RAIL SAFETY FIRST

COMMUNITIES FOR SAFE, TRANSPARENT + ACCOUNTABLE RAIL.

22 April 2016

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Standing Committee on Transport, Infrastructure and Communities
House of Commons
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Ladies and Gentlemen:

Re: Study on Implementation of Recommendations Made in the Report *Review of the Canadian Transportation Safety Regime: Transportation of Goods and Safety Management System*

Rail Safety First is a coalition of resident and business improvement associations formed in the aftermath of the Lac-Mégantic derailment to advocate for safe, transparent and accountable rail. We welcome the opportunity to make submissions to the Committee. The appendix to this letter contains a list of materials to which we refer. The defined terms used in this letter are set out in the appendix.

Given the scope of the Committee's study we will limit our comments to three topics, safety management system (SMS) (Recommendations 1 and 9 of the TRAN Final Report), tank cars (Recommendations 2 and 3 of the TRAN Final Report) and liability and compensation regime (Recommendation 4 of the TRAN Final Report).

The theme that underlies our submission is the perception that the public interest in the safe transportation of dangerous good (DGs) -- not just crude oil -- by rail has been subordinated to the interests of other participants in the system.

1. SMS – The Failure of "Smart Regulation"

The Auditor-General's report was circumspect in its turn of phrase "that Transport Canada needs to address "significant weaknesses" in its oversight of safety management systems implemented by federal railway companies to manage safety rules on a day-to-day basis" (page 36 par. 7.82). The TSB Lac-Mégantic Report was less delicate when it stated:

> Given that the SMS Regulations came into force in 2001, TC Rail Safety should have had enough time to confirm that all railways have an SMS in place that is efficiently implementing safety...
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> However, as the Office of the Auditor General's (OAG's) examination of the adequacy of the rail oversight in November 2013 revealed, this

> objective has not been met. The OAG concluded that 12 years after the implementation of SMS, TC does not have adequate assurance that federal railways have implemented effective SMS.
>
> Despite TC's efforts, this accident demonstrates that a number of weaknesses are still present in the oversight of safety programs. (pages 126-127 par. 2.14.2)

The OAG report followed on the Advisory Panel Report in 2007 which, in turn, was precipitated by a number of high-profile rail accidents between 2005 and 2007. (OAG Report page 1)

The time has come to acknowledge that the SMS model is well beyond experiencing teething pains and is a problem child. SMS has demonstrably failed to protect the public interest. We submit that this failure of SMS is attributable to the design of the model, the under resourcing of Transport Canada and to its reflexive culture. SMS is in need of a thorough rethink, not just tinkering.

This conclusion is best articulated by Mark Winfield in his paper *"Smart Regulation" and Public Safety: Transport Canada's Safety Management System (SMS) Model and the Lac-Mégantic Disaster*. Professor Winfield presented his paper at our rail safety Town Hall in the spring of 2015. We commend the entire paper to you but quote the following from pages 12 and 13 of his paper.

> NPM [New Public Management] models for public administration have traditionally relied on a strong separation of policy and administrative functions between the state and service delivery agents respectively,[and] the intent has been that governments, who are subject to democratic accountability structures retain control over the content of policy, and that non-traditional delivery agents only carry out the administrative implementation of policy decisions (reference omitted).
>
> The current rail safety regulatory regime departs from these principles in a number of important ways. As noted above, even where Transport Canada retains nominal control over the general formulation of rules, regulations and standards, the move towards performance standards provide increasingly broad discretion to railway operators in terms of how the required outcomes can be met through their SMS. The situation is further reinforced by the availability of the option of formulating company-specific rules subject to Transport Canada approval. In the result, important policy decisions regarding balance being struck between efficiency and safety and operating practices are embedded in the company rules and SMS developed by the railways. Significant concerns over the department's ability to review the contents of these

> rules and SMS in a timely manner were identified by the Auditor General (2013). Without such capacity, Transport Canada's role becomes one of being the enforcer of policy choices made by the railway operators. The situation effectively reverses the NPM principles of government retaining control of the content of policy, while routine administrative oversight casts are being allocated to non-governmental actors.
>
> The existing oversight system embeds considerable potential for conflict of interest on the part of railway operators in the design and implementation of their individual company operating rules and SMS plans. They system potentially puts firms in the position of making their own choices about the balance between safety and efficiency and achieving the performance outcomes required by the Transport Canada and company rules.

Let us illustrate the point with some examples.

The Fox is in Charge of the Hen House

The TSB White River Report relates to an incident on April 3, 2013 in which a CP train from Thunder Bay en route to Toronto derailed near White River, Ont. Twenty-two tank cars derailed, seven of which were carrying DG (petroleum crude UN 1267). Two of the DG tank cars and a tank car loaded with canola oil released product (page 2). The train was travelling at 34.9 miles per hour at the time of the derailment.

The TSB White River Report identified the cause of the derailment as a broken wheel that fractured a rail. (Findings 1 page 37)

Railway tank cars are generally owned by shippers, not railways. Under operating rules railways have the authority to remove from service (set out) tank cars that have defects and repair them at the owner's expense.

To their credit, railways have adopted wheel impact load detector (WILD) technology that, in conjunction with other technologies and inspections, proactively identifies wheel flaws before they result in a wheel failure or derailment.

The TSB White River report noted that: "There are currently no regulatory requirements on thresholds governing WILD use in Canada or the United States" (page 16). In fact, the Report notes that there are a number of criteria that are being used.

Rule 41 of the Association of American Railroads is one such criterion (page 17).

CP has its own criteria, which TSB describes as follows:

> CP's WILD threshold was established primarily by industry practice and in order to manage the volume of wheels removed for WILD impact. CP has no engineering analysis of WILD data to support the WILD removal thresholds contained in its guidelines. (page 19)

CN also has its own criteria (pages 19-20). The TSB White River Report observed:

> The Transport Canada approved railway freight car inspection and safety rules have no provisions for condemning wheels due to recorded high impacts. Furthermore, there are currently no regulatory requirements or guidelines in Canada or the United States governing the use of wayside inspection systems (WIS), including WILDs. Consequently the location of WILD sites, the distance between them and the intervention thresholds differ for each railway. Railways can also alter WILD thresholds at any time to satisfy operating needs. While Transport Canada has indicated that it would create a joint forum to conduct a comprehensive review of WIS and WILD criteria in 2011, to date there have been no developments (page 33-34).

In its Findings as to the cause of the derailment, TSB stated that "despite recording a wheel impact that was condemnable under Association of American Railroads Rule 41, the wheel impact load detector guidelines of Canadian Pacific Railway permitted the R.1 wheel on tank car DBUX 302383 to remain in service until it failed four days later" (Findings 8 page 37).

While the Cat's Away the Mice Will Play

As the TRAN Interim Report notes, shipments of crude by rail increased from 500 car loads in 2009 to 160,000 car loads in 2013 with this figure expected to rise by another 73,000 car loads in 2014 and to total more than 510,000 car loads in 2016 (page 1). While market forces have doubtlessly tempered this forecast, one would have thought that this sudden increase in traffic was a significant change in operations that would have caused participants to re-examine corridor risk assessments and route planning and enquire as to the content of the tank cars. Ironically, in 2009 Canadian Pacific abandoned its Ottawa Valley Railroad rail route, which bypasses major urban areas.

TSB Lac-Mégantic Report states:

> In 2011, the TDG Directorate identified the rapid increase in the transportation by rail of petroleum crude as an emerging issue requiring greater regulatory oversight. As a result, the TDG Directorate started inspecting petroleum crude oil transloading facilities, focusing on specific areas of regulatory compliance in facility operations, such as

> tank car loading and securement practices. However, these inspections did not include verification of the classification of the petroleum crude being handled, offered for transport, transported or imported. Such verifications would have included a review of company classification procedures to ensure that dangerous goods are being classified based on the appropriate tests. Without monitoring an effective enforcement of compliance with applicable classification provisions in the TDG Regulations, there is a risk that improperly classified dangerous goods will enter the transportation system (paragraphs. 2.8.4 page 113).

In its Findings, the TSB identified that in fact the crude oil being transported was improperly classified as packing group III (lowest hazard), despite meeting the criteria of packing group II (Other findings para 3.3 2 page 132).

It also found that if Transport Canada does not audit the safety management systems of railways in sufficient depth and frequency and confirm that proactive actions are effectively implemented, there is an increased risk that railways will not effectively manage safety (Findings as to risk 3.2 15 page 131).

The Lac-Mégantic derailment raised the question whether the composition of the Bakken crude that was being transported posed incremental safety risks that should be factored in to corridor risk assessment and route planning.

One of the benchmarks in risk assessment is the volatility of the crude measured by its vapour pressure. Bakken crude is noted for containing more dissolved gases than conventional crude. The TSB laboratory analysis of samples from Lac-Mégantic recorded a Reid vapour pressure at 62.3 kpa to 66.1 kpa. (Appendix F, page 160) The higher the vapour pressure the greater the volatility. The vapour pressure can be reduced by "stabilizing" the crude before it is offered for shipment but this stabilization comes at a cost to the producer.

The composition of Bakken crude and its implications for rail safety became a matter of some controversy. The Wall Street Journal reported on November 2014:

> Canada's Transport Ministry does not typically test oil or other potentially hazardous products, but decided to run a series of tests following up on a transportation safety board investigation of crude involved in the Quebec train disaster. The study will look at 80 samples of Canadian crudes and will incorporate sealed and pressurized cylinders.
>
> "We've identified it 'using closed sealed cylinders' [and] that's probably being for our purposes the most accurate test to make sure we're not losing any light ends", said Patrick Juneau, a Transport Canada

> engineering research officer in charge of the test. "The science on this is evolving. Where we were a year ago or five years ago is different from today", he said.
>
> Under normal conditions, these light ends can boil out of the crude, creating a volatile head on the crude inside the tank car that can increase the risk and magnitude of an explosion. Many light oils contain elevated levels of highly volatile gasses like butane and propane, but where they are highest – such as in the Eagle Ford shale in Texas, crude is routinely stabilized to remove them.

To our knowledge, the Transport Canada test results have not been made public.

In December 2014, the Oil and Gas Division of the North Dakota Industrial Commission pre-empted matters when, it approved, effective April 1, 2015, a maximum vapour pressure of 13.7 pounds per square inch (PSI or 94.458 kpa) or approximately 50% higher than the values observed at Lac-Mégantic.

The North Dakota Industrial Commission's website says:

> The Oil and Gas Division regulates drilling and production of oil and gas in North Dakota. Our mission is to encourage and promote the development, production and utilization of oil and gas in the state in such a manner as will prevent waste, maximize economic recovery, and fully protect the correlative rights of all owners to the end that the land owner, the royalty owners, the producers, and the general public realize the greatest possible good from these vital natural resources.

There is no reference to safety.

The Q&A released with the announcement of the new vapour standard states:

> Question: The crude oil after the accident in Quebec had a vapour pressure of 9.3 PSI. Why doesn't the commission require a vapour pressure of 9 or less?
>
> A: Evidence in the record shows that the Transportation Safety Board of Canada questions the validity of the sample taken from the tank cars. The Transportation Safety Board of Canada has stated that in the product samples from the derailed tank cars would not be representative of the cargo prior to shipment. In addition the timing, source, sampling and analysis of the samples used have raised numerous questions about the results. No evidence supporting a lesser standard was presented to the Industrial Commission hearings on the subject.

The issue of the volatility of Bakken crude was canvassed in the March 2015 Sandia Report.

The May 1, 2015 joint announcement of the enhanced tank car standards deferred the issue of the volatility of Bakken crude for two years of further study.

2. Tank Car Standards – Running with Scissors

We welcome the May 1, 2015 joint USDOT Enhanced Standard/TC Enhanced Standard (TC/DOT-117) for transporting DGs that replaces the DOT-111 and CPC-1232 standards and supersedes the TC-140 standard. However, this announcement provides no immediate gains in safety and runs the risk of creating a false sense of security for a number of reasons.

First, the full retirement from service of the DOT-111 and CPC-1232 tank cars will not be completed until 2025. This seems an unduly protracted timeframe. Greenbrier, a U.S. tank car manufacturer and owner, welcomed the announcement of the new standard and indicated in a press release issued with the announcement that the standard was consistent with its Tank Car of the Future announced in February 2014 and that nearly 1,000 of the new tank cars had been delivered and were in service.

Secondly, the TC/DOT-117 standard, while intuitively more robust, has not been empirically verified to be able to withstand puncture and thermal tearing in real-world situations. The February 2016 Key Train Rules for core census metropolitan areas and secondary core consensus metropolitan areas establishes a speed limit of 40 miles per hour for key trains. However, in the Transport Canada regulatory impact analysis statement (TC RIAS) that accompanied the announcement of the new standard, Transport Canada indicates that demonstration tests for puncture resistance of tank car heads is at a speed of 18 miles per hour. For tank car shells the test speed is 12 miles per hour. It also indicates the possibility of validating new designs or retrofits using computer modelling. Derailments resulting in product loss due to punctures have been observed at speeds significantly lower than 40 miles per hour (White River noted above, Lynchburg, Va., and Mt. Carbon, W.Va.).

In fact, Transport Canada's RIAS states: "While transporting flammable liquids in TC/DOT-117 tank cars or retrofitted tank car would not completely eliminate the possibility of a release of flammable liquid during a rail accident, the enhanced tank car standards would significantly reduce the risk of release and the associated consequences."

Thirdly, in real-world scenarios, the survivability of a tank car in a derailment and the consequences, if any, of a breach are dependent on a number of variables of which tank car standards are only one. The enhanced standards are not a silver bullet. The volatility of the product being shipped is clearly one and we have noted above the

unsatisfactory state of the rules regarding that matter. The route selected is also vital to the analysis. So also, as noted above, is the speed at which the derailment occurs and the position in the train of the derailed cars. The derailment of a loaded tank car generates a tremendous amount of kinetic energy that must be absorbed or dissipated. Kinetic energy is determined by the formula $ke = \frac{1}{2} m \, x \, v^{\,2}$ where m is the mass of the tank car and v is its velocity.

The derailment of a tank car at 40 miles per hour generates four times the kinetic energy of a derailment at 20 miles per hour.

Taken together, the unsatisfactory rules surrounding the volatility of the Bakken crude and whether it should be stabilized before shipment, the speeds at which the DG trains are permitted to travel, and route planning that seems to fail to take into consideration traffic through urban areas create a situation akin to running with scissors, something that we tell our kids not to do.

Serious consideration should be given to rerouting these types of trains as set out in recommendation 11 on rail in the Emerson Report and in the Grange Royal Commission report on the 1979 Mississauga derailment. The Emerson Report states:

> The review recommends that in order to support the long term health of Canadian urban municipalities and reduce the risks associated with public and freight rail interactions, the Federal Government used infrastructure funding leveraged to:
>
> a. support the relocation of rail infrastructure outside of dense urban areas, and the implementation of technologies or infrastructure aimed at improving the safety of the rail/urban interface, with safer alternatives including road/rail grade separations, tunnels and robust noise/visual barriers;
> b. Encourage municipal governments to establish a buffer zone around new rail developments in order to provide separation from residential developments and mitigate future concerns over rail and logistic operations.

Finally, while the enhanced Canadian and U.S. standards are similar, they are not the same. The DOT-117 (and TC-140) standards included the use of electronically controlled pneumatic brakes (ECP). In its FIRA, the PHMSA determined that the employment of this technology would result in faster brake signal propagation which, in turn, would slow down rail cars more quickly in the event of an emergency braking, thereby reducing the kinetic energy in a derailment. Transport Canada noted in its RIAS that the TC-117 standard does not include ECP braking.

This ECP brake mandate was vigorously resisted in the United States. The Association of American Railroads appealed the ECP mandate, but this was rejected in November 2015. However, in December 2015, the U.S. signed into law the Fixing of America's Surface Transportation (FAST) Act. While many of its provisions are positive and should be

adopted in Canada, FAST requires the Government Accountability Office and the National Academy of Sciences to conduct an independent "evidence-based approach" to evaluate ECP braking systems, pilot program data, and the USDOT's research and analysis on the brakes' costs and benefits. USDOT has until December 4, 2017 to publish a "determination" that the ECP mandate either is justified or should be repealed. As with the further study concerning the volatility of Bakken crude, this requirement could well affect the timing of roll-out of tank cars complying with the DOT-117 standard.

3. Liability and Compensation – Show me da money

More than 2 ½ years after the Lac-Mégantic derailment, victims have not been fully compensated for their losses. As of earlier this month, about 400 people were contesting the amount of money they would receive for non-death related damages. On any basis this is not right and has not been addressed in the amendments to the liability and compensation provisions of the Canada Transportation Act implemented by the Safe and Accountable Rail Act (SARA).

Let's be frank. The purpose of SARA was to implement the quid pro quo between railways and the government. In exchange for continuing to be obliged to discharge their obligations as a common carrier for all goods offered for transport (including DGs) in compliance with applicable regulations, the liability of railroads for damages was capped. This is best summarized in Canadian Pacific's 2015 Annual Report which describes the effect of SARA as follows:

> Bill C-52 sets out new minimum insurance requirements for federally regulated railways based on: amounts of crude and toxic inhalation, hazards/poisonous inhalation hazards moved; imposes strict liability; limits railway liability to the minimum insurance level; mandates the creation of a fund of $250 million paid for by crude shippers, to be utilized for damages beyond $1 billion (in respect of CP); allows railways and insurers to have existing rights to pursue other parties (subrogation); and prevents shifting liability to shippers from railways except through written agreements. It is too soon for the Company to determine the impact that these amendments to the CTA and the RSA will have on the company's financial condition and results from operations. (page 39)

Liability is capped at the level of insurance, which in the SARA is set at $1 billion for class one railways. The $25 million minimum for smaller railways is a separate issue. In CP's case, the cap is $1 billion. As the Committee is aware from prior correspondence, CN carried insurance at $1.25 billion as of 2015.

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The supplemental shipper-financed fund of $250 million, adopting the "polluter pays" approach, will take years to be funded at the rate of $1.65 per tonne of crude shipped by rail given the recent drop-off in crude by rail shipments.

Putting these caps into context of Lac-Mégantic, the settlement fund established pursuant to the Lac Mégantic plan to compensate victims (excluding any contribution from CP) is $460 million. This amount is less than the $1.5 to $2.7 billion cited by PHMSA in its FRIA as the anticipated losses as a result of the Lac-Mégantic derailment (footnote 109 page 120).

In its FRIA issued in connection with the enhanced tank car standards, the PHMSA examined the likelihood of a derailment of a DG train carrying petroleum crude and the damages resulting from such derailment. In doing so, it focused on derailments in high-threat urban areas, which it describes as high consequence events (HCEs). Using several predictive techniques PHMSA estimated there could be five HCEs over 20 years resulting in damages that are multiples of what is provided by SARA (FRIA page 110).

Clearly, the compensation available under SARA is inadequate in the event of an HCE. If the policy imperative is to maintain the common carrier obligations on railways and capacity does not exist in the insurance market to cover catastrophic losses, the government should consider backstopping compensation as it does in the nuclear and vaccine areas. This backstop should be on terms that would protect the public purse and address the moral hazard inherent in such an arrangement. Who knows – having some skin in the game may have a salutary effect on oversight.

Yours very truly,
Rail Safety First

Henry Wiercinski, vice-chair
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Appendix

Term:	**Definition:**
Advisory Panel Report	Review of the Railway Safety Act. Stronger Ties; A shared commitment to railway safety – November 2007

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DG:	Dangerous goods as defined in the Transportation of Dangerous Goods Act (Canada)
Emerson Report:	Canada Transportation Act review report. Pathways Connecting Canada's transportation system to the world, February 2016.
FRIA:	Final Regulatory Impact Analysis. Hazardous Materials. Enhanced tank car standards and operational controls for high hazard flammable trains. Final Rule [Docket No. PHMSA-2012-0082] (HM-251, May 2015
Key Train Rules:	Rules respecting key trains and key routes. Transport Canada February 2016
Lac-Mégantic Plan:	Amended plan of compromise and armament pursuant to the Companies' Creditors Arrangement Act concerning, effecting and involving Montreal, Main & Atlantic Canada Co. June 8, 2015 Court File No.: 450-11-000167-138
PHMSA	Pipeline and hazardous materials safety administration US department of transportation
OAG Report	Report of the Auditor General of Canada chapter 7 oversight of rail safety – Transport Canada Fall 2013
Sandia Report	Literature survey of crude oil properties relevant to handling and fire safety in transport. DOE/DOT Tight Crude Oil and Flammability and Transportation Spill Safety Project. SAND 2015-1823 March 2015
TC Enhanced Standards	Regulations amending the transportation of dangerous goods regulations (TC 117 tank cars) SOR/2015-100 May 1, 2015
TC RIAS	Regulatory impact analysis statement from Transport Canada published concurrently with the TC Enhanced Standards
TRAN	Standing committee on transport, infrastructure and communities
TRAN Final Report	Review of the Canadian Transportation and Safety Regime: transportation of dangerous goods and safety management system – report of the standing committee on transport, infrastructure and communities March 2015
TRAN Interim Report	Interim report on rail safety review. Report of the Standing Committee on transport, infrastructure and communities June

2014

TSB	Transportation Safety Board of Canada
TSB Lac-Mégantic Report	Transportation Safety Board of Canada railway investigation report R1300054 runaway and main-track derailment Montreal Main & Atlantic Railway freight train MMA-002 miles 0.23 Sherbrook subdivision, Lac-Mégantic Quebec 06 July 2013
TSB White River Report	Transportation Safety Board of Canada railway investigation report R13T0060 main-track derailment Canadian Pacific Railway freight train 420-02 mile 9.41 Heron Bay subdivision White River Ontario 03 April 2013
Wall Street Journal12	Wall Street Journal November 13, 2014 Chester Dawson and Russell Gold Fight Brews Over Crude Rail Rules
Winfield Paper	*"Smart regulation" and public safety: Transport Canada's Safety Management System (SMS) Model and the Lac-Mégantic disaster.* Mark Winfield, faculty of environment studies, York University, April 2015