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EMERGENCY RESPONSE TASK FORCE

FINAL REPORT AND RECOMMENDATIONS - COMPREHENSIVE STRATEGY
FOR IMPROVING TDG INCIDENT RESPONSE IN CANADA



Presented to Director General,
Transportation of Dangerous Goods

Canada

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Please send your written comments to:

Director, Compliance and Response Branch
Transportation of Dangerous Goods
Transport Canada
9th floor, Tower C, Place de Ville
330 Sparks Street
Ottawa, Ontario K1A 0N5
Canada

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TRANSPORT CANADA EMERGENCY RESPONSE TASK FORCE

FINAL REPORT AND RECOMMENDATIONS

A comprehensive strategy for improving transportation of
dangerous goods incident response in Canada

Presented to Director General,
Transportation of Dangerous Goods
July 13, 2016

FOREWORD FROM THE DIRECTOR GENERAL

I would like to express my thanks and deep gratitude to the ERTF members for their tireless efforts in working together in advising Transport Canada on how to improve the TDG program specifically as to how we could learn together from the tragic events of Lac-Mégantic. The intensity of these efforts with well over 70 meetings spread over the timeline of the mandate, with increasing attendance at each meeting, demonstrated to me how important our dialogue was and how invested everyone was in setting a proper course of action. If there is anything that I have learned while being in the TDG Directorate it is that we have industry partners ranging from producers and shippers, to first responders who, even with different interests, can speak with one voice that is clear, articulate and which holds the safety of Canadians at heart. The TDG staff have followed the discussions closely and I think I speak for everyone when I say that it is because of the ERTF's sage counsel and the thoroughness of their discussions and resulting recommendations that we will be able to continue pushing the program forward. None of this would have been possible without the strong leadership of the ERTF Chair, Chris Powers, initially supported by Louis Laferriere and then by Adrian Michielsen. Chris' clear interest in supporting the group while making sure that the Task Force was not forgetting the overall objective of the mandate ensured that the ERTF stayed on track while taking in all views, with a collective result of which everyone can be proud.

It would be remiss of me not to highlight the ERTF Secretariat, led by Mylaine Desrosiers, who tirelessly organized the meetings and oversaw the progress of discussions and who did not hesitate to draw everyone's attention to areas still requiring discussion. The TDG management team requested quarterly reports in order to start implementing recommendations as quickly as possible, where feasible. This created additional administrative pressure on the team as they continued to organize a multitude of meetings every week. They responded with action, humour and grace to which I am deeply grateful.

The staff members of the TDG Directorate thank you for your incredible contributions and efforts over the last few years. The results found in this report will inform us in setting the stage for continued improvements in the TDG program now and for the future.

Nicole Girard

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EXECUTIVE SUMMARY

The Emergency Response Task Force (ERTF) submits this Final Report to the Director General, Transportation of Dangerous Goods (TDG) Directorate at Transport Canada. It presents 40 recommendations on ways to improve emergency response assistance to incidents involving flammable liquids transported by rail. For a complete list of recommendations, see Annex A.

ERTF recommendations address three main areas, which are to:

- **Improve the Emergency Response Assistance Plan (ERAP) Program**
- **Expand ERAP Requirements to other Flammable Liquids**
- **Enhance Emergency Response, Preparedness and Training**

Improve the ERAP Program

This topic is one of the most challenging issues the ERTF reviewed. It is essential to its mandate and important to strengthening emergency response assistance. First responders and industry stakeholders benefit from the ERAP program for emergency response preparation and risk mitigation before incidents involving the transportation of dangerous goods occur. The program also promotes awareness and understanding of roles and responsibilities, regulatory requirements, standards and guidance. Recommended ERAP program improvements therefore, include better distribution of information on available ERAP resources and how and when to access them.

The ERTF also recommends clarifying the authority and regulatory requirements for ERAP activation. The ERTF developed a proposal for an ERAP Activation Model with questions and criteria to make it easier to know how and under what conditions to activate an ERAP. The proposed model requires:

- the carrier to notify the ERAP holder of an incident involving a shipment covered by an ERAP; and
- CANUTEC to receive notice when an ERAP is activated.

ERTF recommendations will help ensure emergency response assistance is: Timely, Appropriate to the incident, Safe for the public and responders, as well as Coordinated. The ERTF addressed the need to strengthen communication with dangerous goods shippers and carriers about how, and to what level, ERAP resources are available for dangerous goods transportation incidents. Recommendations include:

- Requiring specific competencies for ERAP technical advisors;
- Using tiered response levels based on industry best practices; and
- Addressing data collection for more efficient monitoring and continuous improvement of the ERAP program.

Expand ERAP Requirement to other Flammable Liquids

The ERTF provided recommendations to expand ERAP requirements to flammable liquids beyond those already identified in Protective Direction 33, based on Subject Matter Experts' scientific analysis.

The ERTF noted that large volumes of Ethanol from the U.S. were being classified as UN1987, Alcohols, N.O.S. and shipped through and into Canadian communities. In these cases, adding an ERAP requirement to UN1987 was considered.

To determine if Canada should expand the ERAP requirements to additional Class 3 flammable liquids, the SMEs:

- Developed a science-based methodology to assess the physical and chemical properties of the substances;
- Grouped together and prioritized products showing the same properties, for risk assessment;
- Identified 43 out of 346 Class 3 Packing Group I, II, III, substances, as having the highest priority for inclusion in the ERAP program; and
- Identified 47 substances as the highest priority, where Class 3 was a primary and/or subsidiary class.

The methodology for assessing the hazard levels of flammable liquids as well as the risk factors is well-documented, and provides scientific evidence for determining substances requiring an ERAP.

Enhance Emergency Response, Preparedness and Training

Key recommendations for enhancing emergency response and preparedness include adopting a standardized approach to managing large scale incidents using a Unified Command Structure within a standard Incident Command System.

Recommendations focus on the risk information local emergency planners need to identify mitigation measures and levels of assistance **before** incidents occur. The ERTF also addressed the need for responders to access information on dangerous goods during an incident, such as the train consist.

First responders, local officials and emergency planners need to understand the risks and incident timelines specific to flammable liquids rail incidents. The ERTF proposed a training strategy for Canadian first responders and specialists. The strategy includes a multi-level program consisting of a basic (introductory) level, an operational (hands-on) level and a specialized level.

The ERTF reviewed the National Fire Protection Association standards to identify levels of knowledge and skills required for flammable liquids incidents. The results of the review were published in the document entitled: *Competency Guidelines – for Responders to Incidents of Flammable Liquids in Transport, High-Hazard Flammable Trains*. These guidelines provide a consistent national foundation for developing firefighter training under provincial and territorial jurisdictions.

The online self-directed awareness tool, *Emergency Preparedness for Rail Incidents Involving Flammable Liquids in Canada*, was developed at the same time. This bilingual tool offers basic information to first responders, at no charge.

Finally, the ERTF recommends to both Transport Canada and all stakeholders to continue networking, sharing expertise and strengthening emergency response assistance beyond the end of the ERTF mandate. ERTF members wish to express their sincere thanks and appreciation to the Minister of Transport for this initiative, as well as the Director General of the TDG Directorate for her continuous support.



THOUGHTS FROM THE CHAIR AND VICE-CHAIR

ERTF Chair – Chris Powers

Prior to July 6, 2013, the transportation of dangerous goods by rail had not been a topic of major concern since the 1979 Mississauga derailment and subsequent 'Grange Inquiry'. Justice Grange made a number of important recommendations, including Emergency Response Assistance Plans (ERAPs) to provide special assistance to communities faced with a dangerous goods incident.

The disaster in Lac-Mégantic, Quebec on July 6, 2013, and other subsequent incidents following the unprecedented growth in rail transport of crude oil, resulted in many Canadian communities to express significant concern over the dangers and challenges related to responding to these incidents.

It is now two years since the Minister of Transport established the Emergency Response Task Force (ERTF). In June 2014, the ERTF began its work to review and make recommendations on means to improve response to dangerous goods incidents involving flammable liquids transported by rail and on the ERAP program. The ERTF completed its mandate with the final meeting on March 17, 2016 and has, over two years, made 40 recommendations to the Director General of Transportation of Dangerous Goods (TDG) Directorate for consideration.

The membership on the ERTF was initially thought to be approximately 20 representatives. However, interest in the work of the ERTF resulted in many more requests to participate and eventually over 90 individuals participated in 88 meetings and on subgroups/working groups.

Most members were volunteer representatives of the various stakeholders, other than the Transport Canada staff. All ERTF members worked towards a common goal of improving safety of Canadians; the driving force that resulted in developing broad based consensus on issues where stakeholders sometimes held differing points of view.

One of the characteristics attributed to Canadians is that of consensus building and accommodation of others concerns. The ERTF members demonstrated those characteristics many times, and not only reached agreement on all 40 recommendations, but developed relationships that have become one of the most important outcomes for the members. First responders, railways, petroleum industry, communities and government now benefit from a much improved relationship and the open communications they established during the ERTF project.

The ERTF sought out and engaged our neighbours south of the border to gain a North American perspective on these issues. We had participation from both the U.S.-based Renewable Fuels Association and significant contribution from the National Fire Protection Association, who attended meetings and cooperatively developed the *Competency Guidelines for Responders to Incidents of Flammable Liquids in Transport, High-Hazard Flammable Trains* Transport Canada published in March 2016.

Transport Canada has already acted on many of the ERTF recommendations and others are under development or consideration. It is most gratifying to see the commitment of Transport Canada TDG Directorate to move ahead with these recommendations.

Transport Canada has received many positive comments on the success of the ERTF and the positive and constructive approach evident at the meetings. This would not have been possible without the goodwill and tireless work of the members and the ERTF Secretariat.

I was not sure at its start how much we would be able to achieve in meeting our mandate, but I am amazed and very proud of the final outcomes. I am honoured to have been given the opportunity to chair this Task Force as it is a highlight of my career, knowing that together we have improved the safety of Canadians.

As we gain experience and a better understanding of our strengths and weaknesses, there is an opportunity to adjust our approach to how we interact with others. A number of years ago I found a valuable reference in a document by Retired General Colin Powell called “A Leadership Primer” he developed to identify some essential leadership attributes. The following quote from Lesson 12 speaks to how I believe the ERTF team achieved its success.

Perpetual optimism is a force multiplier

“The ripple effect of a leader’s enthusiasm and optimism is awesome. [...] I am talking about a gung-ho attitude that says ‘we can change things here, we can achieve awesome goals, we can be the best.’ Spare me the grim litany of the ‘realist’, give me the unrealistic aspirations of the optimist any day.”

– General Colin Powell (Ret.)

ERTF Vice-Chair – Adrian Michielsen

Prior to me taking on the Vice-Chair position, my involvement with the ERTF was as a representative of the Canadian Fuels Association, but I also represented petroleum producers and other shippers of dangerous goods (Canadian Association of Petroleum Producers and Chemistry Industry Association of Canada), along with their other representatives. The petroleum industry and other shippers have a common goal, which is that their products reach the market safely and effectively. They also recognize that it is very important the public and the environment are protected as our goods travel through communities, and should an incident occur during our products’ transport, first responders are prepared and understand what to do and what not to do, to protect themselves and the public.

The goal of the ERTF was to use a collaborative approach to identify ways to ensure first responders are better prepared for an incident and improve the ERAP program. To achieve this goal, it was important that all stakeholders including: communities, First Nations, first responders, regulators (Transport Canada and other federal and provincial regulators) along with the transporters, producers, shippers, emergency response organizations and Subject Matter Experts listened to each other to help understand each other’s concerns and how they could contribute. This enabled the ERTF to make consensus based recommendations to Transport Canada.

After many meetings over the two years and a lot of volunteer time and work, I believe the ERTF achieved their mandate; i.e., to improve the response to dangerous goods incidents involving flammable liquids transported by rail and the overall ERAP program. I also believe the membership set a strong framework for an ongoing collaborative approach that can be used for continuous improvement of the TDG Program. Like the Chair, I too was not sure at the start of the ERTF how much we would be able to achieve in meeting our mandate, but I am very pleased with the recommendations that have been put forward and that Transport Canada has already accepted/implemented many of them; recognizing that some will take longer to put in place. Thus, although there was a lot of time, energy and work required for success, it was well worth it.

I would like to thank the Secretariat, who worked very effectively to organize the many meetings, to compile the information gathered, and to document the recommendations.

| | |
|-----------------|---|
| AFFF | Aqueous Film-Forming Foam |
| AHJ | Authority Having Jurisdiction |
| CANUTEC | Canadian Transport Emergency Centre |
| CFR | <i>Code of Federal Regulations</i> |
| DRDC-CSS | Defence Research and Development Canada – Centre for Security Science |
| EMS | Emergency Medical Services |
| ERAP | Emergency Response Assistance Plan |
| ERG | <i>Emergency Response Guidebook</i> |
| ERP | Emergency Response Plan |
| ERTF | Emergency Response Task Force |
| FLTA | Flammable Liquids Technical Advisor |
| GIS | Geographic Information Systems |
| GPAC | General Policy Advisory Council |
| HHFT | High-Hazard Flammable Trains |
| HIRA | Hazard Identification and Risk Assessment |
| HIT | Heat Induced Tear |
| IAP | Incident Action Plan |
| ICS | Incident Command System |
| IMS | Incident Management System |
| MASAS | Multi-Agency Situational Awareness System |
| MOC | Means of Containment |
| MSDS/SDS | Material Safety Data Sheet/Safety Data Sheet |
| NFPA | National Fire Protection Association |
| PG | Packing Group |
| PD | Protective Direction |
| PHMSA | Pipeline and Hazardous Materials Safety Administration |
| RMS | Remedial Measures Specialist |
| SERTC | Security and Emergency Response Training Center |
| SME | Subject Matter Expert |
| SP | Special Provision |
| TASC | Timely, Appropriate, Safe and Coordinated |
| TDG | Transportation of Dangerous Goods |
| TDG Act | <i>Transportation of Dangerous Goods Act, 1992</i> |
| TDG Regulations | <i>Transportation of Dangerous Goods Regulations</i> |
| TSB | Transportation Safety Board of Canada |



4

INTRODUCTION

While emergency preparedness is everyone's business, transportation incidents involving dangerous goods can present specific risks. Flammable liquids are one category of products that can present a high hazard level, depending on their specific chemical and physical characteristics. For example, when tank cars carrying crude oil are subjected to intense heat, they can suddenly tear up and cause large explosions. Even the most experienced firefighters can be quickly overwhelmed by the scope and complexity of the response required in these types of situations. Typical firefighting training does not prepare them for this.

The Emergency Response Assistance Plan (ERAP) program was designed in the early 1980s, precisely to require shippers and manufacturers to provide specialized assistance through advice and special equipment to support a safe and efficient response to rail incidents and reduce their impacts.

This is the Emergency Response Task Force's (ERTF) Final Report, presented to the Director General, Transportation of Dangerous Goods (TDG) Directorate. It provides a total of 40 recommendations. As of November 2015, the ERTF had provided 33 recommendations to Transport Canada in three quarterly reports, which enabled TDG to start strategizing and acting on recommendations in a timely manner. This Final Report summarizes these activities and introduces seven new recommendations to Transport Canada for consideration.

This report is the result of the collaboration between Transport Canada's TDG Directorate and Task Force participants. ERTF findings and recommendations address three main areas, aimed to:

- Improve the ERAP Program
- Expand ERAP Requirement to other flammable liquids
- Enhance Emergency Response and Preparedness

The focus of this collaboration is to increase public safety by raising the emergency response capabilities for incidents involving Class 3 flammable liquids by rail.

The purpose of this report is to describe how the Task Force carried out its mandate, and provide an informed understanding of the intent behind initiatives and the resulting documents, case studies, findings and recommendations.

4.1 Background

On July 6, 2013, one of the largest and most devastating dangerous goods incidents in Canadian history occurred in Lac-Mégantic, Quebec. A crude oil unit train, operated by Montreal, Maine and Atlantic Railway, carrying Bakken crude oil from North Dakota rolled away from its parked location and derailed in downtown Lac-Mégantic, Quebec; 62 of the 72 tank cars derailed, releasing about 6 million litres of petroleum crude oil. Fires from multiple tank cars caused explosions that killed 47 people and destroyed the town's centre. Following the incident, Transport Canada made several changes, including emergency directives and regulatory amendments to better ensure public safety.



Photo taken by Lac-Mégantic resident Bernard Boulet showing the view from his house, across the lake from the downtown area, on the night of July 6, 2013¹.

In November 2013, at the TDG General Policy Advisory Council (GPAC) meeting, the Minister of Transport created a working group, chaired by the Canadian Association of Fire Chiefs (CAFC), to:

- Examine the expansion of ERAP program to include flammable liquids such as crude oil; and
- Recommend other emergency response solutions aimed to ensure access to appropriate response capability and specialized resources.

On January 31, 2014, the ERAP Working Group tabled their report to the Minister of Transport. Recommendations 14.1 and 14.6 stated that:

- ERAPs be required for all Packing Group (PG) I and PG II Class 3 flammable liquids in accordance with the *Transportation of Dangerous Goods Regulations* (TDG Regulations) Part 7. Furthermore, it is recommended that Transport Canada conduct further study on the properties of different Class 3 flammable liquids to determine if ERAPs should be required for these products.
- An ERAP Working Group on flammable liquids continue to work on all aspects that are required to implement a national flammable liquids emergency response capacity and that Transport Canada provide funding to support the work of those non-profit associations on this ERAP Working Group².

A week before the ERAP Working Group report was delivered, the Transportation Safety Board of Canada (TSB) issued Rail Recommendation R14-03 that Transport Canada require ERAPs for the transportation of large volumes of liquid hydrocarbons³.

¹ TC was granted permission to use this photo by Mr. Bernard Boulet.

² Report and Recommendations of the Transportation of Dangerous Goods General Policy Advisory Council (GPAC) Emergency Response Assistance Plan (ERAP) Working Group Relating to Class 3 Flammable Liquids January 31, 2014, Recommendation 14.6 <http://www.tc.gc.ca/media/documents/tdg-eng/5807-2014-3477-F-BT8821720-ERAP-WG-Report-and-Recommendations-FINAL-21-en-rev-AAA-rev.pdf>

³ Rail Recommendations R14-01, R14-02, R14-03 (January 23, 2014) <http://www.tsb.gc.ca/eng/recommendations-recommendations/rail/2014/rec-r1401-r1403.asp>

With these recommendations in mind, on April 23, 2014, the Minister announced a TDG Emergency Response Task Force. The first ERTF meeting took place July 10, 2014.

4.2 Mandate and Objectives

The Task Force's main focus was to improve public safety at dangerous goods incidents involving flammable liquids transported by rail. It also had the mandate to conduct further research, assess, evaluate and make recommendations to advance and make improvements to the ERAP program.

The Terms of Reference⁴ were agreed upon by Task Force members and officially signed on September 9, 2014.

In July 2015, the Minister of Transport extended the mandate to May 1, 2016, to allow the ERTF to complete its review of the ERAP program's continuous improvement.⁵

4.3 Membership

The Task Force was led by the ERTF Chair, Chris Powers, and Vice-Chairs Louis Laferriere (August 2014 - April 2015) and Adrian Michielsen (November 2015 - May 2016).

The Task Force generated much interest and stakeholder engagement. The initial membership of 20 people represented key stakeholders from across Canada and the U.S.; including railways, petroleum and ethanol industries, emergency response contractors, first responder groups including First Nations, provinces/territories, municipalities, as well as Transport Canada and other federal government departments. Members demonstrated a strong commitment to this initiative, and membership continued to increase after the ERTF's launch in July 2014.

By the end of the mandate in May 2016, over 90 participants volunteered their time, effort, and expertise to work together to provide meaningful recommendations to Transport Canada. A list of participating organizations and their representatives can be found in Annex B.

4.4 Summary of Meetings and Activities

Plenary meetings took place every month from July 2014 to June 2015 and from November 2015 to March 2016. Members agreed on a work plan to strategize and prioritize items for discussion. Five subgroups focused on specific topics. A list of presentations provided at these various meetings can be found in Annex C.



Photo taken at the final ERTF plenary meeting held on March 17, 2016.

4 <http://www.tc.gc.ca/eng/tdg/safety-menu-1196.html>

5 *Addendum to the Terms of Reference for the Emergency Response Task Force (ERTF) for the Transportation of Dangerous Goods* <http://www.tc.gc.ca/eng/tdg/safety-menu-1263.html>

Subgroup 1: Building on PD 33 (August 2014 - January 2015)

Subgroup 1 was tasked with building on requirements identified in Protective Direction (PD) 33 for the transportation of Class 3 flammable liquids by rail. They had a challenging task, given the limited availability of data at the time. The ERTF requested Transport Canada's help in collecting data related to flammable liquids such as UN numbers, physical and chemical properties, volumes, modes of transportation and firefighting resources located along rail corridors. The subgroup:

- Focused on industry's approach to emergency response to develop Response Tier and Timelines based on best practices.
- Developed a Flammable Liquid Technical Advisor Competency Profile to clarify credentials and competency requirements specific to flammable liquids.
- Presented its findings to the ERTF on February 19, 2015.

Subgroup 2: Incident Management (August 2014 – November 2014)

Subgroup 2's tasks were to:

- Clarify roles and responsibilities by conducting case studies, comparing Incident Command System (ICS) models and best practices, and identify gaps, needs and overlaps.
- Identify incident management protocols and develop templates based on best practices.
- Explore communication options to improve information sharing for timely access to safety data, and identify outreach solutions to better convey roles and responsibilities.

The subgroup discussions highlighted some of the challenges first responders face to receive specialized training. Subgroup 2 submitted their findings and proposed recommendations to the ERTF in January 2015.

Following the Subgroup 2 report, the ERTF:

- Filed a submission to the National Fire Protection Association (NFPA) Standards Council proposing a new standard on competencies for responders to incidents involving flammable liquids by rail. The NFPA sponsored a workshop in March 2015, to conduct a gap analysis in training standards and identify key competencies.
- Established Subgroup 5 to assess the need for first responder training and develop options.
- Launched a Canada-wide survey of fire departments to assess response capacity along rail corridors. Unfortunately, the survey did not yield comprehensive results and Transport Canada is now considering other options for systematically gathering the information.

Subgroup 3: ERAP Expansion to other Flammable Liquids (February 2015 – April 2015)

Subgroup 3's task was to identify and categorize flammable liquids that Transport Canada could add to the ERAP requirement for flammable liquids transported by rail.

The TDG Directorate engaged two Subject Matter Experts (SMEs) to help with the complex and technical work involved. Their task was to develop hazard-based criteria to categorize flammable liquids, then collect and analyze the data. Based on these results, the subgroup identified risk factors to consider when further assessing substances the SMEs identified.

In July 2015, Transport Canada conducted the first of a series of risk assessment exercises to determine a potential expansion of the ERAP program to other flammable liquids.

Subgroup 4: ERAP Program Improvement (April 2015 – June 2015)

Subgroup 4's task was to develop options to improve the ERAP program. It identified the data to collect and monitor to improve ERAP program delivery. The subgroup presented its findings to the ERTF in June 2015.

Subgroup 5: First Responder Training (February 2015 – June 2015)

Subgroup 5's task was to assess the training needs of first responders in Canada and explore the need to offer training programs tailored to their needs. Discussions turned to developing a multi-level program that would offer a basic (introductory) level, an operational (hands-on) level and a specialized level.

The introductory component is now available in both official languages. This is a no cost, self-directed online tool to raise awareness of general information on flammable liquids response procedures and protocols.

Following the announcement that the ERTF mandate was extended (July 2015 - June 2016), ERTF meetings reconvened in November 2015. Discussions built upon the foundations set by Subgroups 4 and 5. The Task Force then created two new working groups to complete the work on training and ERAP program review.

Training Working Group (November 2015 – February 2016)

The Training Working Group continued the work of Subgroup 5 to identify the key competencies to include in the specialized level for responders at large scale flammable liquids incidents. The ERTF created and published a guideline in both official languages, on key competencies for first responders at a flammable liquid incident. Other collaborators in creating this guideline were:

- Defense Research and Development Canada - Centre for Security Science (DRDC-CSS);
- *École nationale des pompiers du Québec*; and
- The NFPA.

The ERTF also worked with Transport Canada to secure funding from CSS to support the Training Working Group's activities in 2015-16. This included facilitating discussions for ERTF members to develop the online awareness tool; create and publish the competency guidelines; and support travel and accommodation costs for non-profit ERTF members.

ERAP Review Working Group (December 2015 – February 2016)

The ERAP Review Working Group continued the work of Subgroup 4. They clarified the ERAP activation authorities and process, and examined the challenge of using several response plans during the same incident. The working group put forward seven new recommendations to the ERTF. Once consensus was reached, the ERTF accepted **Recommendations 34 to 40** and presents them to Transport Canada in this report for consideration.

Proceedings and Governance

Subgroups 1 and 2 initially met each week, and later switched to twice a month. Subgroups 3, 4 and 5 met twice a month. Virtual meeting options allowed members to participate via teleconference and WebEx, or in person in Ottawa. Although remote access was always available, members acknowledged the value of attending these monthly meetings in person.

All five subgroups updated the ERTF during monthly plenary meetings. Each subgroup documented its findings in subgroup reports and submitted its recommendations for decision at plenary meetings. Once the ERTF reached consensus, it submitted recommendations to the TDG Director General via quarterly reports for immediate consideration. As of November 2015, Transport Canada received 33 recommendations in three quarterly ERTF reports.

"Obviously, the major accomplishment is with the leadership of the ERTF and subgroups to get all of the various stakeholders to state their views and arrive at agreement in all the recommendations to be put forth to the Director General."

- ERTF Member

5

ERTF FINDINGS AND RECOMMENDATIONS

5.1 Improve the ERAP Program

SUMMARY

- This section includes 10 recommendations to improve the ERAP program, grouped under three themes: clarifying ERAP activation, coordinating multiple plans and ensuring effective monitoring.
- A proposed ERAP Activation Model illustrates an Initial ERAP Assessment phase, with four questions to trigger the activation of an ERAP. The second phase starts with ERAP activation and provides streamlined protocols for monitoring the incident's scope and severity, to determine the appropriate escalation of levels of service.
- Response Tier and Timelines will help ensure services and assistance appropriate to an incident's scope and severity.
- ERAP holders want guidance on how to complete ERAP applications and submit them to Transport Canada.
- The ERTF created a Flammable Liquids Technical Advisor (FLTA) Competency Profile to document credential and competency requirements for a Technical Advisor in an ERAP for flammable liquids.
- Transport Canada should monitor the four expected ERAP outcomes, which are to provide Timely, Appropriate, Safe and Coordinated (TASC) response support.
- The ERTF identified collecting post-incident data such as response time, ERAP Response Team Contractor, Plan reference number, and tiered service level, as important to the continuous improvement of the ERAP program.

Background

Most first responders and communities are not aware of the type of assistance rail carriers and ERAP holders can provide. Local officials have asked for ways to become better informed and receive better support. ERAP holders are looking for guidance and want a consistent approach to determining the level of service appropriate to an incident's scope and severity.

The ERTF has 10 recommendations to improve the ERAP program; seven of which are introduced in this final report for the first time (**Recommendations 34 to 40**).

The ERTF looked at ways to make the ERAP program more effective by clarifying ERAP activation, examining how to coordinate the use of multiple plans during the same incident, looking at opportunities for continuous improvement, and ensuring effective monitoring of the ERAP program. These are described in detail throughout this section.

5.1.1 ERAP Program: Current Framework

Recommendations in the 1981 *Grange Report - Mississauga Railway Accident Inquiry*⁶ laid the policy foundation for the TDG ERAP program. It was established to ensure immediate and suitable response assistance to an incident involving dangerous goods deemed to be a higher risk to public safety, property and the environment.

The TDG Director General is delegated under Section 7 of the *Transportation of Dangerous Goods Act, 1992* (TDG Act) to exercise the ministerial authority and can direct the activation of an ERAP on behalf of the Minister.

Until 2015, the ERAP requirement applied to 69 Class 3 flammable liquids.

Until 2015, the ERAP requirement applied to 69 Class 3 flammable liquids.⁷ However, most of them had a subsidiary Class 6.1 (toxic substance) or subsidiary Class 8 (corrosive). The only Class 3 substances without a subsidiary class requiring an ERAP were:

- UN1089, Acetaldehyde;
- UN2381, Dimethyl Disulfide; and
- UN1202, UN1203 and UN1863 when they were transported on interconnected tank cars (as per Special Provision [SP] 82, which has since been repealed [SOR 2014-306]).

On December 31, 2014, the TDG Regulations were amended⁸, and consequently 11 Class 3 flammable liquids (9 of which were included in PD 33) now require an ERAP under subsection 7.1(6).

5.1.2 Analysis and Findings

During consultation, the ERTF expressed its concern over a lack of specific details in the TDG Act and Regulations relating to ERAPs. They identified opportunities to improve the ERAP program grouped under three themes:

- Clarify ERAP activation;
- Coordinate multiple plans used during the same incident; and
- Ensure continuous improvement and effective monitoring.

5.1.3 Clarify ERAP Activation

One concern the ERTF identified was the lack of understanding about:

- Who has the authority to activate an ERAP; and
- What would be the circumstances that would trigger the ERAP activation.

The Task Force found opportunities for improvement in the following five areas:

- a) Process and authority to activate an ERAP;
- b) Levels of Service;
- c) Guidance for submitting ERAP Applications to Transport Canada;
- d) Role and Competencies of an ERAP FLTA; and
- e) Reporting an incident versus activating an ERAP.

⁶ <http://epe.lac-bac.gc.ca/100/200/301/pco-bcp/commissions-ef/grange1981-eng/grange1981-eng.htm>

⁷ Referring to Class 3 Flammable Liquids that were ERAPable under the TDG Regulations before the Regulations were consolidated to include regulatory amendment SOR/2014-306 (Lithium Metal Batteries, ERAPs and Updates to Schedules).

⁸ SOR/2014-306

a) Process and Authority to Activate an ERAP

Transport Canada must clarify how to activate an ERAP, what situations warrant activation, and who has the authority to do this.

The TDG Act or Regulations do not describe the process and circumstance under which responders and municipalities can access advice and services described in an ERAP. As a result, people:

- Have different interpretations of what it means to activate an ERAP; and
- Find it difficult to identify the authorities and process to activate an ERAP.

As of May 2016, there were 973 ERAPs covering 399 UN numbers. Nonetheless, few municipalities and first responders are aware of the program.

As of May 15, 2016, there were 973 ERAPs covering 399 UN numbers, but few municipalities and first responders are aware of the program. Very few responders know that an ERAP's reference number and activation telephone number are on the shipping documents.

First responders explain that when arriving at an incident, their duty is to evaluate the scene, and protect both the public and themselves. Based on their evaluation, which may include discussions with the carrier and/or shipper, they may determine they need additional and specialized assistance the ERAP holder could provide. Their lack of awareness of ERAPs, however, may delay a request for such assistance.

First responders also indicate that shipping documents are not always readily available to them during rail incidents. This makes it difficult for them to request assistance through an ERAP provider.

There is no legal requirement outlining whose responsibility it is to activate an ERAP.

The TDG Act does not clearly outline ERAP responsibilities, so there is no legal requirement outlining who is responsible to activate the ERAP, or when. Neither the TDG Act nor the TDG Regulations defines the term activation. Subsection 7(5) of the TDG Act provides the only indication of the ERAP holder's obligation to activate a plan by allowing Transport Canada to revoke the ERAP if the holder refused to activate it.

To facilitate the discussions and help clarify the ERAP activation process, the ERTF developed a draft ERAP Activation and Mobilization Flowchart. It gives a high level overview of the activation process and mobilization of resources, based on current common practice amongst shippers.

Industry stakeholders (ERAP holders) want a clear and consistent approach to deciding when to activate an ERAP. Working from this flowchart, members collaborated with TDG Remedial Measures Specialists (RMS) to propose a new ERAP Activation Model, which describes the process to activate an ERAP and escalate the level of response as required, broken down into Phases I and II.

Proposed ERAP Activation Model

Phase I: Initial ERAP Assessment

A transportation incident involving dangerous goods covered by an ERAP triggers a **mandatory call** to the Technical Advisor/Plan Holder to notify them of the incident. Once notified, the Technical Advisor/Plan Holder must decide whether or not to activate the ERAP, based on scene assessment information from the carrier, first responder and/or Authority Having Jurisdiction (AHJ).

Phase I includes a Preliminary Assessment of four key questions to give the Technical Advisor/Plan Holder a clear, quick and consistent approach to quickly determine whether or not to activate the ERAP:

1. Could the integrity of the Means of Containment (MOC) have been compromised?
2. Is a transfer anticipated or required?
3. Is there a release or an anticipated release?
4. Did first responder/AHJ/carrier ask for help?

If the answer is “no” to all four questions, the Technical Advisor/Plan Holder is not required to activate their ERAP. However, they may still activate their ERAP at any time and to any Tier, as indicated in their plan or as appropriate.

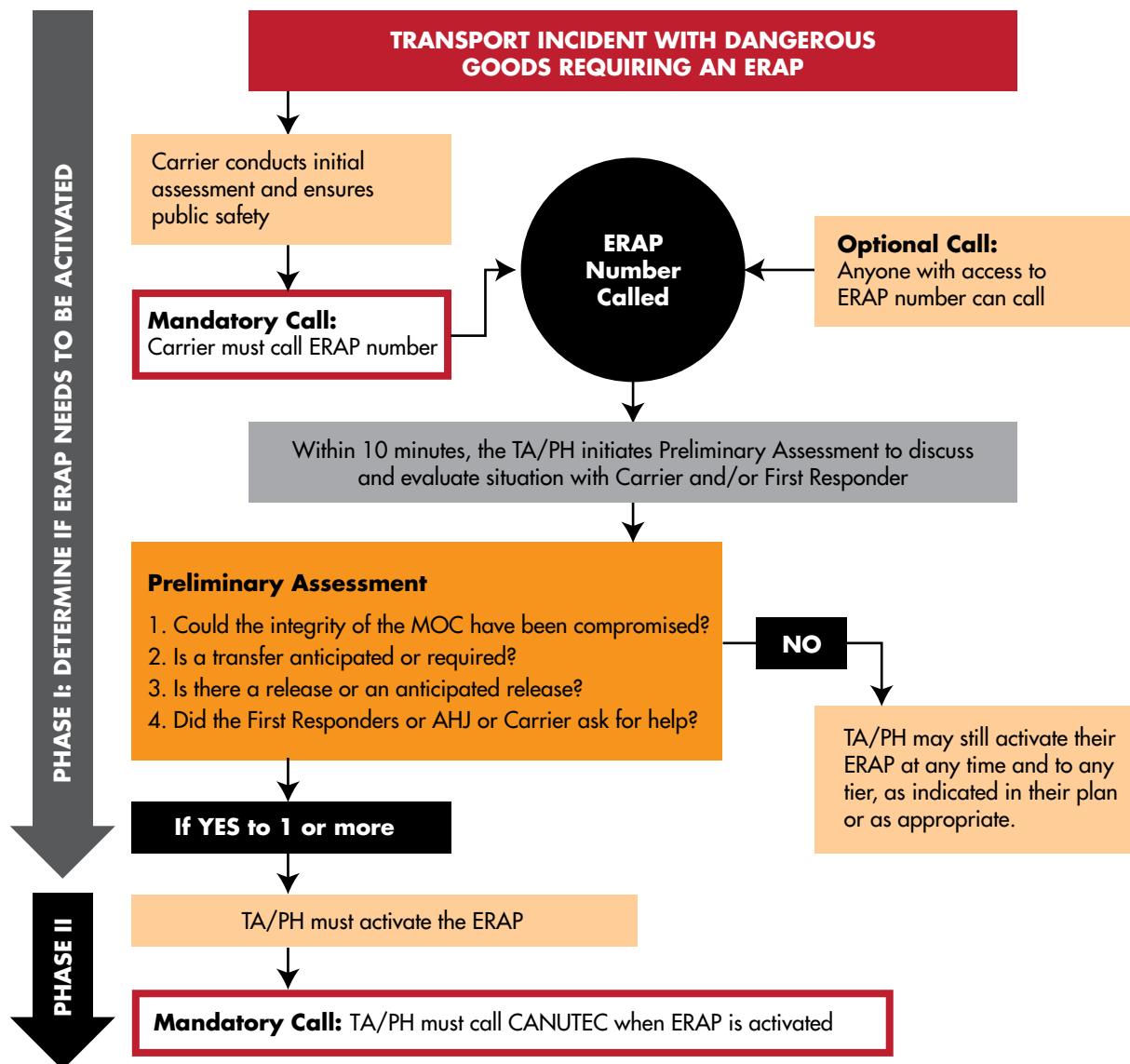
If the answer is “yes” to one or more of the four questions, the Technical Advisor/Plan Holder must:

- activate their ERAP;
- move to Phase II to determine the level of service required appropriate to the scope and severity of the incident; and
- call the Canadian Transport Emergency Centre (CANUTEC).

Note: “Optional Call” means that anyone with access to the ERAP number can call to notify the Technical Advisor/Plan Holder of an incident (e.g. first responder, AHJ). Also, carriers must continue to meet their obligation to provide reasonable emergency measures as set out in Subsection 18(2) of the TDG Act.

Phase I of the proposed ERAP Activation Model is illustrated in Figure 1.

Figure 1: Phase I - Initial ERAP Assessment*



* Where TA/PH denotes Technical Advisor/Plan Holder

Phase II: ERAP Activated

Phase II begins when the Technical Advisor/Plan Holder activates the ERAP. It provides an assessment process designed to determine the level of service required appropriate to the incident's scope and severity.

Once the ERAP is activated, regardless of the level of service, it is mandatory for the Technical Advisor/Plan Holder to inform CANUTEC of the activation as well as every time the response level escalates. Notifying CANUTEC enables Transport Canada to exercise its oversight duty by monitoring that first responders receive the appropriate assistance, and intervene if required.

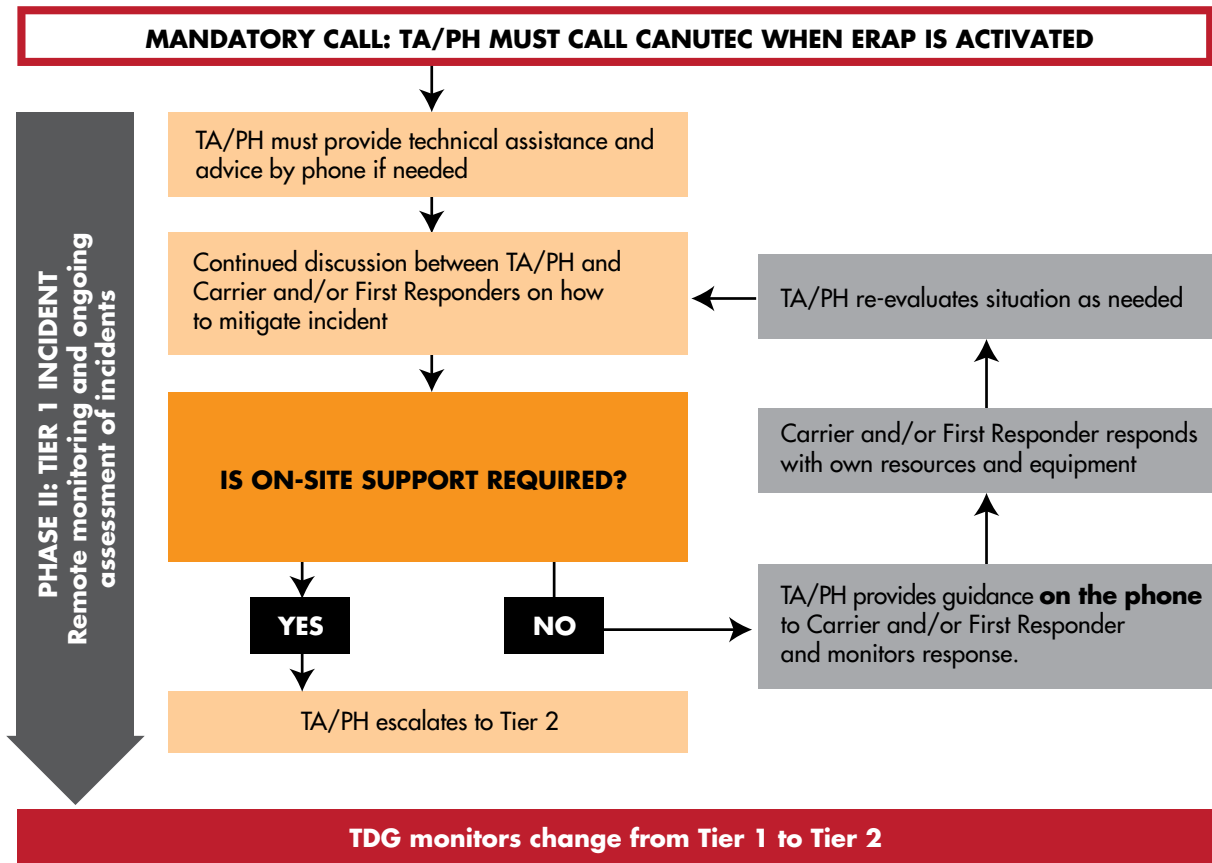
If the response level escalates, Transport Canada will monitor the change from Tier 1 to 2 to 3. Regardless of the Tier, the situation is always re-evaluated, as needed. The Technical Advisor/Plan Holder must also monitor and assess the incident throughout the entire process so that if the situation changes or if more information becomes available, the Technical Advisor/Plan Holder can decide when services are no longer required.

Tier 1 Level of Services: Remote monitoring and ongoing assessment of incident

- If on-site support **is not required**, the Technical Advisor will provide a Tier 1 level of service. The carrier and first responder/AHJ will manage the incident with technical advice from the Technical Advisor via telephone.
- If on-site support **is required**, the Technical Advisor will escalate the level of response to Tier 2.

Phase II Tier 1 is illustrated in Figure 2.

Figure 2: Phase II - ERAP Activated: Tier 1

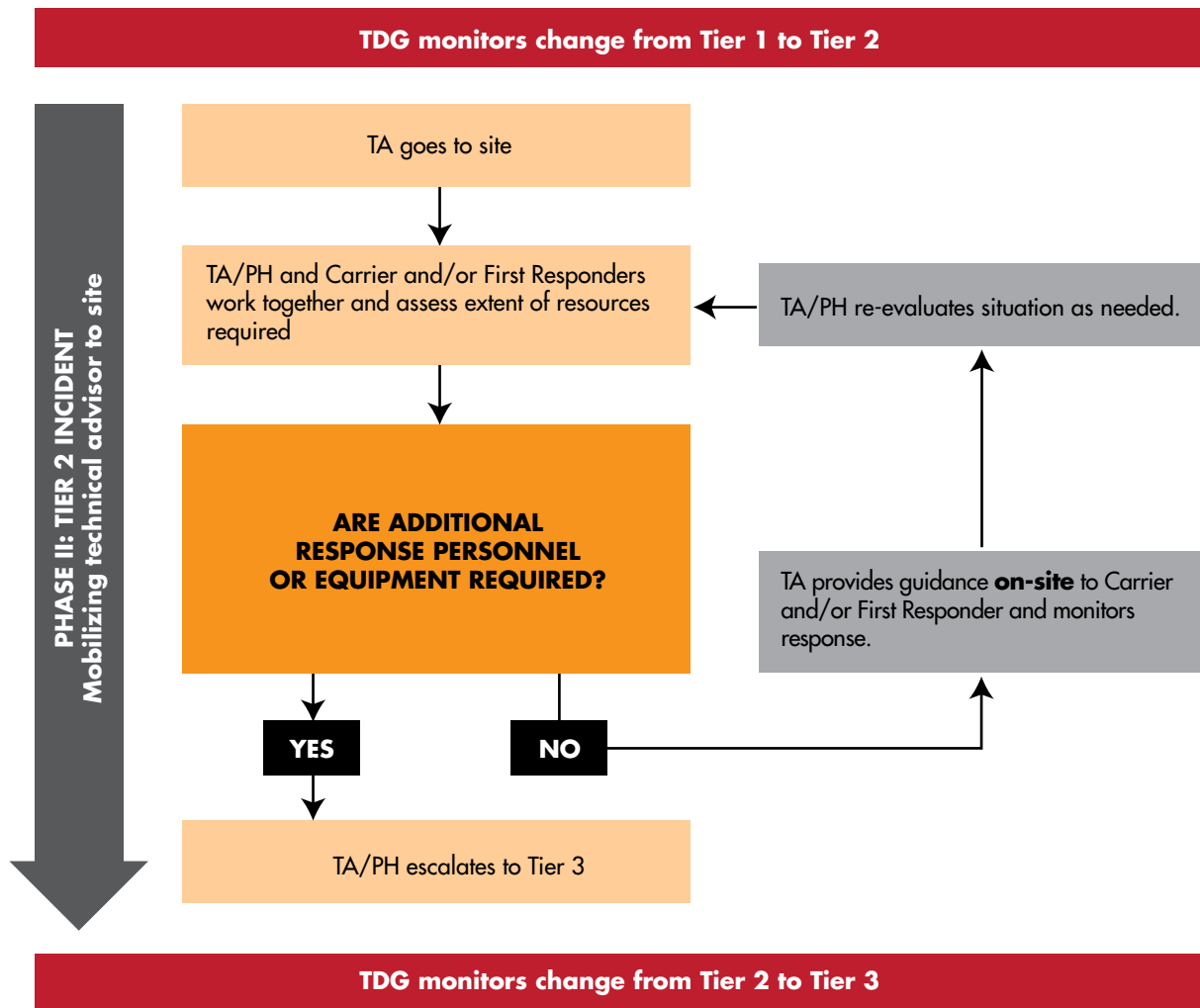


Tier 2 Level of Services: Mobilize Technical Advisor to site

- The Technical Advisor goes to the site and works with the carrier, first responder/AHJ to assess the extent of resources required.
- If additional response personnel or equipment is required, the Technical Advisor will escalate the level of response to Tier 3.

Phase II Tier 2 is illustrated in Figure 3.

Figure 3: Phase II - ERAP Activated: Tier 2

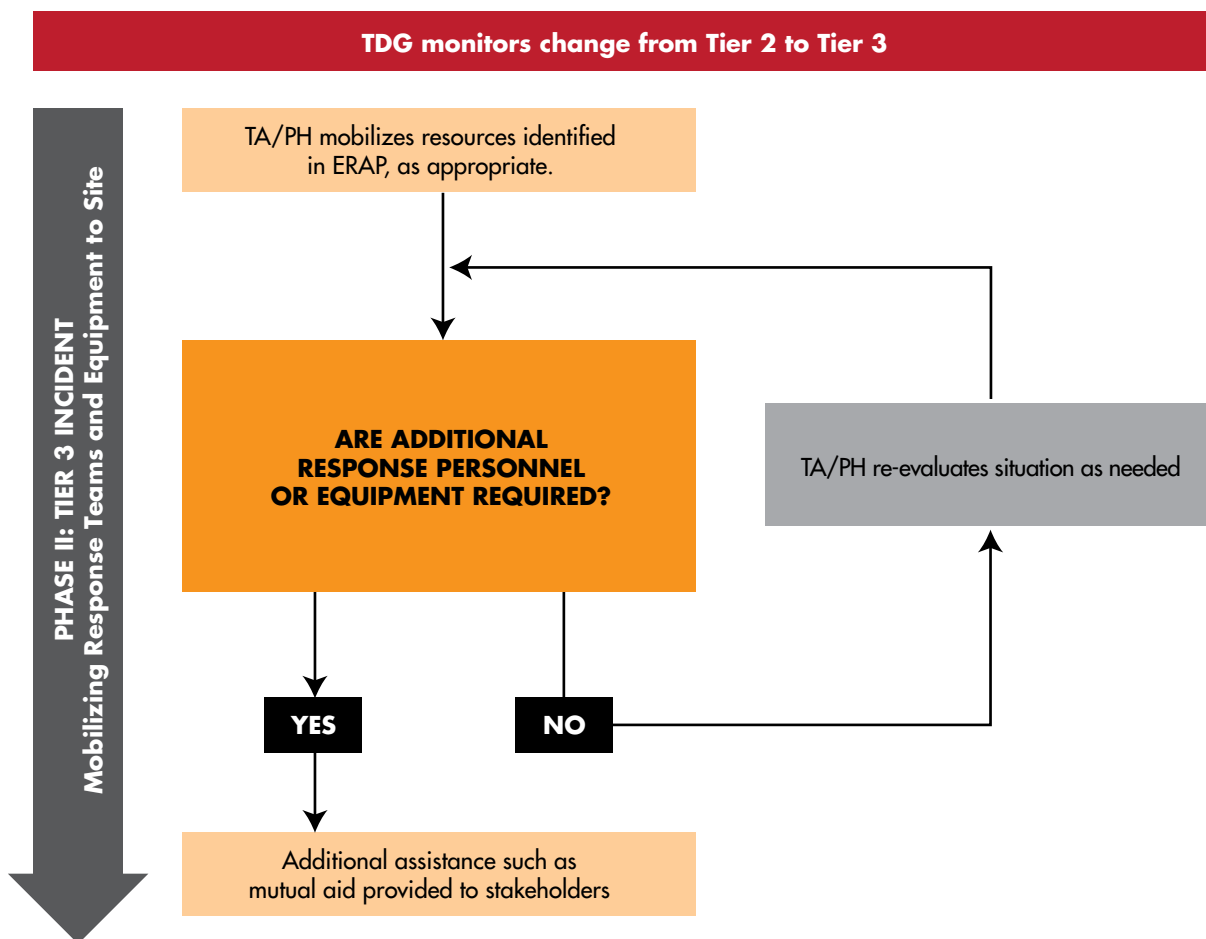


Tier 3 Level of Services: Mobilize response teams and equipment to site

- The Technical Advisor/Plan Holder mobilizes response personnel and/or equipment on-site as identified in their approved ERAP.
- If additional response personnel or equipment **is required**, the Technical Advisor may provide mutual aid to stakeholders.

Phase II Tier 3 is illustrated in Figure 4.

Figure 4: Phase II - ERAP Activated: Tier 3



The ERTF submits **Recommendations 37 and 38** to Transport Canada for consideration.

Recommendation 37 proposes a mechanism to trigger the ERAP Holder/Technical Advisor to conduct an immediate initial assessment of the incident. This will also clarify the process to determine if an ERAP requires activation, once the carrier calls the ERAP holder.

Recommendation 37: Clarify the process to determine if ERAP requires activation following the phone call made to the ERAP holder, and consider:

1. Mandatory phone call be made by the carrier to the ERAP holder/Technical Advisor to trigger an immediate initial assessment of the situation by the Technical Advisor in consultation with carrier, First Responder, or AHJ;
2. Standardized approach requiring the ERAP Technical Advisor to evaluate the situation with the carrier, First Responder, or AHJ to determine if the ERAP is to be activated based on the following:
 - Could the integrity of the MOC have been compromised?
 - Is a transfer anticipated or required?
 - Is there a release or an anticipated release?
 - Did carrier, First Responder, or AHJ ask for help?

The intent of **Recommendation 38** is to clarify that ERAP activation implies the ERAP holder will provide response assistance that is appropriate to the incident's scope and severity.

Recommendation 38: Consider an "ERAP Activated" if:

The ERAP initial assessment has been completed by the Technical Advisor and based on the assessment that the situation requires an appropriate response in accordance with the approved ERAP.

The activation of an ERAP includes a mandatory notification to CANUTEC, from the ERAP holder/Technical Advisor, notifying that an ERAP is being activated.

Further to **Recommendation 38**, Task Force members expressed concern that the proposed activation definition would have an impact on the application of the liability exoneration regime currently stated in Section 20 of the TDG Act (Personal Liability):

20. The following persons are not personally liable, either civilly or criminally, in respect of any act or omission done in good faith and without negligence:

(a) any person who responds to an actual or anticipated release using an emergency response assistance plan that applies to the release, acts in accordance with the plan and informs the Canadian Transport Emergency Centre of the Department of Transport of their response to the release;

Specifically, does Section 20 apply only when resources were deployed on-site, or does it also apply when advice is provided over the telephone? The ERTF believes further clarification is needed to understand the meaning of the application of Section 20(a) of the TDG Act, so submits **Recommendation 39** to Transport Canada for consideration.

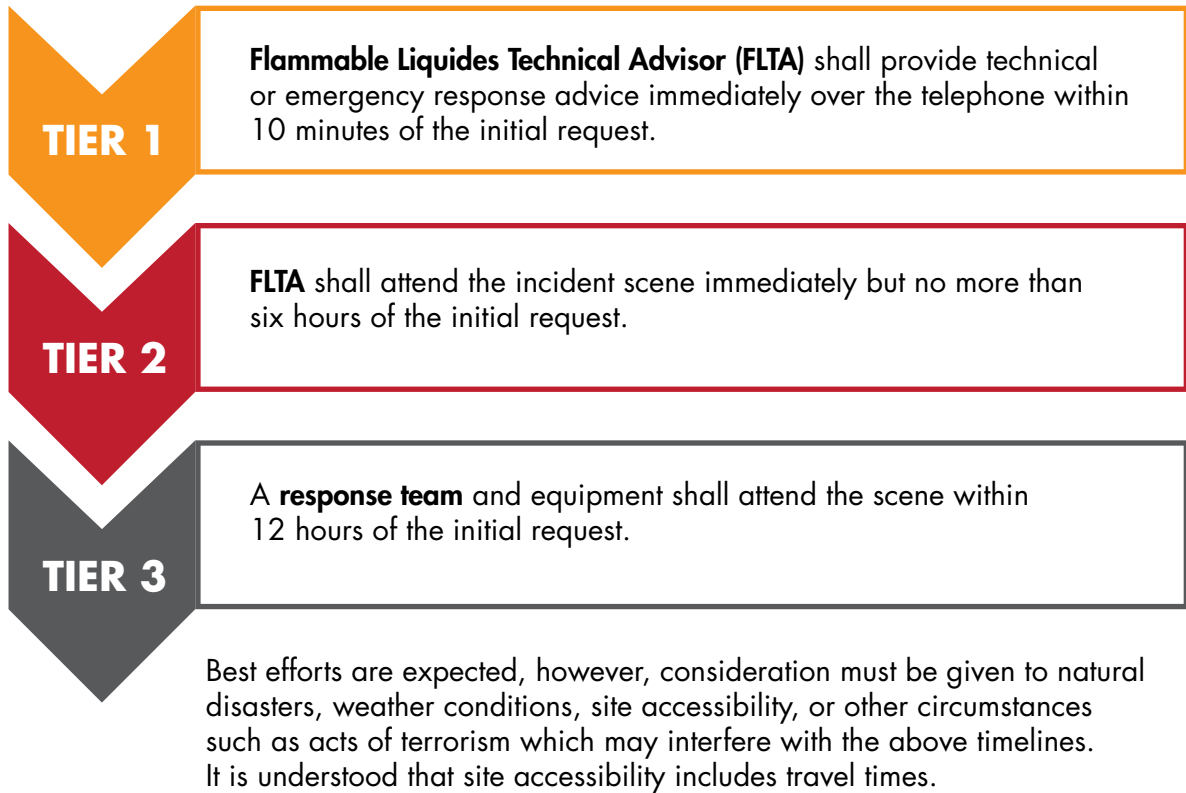
Recommendation 39: Clarify the meaning of "any person who responds to an actual or anticipated release" for the application of Section 20 TDG Act.

b) Levels of Service

The ERTF communicated the need to clarify the ERAP appropriate response level that would meet regulatory requirements. Part 7 of the TDG Regulations does not specify criteria for expected response and timelines when providing ERAP services. The ERTF is also looking for national consistency in terms of expected response and timelines and a common approach based on industry recognized best practices.

Members addressed this concern by identifying tiered levels of service. They established the Response Tier and Timelines for flammable liquid rail incidents based on an industry best practice example as shown in Figure 5.

Figure 5: Response Tier and Timelines: Best Practices



Nothing in the Regulations currently prevents ERAP holders from offering a tiered response as part of their plan and describing the levels of service they offer upon ERAP activation.

The level of service the ERAP holder provides should be appropriate to the severity and scope of that incident.

ERTF members recommend including the Response Tier and Timelines in the generic sections of ERAPs (see section 5.3.8), not only to promote it as a best practice standard, but to clarify what level of service emergency planners and first responders can expect following ERAP activation in case of rail incidents involving Class 3 flammable liquids.

The ERTF makes **Recommendation 29** to encourage national consistency and to further increase confidence in Class 3 ERAP response and technical advice. It establishes three levels of assistance, based on industry's recognized best practices. Members understand and agree that the level of assistance required depends on the unique circumstances of a particular incident.

Recommendation 29: To include the “Response Tier and Timelines” presented as industry’s best practices, in all ERAPs. The Response Tier and Timelines is a suggested minimum of three tiers as follows:

1. Tier One response time for a Technical Advisor to provide technical or emergency response advice by telephone would be within 10 minutes of the initial request;
2. Tier Two response time for a Technical Advisor to attend the incident scene would be within six hours of the initial request; and
3. Tier Three response time for a response team and equipment to attend the scene would be within 12 hours of the initial request.

Best efforts are expected, however, consideration must be given to natural disasters, weather conditions, site accessibility, or other circumstances such as acts of terrorism which may interfere with the above timelines.

To provide timely and appropriate assistance to responders and uphold public safety during the transportation of dangerous goods, ERTF found that:

- An incident may not automatically require the full deployment of a specialized team and equipment to the scene; and
- The level of service the ERAP holder provides should be appropriate to the severity and scope of that incident.

Consequently, the ERTF submits **Recommendations 34 and 35** to Transport Canada for consideration.

Recommendation 34: Requires a tiered service level as a cost and time effective measure to ensure the level of services and assistance is appropriate to the scope and severity of the incident.

That it is mandatory for an ERAP holder to provide services (Tier 1) upon the ERAP holder being notified of an incident.

Recommendation 35: Consider practical means to include a tiered service level in existing ERAPs regardless of the mode of transportation that would minimize time and costs to both the ERAP holder and Transport Canada.

c) Guidance for ERAP Holder on submitting ERAP Applications to Transport Canada

ERAP holders need a clear understanding of what Transport Canada expects from them when submitting an ERAP application for approval. They are asking for better guidance from the Department to help them develop a tiered approach to providing specialized assistance that is appropriate to an incident's scope and severity.

Members want Transport Canada to develop a standardized assessment tool for developing ERAP applications with a tiered implementation process. This standardized assessment tool would:

- Standardize criteria for ERAP approval;
- Clarify what Transport Canada expects from the ERAP holder submitting an ERAP for approval and what assistance it must provide during an incident; and
- Provide a clear and structured process to determine the level of service beyond Tier 1, appropriate to the scope and severity of the incident.

As a result, the ERTF identified criteria Transport Canada can consider when developing the standardized assessment tool. The objective is to help ERAP holders determine the service level appropriate to an incident's scope and severity. ERTF also suggests:

- Developing an approved checklist or flow chart for each service level; and
- Providing generic assessment guidance (to include every mode and every product with an ERAP).

Some criteria Transport Canada should consider when developing the standardized assessment tool, include:

- i) Is there a risk to public safety, property or the environment?
- ii) Is the incident confined to shipper's / carrier's property?
- iii) Is the release controlled?
- iv) Can the MOC be fully assessed for damage?
- v) Is first responder or regulatory agency intervention required?
- vi) Are qualified and equipped personnel on-scene who can take the required corrective action?
- vii) Is the ERAP holder satisfied / in agreement with the suggested corrective action proposed by the carrier without additional resources being provided?
- viii) Other factors to be identified.

The ERTF submits **Recommendation 36** to Transport Canada for consideration.

Recommendation 36: Develop a standardized Assessment Tool that would assist the ERAP holder in determining the appropriate level of response (tier) to an incident.

d) Role and Competencies of a Flammable Liquids Technical Advisor

When an ERAP is activated, the initial resource the ERAP holder provides is referred to as a Technical Advisor. The Technical Advisor's responsibility is to provide substance-specific technical advice. This resource capability is well established and known by those familiar with ERAPs, such as ERAP holders, carriers and approval authorities like TDG. However, there is little openly available information on the capabilities and competencies a Technical Advisor must possess, specifically for Class 3 flammable liquids. Subgroup 1 developed an FLTA Competency Profile to address this gap. This profile documents credential and competency requirements for an ERAP's FLTA (see Annex D).

There is little openly available information on the capabilities and competencies expected of a Technical Advisor, specifically for Class 3 flammable liquids.

Documenting specific capability and competency requirements for an FLTA will:

- Provide better guidance to ERAP holders on what Transport Canada expects of them for compliance;
- Provide better guidance to community authorities and emergency responders such as police, fire and emergency medical services, on what an ERAP FLTA can and cannot provide during a rail incident;
- Increase confidence in the availability and competency of this important on-scene resource during incident response decision-making; and
- Provide improved approval and performance assessment tools to regulatory authorities, such as TDG RMS.

The FLTA Competency Profile can serve as a baseline to Transport Canada to be developed further, as necessary.

Recommendation 17: Further develop a Flammable Liquids Technical Advisor (FLTA) Competency Profile that can be used as a tool during the review and approval process of an ERAP for Class 3 Flammable Liquids.

The ERTF has further defined FLTA knowledge and skills as FLTA C, B or A levels, as per the NFPA Standard 472 (2013) Specialist Employee C, B or A. The key competencies for each level can help provincial/territorial authorities and training facilities in Canada develop a specialized FLTA curriculum.

Key competencies help provincial/territorial authorities and training facilities develop a specialized curriculum for FLTA.

e) Reporting an Incident versus Activating an ERAP

During consultations, some stakeholders noted they considered an ERAP activated when the carrier calls the shipper to report an incident involving dangerous goods covered by an ERAP. This makes it clear Transport Canada must explain the difference between the duty to report an incident under Part 8 of the TDG Regulations and the requirements under Part 7.

According to Part 8 of the TDG Regulations, in the event of a release of dangerous goods during a rail incident, the carrier with possession of the dangerous goods must report the incident to:

- the appropriate provincial or territorial authority (as listed in Subsection 8.1(5) of the TDG Regulations);
- its employer;
- the consignor of the dangerous goods; and
- CANUTEC.

When the ERAP activation telephone number and the 24-hour telephone number on the shipping document are the same, it increases the confusion related to activating an ERAP versus reporting an incident. When an incident occurs, the carrier reports the incident to the shipper (using the 24-hour telephone number) and may believe the conversation means that the ERAP is being activated. During consultation, members agreed that:

- The obligation to report an incident applies even in the absence of an ERAP as per Part 8 of the TDG Regulations.
- Reporting an incident to a shipper is not an automatic activation of an ERAP.

This obligation to provide reasonable emergency measures under section 18 of the Act does not include deciding whether or not to activate the shipper's ERAP.

Under current Act and Regulations, the obligation to hold an ERAP approved by Transport Canada rests mostly on the shipper, not the carrier. The carrier's responsibility under Section 18 of the TDG Act is to take reasonable emergency measures and to report the incident as set out in Part 8 of the TDG Regulations if the carrier had charge, management or control of the dangerous goods at the time of the release. This obligation does not include deciding whether or not to activate the shipper's ERAP.

The ERTF concludes that Transport Canada must make outreach efforts to clarify the following points:

- The requirement for reporting an incident involving dangerous goods under Part 8 of the TDG Regulations applies even when the incident involves dangerous goods that do not require an ERAP.
- Reporting an incident under Part 8 of the TDG Regulations is different than making the telephone call to the ERAP holder under Part 7.
- Reporting an incident under Part 8 does not activate an ERAP since it does not automatically trigger the shipper's duty to provide technical advice or mobilize approved response resources.

5.1.4 Coordinating multiple plans used during the same incident

Challenges involving first responders and other response contractors can also occur when both a carrier's Emergency Response Plan (ERP) and an ERAP are activated, in addition to the municipal ERP being put in force for the same event. In these situations, coordinating a prompt and effective response is a concern for many stakeholders, particularly first responders and community representatives.

The ERTF proposes **Recommendation 15** on developing response exercises to test and evaluate the ERAP program to enhance cooperation between carriers, shippers and local first responders during incidents (see Section 5.3).

The ERTF also proposes **Recommendation 30** related to rail carrier ERP to address coordinating multiple plans in force during the same incident by different agencies and stakeholders (see Section 5.3).

The objective is the sharing of railway ERP information before an incident occurs. This recommendation aims to improve cooperation and coordination efforts during the pre-incident planning phase, and better support planners and other agencies who will be involved in a dangerous goods rail incident.

If carriers only activate their ERP in lieu of the approved ERAP, public perception could be that the government failed in its obligation to provide oversight of private response in the case of a rail incident involving flammable liquids.

Public safety is the ERAP program's primary objective. While Transport Canada assesses and audits the technical response an ERAP provides, there is no Transport Canada oversight for the response provided in a railway ERP. If carriers only activate their ERP in lieu of the approved ERAP, the public could feel the government failed in its obligation to provide oversight of private response to a rail incident involving flammable liquids.

5.1.5 Continuous Improvement and Effective Monitoring

The ERTF identified the data needs and gaps to continually monitor the ERAP program's effectiveness and to provide the necessary information to ensure its ongoing improvement. During consultation, members identified opportunities for improving monitoring of:

- a) Program performance; and
- b) Risks for the program.

a) Monitoring Program Performance

Evaluating the ERAP program will establish how it is being used and if it achieves the objectives for which it was created. The intent is not to establish criteria to distinguish high from low performing response agencies.

The purpose of assessing ERAP program performance is to:

- Verify if public policy objectives are met; and
- Develop lessons learned and facilitate future improvements, if needed.

The foundation of the ERAP program is public safety, with two objectives in mind:

1. Offer additional and specialized resources to first responders for transportation incidents involving high risk dangerous goods; and
2. Allow improved planning, by outlining what to expect during a response to an incident involving certain dangerous goods.

Response support should be Timely, Appropriate, Safe and Coordinated (TASC).

To meet these objectives, an ERAP should provide response support that is Timely, Appropriate, Safe and Coordinated (TASC); and Transport Canada should monitor all four.

Timely

Public safety requires timely response. First responders need immediate specialized advice from a technical expert to keep them safe and allow them to make sound decisions on the scene.

Additional response resources, when required, must arrive on-site as quickly as conditions permit, such as weather, location of incident, road access and other factors. Members have identified tiered response levels as best practices and have recommended its use as guidelines on response service levels.

Appropriate

Appropriate ERAP response services must meet established standards and provide useful and effective support to responders during a dangerous goods incident. The ERAP holder will provide an appropriate response by supplying the right equipment, the right resources and sound advice from competent personnel, for the incident's scope and severity, and the nature of the products involved.

Safe

Public and first responder safety is the first priority during a response. Ensuring the right protection for first responders to operate safely is critical. To ensure the ERAP response takes place in a safe manner that minimizes risks to responders and public, ERAP response team personnel must be trained and competent, and use the equipment and procedures according to safety requirements.

Response to complex and/or large scale incidents can involve as many as 50 agencies, each with its own priorities. Response efforts must be coordinated quickly to avoid chaos and delays.

Coordinated

Response to complex and/or large scale incidents can involve as many as 50 different participating agencies, each with a specific mandate and way to operate. Uncoordinated response efforts quickly create chaos and result in delays.

Responders can deliver a coordinated response by:

- Clearly understanding respective roles and responsibilities;
- Operating in a unified command structure;
- Recognizing one incident commander assigned by the AHJ;
- Building trust and networking ahead of crisis by planning and exercising; and
- Prioritizing public safety over enforcement operations until such time as public safety is secure.

This is why the ERTF proposed **Recommendation 31** to Transport Canada.

Recommendation 31: Recognizing that expected outcomes of an ERAP are to provide response support that is Timely, Appropriate, Safe and Coordinated (TASC), it is recommended that Transport Canada monitor the ERAP program and foster its continuous improvement by establishing criteria to assess if the four identified expected outcomes are being met, collect and assess the necessary data and consider opportunities for improvements.

b) Monitoring Risks for the Program

The ERTF noted data gaps which hinder Transport Canada's ability to produce evidence-based risk assessment and policy recommendations on the ERAP program. Incident reporting requirements under Part 8 of the TDG Regulations generate important statistics, which help identify sources of risk and areas for improvement. However, there is currently no mechanism in place to see if ERAPs provide the appropriate assistance.

The ERTF suggested that Transport Canada collect more relevant data by expanding its reporting requirements for ERAP holders, under Part 8 of the TDG Regulations. Examples of relevant data include:

- Response time (including time of arrival on-site);
- ERAP Response Team Contractor;
- Plan reference number; and
- Tiered service level.

Post incident reports filed by RMS or TDG officers deployed on the site of an incident could also be considered an important source of information.

Consequently, the ERTF submits **Recommendation 40** to Transport Canada for consideration.

Recommendation 40: Collect meaningful data that is proportioned to the scope and severity of the incident and the response level provided by ERAP holder/Technical Advisor to monitor the ERAP Program Effectiveness and foster continuous improvement.

5.1.6 Moving Forward

The proposed ERAP Activation Model and the Response Tier and Timelines showcase industry's current best practices. These best practices can help Transport Canada clarify the activation process and the program outcomes it expects.

Expanding the reporting requirements under the TDG Regulations to include post-incident information on ERAP activations and the services provided, would inform Transport Canada decision-making to ensure continuous improvement of the ERAP program.

Expanding reporting requirements to include post-incident information on ERAP activations would allow for continuous improvement of the ERAP program.

5.2 Expand ERAP Requirements to other Flammable Liquids

SUMMARY

The Task Force reviewed the possible expansion of the ERAP program to other Class 3 flammable liquids not included in PD 33. As a result, it:

- Identified large volumes of UN1987 Alcohols, N.O.S. (Ethanol) transiting by rail from the U.S. through Canadian communities as requiring an ERAP before shipping.
- Categorized 346 Class 3 flammable liquids (PG I, II and III) based on their physical and chemical properties.
- Ranked 43 substances as Priority 1 for potential inclusion in the ERAP program.
- Included transportation modes, volumes and routes as risk factors to assess for each category.
- Analyzed combinations of Class 3 flammable liquids where Class 3 was either a primary and/or subsidiary class, and ranked 47 substances as Priority 1 for potential inclusion in the ERAP program. These substances will require further risk assessment.

Transport Canada conducted a risk assessment of the 43 substances and flagged UN2055 (Styrene monomer, stabilized) for its polymerization characteristics, and concluded an ERAP is not required at this time due to low volume, low incident frequency and careful handling procedures.

Background

On April 23, 2014, Transport Canada issued PD 33, which identified nine flammable liquids for immediate inclusion in the ERAP program. The Task Force received the mandate to build on requirements identified in PD 33 and identify gaps that may exist.

5.2.1 Shipments of Ethanol transiting in Canada

According to the U.S.-based Renewable Fuels Association, 42% of Ethanol exported from the United States is transported by rail into Canada and transits through Canada (bridge traffic) classified as UN1987 Alcohols, N.O.S. In the fall of 2014, the Task Force submitted **Recommendation 3**, to add UN1987 to the list of dangerous goods requiring an ERAP.

42% of Ethanol exported from the U.S. is transported by rail through and into Canada as UN1987.

Recommendation 3: To proceed in including Ethanol being shipped under UN1987 as part of the primary ERAP requirements for Class 3 Flammable Liquids, and that Transport Canada proceed with advising those shippers that may be impacted by this recommendation so they may act accordingly with respect to ERAP requirements.

The regulation came into force on December 31, 2014⁹ and required an ERAP for UN1987 as well as UN3494 (Petroleum Sour Crude Oil).

The ERAP program is based on assessed risks of dangerous goods transported. More specifically, Transport Canada requires an ERAP before operators transport high risk dangerous goods that would require special assistance for emergency response to an incident. To make this determination, products are assessed based on their level of inherent hazard, such as chemical and physical properties. Other factors to consider that would impact the level of risk for communities include product volume, modes of transportation and transportation corridors.

For thorough analysis and sound decision making, the TDG Directorate relies on accurate and timely data as well as these risk factors, to identify communities at risk and target the potential high risk products to include in the ERAP program.

5.2.2 Flammable Liquid Categorization and Priority Ranking

Part of the challenge is that hundreds of products meeting the definition of flammable liquids are being transported in or through Canada every day. The Task Force had neither the resources nor time to assess the level of hazard and risk for each substance. The ERTF agreed on a strategic approach that:

- grouped flammable liquids sharing similar behaviour and properties into categories.
- prioritized, then risk assessed each category, starting with the one presenting the highest level of inherent hazard.

The TDG Directorate engaged two SMEs, Ernie Wong and Michel Cloutier, to support the ERTF in this complex and technical work.

Scope of the Analysis and Methodology

The SMEs used a hazards-based methodology to identify criteria to differentiate the flammable liquids (including all Class 3 substances with both a primary and subsidiary classification). They collected data on the characteristics of each substance, including physical-chemical properties and toxicological data; including boiling point, flash point, potential polymerization, explosive peroxides and special handling procedures (such as reaction with oxygen) as well as toxicological data using the following references:

- The TDG Schedule 1 information from the amendment (SOR/2014-306);
- The Hazardous Materials table 172.101 of Title 49 of the *Code of Federal Regulations* (CFR) from the United States; and
- The guide page number from the *2012 Emergency Response Guidebook* (ERG).

The SMEs quickly recognized they needed more technical information to conduct a more comprehensive analysis. Some additional criteria the SMEs used to analyze these substances included the CAS number¹⁰, carcinogenicity, Environment Health and Safety (EHS), Polymerization, NFPA Health, Flammability, Reactivity (HFR), and Clean Air Act thresholds.

Flammable liquids with a lower boiling point and a lower flash point represent a higher degree of hazard during incidents involving a fire and require specialized emergency response.

They also considered Canadian weather and adverse fire conditions that may prevail during a transportation incident.

When subjected to severe heat conditions, flammable liquids with a lower boiling point and a lower flash point represent a higher degree of hazard during incidents involving a fire. These incidents could require specialized emergency response teams on-site, to apply appropriate risk evaluation techniques and specialized emergency response procedures to safely resolve the situation.

Early in the project, the Task Force decided to broaden the scope and include all Class 3 substances with both a primary and subsidiary classification. This resulted in a total of 663 substances to be analyzed, giving priority to Class 3, PG I, II and III (no subsidiary class) substances. The SMEs identified 369 substances as Primary Class 3, 23 of which were already classified as requiring an ERAP, leaving 346 substances to analyze and prioritize.

369 substances were identified as Primary Class 3, 23 already required an ERAP, leaving 346 substances to analyze and prioritize.

¹⁰ A CAS number is a short string of text that refers to a chemical substance. It contains a sequence of up to 10 numerical digits separated into three groups by two hyphens.

The following section presents the results of these 346 substances, first by Class 3 PG I, II and III (no subsidiary classes), followed by the remaining substances (Class 3 with a subsidiary class, or any other Class with a Class 3 subsidiary).

Class 3, PG I, II, III

The SMEs established criteria to take a hazard-based approach to determining the Priority level for the 346 Class 3 PG I, II and III flammable liquids. Table 1 describes each of the six criteria used for this categorization.

Table 1: Criteria used for the Categorization for Class 3 PG I, II & III

| Criteria | Description |
|----------|---|
| 1 | Have a initial boiling point of 35°C or less (TDG Regulations) |
| 2 | Flash point less than or equal to -25°C (the monthly average temperature along the rail transportation corridors is above this) |
| 3 | Potential polymerization hazard (typically loss of inhibitor/stabilizer) |
| 4 | Can form explosive peroxides under certain conditions (e.g. exposure to elevated temperatures) |
| 5 | Requires special handling procedures (e.g. reaction with oxygen) |
| 6 | Possible carcinogen |

Based on the description field in Table 1, the SMEs created seven different colour-coded categories to define substances by level of priority for being included in the ERAP program, and are illustrated in Table 2. On a scale of 1 to 5, the highest hazards are considered Priority 1. Category 6 includes substances flagged for further TDG review, and Category 7 includes substances that already require an ERAP. For example, a substance is considered Category 1 (orange) if it meets at a minimum the boiling point, flash point and polymerization criteria, and may also meet any other criteria.

Table 2: Category definition and colour of Class 3, PGs I, II and III

| Category | Definition |
|----------|---|
| 1 | Boiling Point, flash point and polymerization at a minimum, and may have any other criteria |
| 2 | Boiling point only or flash point only or both, and may meet any other criteria except polymerization |
| 3 | Boiling point and flash point at a minimum, but no other criteria |
| 4 | Any other criteria except boiling point, flash point and Polymerization |
| 5 | Boiling point only |
| 6 | Flagged for TDG review |
| 7 | Already requires an ERAP |

Out of the 346 Primary Class 3 flammable liquids in PG I, II and III, SMEs identified 43 products that received Priority 1 ranking for potential inclusion in the ERAP program. Table 3 identifies the 43 highest priority substances to include in the ERAP program, including the criteria met.

Of 346 Primary Class 3 flammable liquids in PG I, II and III, 43 products received Priority 1 ranking for potential inclusion in the ERAP program.

Table 3: List of 43 Priority 1 Class 3, PG I, II and III Substances for ERAP Potential

| Criteria | Class 3, PG I |
|-------------------|---|
| 1, 2, 3, 4, 5 & 6 | UN1303, Vinylidene chloride, stabilized |
| 1, 2, 3, 4 & 6 | UN1218, Isoprene, stabilized |
| 1, 2, 3 & 4 | UN1167, Divinyl ether, stabilized UN1302, Vinyl ethyl ether, stabilized |
| 1, 2, 3 & 6 | UN1280, Propylene oxide |
| 1, 2, & 3 | UN2456, 2-Chloropropene |
| | UN1989, Aldehydes, N.O.S. |
| | UN1987, Alcohols, N.O.S. |
| Criteria | Class 3, PG II |
| 2, 3, 4, 5 & 6 | UN1275, Propionaldehyde |
| 2, 3, 4 & 6 | UN2056, Tetrahydrofuran |
| 2, 3 & 4 | UN1088, Acetal |
| 2, 3 & 6 | UN3022, 1,2-Butylene oxide, stabilized |
| 2 & 3 | UN2458, Hexadienes UN2460, 2-Methyl-2-butene |
| 3, 4 & 6 | UN1301, Vinyl acetate, stabilized |
| 3, 4 & 5 | UN2251, 2,5-Norbornadiene, stabilized UN2358, Cyclooctatetraene |
| 3 & 6 | UN1917, Ethylacrylate, stabilized UN2554, Methylallyl chloride |
| 3 & 4 | UN1247, Methyl methacrylate monomer, stabilized UN1304, Vinyl isobutyl ether, stabilized UN2309, Octadiene UN2352, Butyl vinyl ether, stabilized |
| 3 | UN1150, 1,2-Dichloroethylene UN1246, Methyl isopropenyl ketone, stabilized UN1919, Methyl acrylate, stabilized UN2277, Ethyl methacrylate UN2403, Isopropenyl acetate UN2838, Vinyl butyrate, stabilized |

| Criteria | Class 3, PG III |
|----------|---|
| 3, 4 & 6 | UN2055, Styrene monomer, stabilized |
| 3 & 4 | UN2048, Dicyclopentadiene |
| 3 & 6 | UN1133, Adhesives, flammable UN2303, Isopropenylbenzene |
| 3 | UN2227, n-Butyl methacrylate, stabilized UN2245, Cyclopentanone UN2283, Isobutyl methacrylate, stabilized UN2348, Butyl acrylates, stabilized UN2520, Cyclooctadienes UN2527, Isobutyl acrylate, stabilized UN2607, Acrolein dimer, stabilized UN2618, Vinyltoluenes, stabilized UN2947, Isopropyl chloroacetate UN3269, Polyester resin kit |

The SMEs identified other Class 3 PG I, II and III products that did not meet Priority 1 criteria, and ranked them as follows:

- Priority 2: 10 substances
- Priority 3: 22 substances
- Priority 4: 61 substances

A list of Priority 2 to 4 substances can be found in Annex E.

5.2.3 Risk Assessment

After identifying the 43 substances, members agreed on the need to assess other risk factors for flammable liquids presenting a high level of hazard. This exercise led to **Recommendation 20**.

At the time, specific information on volumes of dangerous goods transported by rail was not readily available for analysis. Since TDG did not normally collect commodity flow data, it was not possible to identify communities potentially at risk. Task Force members requested Transport Canada's help to collect data from various sources (including rail carriers and shippers) and to analyze and distribute the data to members.

The Task Force subsequently suggested that the TDG Directorate conduct an evaluation of the SME's findings, using a risk-based approach that would consider at least the following four factors:

- Mode of transport;
- Means of containment;
- Transportation volume, frequency and routing; and
- Other transport and public safety considerations.

Recommendation 20: When conducting the risk assessment to determine products that require an ERAP, consider:

- The Subject Matter Experts findings regarding the physical-chemical behaviours of Class 3 PG I and II Flammable Liquids as documented in the SME's Report dated April 12, 2015 (presented in April 2015 to the ERTF Subgroup 3), and
- Volume of product in transport by rail.

Transport Canada put together a geographic information systems (GIS) team to map transportation routes and volumes of flammable liquids. The team conducted the GIS mapping of the flow of liquids by rail once Transport Canada obtained the volume data for 2014 and 2015. The TDG Directorate was then able to hold a three-day workshop in July 2015 to conduct a comprehensive risk assessment of the 43 Class 3 products identified as Priority 1.

The Risk Assessment team was composed of internal and external stakeholders, and experts from key areas (i.e. industry, government, emergency response contractors, and railways). The team documented the methodology developed for the exercise, which can eventually be expanded to assess other classes of dangerous goods for potential inclusion in the ERAP program.

The Risk Assessment team concluded that Styrene monomer, stabilized (UN2055) required further assessment because of its polymerization characteristics. As a result, Transport Canada consulted industry to confirm volume and rail accident data. The data revealed low volumes of Styrene being transported by rail, few incidents involving the substance, and how the shipper prepares Styrene for transport, presented low concern. Based on the combination of these three factors, the team concluded that Styrene should not require an ERAP at this time.¹¹

The risk assessment revealed low concern over Styrene being transported by rail, due to low volumes, few incidents, and how the shipper prepares it for transport.

The Task Force agreed that the SMEs continue their analysis of flammable liquids to include combinations where Class 3 is the primary and/or the subsidiary class. This resulted in

Recommendation 21.

Recommendation 21: Subject Matter Experts are to continue the work on the technical categorizing of Class 3 Flammable Liquids based on physical-chemical behaviours, in the following priority order:

- Class 3 PG III
- Class 3(6.1)(8); Class 3(8)
- Class 4.3(3); Class 4.3(3)(8)
- Class 6.1(3); Class 6.1(3)(8); Class 6.1(4.3)(3)
- Class 8(3); Class 8(3)(6.1)

¹¹ [RDIMS 10894904](#) Report: Risk Assessment Flammable Liquids ERAP

Class 3 (primary or subsidiary class)

Following the same methodology they used to categorize Class 3, PG I, II and III flammable liquids, the SMEs identified the following 10 combinations with a Class 3 for technical categorization. They are regrouped in four sections:

- A. Class 3(6.1), Class 6.1(3)
- B. Class 3(6.1)(8), Class 6.1(3)(8), Class 8(3)(6.1)
- C. Class 3(8), Class 8(3)
- D. Class 4.3(3), Class 4.3(3)(8), Class 6.1(4.3)(3)

Although Class 3(6.1) was not originally identified in **Recommendation 21**, it was included. The results presented in the following four sections (A through D) identify the criteria SMEs used to categorize each substance and assign priority ranking to the 10 combinations with a Class 3.

Of the remaining 10 combinations with a Class 3 primary or subsidiary class, 47 products were identified as Priority 1 ranking for potential inclusion in the ERAP program.

A. Class 3(6.1), Class 6.1(3)

The SMEs used the same criteria as Class 3 PG I, II and III for Class 3(6.1) and Class 6.1(3); except Criteria 3. In this case, they used the same polymerization hazard, but included PG and SP 23, as shown in Table 4.

Table 4: Criteria Categorization for Class 3(6.1), Class 6.1(3)

| Criteria | Description |
|----------|---|
| 1 | Have an initial boiling point of 35°C or less (TDG Regulations) |
| 2 | Flash point less than or equal to -25°C (the monthly average temperature along the rail transportation corridors is above this) |
| 3 | Potential polymerization hazard and/or Class 3(6.1) PGI (PGI) and/or Special Provision 23 (SP23) TDG Regulations |
| | Potential polymerization hazard and/or Class 6.1(3) PGI (PGI) and/or Special Provision 23 (SP23) TDG Regulations |
| 4 | Can form explosive peroxides under certain conditions (e.g. exposure to elevated temperatures) |
| 5 | Requires special handling procedures (e.g. reacts with water, nitrogen padding, refrigeration, etc.) |
| 6 | Possible carcinogen |

Table 5 illustrates this categorization. In this case, the SMEs considered a substance Category 1 (orange) if it met at minimum the polymerization criteria, and/or Class 3(6.1) PG I and/or SP 23. This same condition applied to Class 6.1(3).

Table 5: Categorization and Priority Ranking Class 3(6.1), Class 6.1(3)

| Category | Category Description |
|----------|--|
| 1 | Polymerization <u>and/or</u> Class 6.1(3) PGI <u>and/or</u> Class 3(6.1) PGI and/or Special Provision 23 (may also meet any other criteria listed below) |
| 2 | Boiling Point only or Flash Point only or both with any other criteria except Category 1 criteria |
| 3 | Boiling Point only or Flash Point only or both |
| 4 | Any other criteria except Boiling Point, Flash Point and Category 1 criteria |
| 5 | Do not meet any of the above |
| 6 | Flagged for TDG review |
| 7 | Already requires an ERAP |

Out of 99 Class 3(6.1) and 75 Class 6.1(3), SMEs identified 2 products (one in each class) that ranked as Priority 1 for potential inclusion in the ERAP program that did not already require an ERAP (Table 6).

Table 6: List of two Priority 1 Class 3(6.1), Class 6.1(3) Substances for ERAP Potential

| Class 6.1(3) | Class 3(6.1) |
|---|--|
| UN2249, Dichlorodimethyl ether, symmetrical (Forbidden in Canada, not forbidden in the U.S.) | UN2478, Isocyanate solution, flammable, toxic, N.O.S. (PG III [SP23]) |

All Class 3(6.1), Class 6.1(3) substances that matched Priority 2 and 3 are already covered by an ERAP. A list of 10 Priority 4 substances can be found in Annex E.

B. Class 3(6.1)(8), Class 6.1(3)(8)

Following the same methodology, analysis of Class 3(6.1)(8), Class 6.1(3)(8), Criteria 3 included the same polymerization hazard criteria, PG and SP 23, and added Hazard Phrase (H314 and H330/331/332) as shown in Table 7.

Table 7: Criteria Categorization for Class 3(6.1)(8), Class 6.1(3)(8)

| Criteria | Description |
|----------|---|
| 1 | Have an initial boiling point of 35°C or less (TDG Regulations)* |
| 2 | Flash point less than or equal to -25°C (the monthly average temperature along the rail transportation corridors is above this)** |
| 3 | Potential polymerization hazard (P) and/or Class 3(6.1)(8) PGI (PGI) and/or SP23 TDG Regulations and/or Hazard Phrase H314 and H330/331/332 (H314/H330/331/332)*** |
| 4 | Can form explosive peroxides under certain conditions (e.g. exposure to elevated temperatures) |
| 5 | Requires special handling procedures (e.g. reacts with water, nitrogen padding, refrigeration, etc.) |
| 6 | Possible carcinogen |

*For the Class 3(6.1)(8) classification subgroup, the MSDS search has not produced any example of a substance with an initial boiling point less than or equal to 35°C. However, this criteria should still be kept in the analysis scheme since future substances may meet this criteria.

** For the Class 3(6.1)(8) classification subgroup, the MSDS search has not produced any example of a substance with a Flash Point less than or equal to -25°C. However, this criteria should still be kept in the analysis scheme since future substances may meet this criteria.

***H314: Causes severe skin burns and eye damage. H330: Fatal if inhaled. H331: Toxic if inhaled. H332: Harmful if inhaled.

Table 8 illustrates this categorization. In this case, the SMEs considered a substance Category 1 (orange) if it met at minimum the polymerization criteria, and/or Class 3(6.1)(8) PG I and/or SP 23 and/or Hazard Phrase H314 and H330/331/332. This same condition applied to Class 6.1(3)(8).

Table 8: Categorization and Priority Ranking Class 3(6.1)(8), Class 6.1(3)(8)

| Category | Category Description |
|----------|---|
| 1 | Polymerization <u>and/or</u> Class 3(6.1)(8) , PGI <u>and/or</u> Class 6.1(3)(8) PGI and/or Special Provision 23 and/or Hazard Phrase H314 and H330/331/332 (may also meet any other criteria listed below) |
| 2 | Boiling Point only or Flash Point only or both with any other criteria except Category 1 criteria |
| 3 | Boiling Point only or Flash Point only or both |
| 4 | Any other criteria except Boiling Point, Flash Point and Category 1 criteria |
| 5 | Do not meet any of the above |
| 6 | Flagged for TDG review |
| 7 | Already requires an ERAP |

Out of 6 Class 3(6.1)(8) and 26 Class 6.1(3)(8), SMEs identified 1 product that ranked as Priority 1 for potential inclusion in the ERAP program that did not already require an ERAP (Table 9).

Table 9: List of one Priority 1 Class 3(6.1)(8), Class 6.1(3)(8) Substances for ERAP Potential

| Class 3(6.1)(8) | Class 6.1(3)(8) |
|---|-----------------|
| UN3286, flammable liquid, toxic, corrosive, N.O.S. (PGII) | 0 |

Note: The number of substances indicates single combinations depending on its PG.

All Class 6.1(3)(8) substances that fell into the Priority 1 category already have an ERAP requirement.

All Class 3(6.1)(8), Class 6.1(3)(8) substances that matched Priority 2, 3 or 4 are already covered by an ERAP.

C. Class 3(8), Class 8(3)

Following the same methodology, in the case of Class 3(8) and Class 8(3), Criteria 3 included the same polymerization hazard criteria and SP 23, but also included corrosivity (pH) details or Hazard Phrase H314/R35, as shown in Table 10.

Table 10: Criteria Categorization for Class 3(8), Class 8(3)

| Criteria | Description |
|----------|---|
| 1 | Have an initial boiling point of 35°C or less (TDG Regulations)* |
| 2 | Flash point less than or equal to -25°C (the monthly average temperature along the rail transportation corridors is above this) |
| 3 | Potential polymerization hazard and/or pH ≤ 2.5 or ≥ 10.0 or H314/R35** severe skin burn or eye damage and/or SP23 TDG Regulations*** |
| 4 | Can form explosive peroxides under certain conditions (e.g. exposure to elevated temperatures) |
| 5 | Requires special handling procedures (i.e. nitrogen padding (N ₂), water reactive producing toxic gases (W), refrigeration) |
| 6 | Possible carcinogen |

*For the Class 3(8) classification subgroup, the MSDS search identified 4 substances meet this criteria.

For the Class 8(3) classification subgroup, the MSDS search has not produced any example of a substance with an initial boiling point less than or equal to 35°C. However, this criteria should still be kept in the analysis scheme since future substances may meet this criteria.

**Hazard phrases H314: Causes severe skin burns and eye damage. R35: Causes severe burns.

**(1) A consignor of these dangerous goods must include, except for UN1005, ANHYDROUS AMMONIA, the words "toxic by inhalation" or "toxic — inhalation hazard" or *toxique par inhalation* or *toxicité par inhalation* in the following places, unless the words are already part of the shipping name.

Table 11 illustrates this categorization. In this case, SMEs considered a substance Category 1 (orange) if it met at minimum polymerization and/or high corrosivity and/or SP 23.

Table 11: Categorization and Priority Ranking Class 3(8), Class 8(3)

| Category | Category Description |
|----------|---|
| 1 | Polymerization and/or pH ≤ 2.5 or ≥ 10.0 or H314/R35 severe skin burn or eye damage and/or SP23 (may also meet any other criteria listed below) |
| 2 | Boiling Point only or Flash Point only or both with any other criteria except Category 1 criteria |
| 3 | Boiling Point only or Flash Point only or both |
| 4 | Any other criteria except Boiling Point, Flash Point and Category 1 criteria |
| 5 | Do not meet any of the above |
| 6 | Flagged for TDG review |
| 7 | Already requires an ERAP |

Out of 67 Class 3(8) and 33 Class 8(3), SMEs identified 32 Class 3(8) products and 12 Class 8(3), that ranked as Priority 1 for potential inclusion in the ERAP program that did not already require an ERAP (Table 12 and 13).

Table 12: List of 32 Priority 1 for Class 3(8) Substances for ERAP Potential

| Class 3(8) | |
|---|---|
| 1. UN1221, Isopropylamine | 16. UN2266, Dimethyl-N-propylamine |
| 2. UN1297 PGI, II*, Trimethylamine, aqueous solution | 17. UN1106 PGII, III*, Amylamines |
| 3. UN1154, Diethylamine | 18. UN1125, n-Butylamine |
| 4. UN1277, Propylamine | 19. UN1160, Dimethylamine, aqueous solution |
| 5. UN2270, Ethylamine aqueous solution, with not less than 50% but not more than 70% Ethylamine | 20. UN1214, Isobutylamine |
| 6. UN2733 PGII, Amines, flammable, corrosive, N.O.S. | 21. UN1235, Methylamine, aqueous solution |
| 7. UN1158, Diisopropylamine | 22. UN1296, Triethylamine |
| 8. UN1922, Pyrrolidine | 23. UN2260, Tripropylamine |
| 9. UN1305, Vinyltrichlorosilane, stabilized | 24. UN2276, 2-Ethylhexylamine |
| 10. UN1289 PGIII, Sodium methylate, solution in alcohol | 25. UN2361, Diisobutylamine |
| 11. UN1815, Propionyl chloride | 26. UN2379, 1,3-Dimethylbutylamine |
| 12. UN3274, Alcoholates solution, N.O.S. in alcohol | 27. UN2399, 1-Methylpiperidine |
| 13. UN2353, Butyryl chloride | 28. UN2493, Hexamethyleneimine |
| 14. UN2985, Chlorosilanes, flammable, corrosive, N.O.S. | 29. UN2610, Triallylamine |
| 15. UN1198, Formaldehyde, solution, flammable | 30. UN2684, Diethylaminopropylamine |

*Note: Substance counts twice; once for each PG

Table 13: List of 12 Priority 1 Class 8(3) Substances for ERAP Potential

| Class 8(3) | |
|------------|---|
| 1. | UN1767, Diethyldichlorosilane |
| 2. | UN2986, Chlorosilanes, corrosive, flammable, N.O.S. |
| 3. | UN2218, Acrylic acid, stabilized |
| 4. | UN1779, Formic acid with more than 85% acid |
| 5. | UN2051, 2-Dimethylaminoethanol |
| 6. | UN2264, Dimethylcyclohexylamine |
| 7. | UN2357, Cyclohexylamine |
| 8. | UN2685, N, N-Diethylethylenediamine |
| 9. | UN2734 PGII, Amines, liquid, corrosive, flammable, N.O.S. |
| 10. | UN2920, PGII, Corrosive liquid, flammable, N.O.S. |
| 11. | UN3463, Propionic acid with not less than 90% acid |
| 12. | UN3470, Paint related material, corrosive, flammable |

All Class 3(8), Class 8(3) substances that matched Priority 2 or 3 are already covered by an ERAP. A list of three Priority 4 substances can be found in Annex E.

D. Class 4.3(3), Class 4.3(3)(8), Class 6.1(4.3)(3)

Following the same methodology, in the case of Class 4.3(3), Class 4.3(3)(8), Class 6.1(4.3)(3), Criteria 3 included the polymerization hazard criteria and/or SP 23, and/or Hazard Phrase H314 and H330/331/332, as shown in Table 14.

Table 14: Criteria Categorization for Class 4.3(3), Class 4.3(3)(8), Class 6.1(4.3)(3)

| Criteria | Description |
|----------|---|
| 1 | Have an initial Boiling point of 35°C or less (TDG Regulations) |
| 2 | Flash point less than or equal to -25°C (the <u>monthly average temperature</u> along the rail transportation routes is above this)** |
| 3 | Potential polymerization hazard (P) and/or SP23 TDG Regulations* and/or Hazard Phrase H314** and H330/331/332 |
| 4 | Can form explosive peroxides under certain conditions |
| 5 | Requires special handling procedures (i.e. reacts with water, nitrogen padding, refrigeration, etc.) |
| 6 | Possible carcinogen |

*(1) A consignor of these dangerous goods must include, except for UN1005, ANHYDROUS AMMONIA, the words "toxic by inhalation" or "toxic — inhalation hazard" or *toxique par inhalation* or *toxicité par inhalation* in the following places, unless the words are already part of the shipping name.

**Hazard phrases H314: Causes severe skin burns and eye damage / R35: Causes severe burns.

All Class 4.3(3), Class 4.3(3)(8) and Class 6.1(4.3)(3) with substances that fell into the Priority 1, 2, 3 or 4 category already have an ERAP requirement.

5.2.4 Ensuring Effective Monitoring

Transportation trends change over time, which affects the volumes and products being transported and can change the level of risk. A risk assessment needs to be responsive to shifting and emerging trends.

Targeting the high risk dangerous goods transported in or through Canada requires effective monitoring. This will help Transport Canada detect changes in transportation trends early, and put timely mitigation measures in place where required. This led the Task Force to issue **Recommendation 22**.

Recommendation 22: Continue the mapping work undertaken by TDG on transportation routes and volumes of Class 3 Flammable Liquids and include additional products that may be transported in large volumes by rail in tank cars.

The intent of **Recommendation 23** is to monitor changes in trends as they evolve. This will help TDG adjust the ERAP program as necessary to ensure it meets its objective of upholding public safety.

Recommendation 23: Establish a performance evaluation program to periodically assess the effectiveness of the ERAP program for Flammable Liquids, taking into consideration changes such as transportation trends, and consider amending the requirements to the products covered by ERAPs to ensure policy objectives are met.

5.2.5 Moving Forward

The SME's methodology allowed them to analyze and prioritize hazards of over 663 flammable liquids products. The methodology is now well documented, and can be applied to future analysis of other classes of products and become a valuable component of a TDG risk-based strategy.

The transportation of dangerous goods industry and its inherent risks are ever changing. Collecting additional data such as rail volumes and commodity flows, and ensuring more effective monitoring will enhance TDG's response and mitigation capacity to detect emerging risks early and adopt proactive mitigation measures.

5.3 Enhance Emergency Response, Preparedness and Training

SUMMARY

- Large scale flammable liquid rail incidents require a complex and coordinated response involving specialized teams and equipment. Since the risk factors specific to these incidents are very different from structural fires, first responders benefit from access to specialized resources to help mitigate such incidents safely.
- During large scale incidents, on-scene agencies and response personnel need to understand each other's roles and responsibilities and recognize the authority of a single Incident Commander designated by the AHJ.
- The ERTF supports a standard approach to Incident Command for large scale incidents using a Unified Command Structure that includes representatives from various response organizations advising the Incident Commander.
- Establishing an ICS and developing an Incident Action Plan will improve the coordination and efficiency of response operations.
- The coordination and management of an incident response can be further improved by public and private response organizations participating in joint training and exercises to network and build trust ahead of incidents.
- Emergency planners rely on risk information to identify sound mitigation measures and levels of assistance required for such incidents.
- The severity of these incidents can increase for hours with little possibility of achieving control. Planners and local authorities must understand risk factors and incident timelines to prevent them from applying undue pressure on first responders to opt for an offensive strategy, when the safest option may be non-intervention.
- A proposed multi-level training strategy addresses the lack of a specialized firefighter training standard and program specific to flammable liquid rail incidents.
- Key competencies are identified for the following three levels: awareness (basic) level, operational (hands-on) level and specialized level training.

Background

In recent years, there has been a significant volume increase of flammable liquids transported by rail, called High-Hazard Flammable Trains (HHFT), moving through hundreds of Canadian communities. After the rail incident in Lac-Mégantic, first responders want to be better prepared and equipped to respond to such a large scale flammable liquid incident.

Most transportation of dangerous goods incidents are managed at the local level by municipal authorities. First responder capacity varies widely, and in some cases, in remote areas there is little or no capacity for emergency response to occur in a timely manner. Private sector organizations like the railways, shippers and emergency response contractors may have significant resources that can help local responders.

The complexity of the response required for large scale rail incidents involving dangerous goods can rapidly overwhelm a local jurisdiction's capacity, and local responders rely on additional assistance from multidisciplinary teams. In recent cases, approximately 50 agencies could be on-site at the same time, in addition to first responders. There are lessons to learn from these cases to better prepare responders to face the challenges of incident management.

Firefighters are trained to respond rapidly to protect life and property. Rail incidents involving flammable liquids increase risks for first responders and the public. They also require special fire control tactics, equipment and supplies that are unknown or unavailable to most firefighters.

Canada needs a comprehensive and specialized training program that will allow first responders, other local emergency forces, industry responders as well as government advisors, to adopt a safer and more effective approach to managing rail incidents involving flammable liquids.

Being well informed about specialized assistance that can be made available could reassure communities located near railways that they do not have to change their existing emergency service levels to meet these special resource requirements. The following sections will provide more details about what this information entails.

5.3.1 Case Studies: Response Coordination

The ERTF examined four case studies to better understand the challenges first responders face and lessons learned in applying Incident Command.

Case Study: Mississauga, Ontario (1979)

On November 10, 1979, a 106-car train derailed. One of the tank cars carrying propane exploded, resulting in a raging fire. Authorities decided to evacuate the area because other tank cars were carrying chlorine. This was one of the largest peace time evacuations in history, relocating about 220,000 residents.

The basis for the current ERAP program originated with the 1981 Grange Commission Report on the Mississauga Railway Accident. Justice Grange's comprehensive review addressed issues that the ERTF is considering. While the Grange Commission did not have a mandate to inquire into the management of that incident by first responders or municipal officials, it did recognize the need for a structured system that included all organizations such as the railways and shippers emergency response teams. Many of the recommendations, such as the need for an incident command protocol, are as relevant today as they were in 1981 when the report was released.¹²

Case Study: Elliot Lake, Ontario (2012)

On June 23, 2012, more than 20 people were injured and two people died, when the roof of Elliot Lake, Ontario's Algo Centre Mall collapsed. The Elliot Lake Commission of Inquiry indicated that community and first-response leaders were well-meaning, but often appeared confused about their roles and responsibilities. This contributed to the lack of effectiveness and mismanagement of rescue efforts. It also resulted in a number of recommendations to change and improve the Ontario Incident Management System (IMS). Recommendations include the need to:

- clarify the understanding of ICS versus IMS, in particular the concept of Unified Command; and
- identify a single Incident Commander having overall responsibility.¹³

Case Study: Lac-Mégantic, Quebec (2013)

On July 6, 2013, a parked crude oil unit train rolled away. 62 of the 72 tank cars derailed, which released about 6 million litres of petroleum crude oil and fire from multiple tank cars. 47 people died and the town's centre was destroyed. First responders faced many challenges, including incident command. "More than 1000 firefighters from 80 different municipalities in Quebec, and from 6 counties in the state of Maine, participated in the response, which was reported to be the largest fire response in recent Quebec history. At any given time, approximately 150 firefighters were on-site."¹⁴ Some firefighter services used different response protocols and brought in equipment that was not compatible. To further complicate the coordination and increase pressure on the Incident Commander, responders found themselves under intense media attention.

12 Grange Commission 1980 - Report On The Mississauga Railway Accident- <http://epe.lac-bac.gc.ca/100/200/301/pco-bcp/commissions-ef/grange1981-eng/grange1981-eng.htm>

13 The Elliot Lake Inquiry: Policy Roundtable Part 2 – Emergency Response http://www.attorneygeneral.jus.gov.on.ca/inquiries/elliottlake/transcripts/pdf/dec2013/12-05-2013_Ell.pdf

14 TSB Railway Investigative Report R13D0054, p. 55 <http://www.tsb.gc.ca/eng/rapports-reports/rail/2013/r13d0054/r13d0054.asp>

Case Study: Gainford, Alberta (2013)

The Gainford train derailment occurred on October 19, 2013. A number of tank cars derailed, including cars containing propane or petroleum crude oil, which required the evacuation of approximately 100 local residents for four days. Parkland County commissioned a review of the incident to assess how the incident was managed. The report concluded that the ICS used on the scene was a major concern. The following are the key elements of concern the report highlighted:

“An overriding/lapping issue is better understanding and utilizing the Incident Command System (ICS) that addresses key issues of concern/opportunity:

- Unified Command, what is it, how it should work and why it did not, at Gainford.
- The roles, responsibility, authority, facilities and communications among the Emergency Operations Center and the incident and reception center commands and departments, in a response mode.
- How to interact/serve the community with timely, useful, consistent, and accurate information.
- Tracking/accountability and work period planning for responders.”¹⁵

These case studies share many common themes. These include the need to use a common ICS that all responding organizations are trained in, and a Unified Command Structure where key stakeholders provide input and recommendations on developing the Incident Action Plan the Incident Commander will follow.

During a large scale incident, the number of organizations involved may have different roles and responsibilities, so it is critical to clearly identify their roles and responsibilities in the emergency. They also need to be well understood in the broader context of emergency response.

5.3.2 Roles and Responsibilities

The ERTF identified roles and responsibilities it could expect each government agency and private sector organization to fill at a railway dangerous goods incident. To further clarify roles and responsibilities across jurisdictions during emergency response, the ERTF developed a table (Annex F), based on participant information.

Making these roles and responsibilities known is necessary if an ICS structure and process will succeed in managing the incident. All parties involved in a large scale dangerous goods incident must work in a coordinated manner and understand the roles and responsibilities of each organization. The ERTF articulated the need for Transport Canada to support this key component by:

- Defining TDG inspectors and RMS roles and responsibilities; and
- Making these well known to first responders, private contractors and the public sector.

When assisting an Incident Commander, it is important to understand how the different organizations and agencies at incident sites can work towards mitigating the effects of the incident (**Recommendations 7, 9, 10 and 11**). This is possible using a Unified Command Structure.

Recommendation 7: Require ERAP Technical Advisors to complete, at a minimum, the following ICS Canada incident command courses, appropriate to their roles in an incident:

- I-100 Introduction to ICS
- I-200 Basic ICS for Single Resources and Initial Action Incidents
- I-300 Intermediate ICS for Expanding Incidents

Recommendation 9: Require railway companies to have company managers, supervisory staff and contractor supervisors, who attend dangerous goods incidents, complete at a minimum, the following ICS Canada incident command courses, appropriate to their roles in an incident:

- I-100 Introduction to ICS
- I-200 Basic ICS for Single Resources and Initial Action Incidents
- I-300 Intermediate ICS for Expanding Incidents

Recommendation 10: Include in the Transport Canada Training Program for TDG Inspectors and Remedial Measures Specialists the following ICS Canada courses, appropriate to their role in an incident:

- I-100 Introduction to ICS
- I-200 Basic ICS for Single Resources and Initial Action Incidents
- I-300 Intermediate ICS for Expanding Incidents

Recommendation 11: Review and define the roles and responsibilities of TDG Inspectors and RMS to include consultation and advice with the Incident Commander to help in developing an Incident Action Plan. Transport Canada should make those roles and responsibilities well known to both the public sector and private sector as part of their Awareness and Outreach Program.

The ERTF also made **Recommendation 14** that Transport Canada complete and publish guidance documents for the benefit of first responders among others. Emergency planners and coordinators would also benefit from such information tools to enhance local emergency response planning.

Recommendation 14: Complete the development of and production of the following concept documents:

- Community Emergency Planning Guide for Dangerous Goods
- The Emergency Planning and Response Cycle Chart
- ICS Structure Using Unified Command for Railway Dangerous Goods Incidents Chart
- Railway Dangerous Goods Incidents – Roles and Responsibilities Table and Chart
- Flammable Liquid (TDG) Emergency Response Chart - A Disciplined Approach
- The Disciplined Approach work sheets for developing an Incident Action Plan (IAP) with ICS
- Provide a dangerous goods lexicon with standard names and terminology

The ERTF has already begun to document and share best practices to help further develop these guidance and information tools, such as the:

- Emergency Planning and Response Cycle Chart (Figure 6);
- Railway Dangerous Goods Incidents – Roles and Responsibilities Table and Chart (Annex F); and
- Disciplined Approach Chart (Annex G).

5.3.3 Who's in Charge?

At a policy level, the question is "What authority/responsibility does each agency have at these incidents?" At a strategic level, the question is "Who should be the Incident Commander?"

The variety of emergency situations first responders attend, combined with the low frequency/high risk nature of dangerous goods incidents, make it unreasonable to expect an Incident Commander from a local AHJ to be aware of the complex factors he or she must consider in major dangerous goods incidents. Several agencies/organizations will provide expertise and specialized equipment to assist. This is why a Unified Command approach is necessary at these emergencies.

Transport Canada has the authority to regulate railways and the transportation of dangerous goods in Canada, but does not take charge of dangerous goods incidents. Within Canada's constitutional framework, the provincial and territorial governments and local authorities are responsible for providing the first response to most emergencies. Responders must recognize the local AHJ as the authority who designates the Incident Commander and answers the question "Who's in Charge?"

LAC-MÉGANTIC

1,000 firefighters from 80 Quebec municipalities and 6 counties in Maine participated in the response;

956 police officers were deployed; and

21 experts were involved.

5.3.4 Unified Command Structure

Since the concept of a Unified Command Structure is not always well understood or applied, there can be confusion as to how to make and act on command decisions. Under the ICS, there are several approaches to the structure of the command, three of which are outlined below.

1. Incident Command from Single Primary Agency

In many routine emergencies, the ICS reflects first responders' understanding that the agency with primary responsibility will assign the Incident Commander. The other agencies will support the Incident Commander's Incident Action Plan. Examples are:

- Structural Fire: Fire Service has primary responsibility and assigns the Incident Commander – Police and Emergency Medical Services (EMS) provide support
- Large Public Demonstration/Disorder: Police Service has primary responsibility and assigns the Incident Commander - Fire and EMS provide support
- Multiple Sick/Injured Patients: EMS has primary responsibility and assigns the Incident Commander – Police and Fire provide support

2. Unified Command Structure with Multiple Primary Agencies

Some incidents extend beyond a single jurisdiction and require coordinated response efforts. An example would be large public demonstrations where a number of police services are involved and no single service has overall responsibility. In these cases, senior officers from the police services would develop an Incident Action Plan, based on a consensus of representatives of the affected jurisdictions.

3. Unified Command Structure with various Agencies (Unified Command Post)

Some incidents fall within a single jurisdiction, but are complex and require the advice and recommendations from a number of different entities representing the AHJ, other government agencies, and the private sector. These incidents benefit from using a Unified Command Structure where representatives with appropriate agency authority are "All in the same Tent". In this type of Unified Command Structure, advisors recognize that there is still a single Incident Commander from the AHJ, and this does not represent "Command by Committee" decision making.

Railway dangerous goods incidents should work under a Unified Command Structure; with the clear understanding the Incident Commander from the AHJ has the ultimate responsibility for command decisions and implementing the Incident Action Plan. The Unified Command Structure can also be named a “Unified Command Post,” which more accurately describes the command structure as inclusive of various organizations but with a single Incident Commander, usually from the AHJ.

The Incident Commander from the AHJ has the ultimate responsibility for command decisions and implementing the Incident Action Plan.

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Canada’s provincial and territorial authorities do not currently have a standardized approach to ICS for large scale incidents. This may lead to coordination challenges including delays in planning and decision making that could put responders and the public at risk.

“... I am so proud we were able to introduce the concept of ICS/IMS at the national level to streamline the response to emergencies such as our focus.”

- ERTF Member

Supporting the use of a common ICS that all responding organizations are trained in and follow, will improve coordination and will help responders to effectively manage the incident. Also requiring that ERAP documents identify ICS and Unified Command Structure as part of the planning requirements for incident responses formalizes this concept (**Recommendation 5 and 6**).

Recommendation 5: Support the concept of a standardized ICS, based on the ICS Canada program and that the Incident Commander in charge of a railway or other dangerous goods incident will be a representative of the local authority having jurisdiction working within a unified command structure.

Recommendation 6: Require ERAP documents to include identification of ICS and a Unified Command structure as part of the planning requirements for response to incidents.

5.3.5 Incident Command System Best Practices

Since Transport Canada has limited legislative authority over many of the organizations involved in emergency response and management, it must incorporate outreach and awareness in ICS, as well as training and exercises in any plans to improve emergency response. Interactions and lessons learned during these training exercises are the most effective ways to gain trust and cooperation between the various parties.

Recommendation 13: Work in collaboration with Public Safety Canada, Senior Officials Responsible for Emergency Management (SOREM), Railway Association of Canada (RAC), Canadian Association of Petroleum Producers (CAPP), Canadian Fuels Association (CFA), Aboriginal Firefighters Association of Canada (AFAC) and the Canadian Association of Fire Chiefs (CAFC) as well as other stakeholders in a comprehensive outreach and education program that provides information and training/reference materials for dangerous goods ICS “best practices”, as well as recommending the use of ICS Canada training courses for First Responders.

To increase awareness and as part of the Communication and Outreach Strategy, it is further recommended that these documents be developed and completed by Transport Canada to be distributed in conjunction with the 2016 Emergency Response Guidebook to all first response agencies and community/First Nations emergency planners in Canada.

Many ERPs could be used /referenced during rail incidents involving flammable liquids, including the municipal ERP, a railway ERP, the ERAP as well as others such as provincial/territorial or environmental ERPs. Understanding how to integrate each of these plans and what each provides in terms of resources, is important for the unified command process.

The ERTF made **Recommendation 30** to address the integration of the railway ERP with the municipal ERP and the ERAP.

Recommendation 30: Require rail carriers to share emergency response and preparedness information pertaining to potential dangerous goods incidents with emergency planners, first responders, CANUTEC and other agencies, to increase cooperation and coordination at dangerous goods incidents.

The ERTF also believes that the information in railway ERPs should be immediately available to CANUTEC during an emergency incident. Since first responders benefit from CANUTEC specialists’ analysis of products involved in incidents, any additional support such as important information in ERPs, could help eliminate delays and support a more efficient and coordinated response.

Recommendation 8: Require railway companies to provide copies of their Emergency Response Plans to the TDG Directorate, with details on how the ICS System is incorporated within those plans for dangerous goods incidents and, that the information in the railway Emergency Response Plans is immediately available to CANUTEC during an emergency incident.

5.3.6 When the AHJ cannot provide Incident Command Presence

Much of Canada’s rail lines pass through remote areas. In other more populated regions of Canada, there are small communities along these rail lines that have limited resources and are not capable of dealing with a major emergency. In these situations, the railways may be the only organization with the capacity to initiate an emergency response and organize the ICS for an incident involving dangerous goods.

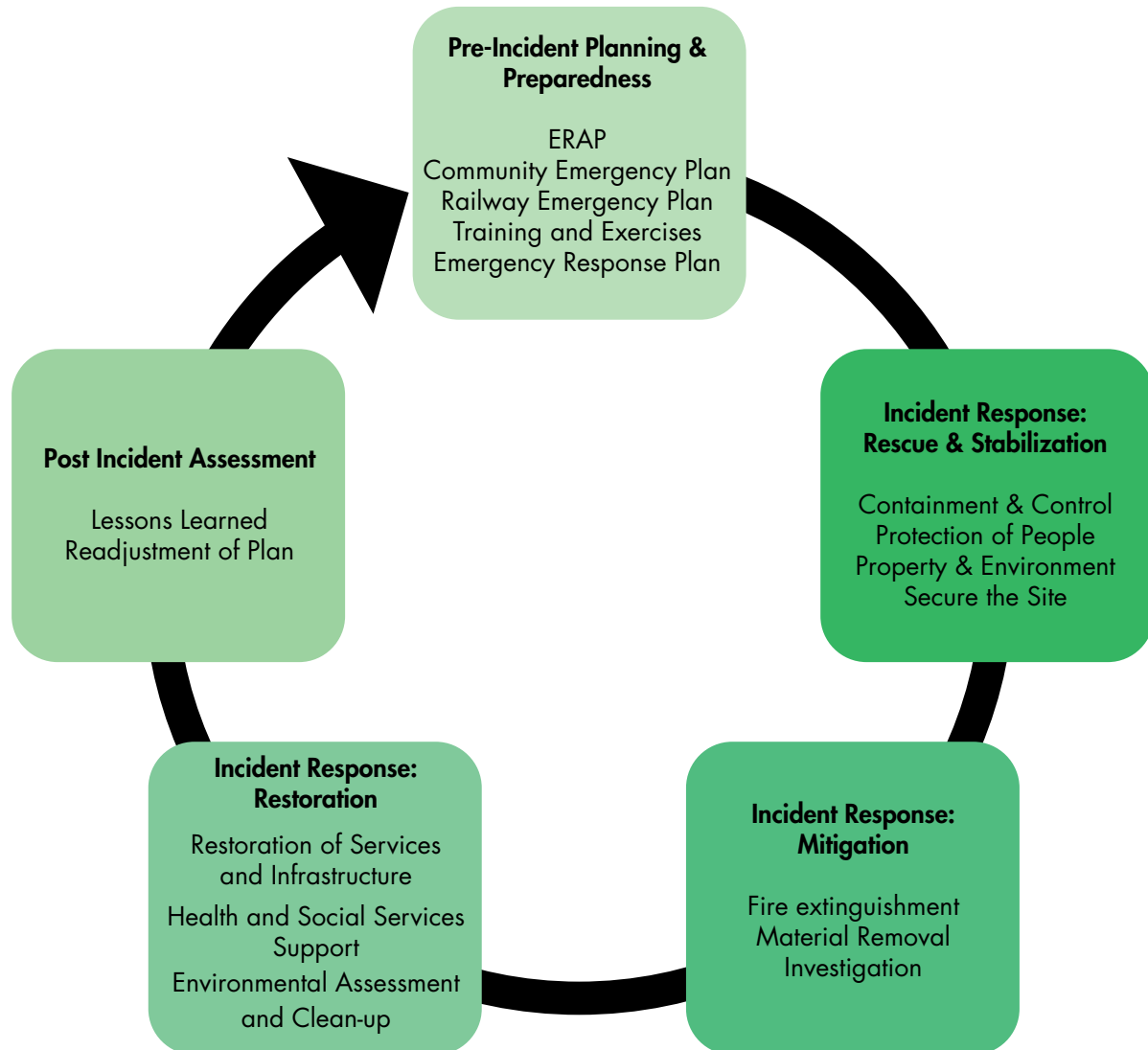
The Canadian Class 1 Rail Carriers have extensive experience and capacity to manage incidents in cooperation with ERAP holders, emergency response contractors and others. The priorities during a response at remote incidents remain the same: Protect life, property and the environment.

In these remote areas, the provincial or territorial government would act as AHJ. Since the AHJ cannot assign an Incident Commander as there are no local first responders, the railways would manage the incident. The AHJ would oversee the response operations the railways provide, to ensure they comply with health, safety and environment regulations. This is necessary to maintain public confidence and ensure there is adequate government oversight of all dangerous goods incidents.

At the federal level, response assistance from a TDG inspector or RMS is appropriate in any case where there is a release of dangerous goods that may affect public safety or the environment. While a TDG inspector or RMS does not fill the role of an Incident Commander, they can provide advice and oversight to ensure responders take safe and effective action.

As an incident progresses to different stages, from emergency response to investigation and then to remediation and recovery, the primary agency responsible and therefore the Incident Commander may change. This change must follow a formal and documented transfer process and be made known to all parties at the time it occurs. Figure 6 illustrates the five different phases of the incident management cycle, from Planning to Post Incident Assessment.

Figure 6: Emergency Planning and Response Cycle Chart



Site Assessment for a Risk-based Response

First responders need to recognize the risk factors inherent to the type of tank car, its condition and behaviour; fire spread, explosion, toxic gases and site conditions. Knowing what specific factors and conditions to look for in a rail incident involving flammable liquids can be challenging and something most first responders are not familiar with. To assist in this evaluation, Imperial Oil (supported by the Chemistry Industry Association of Canada and the Canadian Fuels Association) developed the Disciplined Approach to Emergency Response Chart (Annex G), a tool specific to these incidents.

Risk-based response is defined as a systematic process through which responders apply facts, science and circumstances of an incident to:

- analyze a problem involving hazardous materials;
- assess the hazards;
- evaluate the potential consequences; and
- determine appropriate response actions.

The ERTF identified A.P.I.E. and D.E.C.I.D.E. as useful risk-based response methodologies to help incident commanders evaluate safety risks before choosing an intervention strategy.

The acronym A.P.I.E. describes this methodology as:

1. **A**ssess the incident
2. **P**lan the response
3. **I**mplement the response
4. **E**valuate the progress of the response

The acronym D.E.C.I.D.E. is another incident assessment methodology used for decision making in hazardous materials emergencies. It consists of six steps:

1. **D**etect hazardous materials presence;
2. **E**stimating likely harm without intervention;
3. **C**hoosing response objectives;
4. **I**dentifying actions options;
5. **D**oing the best options and
6. **E**valuating progress.

The Incident Commander can use the Disciplined Approach Chart with either the A.P.I.E. or the D.E.C.I.D.E. methodology. Incident size-up starts the process of assessing the hazards and evaluating the potential risks at a HHFT incident.

As part of a risk-based response process, understanding the behaviour of the MOC involved, its contents, the incident's location and surrounding exposures are critical elements in determining whether responders should and can safely intervene. One example of high risk MOC behaviour during incidents involving tank cars containing flammable liquids is the potential for a Heat Induced Tear (HIT).

Understanding the behaviour of the MOC involved, its contents, the incident's location and surrounding exposures are critical elements in determining whether responders should and can safely intervene.

A HIT is a tank car failure. Under the intense heat of a fire, non-pressure tank cars containing flammable liquids will tear, generally at the top, causing the product to suddenly vent at high speed, generate a fireball and an intense heat wave, and in some cases release toxic gases. Anyone too close could suffer serious or fatal burns.

HITs have been known to occur within 20 minutes to several hours after tank cars carrying flammable liquids have derailed. A tank car with a HIT may still contain product that can burn or leak for 8 hours or more. During this critical time, first responders must focus on securing the scene and exercising extreme caution until the fire intensity declines and the situation has stabilized. Any other action could put both first responders and the public at risk.



Photo of a ruptured tank car taken at Lac-Mégantic, in July 2013, by the Farmington (Maine) Fire Rescue Department¹⁶.

Analyzing the Incident

The risk of a HIT underlines the importance for the Incident Commander to consider the Incident Timelines when analyzing the incident. Rail incidents involving flammable liquids have timelines that are much longer than typical fire incidents, where responders would normally use an offensive strategy.

This means that incident severity can continue to increase for hours, with little or no possibility of achieving fire control. This is why the Incident Commander must understand the importance of using either a non-intervention or a defensive strategy when developing the Incident Action Plan.

The Pipeline and Hazardous Materials Safety Administration (PHMSA) Stress/Breach/Release Behaviours (Figure 7) illustrates the progression of tank car behaviours during a HHFT incident over 8 hours or more.¹⁷ The timeline illustrates possible considerations for response options at various points in time; from non-intervention, defensive and offensive strategies.

¹⁶ This photo is used with the authorization from the Farmington (Maine) Fire Rescue Department.

¹⁷ Transportation Rail Incident Preparedness & Response: Flammable Liquid Unit Trains (TRIP-R) program developed by the U.S. Department of Transportation - Pipeline and Hazardous Materials Safety Administration (DOTPHMSA)

Figure 7: Stress/Breach/Release Behaviours

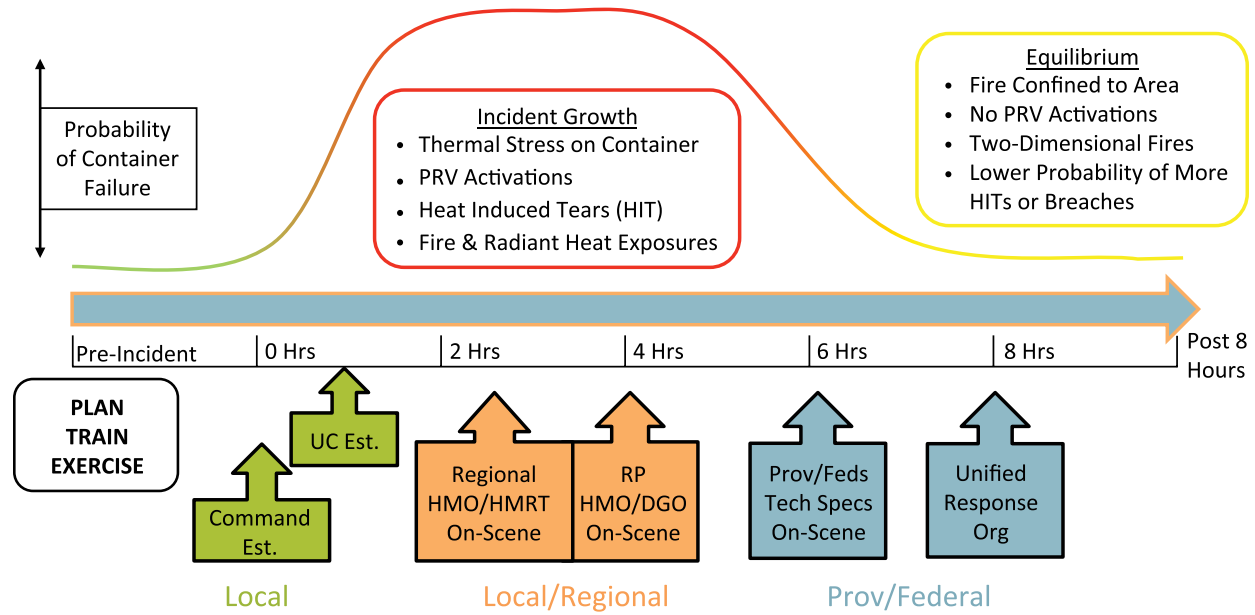
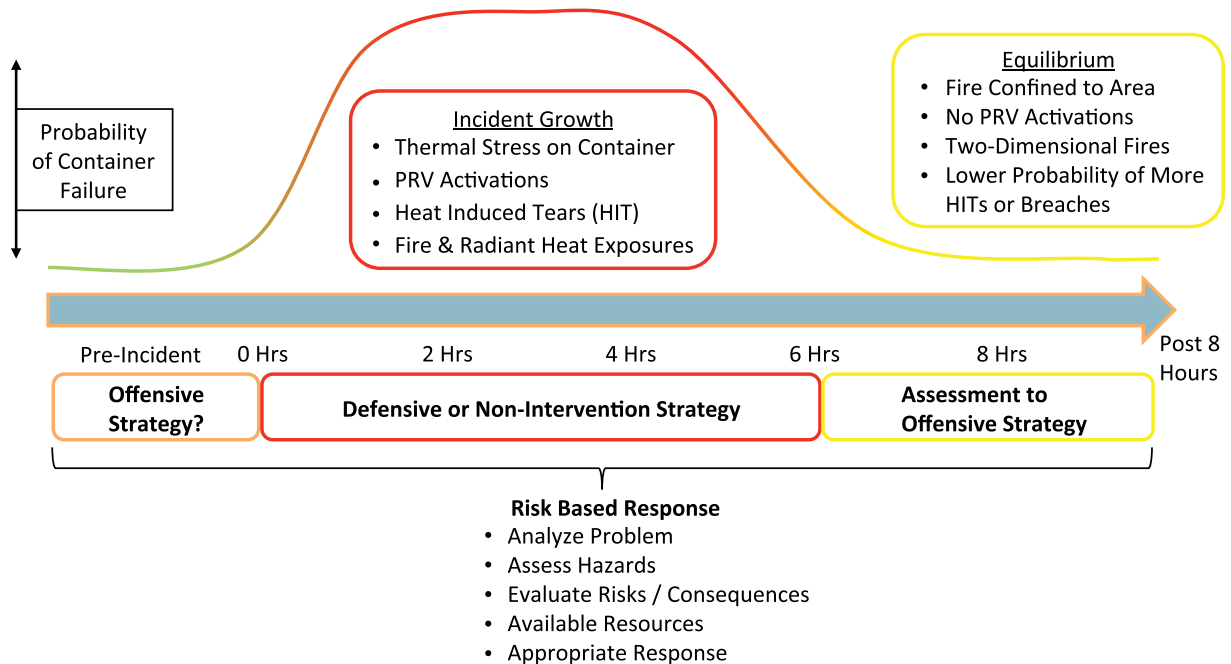


Figure 8: Problem vs. Response Timeline



The PHMSA Problem versus Response Timeline (Figure 8) illustrates the same 8-hour progression of an HHFT incident as well as the possible considerations for resource (local, provincial, federal) availability during this time. It shows the growth of the incident intensity (fire growth and container failure potential) and over time achieving a 'steady state' of fire behaviour and a decline in fire intensity to a state of equilibrium.

It is important for an Incident Commander to recognize the risk factors specific to rail incidents involving flammable liquids in order to choose the safest and most appropriate response strategy, which may include non-intervention. Municipal officials should also recognize these risk factors and intervention strategies because it would help them to:

- better understand an Incident Commander's decision to intervene or not; and
- refrain from putting undo pressure on first responders to intervene in certain situations, when in fact the safest and most appropriate option might be non-intervention.

TDG inspectors or RMS understand the ERAP program and its requirements and work closely with ERAP holders. This is why their primary role and focus during an emergency incident should be on providing help, advice and technical support.

Local officials need to recognize the risk factors specific to flammable liquids incidents and refrain from putting undo pressure on first responders. The safest and most appropriate option might be non-intervention.

It is also important to recognize that they have an oversight role. To keep everyone safe and to avoid impeding on or causing delays to the emergency response operations, any inspection or enforcement actions, if required, should take place only once the incident is stabilized and public safety is assured.

A consideration for Transport Canada is the following recommendation from the Grange Commission:

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.¹⁸

If a TDG inspector or RMS does not take charge at a scene, they must ensure the private sector actions are not placing people, property, or the environment at risk. This is because private sector priorities may not always align with those needed to protect the public and environment.

The provinces and territories should also have contingency plans to respond to these incidents if no local AHJ is available or when a local AHJ asks for assistance.

Failure to implement ICS at a major dangerous goods incident will jeopardize the possibility of successfully mitigating the incident and ensuring that the resources (both technical and material) are used in the most effective and safe manner. The safety of first responders and the public is a critical element in establishing an effective ICS structure and developing an Incident Action Plan that all on-scene agencies and personnel understand and follow.

5.3.7 Networking and Building Trust Ahead of Incidents

Networking and building trust ahead of incidents is important to enhance cooperation and coordination of response operations. **Recommendations 2, 15 and 16** address an opportunity to review and improve ICS protocols during a transportation of dangerous goods incident. This aspect has been demonstrated by the partnership between Transport Canada and the DRDC-CSS¹⁹ on common areas of interest that would benefit the work of the Task Force and Transport Canada in its TDG program development efforts.

¹⁸ <http://epe.lac-bac.gc.ca/100/200/301/pcobcp/commissions-ef/grange1981-eng/grange1981-eng.htm>

¹⁹ <http://www.drdd-cddc.gc.ca/en/science-tech/public-safety-and-security.page>

Recommendation 2: Work with the DRDC-CSS to:

- Explore opportunities for collaboration on the existing CSS Eastern HAZMAT project;
- Allow Transport Canada access to information from the Canadian Targeted Capability List-Canada, a framework describing the capabilities related to major all-hazards events;
- Explore areas where CSS Operational Research Expertise can assist the Task Force in the areas of risk (human health/economic), multi-disciplinary information sharing (such as the Multi-Agency Situational Awareness System [MASAS] and response standards);
- Explore opportunities to engage with the CSS on their Incident Exercise program to improve the understanding of roles and responsibilities of various agencies and industry when responding to TDG incidents; and
- The Task Force will explore possible scenarios to exploit the CSS' exercise development and funding program. This program utilizes exercise of small and large scale, tabletop to full scale live exercises to develop and validate response planning. Exercises such as the current Transport Canada ERAP exercise series should be developed to practice and validate Incident Command Management and Structure, expanded ERAP, increased CANUTEC abilities etc. identified by the Task Force.

Greater cooperation between carriers, shippers, and local first responders is important during both the initial response and in command centre operations during incidents. This can be achieved through networking and exercises such as developing response exercises to test and evaluate the ERAP program.

Recommendation 15: Work with the Centre for Security Science (CSS), First Responders, emergency planners, RAC member companies, ERAP holders, CANUTEC and Transport Canada RMS representatives to develop response exercises to test and evaluate the effectiveness of the ERAP program and identify opportunities for improvement.

Recommendation 16: Encourage and support training, exercises, networking and interaction between railway personnel, First Responders, emergency planners and Transport Canada to build experience, trust and communications in application of the ICS and unified command at dangerous goods incidents.

Transport Canada has been working with the DRDC-CSS, and has developed and hosted response exercises on rail incidents involving flammable liquids. So far, two exercises have been successfully conducted in British Columbia. A table top exercise held in November 2015, and a full scale, hands-on exercise held in March 2016.

Exercise Vulcan,²⁰ the full scale, hands-on training exercise, received a high level of interest and participation from railway operators, industry responders, RMS, and first responders. The participant feedback confirms the value of more hands-on training exercises.

20 http://cradpdf.drdc-rddc.gc.ca/PDFS/unc229/p803844_A1b.pdf



Photo of participants applying foam to simultaneously cool a tank car and extinguish the pool fire below.

The June 2016 issue of *Firefighting in Canada* magazine included an article titled, "Improving rail response: Flammable-liquids exercise teaches fire services new response techniques".²¹ The article highlighted the importance of continuing to conduct exercises such as Vulcan.

Derailments involving flammable liquids, fortunately, do not happen every day, but the knowledge gained through this exercise will change the way fire departments respond to these types of incidents and give smaller departments the confidence to be able to handle them, knowing that resources are available, and that they are not alone.

Participants experienced the importance for all parties to understand each other's respective roles and responsibilities and for efforts to be well coordinated for the emergency response to be effective and successful.

... the most significant aspect of the exercise was to gauge the existing knowledge and capacities of firefighters to determine the standard level of hazmat training and the type of response that can be expected mostly in rural areas.

5.3.8 Emergency Planning

Provinces and territories have a responsibility for public safety and have passed legislation on emergency management as part of that responsibility. For example, many municipalities are required to develop an emergency management plan. This plan is typically an 'all hazards' plan developed using evaluation criteria to identify potential hazards and risks. In Ontario, this process is called HIRA: Hazard Identification and Risk Assessment. Most HIRA plans are based on information and data from past experience or predicted hazards.

21 Tom Desorcy, "Improving rail response: Flammable-liquids exercise teaches fire services new response techniques," *Firefighting in Canada*, June 2016, p. 18

First responders and emergency planners need to be informed of the type and availability of specialized resources they can anticipate from ERAP holders in case of an incident. This is why the ERTF suggested that Transport Canada further promote and improve knowledge and understanding of various aspects of TDG activities and programs by helping with the development of a template for a Dangerous Goods Emergency Response Plan. These templates could be incorporated as part of a local emergency response plan to help identify risks related to the transport of dangerous goods in their community and provide information on resources they can call upon in case of incident (**Recommendation 12**).

Recommendation 12: Facilitate the development of a template for a Community Dangerous Goods Emergency Response Plan that can be incorporated in Community Emergency Plans.

The ERTF also recommended Transport Canada create an ongoing Outreach and Awareness Program that would promote the different TDG programs and resources including the ERAP program, CANUTEC, Protection Directives, and the roles of TDG RMS (**Recommendation 4**).

Recommendation 4: Further promote and improve knowledge and understanding of various aspects of TDG activities and programs with an Outreach and Awareness program as an ongoing activity that will address, among other topics, the following:

- ERAP Program;
- Roles of TDG RMS;
- CANUTEC;
- PD 32*;
- PD 33**;
- Emergency Response Task Force; and
- TDG-GPAC.

* Note: PD 32 was replaced by PD 36 on April 28, 2016.²²

** Note: The updates to the TDG Regulations incorporating PD 33 came into force on December 31, 2014.²³

PD 32 required railways to provide information on dangerous goods being transported through a community. Communities now have the ability to obtain information from the railway companies on the nature and volume of dangerous goods transported through their communities. As of April 28, 2016, PD 36 came into effect, which:

- Requires railways to provide municipalities and first responders with even more data on dangerous goods, to improve their emergency planning, risk assessment, and training activities; and
- Allows municipalities to share this information directly with the Canadian public.²⁴

Just as a community plans for other emergencies, in large part based on past data and experience, communities should use the information the railway now provides to develop plans for dangerous goods incidents.

These communities should also develop mutual aid agreements with other communities that can provide additional assistance during a major emergency.

22 Protective Direction (PD 36) - <https://www.tc.gc.ca/eng/tdg/safety-menu-1281.html>

23 *Transportation of Dangerous Goods Regulations* - Incorporation of Protective Direction (PD 33) - <http://www.gazette.gc.ca/rp-pr/p2/2014/2014-12-31/html/sor-dors306-eng.php>

24 Protective Direction (PD 36) - <https://www.tc.gc.ca/eng/tdg/safety-menu-1281.html>

Generic ERAP

Ideally, local emergency management planners/coordinators would take the existence of ERAPs into account when developing their local ERP. Unfortunately, due to confidentiality legislation, most parties are not privy to an ERAP's content beside Transport Canada and the ERAP holder. The ERTF recommends:

- Publishing generic components of an ERAP for flammable liquids and eventually, generic ERAP information for each class of dangerous goods.
- Making generic information that is common to all Class 3 ERAPs available to stakeholders through a dangerous goods ERP template (**Recommendation 12**).

Some specific information would not be shared, such as reference to specific ERAP holders or response contractors, crew names, locations of resources and inventory, all of which are protected by the *Access to Information Act*.²⁵

Providing generic ERAP information would better inform planners and emergency responders on the type of expertise, equipment and resources to expect should an incident occur and an ERAP is activated. It would also complement the ERP template. More importantly, access to generic ERAPs would enhance capacity of response, as well as increase safety and public confidence by:

- Improving awareness of the ERAP program and how it can assist first responders; and
- Describing the type of expertise, equipment and resources responders could expect should an incident occur and an ERAP is activated.

Recommendation 32: Provide first responders and emergency planners with information on the contents and resources available to them in the event of a dangerous goods incident and that these documents be made available on line and as part of the Outreach and Awareness program.

Response Tier and Timelines

The ERTF also recommended that Transport Canada make the Response Tier and Timelines best practices (see section 5.1.3b) available to first responders and emergency planners as part of its awareness and outreach program. This would give them the assurance that a common approach based on industry recognized best practices and national consistency in expected response and timelines **do** exist. This would also provide them with a clear understanding of how and to what level ERAP resources can be made available for dangerous goods incidents and give them a good idea of what to expect.

Recommendation 18: Include the Response Tier and Timelines Best Practices as a standard addition for outreach activities.

Recommendation 19: Include the Flammable Liquids Technical Advisor (FLTA) Competency Profile in the TDG Directorate planning for outreach activities.

25 Access to Information Act (R.S.C., 1985, c. A-1)

Access to Real-time Data and Train Consist

Timely access to critical information on dangerous goods involved in a rail incident, such as the train consist, Safety Data Sheets (SDS), is imperative for coordinating emergency response efforts while maintaining public safety.

The train consist describes the train's composition, and the sequence of cars. It also identifies any cars carrying dangerous goods. As per Section 3.3 of the TDG Regulations, the information on the train consist must be kept current and a carrier must be able to immediately provide CANUTEC with a copy of the consist whenever the train to which it applies is in operation or is involved in an accident.

Knowing the type of products involved often dictates specific response tactics and safety precautions. Eliminating delays and improving information sharing will support an efficient and effective response. The ERTF reported cases where first responders had difficulty quickly accessing critical information, so made **Recommendation 33**.

Recommendation 33: Require railways to provide to CANUTEC train consist information, in an electronic format, immediately upon becoming aware of a rail incident involving the release or potential release of dangerous goods.

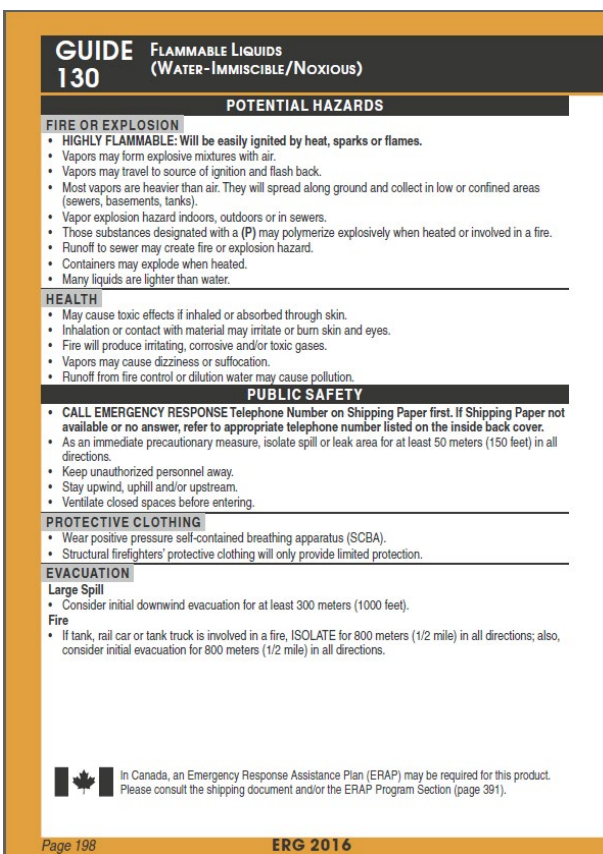
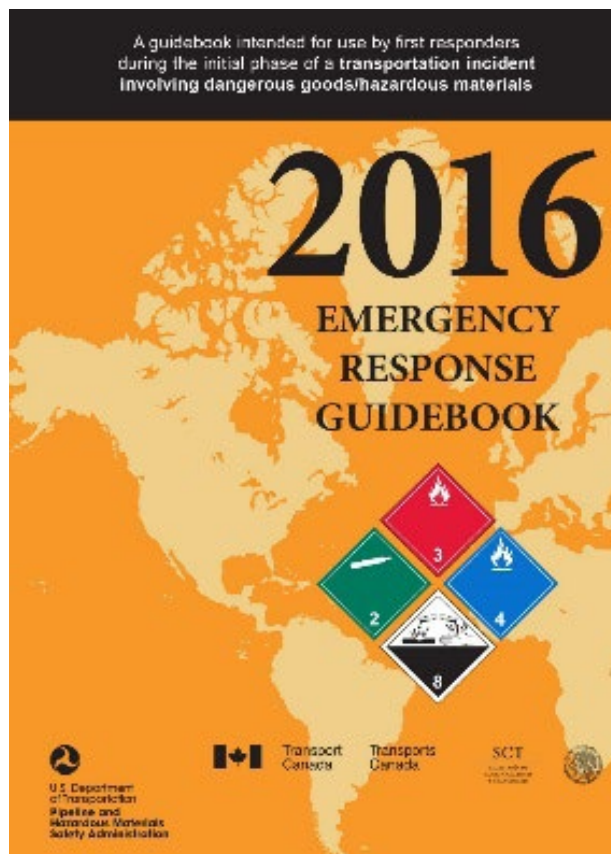
First responders benefit from CANUTEC specialists who provide analysis of products involved in incidents. To provide the best advice possible, CANUTEC has worked with the railways to improve its access to real-time train consists and knowledge of dangerous goods incidents. CANUTEC now has access to real-time train consists via the AskRail™ application in their emergency centre, and receives automatic e-mail notification of dangerous goods incidents.

5.3.9 ERAP Awareness

The ERTF confirmed a lack of awareness about the ERAP program among first responders and municipalities. Early in their discussions, the ERTF suggested including ERAP information in the 2016 *Emergency Response Guidebook* as an effective first step to increasing first responders' awareness on ERAPs. Given that first responders are already well aware of the ERG, it is a good vehicle to introduce the ERAP concept and give responders an idea of which products require an ERAP, hence, specialized assistance in case of an incident.

Recommendation 1: Support a request to include basic information on the ERAP program in the reference section of the 2016 *Emergency Response Guidebook* and mark products that are required to have an ERAP with a Canadian logo for ease of reference.

Transport Canada has fully implemented this recommendation. The 2016 Edition of the ERG, published in April 2016 incorporates ERAP information as well as other updates and revisions on regulatory changes. For example, a new feature in the orange section of the ERG indicates when a product may require an ERAP in Canada, as illustrated on guide page 130 below.



Hard copies of the ERG can be obtained through CANUTEC. The ERG is also available online at <https://www.tc.gc.ca/eng/canutec/menu.htm>.

5.3.10 First Responder Training

The significant volume increase of flammable liquids transported by rail in recent years has introduced a risk that many fire departments may not be aware of. Firefighters may not have experience with large scale flammable liquid incidents such as Lac-Mégantic, and may not be trained or fully equipped to handle them as they are more accustomed to handling structural fires.

First responders need to increase their knowledge and awareness to effectively use specialized equipment, assistance and resources available to them (i.e. foam, RMS, ERAPs, railway ERPs, mutual aid) during flammable liquid incidents. Small and remote communities have an additional challenge because they may also have limited funding to access specialized training they need to adequately respond.

Firefighting Training Standards

There is currently no specific comprehensive firefighting training standard in North America to safely and effectively mitigate these large scale incidents.

In Canada, first responder training falls under provincial/territorial jurisdiction. In December 2015, the ERTF Secretariat conducted a national survey on current training for firefighters in Canada. Results confirmed that current training programs in Canada are based on NFPA Standards 1001 and 472:

- *NFPA 1001: Standard for Fire Fighter Professional Qualifications*; and
- *NFPA 472: Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*.

NFPA Standard 1001 is directed to qualifications firefighters need to safely and effectively deal with structural fires (buildings). This standard addresses flammable liquids fire control, but it is limited in scope and does not address HHFT incidents.

NFPA Standard 472 identifies the minimum competency levels required to respond to incidents involving dangerous goods. The standard addresses Class 3 flammable liquids and provides general reference to fire suppression requirements. However, a fire involving flammable liquids would require the intervention of fire suppression crews if fire control and extinguishment are determined to be a safe and effective strategy. This can lead to discrepancies or create a gap between the special skills, knowledge and equipment of a “Hazmat” response team and a fire suppression team, who would employ both standard and special fire control tactics, equipment and supplies (e.g. foam).

The TSB has recognized the importance of adequate training for first responders for a number of years.

Case Study: Saint-Hyacinthe, Quebec (1999)

On December 30, 1999 in Saint-Hyacinthe, Quebec, two people died when a train derailed and another train collided with it, causing approximately 2.7 million litres of hydrocarbons to spill and catch fire. 350 families had to be evacuated.²⁶ The pile-up of rail cars made the firefighters’ job extremely difficult because the fire was hidden under debris. The TSB concluded that firefighters performed effectively, even though they were facing a major disaster involving a mode of transportation not covered by their practical training.²⁷

Case Study: Firdale, Manitoba (2002)

On May 2, 2002, near Firdale, Manitoba, a freight train derailed at a public crossing, after colliding with a loaded tractor-trailer. Five of the derailed tank cars were carrying Class 3 flammable liquids, four of which punctured, released the products and ignited a large fire that engulfed the derailed cars. Authorities evacuated 156 people for two days. No significant injuries to either the train crew or truck driver were reported. Approximately 580 personnel representing more than 75 different companies, government agencies and fire departments attended the site in response.²⁸

The TSB found that one of the firefighters on-scene had climbed over the derailed tank cars to check the tractor-trailer driver’s condition with no personal protective equipment, while a fire was in progress. Although the firefighter was trained to NFPA Standards 1001 and 472, he had not received refresher dangerous goods training and had not responded to a dangerous goods rail incident since his initial training.²⁹ The TSB report states:

“An emergency responder at a rail DG fire should initially assess the situation from a safe distance. [...]. In some circumstances, it may be preferable to let the dangerous goods fire burn itself out rather than attempt a response. This is contrary to firefighting training that emphasizes rapid response and intervention to protect life and property.”³⁰

Following the Saint-Hyacinthe (1999) and the Firdale (2002) incidents, the TSB recommended introducing consistent training requirements. This would ensure first responders are fully aware of the risks associated with dangerous goods transported through their communities and continue to be competent to respond to rail incidents.³¹

In the U.S., dangerous goods emergency responders are trained in accordance with the CFR. The Regulations state that they must receive annual refresher training or must demonstrate competency in those areas at least yearly. The equivalent requirement does not exist in Canadian regulations.

26 TSB Railway Investigation Report R99H0010, <http://www.tsb.gc.ca/eng/rapports-reports/rail/1999/r99h0010/r99h0010.asp>

27 Ibid p. 21

28 TSB Railway Investigation Report R02W0063 p. 6, <http://www.tsb.gc.ca/eng/rapports-reports/rail/2002/r02w0063/r02w0063.asp>

29 Ibid p. 37

30 Ibid p. 38

31 TSB Railway Investigation Report R99H0010, p. 21, <http://www.tsb.gc.ca/eng/rapports-reports/rail/1999/r99h0010/r99h0010.asp>

Most local authorities establish emergency and fire services to those incidents that present the most frequent and serious public safety risks within their community, such as structural firefighting. Large, industrial scale, flammable liquids firefighting is not a service that most fire departments have been trained or equipped for, since historically, there has not been a demonstrated need to provide this type of response capacity.

Railway personnel are not always the first on the scene of a train derailment involving dangerous goods. Local emergency responders including medical, police and fire service personnel, many of them volunteers, play a significant role in these responses across Canada, particularly in rural communities. They are expected to perform the critical steps of assessment and perimeter containment. This role requires familiarity with rail equipment and the risks associated with the bulk transportation of dangerous goods.

Case studies of more recent events, such as Lac-Mégantic in 2013, have highlighted the following:

- Firefighters are not adequately trained to handle large scale incidents involving flammable liquids spills or fire;
- First responders are not aware of the resources available to them such as ERAPs and RMS;
- First responders do not have the knowledge and experience they need to effectively use some of the specialized equipment that can be made available to them during flammable liquid incidents; and
- Small and remote communities have limited access to specialty training programs, facilities and equipment to adequately prepare first responders for flammable liquids spills and fires resulting from derailments.

The ERTF agrees on the need for a standardized qualification reference to help responders be better trained to safely mitigate large scale incidents involving flammable liquids in transport. The specialized training standards need to address the following gaps:

- The complexities and risks of a multiple tank car release of a large quantity of flammable liquids;
- The competencies required to provide advice to Incident Commanders on strategic and tactical considerations for large flammable liquid transportation incidents, which could be identified as a Hazardous Materials Technician-Flammable Liquids in Transport Specialty;
- Fire control strategies for large flammable liquid fires resulting from transportation incidents;
- The application of firefighting foam, such as aqueous film-forming foam (AFFF) or alcohol resistant AFFF, including the correct ratio of foam and water (usually 3%-6%), the correct application, so as not to agitate the flammable liquid, and its application at a rate sufficient to blanket the surface of the flammable liquid; and
- A general understanding of how to operate specialized equipment brought to an incident such as foam trailers, foam eductors and master stream devices etc.

Training Programs and Facilities

The ERTF identified the need for specialized firefighting training programs and facilities for flammable liquids, as none are currently offered in Canada.

The Crude by Rail Emergency Response course, currently offered at the Security and Emergency Response Training Center (SERTC) in Pueblo, Colorado, is funded by the American Association of Railways and by the Federal Emergency Management Agency (FEMA), and costs \$1,550 USD plus travel. Most Canadian firefighters are volunteers³² and small communities may not have the means to support such costs. The SERTC also offers an online program entitled, *Web-Based – For Crude by Rail*. These American programs do not take into consideration the Canadian legal framework (ERAP requirement exists only in the Canadian regime) or Canadian practices, and the courses are not available in French.

32 http://c.ymcdn.com/sites/www.caafc.ca/resource/resmgr/Files/GR_Week/2014/AbouttheCAFC-ENandFR-Doc.pdf

Proposed Strategy

To address this issue, the ERTF proposes a strategy for developing a Canadian training program. As part of the strategy, the ERTF took steps to identify key components of a single qualification standard specific to flammable liquids incidents. The objective of this strategy is to help firefighters and first responders across North America be better trained to safely mitigate large scale incidents involving flammable liquids in transport. A single, comprehensive reference standard would define the knowledge, skills and training required by technical advisors from industry, public first responders (including incident command staff and firefighters) as well as federal government specialists (RMS).

Training curriculum

The ERTF proposes a training program concept with Canadian-specific content and references in both official languages. The multi-level concept is a means to tailor the degree of specialization to specific community needs. Not all firefighters need to be trained to such a specialized level. In most cases, being aware of what to expect will provide first responders and communities with the information they need to safely respond to a large scale incident involving flammable liquids. Considering volunteer fire departments make up over 90% of all Canadian fire departments, it is important to accommodate such communities with limited access to resources for training. There is also a need for some trained specialists in or near communities where flammable liquids are transported by rail.

The proposed strategy consists of three levels:

1. **The first** provides basic safety information on flammable liquids including, among other topics, a summary of the Canadian regulatory framework and available services, such as CANUTEC, RMS and ERAP resources. This component of the program would be offered online at no cost.

The ERTF examined two existing training programs:

1. *Anhydrous Ammonia Awareness for First Responders*, established with the Canadian Fertilizer Institute (CFI) and the CAFC program
2. *Crude Oil by Rail Response Safety Course*, established by the Association of American Railroads and the American Petroleum Institute.

The ERTF used these as models because of the accessibility of their format.

2. **The second** level is operational (hands-on). Training would build on the first level information with an added focus on-site assessment, ICS, how to work with railway and emergency response personnel and the operation of specialized equipment.
3. **The third** is a specialized level. It would include Incident Command training and would target the person responsible for all incident response activities, including the development of strategies and tactics and the ordering and release of resources.

The intent of the second and third levels of operational and specialized training will be part of a curriculum provincial/territorial authorities will develop, and eventually deliver at provincial fire training colleges and facilities in Canada. The ERTF hopes that industry and the emergency response community will jointly design and deliver the training program.

The ERTF recommends supporting the concept of a Canadian “Flammable Liquids in Transport Training Program” in **Recommendation 24**.

Recommendation 24: Support the concept of a Canadian “Flammable Liquids in Transport Training Program” that addresses the following:

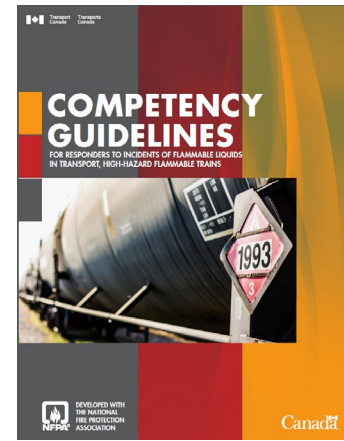
- A training program modeled on the precedent established with the CFI and the Canadian Association of Fire Chiefs (CAFC) program - “Anhydrous Ammonia Awareness for First Responders”.
- A program designed with Canadian content and references in both official languages.
- A multi-level program design consisting of:
 1. Basic (introductory) level - designed as a self-directed, web based program with modular content and an examination component; and
 2. Operations (Hands-on) and specialized levels – designed for delivery at provincial fire colleges or fire department training facilities.
- A program acceptable to the CAFC and the Council of Canadian Fire Marshals and Fire Commissioners.
- Basic introductory awareness course content development and implementation supported by Canadian Association of Petroleum Producers (CAPP) and Canadian Fuels Association (CFA) through ENFORM in consultation with Emergency Response Task Force stakeholders. Funding for more advanced training programs needs to be further discussed with input from Transport Canada, CAPP, CFA, CAFC, Railway Association of Canada and other the Class 1 Carriers.
- A program maintained and updated as new standards or information becomes available to reflect “Best Practices”.

In support of this recommendation, and as a result of ERTF collaboration, significant progress has already been achieved in the area of training. The level 1 introductory awareness component of the strategy was developed by a working group led by the CAFC, the Canadian Association of Petroleum Producers (CAPP), and was facilitated and led by ENFORM, the safety association for the oil and gas industry. Other participants included the *École nationale des pompiers du Québec*, Transport Canada and railway carriers. The online self-directed awareness program was launched on March 17, 2016. It can be found online in both English and French at: <http://www.capp.ca/canadian-oil-and-natural-gas/infrastructure-and-transportation/rail>.



On January 27, 2015, the ERTF Chair, on behalf of its members, sent the NFPA a submission proposal entitled, *Standard on Competencies for Responders to Incidents of Flammable Liquids in Transport – High-Hazard Flammable Trains (HHFT)* to address the lack of specialized training on flammable liquids.

Upon receiving the submission, the NFPA Standard Council voted to solicit public comments and directed its Technical Committee on Hazardous Materials Response Personnel to review the new project request and submit comments to the Standard Council. This process is now underway, but may require up to two years if revisions to the NFPA standard are accepted. However, there was an immediate need for competency guidelines to provide guidance for training and curriculum development.



With funding from the DRDC-CSS, the ERTF worked with the NFPA, the Justice Institute of British Columbia (JIBC), the CAFC and the *École nationale des pompiers du Québec* to identify specific knowledge and skills needed to respond to rail incidents involving flammable liquids. The result of this collaboration produced a Guideline entitled, *Competency Guidelines for Responders to Incidents of Flammable Liquids in Transport, High-Hazard Flammable Trains*. It was published and made available by Transport Canada on March 31, 2016 and can be found online at <https://www.tc.gc.ca/eng/tdg/publications-menu-240.htm>.

The key competencies the ERTF has identified and documented provide a standardized approach and ensure a consistent understanding of training requirements across Canada.

Strategy: Curriculum and Facilities

The ERTF also submitted **Recommendations 25, 26 and 27** seeking Transport Canada's continued support of the training program development and delivery.

Recommendations 25: Make Transport Canada staff available to assist in developing the training programs to ensure complete and correct information on TDG programs (CANUTEC, ERAP, RMS services, etc.) are included.

Recommendation 26: Include these training courses for Remedial Measures Specialists, CANUTEC advisors and other appropriate employees that could be involved in flammable liquids incidents.

Recommendation 27: Make available Transport Canada staff to assist in the delivery of Operations level of flammable liquids training programs as a part of the TDG Outreach and Awareness program.

Transport Canada will continue to work with industry and first responders to further promote and improve knowledge and understanding of various aspects of TDG activities and programs. Various outreach and awareness opportunities include the TDG Newsletter, ERTF website, training exercises, joint stakeholder events and workshops (**Recommendation 4**).

5.3.11 Moving Forward

Two ERTF members currently represent Canada on the PHMSA Technical Panel on *Enhancing Incident Commander Competencies for Management of Incidents Involving Pipeline and Rail Car Spills of Flammable Liquids*. This Panel is mandated by the PHMSA and managed by the NFPA. The project's goal is to support the development of a tool Incident Commanders can use to manage incidents involving pipeline and rail car releases of crude oil. The participation of Canadian ERTF members will foster a harmonized approach across the border.

The ERTF hopes that the CAFC, the Council of Canadian Fire Marshalls and Fire Commissioners, as well as the provinces, territories and municipalities will endorse the concept of a Canadian "Flammable Liquids in Transport Training Program" and the *Competency Guidelines for Responders to Incidents of Flammable Liquids in Transport, High-Hazard Flammable Trains*, which they can then use as a national basis for developing their respective first responder training curricula. Further work and funding requests for future first responder training program development is contingent upon such an endorsement.



IMPORTANCE OF NETWORKING

A survey of members in February 2016 measured the performance of the ERTF's efforts by asking about:

- the appropriateness of the ERTF as a forum for input;
- the level of perceived success of the ERTF bringing together the right stakeholders to discuss concerns;
- their views on the venues/location and methods of communication and information sharing for fruitful discussions and;
- the support services provided by the ERTF Secretariat.

The ERTF Secretariat received a total of 33 completed surveys.

Of the 33 respondents:

- More than 87% indicated the Task Force was a somewhat or extremely relevant forum for input and Transport Canada should use this type of forum in the future.
- More than 90% were somewhat or extremely satisfied that a broad range of expertise among stakeholders was available to facilitate discussions and propose relevant recommendations.
- More than 87% rated the ERTF meetings as extremely valuable to their organizations.
- 87% found the frequency, location and room set up of the meetings, as well as the overall consultation process to be very good or excellent.
- Over 90% found the methods used for information sharing to be very or extremely effective.
- Only 69% found remote meeting participation very or extremely accessible.
- More than 87% found that communications and documentation were provided most of the time or all of the time in both official languages.
- More than 90% found that the ERTF Secretariat responded to their inquiries for information in a timely manner most of the time or all of the time.
- 96% rated the overall professionalism of the ERTF Secretariat as very or extremely professional.

When members were asked what they considered to be the ERTF's biggest accomplishment, many responses highlighted the ERTF network itself! Below are several examples of what ERTF members had to say.

What some ERTF Members had to say

"The ERTF brought together representatives from across Canada: Regulators, industry, associations, local authorities, and municipalities. This collaboration enabled key concerns to be identified and prioritised."

"There were so many (accomplishments) and if I had to pick only one it was that government, industry and the emergency community all connected and interacted with a positive outcome. Most did not speak or interact prior to this and now a forum has been established and relationships built."

"There was no better way to do this than through the ERTF; people were able to meet face-to-face and talk. There were relationships established which will last beyond the ERTF. I believe this was precedent setting and, being fiercely Canadian, this is something that could only happen in Canada."

"I have been pleased with the discussions and have found it overall intensity, useful and enjoyable. By participating I have increased my knowledge and understanding of rail response. This has also been a great opportunity to network!"

Members were concerned that the opportunity to network and discuss emergency response issues would end when the ERTF mandate was complete. This is why the Task Force proposed **Recommendation 28** to create a permanent forum that provides further opportunity for stakeholder collaboration in addressing issues related to emergency response and address a need expressed by stakeholders. The ERTF identified GPAC as a potential option. The discussion could also expand to other dangerous goods and other modes of transport.

Recommendation 28: Establish a forum for members of the ERTF to continue to hold technical discussions once the ERTF has completed its mandate. This could be in the form of a technical committee or standing working group under the General Policy Advisory Council (GPAC).

During their November 18, 2015 meeting, GPAC members established a Sub-committee on Emergency Response under its umbrella, which held its first meeting on May 25, 2016. This will provide an emergency response discussion forum on emerging issues and important emergency response matters related to the transportation of dangerous goods.



NEXT STEPS

With the end of the ERTF mandate, there is still a need to develop the first responder training curriculum and have it endorsed by the various training institutions across Canada. The ERTF's work in identifying and publishing the key competencies on flammable liquids provides a national foundation for the provinces and territories, in partnership with local municipalities, to build upon and develop the required curriculum. Once this is achieved, a number of Canadian training facilities have already demonstrated an interest in potentially offering the training program to first responders. While this type of curriculum development falls outside of Transport Canada's mandate or responsibility, the Department can continue to support these efforts through its Awareness and Outreach program and by making staff available to help develop and deliver the training program.

There are also opportunities for further collaboration with the railways, petroleum industry, emergency response contractors and others to develop training facilities capable of delivering the operational level program. The recent Exercise Vulcan at the JIBC demonstrated how multi-stakeholder participation can provide realistic and effective training. The ERTF heard from the *École nationale des pompiers du Québec* (Laval, Quebec), and Lambton College (Sarnia, Ontario), of their interest in developing a similar capacity at their respective flammable liquid training sites. There may also be other facilities in the prairies or Atlantic Canada that could provide some or all of this level of training.

The ERTF hopes to come together in 2017 for a status update on Transport Canada's response to recommendations and other activities related to ERTF findings and recommendations.

8

CONCLUSION

The transportation of dangerous goods is subject to an ever-changing operational environment. This is why Transport Canada's emergency response programs such as the ERAP program, must be subject to periodic review, consultation and improvement. Monitoring the operational environment of the transportation of dangerous goods is essential to detect new trends and identify potential risks. This allows for the continuous improvement of emergency response planning and the establishment of safe and efficient mitigation measures to reduce potential impacts of incidents.

It is important to point out that while the Task Force's mandate focused on expanding ERAP and transportation of flammable liquids by rail, many of the findings and recommendations would also apply to incidents involving other dangerous goods shipped by other modes of transport.

The ERTF as a forum fostered thorough discussion and valuable, practical collaboration among various stakeholder groups who may not otherwise have had the opportunity to access such a multi-disciplinary network. Members have succeeded in developing an impressive network built on trust that will outlast the ERTF's mandate. That trust allowed all sectors of the industry to communicate diverse perspectives, share best practices and promote systemic improvement for the benefit of all.

Having received three quarterly ERTF reports, Transport Canada is already implementing Recommendations 1 to 33. This Report presents Recommendations 34 to 40 for Transport Canada's consideration. The 40 recommendations provide a comprehensive strategy for improving transportation of dangerous goods incident response in Canada. It is the result of intense work, respectful and sometimes animated debate, driven by the unanimous desire to enhance the TDG response capacity in Canada.

The ERTF appreciates the support and commitment of the Minister of Transport to this initiative and recommends that Transport Canada and stakeholders continue the networking and partnerships that were created during the ERTF mandate.



A photo taken at the March 17, 2016 meeting of some of the ERTF members.

ANNEX A: LIST OF ERTF RECOMMENDATIONS

Recommendation 1

Task Force members are recommending that Transport Canada support a request to include basic information on the ERAP program in the reference section of the *2016 Emergency Response Guidebook* and mark products that are required to have an ERAP with a Canadian logo for ease of reference.

Recommendation 2

The Task Force is recommending that Transport Canada work with the DRDC-CSS to:

- Explore opportunities for collaboration on the existing CSS Eastern HAZMAT project;
- Allow Transport Canada access to information from the Canadian Targeted Capability List-Canada, a framework describing the capabilities related to major all-hazards events;
- Explore areas where CSS Operational Research Expertise can assist the Task Force in the areas of risk (human health/economic), multi-disciplinary information sharing (such as the Multi-Agency Situational Awareness System [MASAS] and response standards);
- Explore opportunities to engage with the CSS on their Incident Exercise program to improve the understanding of roles and responsibilities of various agencies and industry when responding to TDG incidents; and
- The Task Force will explore possible scenarios to exploit the CSS' exercise development and funding program. This program utilizes exercise of small and large scale, tabletop to full scale live exercises to develop and validate response planning. Exercises such as the current Transport Canada ERAP exercise series should be developed to practice and validate Incident Command Management and Structure, expanded ERAP, increased CANUTEC abilities etc. identified by the Task Force.

Recommendation 3

Task Force members are recommending that Transport Canada proceed in including Ethanol being shipped under UN1987 as part of the primary ERAP requirements for Class 3 Flammable Liquids, and that Transport Canada proceed with advising those shippers that may be impacted by this recommendation so they may act accordingly with respect to ERAP requirements.

Recommendation 4

Task Force members are recommending that Transport Canada further promote and improve knowledge and understanding of various aspects of TDG activities and programs with an Outreach and Awareness program as an ongoing activity that will address, among other topics, the following:

- ERAP Program;
- Roles of TDG RMS;
- CANUTEC;
- PD 32;
- PD 33;
- Emergency Response Task Force; and
- TDG-GPAC.

Recommendation 5

Support the concept of a standardized ICS, based on the ICS Canada program and that the Incident Commander in charge of a railway or other dangerous goods incident will be a representative of the local authority having jurisdiction working within a unified command structure.

Recommendation 6

Require ERAP documents to include identification of ICS and a Unified Command structure as part of the planning requirements for response to incidents.

Recommendation 7

Require ERAP Technical Advisors to complete, at a minimum, the following ICS Canada incident command courses, appropriate to their roles in an incident:

- I-100 Introduction to ICS
- I-200 Basic ICS for Single Resources and Initial Action Incidents
- I-300 Intermediate ICS for Expanding Incidents

Recommendation 8

Require railway companies to provide copies of their Emergency Response Plans to the TDG Directorate, with details on how the ICS System is incorporated within those plans for dangerous goods incidents and, that the information in the railway Emergency Response Plans is immediately available to CANUTEC during an emergency incident.

Recommendation 9

Require railway companies to have company managers, supervisory staff and contractor supervisors, who attend dangerous goods incidents, complete at a minimum, the following ICS Canada incident command courses, appropriate to their roles in an incident:

- I-100 Introduction to ICS
- I-200 Basic ICS for Single Resources and Initial Action Incidents
- I-300 Intermediate ICS for Expanding Incidents

Recommendation 10

Include in the Transport Canada Training Program for TDG Inspectors and Remedial Measures Specialists the following ICS Canada courses, appropriate to their role in an incident:

- I-100 Introduction to ICS
- I-200 Basic ICS for Single Resources and Initial Action Incidents
- I-300 Intermediate ICS for Expanding Incidents

Recommendation 11

Review and define the roles and responsibilities of TDG Inspectors and RMS to include consultation and advice with the Incident Commander to help in developing an Incident Action Plan. Transport Canada should make those roles and responsibilities well known to both the public sector and private sector as part of their Awareness and Outreach Program.

Recommendation 12

Facilitate the development of a template for a Community Dangerous Goods Emergency Response Plan that can be incorporated in Community Emergency Plans.

Recommendation 13

Work in collaboration with Public Safety Canada, Senior Officials Responsible for Emergency Management (SOREM), Railway Association of Canada (RAC), Canadian Association of Petroleum Producers (CAPP), Canadian Fuels Association (CFA), Aboriginal Firefighters Association of Canada (AFAC) and the Canadian Association of Fire Chiefs (CAFC) as well as other stakeholders in a comprehensive outreach and education program that provides information and training/reference materials for dangerous goods ICS “best practices”, as well as recommending the use of ICS Canada training courses for First Responders.

To increase awareness and as part of the Communication and Outreach Strategy, it is further recommended that these documents be developed and completed by Transport Canada to be distributed in conjunction with the *2016 Emergency Response Guidebook* to all first response agencies and community/First Nations emergency planners in Canada.

Recommendation 14

Complete the development of and production of the following concept documents:

- Community Emergency Planning Guide for Dangerous Goods
- The Emergency Planning and Response Cycle Chart
- ICS Structure Using Unified Command for Railway Dangerous Goods Incidents Chart
- Railway Dangerous Goods Incidents – Roles and Responsibilities Table and Chart
- Flammable Liquid (TDG) Emergency Response Chart - A Disciplined Approach
- The Disciplined Approach work sheets for developing an Incident Action Plan (IAP) with ICS
- Provide a dangerous goods lexicon with standard names and terminology

Recommendation 15

Work with the Centre for Security Science (CSS), First Responders, emergency planners, RAC member companies, ERAP holders, CANUTEC and Transport Canada RMS representatives to develop response exercises to test and evaluate the effectiveness of the ERAP program and identify opportunities for improvement.

Recommendation 16

Encourage and support training, exercises, networking and interaction between railway personnel, First Responders, emergency planners and Transport Canada to build experience, trust and communications in application of the ICS and unified command at dangerous goods incidents.

Recommendation 17

Further develop a Flammable Liquids Technical Advisor (FLTA) Competency Profile that can be used as a tool during the review and approval process of an ERAP for Class 3 Flammable Liquids.

Recommendation 18

Include the Response Tier and Timelines Best Practices as a standard addition for outreach activities.

Recommendation 19

Include the Flammable Liquids Technical Advisor (FLTA) Competency Profile in the TDG Directorate planning for outreach activities.

Recommendation 20

When conducting the risk assessment to determine products that require an ERAP, consider:

- The Subject Matter Experts findings regarding the physical-chemical behaviours of Class 3 PG I and II Flammable Liquids as documented in the SME's Report dated April 12, 2015 (presented in April 2015 to the ERTF Subgroup 3), and
- Volume of product in transport by rail.

Recommendation 21

Subject Matter Experts are to continue the work on the technical categorizing of Class 3 Flammable Liquids based on physical-chemical behaviours, in the following priority order:

1. Class 3 PG III
2. Class 3(6.1)(8); Class 3(8)
3. Class 4.3(3); Class 4.3(3)(8)
4. Class 6.1(3); Class 6.1(3)(8); Class 6.1(4.3)(3)
5. Class 8(3); Class 8(3)(6.1)

Recommendation 22

To continue the mapping work undertaken by TDG on transportation routes and volumes of Class 3 Flammable Liquids and include additional products that may be transported in large volumes by rail in tank cars.

Recommendation 23

Establish a performance evaluation program to periodically assess the effectiveness of the ERAP program for Flammable Liquids, taking into consideration changes such as transportation trends, and consider amending the requirements to the products covered by ERAPs to ensure policy objectives are met.

Recommendation 24

Support the concept of a Canadian "Flammable Liquids in Transport Training Program" that addresses the following:

- A training program modeled on the precedent established with the CFI and the Canadian Association of Fire Chiefs (CAFC) program - *"Anhydrous Ammonia Awareness for First Responders"*.
- A program designed with Canadian content and references in both official languages.
- A multi-level program design consisting of:
 1. Basic (introductory) level - designed as a self-directed, web based program with modular content and an examination component; and
 2. Operations (Hands-on) level – designed for delivery at provincial fire colleges or fire department training facilities.
- A program acceptable to the CAFC and the Council of Canadian Fire Marshals and Fire Commissioners.

- Basic introductory awareness course content development and implementation supported by Canadian Association of Petroleum Producers (CAPP) and Canadian Fuels Association (CFA) through Enform in consultation with Emergency Response Task Force stakeholders. Funding for more advanced training programs needs to be further discussed with input from Transport Canada, CAPP, CFA, CAFC, Railway Association of Canada and other the Class 1 Carriers.
- A program maintained and updated as new standards or information becomes available to reflect "Best Practices".

Recommendation 25

Make staff available to assist in developing the training programs to ensure complete and correct information on TDG programs (CANUTEC, ERAP, RMS services, etc.) are included.

Recommendation 26

Include these training courses for Remedial Measures Specialists, CANUTEC advisors and other appropriate employees that could be involved in flammable liquids incidents.

Recommendation 27

Make available staff to assist in the delivery of Operations level of flammable liquids training programs as a part of the TDG Outreach and Awareness program.

Recommendation 28

Establish a forum for members of the ERTF to continue to hold technical discussions once the ERTF has completed its mandate. This could be in the form of a technical committee or standing working group under the General Policy Advisory Council (GPAC).

Recommendation 29

To include the "Response Tier and Timelines" presented as industry's best practices, in all ERAPs. The Response Tier and Timelines is a suggested minimum of three tiers as follows:

1. Tier One response time for a Technical Advisor to provide technical or emergency response advice by telephone would be within 10 minutes of the initial request;
2. Tier Two response time for a Technical Advisor to attend the incident scene would be within six hours of the initial request; and
3. Tier Three response time for a response team and equipment to attend the scene would be within 12 hours of the initial request.

Best efforts are expected, however, consideration must be given to natural disasters, weather conditions, site accessibility, or other circumstances such as acts of terrorism which may interfere with the above timelines.

Recommendation 30

Require rail carriers to share emergency response and preparedness information pertaining to potential dangerous goods incidents with emergency planners, first responders, CANUTEC and other agencies, to increase cooperation and coordination at dangerous goods incidents.

Recommendation 31

Recognizing that expected outcomes of an ERAP are to provide response support that is Timely, Appropriate, Safe and Coordinated (TASC), it is recommended that Transport Canada monitor the ERAP program and foster its continuous improvement by establishing criteria to assess if the four identified expected outcomes are being met, collect and assess the necessary data and consider opportunities for improvements.

Recommendation 32

Provide first responders and emergency planners with information on the contents and resources available to them in the event of a dangerous goods incident and that these documents be made available on line and as part of the Outreach and Awareness program.

Recommendation 33

Require railways to provide to CANUTEC train consist information, in an electronic format, immediately upon becoming aware of a rail incident involving the release or potential release of dangerous goods.

Recommendation 34

Require a Tiered service level as a cost and time effective measure to ensure the level of services and assistance is appropriate to the scope and severity of the incident.

That it is mandatory for an ERAP holder to provide services (Tier 1) upon the ERAP holder being notified of an incident.

Recommendation 35

Consider practical means to include a Tiered service level in existing ERAP's regardless of the mode of transportation that would minimize time and costs to both the ERAP holder and Transport Canada.

Recommendation 36

Develop a standardized Assessment Tool that would assist the ERAP holder in determining the appropriate level of response (Tier) to an incident.

Recommendation 37

Clarify the process to determine if ERAP requires activation following the phone call made to the ERAP holder, Transport Canada should consider:

1. Mandatory phone call made by the carrier to the ERAP holder/Technical Advisor to trigger an immediate initial assessment of the situation by the Technical Advisor in consultation with carrier, First Responder, or AHJ;
2. Standardized approach requiring the ERAP Technical Advisor to evaluate the situation with the carrier, First Responder, or AHJ to determine if the ERAP is to be activated based on the following:
 - Could the integrity of the MOC have been compromised?
 - Is a transfer anticipated or required?
 - Is there a release or an anticipated release?
 - Did carrier, First Responder, or AHJ ask for help?

Recommendation 38

Consider an “ERAP Activated” if:

- The ERAP initial assessment has been completed by the Technical Advisor and based on the assessment that the situation requires an appropriate response in accordance with the approved ERAP.
- The activation of an ERAP includes a mandatory notification to CANUTEC, from the ERAP holder/ Technical Advisor, notifying that an ERAP is being activated.

Recommendation 39

Clarify the meaning of “any person who responds to an actual or anticipated release” for the application of Section 20 TDG Act.

Recommendation 40

Collect meaningful data that is proportioned to the scope and severity of the incident and the response level provided by ERAP holder/Technical Advisor to monitor the ERAP Program Effectiveness and foster continuous improvement.

ANNEX B: ERTF MEMBERSHIP ORGANIZATION REPRESENTATION

| ORGANIZATION | NAME |
|--|---|
| Aboriginal Firefighters Association of Canada | Blaine Wiggins, Arnold Lazare, Mike Seth |
| Assembly of First Nations | Irving Leblanc |
| Responsible Distribution Canada (Canadian Association of Chemical Distributors, CACD) | Jim Bird, Mark Jasper |
| British Columbia Ministry of Environment | Dennis Redford, Laurie Boyle, D'Arcy Sego, Yannick Lapière |
| British Columbia Ministry of Transportation | Brandie Frawley |
| Canadian Association of Chiefs of Police | Mark Ford, Murray Knowles |
| Canadian Association of Fire Chiefs (CAFC) | Erika Adams, Brian Ladds, J-P Cody-Cox, Kevin Clifford, Dan Paulsen, Corey Schram |
| Canadian Association of Petroleum Producers (CAPP) | Blake Williams, Vicki Ballance, Craig McCaskey, Henry Ridders |
| Canadian Council of Fire Marshals and Commissioners (CCFMC) | Dennis Gannon |
| Canadian Emergency Response Contractors Alliance (CERCA) | Bob Goodfellow, JC Morin |
| Canadian Fuels Association (CFA) | Adrian Michielsen (ERTF Vice-Chair), Linda Manka |
| Canadian Interoperability Technology Interest Group (CITIG) | Eric Torunski |
| Canadian National (CN) Rail | Danny Simpson, Lee Nelson |
| Canadian Pacific (CP) Railway | Jim Kozey, Darlene Nagy, Scott Croome |
| Canadian Propane Association (CPA) | Mélanie Levac |
| Canadian Volunteer Fire Services Association | Denis Lauzon |
| Canadian Trucking Alliance (CTA) | Geoffrey Wood, Barrie Montague |
| Center for Toxicology and Environmental Health (United States) | James Panasiuk, Dr. Glenn Millner |
| Chemistry Industry Association of Canada (CIAC) | Fiona Cook, Kara Edwards |
| Defense Research and Development Canada, Centre for Security Science (DRDC-CSS) | David Matschke, Jean Murwanashyaka, Tara Logue, John DeHooge |
| <i>École nationale des pompiers du Québec</i> | Benoit Laroche |
| Emergency Response Assistance Canada (ERAC) | Spencer Buckland, Patrick Knight, Louis-Phillipe Éthier |
| ENFORM | Finbarr Wilson, Gordon Walsh |
| Environment Canada | Lo Cheng, Simon Despatie, Thierry Mezzana |

| ORGANIZATION | NAME |
|--|---|
| Federal/Provincial/Territorial Task Force | Trudy Iwanyshyn, Scott Davies |
| Federation of Canadian Municipalities (FCM) | Andrée Chenard, Daniel Rubinstein, Caroline Mellor |
| Fertilizer Canada | Giulia Brutesco, Ron Lutzer |
| International Association of Emergency Managers – Canada | Brian Moore |
| Justice Institute of British Columbia (JIBC) | Peter Grootendorst, Brent Cowx |
| <i>Ministère de la Sécurité Publique du Québec</i> | Gilles Desgagnés, Jacques Proteau, Serge Fortier, Sylvie Mathurin, Louis Bétournay |
| National Fire Protection Association (NFPA) | Shayne Mintz, Thomas McGowan |
| Ontario Ministry of Transportation | Stephanie Maragna |
| Public - Subject Matter Expert | Ernie Wong, Michel Cloutier, Brian Mullen |
| Railway Association of Canada (RAC) | Andy Ash, Jean-Pierre Couture, Paul Mahony |
| Renewable Fuels Association (United States) | Kristy Moore, Missy Ruff |
| Teamsters Canada (Rail) | Glen MacDonald, Phil Benson, Don Ashley |
| Transport Canada, TDG | Chris Powers (ERTF Chair), Louis Laferriere Nicole Girard, Clive Law, Nathalie Belliveau, Ben Turcotte, Peter Coyles, Louis Marcotte, Nicolas Cadotte, Fred Scaffidi, Monique Lavoie, Julie Laurendeau, Sara Devereaux, Mathieu Lemay, Josée Boudreau, Paul Driver, Dan Olech, Ève Poirier |
| Transport Canada, CANUTEC | Angelo Boccanfuso, Pierre Manseau, Carieanne Picard |
| Transport Canada, TDG, ERTF Secretariat | Mylaine Desrosiers, Kathie Keeley, Lindsay Jones, Anastasia Karvounis, Rachèle Renaud |
| Transportation Safety Board (TSB) | Kirby Jang |

Guest presenters: Lambton College (André Ouellette); *Sûreté du Québec* (Captain René Cayer); *Association des chefs d'incendies du Québec* (Stephen Valade)

ANNEX C: LIST OF PRESENTATIONS

| Meeting Date | Document Title | Presenter |
|--------------------|---|--|
| August 14, 2014 | Presentation on Lac-Mégantic Derailment | Canadian Volunteer Fire Services Association |
| August 14, 2014 | Presentation on the LPGERC Organization and Elements of the LPGERC Flammable Liquids ERAP | LPG Emergency Response Corporation |
| September 5, 2014 | Discussion Document on Incident Scenarios | CAFC |
| September 5, 2014 | Incident Scenarios | ERAC |
| September 11, 2014 | GIS Mapping Opportunities | TDG Safety Research and Analysis, Transport Canada |
| September 11, 2014 | TDG Crude Oil Research Projects - 2014-15 | TDG Safety Research and Analysis, Transport Canada |
| October 1, 2014 | Presentation (CIAC): TEAP III Introduction to Technical Advisor Training Disciplined Approach | CIAC |
| October 1, 2014 | PHMSA Crude Oil Rail Emergency Response Lessons Learned Roundtable Report | CAPP |
| October 1, 2014 | Presentation (CAPP): PHMSA Crude Oil Rail Transportation Emergency Response Outreach Update | CAPP |
| October 9, 2014 | Renewable Fuels Association: Industry Information, Safety Efforts | RFA (U.S.A.) |
| October 9, 2014 | Emergency Response Overview | CP Rail |
| November 12, 2014 | Presentation (CN Rail): CN Rail ICS Presentation - RR ICS Section (Final) | CN Rail |
| November 12, 2014 | Presentation (CN Rail): CN Rail ICS Presentation - CN Emergency Response Plan 2013 | CN Rail |
| November 20, 2014 | AskRail Presentation for the TDG Emergency Response Task Force | CP Rail |
| November 20, 2014 | Renewable Fuels Association: Industry Information, Safety Efforts | RFA (U.S.A.) |
| November 20, 2014 | Canadian Flammable Liquid Firefighting Fund | CAFC |
| November 20, 2014 | Canada's Multi-Agency Situational Awareness System (MASAS) | DRDC-CSS |
| December 11, 2014 | Lac-Mégantic and L'Isle-Verte: Lessons in Major Disaster Management | Sûreté du Québec |
| December 11, 2014 | Understanding the NFPA Standards and Codes Process... | NFPA |

| Meeting Date | Document Title | Presenter |
|-------------------|--|--|
| December 11, 2014 | Presentation on the Lac-Mégantic train derailment | Canadian Volunteer Fire Services Association |
| December 11, 2014 | Fire Service Training Standards in Canada | ERTF Chair |
| January 15, 2015 | Updated Report on the ICS/IMS Canada Project | Alberta Emergency Management Agency |
| January 15, 2015 | Making Communities More Resilient Incident Management Teams and Regional Partnerships | Alberta Emergency Management Agency |
| January 15, 2015 | Amendments to the Transportation of Dangerous Goods Regulations (TDGR) - Lithium Metal Batteries, ERAPs & Updates to Schedules | TDG Regulatory Affairs, Transport Canada |
| February 19, 2015 | Experience in Emergency Procedures Involving Flammable Liquids | SME |
| February 19, 2015 | Flammable Liquids Field Response Experience | Canadian Emergency Response Contractors Alliance |
| February 19, 2015 | RMS role and responsibilities | Transport Canada |
| March 19, 2015 | Mapping of Crude Oil and Ethanol by Rail | TDG Safety Research and Analysis, Transport Canada |
| March 19, 2015 | FCM's Rail Safety Priorities -Transportation of Dangerous Goods by Rail | Federation of Canadian Municipalities |
| March 19, 2015 | National TRANSCAER Initiative Overview | CIAC |
| April 16, 2015 | ERAP Activation Process | ERTF Vice-Chair |
| April 16, 2015 | SME Report on Findings for Flammable Liquids Potential Requirement for an ERAP (Class 3 PGs I and II) | SME |
| April 16, 2015 | Presentation on CACD -Who they are and the role they play in the shipping of Dangerous Goods in Canada | CACD |
| May 14, 2015 | Environmental Emergencies Program: Things to Consider During Flammable Liquid Incidents | Environment Canada |
| May 14, 2015 | Flammable Liquids Volumes Transported by Rail | TDG Safety Research and Analysis, Transport Canada |
| May 27, 2015 | Presentation Generic ERAP | ERTF Chair |
| May 27, 2015 | Discussion on ERAP Activation Using a Scenario-based Approach: - Activation Process - Table 1 Potential Accident Assessment - HBC Incident Briefing (ICS 201) & Checklist - Mobilization Process | ERAC |

| Meeting Date | Document Title | Presenter |
|-------------------|--|--|
| June 10, 2015 | Suggestions for ERAP Program Improvement and Effectiveness | ERTF Chair |
| June 11, 2015 | SME Report on Findings for Flammable Liquids Potential Requirement for an ERAP (Class 3 PGs I, II and III) | SME |
| June 11, 2015 | SME Report on Findings Class 3 Packing Groups I, II and III | SME |
| November 19, 2015 | SME Report on Findings for Flammable Liquids Potential Requirement for an ERAP (Classes 3(6.1), 6.1(3), 3(6.1)(8), 6.1(3)(8), 3(8) and 8(3)) | SME |
| November 19, 2015 | Briefing on the Risk Assessment on Flammable Liquids by Rail | TDG Compliance and Response, Transport Canada |
| November 19, 2015 | SME Report on Findings Classes 3(6.1), 6.1(3), 3(6.1)(8), 6.1(3)(8), 3(8) and 8(3) | SME |
| December 17, 2015 | Emergency Management Program Strategic Review: December 17, 2015 | Emergency Management and Planning Office, Ontario, MOT |
| January 21, 2016 | About the Justice Institute of British Columbia (JIBC) | JIBC |
| January 21, 2016 | Canadian Fire Service Training Directors | École nationale des pompiers du Québec |
| January 21, 2016 | Overview of Fire Training Program at Lambton College | Lambton College |
| January 21, 2016 | System Protection and Emergency Preparedness | CN Rail |
| February 17, 2016 | Activation and Mobilization | ERTF Vice-Chair |
| February 17, 2016 | Defining "ERAP Activation" and Proposed Recommendations 37, 38, 39, and 40 | ERTF Vice-Chair |
| February 17, 2016 | Content to Include in a Generic Class 3 ERAP | ERTF Vice-Chair |
| February 17, 2016 | Data Needed for Continuous Improvement and Effective Monitoring of the ERAP Program and Proposed Recommendation 42 | ERTF Vice-Chair |
| February 18, 2016 | Emergency Response Guidebook (ERG): From the beginning until today | CANUTEC, Transport Canada |
| February 18, 2016 | Crude Oil Sampling and Testing Research Project – Findings and Action Plan | TDG Safety Research and Analysis, Transport Canada |
| June 10, 2016 | Activation and Mobilization Flow Chart: Transportation Incident Escalation for ERAPable Products (Draft) | CFA |

ANNEX D: FLAMMABLE LIQUIDS TECHNICAL ADVISOR COMPETENCY PROFILE

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Purpose

Under Part 7 of the *Transportation of Dangerous Goods Regulations*, an organization may be required to have an Emergency Response Assistance Plan (ERAP). When an organization applies for an ERAP and receives approval by the TDG Directorate, that organization is then referred to as an ERAP-holder. The ERAP-holder's documentation must contain a description of the capabilities of a Technical Advisor.

With the intent to improve the understanding by ERAP-holders, rail carriers, first responders and public safety authorities, the basic role and responsibility of the Technical Advisor is to provide or be able to identify resources or information necessary for effective incident mitigation. This role - which may be filled by more than one individual but with only a single point of contact within the Incident Command System – will be to provide assistance via the telephone and at the scene of the incident.

The purpose of this document is to describe the capability/competency (expected knowledge, training, and experience) of a specific type of Technical Advisor, one for a Flammable Liquids ERAP namely a Flammable Liquids Technical Advisor (FLTA).

Scope

This document applies to all ERAP-holders who offer, transport, import or are responsible for a TDG Class 3, Flammable Liquid, ERAP in Canada and therefore, have a FLTA as required by the ERAP. The following description applies to both ERAP-holder company employees and contracted transportation emergency response service providers acting as FLTA on behalf of an ERAP holder.

Role and Responsibilities

A FLTA must be available 24 hours a day, 7 days a week.

The FLTA must be able to provide initial assistance by telephone.

The FLTA must have the authority to provide advice and assistance as well as engage necessary resources in accordance with the ERAP for the safe and effective resolution of the incident.

The FLTA must attend a transportation incident scene, as required, including requests by carrier, public authorities or mutual aid/contracted transportation emergency response service provider.

The FLTA must be able to assess a flammable liquid railway incident and provide advice on tactics and strategies for spill and firefighting response within the Incident Command System, in the areas:

a. hazards associated with the flammable liquid;

- reactivity and compatibility with other chemicals, materials and the physical environment
- physical characteristics
- flammability, explosively, by-products of incomplete and complete combustion, and
- consequences of personnel exposure (contact, inhalation, ingestion).

b. behaviour characteristics if the flammable liquid is released;

- physical state (solid, liquid, gas) and appearance (colour, odour)
- density in air, water
- solubility, and
- mobility in water, soil and air

c. hazards associated with the incident;

- ignition sources

- threats to
 - response team
 - population in the area
 - environment
 - equipment and property, and
 - adjacent means of containments

d. knowledge of the means of containment;

- specifications, safety and relief valves, stenciling and safety marks
- rail tank car damage assessment, and
- receiving means of containment

e. response options;

- isolation zones
- spill
 - installation of plugs, capping of valves, stabilization, containment
 - transfer, recovery, and
- fire suppression
 - defensive, offensive, non-intervention

f. response resources and contacts as identified in the ERAP;

- transportation emergency response service providers (i.e. in-house, for hire, ER contractor, consultant, mutual aid).

Furthermore, the FLTA must have ready access to individuals that can provide information such as
1) potential environmental impacts of both the spill and the implemented response techniques, and
2) air dispersion modeling.

Knowledge

Working knowledge means having training and experience necessary to provide technical assistance to the on-scene responders as well as having resources identified to obtain more specific technical information.

FLTAs must have working knowledge for those materials for which they are responsible in a transportation incident:

- a. Safety practices at an incident scene
- b. TDG Regulations, GHS/WHMIS
- c. safe handling for Flammable Liquids
- d. suitable detection equipment technologies and their limitations
- e. Incident Command System
- f. personal protective equipment requirements
- g. railway tank car damage assessment
- h. response techniques (options) available for the material and means of containment,
- i. Flammable Liquids firefighting,
- j. Flammable Liquids (TDG) Emergency Response Chart, A Disciplined Approach, and
- k. ERAP.

Training and Experience

The training and experience qualifications of a FLTA must be documented and records maintained by the ERAP holder. The required training and experience or equivalent credentials for the FLTA must include the following at the minimum frequency shown in parenthesis:

- a. Communication skills and devices
- b. Company Safework Guidelines/Practices (three years)
- c. TDG Certification (three years)
- d. WHMIS (three years)
- e. ERAP-holder's ERAP (three years or sooner if major changes occur)
- f. Incident Command System, ICS 100 and 200 are mandatory, ICS 300 is preferred (formal review/training every three years; annual exercise or participation in an incident utilizing ICS)
- g. spill and firefighting response techniques – this includes response to an actual incident or taking part in a mock/drill exercise (annual)
- h. NFPA 472 HazMat Technician with Tank Car Specialty or Advanced Tank Car Specialty
 - flammability and toxicity detection equipment and limitations (annual)
 - personal protective equipment requirements (annual)
 - tank car damage assessment (three years)
- i. Selected Requisite Knowledge or Requisite Skills from the following:
 - NFPA 1001 Firefighter level 1 or 2, and
 - NFPA 1081, or
 - NFPA 472.
- j. Trained in rail safety for emergency response operations
 - Valid eRail Safe card (for contractors hired directly by a rail carrier)
 - ERAP-holders FLTAs shall be vetted and documented separately (to be determined)
- k. Crude By Rail (one time, 3-day course, SERTC, Pueblo)
- l. Technical working knowledge of the physical and chemical characteristics of the material and anticipated hazards at an incident scene
- m. Technical working knowledge of suggesting stabilization and mitigation measures that could be implemented at the incident scene, and
- n. Technical working knowledge of the means of containment.

Response Tier and Timelines

FLTAs shall provide technical or emergency response advice immediately over the telephone within 10 minutes of the initial request.

FLTAs shall attend the incident scene immediately but no more than six hours of the initial request.

A response team and equipment shall attend the scene within 12 hours of the initial request.

Best efforts are expected, however, consideration must be given to natural disasters, weather conditions, site accessibility, or other circumstances such as acts of terrorism which may interfere with the above timelines.

ANNEX E: PRIORITY 2, 3 AND 4 FLAMMABLE LIQUIDS FOR ERAP POTENTIAL

Table 1: List of 10 Priority 2 Class 3, PG I, II and III Substances for ERAP Potential

| Priority 2: 10 substances | |
|---|---|
| PG I | |
| 1. UN2389, Furan | 3. UN1155, Diethyl ether |
| 2. UN1108, 1-Pentene | 4. UN2059, Nitrocellulose solution, flammable |
| PG II | |
| 5. UN2398, Methyl tert-butyl ether | 8. UN2246, Cyclopentene |
| 6. UN1159, Diisopropyl ether | 9. UN2298, Methylcyclopentane |
| 7. UN2059, Nitrocellulose solution, flammable | 10. UN2384, Di-n-propyl ether |
| PG III (none) | |

Table 2: List of 22 Priority 3 Class 3, PG I, II and III Substances for ERAP Potential

| Priority 3: 22 substances | |
|-------------------------------|--|
| PG I | |
| 1. UN1144, Crotonylene | 5. UN2459, 2-Methyl-1-butene |
| 2. UN1265, Pentanes | 6. UN2561, 3-Methyl-1-butene |
| 3. UN2356, 2-Chloropropane | 7. UN2749, Tetramethylsilane |
| 4. UN2363, Ethyl mercaptan | 8. UN3336, Mercaptan mixture, liquid, flammable, N.O.S. |
| PG II | |
| 9. UN1091, Acetone oils | 16. UN2347, Butyl mercaptan |
| 10. UN1146, Cyclopentane | 17. UN2370, 1-Hexene |
| 11. UN1164, Dimethyl sulphide | 18. UN2402, Propanethiols |
| 12. UN1208, Hexanes | 19. UN2457, 2,3-Dimethylbutane |
| 13. UN1265, Pentanes | 20. UN2461, Methylpentadiene |
| 14. UN2288, Isohexenes | 21. UN2612, Methyl propyl ether |
| 15. UN2301, 2-Methylfuran | 22. UN3336, Mercaptan mixture, liquid, flammable, N.O.S. |
| PG III (none) | |

Table 3: List of 61 “Priority 4” Class 3, PG I, II and III Substances for ERAP Potential

| Priority 4: 61 substances | |
|---|---|
| PG I (none) | |
| PG II | |
| 1. UN1165, Dioxane | 17. UN2615, Ethyl propyl ether |
| 2. UN1224, Ketones, liquid, N.O.S. | 18. UN3271, Ethers, N.O.S. |
| 3. UN1245, Methyl isobutyl ketone | 19. UN1129, Butyraldehyde |
| 4. UN1153, Ethylene glycol diethyl ether | 20. UN1989, Aldehydes, N.O.S. |
| 5. UN1156, Diethyl ketone | 21. UN2058, Valeraldehyde |
| 6. UN1166, Dioxolane | 22. UN2367, alpha-Methylvaleraldehyde |
| 7. UN1179, Ethyl butyl ether | 23. UN1114, Benzene |
| 8. UN1219, Isopropanol | 24. UN1136, Coal tar distillates, flammable |
| 9. UN1234, Methylal | 25. UN1175, Ethylbenzene |
| 10. UN2045, Isobutyl aldehyde | 26. UN1261, Nitromethane |
| 11. UN2252, 1,2-Dimethoxyethane | 27. UN1279, 1,2-Dichloropropane |
| 12. UN2256, Cyclohexene | 28. UN1288, Shale oil |
| 13. UN2350, Butyl methyl ether | 29. UN1294, Toluene |
| 14. UN2373, Diethoxymethane | 30. UN1306, Wood preservatives, liquid |
| 15. UN2377, 1,1-Dimethoxyethane | 31. UN2047, Dichloropropenes |
| 16. UN2536, Methyltetrahydrofuran | 32. UN1999, Tars, liquid |
| | 33. UN2342, Bromomethylpropanes |
| PG III | |
| 34. UN1918, Isopropylbenzene | 47. UN3272, Esters, N.O.S. |
| 35. UN1147, Decahydronaphthalene | 48. UN2219, Allyl glycidyl ether |
| 36. UN1149, Dibutyl ethers | 49. UN1989, Aldehydes, N.O.S. |
| 37. UN1153, Ethylene glycol diethyl ether | 50. UN2222, Anisole |
| 38. UN1157, Diisobutyl ketone | 51. UN1134, Chlorobenzene |
| 39. UN1171, Ethylene glycol monoethyl ether | 52. UN1136, Coal tar distillates, flammable |
| 40. UN1172, Ethylene glycol monoethyl ether acetate | 53. UN1139, Coating solution |
| 41. UN1188, Ethylene glycol monomethyl ether | 54. UN1223, Kerosene |
| 42. UN2053, Methyl isobutyl carbinol | 55. UN1306, Wood preservatives, liquid |
| 43. UN2057, Tripropylene | 56. UN1307, Xylenes |
| 44. UN2528, Isobutyl isobutyrate | 57. UN1915, Cyclohexanone |
| 45. UN3092, 1-Methoxy-2-propanol | 58. UN1999, Tars, liquid |
| 46. UN3271, Ethers, N.O.S. | 59. UN2047, Dichloropropenes |
| | 60. UN2344, Bromopropanes |
| | 61. UN2608, Nitropropanes |

Table 4: List of 13 Priority 4 Class 6.1(3), Class 3(6.1), Class 3(8), Class 8(3), Substances for ERAP Potential

| Class 6.1(3): 5 substances | Class 3(6.1): 5 substances |
|--|---|
| <ol style="list-style-type: none"> 1. UN2903 PG II, III*, Pesticide, liquid, toxic, flammable, N.O.S. 2. UN2929, Toxic liquid, flammable, organic, N.O.S. 3. UN3275 PG II, Nitriles, toxic, flammable, N.O.S. 4. UN3279 PG II, Organophosphorus compound, toxic, flammable, N.O.S. | <ol style="list-style-type: none"> 1. UN2310, Pentan-2,4-dione 2. UN1988, PG II, III*, Aldehydes, flammable, toxic, N.O.S. 3. UN1184, Ethylene dichloride 4. UN2603, Cycloheptatriene |
| Class 3(8): 1 substance | Class 8(3): 2 substances |
| <ol style="list-style-type: none"> 1. UN1289 PG II, Sodium methylate, solution in alcohol | <ol style="list-style-type: none"> 1. UN1747, Butyltrichlorosilanes 2. UN2502, Valeryl chloride |

*Note: Substance counts twice; once for each PG

ANNEX F: RAILWAY DANGEROUS GOODS INCIDENTS-ROLES AND RESPONSIBILITIES TABLE

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AGENCY/ ORGANIZATION

RAILWAYS

Note: This section of the table identifies Roles and Responsibilities that Class 1 railways (CN and CP) are able to assume.

Short line railways do not have the same level of resources available.

ROLES AND RESPONSIBILITIES AT AN HHFT INCIDENT

When an incident occurs railways respond through their internal Emergency Response Plans (ERPs).

- Train Crew reports incident, starting a callout process.
- The railway then:
 - Notifies First Responders – police, fire, ambulance immediately
 - Report the incident to (as required by regulation):
 - Transportation Safety Board
 - TDG (Transport Canada – CANUTEC)
 - Environmental Authorities
 - Local authorities
 - Secures product identification and emergency handling information
 - Mobilizes operations, engineering, mechanical, environmental services, claims and community relations to the site, as required.
 - Notifies Consignor/ERAP holder(s)

Notes:

- If commodity is Dangerous Goods, the consignor or contractor may mobilize to site
- Depending on incident severity and type, specialized contracted services are notified and mobilized to the site.

Incident Command

Railways (RR) are prepared to function in any capacity within any ICS structure.

The Senior Transportation Officer or his designate at the scene is the RR's On Scene Responses Coordinator (OSRC) to interface with the Incident Commander under the ICS Operations Branch.

The Train Crew will provide the train documents to the IC. In absence of the Train crew the documents can be obtained via the Rail Traffic Controller, RR Police, or the RR OSRC.

A RR Incident/Operations Command Centre is set up. Major Organization Components in a typical railroad structure (under Operations Branch in ICS):

- Transportation – protect incident scene from trains – arrange movement of cars
- Mechanical – order heavy equipment for wrecking operations
- Engineering – re-build track and build track to support re-railing/transload operations
- Safety/Risk Management
 - Environment & HazMat Team

| AGENCY/ ORGANIZATION | ROLES AND RESPONSIBILITIES AT AN HHFT INCIDENT |
|---------------------------|--|
| | <ul style="list-style-type: none"> • Works within ICS • Conduct damage assessment and mitigate leaks and spills • Arrange for transloading of product, if required. • Work with ERAP holder/contractor, as required • Public Affairs – address public dislocated or evacuated • Accident Investigation <p>Debriefing</p> <ul style="list-style-type: none"> • Incidents are “debriefed” among railway personnel and regulators • If serious incidents affect the community, the railway participates in debriefings with Community representatives, local leaders and first responders <p>Responsibilities:</p> <ul style="list-style-type: none"> • Protect life and health • Protect property and the environment • Ensure and provide for business continuity |
| FIRE SERVICE | <p>First responder, usually Authority Having Jurisdiction</p> <ul style="list-style-type: none"> • Assess situation, establish incident command, make notifications, secure scene with Police, rescue of persons at risk, if possible, consider evacuations, develop Incident Action Plan, call for additional resources • Fire suppression, rescue, traffic control • Fire control, incident stabilization • Fire service decontamination <p>First Nations fire services, through their funding agreements with AANDC, are primarily funded to suppress fires in residential occupancies and facilities funded through AANDC.</p> <p>Many First Nations’ fire services provide protection above and beyond those identified as part of the funding formula to include additional fires and rescue.</p> <p>The First Nations must determine an appropriate level of service provision, and as such where financial, policy, etc. implications come into play, it is their responsibility to provide for those services.</p> |
| POLICE SERVICE | <ul style="list-style-type: none"> • On-scene Security, Traffic/Crowd Management, Investigation, Evacuation, • Family/Community Support, • Incident Command (depending on nature of Incident) • Support – manage security, zones, evacuation, • Victim Identification, assist Coroner • Investigation under Criminal Code |
| EMERGENCY MEDICAL SERVICE | <p>Support – medical services – treat, triage, transport</p> |

| AGENCY/ ORGANIZATION | ROLES AND RESPONSIBILITIES AT AN HHFT INCIDENT |
|---|--|
| CANUTEC TRANSPORT CANADA TDG Directorate | Provides TDG technical and scientific advice and communicates to first responders ERAP information such as MSDS (SDS) information, arranges conference calls with industry experts and others. |
| COMPLIANCE AND RESPONSE BRANCH TRANSPORT CANADA TDG Directorate | TC TDG Inspectors or Remedial Measures Specialists (RMS) provide advice and expertise to Incident Command on emergency response, provide technical support and understand the ERAP requirements, work with Industry and Contractors to ensure public safety and may be part of Unified Command. |
| TRANSPORTATION SAFETY BOARD | Investigates incident. Recommends incident prevention and response. |
| ERAP HOLDER | If the product is “ERAPable”, the consignor/importer must be able to provide technical knowledge on product and ensure response assistance is available (either directly or via contracted service) |
| ERAP EMERGENCY RESPONSE ORGANIZATION | Provides the response coordination as per the approved ERAP, which may include: 1. Emergency Call Centre 2. Initial response support via over the phone support from a Technical Advisor 3. On-site assistance with response tactics, logistics, safety and communications provided by a Technical Advisor and/or response team Establish and maintain training and records for competency standards and responses |
| EMERGENCY RESPONSE CONTRACTOR(S) | Provides for hire, hands-on, on-scene emergency response within the railway operations sector. Conducts recovery, mitigation and clean-up activities |
| PROVINCIAL/ TERRITORIAL MINISTRY OF ENVIRONMENT | Inspects & investigates environmental impacts (if leaves federal site or if there is a possibility of an adverse effect on the environment off federal site); Provides advice on environmental concerns to Incident Command; provides local technical knowledge, organizes/directs mitigation of environmental impact of incident in areas under Provincial/Territorial jurisdiction. |

ANNEX G: FLAMMABLE LIQUID (TDG) EMERGENCY RESPONSE CHART – A DISCIPLINED APPROACH

How to use the Disciplined Approach Chart:

Situation Analysis

Start by analyzing the situation. The goal is to define and prioritize critical objectives: what needs to be protected (life, property, and environment) from what hazards? This includes identifying and analyzing:

- The problem (nature and quantity of material, type and condition of Container; stability of the incident);
- Modifying conditions (location, time and weather conditions);
- Potential losses (affected area): from the list of potential losses, identify and prioritize those that are critical.
- Control measures: determine the right kind and amount of resources needed to protect life, property and environment.

Strategies and Tactics

Develop the response and restoration tactics to meet the critical objectives, including:

- Establishing Incident Command Structure
- Protecting from Additional Losses
- Stabilizing the hazard
- Planning Fire Interventions
- Mitigating the hazard
- Following Recovery and Clean Up Strategies.

Implementation

Does the situation stabilize, intensify or change in other ways? if yes, return to the Situation Analysis Modifying Conditions list.

SITUATION ANALYSIS

| Problem | | | Modifying Conditions | | | Potential Losses | Control Measures |
|---|---|---|--|---|---|--|---|
| Nature & Quantity of Material | Type, Condition & Behaviour of Container | Stage of Incident | Location | Time | Weather Conditions | Affected Area | Resources |
| 1. UN Number & Shipping Name 2. Quantity spilled 3. Quantity at risk 4. Physical and chemical properties 5. Dangerous goods; ERAP | 1. Mode of transport <ul style="list-style-type: none"> • road • rail • ship/barge 2. Means of Containment <ul style="list-style-type: none"> • tank car & number involved • tank truck • Intermodal container 3. Fixed Facilities <ul style="list-style-type: none"> • transload • loading rack 4. Danger of failure <ul style="list-style-type: none"> • Mechanical damage • chemical reaction • fire exposure 5. Failure <ul style="list-style-type: none"> • leak • puncture • Heat Induced Tear • BLEVE | 1. Stable 2. Unstable <ul style="list-style-type: none"> • potential for escalation of the incident | 1. Remote 2. Rural 3. Urban/suburban 4. Difficult terrain 5. Limited access 6. Land spill 7. Involves body of water 8. Effects of terrain on product location & migration | 1. Time of incident 2. Time of notification 3. Time of day <ul style="list-style-type: none"> • daylight • traffic • tide 4. Day of week 5. ETA at incident for: <ul style="list-style-type: none"> • Community • First Responders • Railway/carrier • FL Technical Advisor • Response resources (personnel & equipment) | 1. Temperature 2. Wind direction 3. Wind speed <ul style="list-style-type: none"> • wind chill 4. Humidity 5. Air inversion 6. Precipitation <ul style="list-style-type: none"> • rain • snow • fog 7. Weather forecast <ul style="list-style-type: none"> • thunder • lightning • ice storm • hurricane • Chinook | 1. People <ul style="list-style-type: none"> • fatality • injury 2. Property <ul style="list-style-type: none"> • private • public 3. Environment <ul style="list-style-type: none"> • drinking water • lakes, rivers or streams • soil/ground water • wildlife/habitat 4. Public Communications <ul style="list-style-type: none"> • media type • government • community • special interest | 1. Carrier (railway) Emergency Response (ER) Plan 2. Community ER Plan <ul style="list-style-type: none"> • Community First Responders; fire, police, EMS • EMO 3. Consignor/shipper ERAP and trained personnel <ul style="list-style-type: none"> • FL Technical Advisor • Specialist for other products • Response resources 4. Marine Response Organization. 5. Control agents <ul style="list-style-type: none"> • Firefighting: water/foam • Dispersants 6. Support services <ul style="list-style-type: none"> • aerial surveillance, dispersion modeling 7. Federal, Provincial, Territorial, Municipal, First Nations <ul style="list-style-type: none"> • Environment, transportation, natural resources • Other 8. Utilities <ul style="list-style-type: none"> • Electricity, gas, telephone, fibre optics 9. Product information <ul style="list-style-type: none"> • Manufacturer, CANUTEC, CHEMTREC |

STRATEGIES AND TACTICS

| Response Strategies | | | | | Restoration Strategies | |
|---|--|---|--|---|---|--|
| Establish Incident Management | Protect Potential Losses | Stabilize the Hazard | Fire Intervention | Mitigate the Hazard | Recovery | Clean Up & Disposal |
| <ol style="list-style-type: none"> 1. Participate in Incident Command System/ Incident Management System 2. Identify Incident Commander (AHJ) 3. Participate in Unified Command 4. Develop and issue Incident Action Plan (IAP) 5. Activate community emergency plan | <ol style="list-style-type: none"> 1. Protect responders 2. Rescue trapped/injured persons 3. Protect public <ul style="list-style-type: none"> • Shelter in place • Evacuate 4. Defensive Protection <ul style="list-style-type: none"> • Property • Domestic animals & wildlife • Environment | <ol style="list-style-type: none"> 1. Ignition <ul style="list-style-type: none"> • remove sources • control burn 2. Stop the leak <ul style="list-style-type: none"> • Plug/patch • capping kit 3. Contain <ul style="list-style-type: none"> • dam/dike • Boom 4. Prevent container failure <ul style="list-style-type: none"> • cool • depressurize 5. Take no action | <ol style="list-style-type: none"> 1. Defensive Action <ul style="list-style-type: none"> • remove other ignition sources • protect exposures • remove fuel • divert/contain spilled material 2. Offensive Action <ul style="list-style-type: none"> • Water • Foam • Chemical 3. Non-Intervention <ul style="list-style-type: none"> • Let substance burn | <ol style="list-style-type: none"> 1. Extinguish fire 2. Maintain foam blanket 3. Material removal <ul style="list-style-type: none"> • transfer • recover 4. Remove uninvolved containers/material 5. Place barrier to prevent impact on container | <ol style="list-style-type: none"> 1. Restore public services <ul style="list-style-type: none"> • electricity, water & transportation • return evacuees 2. Rehabilitate damaged infrastructure 3. Resumption of business 4. Support services for health and social services | <ol style="list-style-type: none"> 1. Comply with regulations 2. Due diligence <ul style="list-style-type: none"> • Re-use • Re-process • Recycle 3. Assess quantity spilled and area affected <ul style="list-style-type: none"> • detect • monitor • sample 4. Assess impact on the environment 5. Evaluate technology <ul style="list-style-type: none"> • Work with authorities |
| IMPLEMENT | | | | | | |
| Does situation stabilize, intensify or other change? If yes, return to Modifying Conditions . | | | | | | |

