



# TRANSPORT DANGEROUS GOODS

# NEWSLETTER

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## RAISING CANUTEC AWARENESS IN SALMON ARM, BRITISH COLUMBIA

By Mathieu Lemay

The Canadian Transport Emergency Centre (CANUTEC), Transport Dangerous Goods Directorate’s emergency response centre, was invited to participate in the Volunteer Firefighters Association of British Columbia’s Spring Seminar, held in Salmon Arm, British Columbia, from April 26 to 28, 2013. This annual seminar holds an important place in training volunteer firefighters from communities all over British Columbia. The Salmon Arm Fire Department, which regularly provides fire training exercises at the nearby Shuswap Regional Fire Training Centre, has a rich history in fire protection and prevention and this year they celebrate 100 years of service.

The seminar included over 30 training modules and allowed some 450 attendees to acquire essential skills that they may not otherwise have obtained. CANUTEC presented seven lectures that focused on how to use the Emergency Response Guidebook (ERG) as well as the services CANUTEC provides in the event of an emergency. Although some attendees were already familiar with the ERG, all found it valuable to review the information it can provide during an incident.

A key concern that attendees raised was the risks associated with propane or liquefied petroleum gases (LPG) during emergencies. Most volunteer firefighters live in smaller communities that use propane as fuel for homes and businesses. The potential hazards of propane include its highly flammable vapours, the shock wave and debris projected by the explosion of a container holding vapors of boiling liquid, as well as possible frostbite upon contact with liquid propane. The new sections on Boiling Liquid



Photo by: Viktoria Haack

Expanding Vapour Explosion (BLEVE), found on pages 364-367, and Improvised Explosive Device (IED), page 372, added in the 2012 edition of the ERG, were well received and deemed useful tools for these types of incidents.

CANUTEC continues to provide dangerous goods awareness to ensure public safety and help first responders return home safely to their families. If you would like to have CANUTEC participate in, or give a talk at, a local seminar or event, or would like to have a phone simulation with one of CANUTEC’s emergency response advisors, please contact us at 613-992-4624 or by email at [CANUTEC@tc.gc.ca](mailto:CANUTEC@tc.gc.ca).

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This newsletter is also available at the same internet address. Please address comments and inquiries regarding additional information or publications to:

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## CLARIFICATION

The article titled "Development in Northern Canada and the Transportation of Dangerous Goods" published in the Spring 2013 TDG Newsletter, stated that "all goods destined for the North are shipped out of Quebec". This was an oversimplification and lacked clarity; the article was meant to point out the challenges faced by the Quebec Region which sees large quantities of dangerous goods shipped, from the ports in the region, to various destinations in Northern Quebec and Iqaluit. We apologize for any inconvenience this may have caused.

# WORD FROM THE DIRECTOR GENERAL

As the country woke up on July 6th, 2013, the Transport Dangerous Goods Directorate was already on the scene in Lac-Mégantic. Within hours of the tragic accident, our inspectors and Remedial Measures Specialists joined the efforts, providing critical immediate and ongoing support to the small Quebec community.

This incident will continue to define the Transport Dangerous Goods Directorate's priorities for the long term. In response to the event we have implemented a number of initiatives to further our mandate to improve and promote the safe transportation of dangerous goods in all modes of transport.

Some of these recent changes include:

- Four protective directions to protect public safety (for more information, see article on p. 6);
- Increasing the number of inspections of crude oil shipments at transloading sites in addition to regular inspections of rail operators; and
- Collaboration with our U.S. counterparts on means of containment standards, classification and testing procedures, sharing data and joint inspections.

The Transportation Safety Board concluded its investigation into the incident and released its report on August 19, 2014. The Transport Dangerous Goods Directorate continues work to improve the safe transportation of dangerous goods throughout the country.

## RECENT CHANGES IN THE TDG DIRECTORATE

In 2011, the Office of the Auditor General (OAG), under the Commissioner of Environmental and Sustainable Development, conducted an audit of the oversight and enforcement program within the Transportation of Dangerous Goods program. The audit recommended that the department clarify roles and responsibilities of the various departmental modal groups involved in the inspection of dangerous goods.

To address this, as a first step, the two Civil Aviation staff members in Headquarters responsible for policy and regulatory interpretations group related to the *Transportation of Dangerous Goods Act, 1992*, were transferred to the Transport Dangerous Goods Directorate in April 2012.

Moving forward, the Transport Dangerous Goods and Civil Aviation Directorates reviewed the existing structure and agreed that further steps to clarify the roles and responsibilities of each Directorate and more effectively deliver the two programs.

Effective January 6, 2014, 18 Civil Aviation Transportation of Dangerous Goods positions were transferred from the Civil Aviation Directorate to the Transport Dangerous Goods Directorate.

Additionally, and in order to meet the recommendations made by the Commissioner of the Environment and Sustainable Development, the Transport Dangerous Goods, the Civil Aviation and the Marine Safety and Security Directorates signed memoranda of agreement. These memoranda outline how the directorates will coordinate TDG issues in both modes of transport such as participation in international meetings, information sharing and inspector training and designation.

The Transport Dangerous Goods Directorate sees these changes as important steps in providing our stakeholders with a consistent approach to policy interpretation, compliance and enforcement.

## SPRING 2013 TDG NEWSLETTER SURVEY

### Thank you for participating!

In the Spring 2013 issue of the Newsletter, we asked readers to complete a survey. The intent was for the Transport Dangerous Goods Directorate to get a better idea of our readership and to identify what we were doing right and what readers wanted to see changed. Working with Transport Canada Communications, we developed a short survey card which we inserted into every paper copy of the Newsletter. We also provided an online version that could be accessed by online readers as well as by “traditional” readers. Additionally, the paper copy included a QR code that allowed users of Smart phones to access the survey simply by scanning the code.

We will publish an analysis of the survey in a future edition of the Newsletter but, very briefly, here are the highlights:

- 385 people responded to the survey (paper and electronic combined);
- Survey respondents are long time readers of the Newsletter (2/3 of respondents have been reading it

for 5 years or longer), and span several years of work experience in the various sectors relating to the transportation of dangerous goods;

<5 years	32%
6-10 years	29%
11-15 years	16%
15+ years	21%

- The quality of the Newsletter is rated as high by a majority of respondents - 86% agree; and
- Readers are engaged! Over 230 comments were received as part of the survey feedback.

We will continue to analyze the survey results in order to improve the Newsletter and we thank you for your engagement and your great feedback!

## TRANSPORTATION OF DANGEROUS GOODS RESEARCH

### WHAT'S NEW?

By Barbara Di Bacco

The Transport Dangerous Goods Directorate is working in a number of exciting research areas. These include:

#### Assessing the Toxicity Risks of the Transport of Petroleum Sour Crude Oil

Crude oil is a mixture of many substances and its makeup can vary widely depending on the source of the oil. Some crude oils contain dissolved hydrogen sulphide gas, which in sufficient concentrations, could be toxic when inhaled and pose significant health, safety and environmental risks. We are working with Natural Resources Canada and the industry-led Canadian Crude Quality Technical Association on research projects that can help predict or measure hydrogen sulphide gas content in the vapour space of crude oil storage tanks and transportation containers. These projects aim to produce standard, practical tools, like a set of reference graphs or a measurement device, that can help Transport Canada and industry better understand and manage safety risks in crude oil storage, transport and handling.

#### Lithium Batteries

Most of us carry lithium batteries every day in our cell phones. So it's easy to forget that lithium batteries are dangerous goods. Being such a common commodity, the shipment of lithium batteries has increased rapidly over the last few years. The Transport Dangerous Goods Directorate is looking more closely at the safety risks of their transport, especially due to recent lithium battery incidents in Canada and abroad.

The Directorate has set up a multi-modal Transport Canada Lithium Batteries Working Group with members from Transport Dangerous Goods, Civil Aviation, Road Safety and Marine Safety. Our regulatory, risk analysis, research, emergency response, compliance and enforcement staff are looking at what Transport Canada can do to reduce the risk of a lithium battery shipment incident

The Working Group has several initiatives on the go:

- Developing an action plan for outreach and compliance strategies;
- Creating and updating awareness material on lithium batteries: [www.tc.gc.ca/eng/tdg/lithium-batteries-are-dangerous-goods-1162.html](http://www.tc.gc.ca/eng/tdg/lithium-batteries-are-dangerous-goods-1162.html);
- Developing a better picture of the lithium battery supply chain in Canada;
- Conducting research projects to analyze incidents, identify key failure modes and risks during shipping, and recommend prevention and mitigation measures; and
- Providing input on proposed amendments to the *Transportation of Dangerous Goods Regulations* to keep them current with international requirements and ensure they ultimately respond to the latest risk findings from our research and risk analysis work.

### Assessing the Application of Crude Oil in Thermal Models for Tank Car Performance in Fire Conditions

The TDG Research team is planning research projects to gain a better understanding of the behaviour of crude oil in tank cars exposed to elevated temperatures using validated, high-fidelity computer models. We are currently in the planning stages and in discussions with industry groups and the U.S. government on possible collaboration.

### Tank Car Derailment and Puncture Analysis: Evaluation of Risk Reduction from Tank Car Design and Operations Improvements

The TDG Research team is planning a collaborative research project with the U.S. DOT Federal Railroad Administration to develop an engineering-based methodology to quantify the safety benefits and risk reduction in dangerous good rail transport resulting from the implementation of mitigation strategies, such as improvements in tank car design or revisions to train operating practices.

### Jack Rabbit II Research Program

The TDG Research and CANUTEC teams are collaborating with the U.S. Department of Homeland Security Chemical Security Analysis Center on large scale chlorine release tests to fill critical knowledge and data gaps for toxic inhalation hazard (TIH) chemical release behaviour, which has not yet been experimentally tested at scales represented by rail car, highway tank, barge or storage tanks.

For more information, contact Barbara Di Bacco - Chief, Research Development, Promotion and Coordination - at 613-990-5883 or [Barbara.DiBacco@tc.gc.ca](mailto:Barbara.DiBacco@tc.gc.ca).

## IMPLEMENTING LEAN MANAGEMENT IN THE TRANSPORT DANGEROUS GOODS DIRECTORATE

By Lindsay Jones

### What is Lean Management?

Lean is a collection of principles, methods and tools used to eliminate waste in a process to make it more efficient. It is both a philosophy and a way of working that puts the client first, so we can provide Canadians with more value-added government services. Lean also boosts employee engagement, by giving them tools to find areas of improvement, to apply the most efficient ways to offer services and to take the lead on making their processes better.

### How is the Transport Dangerous Goods Directorate implementing Lean?

Other government organizations, like the Government of Saskatchewan and the State of Iowa, use Lean management and are seeing positive results. We are the first program to use these tools in Transport Canada. We began applying Lean methods and tools in 2012 and, through ongoing implementation, we are becoming more transparent in our

work and are finding ways to reduce waste and improve the flow of some of our processes.

We have held three value stream mapping events, an introductory workshop with our senior management team and learning sessions with staff. Some staff have even begun using visual management boards and having daily report-out meetings to talk about what is going well and what is not, and reviewing their action plans to improve their processes.

### So, why are we doing this?

We are using Lean management principles to improve the efficiency of the Transportation of Dangerous Goods program. We also want to empower and engage staff to improve their processes, and in turn provide better and more value-added services.

Lean is about continuously improving our processes to better serve Canadians, and we are committed to continuing with Lean.

# PROTECTIVE DIRECTIONS ISSUED BY THE TRANSPORT DANGEROUS GOODS DIRECTORATE

By Anne-Marie Noël

In response to Transportation Safety Board of Canada (TSB) recommendations after the tragic Lac-Mégantic accident, Transport Canada has issued four protective directions since October 2013, to protect public safety.

We issue protective directions under the authority of section 32 of the *Transportation of Dangerous Goods Act, 1992* and regulate them under Part 13 of the *Transportation of Dangerous Goods Regulations*. A protective direction:

- Takes effect on the date the Minister or a designated person signs it, or at a date set out in the protective direction; and
- Expires on the expiry date set out in it. If there is no set expiry date, it will expire 12 months after it is signed.

## Brief Summaries

### 1. Protective Direction 31:

- Directs any person who imports, handles or offers for transport or transports crude oil to:
  - Immediately test crude oil classified as UN1267, or UN1993, if the classification testing was done before July 7, 2013; and
  - Provide those test results to Transport Canada's inspectors upon request.
- Requires any person who imports or offers for transport UN1267 or UN1993 to immediately provide a Safety Data Sheet (SDS) for the tested product to the Director General, Transport Dangerous Goods Directorate, through the Canadian Transport Emergency Centre, (CANUTEC); and
- Requires any person who imports, handles, offers for transport, or transports crude oil classified as UN1267 or UN1993 by rail – until the testing is complete, to:
  - Ship all such crude oil as a Class 3 Flammable Liquid Packing Group (PG) I; and
  - Meet the requirements in the Act, regulations and standards related to UN1267 or UN1993 classified as PG I.

### 2. Protective Direction 32:

- Directs any company who transports dangerous goods through a municipality by rail, to provide

the municipality's designated Emergency Planning Official with the aggregate information on the nature and volume of dangerous goods it transports through the municipality, each year;

- Directs CANUTEC to develop and maintain a list of all Emergency Planning Officials and provide it to all railway companies; and
- Requires railway companies to provide in writing to Transport Canada, through CANUTEC, contact information of the person who will liaise with a municipality's Emergency Planning Official.

### 3. Protective Direction 33:

- Directs every person who offers for transport or imports dangerous goods by rail to have an Emergency Response Assistance Plan (ERAP) approved as set out in section 7 of the *Transportation of Dangerous Goods Act* for: UN1170 ETHANOL, UN1202 DIESEL FUEL, UN1203 GASOLINE, UN1267 PETROLEUM CRUDE OIL, UN1268 PETROLEUM DISTILLATES, N.O.S., UN1863 FUEL, AVIATION, TURBINE ENGINE, UN1993 FLAMMABLE LIQUID, N.O.S., UN3295 HYDROCARBONS, LIQUID, N.O.S. or UN3475 ETHANOL AND GASOLINE MIXTURE.

**Note:** This direction will take effect 150 days from the date it was signed.

### 4. Protective Direction 34:

- Directs every tank car owner to immediately identify each of its tank cars that meets all four criteria listed in the direction. Any tank car that meets these criteria can no longer transport dangerous goods and must be marked with the words "Do not load with dangerous goods in Canada/Ne pas charger de marchandises dangereuses au Canada".

**Note:** A tank car owner must also provide the reporting mark within 30 days of the signature of this direction.

## To learn more

Visit our Frequently Asked Questions (FAQ) page on Transport Canada's website:

[www.tc.gc.ca/eng/tdg/faq-319.htm#a11\\_0](http://www.tc.gc.ca/eng/tdg/faq-319.htm#a11_0).

# ASSOCIATION QUÉBÉCOISE DU PROPANE ANNUAL TRAINING FOR EMERGENCY RESPONSE ADVISORS

By Eve Poirier, in collaboration with Michel Deslauriers, Director General of the Association Québécoise du Propane

In June 2013, the Association Québécoise du Propane (AQP) emergency response advisors and senior emergency response advisors met for their annual training workshop. This training is part of the AQP mutual assistance plan, an intervention structure composed of Association Québécoise du Propane members ready to respond at any time to an incident involving propane. This response capacity is a *Transportation of Dangerous Goods Regulations* requirement for the transport of liquefied petroleum gas.

The goals of the Association Québécoise du Propane mutual assistance plan are to:

- Develop a system of structured collaboration for emergency response operations in the propane industry, especially for communications, accessibility, and availability of human and material resources required to respond effectively during incidents involving propane;
- Ensure signatories, first responders (firefighters, police), Transport Canada and other authorities tasked with public safety and protection have 24/7 access to:
  - A permanent list of propane distributors and resource people who can intervene (i.e. emergency response advisors and/or senior emergency response advisors and their 24/7 contact information, etc.); and
  - An inventory of available response operation equipment nearest a site where an incident could occur
- Set out the mutual assistance plan's application framework, signatory obligations and responsibilities and operating procedures; and
- Define the role of the Association Québécoise du Propane as holder of the mutual assistance plan.

To maintain a level of knowledge comparable to that of other emergency response organizations, the Association Québécoise du Propane updates its training program each year.

Among other things, the Association asked the Ville de Granby fire department to present the viewpoint of firefighters during response operations involving one or more dangerous goods. The discussion was productive for all parties. Understanding the roles and responsibilities of each participant at an incident site ensures a better grasp of the respective issues. I invite fire departments and other organizations to get acquainted with their neighbouring industries and learn about response capacities for transport incidents – a component often forgotten in emergency planning. We forget that the people involved in an incident are key resources who can make an invaluable contribution.

I would also highlight the initiative of the propane companies which have shared their transport incident experience and discussed various issues that arise during response operations.

Propane companies must have at least one emergency response advisor on staff and organize response simulations during the year to supplement and upgrade their training.

To date, the Association Québécoise du Propane has trained 148 emergency response advisors and 20 senior emergency response advisors (available for each administrative region of Quebec).

To learn more about the Association Québécoise du Propane's mutual assistance plan, visit their website at: [www.propanequebec.com](http://www.propanequebec.com).

# LITHIUM BATTERIES ARE DANGEROUS GOODS

## DID YOU KNOW THAT LITHIUM BATTERIES ARE DANGEROUS GOODS?



Laptop



Camera



Mobile Phone



Video Camera



Watch

In Canada, the shipping and importing of lithium batteries<sup>1</sup> are subject to the *Transportation of Dangerous Goods (TDG) Act, 1992* and its *Regulations*. Lithium batteries are used in many electronic devices like cameras, cell phones, hearing aids, laptop computers, medical equipment and power tools.

When you ship or import lithium batteries, including those **contained** in or **packed with** devices and equipment, you **must** meet shipping requirements and declare package contents to postal carriers, couriers or transport companies.

### Cause for Concern

While most lithium batteries are safe, some have overheated and caught fire. Once ignited, they can cause any nearby batteries to overheat and catch fire, as well. These fires are difficult to put out and produce toxic and irritating fumes. It is **FORBIDDEN** to ship damaged, defective, recalled or recycled lithium batteries by **aircraft**. This ban applies whether or not these lithium batteries are contained in equipment.

### Short Circuit Protection

Preventing lithium batteries from short circuit is very important to keeping them from overheating and catching fire. Always keep lithium batteries isolated from metal objects (e.g. jewellery, keys) or other conductive materials by enclosing each one separately and insulating terminals with a non-conductive material (e.g. electrical tape). Pack them so they cannot shift during transport.

### Watt-hour (Wh) Rating

The Wh indicates the amount of energy contained in a lithium battery. The *UN Recommendations on the Transportation of Dangerous Goods, Model Regulations* regulate lithium ion batteries based on their Wh rating.

### How Do I Calculate the Wh Rating?

The Wh rating must appear on the battery case if it was made on or after January 1, 2009. If it is not there, you can calculate the Wh rating by using one of these formulae:

1. If you know the nominal voltage (V) and the capacity in ampere-hours (Ah), then  $Wh = (V) \times (Ah)$ ; or
2. If you know the nominal voltage (V) and the capacity in milliampere-hours (mAh), then  $Wh = (V) \times (mAh \div 1000)$ .

If you are still not sure what your lithium battery's Wh rating is, contact its manufacturer.

### UN Manual of Tests and Criteria

Lithium batteries are subject to rigorous testing according to the *UN Manual of Tests and Criteria*.

More information can be found on this website:  
[www.unece.org/?id=6928](http://www.unece.org/?id=6928)

<sup>1</sup>In this document, the term *lithium batteries* is used to refer to *lithium ion* and *lithium metal* batteries. The terms *battery* and *cell* are used interchangeably.

## Air Transport

The TDG Regulations, Part 12 and the *International Civil Aviation Organization (ICAO) Technical Instructions* provide detailed instructions on the transport of lithium batteries.

## Declare Your Lithium Batteries

Remember that regardless of the mode you are using to ship your lithium batteries, your shipment may end up on an aircraft, so prepare your shipment accordingly. Otherwise, you should specify that the shipment of batteries is for **ground transport only**.

## Importing

Importing lithium batteries means bringing them from a foreign country into Canada. When importing lithium batteries, you must comply with the TDG Regulations. The TDG Regulations specify requirements for classification, documentation, labelling, packaging and training. You must declare them to postal carriers, couriers or transport companies.

**Failure to comply with the Transportation of Dangerous Goods Act and Regulations can lead to fines and/or imprisonment.**

## DEFINITIONS

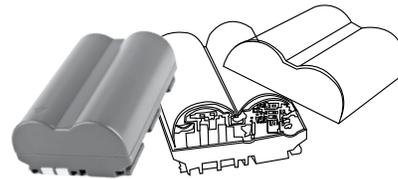
# WHAT IS THE DIFFERENCE BETWEEN A "CELL" AND A "BATTERY"?

A **cell** is a single encased electrochemical unit (one positive and one negative electrode) with a voltage differential across its two terminals.



- ◆ Did you know that AA batteries and AAA batteries are actually cells?

A **battery** is two or more cells that are electrically connected together and fitted with devices such as a case, terminals, marking and protective devices that it needs to function properly.



- ◆ Did you know that battery packs, modules or battery assemblies manufactured to provide a source of power to another piece of equipment are treated as batteries?

## Looking for More Information?

Please visit Transport Canada's website:  
[www.tc.gc.ca/tdg](http://www.tc.gc.ca/tdg).

# TRANSPORT CANADA'S CHEMICAL, BIOLOGICAL, RADIOLOGICAL, NUCLEAR AND EXPLOSIVE RESPONSE PROGRAM UPDATE

By Fred Scaffidi

Transport Canada's Emergency Response Assistance Plan (ERAP) program has undergone major changes with the implementation of the new Emergency Response Assistance Plan Assessment Framework (see the spring 2013 TDG Newsletter article, [www.tc.gc.ca/eng/tdg/newsletter-menu-268.htm](http://www.tc.gc.ca/eng/tdg/newsletter-menu-268.htm), for more information). A similar framework specific for the Transport Canada Chemical, Biological, Radiological, Nuclear and Explosive (CBRNE) Response program is currently under development. The purpose of the CBRNE program is to deliver on Transport Canada's commitment to make available capable private sector emergency response to a CBRNE event. This tool is available at the request of government authorities through provision of subsection 7.1(b) of the *Transportation of Dangerous Goods Act, 1992*.

The purpose of developing a CBRNE framework is to solidify the program by ensuring a consistent approach to a CBRNE event. It will take into account the unique aspects of a CBRNE response (over and above those of a typical ERAP response). These aspects are related to costs incurred in the response and remediation, liability protection and any additional capabilities that might be needed to respond to an actual or suspected CBRNE event.

In parallel with the framework development, Transport Canada has been actively engaging the industry emergency response community by providing training and opportunities to participate in exercises, where both government officials and industry are "in the same room". One of our goals is to establish working relationships and response protocols between government and industry *before* an actual crisis occurs.

## Tabletop Exercise – Calgary Fire Academy, March 19, 2013

The Transport Dangerous Goods Directorate hosted a tabletop exercise in partnership with the Centre for Security Science (CSS) Chemical Portfolio (Defense Research and Development Canada). This is the second tabletop exercise in which Transport Canada has partnered: the first one having been held in Hamilton in March 2012



in partnership with Environment Canada, Emergencies Science and Technology Section.

### Objectives for the tabletop exercise included:

- Engaging industry emergency response teams in a CBRNE event to familiarize them with the requirements and complexities associated with such a situation. As an example, responding to a dangerous goods incident that is also a crime scene, and working with fire, police and other government agencies to mitigate a situation where there is criminal intent;
- Exploring how we engage industry emergency response capabilities during a CBRNE event, such as exploring issues surrounding acceptable risks, costs and liabilities; and
- Building partnerships between organizations, in order to avoid an actual CBRNE event to be the first time our organizations work together.

*Scenario description:* Two scenarios were put forward, each involving the release of a toxic chemical hazard resulting from a terrorist attack in the transportation sector. This resulted in impacts on both public safety and city infrastructure. The first scenario involved a release of a toxic liquefied gas from a rail tank car and the second involved a planned collision of a van carrying metal drums of a toxic chemical. Both scenarios required immediate critical incident response and mitigation to eliminate the threat,

protect the public and ensure proper remediation to return the sites and surrounding area to normal conditions. The objectives of the tabletop exercise were designed specifically to investigate the existing capabilities of the industry to provide support for responders at each response stage of a CBRNE incident. The scenarios required industry support during critical incident response, forensics, mitigation, and recovery (site remediation). The intent was to identify strengths and weaknesses.

Additionally, we sought to demonstrate how industry contractors can participate in all phases of the response and, especially, to:

- Demonstrate to the first response community (fire, police, and other agencies at local and provincial levels) the capabilities that exist within industry to assist in a CBRNE event;
- Explore how contractors could be part of an incident command and control structure during a CBRNE event and how this would differ from a response without a criminal/terrorist component; and
- Observe how responding to a dangerous goods or CBRNE event fits within both the legal jurisdiction of the Directorate and internal Transport Dangerous Goods response plans.

### **Tabletop exercise participants included:**

#### **First Responders**

- Calgary Emergency Medical Services (EMS)
- Calgary Fire/Hazmat
- Calgary Police Services
- Canadian Pacific Police Service
- Office of the Fire Commissioner

#### **Industry**

- Agrium Inc.
- Canadian Fertilizer Institute (CFI)
- Canadian National Railway (CN Rail)
- Canadian Pacific Railway (CP Rail)
- Chemistry Industry Association of Canada (CIAC)
- Enviro Hazmat
- Quantum Murray LP
- Railway Association of Canada (RAC)
- Shield Specialized Emergency Services Inc.

### **Municipal/ Regional Organizations**

- Alberta Emergency Management Agency (AEMA)
- Calgary Emergency Management Agency (CEMA)
- Alberta Environment
- Alberta Transportation Dangerous Goods
- Transport Canada

### **Exercise Development Team**

- Canadian Safety & Security Program (CSSP)
- Transport Canada
- International Safety Research Inc. (ISR)

### **Results**

#### **The Calgary tabletop exercise was successful in:**

- Demonstrating industry's technical expertise and capabilities to first responder communities. It is very likely that industry will play an important role in the response to the type of scenario used in the tabletop exercise;
- Demonstrating the need to involve industry in the planning phases for incident response. Their familiarity with product behavior and means of containment was important in risk assessment and response strategy development;
- Re-enforcing existing working relationships between organizations and establishing some new ones. First responders in Calgary now have a better knowledge of the industry's capabilities that exist as a result of the exercise;
- Providing critical input on the development of the Transport Canada draft CBRNE Response Framework, such as the need to clarify limits on costs, the extent to which an ERAP can be applied to a situation and additional equipment needed during a CBRNE event;
- Demonstrating just how complex a CBRNE incident can be in terms of scope, requirements for decisions affecting public safety, and requirements for decisions with large financial implications, such as evacuation distances and the extent and scope of decontamination activities; and
- Providing first-hand knowledge of the capabilities that exist by displaying equipment supplied by several of the contractors.

### **Next Steps**

The Transport Dangerous Goods Directorate is intent on developing our CBRNE framework and we are making this a priority. We plan to further engage industry during

this development to ensure that their needs, as well those of Transport Canada, are addressed.

The Transport Dangerous Goods Directorate proposes to continue with our series of tabletop exercises by hosting one in the Quebec Region. This tabletop exercise will build on our experiences from the previous two events.

The Transport Dangerous Goods Directorate would like to acknowledge and thank Assistant Deputy Chief Mark

Woodward for allowing us the use of the Calgary Fire Academy for our event. We would also like to thank the participants for taking time out from their busy schedules to be present. I believe that your participation has had a positive impact on the response capability in Calgary. Finally, we would like to thank the industry organizations that were able to bring equipment for display; this added tremendous value to the day.

## PETROLEUM CRUDE OIL TRANSLOADING FACILITIES IN WESTERN CANADA

By Ray Desjardins



Petroleum crude oil transloading facilities are an increasingly common sight in western Canada. Why? Because the demand for oil is growing and pipelines are operating at or near capacity. As a result, industry is changing how it transports petroleum crude oil across western Canada. These new portable or fixed transloading facilities are set up along rail lines to facilitate the transfer of petroleum crude oil from highway tanks to rail cars.

The transloading equipment used to transfer petroleum crude oil can monitor various items including: the quantity and flow rate of oil transloaded, hydrogen sulphide gas presence, wind direction and the quantity of oil in a tank car.

Under the *Transportation of Dangerous Goods Act, 1992*, and the *Transportation of Dangerous Goods Regulations*, any person that handles, offers for transport, transports or imports dangerous goods must comply with the Act and Regulations. This includes requirements for classification, shipping documents, placarding, containers, training and accidental release reporting as it relates to petroleum crude oil.

Selecting and using proper containers, as set out in the Regulations, is fundamental to the safe transportation of dangerous goods. Two packaging standards apply to transporting petroleum crude oil by highway tank and rail tank car.

**National Standard of Canada CAN/CSA B621-09, Selection and Use of Highway Tanks, TC Portable Tanks, and Other Large Containers for the Transportation of Dangerous Goods, Classes 3, 4, 5, 6.1, 8 and 9.**

**CAN/CSA Standard B621-09** requirements for highway tanks include:

- Specific highway tanks for transporting petroleum crude oil;
- Inspection and testing for highway tanks and hose assemblies;
- Precautions to ensure the safe dissipation of static electricity through bonding or grounding;
- Attendance during unloading and control of the quantity of dangerous goods unloaded;
- Closure and securement of all hatches, valves and other openings on tank after unloading; and
- Verification that exterior surfaces of the tank are clean and free of residue or spills of dangerous goods after unloading.

- Application of hand brakes and blocking of wheels in both directions;
- Monitoring during loading and unloading so that any condition or release of dangerous goods can be readily identified;
- Proper securement and closure of all hatches, valves and other openings following loading or unloading;
- Inspection of tank cars for spillage of dangerous goods on exterior surface and removal of any spillage;
- Protection of sections of track where a tank car is being loaded or unloaded; and
- Caution flags conspicuously displayed on both ends of the tank car to warn approaching rail traffic that loading or unloading operations are in progress.

For all packaging requirements, refer directly to the packaging standards:

- CAN/CSA B621-09 is available from the Canadian Standards Association at: [www.csa.ca](http://www.csa.ca) or 1-800-463-6727; and
- TP14877 is available from Transport Canada at: [www.tc.gc.ca/eng/publications-menu.htm](http://www.tc.gc.ca/eng/publications-menu.htm).

The growing number of transloading facilities in western Canada has made this issue a priority for Transport Dangerous Goods inspections. The Transport Dangerous Goods Directorate has completed compliance inspections at a number of sites, and identified industry compliance levels. Transport Canada will continue to make compliance inspections at transloading facilities a priority, and take appropriate action to ensure compliance with the Act and Regulations.

If you have any questions, please contact the Prairie & Northern Region at 1-888-463-0521 or [TDG-TMDPNR@tc.gc.ca](mailto:TDG-TMDPNR@tc.gc.ca). You will find more information on the transportation of dangerous goods at: [www.tc.gc.ca/eng/tdg/safety-menu.htm](http://www.tc.gc.ca/eng/tdg/safety-menu.htm).

**Transport Canada Publication TP14877– Containers for the Transport of Dangerous Goods by Rail, a Transport Canada Standard**

**TP14877** requirements for tank cars include:

- Specific tank cars for transporting petroleum crude oil;
- Qualification and maintenance of tank cars;
- No movement of tank cars during loading or unloading;
- Grounding of tank cars when loading or unloading flammable liquids and grounding or bonding of tracks;



# DEALING WITH SODIUM CHLORATE AT A DERAILMENT SITE

By Eve Poirier

On May 27, 2013, a derailment occurred at the CN Taschereau yard. A loaded hopper rail car of sodium chlorate was breached, releasing some of its contents. The remainder was later transferred using a Canexus pneumatic transfer unit.



*Hopper rail car (loaded with sodium chlorate) involved in the derailment*



*The knuckle of the boxcar breached the hopper rail car releasing some sodium chlorate (in a free flowing form)*

## Physical and Chemical Characteristics

Sodium chlorate is a very strong oxidizer, mainly used to produce chlorine dioxide at pulp and paper bleaching plants. It is most often shipped as a solid (white crystals that look like salt) in a hopper rail car, and is classified as sodium chlorate, Class 5.1, UN1495, PG II.

The crystals may be free flowing or agglomerated into one mass in the rail car, depending on the product moisture, the crystal size and the ambient weather conditions. It is very hygroscopic (it will absorb the water from humidity in the air), has a specific gravity of 2.49, is very soluble in water and is toxic by ingestion (10-30 g).

## Safe Handling and Emergency Response

A sodium chlorate solution will soak into porous combustible materials such as wood, paper and clothing. Once the contaminated materials dry, even a small spark can start an intense fire and/or explosion. It will also react with strong acids, producing toxic gases such as chlorine dioxide and chlorine. This reactivity makes it very important to keep sodium chlorate away from other materials at an incident site.



*Free flowing sodium chlorate released on the ground*

All responders involved with damage assessment, wrecking and transfer operations must be familiar with the hazards this product presents, use the required personal protective equipment (PPE) and take all relevant preventive measures. Never neglect the cleaning requirements for all equipment that may come in contact with sodium chlorate. Equipment with lubricants must be compatible (non-reactive) with sodium chlorate exposure in order to avoid a violent reaction. Sodium chlorate will not give you a second chance!

Do not allow sodium chlorate to be contaminated. Treat contaminated sodium chlorate as a hazardous waste and possibly, as a reactive product.

### Transfer methods

There are different ways to transfer sodium chlorate. These include: manual transfer, solution transfer, mechanical transfer (backhoe) and pneumatic transfer.

Responders must take into consideration different factors which come into play while choosing the best transfer method. These considerations include: location of the rail car, accessibility, damage assessment, integrity of each compartment of the hopper rail car, availability and mobilization of specialized equipment and of trained personnel.

To avoid contamination, the best and most efficient way to transfer a breached hopper rail car containing sodium chlorate is to use a Canexus pneumatic transfer unit. Since this unit is product specific, contamination is not a concern.



*Canexus ER team and the pneumatic transfer unit*

### Canexus pneumatic transfer unit

These units are designed to use a system with cyclone separators, dust filters and rotary blowers (vacuum and pressure). The sodium chlorate is conveyed through straight and flexible pipe sections from the damaged hopper rail car through the transfer system and into the receiving hopper rail car. The system requires a lot of preparation to avoid contamination and/or other releases.



*Sodium chlorate pneumatic transfer joint detail*

During the demonstration the Canexus Emergency Response team walked us through all the steps and answered questions in a professional manner. The transfer was done over 2 days which included setting up, cleaning each compartment of the hopper car and tearing down the equipment.

If you have read any of my previous articles about emergency response, I am always amazed how people can work together, share their knowledge and bond so quickly. While the Canexus Emergency Response team members were from different plants (mainly Brandon, MB, Nanaimo, BC and Beauharnois, QC), I would not have known this had they not told me. They worked together seamlessly, even with the new emergency response team members on board. It shows that Canexus takes great responsibility in emergency response and their Responsible Care commitments.

The day after the CN Taschereau yard derailment, there was a CSX railroad derailment in Baltimore involving sodium chlorate. The outcome was very different, as the hopper rail car exploded. At the time of writing this article, the cause of the explosion was not determined.

# Reportable Accidents Across Canada in 2012 and 2013

By Susan Williams, Sidrah Nadeem and Jonathan Rose

A reportable accident involves a release of dangerous goods greater than the quantity set out in the *Transportation of Dangerous Goods Regulations, 1992*, Part 8. This article presents sample accidents from 2012 and 2013.

Companies must submit a 30-Day Follow-Up Report within 30 days of an accidental release, a “dangerous goods accident” or a “dangerous goods incident”. Please send these completed reports to Transport Canada either by e-mail, fax or by mail.

- E-mail: dor-rcd@tc.gc.ca
- Fax: 613-990-2917
- Mail: Transport Dangerous Goods (TDG)

Place de Ville, Tower C, 9th Floor  
330 Sparks Street  
Ottawa, Ontario K1A 0N5

## Samples of 2012 and 2013 reportable accidents

These accidents represent various provinces/territories, classes of dangerous goods, modes of transport and means of containment.

January 22, 2012 – Glen Ewen, Saskatchewan  
Severity Level 5  
Petroleum Crude Oil – Class 3  
Means of Containment: Tank Car (TILX253488 – DOT211A100 W1)

A train collided with a passenger vehicle at a railway crossing during foggy conditions. Twenty-four tank cars containing petroleum crude oil derailed, fourteen of which turned. One breached tank car released 50,000 litres of product. Emergency response personnel arrived on site to contain and clean up the spill, transfer the remaining product into several tank trucks, set right and remove the overturned tank cars, and take the driver to the hospital with non-life threatening injuries.

March 30, 2012 – Drumheller, Alberta  
Severity Level 2  
Flammable Liquid, N.O.S. – Class 3  
Means of Containment: Tank Trailer (MC306AL/BEALL MANUFACTURING/25-850-04-1987/3 PSI/TT 18853/1900-1450-3800USG/08-11 VKIP 850/TRAILER)

A tractor tank trailer and pup (B-Train) containing flammable liquid, N.O.S. (hexane, xylene) caught the shoulder of the road and overturned. The walls of the pup cracked open, releasing 8,500 litres of product. Emergency response personnel arrived on site to contain and clean up the spill and set right and remove the overturned pup.

June 12, 2012 – Sandy Lake, Ontario  
Severity Level 3  
Fuel, Aviation, Turbine Engine – Class 3  
Means of Containment: Aircraft (HS 748)

An aircraft caught fire at an airport while de-fuelling aviation fuel into a storage tank, releasing 6,000 litres of product. Emergency response personnel arrived on site to extinguish the fire and investigate the cause. An environmental assessment and clean up of the contaminated property was conducted afterwards.

October 14, 2012 – Anaktalak Bay, Newfoundland and Labrador

Severity Level 2

Diesel fuel; Fuel Oil; Gas Oil; or Heating Oil Light – Class 3 and Gasoline; Motor Spirit; or Petrol – Class 3

Means of Containment: Tote Tank (UN31A), Drum (UN1A1), and Jerricans (UN3H1)

Due to hurricane winds, a barge lost anchor from the seabed, and travelled about 7 kilometres to a nearby beach. The slip tank, one drum, and a number of jerricans were damaged on impact, releasing 425 litres of diesel and 50 litres of gasoline, most of which went into the water. Clean up operations began soon after the barge was located.

October 20, 2012 – Flatbush, Alberta

Severity Level 5

Ammonia, Anhydrous; or Anhydrous Ammonia – Class 2.3(8)

Means of Containment: Nurse Tank (TC51/WESTERN ROCKBIT/1983)

While being driven into a field by a farm vehicle, the front axle/tire assembly of a twin nurse tank wagon containing ammonia, anhydrous pulled apart from the wagon, causing the connection hose to stretch and break, releasing 6,495 litres of product. The breakaway couplers were unable to function properly because of the direction in which the connection hose was being pulled. Emergency response personnel arrived on site and evacuated one person from a nearby residence until the product vapours dissipated

December 28, 2012 – Islet, Quebec

Severity Level 3

Diesel fuel; Fuel Oil; Gas Oil; or Heating Oil Light – Class 3

Means of Containment: Tractor Tank Trailer (DOT306AL/HEIL/02-1976/SERIAL#927924/2700G/1100G/2250G/295OG(4)/K-EPA 27 8-12/ VK-DEP 7-11/CT4973/R3655)

When the driver of a tractor tank trailer containing 30,402 litres of diesel fuel became ill, the unit went off the road and overturned in a ditch. The tank sustained major damage and released its entire contents. First responders sent the driver to the hospital as a precaution. Emergency response personnel set upright, and removed, the damaged unit. The HAZMAT response crew cleaned up the spill and removed contaminated snow and soil. This accident involved an American carrier that was making a delivery in the province of Quebec. The carrier complied with Part 8.3 of the *Transportation of Dangerous Goods Regulations* by completing a 30-day follow-up report.

January 17, 2013 – Williams Lake, British Columbia

Severity Level 6

Bulk Emulsion Explosives – Class 1.5D

Means of Containment: Tractor with Standard Tank Trailer (DOT407SS/BRENNER TANK/03-2002/172KPA/10BFB62M13F0B4381/)

During transport, 800 kilograms of bulk emulsion explosives were spilled when a tractor tank trailer went off the road and overturned in a ditch. The driver was injured and airlifted to the hospital. Emergency response personnel evacuated 78 people from nearby residences, cleaned up the spill and removed the trailer from the ditch.

January 24, 2013 – Paynton, Saskatchewan

Security Level 4

Flammable Liquid, N.O.S – Class 3

Means of Containment: Tank Car (AAR211A100W1)

A train collided with a road grader at a passive rail crossing. Sixteen tank cars derailed, releasing 179,000 litres of flammable liquid, N.O.S. The driver of the grader was taken to hospital, but died from his injuries. Emergency response personnel transferred product from all of the tank cars and cleaned the contaminated area.

February 23, 2013 – Etobicoke, Ontario

Severity Level 2

Corrosive Solid, Toxic, N.O.S. (Dianiline Dithiophosphoric Acid) – Class 8

Means of Containment: Passenger/Cargo Aircraft (UN4GV/X44/S/11CN/120076 PI :009)

Shortly after takeoff, the crew and passengers on an international flight carrying a shipment of Dianiline Dithiophosphoric acid noticed a strong odour in the airplane cabin and cockpit. When the flight arrived at its destination, responders got everyone off of the aircraft as quickly as possible. 13 of 15 crew members (12 attendants and 1 pilot) had dry throat and burning eye symptoms and went to the hospital for examination.

Emergency response technicians unloaded the shipments of shrink-wrapped boxes and discovered that plastic pails inside 14 of 59 of the boxes were either improperly sealed or had cracked lids and released a small amount of product. Responders removed the pails from the location and sent them to a dangerous goods disposal facility.

September 16, 2013 - Melita, Manitoba

Security Level 3

Diesel Fuel – Class 3

Means of Containment: Straight Truck Tank (TC306AL/ADVANCE ENGINEERING/5528/08-2002/20.7 PSI/2AEATJA062R000180)

A straight truck spilled 3000 litres of diesel fuel when its driver lost control and it ran off the road and overturned. The driver was taken to hospital, but died from his injuries. The highway was closed while emergency response personnel cleaned the accident scene.

October 15, 2013 – La Glace, Alberta

Security Level 5

Anhydrous Ammonia – Class 2.3(8)

Means of Containment: Nurse Tank (WKB/E8048.234/1997/34160A)

While a farm worker applied anhydrous ammonia on a field using a nurse tank, a hitch failure caused the hose to burst and release 700 kilograms of product. While no one was hurt, two people were evacuated. Police and fire department were on site.

December 13, 2013 – Richmond, Québec

Severity Level 2

Liquefied Petroleum Gas – Class 2.1

Means of Containment: Tank Car (DOT112J340W)

During rail yard operations, personnel found a rail tank car leaking liquefied petroleum gas from the liquid education valve. They isolated the tank in the yard and activated the ERAP. Emergency response personnel tightened the valve, which stopped the leak.

# CANUTEC COMMUNICATION SYSTEM CANADA'S NEW SAFETY HOTLINE FOR THE TRANSPORTATION OF DANGEROUS GOODS

By Nicolas Cadotte



system, accessing information such as logbooks, safety data sheets (SDS) and shipper information is more efficient. CANUTEC advisors can fully focus on providing life-saving information during emergencies, quickly and effectively relaying detailed knowledge to fire, police and ambulance.

The CANUTEC Communication System also enables advisors to immediately see the name of the shipper calling them on their screens. When a company official calls CANUTEC using the number listed in the Registration System, full details of the company and the type of goods being shipped automatically appear on the advisor's screen, enabling them to quickly get up to speed on the particulars of this shipper.

The system allows CANUTEC to conduct teleconferences that fully integrate voice and data. Advisors can establish a teleconference “on the fly” or at pre-arranged time with up to 12 participants without congesting any CANUTEC emergency lines.

Each advisor working in the emergency centre is equipped with a wireless headset. The CANUTEC Communication System's wireless capability gives advisors greater mobility, which is especially vital in emergency situations where advisors may need to access hard copy safety data sheets or technical books and resources to assist the first responder.

The upgraded CANUTEC communication system makes the transportation of dangerous goods in Canada safer and more secure. It is one more step in enhancing the overarching goal of Transport Canada — to provide Canadians with the safest, most effective transportation system.

**A**t the beginning of June 2013, Canadian Transport Emergency Centre (CANUTEC) significantly upgraded its communication system.

Switching to Voice Over Internet Protocol (VOIP) was pivotal in modernizing how CANUTEC delivers its services. Integration of voice and data enhances the work of advisors and the operations of the centre in several important ways.

With this new system, the detailed information advisors need to successfully respond to shippers' and first responders' questions is only a click away. Gone are the days when advisors needed to search separate resources for contact information or use multiple lines to communicate with several parties. The click-to-dial function applies not only to CANUTEC's databases, but also to web pages. As a result of the databases being integrated with the phone



As a result of recommendations regarding the ERAP program made to Transport Canada by the Transportation Safety Board and the Transport Dangerous Goods General Policy Advisory Council Working Group in January 2014, an Emergency Response Task Force was created by the Minister in April 2014. To find out more, please visit: [www.tc.gc.ca/eng/tdg/safety-menu-1186.html](http://www.tc.gc.ca/eng/tdg/safety-menu-1186.html)

## Two amendments to the *Transportation of Dangerous Goods Regulations* published in Part II of the *Canada Gazette* on July 2, 2014

**Regulations Amending the *Transportation of Dangerous Goods Regulations* (Update of Standards), published in the *Canada Gazette* Part II, Vol. 148, No.14 as SOR/2014-152, can be viewed at the following URL:**

[www.gazette.gc.ca/rp-pr/p2/2014/2014-07-02/html/sor-dors152-eng.php](http://www.gazette.gc.ca/rp-pr/p2/2014/2014-07-02/html/sor-dors152-eng.php)

This amendment adopts a series of new safety standards:

- **CSA Standard B625-08**
- **CSA Standard B626-09**
- **CSA Standards B341-09**
- **Transport Canada Publication TP14850**
- **Transport Canada Publication TP14877**

It also adopts new editions of standards already in the *Transportation of Dangerous Goods Regulations*:

- **CSA 339-08**
- **CSA B340-08**
- **CGSB 43.123-2010**
- **CSA B620-09**
- **CSA B621-09**
- **CSA B622-09**

Additionally, the amendment introduces new provisions for consignor certification, proof of classification and sampling methods.

**The Regulations Amending the *Transportation of Dangerous Goods Regulations* (Part 4, Dangerous Goods Safety Marks), published in *Canada Gazette* Part II, Vol. 148, No. 14 as SOR/2014-159, can be viewed at the following URL:**

[www.gazette.gc.ca/rp-pr/p2/2014/2014-07-02/html/sor-dors159-eng.php](http://www.gazette.gc.ca/rp-pr/p2/2014/2014-07-02/html/sor-dors159-eng.php)

This amendment includes the following:

- Harmonizing Part 4 of the *Transportation of Dangerous Goods Regulations* with international and U.S. regulations;
- Replacing the existing placarding scheme to one that requires safety marks to be affixed at all times, though exemptions for some dangerous goods would be retained;
- Adding a definition for “overpack”;
- Redefining the conditions under which a DANGER placard may be displayed on a large means of containment;
- Adopting new markings for organic peroxides, marine pollutants and a new limited quantity mark;
- Allowing the use of four labels or two placards on intermediate bulk containers of up to 3000 litres; and
- Requiring additional markings on means of containment used for the transportation of dangerous goods that are toxic by inhalation.

### WE ARE HIRING!

Transport Canada is hiring inspectors and CANUTEC advisors!  
To find out more, visit [www.emplois-jobs.gc.ca](http://www.emplois-jobs.gc.ca).

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