COMMUNITY DATA NEEDS ON DANGEROUS GOODS MOVEMENT BY RAIL: PERSPECTIVES OF SELECT NEW BRUNSWICK EMERGENCY PLANNING OFFICIALS

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1 Introduction

In the days following the rail disaster at Lac-Mégantic, QC that resulted in 47 fatalities and devastated the downtown, public calls were made for "real-time" information regarding the movement of dangerous goods through communities. The response from Transport Canada was the issuance of Protective Direction (PD) 32 requiring railways to share with emergency organizations on a yearly basis aggregate information detailing the amount and type of dangerous goods being transported by rail through their communities (Government of Canada, 2013). Transport Canada and the president of the Canadian Association of Fire Chiefs recently stated publicly that these new data sharing measures are sufficient and question the need for at data at real-time granularity to support emergency planning, though acknowledge some municipalities are still calling for real-time information (CBC, 2015). A better understanding of the perspectives of individual emergency planning officials could shed light on specific concerns regarding data availability, including whether there are opportunities to enhance the type, frequency, and resolution of the data. No published research appears to solicit and present the perspectives of these organizations regarding their preferences relating to the information provided through PD 32 or through alternate sources. This paper presents the results of a survey distributed among emergency planning organizations in communities along rail lines in New Brunswick.

2 Background

Increasing amounts of crude oil and fuel oil are moving by rail in Canada, and while the growth in the number of carloads transporting these commodities had been relatively steady (approximately 4% per year between 1999 and 2011), the number of carloads nearly tripled between 2011 and 2014 to 373,000 (Statistics Canada, 2016) (Figure 1). Crude exports by rail in Canada have more than tripled since 2012 from 17 million barrels to 59 million barrels in 2014 (National Energy Board, 2015). Similar trends are being observed in the United States; there were 9,000 tank car loads of crude oil originated by Class 1 railroads in 2008, increasing to 493,146 tank car loads in 2014 (Association of American Railroads, 2015). The Lac-Mégantic disaster occurred in 2013 when crude oil and fuel oil movements by rail in Canada were at an all-time high, a value that was exceeded by 14% in 2014. This growth appears to have stalled in 2015 (according to the Statistics Canada monthly carloadings statistics); however, barring a substantial modal shift, it can be expected that the high volumes of crude oil and fuel oil will continue to move by rail through Canadian communities. The number of rail cars transporting gaseous hydrocarbons (another dangerous commodity) has remained relatively stable since 1999, though still accounting for over 154,000 rail cars in 2014.

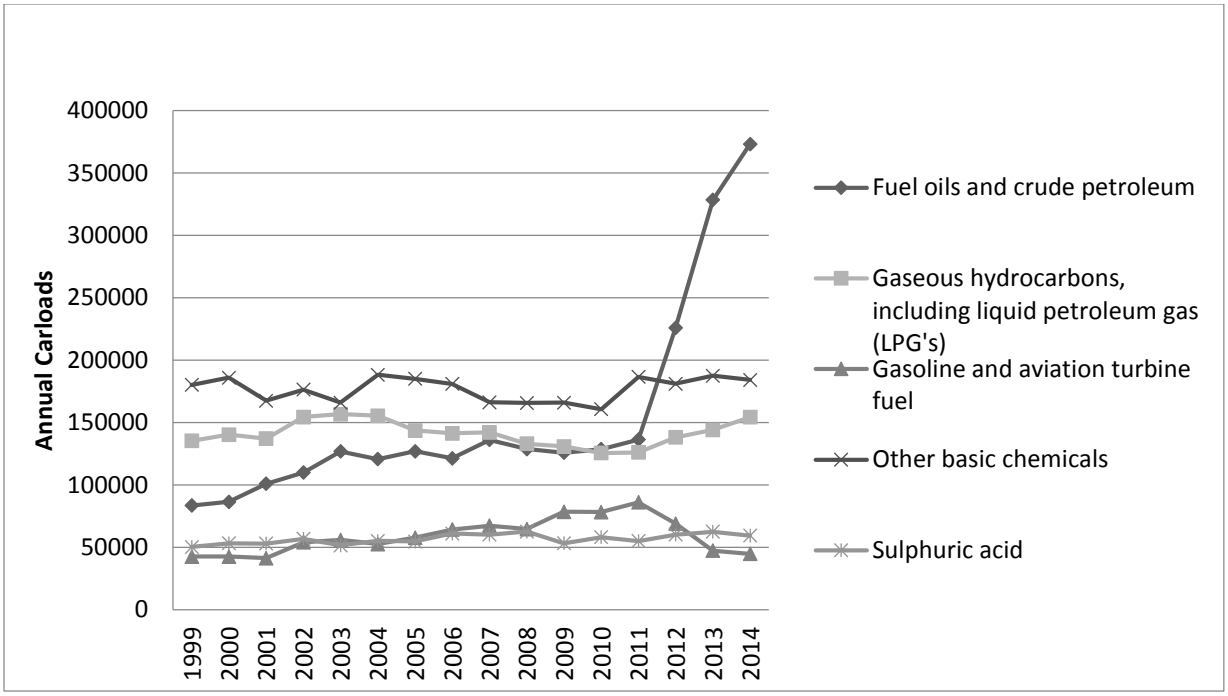

Figure 1: Number of railcars transporting dangerous goods transported annual within Canada (Assembled from Statistics Canada (2016))

Assuming incident rates remain relatively static, substantial increases in the amount of product moved could be expected to translate into an increased risk of incidents; therefore, emergency officials need to be prepared to respond to and plan for the consequence of such incidents. Emergency officials registered with the Canadian Transport Emergency Centre (CANUTEC) have access to the confidential dangerous goods reports made available through PD 32. PD 32 requires Class I railways to provide dangerous goods information to CANUTEC registered officials yearly, aggregated quarterly; Class III railways are to provide this information aggregated annually. While providing some consistency regarding dangerous goods reporting, at that level of aggregation the ability to arrive at any conclusions concerning day to day train activity or variability in activity is limited. Some emergency officials can also receive reports directly from carriers, and/or are made aware of cargo updates through routine discussions with carriers, though the extent of this practice nationally is not known. In 2014, North American Class I railways piloted an innovative smartphone application called "AskRail" which provides registered emergency responders access to information about what type of dangerous goods is being transported in a rail car by keying in the equipment ID. It is envisioned to be a source of dangerous goods information in the event of an accident if the train manifest or conductor is not immediately available (Association of American Railroads, 2015). It offers first responders a real-time ability to understand rail cargo; however it appears limited to single car information on Class I railways only, and is not accompanied by any reporting to help emergency organizations understand and respond to traffic trends.

While emergency officials have a greater breadth of information regarding the movement of dangerous goods by rail, and the level of detail is considered sufficient by Transport Canada and the president of the Canadian Association of Fire Chiefs, there is reportedly still interest in obtaining real-time information by some municipalities. Annual reports represent a lagging indicator, and while may be appropriate for most planning purposes, there are questions regarding the mechanisms to respond to marked changes in cargo volumes, which were only observed annually between 2011-2014. PD32 does require any railway that is

not a Class 1 to advise the designated emergency planning official of "any significant change" to the nature and volume of dangerous goods "as soon as practicable after the changes occurs", (Government of Canada, 2013) though "significant" has not been defined. There also appears to be limited information regarding dangerous goods movement by short line railways, which account for approximately 22% of track in Canada, or 10,000 km (Transport Canada, 2012), when compared to Class I as they are only required to report annual cargo volumes and are not represented with the AskRail application.

3 Study methodology

This study represented an exploratory effort to better understand the perspectives of emergency organizations in New Brunswick with respect to the information they receive regarding the movement of dangerous goods by rail through their communities. A survey was developed, piloted, and distributed by email to targeted emergency officials in communities located along rail corridors in New Brunswick. The distribution was followed up by a phone call to determine whether the survey had been received or if there were any questions. A total of 15 surveys were distributed, with a total of 5 responses from communities of at least 4000 persons. Responses were aggregated for presentation and publishing purposes to ensure a single community's responses were not identifiable. The surveys were distributed in English only; future surveys will be translated into French to ensure increased applicability to all communities in New Brunswick.

The survey solicited information in the following six areas:

1. Cataloguing the number of organization registered with CANUTEC
2. Soliciting the types of data sources available
3. 5-point Likert scale on satisfaction with level of detail with reporting
4. 5-point Likert scale on satisfaction with usefulness of reporting
5. Desired reporting frequency and level of detail
6. Data needs

4. Results

A total of 4 of the 5 emergency planning officials reported being registered with CANUTEC, with one reporting they were unsure if they have an official registered in the New Brunswick area.

The data in Table 1 show that the most popular source of data for the respondent communities was the annual report information enabled through PD32. Only two of the five reported receiving reports directly from carriers. While all the communities reported having a Class I railway operate through their community, only two of the five subscribed to the AskRail app. One reported not receiving any information from any data sources.

Table 1: Number of respondents reporting available data sources on dangerous goods movement (n=5)

	Respondents
Annual reports from carriers (PD32)	4
Reports directly from carriers	2
Other: AskRail	2
Do not receive information from any data sources	1

The data in Table 2 show the level of satisfaction that each emergency official reported with respect to the level of detail available from each of the data sources. These choices were provided in the survey. The data suggest that among the respondent officials, there are varying degrees of satisfaction with the information provided, as well as varying degrees of data availability. Only two of the four respondents receiving the PD 32 reports were satisfied/very satisfied with the information, while one was neutral and one was dissatisfied/very dissatisfied. Three of the five respondents reporting received reports directly from carriers, with two satisfied/very satisfied and one dissatisfied/very dissatisfied. The reason for the polarized responses is unclear, as is the reason that two respondents do not receive any reports directly from carriers. The majority of officials do not report receiving any information of typical volumes and cargo types through high-level discussions with carriers. No official reported receiving information from Statistics Canada or any other government agency. Those officials who do have the AskRail app appear to be satisfied with the level of detail it provides.

Table 2: Number of respondents and their satisfaction with "Level of Detail" from data sources to support its emergency planning purposes (n=5)

	Very dissatisfied/ Dissatisfied	**Neutral**	**Satisfied/ Very Satisfied**	**Not applicable**
Annual reporting of the transportation of DG by rail from carriers via CANUTEC	1	1	2	1
Detailed reporting of DG volumes and types directly from carriers	1	-	2	2
High-level discussions with carriers of typical volumes and cargo types	1	-	-	4
Statistics Canada or other government agencies	-	-	-	5
Other: AskRail	-	-	2	3
***DG = Dangerous Goods**				

The data in Table 3 follow a similar trend to that of Table 2, with one exception. The respondent who was dissatisfied with the level of detail from the PD 32 report did report being satisfied with its usefulness for emergency planning purposes.

Table 3: Number of respondents and their satisfaction with the "Usefulness" from data sources to support its emergency planning purposes (n=5)

	Very dissatisfied/ Dissatisfied	Neutral	Satisfied/ Very Satisfied	Not applicable
Annual reporting of the transportation of DG by rail from carriers via CANUTEC	-	1	3	1
Detailed reporting of DG volumes and types directly from carriers	1	-	2	2
High-level discussions with carriers of typical volumes and cargo types	1	-	-	4
Statistics Canada or other government agencies	-	-	-	5
Other: AskRail	-	-	2	3
DG = Dangerous Goods				

Respondents were asked to identify a sufficient summary reporting frequency of the movement of dangerous goods by rail for their emergency planning purposes, summarized in Table 4. The majority reported that they wanted to see a greater reporting frequency than "annually", with two of the five wanting to see daily reports and two others stating monthly or quarterly reports would be sufficient.

Table 4: Number of respondents reporting sufficient reporting frequency for emergency planning purposes (n=5)

	Respondents
Daily	2
Weekly	0
Monthly	1
Quarterly	1
Annually	1

Respondent emergency officials were also asked to report on the type of information that they believed to be important to receive in a summary report. The data are summarized in Table 5. The results suggest that the majority of the respondents believe that a greater breadth of data are needed to enhance the cargo volume reports to support their emergency planning.

Table 5: Number of respondents reporting additional types of information important to be included in summary report (n=5)

	Important to include in summary report?	
	Yes	**No**
Total volume and types of DG* transported in a time period	4	1
Total volume and types of DG* transported on a per train basis	5	0
Time of day of train movement	4	1
Frequency of train movement	4	1
Number of cars in a train consist	4	1
Order of train cars transported	4	1
Speed of trains	3	2
***DG = Dangerous Goods**		

5 Discussion

This exploratory research highlights a number of notable observations, even though limited by a small sample size. First, not all of the emergency organizations have taken advantage of registering with CANUTEC to obtain the annual reports through PD32, and the majority have not registered to use AskRail. There also appears to be some disparity between emergency officials who report receiving information directly from carriers and those that do not. It is not clear whether those receiving less information overall have not been made aware of the services available or are subject to some other factor (e.g. disparities in data sharing practices within companies).

Second, even if all of the emergency organizations were to take advantage of all the available data sources, the data sources do not fully provide the breadth of data at the frequency that the majority in the sample reported sufficient for their emergency planning purposes. It may be possible that annual reporting is sufficient in most cases, but that the officials sampled would like the ability to obtain higher resolution information if so desired. These initial results suggest that a broader research effort could further determine the progress of Canadian communities in terms of accessing data regarding dangerous goods by rail, whether data reporting needs to be better tailored to the perceived needs of emergency officials, and whether Class I and short lines warrant separate distinctions in reporting. As Transport Canada considers the future of PD 32 (which is set to expire in November 2016) it would benefit from a clearer understanding of these perceptions. In the interim, an enhanced education campaign could be developed to inform those municipalities near rail lines and their emergency personnel who are not currently aware of the data sources available to them, including AskRail. These communities may not be fully aware of the benefits of registering with CANUTEC and receiving the information available to them to facilitate their emergency management planning.

6 Conclusions

This exploratory research effort compiled the perspectives of five emergency planning officials representing five communities of greater than 4000 people, located along rail corridors in New Brunswick. While the majority of the officials are satisfied with the usefulness of the annual rail cargo reports provided through PD 32, they also indicated that a greater reporting frequency than annual is preferred, with two of the five seeking daily reports. The majority of reporting officials also indicated that it would be important for summary reports to contain data at a higher level of detail than currently available through PD 32, such

as time of day of train movement and frequency of movement. It also appears that not all of the officials have access to all the information potentially available to them, such as reports directly from carriers or AskRail. Future research could further explore these issues at a national level.

7 Acknowledgements

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8 References

Association of American Railroads. (2015). *Moving Crude Oil Safely by Rail.* Retrieved 20 25, 2016, from https://www.aar.org/BackgroundPapers/Moving%20Crude%20Oil%20Safely%20by%20Rail.pdf

CBC, 2015. *Hamilton officials back off call for real-time dangerous rail cargo data.* Retreived 02 25, 2016, from http://www.cbc.ca/news/canada/hamilton/news/hamilton-officials-back-off-call-for-real-time-dangerous-rail-cargo-data-1.2998640

Government of Canada, 2013. Backgrounder - *Archived - Protective Direction No. 32.* Retrieved 02 25, 2016, from http://news.gc.ca/web/article-en.do?nid=829079

National Energy Board. (2015). *Canadian Crude Oil Exports by Rail - Quarterly Data*. Retrieved 02 23, 2016, from National Energy Board: https://www.neb-one.gc.ca/nrg/sttstc/crdlndptrlmprdct/stt/cndncrdlxprtsrl-eng.html

Statistics Canada. (2016, 01 26). *Table 404-0002*. Retrieved 02 23, 2016, from Statistics Canada: http://www5.statcan.gc.ca/cansim/a47