand clear language the reader will always have to refer to the definitions and keep them well in mind. This means that every time the word “consignment” is used, one has to remember the definition to understand the text properly. At first, this may seem confusing, but we believe that, after a period of adjustment, it will mean a clearer understanding of the requirements of the *Transportation of Dangerous Goods Regulations*.

Good luck with your reading and do not hesitate to send us questions through our Web site (<http://www.tc.gc.ca/tdg/clear/tdgclearquestion.htm>) or communicate with us for more details.



# An Interpretation of Clear Language – When Two Regulations Do Not Say the Same Thing!

by Jacques Savard

It was recently brought to our attention that the Clear Language Regulations have provisions that seem to contradict the Dangerous Goods Shipping Regulations (DGSR).

The Clear Language Regulations permit 100 litres of gasoline to be transported on a vehicle on board a passenger ship. The DGSR impose a limit of 25 litres or less and require this quantity of gasoline to be placed in different areas of the vehicle. The same situation exists for dangerous goods transported in limited quantities on board a passenger ship. These differences give the impression that there is a conflict but, in reality, this is not the case.

A conflict exists if it is impossible for a person to comply with two regulatory requirements at the same time. For example, suppose regulation “A” requires a means of containment to be manufactured in steel with a wall thickness greater than 1.25 mm and regulation “B” requires the same means of containment to be manufactured in steel with a wall thickness of exactly 1.20 mm. This is a conflict. It would be impossible for a person to comply with these two conditions at the same time.

On the other hand, the transport by ship of gasoline mentioned above can be done in compliance with the Clear Language Regulations and the DGSR at the same time. A passenger who transports three means of

containment each containing 25 litres of gasoline with each placed in a vehicle according to the requirements of section 12 of the DGSR satisfies the Clear Language Regulations and the DGSR at the same time. There is no conflict.

Similarly, a truck loaded with gasoline in “limited quantities” and transported on board a ship is subject to the two regulations. A consignor who takes advantage of the exemption for limited quantities in section 1.17 of Clear Language is limited to means of containment that do not exceed 30 kg each and is subject to the marking and documentation conditions. The exemption for limited quantities in Clear Language does not remove the application of the requirements in the DGSR. Consequently, the quantity limits for stowage and segregation requirements in the DGSR must be respected.

When two regulations apply to the same situation, the requirements in both must be complied with even if the requirements are different. There is a conflict only if one requirement makes it impossible to comply with the other requirement.

If any of our readers find a “conflict” in the Clear Language Regulations, please contact the Directorate to let us know (TDG@tc.gc.ca). We’ll buy you a T-shirt!

## Upcoming Event in TDG...

**October 22-23, 2002  
Ottawa, Ontario**

**International Symposium on Protection of  
Dangerous Goods Tanks and Cylinders in Fire**

**Visit our Web site at:  
<http://www.tc.gc.ca/tdg/menu.htm>**





# The Transportation of Dangerous Goods Regulations and the Transportation of Gasoline and Diesel Fuel by Portable Tanks (Slip Tanks and Off-road Tanks)

by Stéphane Garneau

The following is a summary of the regulatory requirements and safety standard requirements. Please consult the text of the Regulations and the referenced standards to review the requirements in their entirety.

The requirements applying to DIESEL FUEL UN1202 also apply to a family of flammable liquids in Packing Group III, with no subsidiary classification, and having a flash point exceeding 37.8°C. This may include: FUEL OIL, GAS OIL, and HEATING OIL LIGHT with the same UN number, KEROSENE UN1223, FUEL and some AVIATION, TURBINE ENGINE UN1863 and PETROLEUM DISTILLATES N.O.S. UN 1268.

## Regulatory Requirements

### Small Means of Containment (<= 450L)

- DIESEL FUEL transported in a small means of containment continues to be exempt from the TDG Regulations (section 1.33 of the TDG Clear Language Regulations);
- GASOLINE in a container of 30L capacity or less and marked “Ltd. Qty.” is exempt from the regulations (section 1.17 of the TDG Clear Language Regulations);
- GASOLINE may be transported in a container between 30L and 450L in water capacity if the container is selected and used in accordance with the requirements of either standards CAN/CGSB 43.150-97 “*Performance Packaging for the Transportation of Dangerous Goods*” or CAN/CGSB 43.146-2002 “*Design, Manufacture and Use of Intermediate Bulk Containers for the Transportation of Dangerous Goods*” (section 5.12 of the TDG Clear Language Regulations).

### Large Means of Containment (> 450L)

- Beginning on January 1, 2003, DIESEL FUEL

transported in a large container will no longer be exempt from the container requirements of the regulations. The selection and use of large containers for DIESEL FUEL and GASOLINE must be in compliance with either CAN/CGSB 43.146-2002 referred to above or CAN/CSA B621-98 “*Selection and Use of Highway Tanks, Portable Tanks, Cargo Compartments and Containers for the Transportation of Dangerous Goods, Classes 3, 4, 5, 6.1, 8 and 9*”.

*Note: Intermodal tank containers such as Type 1 and Type 2 of the IMDG code or IM101 and IM102 of 49 CFR are permissible but rarely, if ever, used as portable refueling tanks and will not be discussed here.*

## Containers Prescribed by the Standards

### CAN/CGSB 43.146-2002

- **UN Standard mobile IBC**, a new type of standardized container that meets the requirements for a Code 31A or 31B Intermediate Bulk Container (IBC) but is subject to additional design, testing and marking requirements.

Transitional provisions have been included in section 13 of the CAN/CGSB 43.146 standard to allow the use of certain alternative types of containers that were manufactured before January 1, 2003:

- a **TC, CTC or DOT specification 57** portable tank or a **UN code 31A or 31B IBC built before 2003** may be substituted for a UN standard mobile IBC;
- **until 2010**, a mobile refueling tank **built before 2003** that is certified as conforming to **ULC ORD-C142.13-1997** may be substituted for a UN standard mobile IBC; and

- **until 2003, a non-specification metal tank** may be substituted for a UN standard mobile IBC.

## Periodic Inspection

CAN/CGSB 43.146 prescribes periodic inspections of mobile IBCs that have a capacity greater than 450L to ensure the continued integrity of the containers. The mobile IBCs enjoy a simplified inspection procedure which does not require pressure testing the container. As of January 2003, a mobile IBC with a capacity greater than 450L, whether it is a UN standard or an alternative type, must be “in-standard” with regard to the periodic inspection requirements of CAN/CGSB 43.146 before it can be filled. The IBC must have been inspected at a Transport Canada registered inspection facility within the previous sixty (60) months.

## CAN/CSA B621-98

For DIESEL FUEL, the following containers are allowed:

- a tank of **specification TC 306 or TC 406** permanently mounted on the frame of a truck or trailer;
- **until 2003, a non-specification tank** that complies with the general requirements of clause 4 of the standard;
- **until 2010, a non-specification tank** that is:
  - manufactured before 2003, and was initially inspected, tested and marked in accordance with the requirements applicable to TC406 tanks of clause 5.6.13 of the CSA B620-98 standard;
  - marked with a permanently attached plate with the words “Non-spec Flammable Liquids Tank” and “Not for Dangerous Goods Use after January 1, 2010”, the date of the first inspection or test and the registered facility that performed the initial inspection or test; and
  - inspected and tested periodically in accordance with clause 8 of the CSA B620-98 standard as though it were a TC 406 tank, by a Highway Tank facility registered with Transport Canada in accordance with the requirements of clause 9 of the CSA B620-98 standard.

For GASOLINE UN1203, the following containers are allowed:

- a tank of **specification TC 306 or TC 406** permanently mounted on the frame of a truck or trailer;
- **until 2005, of a non-specification tank** that is:
  - manufactured before July 1, 1995, and was initially inspected, tested and marked in accordance with the requirements applicable to TC 406 tanks of clause 5.6.13 of the CSA B620-98 standard;
  - marked with a permanently attached plate with the words “Non-spec Flammable Liquids Tank” and “Not for Dangerous Goods Use after January 1, 2005”, the date of the first inspection or test and registered facility that performed the initial inspection or test; and
  - inspected and tested periodically in accordance with clause 8 of the CSA B620-98 standard as though it were a TC 406 tank, by a Highway Tank facility registered with Transport Canada in accordance with the requirements of clause 9 of the CSA B620-98 standard.

To find a facility registered with Transport Canada, whether to inspect IBCs or manufacture or inspect and test highway tanks, consult the TDG Web site at: <http://www.tc.gc.ca/tdg/en/menu.htm>. The Transportation of Dangerous Goods Clear Language Regulations are also available on the same site.

For copies of the CGSB standards, contact the CGSB at 1-800-665-2472 or visit their Web site at: <http://www.pwgsc.gc.ca/cgsb>.

For copies of the CSA standards, contact CSA International at 1-800-463-6727 or visit their Web site at: <http://www.csa.ca>.



## Summary Table

Product and Capacity of Container	Prescribed Container	Alternate Container	Sunset Date
DIESEL FUEL UN 1202 450L or less	Non-Specification	N/A	N/A
Gasoline UN 1203 30L or less	Non-Specification, when the conditions for "Ltd. Qty." are met.	N/A	N/A
GASOLINE UN 1203 Between 30L and 60L	Jerrican or drum to CGSB 43.150	None	N/A
GASOLINE UN 1203 Between 60L and 450L	Drum to CGSB 43.150; UN Standard IBC to CGSB 43.146	Code 31A and 31B IBC, TC 57 and ULC/ORD C142.13, all built before 2003.	2010 for ULC/ORD C142.13 Mobile Refuelling Tanks.
DIESEL FUEL UN 1202 Between 450L and 3000L	UN Standard IBC to CGSB 43.146 or TC 306/406 to CSA B620	Code 31A and 31B IBC, TC 57 and ULC/ORD C142.13, all built before 2003 or Non-spec tank built before 2003 tested and marked to CSA B621 Specific Req. 5.	2010 for ULC/ORD C142.13 Mobile Refuelling Tanks.
DIESEL FUEL UN 1202 More than 3000L	TC 306/406 to CSA B620	ULC/ORD C142.13 (max. 5000L) built before 2003 or Non-spec tank built before 2003 tested and marked to CSA B621 Specific Req. 5.	2010 for non-spec flammable liquids tank in DIESEL FUEL service.
GASOLINE UN 1203 Between 450L and 3000L	UN Standard IBC to CGSB 43.146 or TC 306/406 to CSA B620	Code 31A and 31B IBC, TC 57 and ULC/ORD C142.13, all built before 2003 or Non-spec tank built before July 1995 tested and marked to CSA B621 Specific. Req.17.	2005 for non-spec flammable liquids tank in GASOLINE service.
GASOLINE UN 1203 More than 3000L	TC 306/406 to CSA B620	Non-spec tank built before July 1995 tested and marked to CSA B621 Specific. Req. 17 or ULC/ORD C142.13 (max. 5000L) built before 2003.	

## Summary of Initial and Periodic Inspection and Testing

Container Type	Initial	Periodic Inspection and Tests
UN Standard IBC to CGSB 43.146 greater than 450L	As manufactured.	Internal & External Visual 60 months, Appendix C of CGSB 43.146.
Alternate Mobile IBC greater than 450L	CGSB 43.146 Appendix C in last 60 months.	Internal & External Visual 60 months, Appendix C of CGSB 43.146.
Specification Highway tank	As manufactured.	Clause 8 of CSA B620 standard (V) External Visual 1 year (K) Leak Test 1 year (I) Internal Visual 5 years (if the tank has a manway) (P) Pressure Test 34.5 kPa (5 psi) 5 years
Non-spec flammable liquids tank (PG II and PG III)	Pressure test at 34.5 kPa (5 psi) and Leak Test, apply Non-spec plate.	

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# When Do Transport Dangerous Goods Inspectors Attend Accidents and What is Their Role

by Réjean Simard

Our readers may remember that a train derailment in the City of Mississauga in 1979 resulted in the evacuation of close to 250,000 people for several days. The Honorable Mr. Justice Samuel G. M. Grange in the Report of the Mississauga Railway Accident Inquiry made this recommendation, which has since become a key element of the Transport Canada program for the safe transportation of dangerous goods.

*“Transport Canada should make available through CANUTEC or otherwise the advice and direction needed upon a rail accident involving dangerous goods. In particular, it should make available at the scene of and within hours of an accident, a person capable of directing the clean-up of that accident and of protecting the populace. He will lend all assistance to the local or provincial authorities and will take charge at the scene if no such authorities are evident. This person, no doubt an inspector under the Transportation of Dangerous Goods Act, should report in writing after every accident to which he is summoned...*

*...This, as I see it, is the major contribution by the Federal Government to the response to an accident, but is no more than could be expected...”*

*The Honorable Mr. Justice Samuel G. M. Grange*

The **Transportation of Dangerous Goods (TDG) Act** and the associated regulations, on which is based Transport Canada’s program for the transportation of dangerous goods, focus primarily on preventing incidents involving dangerous goods. However, the legislation also has requirements for an effective and timely response when such incidents occur and provides specific authorities to inspectors designated under the TDG Act.

One of the response-related requirements of the TDG Act is to file an Emergency Response Assistance Plan (ERAP) when the quantity of dangerous goods exceeds the ERAP limit referred to in column 7 of Schedule 1

of the Clear Language Regulations. The ERAP must be approved by the Minister or a designated person. Three persons are presently designated in the Transport Dangerous Goods Directorate to approve ERAPs; namely the Director General, the Director, Compliance and Response and the Chief, Response Operations.

The ERAP system is based on industrial emergency response capability and preparedness from a person or a group of persons with specialized knowledge and equipment to provide assistance to First Responders at times of major transportation incidents involving a group of especially dangerous goods whose release could have severe and widespread impacts on people, property or the environment.

An ERAP cannot foresee all eventualities and it may be that in a particular accident an ERAP should be modified. Section 19 of the TDG Act provides a TDG Inspector with the ability to modify an ERAP or to intervene in some circumstances. The period of greatest threat from dangerous goods is during and immediately following an accident. Spilled dangerous goods may need to be neutralized. A leaking container may need to be patched. A damaged container, from a small box to a railway tank car, may need immediate specific attention to ensure it will not fail at the accident site or while being removed from that site. The response procedures and assessment of the response requires special attention. For example, following a train derailment some questions may arise: Has the tank car suffered sufficient damage to require special handling? How is the damage assessed? Is the special handling proposed sufficient? Is it safe to use adjacent tracks while the response is ongoing? Under what conditions is it safe to work on the site? Should there be an evacuation and how far should this evacuation extend?

In addition to the ERAP requirements, the TDG Act also provides specific authority to designated TDG Inspectors while at accident sites. The inspectors have authority to monitor compliance with the TDG Act and Regulations (section 16 of the Act), to correct any non-

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compliance, (section 17 of the Act), to take the necessary measures to prevent an imminent accidental release of dangerous goods or to reduce any danger to public safety resulting from the accidental release. Section 19 of the Act also gives authority to TDG Inspectors to allow recovery of costs and expenses incurred while taking reasonable measures.

### **When Would Transport Canada be Expected to Attend an Accident Involving Dangerous Goods?**

Transport Canada will attend most accident sites where dangerous goods requiring an ERAP are involved and where it is expected that the response will take more than 24 hours. An example of this type of accident is a major train derailment involving tank cars transporting poisonous or flammable gases. Under such circumstances, an inspector who has knowledge of the ERAP being activated, the means of containment and the dangerous goods will be sent to the accident site, if available.

In addition, Transport Canada may attend accidents of lesser-anticipated duration or accidents where an ERAP is not required, to monitor response activities as well as conduct a compliance inspection or investigation and obtain information on the condition of the means of containment and the behaviour of the dangerous goods. Transport Canada may also attend these accidents if requested by local authorities, provided that an inspector could arrive in a reasonable period of time.

The Chief of Response Operations in Transport Canada is the person to contact for all accidents involving the transportation of dangerous goods. He may be reached by contacting CANUTEC at any time.

### **What is the Role of a TDG Inspector at an Accident Site?**

The primary role of the inspector is to promote public safety by ensuring that appropriate remedial measures are taken at the accident site. The inspector will assist the local authorities by giving advice and recommendations, by activating the ERAP and by monitoring the response of the industry whether they are carriers, consignors or response contractors. The inspector will conduct his own site assessment and report to the local authorities and to Transport Canada.

He will also monitor the implementation of any activated ERAP to ensure that the approved ERAP functions well.

The inspector may sometimes initiate a compliance investigation in the circumstances prior to the accident to determine if there was non-compliance. Such an investigation may involve safety marks, shipping documents, selection and condition of the means of containment and the training received. This investigation may involve the consignors of dangerous goods and may result in prosecution, if warranted.

The inspector will gather information on the dangerous goods; their behaviour, their impact and the damages they may have caused. This information may be used to modify or validate data in the “2000 Emergency Response Guidebook” or amend some aspects of the regulations.

The inspector will also collect data on the means of containment; its safety features and possible causes of failure, if any. This information may be used to certify specific design standards, modify existing standards, develop new standards or identify deficiencies in previously registered and approved designs that may not have performed as intended. Observations made on-site by the inspector may, in some cases, result in protective directions being issued or means of containment being recalled.

### **What Can a TDG Inspector Offer On-Site?**

The TDG Inspector has knowledge, experience, skills and authority that may be exercised regarding response to accidents involving dangerous goods.

The TDG Inspector has a sound knowledge of the TDG Act and Regulations, the safety standards and safety requirements of the means of containment (railway tank cars, highway tanks and portable tanks, packaging and intermediate bulk containers), the ERAPs, the remedial measures (neutralization, transfer, unloading, etc.) the properties of the dangerous goods, the incident command system, the response resources available from industry, the site assessment procedures and the accident response.

The TDG Inspector communicates well in advising local authorities and making recommendations on

evacuations and remedial measures that should be undertaken following an accident. Remedial measures include the transfer of the load, the handling of the damaged means of containment and when to activate the ERAP.

The TDG inspector also has specific authorities under the TDG Act to assist local authorities at the site of an accident involving dangerous goods.

## How is Transport Canada Advised of an Accident Involving Dangerous Goods?


Transport Canada Inspectors do not attend an accident site unless they are informed of an accident. Transport Canada is informed of these accidents from a number of sources. If the accident involves rail or air modes, the carriers are required under the TDG Regulations to immediately notify Transport Canada (CANUTEC). If the accident involves the marine mode, the carriers must notify immediately the appropriate Coast Guard

or Port Authority which, in turn, will notify Transport Canada. Agreements are in place with other federal and provincial departments (e.g. Department of Environment) and agencies (e.g. Transportation Safety Board) to allow the exchange of information on accident notifications. All accident notifications to Transport Canada must be done through CANUTEC.

However, if the accident occurs on road, the local authorities must be notified immediately. Transport Canada will only be informed if the First Responders have contacted CANUTEC, if the incident is reported in the media, or if someone has called CANUTEC for assistance. There is no requirement to notify CANUTEC in the event of an accident on road.

## How Can Local Authorities Contact a TDG Inspector at the Time of a Transportation Accident Involving Dangerous Goods?

The answer is quite simple, **call CANUTEC at (613) 996-6666!**

<b>Number of Calls</b>		 January 1, 2002 to June 30, 2002	<b>Emergency Calls by Province/Country</b>	
Technical	4,769		British Columbia	52
Regulatory	1,994	Alberta	65	
Information	5,578	Saskatchewan	14	
Other	2,771	Manitoba	16	
<b>Total</b>	<b>15,112</b>	Ontario	126	
<b>Emergency Calls</b>	<b>395</b>	Quebec	76	
<b>Source of Emergency Calls</b>		New-Brunswick	15	
Fire Dept.	109	Nova Scotia	13	
Police Dept.	29	Prince Edward Island	1	
Hazmat Contractor	5	Newfoundland	1	
Carrier	164	Northwest Territories	3	
End User	25	Yukon	0	
Manufacturer	6	Nunavut	0	
Government	29	United States	13	
Private Citizen	9	International	0	
ER Centre	5	<b>Emergency Calls by Transport Mode</b>		
Poison Control	5	Road	119	
Medical	5	Rail	127	
Others	4	Air	5	
<b>Emergency Calls by Class of Dangerous Goods</b>		Marine	1	
Class 1 - Explosives	3	Pipeline	0	
Class 2 - Compressed Gas	109	Non transport	143	
Class 3 - Flammable Liquids	96	Multimodal	0	
Class 4 - Flammable Solids	12			
Class 5 - Oxidizers and Organic Peroxides	28			
Class 6 - Poisonous and Infectious Substances	34			
Class 7 - Radioactives	2			
Class 8 - Corrosives	96			
Class 9 - Miscellaneous	122			
NR - Non-regulated	41			
Mixed Load -	10			
Unknown -	17			

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# Emergency Response Assistance Plans – Onerous or Bonus? An Industry Perspective

*by Norman Loiseau*

Almost every major national government has struggled with the issue of how to, on the one hand, ensure the highest possible security in the transport of dangerous goods, and on the other hand, avoid the imposition of obstacles or burdens that would adversely affect commerce and the economic movement of goods.

One will surely recall industry's controversial and reluctant attitudes when Transport Canada initiated discussions on the uniquely Canadian concept of Emergency Response Assistance Plans (ERAPs). While industry may have viewed ERAPs as onerous, time has proven the opposite. ERAPs continue to contribute to safety and security. The foresightedness of this program cannot be underestimated.

How so? Most of us would certainly agree that the majority of dangerous goods transported daily in Canada pose no significant safety or security risks if basic requirements and the safety provisions are fully respected.

It must be recognized, however, that certain dangerous goods either by their inherent nature or when transported in very large quantities do, indeed, pose significant "in transport" risks to both human health and the environment.

None of us live in Metropolis. When we are confronted with an emergency situation there are no super-heroes to come to our rescue.

Rather, we must rely solely on our established resources and hope that these are up to the challenge.

Most Canadian citizens, by virtue of their tax dollars, are provided with effective emergency response and public safety services. These are generally provided for at the municipal level, focusing on immediate issues of public safety. They are constrained by budgetary limitations which affect the acquisition of training, expertise and equipment, specifically regarding handling incidents involving dangerous goods.

It would be reasonably safe to assert that the sophisticated responses, expertise and technologies required for handling emergency situations involving dangerous goods are often beyond the capabilities of most existing municipal response organizations.

Recognizing these deficiencies, Transport Canada, with its unique ERAP approach, clearly put the burden of safety on those who would expose us to these risks in transport. In extending responsibilities beyond simple compliance to the regulations, Transport Canada required industry to develop substantive pre-planned incident response capabilities.

The ERAP approach required or rather, obliged, industry to conduct extensive reviews of the inherent risks, establishing "what if" and

"worst-case" scenarios. Having identified these risk scenarios, a prudent and diligent industry was able to adopt pre-plans to respond to these situations, supplementing, if not leading, the incident response.

With the unfolding of the tragic events of September 11<sup>th</sup>, the transport of dangerous goods and the risk of terrorist activities become an immediate and major security concern. The ERAP concept demonstrated its efficacy. Without any hesitation, Transport Canada was able to identify "significant risk" substances, those that could pose a serious and potential terrorist threat.

By virtue of having ERAPs registered and approved by Transport Canada, the Department had, at its immediate disposal, a comprehensive list of significant risk substances, their consignors and carriers and geographical routes of transport in Canada. With this information in hand, the Department was able to identify, review and address security and safety issues. This action established a new and enhanced safety and security level. Thus, ERAPs became yet another essential tool in countering safety and security risks.

Quite the bonus, quite the program!

# Emergency Response Assistance Plans – How Does Your Technical Advisor Rate?

by Doug Kittle

**Technical: “involving or concerned with ..... applied sciences”**

**Advice: “information given”**

**Advisor: “a person who advises, especially one appointed to do so and regularly consulted”**

*(Source: The Concise Oxford Dictionary)*

When applying for approval of an Emergency Response Assistance Plan (ERAP), a company is asked to provide basic information related to preparedness and capability to respond to transportation accidents involving dangerous goods. Included in the description of the response capability is the necessity to identify the number of persons qualified to give, by telephone, **technical advice** about the dangerous goods and the number of persons qualified and available **to give advice and assistance** at the site of an accident. This type of information will also be required when the “clear language” version of the regulations come into effect August 15, 2002.

Technical advisors attending accident sites are there to provide advice and assistance on a number of tasks related to the dangerous goods including the means of containment involved and the specific emergency response issues. Their essential qualities are the knowledge and the preparedness to act in this capacity. It could be that more than one individual may be needed to perform the duties of the technical advisor and that not all dangerous goods would require the entire set of criteria listed below. The following checklist may be used to determine how you would rate your technical advisors.

## Product and Related Knowledge

- In-depth knowledge of the specific dangerous goods for which the plan relates including physical and chemical properties and specific handling precautions and techniques.
- Knowledge of the compatibility of the dangerous goods with the construction materials of the means of containment and its service equipment and product handling equipment.
- Knowledge of the chemical reactivity and the results of mixing the dangerous goods with other dangerous goods and non dangerous goods.
- Knowledge of the expected behavior of the means of containment following serious mechanical defects.
- Knowledge of the expected behavior of the dangerous goods or their interaction with the means of containment when subjected to severe heating or fire.
- Knowledge of the design of the means of containment and of the regulations or standards governing their design, maintenance and use.
- Knowledge of the appropriate plume dispersion modeling or equivalent predictive capability for air borne hazards to advise and recommend on hazard zones designation.
- Knowledge of the dispersion techniques, as applicable.
- Knowledge of the neutralization techniques, as applicable.
- Knowledge of the disposal techniques, as applicable.
- Knowledge of the recovery and the transfer techniques, as applicable.
- A sound knowledge of the Incident Command System and the chemical emergency response assessment systems and techniques (such as the Disciplined Approach to Emergency Response).
- Ability to effectively communicate with on-scene local authorities the full range of product and related knowledge described above.
- Ability to read, understand and interpret material safety data sheets or other technical publications on the product(s).
- Ability to calibrate and use monitoring equipment specific to the product and to correctly interpret results.

## Preparedness

- ❑ The technical advisors are thoroughly familiar with the Emergency Response Assistance Plan for which a registration number has been issued by Transport Canada.
- ❑ The technical advisors are sufficiently trained to meet the above criteria as applicable to the dangerous goods for which the plan relates including the use of personal protective equipment appropriate for the dangerous goods.
- ❑ The alerting procedures for the technical advisors are in place and effective.
- ❑ The necessary arrangements have been made for the technical advisors to travel to the accident site

by the most expeditious route with their personal protective equipment and other basic monitoring equipment.

Based on the above, how did your technical advisors rate? Can one person or a group of persons working as a team in your organization perform the work or do you have to look elsewhere? Do they have the training and experience needed to do the job? If you did not meet several of the requirements on the list, your emergency response assistance plan is insufficient and more effort will probably be required in some areas.

For more information or if you have any questions, please contact Réjean Simard, Chief, Response Operations in Ottawa at (613) 991-9396.

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# Terrorism in Transportation Implications for Dangerous Goods Emergency Response Planning

*by Peter Arthur*

The recent events in North America have caused us to see emergency preparedness in a different light, and preparedness for transportation accidents involving dangerous goods is no exception. Transport Canada, through the requirements of the Transportation of Dangerous Goods Act requires companies to plan for accidents involving dangerous goods that present a high public safety risk if they are spilled or released from their means of containment, or present significant explosive, biological or radiological hazard. Transport Canada also assists first responders with critical chemical information, emergency advice, on-scene response specialists and access to industry emergency response assistance plans (ERAPs) through its emergency response centre, CANUTEC, supported by the development and publication of resource materials such as the 2000 Emergency Response Guidebook.

Industry and government have therefore already taken significant steps to plan for dangerous goods releases during transportation whether they are accidental or deliberately caused. However, existing planning has generally focused on planning for the worst probable case while considering likely transportation accident scenarios. Considering the potential for a chemical's use as a terrorist weapon in planning for a transportation incident requires the consideration of significant additional planning and response elements.

The first element is that planning must be for the worst case scenario where any intervention to mitigate the release of product is not possible because of actions taken by the terrorists to frustrate responders. Railway tank cars and tank trucks have many safety features, and a catastrophic release of the product from the tank is extremely rare, leading planners to consider more

limited releases and countermeasures that can be taken to stop them. Where catastrophic releases have taken place they have tended to be in lower density or isolated areas, as trains tend to move slower in, and trucks tend to avoid, populated or congested areas and urban centers. In the terror attack, the terrorist is likely to choose an area that will produce the largest number of casualties, and will try to organize the attack in such a way that the release is catastrophic, or the damage, such as a sabotaged valve on a pressure tank car, or a hole below the liquid level on a tank cannot be plugged or repaired. In real life, there is no chance of a tank truck of gasoline or of fuming acid being driven into a crowded shopping mall, a crowded stadium, a large outdoor concert or a Canada Day celebration. However, the higher the profile of the event, the more the media are present, and the larger the crowd, the higher the location's value as a target of terror

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becomes. In these cases, conventional industry planning which focuses on putting a fully equipped response team from the chemical manufacturer into the hot zone needs to be augmented by planning for the mass treatment of casualties, the quick assessment of potentials to rapidly create evacuation and exclusion zones (this will need to be over the phone for timeliness), and the advance completion of studies for the potential for shelter in place for the particular product so that effective information is quickly relayed to decision makers. Information such as whether to advise people to head for the second floor (a life saver in Bhopal) to get above a heavier than air gas cloud, or to the basement, to protect against an explosion or radiation is critical in the early minutes, as is the knowledge, given standard sets of atmospheric variables, of how for a lethal gas cloud, or blast radius would extend, given the tank size commonly used by the company.

The second element of an act of terrorism is that the attack may come in stages through the use of a secondary device designed to cripple emergency services and spread terror, hindering a further response. An example might be using a small explosive charge to open the vapor valve on a tank, and then detonating a larger charge under the tank or on a neighboring tank, either by timer or remote control once emergency services have deployed at the scene. The good news is that trains are more or less random mixes of cars and train departures are not predictable, making it difficult to use specific tank cars in a coordinated attack. Chemical tank trucks and pressure tankers would look highly anomalous if driving around in or parked in high profile public areas. However, security personnel and first responders should not count on the presence of placards to warn them of the presence of dangerous goods as these may have been removed or substituted for incorrect placards to increase confusion. For this reason, training and preparedness should include a knowledge of the unique shapes and features of the different types of chemical haulers and tank cars as a guide to what sort of goods they may contain and the risks that would be posed. Once a terrorism incident has been identified, responders should include a security aspect to the response including elements such as establishing the command post in a protected location, and conducting searches for additional explosives or booby traps on other parts of the tank, or possibly on other tank cars in the train, outside the area that has the immediately identified problem. It is also important to note that dangerous goods can be concealed in non traditional packaging. Beware the innocent looking

cube van, trailer van, or 20 ft. shipping container. If they are part of the incident scene, they should be opened and searched as well.

A third element of responding to a terrorism incident is decontamination. Conventional emergency response planning considers decontamination in terms of a limited number of victims and a tightly controlled number of responders working in the hot zone. In a terrorism incident, hundreds or potentially thousands of people may be contaminated. The worst case scenario would be the use of a radioactive “dirty bomb”, where conventionally available radioactive sources are packed with explosives to particularize radioactive contaminants over a wide area, but other possibilities include the use of highly toxic pesticides, or products such as acids or dermally toxic phenol. The need to decontaminate large crowds of people while moving them rapidly from the hazard area will be incredibly taxing on first responders which may lead to contaminated victims leaving the scene without a proper decontamination. A suggestion in this area is to immediately consider using local stores for supplies such as rubber gloves, plastic rain wear, garbage bags, sheets to replace clothing and highly absorbent materials such as diapers and sanitary napkins for surface scrubbing. The decon should be as dry as possible to minimize cross contamination, and efforts should be made to try to organize people that have come forward to help as ad hoc decon teams, crowd containment and record keepers, freeing up properly equipped responders to deal with other aspects of the emergency. Company planning should consider a readily faxable protocol for mass rapid decon using common materials for their particular products.

The fourth and potentially most important element of the dangerous goods terrorism incident is that the incident site is a crime scene. Responders must balance the timeliness and effectiveness of their response with the need to preserve evidence. If the perpetrators cannot be identified and caught, it is almost certain that they will use the knowledge they have gained to cause even greater damage the next time. The Oklahoma City bomber was eventually identified from a serial number on a truck part found several blocks from the scene, preventing further attacks. Everything at the scene or near it, and its initial location and condition could be critical to the investigation. Once a thing has been moved or altered, washed down or overturned, its usefulness as evidence that could be used



to reconstruct the event, or introduced at a criminal trial is significantly reduced. Chain of custody and good note taking, including photos and sketches of locations of objects are found critical. First responders are already well aware of behaviors such as arsonists and saboteurs wishing to witness what they created, and this may be no less true at the terrorism scene. What will be different is that, as a large scale public disaster, the high level of focus on the dangerous goods aspect of the situation may lead to delays in recognizing or establishing the criminal element of the response. Just as the worst burned person at a structure fire may be the arsonist, one of the victims rushed through decon may have been the perpetrator. In the United States, the FBI would quickly assert jurisdiction if the incident is a criminal act. In Canada we have no similar structure, leaving the local authorities charged with this responsibility.

Planning for an act of terrorism involving dangerous goods requires consideration of the unthinkable, unlikely or impossible. As the elements described in this article show, no matter how extreme the circumstances, awareness of how a dangerous goods terrorism incident is different from an equivalently serious dangerous goods accident will make a difference, both in mitigating the potential severity of the incident and in preventing further incidents such as secondary attacks to the initial strike, and, if the perpetrators can be identified, further attacks in the future.

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## Road Transportation

by Julia Cloutier

*This article is the second in a series of four articles to be published on the history of the transportation of dangerous goods program through the modes of transportation used to move the goods; namely, marine rail, air and road.*

A specific event did not trigger the decision to regulate road transportation of dangerous goods. It was more the concern about a non-regulated mode of transport and public safety.

In the early 1970's people with experience in the transportation of dangerous goods began to look at the regulations or, rather, the lack of regulations governing the transport of dangerous goods by road. While consignors and carriers of dangerous goods by rail, ship and air had to comply with regulations that included provisions for classification, packaging and safety marks, those dealing with road transport had far fewer constraints. At that time it was not uncommon for road carriers to accept shipments of dangerous goods rejected by the other modes. This situation was not in the best interests of public safety and the environment and, in addition, it gave the road carriers a competitive advantage over other modes of transport particularly rail transport.

In 1974, the federal and provincial governments began work to develop an act and a national set of regulations to control the transportation of dangerous goods by road. Originally, the intent was to legislate road

transport of dangerous goods at the federal level. However, it quickly became apparent that legislation regarding road transport only would not suffice. Existing rail regulations and regulations for international transport, particularly between Canada and the United States, had to be taken into account. Other issues also needed to be considered: trucks transport goods to and from ports and airports. As the interconnectedness of the modes in transporting dangerous goods was realized, the goals of the legislation changed.

An act and a comprehensive set of regulations governing all modes of transport was needed.

It was decided that the existing acts and regulations governing rail, air and ship would remain in place. The *Transportation of Dangerous Goods Act* (TDG Act) would introduce a uniform system for transporting dangerous goods that would apply to all modes of transport but where there was a conflict between the existing acts and regulations and the TDG Act and Regulations, the latter would take precedence.

The TDG Act was given Royal Assent in 1980. It passed through Parliament much more quickly than anticipated due to the Mississauga train derailment in 1979. The regulations made under the Act came into force in July 1985.

Yet the new Act had problems. At the time it was a welcome step, but it had not gone far enough. The Act needed to have greater impact, especially with road transport. The Act covered dangerous goods transported by air, ship or rail but its ambiguous wording covered only inter-provincial and cross border road transport. The regulations worked, but the Act needed to be changed.

The task was accomplished in the *Transportation of Dangerous Goods Act, 1992* (TDG Act, 1992). The TDG Act 1992 was confirmed as criminal law which made it easier to enforce and which solved some of the earlier wording difficulties that excluded its application from some areas of road transport.

The TDG Act, 1992 is in force today but the history of the Regulations made under the Act is still being

written. In August 2001, the “clear language” version of the TDG Regulations was published in the Canada Gazette, Part II. This version contained regulations in a format and language that those who are bound to comply with them can understand.

There will always be new developments in the field of dangerous goods because the chemicals that we use daily, whether we realize it or not, will keep growing in number and will need to be transported. Canada’s dangerous goods legislation will continue to change to meet the challenges posed by technological advances.

If you have any questions or would like to comment on this article, please contact Edgar Ladouceur, Director, Compliance and Response at ladouce@tc.gc.ca or (613) 998-6540.

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## Transportation by Air

*by Judith Code and Roger Lessard*

*This article is the third in a series of four articles to be published on the history of the transportation of dangerous goods program through the modes of transportation used to move the goods; namely, marine, rail, air and road.*

### The History of Aviation

In the early years of aviation, the airplane added a new dimension to transport that could no longer be contained within a country. The Paris Multi-national Conference on International Legislation laid down basic principles governing aviation (1910). World War I created a completely new situation with regard to aviation technical developments, as well as the safe and rapid transport of goods and persons over long distances.

In 1917, an Inter-Allied Aviation Committee was set up which led to the 1919 Paris Peace Conference and the Treaty of Versailles. The League of Nations was then created to promote international aviation co-operation,

peace and security. At the same time, some aviation companies created in European States and in North America were already engaged in international operations. The Canadian Air Board Act and Regulations were published in 1919 engaging Canada in international air security. Discussions to regulate the transport of dangerous goods were not scheduled to take place for another few decades.

After the war, a group of young aviators proposed that the international aviation collaboration born out of military necessity be directed to the development of post-war aviation. The proposal resulted in the ratification by 38 States, including Canada, of the International Air Convention dealing with technical, operational and organizational aspects of aviation and creating the International Commission for Air Navigation (ICAN), which opened the first secretariat in Paris (1922).

Continuous growth of aviation in both the technical and the commercial fields, namely the achieving of higher speeds, greater reliability and the covering of greater distances continued between the two World Wars. The development of ground facilities permitted the orderly and expeditious transportation of large numbers of people and goods over long distances during the Second World War. In the meantime, the League of Nations ceased its attempts to prevent another war.

### Foundation of the International Civil Aviation Organization and the United Nations

Studies of post-war civil aviation issues were initiated in 1943; the results of the studies, and subsequent consultations were extended to 55 States or authorities. The ratification by 32 States of the Convention on International Civil Aviation, known

as the Chicago Convention, established a permanent International Aviation Organization (1944). A foundation was laid for a set of rules and regulations regarding air navigation, bringing safety in flying a great step forward. The International Civil Aviation Organization (ICAO), created in April 1947, replaced ICAN and the Secretariat was relocated to Montréal.

The United Nations (UN) was created in June 26, 1945 (San Francisco) with the signature of the United Nations Charter. The UN Economic and Social Council's Committee of Experts on the Transport of Dangerous Goods received the mandate to discuss the urgent needs of modern transportation systems and the requirement to ensure the safety of people, property and the environment.

In October 1947, a relationship agreement was concluded between the ICAO and the UN. It was now a matter of time until the discussion on the Transportation of Dangerous Goods by Air would begin.

In 1956, the UN published the first Edition of the Recommendation on the Transport of Dangerous Goods addressed to governments and to the international organizations concerned with the regulations on the transport of dangerous goods.

### **International Air Transport Association**

In 1953, the Member airlines of the International Air Transport Association (IATA), an air industry carrier association, recognized the need to govern the transport of dangerous goods by air. Experience with other modes of transport had demonstrated that substances having hazardous properties, if uncontrolled, could adversely affect the safety of passengers, crew and/or aircraft. However, all such articles properly packaged in controlled quantities could be carried safely.

The IATA published in 1956 the *IATA Restricted Articles Regulations* (RAR). Subsequently, the IATA approached the ICAO in the late seventies, early eighties and requested the RAR be incorporated into a set of user-friendly regulations to be binding on all states involved in Civil Aviation and members of the Chicago Convention.

The *IATA Dangerous Goods Regulations*, replacing the RAR, are still published on an annual basis. It constitutes a manual of industry carrier regulations to be followed by all IATA Member airlines. Not all airlines are members of IATA. While it has no regulatory basis, it incorporates all of the ICAO requirements and sets higher criteria for

member airlines. IATA is represented as a Member at Meetings of the ICAO Dangerous Goods Panel.

### **Annex 18 to the Convention on International Civil Aviation**

The Air Navigation Commission of ICAO developed in 1981 Annex 18 to the Chicago Convention in response to a need for an internationally agreed set of provisions governing the safe transport of dangerous goods by air. The provisions of this Annex are based on the Recommendations of the United Nations Committee of Experts on the Transport of Dangerous Goods and the *Regulations for the Safe Transport of Radioactive Materials* of the International Atomic Energy Agency. The provisions of Annex 18 are amplified by the *ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air* (ICAO TI's) first published in 1983.

### **The Canadian Legislation Governing the Transportation of Dangerous Goods by Air**

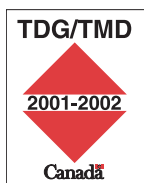
In July 1980, the Canadian *Transportation of Dangerous Goods Act* came into force. In 1985, the first *Transportation of Dangerous Goods Regulations* (TDGR) were published which incorporated by reference the ICAO TI's.

On August 15, 2001 the revised *Transportation of Dangerous Goods Regulations* were published in the *Canada Gazette*, Part II in a clear language format. These new Regulations will come into force August 15, 2002 setting the groundwork for the writing of modern regulatory text.

### **Conclusion**

The aircraft was a creation of no one nation or of no one technology. Today, some 90 years later, the international character of air transport is self-evident. A network of air routes envelops the world. The skies have become a highway for world commerce, where the transportation of dangerous goods carries its own history. Today, scheduled airline flights around the world carry millions of shipment of dangerous goods per day.

The transportation of dangerous goods by air to, from, and within Canada must be done in compliance with the TDGR and the ICAO TI's.



# ERAP Requirements for White or Yellow Phosphorus – UN1381

by Denis Carrière

Part 7 of the *Transportation of Dangerous Goods Act 1992*, requires that before a person offers for transport or imports certain dangerous goods, the person must have an approved Emergency Response Assistance Plan (ERAP). The intent of an ERAP is to provide on-site assistance to local authorities in the event of an accident involving the dangerous goods. The assistance provided would include, without being limited to, the provision of emergency response advice first by telephone, then by a knowledgeable person attending the accident site, and the supply of specialized equipment and a response team to mitigate the effect of the dangerous goods at the accident site. Sections 7.15 to 7.19 and Schedule XII of the *Transportation of Dangerous Goods (TDG) Regulations* prescribe the dangerous goods and the concentration or quantity for which an ERAP is required. (As of August 15, 2002 you must refer to part 7 and column 7 of Schedule 1 of the *Clear Language Regulations*.)

The persons filing ERAP applications have various options for securing adequate response capabilities and will usually consider several factors such as the nature of the dangerous goods, the specialized training and equipment, the mode of transport, the geographic area to cover and the means of containment. A Remedial Measures Specialist (RMS) will examine certain criteria before recommending for approval the ERAP application.

Transport Canada has received and reviewed several Emergency Response Assistance Plans concerning the transportation of phosphorus. This substance is transported in either tank cars or intermodal containers. These shipments may have arrived through the Port of Vancouver or Halifax and they may have been shipped to central locations in Ontario.

This article will cover some of the basic requirements that are considered necessary for an ERAP relating to white or yellow phosphorus, UN1381, and key elements that must be addressed while writing up the ERAP. White and yellow phosphorus behave identically, so any mention of white phosphorus also includes yellow

phosphorus. The information below is given to raise awareness only and should not be construed as the final guidelines for approving an ERAP application.

## Shipping Name

There are two accepted shipping names for the dangerous good. The color difference is due to contamination of the phosphorus. The more impurities, the more the color will tend from white to yellow. The proper shipping name must be used for the corresponding dangerous good.

- Phosphorus, white, dry *or* Phosphorus, white, in solution *or* Phosphorus, white, underwater
- Phosphorus, yellow, dry *or* Phosphorus, yellow, in solution *or* Phosphorus, yellow, underwater

## Properties

Phosphorus is a highly reactive element of the periodic table. White Phosphorus is a waxy white solid; when pure it is colorless and transparent. It will have a yellowish opaque color when it is contaminated with impurities. Some of its physical properties are inherent with its dangerous properties. Response planning must take into considerations its high flammability.

Melting point:	44.1°C
Boiling point:	280.5°C
Flammability:	Ignites spontaneously upon contact with air.
Auto-ignition temperature:	33.9°C (as a general guideline, will ignite in air at temperatures above 30°C)
Specific gravity:	1.82 (at 20°C)
Density (liquid):	1.74 (at 50°C)
Solubility (in water):	very slightly soluble
Behaviour in air:	ignites, forming fume cloud of P <sub>2</sub> O <sub>5</sub> (phosphorus pentoxide) with considerable heat.
Odour threshold:	odourless

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## Toxicity

White phosphorus is a necessary element for living organisms (e.g. bones, teeth), but in its pure form is highly toxic by all routes of entry. Safety considerations and guidelines must be implemented prior to any response.

TLV: 0.1 mg/m<sup>3</sup> (inhalation);

STEL: 0.3mg/m<sup>3</sup> for 15 minutes;

Inhalation of combustion products: Irritation of respiratory tract, skin and eyes.

Inhalation of solid phosphorus: photophobia with myosis, dilation of pupils, retinal haemorrhage and congestion of blood vessels;

Ingestion: Vomiting, weakness, necrosis of the mandible, anaemia, loss of appetite, pallor;

Contact: Will cause severe burns to skin and eyes;

Environmental: Acute and chronic effects on aquatic biota are significant at concentrations well below 10 µg/L. Available data indicates an environmentally safe concentration should be equal to or less than 0.01 µg/L.

## Means of Containment

The construction material for the means of containment should be stainless steel or carbon steel. Aluminum should not be used because of its incompatibility with white phosphorus. The types of steel that should be used are set out in the various standards. Specific requirements are prescribed in the various standards such as **CSA B621-98** and **CGSB-43.147-97**. Some of the requirements are listed below:

Tanks must not be equipped with bottom outlets;

Tanks must be insulated with at least 100mm (4 inches) of insulation, except that the insulation may be reduced to 50mm (2 inches) over the exterior heater coil;

Tanks must not be equipped with interior heating coils;

Tanks must contain a padding composed of an inert gas or be filled with water.

These requirements must be considered if field operations/response are to be performed. When transported in an intermodal/portable tank, the IMDG code requires that the product be shipped in solid state. Therefore, for imported product from an ocean-going vessel, the response must take into account that the product will be in solid state.

## Personnel

Any personnel that deals or will deal with this product must be knowledgeable about the dangers of the product (ignition in air, toxicity, etc.). This is especially relevant for clean-up companies under contract/sub-contract.

An awareness package prepared by the consignor must exist and it must be distributed to companies under contract.

Response Personnel must be trained for handling white phosphorus, including clean-up contractors.

These criteria are very important for the safety of the response. While reviewing the ERAP, the RMS will assess the knowledge and the training for this particular product.

## Equipment

Specialized equipment is necessary to respond to an incident involving white phosphorus. The availability of the key pieces of equipment, which will be verified by the RMS when doing the audit, is for the safety of the responders.

The gloves must be chemically resistant to white phosphorus and phosphoric acid;

Flame retardant clothing and aluminized suits must be worn for response operations;

Nitrogen must be available for replacement pad;

Miscellaneous patching equipment is necessary, with the emphasis on chemical compatibility with the dangerous goods;

Water availability (i.e. water pumps, hoses, etc.). In the case of an accident with leakage of product, water must be made available, and provisions should be made for availability for isolated incident sites. Equipment dedicated for water should be part of the response package;

Shovels (not aluminum);

Non-sparking tools;

Equipment must be grounded when performing operations;

Equipment must be compatible with acids (hence no aluminum).

## Response Actions/Reactivity

White phosphorus is highly reactive. Special considerations must be taken for response operations for this dangerous good. White phosphorus will dissolve partially in water and react to generate phosphoric acid. This water solution is often referred to in industry as “phossey” water. The water pad above the product in the tank can have a pH ~5. Hence, precautions for weak acids must be taken. Any material sensitive to acids should not be used in the operations.

This product will ignite spontaneously on contact with air and will extinguish when air is excluded, i.e. submerged in water (white phosphorus will sink in water), buried in wet sand/earth. Planning must ensure that containment of spilled material must be done under/in water.

Breached container must be flooded with water fog/soft water spray at the breach area and spill area. Violent water spray will only spread the product. Cooling the breach area will solidify any liquid phosphorus. Depending on the tank integrity, there is the possibility of flowing cold water through the heater coils to help in solidify the product. Response operations for spilled material must be done under water fog.

White Phosphorus is incompatible with the following materials: oxidizing materials, strong caustics, air, sulfur, beryllium, thorium, zirconium, various halogens, oxides, fluorides, azides, iodates, bromates, chlorates, nitrides, acids, iodides, chlorides, carbides and acid anhydrides. It will react with strong caustics to generate phosphine (highly toxic and flammable).

## Transportation / Handling

The container must be heated to between 50°C and 60°C for off-loading. The product is loaded and off-loaded in liquid state, by displacement with water. The loaded tank must contain a water pad, with a nitrogen blanket. Residue tanks are filled with water from the

displacement procedure. Transfer procedures must not heat the product above 60°C. Steam or electrical heating of the product is not acceptable because of the difficulty in temperature control. Only hot water should be used. Transfer pipes should be heated with a water jacket at controlled temperature. Such operations are very difficult for field transfers. The ERAP must address these problems. All piping, which will transfer product, must be below water level. Tanks must be able to accommodate liquid expansion. Field transfer of liquid white phosphorus is highly dangerous and the possibility of this must be addressed in the pre-planning. In the case of identical accidents, several factors may determine whether liquid transfer is feasible (e.g. urban vs. rural area, water availability). A permanent facility should be used for liquid transfers. Field transfer of solid white phosphorus is possible and may be necessary. Personnel must be trained to perform these type of operations.

## Assessment of Danger

The ERAP application must demonstrate a complete and thorough potential accident assessment. This must include but not be limited to the following:

- A general analysis of how an accidental release of dangerous goods could occur;
- A general description of the potential consequences of an accidental release of dangerous goods; and
- A description of the actions the applicant is expected to take in the event of an accidental release or an imminent accidental release of dangerous goods.

## Correction on Previous Edition:

A correction was made to the label border of the WHMIS advertisement published in the previous edition of the Newsletter. The correct advertisement is found on page 27 of this issue.

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# Class 6.2: Infectious Substances

by Farrah Fleurimond

Of all the dangerous goods listed, those in Class 6.2 are called “infectious substances”. By definition, an infectious substance means a substance known or reasonably expected to contain pathogens, defined as micro-organisms which can possibly or certainly cause disease in human beings or animals.

Based on its capacity to cause and spread disease, and the seriousness of that disease, an infectious substance can belong to one of four different risk groups. Risk groups II, III and IV are regulated by the *Transportation of Dangerous Goods Regulations* (TDGR). Risk group I, which is the group which presents the least risk, is composed of micro-organisms which are not likely to cause disease in humans or animals and is therefore not regulated by the TDGR.

At the other end of the scale, risk group IV presents the most dangerous risk and has the following characteristics, as specified in the clear language version of the TDGR:

- The disease caused by the micro-organisms has serious effects that may be irreversible or lethal in humans or animals contracting it;
- The micro-organisms are readily transmitted, directly, indirectly or by accidental contact;
- Effective treatment or preventive measure is not generally available.

Pursuant to the TDGR, a person must not handle, offer for transport or transport dangerous goods included in Class 6.2, Infectious Substances, in a means of containment unless the means of containment is required or permitted by Part 5 “Means of Containment” of the Clear Language Regulations (please refer to section 5.16). Types 1A, 1B and 1C means of containment may be selected and used depending on the desired level of integrity, the use to be made of the infectious substances and the risk group. The **CAN/CGSB-43.125-99** standard states the requirements for the manufacturing and marking of the means of containment for the transportation of infectious substances. Type 1A packaging must be used for risk group IV. This type of packaging may be used in all cases.

Part 7 of the TDG Clear Language Regulations “Emergency Response Assistance Plan”, describes the inclusion criteria for applying for approval of an Emergency Response Assistance Plan (ERAP). Infectious substances in risk group IV are the only substances requiring an emergency response assistance plan, regardless of their quantity.

On a national basis, Health Canada has an emergency response assistance plan approved by Transport Canada. Should an incident occur while infectious substances are in transport, Health Canada’s Centre for Emergency Preparedness and Response would ensure the implementation of the emergency response assistance plan and the provincial-territorial authorities would be responsible for emergency measures dealing with clean-up, recovery and confinement. Adequate resources are available in every province to respond effectively within a reasonable timeframe. Although emergency responses are handled by the regions, the administration is centralized and overseen by Health Canada. A participation agreement was signed by most provinces to ensure immediate assistance and to provide support for emergency activities when needed. For those regions where the provincial public health laboratory does not participate in the emergency plan, the response team would consist of Health Canada emergency responders.

A list of the personal protective equipment, decontamination and confinement equipment used by the responders during the clean-up process of risk group IV infectious substances must be completed, maintained and up-to-date. The procedures in place and the material used in the recovery process must ensure the safety of the public and the environment. During the decontamination process, it is important to use a chemical disinfectant that is very large in spectrum. The treatment and removal of used equipment is also very important. The used equipment must not contaminate nearby people or objects and must not, under any circumstances, leave viable micro-organisms which can cause infection.

Despite the acquisition of specialized equipment, the knowledge of qualified personnel, the writing and application of procedures, the best preparation tool remains the implementation of the emergency measures. The development of potential accident scenarios and accident simulations helps to review the quality of staff training, assess the effectiveness of both the emergency measures and of the equipment and to note any discrepancies in the emergency response assistance plan. It should be noted that any emergency plan must include the development of potential scenarios dealing with accidental releases and imminent accidental releases.

# A New Program Related to Transportation Terrorist Incidents Involving Chemical, Biological, Radiological, and Nuclear (CBRN) Agents

by Réjean Simard

Following the terrorist events of September 11<sup>th</sup>, the Canadian Government conducted security reviews and identified several initiatives and projects to reduce the threat or impact of terrorist acts. One initiative identified and approved for the department was the development and implementation by Transport Canada of a program to train industrial emergency response teams capable of assisting in the response to terrorist incidents involving CBRN agents.

The *Transportation of Dangerous Goods Act* (TDG Act) provides the Minister of Transport with the responsibility of promoting public safety in the transportation of dangerous goods. The wording used throughout the TDG Act makes it an act established under the Criminal Law Constitutional Head of Power. It applies to all Canadians, individuals as well as companies. Although the TDG Act and Regulations concentrate on the prevention of incidents involving dangerous goods, they provide specific requirements for an effective and timely response to transportation incidents involving dangerous goods when such incidents occur. One of the response-related requirements of the TDG Act mandates industrial emergency response teams with specialized knowledge and equipment to provide assistance to First Responders at times of major transportation incidents involving a group of especially dangerous goods whose release could have severe and widespread impacts on people, property, or the environment. Many of these dangerous goods could be used for terrorist or criminal acts.

Since the mid-1980's, Transport Canada has repeatedly and successfully dealt with significant accidents involving dangerous goods by managing a program that allows access to industrial response experts, more specifically the Emergency Response Assistance Plans (ERAPs) required by the TDG Act and Regulations, the attendance of designated specialist inspectors at accident site, and the information provided by the well-known CANUTEC emergency information centre.

The new Transport Canada initiative is aimed at developing and delivering national training, equipment, and response standards and establishing legal and contractual mechanisms to secure access to these special

industrial response teams at the time of a CBRN incident and to provide on-site specialist inspectors.

The new program will be based on an assessment of vulnerabilities and will be built using existing response systems to be integrated with them.

The preliminary tasks identified to date within this new program include:

- Consultation with industry, emergency response contractors, first responders, other federal departments, provinces and territories;
- Assessment of the need for new regulations, liability implications, safety and health requirements and reimbursement mechanisms;
- Development of program policies and procedures, including the assessment of vulnerability and threat, the definition of roles and responsibilities, and the identification reimbursement mechanisms for the use of industrial emergency response teams by local governments (e.g. firefighters, police), provincial and territorial governments, or the federal government (e.g. for terrorist incidents on federal lands or border crossings);
- Development of training, equipment, and response standards and the identification of mechanisms for their implementation;
- Identification of Industry Emergency Response Teams capable of assisting in the response to terrorist incidents involving CBRN; and,
- Providing program management and oversight, monitoring the application of standards, verifying compliance with formal agreements and reporting on response performance at CBRN terrorist incidents.

Transport Canada is currently initiating consultation with interested parties and welcomes any comments, suggestions or proposals from interested parties concerning this new program. These may be forwarded directly to Mr. Réjean Simard at [simarrj@tc.gc.ca](mailto:simarrj@tc.gc.ca)





**Commercial and Business  
Aviation  
Dangerous Goods Standards**

## **Requirements Governing Approval Certificates Issued by the Competent State Authority for Radioactive Material, Radioactive Material Packaging and Radioactive Material Shipments.**

### **Scope**

This notice is of particular importance to persons handling, offering for transport or transporting radioactive material.

### **Introduction**

The *Transportation of Dangerous Goods Regulations* and by reference the *International Civil Aviation Organization Technical Instructions for the Safe Transport of Dangerous Goods by Air* (ICAO TI's) regulate the transport of radioactive material by air in Canada and between Canada and another country.

### **Regulations Governing the Transportation of Radioactive Material**

The ICAO TI's establish acceptable levels for the emission of radiation, the criticality safety index of specified radioactive materials and the protection criteria from thermal hazards that are associated with the transport of radioactive material.

- Chapter 2;7 and Table 2-12 of the ICAO TI's sets out the classification criteria for radioactive material,
- Chapter 4;9 specifies radioactive packaging requirements, and
- Chapter 6;7 sets the requirements for the construction, testing and approval of packages and material for class 7.

### **Approval Certificates Required from the Competent State Authority**

The ICAO TI's (6;7.21) require certificates of approval issued by the applicable Competent State Authority for some Radioactive Material, Radioactive material packages and Radioactive material shipments. The shipper (consignor) must be in possession of the following certificates of approval (5;1.3.3) as applicable and must make them available to the those who handle or transport the shipment or to Inspectors upon request (5;4.1.9.3):

Radioactive material designs:

- Special form Radioactive material;
- Low dispersible Radioactive material;

Package designs:

- Packages containing 0.1 kg or more of uranium hexafluoride;
- All packages containing fissile material unless excepted;
- Type B(U) and Type B(M) packages; and
- Type C packages.

## Shipments:

- Special arrangements
- Certain other shipments

Certified Packages must be legibly and durably marked with an identification mark allocated to that design by the Competent Authority of the State. This mark includes the Vehicle Registration Identification (VRI) Code of the country of origin of the design as published by the United Nations Economic Commission for Europe, Transport Division which can be consulted at the following Web site:

**<http://www.unece.org/trans/conventn/disting-signs-5-2001.pdf>**

Each approval certificate issued by a competent authority is assigned an identification mark. Markings found on the packaging will be recorded in the text of the certificate. A sample follows:

A/132/B(M)F-96, where

A	VRI code for Austria
132	Number assigned to the package design
B(M)F	Type B(M)F package design for fissile material
96	Date of the IAEA Edition certification criteria

Note : Please note that the ellipse around the VRI code, and the size of the marking (8 cm) are not applicable.

A Canadian Nuclear Safety Commission (CNSC) issued certificate of approval is required in most cases before a Radioactive material package requiring approval can be transported in Canada (see also Attachment 3 - Notified Variations from the ICAO TI's; Canadian State Variations CA 1, CA 2, CA 3 and CA 4.).

## **Approval Certificates Not Required From the Competent State Authority**

Excepted packages, Industrial packages Type IP-1, Type IP-2, Type IP-3 and Type A packages that meet requirements are legibly and durably marked in accordance with 5;2.4.5 may be used without a Competent Authority approval certificate.

## **Grandfathering Clause**

Packages certified under the 1973, 1973 (as amended), 1985 and 1985 (as amended 1990) (6;7.23.2) may continue to be used, but in most cases must have an approval certificate issued by the CNSC. These packages will be marked with an original certificate identification number such as:

A/132/B(M)-85, or A/132/B(M).

Packages not requiring Competent Authority certification that are in accordance with the 1985 and 1985 (as amended 1990) may continue to be used until December 31, 2003, subject to the applicable provisions (ICAO TI's 6;7.23.1). After this date, transport is restricted to only those packages prepared for transport before this date.

For additional information please contact the following :

Atlantic Region	(506) 851-7247
Quebec Region	(514) 633-2838
Ontario Region	(416) 952-0000
Prairie and Northern Region	(780) 495-5278
Pacific Region	(604) 666-5655
Airline Inspection	(514) 633-3116

Or visit the Web site at :

**[www.tc.gc.ca/civilaviation/commerce/dangerousgoods](http://www.tc.gc.ca/civilaviation/commerce/dangerousgoods)**

## Marketing Chemicals in Canada? \*

### Workplace Hazardous Materials Information System (WHMIS)

is Canada's hazard communication standard

[www.hc-sc.gc.ca/whmis](http://www.hc-sc.gc.ca/whmis)

This Government of Canada site provides information on:

- hazard classification;
- preparation of labels and MSDSs, including ingredient disclosure;
- language requirements, MSDS toxicological and PPE disclosure;
- trade secret provisions;
- use of the ANSI / ILO / EU 16-heading MSDS format;
- Globally Harmonized System for hazard communication;
- high-resolution files for hazard symbols and label borders;
- an indexed Reference Manual; and
- data sheets for infectious agents (including anthrax).

\*New: **Revised Canadian regulations for chemicals for the retail market now in effect.** Visit: <http://publiservice.gc.ca/services/gazette/part2/pdf/g2-13517.pdf> for the amended «Consumer Chemicals and Containers Regulations, 2001»; (see SOR/2001-269 and -270).