TESORO SAVAGE VANCOUVER
ENERGY DISTRIBUTION TERMINAL
Docket No. EF-131590

EXHIBIT 7

Comments of the Natural Resource Defense Council to Pipeline and Hazardous Materials Safety Administration, Recommendations to Improve the Safety of Railroad Tank Cr Transportation, dated December 5, 2013

BEFORE THE
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION
U.S. DEPARTMENT OF TRANSPORTATION

Advance Notice of Proposed Rulemaking

Hazardous Materials:
Rail Petitions and Recommendations To Improve the
Safety of Railroad Tank Car Transportation

PHMSA-2012-0082 (HM-251)
Published: 78 Fed. Reg. 54,849 (Sept. 6, 2013)

Comments of the Natural Resources Defense Council,
Sierra Club and Oil Change International on behalf of

Earthjustice
ForestEthics
Public Citizen
Friends of the Earth
Spokane Riverkeeper
Columbia Riverkeeper
Puget Soundkeeper Alliance
Friends of Grays Harbor
Natural Resources Council of Maine
Benicia Good Neighbor Steering Committee
Community In-power and Development Association
Vermont Chapter of the Sierra Club
Audubon Society of New Hampshire

Submitted December 5, 2013

I. INTRODUCTION

These comments are submitted, in response to the above-captioned Advance Notice of Proposed Rulemaking by the Sierra Club, Oil Change International and the Natural Resources Defense Council on behalf of their millions of members and active supporters, and on behalf of Earthjustice, ForestEthics, Public Citizen, Friends of the Earth, Spokane Riverkeeper, Columbia Riverkeeper, Puget Soundkeeper Alliance, Friends of Grays Harbor, Natural Resources Council of Maine, Benicia Good Neighbor Steering Committee, Community In-power and Development

Association, Vermont Chapter of the Sierra Club and Audubon Society of New Hampshire. These comments respond to: (1) Petitions P-1577, P-1587, P-1595 (regarding retrofitting of DOT-111 tank cars) and (2) the invitation of the Pipeline and Hazardous Materials Safety Administration ("PHMSA") to address whether other "operations enhancements" are called for in the context of rail shipments of crude oil.

II. BACKGROUND

Crude Oil, particularly fracked crude, is highly toxic and dangerous

Crude oil is a hazardous material as defined by the U.S. Department of Transportation.[1] Notably, crude has certain properties that make it uniquely dangerous. First, it is a liquid that can migrate away from the site of an accident or other release and travel into communities, down waterways, and the like. Crude oil is also generally less flammable than other hazardous liquids (like ethanol and gasoline), meaning that it is more likely to migrate some distance before reaching an ignition source and catching fire.[2]

Unlike other liquids transported by rail, unrefined crude oil contains a wide range of contaminants: sulfur and arsenic; toxic metals like mercury, nickel, and vanadium; organic compounds like phenols, ketones and carboxylic acids.[3] Hydraulic fracturing, or "fracking" contributes an additional suite of contaminants, including hydrochloric acid and in some cases hydrogen sulfide.[4] Indeed, the Federal Railroad Administration has observed "an increasing number of incidents involving damage to tank cars in crude oil service in the form of severe corrosion of the internal surface of the tank, manway covers, and valves and fittings," and suggested that this may involve contaminated oil.[5]

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[1] 49 C.F.R. § 172.101. Hazardous materials are materials that have been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce 49 C.F.R. § 171.8.

[2] *See* BP West Coast Products LLC, "Material Safety Data Sheet – Crude Oil," http://oilspill.fsu.edu/images/pdfs/msds-crude-oil.pdf, May 13, 2002. (flash point of 20° - 90° F).

[3] *See* U.S. EPA, "Screening-Level Hazard Characterization, Crude Oil Category," http://www.epa.gov/chemrtk/hpvis/hazchar/Category_Crude%20Oil_March_2011.pdf March, 2011.

[4] *Enbridge Pipelines (North Dakota), LLC,* FERC Docket No. IS13-273-000, 2013. (FERC order granting pipeline operator authority to reject certain Bakken crude oil supplies, due to evidence that hydrogen sulfide levels can rise to dangerous or even lethal levels.). See also Abrams, L., "*Fracking chemicals may be making oil more dangerous,*" http://www.salon.com/2013/08/13/fracking_chemicals_may_be_making_oil_more_dangerous/, August 13, 2013.

[5] *See* Herrmann, T., FRA, Letter to Jack Gerard, American Petroleum Institute, July 29, 2013 at 4 (reproduced in Attachment 1).

North American crude production is increasing exponentially, with a corresponding boom in shipments of crude-by-rail

Domestic crude oil production is undergoing a major boom, chiefly because of the increase in fracking. U.S. Energy Information Administration ("EIA") Administrator Adam Sieminski recently testified that:

> Domestic oil production in the United States has increased significantly, and at 7.4 million barrels per day as of April 2013 is now at the highest level since October 1992. Over the five year period through calendar year 2012, domestic oil production increased by 1.5 million barrels per day, or 30%. Most of that growth occurred over the past 3 years. Lower 48 onshore production (total U.S. Lower 48 production minus production from the federal Gulf of Mexico and federal Pacific) rose more than 2 million barrels per day (bbl/d), or 64%, between February 2010 and February 2013, *primarily because of a rise in productivity from oil-bearing, low-permeability rocks.*[6]

This dramatic increase in production has caused a corresponding boom in crude-by-rail. In May 2013, AAR profiled how crude production and crude-by-rail are undergoing twin booms:

> Historically, most crude oil has been transported via pipelines. However, in places like North Dakota that have seen huge recent increases in crude oil production, the existing crude oil pipeline network lacks the capacity to handle the higher volumes being produced. Pipelines also lack the operational flexibility and geographic reach to serve many potential markets. Railroads, though, have capacity, flexibility, and reach to fill the gap.
>
> Small amounts of crude oil have long been transported by rail, but since 2009 the increase in rail crude oil movements has been enormous. As recently as 2008, U.S. Class I railroads (including the U.S. Class I subsidiaries of Canadian railroads) originated just 9,500 carloads of crude oil. By 2011, carloads originated were up to nearly 66,000, and in 2012 they surged to nearly 234,000. Continued large increases are expected in 2013. In the first quarter of 2013, Class I railroads originated a record 97,135 carloads of crude oil, 20 percent higher than the 81,122 carloads originated in the fourth quarter of 2012 and 166 percent higher than the 36,544 carloads originated in the first quarter of 2012.
>
> Crude oil accounted for 0.8 percent of total Class I carload originations for all of 2012, 1.1 percent in the fourth quarter of 2012, and 1.4 percent in the first quarter of 2013. It was just 0.03 percent in 2008.

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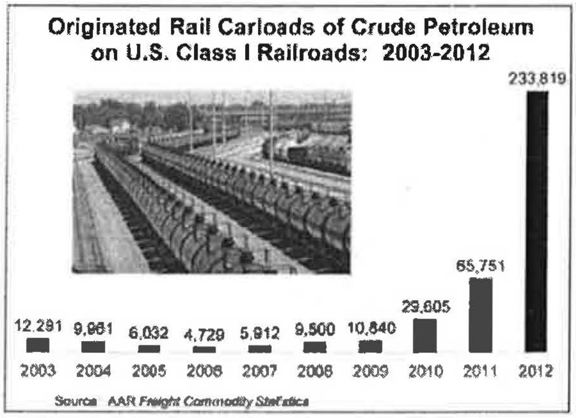
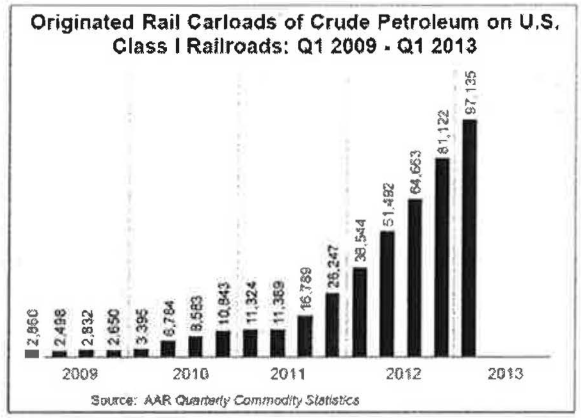
[6] *Hearings Before the Committee on Energy and Natural Resources, U. S. Senate*, July 16, 2013 (Statement of EIA Administrator Sieminski, at 2).

Figure 1: The growth of rail as a means of crude transport





[…]

Assuming, for the sake of simplicity, that each rail tank car holds about 30,000 gallons (714 barrels) of crude oil, the 97,135 carloads originated in the first quarter of 2013 equal approximately 762,000 barrels per day moving by rail. As a point of reference, according to EIA data, total U.S. domestic crude oil production was approximately 7.1 million barrels per day, so the rail share is around 11 percent – up from a negligible percentage a few years ago. [7]

As also noted by AAR, "North Dakota, and the Bakken region more generally, have accounted for the vast majority of new crude oil originations."[8] During 2013, crude-by-rail shipments out of North Dakota have fluctuated between 600,000 to 700,000 barrels per day, transporting 61-75% of total Bakken production: [9]

[7] American Association of Railroads, "Moving Crude Petroleum by Rail," https://www.aar.org/keyissues/Documents/Background-Papers/Crude-oil-by-rail.pdf May 2013, at 3-5.

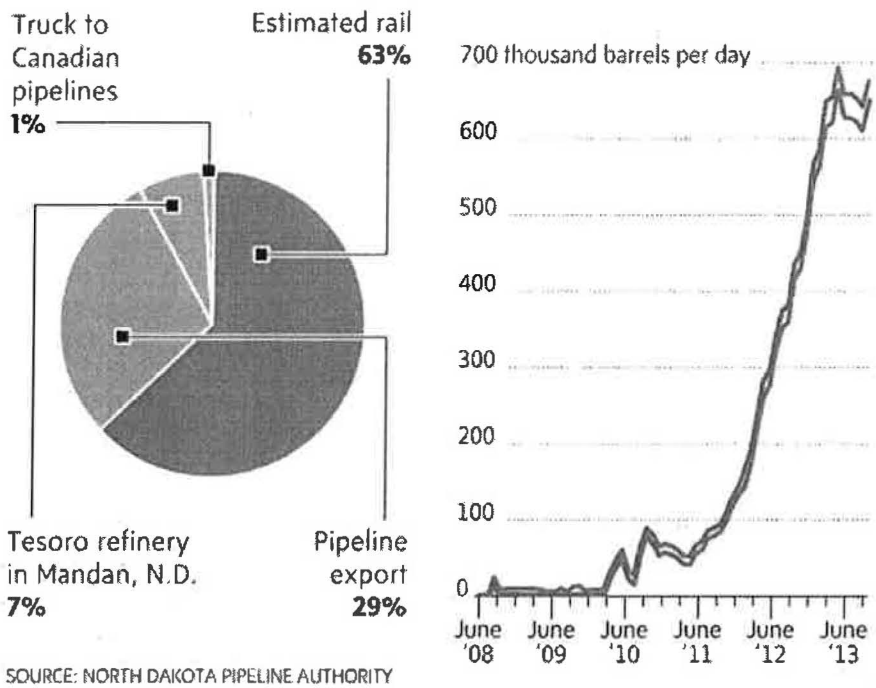
[8] Id., p. 5.

[9] See North Dakota Pipeline Authority http://northdakotapipelines.com/directors-cut/ Monthly Updates for April 2013-November 2013 (February 2013-September 2013 data); "How oil is transported from North Dakota's Williston Basin," The Globe and Mail, http://www.theglobeandmail.com/news/national/how-oil-is-transported-from-north-dakotas-williston-basin/article15711682/ December 2, 2013.

Figure 2: The growth of rail in transporting crude oil from the Bakken

How Crude is Transported (September 2013) Williston Basin Oil Output

ND Oil Export Volumes by Rail (June 2008-September 2013) High-Low Estimates[10]



As shown in the data from North Dakota[11] and AAR,[12] crude-by-rail volumes increased rapidly from 2009 into the second quarter of 2013, then dipped for several months as a result of crude pricing that encouraged a shift to pipeline transport.[13] Later in 2013, pricing was again

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[10] Rail volumes are estimated as a range based on estimates of total crude production, less volumes to pipeline, truck, and local refining. http://northdakotapipelines.com/rail-transportation

[11] See Figure 2 and North Dakota Pipeline Authority. Ibid.

[12] U.S. Class I railroads (including the U.S. Class I subsidiaries of Canadian railroads) originated 108,605 carloads of crude oil in the second quarter of 2013 (12 percent higher than the 97,135 carloads in the first quarter) and 93,312 carloads in the third quarter. See American Association of Railroads, "AAR Reports Record Second Quarter Crude-by-Rail Data; Decreased Weekly Rail Traffic," https://www.aar.org/newsandevents/Freight-Rail-Traffic/Pages/2013-08-29-railtraffic.aspx August 29, 2013; "AAR Reports October and Weekly Rail Traffic Gains, 3Q Crude Oil Up Year Over Year," https://www.aar.org/newsandevents/Freight-Rail-Traffic/Pages/2013-11-07-railtraffic.aspx November 7, 2013.

[13] Fielden, Sandy, RBN Energy, "On the Rails Again? – Bakken Crude Rail Shipments Return to April Highs." http://www.rbnenergy.com/on-the-rails-again-bakken-crude-rail-shipments-return-to-april-highs October 30, 2013. See also Figure 1

favorable for rail and crude production continues to increase, such that crude-by-rail volumes have rebounded.[14]

Unit Trains account for most of the expansion in crude-by-rail

Unit trains are long freight trains composed of at least 50 and sometimes 100 or more cars used to transport single bulk products between two points. Unit trains are unloaded on arrival and returned for another load. Unit trains cut costs (and save time) by eliminating the need for intermediate yarding and switching between origin and destination.[15]

These cost savings, combined with the boom in mid-continent production of crude oil have driven a corresponding boom in the construction of rail terminals designed to handle unit trains. According to one recent industry analysis:

> The number of rail terminals in producing regions loading crude oil onto rail tank cars has increased from a handful at the end of 2011 to 88 and growing today. A further 66 crude oil unloading terminals have been built or are under construction.[16]

Various industry reports indicate that unit trains account for the vast majority of the recent boom in crude-by-rail transportation. A presentation by Union Pacific at a recent industry conference offered one example of the central role unit trains have played in recent years:[17]

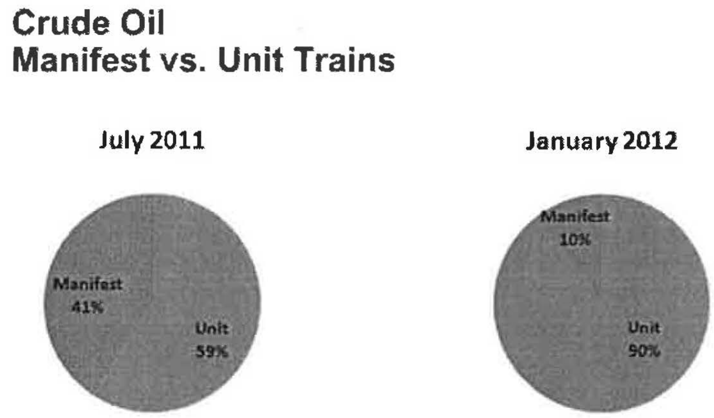
[14] Ibid. See also Figure 2.

[15] AAR May 2013. Ibid, at.7; Titterton, Paul, GATX, "Crude Oil Tank Cars: Economics, Specification, Supply, Regulation, and Risk," http://www.crude-by-rail-destinations-summit.com/media/downloads/127-paul-titterton-vice-president-and-group-executive-fleet-management-marketing-and-government-affairs.pdf February 27, 2013, at 5.

[16] Fielden, Sandy, RBN Energy, "Crude Loves Rock'n Rail," http://www.rbnenergy.com/154-terminals-operating-bnsf-the-dominant-railroad May 12, 2013.

[17] The full presentation is included as Attachment 2.

Figure 3: Slide from a presentation by Craig Johnson, Gen. Director – CTS, Union Pacific Railway at the Crude-in-Motion Conference 2013



Reliable information on the total number of unit trains currently transporting crude oil are hard to find. But a reasonable estimate is that there are now on the order of 200 unit trains operating in the U.S. rail system.[18] At any time, about 100 trains (half of the total) are transporting crude from loading to unloading facilities; the other 100 trains are returning for another load of crude, so tank cars are empty (or backhauling another commodity such as condensate/diluent). Significant amounts of crude oil continue to be moved in non-unit train shipments, so there are also sizable numbers of manifest trains transporting crude oil tank cars.[19]

Accidents and releases of crude-by-rail have jumped proportionally

Predictably, the rise in crude transportation by rail has resulted in soaring numbers of crude oil releases to the environment in the form of both accidents and "non-accident" releases such as leaks. PHMSA incident records underscore these growing risks. The number of incidents" involving crude oil transportation by rail are as follows:

2009: 0
2010: 9
2011: 34

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[18] In 2013, the crude fleet is estimated to be in the order of 30,000 tank cars, providing a crude-by-rail capability in North America of at least 1 million barrels per day. (Paul Titterton. Ibid at 12-13). Assuming two-thirds of the crude fleet is in U.S. unit trains (with the remainder of cars in manifest trains, Canada, and out of service for bad orders/etc.) and 100 cars per train, there would in the order of 20,000 tank cars comprising 200 unit trains.

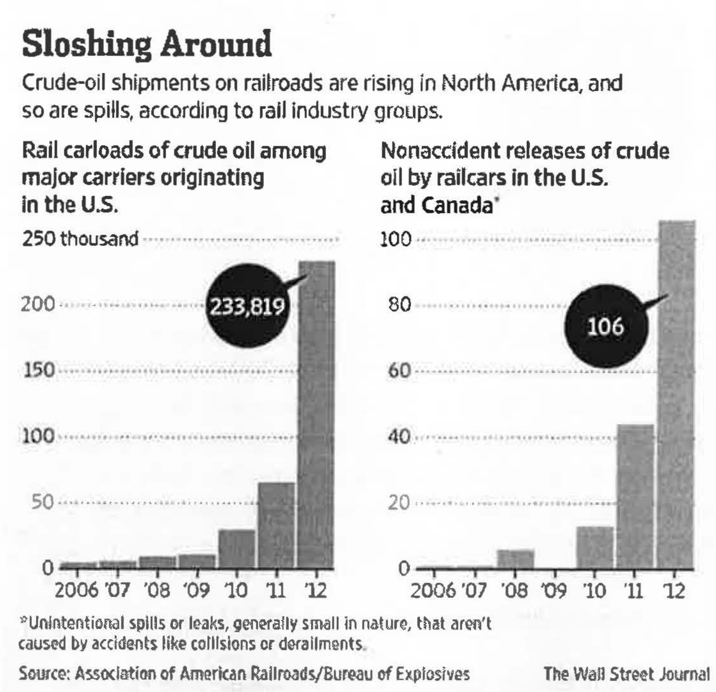
The above estimate for number of unit trains is consistent with assuming that 11 unit trains are loaded daily with an average turn time of 18 days (11 trains x 18 days per roundtrip = 198 unit trains). Available information (see sources in footnotes 7-18) indicates that 10+ unit trains are loaded daily, with turn times up to 20+ days.

[19] AAR May 2013. Ibid, at.7.

2012: 86
2013: 85 (partial)[20]

Similar statistics were published by the Wall Street Journal, based on data generated by the Association of American Railroads ("AAR"):[21]

Figure 4: Industry shipment and incident reports



Unfortunately, the surge of incidents and releases has not been matched by an increase in the resources available to responders and regulators. The same has been true in Canada.[22]

Lac-Mégantic

On July 5, 2013, a train hauling 72 tanker cars loaded with 2.0 million gallons of crude from the Bakken shale oil field in North Dakota slammed into Lac-Mégantic, a town of 6,000

[20] Data derived from PHMSA incident reports - http://www.phmsa.dot.gov/hazmat/library/data-stats/incidents.

[21] The Wall Street Journal, "Officials Tighten Crude-Shipping Standards," http://online.wsj.com/news/articles/SB10001424127887323838204578654463632065372 Aug. 7, 2013.

[22] Budget reductions for Canada's rail safety and hazardous materials transportation program are reviewed in Canadian Centre for Policy Alternatives, *The Lac-Mégantic Disaster* (October, 2013) at 9.

located in Quebec. Owned by an American company – Montreal, Maine and Atlantic Railway – the train had only a single staffer, who abandoned the train in order to sleep in a motel before a replacement crew arrived to complete the train's journey to an oil refinery on Canada's east coast. The brakes on the five-locomotive train malfunctioned, and it began a seven-mile roll toward the small town. Reaching a speed in excess of 60 m.p.h, the train reached a bend in the tracks, derailing and dumping 1.6 million gallons of its contents, which caught fire and incinerated dozens of buildings. Forty-seven people were killed.[23]

Figure 5: Post-accident aerial photo of Lac- Mégantic (Reuters)

Information regarding the Lac-Mégantic accident is provided in Attachment 3, "Analysis of the Potential Costs of Accidents/Spills Related to Crude by Rail."[24] This analysis demonstrates that the costs of crude-by-rail accidents/spills can be very large, and that a major unit train accident/spill could cost $1 billion or more for a single event.

As explained in Attachment 3, the Lac-Mégantic rail accident/spill will likely have costs on the order of $500 million to $1 billion excluding any civil or criminal damages. Costs/damages for a similar incident could have been substantially higher had it occurred in a more populated area. Lac-Mégantic is also relevant in that it shows how an accident involving highly flammable light crude (such as the Bakken crude) can have devastating consequences even in a small town in terms of loss of human life and widespread explosion and fire damage to surrounding property.

Attachment 3 also analyzes the spill of tar sands dilbit from Enbridge's Line 6B in Marshall, Michigan: This rupture in 2010 had costs of about $1 billion for Enbridge. The spill volumes at Marshall (840,000 gallons) were within the range of the amount of spill possible

[23] Transportation Safety Board of Canada, "Railway Investigation R13D0054," http://www.bst-tsb.gc.ca/eng/enquetes-investigations/rail/2013/R13D0054/R13D0054.asp#sal September 11, 2013.

[24] This analysis was prepared by The Goodman Group, Ltd, a consulting firm specializing in energy and regulatory economics, on behalf of Oil Change International.

(and, in fact, substantially less than the maximum spill) if a crude by rail unit train released much of its cargo. Costs/damages for similar incident could have also been substantially higher had it occurred in a more populated area. Marshall is also relevant in showing the high potential cost of dilbit spills into water (and rail lines are often highly proximate to water).

Alabama

On November 8, 2013, a 90-car unit train carrying 2.7 million gallons of crude oil derailed and exploded in a rural wetland in western Alabama, spilling crude oil into the surrounding wetlands and igniting a fire that burned for several days.[25] No injuries resulted from the accident, but a similar accident in a more populated location would certainly have caused serious risk to public safety.

Figure 6: Aerial photo of Alabama derailment and explosion (Reuters)

Crude oil is a security risk

The explosions in Lac-Megantic and Alabama were accidents, but they could easily have been created by terrorists. The fact that terrorists haven't yet targeted rail tank cars carrying crude oil doesn't mean it won't occur in the future. The recent Canadian accidents demonstrate the amount of death and destruction that can happen if a rail tank car overturns. Terrorists will have read about these accidents. Without any additional security precautions, crude oil tank cars will be seen as a soft target for an attack.

[25] Karlamangla, Soumya, "Train in Alabama oil spill was carrying 2.7 million gallons of crude." Los Angeles Times, http://www.latimes.com/nation/nationnow/la-na-nn-train-crash-alabama-oil-20131109,0,780637.story November 9, 2013.

Community Emergency Preparedness Response

When a crude oil spill occurs, local response assets are generally the first ones on scene. These assets will include those provided by police departments, fire fighters, and emergency managers. Many times however, these response individuals are unaware of the nature of, and the threat posed by the materials that are being transported through their communities.

Congress, recognizing a gap in communication, mandated in the "9/11 Act"[26] that rail companies transporting security sensitive materials, including toxic-by-inhalation materials, but not including crude oil, improve communication with local officials. Rail carriers are now required to identify a point of contact and to provide information to (1) state and/or regional "Fusion Centers" that have been established to coordinate with state, local and tribal officials on security issues and which are located within the area encompassed by the rail carrier's rail system; and (2) state, local, and tribal officials in jurisdictions that may be affected by a rail carrier's routing decisions and who directly contact the railroad to discuss routing decisions.[27] This knowledge enables local communities to have a better understanding of what is being transported near their homes and schools.

According to the mandate of the 9/11 Act, rail carriers transporting security sensitive materials are required to select lower-risk routes, based on an analysis of the safety and security risks presented various routes, railroad storage facilities and proximity of high-consequence targets along the route. The results of this analysis could dictate the rerouting of the security sensitive materials to other locations

Crude oil is not currently defined as "security sensitive" so the additional reporting requirement does not apply to rail carriers transporting crude oil, despite its obvious hazards.

The lack of regulatory guidance on communication about the movement of crude oil via rail with local officials, neighbors and local businesses is inconsistent with the Administration's initiatives goal to improve preparedness. President Obama issued a proclamation on August 30, 2013 stating that September 2013 was National Preparedness Month. In this document, the President also stated that Americans should "refocus our efforts on readying ourselves, our families, our neighborhoods, and our Nation for any crisis we may face." Additionally he directed the Federal Emergency Management Agency to "launch a comprehensive campaign to build and sustain national preparedness with private sector, non-profit, and community leaders and all levels of government."[28] Private sector and community preparedness can't occur if the federal government fails to require the disclosure of information that could help communities become more prepared.

The failure to share information also contradicts the mission of the Citizen Corps, a

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[26] Implementing Recommendations of the 9/11 Commission Act of 2007, Pub. L. 110-53; 121 Stat. 266.

[27] http://www.gpo.gov/fdsys/pkg/FR-2008-11-26/html/E8-27826.htm.

[28] http://community.fema.gov/gf2.ti/f/280514/8233733.1/PDF/-/Presidential_Proclamation__National_Preparedness_Month_2013.pdf

FEMA-managed initiative. Its mission "is to harness the power of every individual through education, training, and volunteer service to make communities safer, stronger, and better prepared to respond to the threats of terrorism, crime, public health issues, and disasters of all kinds." http://www.ready.gov/citizen-corps. Disasters of all kinds include spills created by overturned rail tank cars carrying crude oil.

FEMA released a report on the Citizen Corps in September 2012. In this document entitled "Citizen Corps Councils Registration and Profile Data FY2011 National Report," FEMA Administrator Fugate stated that the Citizen Corps Councils provide "'the table'" for collaboration to "(i)ntegrate whole community representatives with emergency managers to ensure disaster preparedness and response planning represents the whole community and integrates nontraditional resources."[29] Again, without access to accurate information, the whole community is unable to adequately plan and integrate resources for disaster response and preparedness in line with FEMA objectives.

Finally, the failure to share information also contradicts recommendations provided by former Director of EPA's Office of Emergency Management Deborah Dietrich regarding coordination between the Citizen Corps and Local Emergency Planning Committees (LEPC). Ms. Dietrich sent an August 2009 letter to all State Emergency Response Commission (SERC) Chairs recommending that all LEPCs work more closely with the Citizen Corps regarding the Emergency Planning and Community Right to Know Act of 1986 (EPCRA). She told them to consider "whether working more closely with the Citizen Corps could make your EPCRA and RMP work more effective."[30] Without basic knowledge about crude oil moving through their communities by rail, these planning committees are unable to accomplish their intended goal.

Safety Rules Are Out of Date

When the 9/11 Act was enacted in 2007, just 5,897 carloads of crude petroleum originated on U.S. Class I railroads. Last year, that number grew to 233,819 carloads – a growth of more than 3865%.[31] In 2013, that number has grown again, totaling 299,052 through the first 3 quarters (averaging about 100,000 per quarter). Assuming volumes will be similar in the fourth quarter, there will be about 400,000 carloads for all of 2013 – a growth of about 6700% relative to carloads in 2007.[32] This exponential growth in unit shipments of crude by rail and associated incidents, as well as the recent Lac-Mégantic disaster, compel the conclusion that unit shipments of crude oil demand enhanced safety standards and should be subjected to the re-routing standards as "security sensitive" materials as set forth in the 9/11 Act.

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[29] FEMA, "Citizen Corps Councils Registration and Profile Data FY2011 National Report," https://s3-us-gov-west-1.amazonaws.com/dam-production/uploads/20130726-1854-25045-2121/citizen_corps_councils_final_report_9_27_2012.pdf. September 2012.
[30] Dietrich, Deborah, Letter to SERC Chairpersons, ftp://tbrpc.org/dri/Documents/LEPC/MISCELLANEOUS/EPA's%20EPCRA%20Letter.pdf. August 20, 2009.
[31] AAR May 2013. Ibid
[32] AAR August 29, 2013. Ibid; AAR November 7, 2013. Ibid.

III. SPECIFIC COMMENTS

A. The Existing Fleet of DOT-111 Tank Cars Needs to Be Replaced or Upgraded

As has been acknowledged by the AAR, the existing fleet of DOT-111 tank cars is simply unsafe for transporting crude oil or other hazardous materials. This is evident from Petition P-1577, in which the AAR calls for higher construction standards for this class of rolling stock. Among many other deficiencies, the head and shells of DOT-111s are paper thin, and they lack many other vital safety features, such as head shields and protection for top fittings.

Rail tank cars should be able to withstand "rollover" accidents. But when DOT-111s are involved in accidents, even at low speeds, almost all of the tank cars rupture and release their contents. This was documented by the National Transportation Safety Board ("NTSB") in its "Cherry Valley accident report," cited in the ANPR. In that low-speed accident (36 mph), 13 of 15 tank cars ruptured. *Ibid.* at 76. The NTSB noted that similar disastrous failure rates had been observed in other accidents (New Brighton, PA – 12 of 23 cars were breached; Arcadia, OH – 28 of 32 were breached). *Ibid.*

These dangerous deficiencies, and the many lethal consequences thereof, have been the status quo for decades. More than 25 years ago, the NTSB wrote to the U.S. Department of Transportation's ("USDOT's") Research and Special Programs Administration, complaining that the then-existing standards for tank cars were inadequate for transporting hazardous materials. In a 1991 study the NTSB noted that in a series of hazmat-by-rail accidents in 1988, 54 percent of DOT-111s were destroyed, twice the percentage of DOT-112s and other models. See Attachment 4. The NTSB again scolded: "The inadequacy of the protection provided by DOT-111A tank cars has been evident for many years in accidents investigated by the Safety Board." Ibid. at p. 11.

B. PHMSA Should Accept the AAR's Recommendation to Phase Out Substandard Tankers.

In its November 14, 2013 comments to PHMSA, the AAR reversed its position regarding the retrofit of the existing DOT-111 fleet and now concedes that new and existing DOT-111s should be held to higher standards. This meets with the longstanding recommendation of the NTSB to apply upgraded safety standards to the entire existing fleet, retroactively. *See* the 1988 NTSB letter included in Attachment 5, at "171," in which the Safety Board urged USDOT to:

> "Establish a specific date by which the 'grandfather clauses' no longer permit hazardous materials to be transported in railroad tank cars that do not meet present safety requirements."

Given the imminent and significant risk to public safety and the environment posed by the growth in crude oil transportation by unit trains containing unsafe tankers, we encourage PHMSA to follow the recommendations of AAR and the NTSB by identifying the soonest-possible date by which DOT-111 can reasonably be removed from crude oil service, beginning with the immediate removal of these tankers from service in unit trains transporting crude oil.

C. Regulatory Changes Are Needed

1. Unit Trains of Crude Oil and Other Hazardous Materials Should be Placed in the Highest Risk Category

Traditionally, the federal hazardous materials regulations have placed the most stringent controls on rail cargoes carrying only "ultrahazardous" materials, e.g., poisons-by-inhalation ("PIH"), toxics-by-inhalation ("TIH"), the most highly kinetic categories of explosives, and radioactive materials.[33] This is based chiefly on the estimated consequences of the rupture of single tank car and the consequent release of its contents. Evidently, little research has been conducted as to the likely consequences of an accident involving two or more such cars.

This single-car risk-assessment methodology underwent a significant evolution last summer, when the AAR revised Circular No. OT-55, its long-standing guidance regarding "Recommended Railroad Operating Practices for Transportation of Hazardous Materials." In Revision N, issued August 5, 2013 (one month after the Lac-Mégantic disaster), the AAR changed its definition of "Key Trains" – those which are subject to the highest standards for transport (*e.g.*, speed limits), equipment (only cars with roller bearings) and track (Class II or above). In revision N, "key trains" are defined as those with a single car of PIH or TIH chemicals, a single car of radioactive waste, or 20 cars of any other hazardous material (including crude oil).

This change is important because it recognizes that trains with dozens of hazmat cars pose environmental and public safety risks that are disproportionately higher than those posed by a single tank car. The AAR circular recognizes that when the contents of many breached tank cars are accumulated and mixed there is a much higher likelihood of conflagrations. With different kinds of hazardous materials involved, there is a possibility of synergistic reactions that are beyond prediction. Trains with multiple hazmat tank cars are also much more likely to trigger acts of terrorism.

We endorse the AAR's analytical approach. All hazmat unit trains – or at least those with 20 cars of hazardous materials or more – should be required by PHMSA to comply with the operating standards set out in OT-55-N.

Defining unit train movements of crude oil as security sensitive will also require carriers to comply with the security measures mandated by the 9/11 Act. These measures include additional threat assessments, vetting, and possible rerouting of cargo.

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[33] **Error! Main Document Only.***See* U.S. Governmental Accountability Office, *FREIGHT RAIL SECURITY, Actions Have Been Taken to Enhance Security, but the Federal Strategy Can Be Strengthened and Security Efforts Better Monitored,* GAO-09-243 (April 2009), in which the GAO recommends that the Transportation Safety Administration (TSA) alter its dominant focus on the risks associated with rail transportation of TIH chemicals, and instead prioritize other types of hazardous materials moving along the nation's rails.

2. Expanded Right-to-Know for Communities at Risk

The nation's principal right-to-know law, the Emergency Planning and Community Right-to-Know Act ("EPCRA"), exempts rail shipments of hazardous materials from its disclosure requirements.[34] Nothing prevents PHMSA, in the context of this proceeding, from remedying this derogation of the public's right to understand the risks to which they are subject by virtue of living and/or working near a rail line. At a minimum, PHMSA should require railroads and shippers, working cooperatively, to reveal to the at-risk public:

1. the nature, volumes and frequency of hazmat (including crude oil) shipments moving regularly through their communities;
2. the risks associated with exposure to these materials in the event of a release;
3. what people should do in the event of a release;
4. where people can get more information.

This information should be distributed to local emergency responders, to local residents by mail, and posted on an easily accessible website.

Canada is already moving in this direction. Responding to the Lac Mégantic incident, Transport Canada has adopted new rules requiring rail companies transporting dangerous goods including crude oil to provide municipalities with regular reports on the nature and volume of the dangerous goods that the company transports by rail through that municipality. [35] PHMSA should provide the American public with no lesser protection.

3. Emergency Preparedness and Training for Crews, Responders and Communities

Carriers and shippers should provide training for all people at risk from exposure to hazmat shipments, including crews, responders, and potentially affected residents. Of these, crew training is the most important, as crews are in a position to prevent many accidents and releases. Over the decades, the industry has earned a shameful record in this regard. In 2007 the NTSB noted this long history of substandard emergency planning, dating back to the mid-1980s. See NTSB, Safety Recommendation R-07-4 and -5 (2007) at 4. Therein the Board stated:

> It is the Safety Board's position that effective emergency planning between railroads and local communities should foster the voluntary exchange of emergency response plans, the maintenance of the plans by all parties, and the evaluation of the plans' effectiveness. Further, effective planning demands that the railroads and local communities jointly organize and participate in drills and exercises as a way of becoming familiar with each other's plans and as a means of testing the plans' overall effectiveness. *Ibid.* at 6.

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[34] Codified at 42 U.S.C. § 11001 *et seq.* The transportation exemption is found at 42 U.S.C. § 11047.

[35] Transport Canada, "Protective Direction No. 32" http://www.tc.gc.ca/eng/mediaroom/backgrounders-protective-direction-no32-7428.html. November 20, 2013.

Now is the time for PHMSA and the industry to take on this responsibility in a meaningful way. Lac-Mégantic was a wake-up call. We cannot delay this work until another disaster occurs.

4. Additional Federal Resources Should be Allocated to Assuring the Safety of Crude Oil Shipments

The Departments of Homeland Security and Transportation should devote more assets and personnel to reviewing the security plans and assessments conducted by carriers transporting crude oil. TSA does not currently have enough personnel to adequately perform its rail safety mission and with the projected increase in crude oil shipments, these resources will be further strained.

TSA, FRA, and PHMSA should also provide to the relevant congressional committees a detailed accounting of the rail networks currently used to transport crude oil and other petroleum products in every state, identifying any weaknesses in existing infrastructure, and describing best practices to address any deficiencies. Congress can then use this information when determining TSA, FRA, and PHMSA's budgets. Identifying the gaps in resources will help Congress close such gaps.

5. Two-person Staffing Should Be Required for All Unit Trains

A unit train carrying crude oil can weigh up to 15,000 tons and extend for well over a mile in length. Directing such a vehicle from the point of origin to the destination is an inordinately demanding task, especially given the enormous risks involved if a mistake is made. The range of tasks and responsibilities imposed on train staff is far too great to identify here, but they include powering up, maintaining speed (in compliance with ever-changing speed limits, changing grades, and track conditions), constant visual surveillance of the track and traffic control signals, continuously operating the radio, completing required paperwork, and remaining aware of other rail traffic. FRA rules require that each car in a hazmat train be inspected visually for defects, signs of tampering, and/or the presence of improvised explosive devices. 49 C.F.R. 174.9(b). This could require over a mile of visual tank car inspections, thus requiring a solo staffer to be away from the locomotive for a long period of time.

Naturally, the task of conducting a train becomes vastly more difficult in the event of a derailment, vehicular collision, mechanical breakdown, etc. Under such conditions, such a massive piece of equipment cannot be safely operated by one individual. Some redundancy in staffing is also needed to maintain safe operations in the event that one of the crew should become injured or incapacitated. This has been recognized by the Federal Aviation Administration, which requires two pilots for all commercial flights. Crude-by-rail operations should be subject to the same requirement.

The evident need for two-person staffing was underscored in a report released by the FRA last year: "Cognitive and Collaborative Demands of Freight Conductor Activities: Results and Implications of a Cognitive Task Analysis – Human Factors in Railroad Operations." Among the report's key findings were these:

> *Locomotive Engineer and Conductor Function As a Joint Cognitive System*
> From interviews with conductors and locomotive engineers ... it is clear that both employees function as a joint cognitive system. They closely coordinate tasks with each other, adaptively share perceptual and cognitive load, and rely on each other to successfully accomplish the mission of the train. The conductor and locomotive engineer not only serve as an extension of "eyes" and "ears" for each other, catching and communicating information that the other may have missed, but they also extend each other cognitively—filling in knowledge gaps, providing reminders for upcoming tasks, and contributing jointly to problem-solving and decision-making situations that arise. This is especially true when a less experienced crewmember is paired with a more experienced crewmember."

Earlier this year, the Canadian Ministry of Transport issued an order requiring railroads to "[e]nsure that no locomotive coupled with one or more loaded tank cars transporting [hazardous materials] is operated on main track or sidings with fewer than two persons qualified under their company's requirements for operating employees.[36] Americans deserve the same level of protection.

6. "Positive Train Control" Should Be Mandatory for All Unit Trains of Crude and Other Hazmats

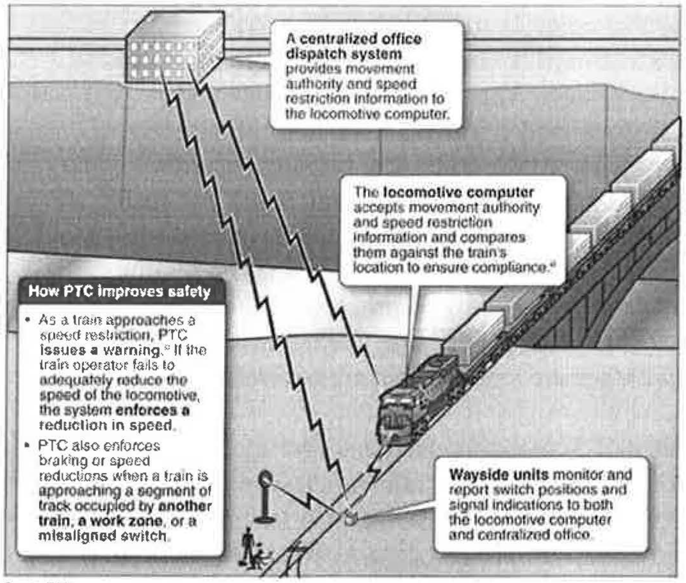
The Rail Safety Improvement Act of 2008 ("RSIA"), Pub. L. No. 110-432, div. A, 122 Stat. 4848, mandated the implementation of positive train control (PTC) systems by December 31, 2015, on "mainlines" used to transport inter-city rail passengers, commuters, or any amount of certain highly toxic materials. It should similarly be required for unit train shipments of crude oil and other hazardous materials.

PTC is a communications-based system designed to prevent certain types of rail accidents caused by human factors, including train-to-train collisions; trains entering established work zones, derailments caused by exceeding safe speeds, and other kinds of operator error. When certain dangerous conditions are recognized by the PTC system, the train is slowed and/or stopped automatically.

[36] Canadian Ministry of Transport, Emergency Directive Pursuant to Section 33 of the Railway Safety Act, July 23, 2013 (appended as Attachment 6).

Figure 7: Positive Train Control

Basic Operation of a Positive Train Control (PTC) System



Source: GAO.

As noted above, the railroads are committed to installing PTC, at an estimated cost of $8 billion. Extending the reach of this technology to unit train shipments of crude oil and other hazardous materials will entail little in the way of marginal costs, and yield a substantial public benefit in terms of public safety and environmental protection.

7. Audio and Video Recorders Should Be Installed in the Cabs of all Unit Trains Carrying Crude Oil or Other Hazardous Materials

The benefits of locomotive cab recorders are obvious. They provide a way to reconstruct the events surrounding an accident in cases where the staff were killed or absent. At the urging of the NTSB, the Federal Aviation Administration began requiring the use of cockpit voice recorders in commercial aircraft in 1977. *See* 49 C.F.R. § 121.359. The NTSB has been calling for the use of voice recorders in locomotives since at least 1997. *See* NTSB Safety Recommendation 97-9. The FRA refused. The NTSB reiterated its demand in 2007 – see Safety Recommendation R-07-3. Still there was no action by the FRA.

In 2010 the NTSB revisited this problem, this time expanding its demand to call for:

> the installation, in all controlling locomotive cabs and cab car operating environments, of crash- and fire-protected inward- and outward-facing image and audio recorders capable of providing recordings to verify that train crew actions are in accordance with regulations and procedures that are essential to safety as well as train operating conditions. The devices should have a continuous 12-hour recording capability ...

Safety Recommendation 10-1 (2010) at 67.

Of the many lessons offered by Lac-Mégantic, one is that the NTSB's pleas regarding audio and voice recorders should finally be honored.

IV. CONCLUSION

Rail shipments of crude oil throughout the United States have clearly risen to unprecedented levels and are likely to increase further in the near future. The regulatory regime currently in place requires significant improvements in order that the public be protected from threats associated with this burgeoning trade. This must include the following:

1. The existing fleet of DOT-111 tank cars must be replaced or upgraded. PHMSA should follow the recommendations of the AAR and the NTSB by identifying the soonest-possible date by which DOT-111 can reasonably be removed from crude oil service, beginning with the immediate removal of these tankers from unit trains transporting crude oil.
2. Unit trains of crude oil and other hazardous materials should be placed in the highest risk category of Hazmat shipments.
3. The exemption for rail shipments of hazardous materials including crude oil from the disclosure requirement of the Emergency Planning and Community Right-to-Know Act ("EPCRA") must be removed. Information regarding the content of all shipments and relevant risks and emergency procedures should be distributed to local emergency responders, to local residents by mail, and posted on an easily accessible website.
4. Emergency preparedness and training for crews, responders and communities at risk from an incident involving hazardous materials including crude oil should be carried out among all communities at risk.
5. Additional federal resources should be allocated to assuring the safety of crude oil shipments. Greater coordination between PHMSA and the Department of Homeland Security is essential for assuring public safety in light of the vulnerability to terrorist attack of hazardous material transport via rail through the United States.
6. Two-person staffing should be required for all unit trains.
7. "Positive Train Control" should be mandatory for all unit trains of crude oil and other hazardous materials.
8. Audio and video recorders should be installed in the cabs of all unit trains carrying crude oil or other hazardous materials.

Thank you for consideration,

David Pettit
Senior Attorney
Natural Resources Defense Council

Devorah Ancel
Staff Attorney
Sierra Club

Lorne Stockman
Research Director
Oil Change International

Bart Mihailovich
Director
Spokane Riverkeeper

Kristen L. Boyles
Staff Attorney
Earthjustice

Lauren Goldberg
Staff Attorney
Columbia Riverkeeper

Charles McKenna
Chair
Vermont Chapter of the
Sierra Club

Michael J. Bartlett,
President
Audubon Society of New
Hampshire

Chris Wilke
Executive Director
Puget Soundkeeper
Alliance

Marcie Keever
Program Director
Friends of the Earth

Hilton Kelley
Executive Director /
Founder
Community In-power and
Development Association

Matt Krogh
Campaign Director
ForestEthics

Arthur Grunbaum
Friends of Grays Harbor

Dylan Voorhees
Clean Energy Director
Natural Resources Council
of Maine

Tyson Slocum
Energy Program Director
Public Citizen

Marilyn Bardet
Founder
Benicia Good Neighbor
Steering Committee

ATTACHMENT 1

U.S. Department
of Transportation

Federal Railroad
Administration

1200 New Jersey Avenue, SE
Washington, DC 20590

JUL 29 2013

Mr. Jack Gerard
American Petroleum Institute
1220 L Street NW
Washington, DC 20005

Dear Mr. Gerard:

The Federal Railroad Administration (FRA) is reviewing potential safety issues related to the transportation of crude oil by rail. FRA has specific safety concerns about the proper classification of crude oil being shipped by rail, the subsequent determination or selection of the proper tank car packaging used for transporting crude oil, and the corresponding tank car outage requirements. This letter presents the basis for FRA's concerns regarding these potential safety issues, notifies you of our intended path forward, and provides recommendations to help ensure compliance with the Department of Transportation's (DOT) applicable Hazardous Materials Regulations (HMR; Title 49 Code of Federal Regulations (CFR) Parts 171–180). In addition, we request that you distribute this letter to those of your members that ship crude oil via rail.

Industry statistics demonstrate that, in terms of rail originations, crude oil shipments are the fastest growing of all hazardous materials shipped by rail. According to the Association of American Railroads' (AAR) Annual Report of Hazardous Materials Transported by Rail for 2012, the number of crude oil originations has increased by 443 percent since 2005.

Table 1: Annual number of originations of tank cars containing crude oil, hazardous materials in tank cars, and all hazardous materials

Year	Crude Oil (4910165)	Crude Oil (4915165)	Total HM in tank cars	Total HM
2005	2,626 (71)	4,472 (45)	1,355,070	1,587,469
2006	2,573 (71)	3,510 (61)	1,370,674	1,571,665
2007	2,235 (79)	4,772 (46)	1,440,341	1,988,294
2008	7,524 (34)	4,368 (51)	1,444,194	1,999,757
2009	7,961 (28)	4,940 (42)	1,379,949	1,895,066
2010	27,979 (8)	5,746 (40)	1,525,540	2,085,361
2011	74,057 (4)	6,117 (40)	1,616,580	2,242,389
2012	257,450 (2)	7,096 (48)	1,789,529	2,474,356

In addition, crude oil transportation presents unique operating considerations because, in general, crude oil is transported in units of cars (blocks of crude oil cars within a train) and by entire unit trains consisting wholly of tank cars containing crude oil. Tank cars containing crude oil are typically loaded by one of two methods: transloading (where crude oil from cargo tanks is transferred directly into tank cars) or bulk loading operations (where crude oil is delivered to a bulk storage facility and the crude oil is then transferred from storage tanks to the railroad tank cars). In both operations, there is a blend of crude oil from a variety of sources in each tank car and the properties of the materials may vary depending on the constituent crude oils.

The HMR require that an offeror (shipper) of a hazardous material properly classify and describe the hazardous material. See 49 CFR § 171.1. To attest compliance with the HMR, a shipper of a hazardous material must also certify that the hazardous material being offered into transportation is offered in compliance with the HMR. Further, the HMR prohibit a shipper from offering hazardous material for transportation unless a tank car being used to transport such hazardous material meets the applicable HMR requirements. See, for example, 49 CFR § 171.2. Only after the properties of a hazardous material are determined and the material is properly classified can a shipper ensure compliance with the HMR. In the case of crude oil, relevant properties to properly classify the material include: flash point, corrosivity, specific gravity at loading and reference temperatures, and the presence and concentration of specific compounds such as sulfur (as found in sour crude oil). This information enables a shipper to properly classify a hazardous material and select the proper HMR-authorized packaging for transportation of that hazardous material. Such information and determination of the authorized packaging also ensures that the required tank car outage can be maintained.

FRA's safety concerns stem from the following three considerations.

1. Crude oil transported by rail often derives from different sources and is then blended, so it is critical that shippers determine the proper classification of the crude oil per the HMR. FRA audits of crude oil loading facilities indicate that the classification of crude oil being transported by rail is often based solely on Material Safety Data Sheet (MSDS) data that only provides a material classification and a range of material properties. This MSDS information is typically provided by the consignee to the shipper, and the shipper is unaware of validation of the values of the crude oil properties. Further, FRA's audits indicate that MSDS information is not gleaned from any recently conducted tests or from testing for the many different sources (wells) of the crude oil. For example, a shipper provided information to FRA showing that crude oil being transported by rail had a flash point of 68° F, or a Packing Group I hazardous material. However, the crude oil had been improperly classified as a Packing Group III material and was being transported in AAR class tank cars that were not equipped with the required design enhancements. This constituted a misuse of the crude oil HMR packaging exceptions and subsequent violations of the HMR.

The HMR contain exceptions that allow for the use of non-DOT-specification tank cars for the transportation of crude oil in certain circumstances. Title 49 CFR § 173.150(f)(1) states, "A flammable liquid with a flash point at or above 38 °C (100 °F) that does not meet the definition of any other hazard class may be reclassified as a combustible liquid." Further, 49 CFR § 173.150(f)(3) allows materials that are classified as combustible liquids to be transported in non-DOT-specification bulk packagings.[1] As such, AAR 211 class cars are permitted to be used to transport crude oil that has been classified as a Packing Group III material with a relatively high flash point. These cars are not built and/or maintained to the standard of a DOT-specification tank car. This distinction has safety implications if the crude oil being transported has been improperly classified and actually has a lower flash point and is a Packing Group I flammable liquid hazardous material. If improperly classified, the crude oil might then be shipped in a lesser standard tank car, as occurred in the above example.

Unfortunately, the AAR standard transportation commodity code data does not distinguish between the different packing groups within the hazard class. Without further information in that regard, and in relation to the accuracy of crude oil classifications being made, FRA can only speculate as to the number of potential crude oil shipments that are being made in AAR class tank cars in violation of the HMR. Recently, the AAR Tank Car Committee introduced new requirements for tank cars constructed for ethanol and crude oil (Packing Groups I and II) service. The new requirements are intended to improve the crashworthiness of the tank cars and include a thicker shell, head protection, top fittings protection, and relief valves with a greater flow capacity. Clearly, any improper classification of crude oil and subsequent shipment in an unauthorized tank car contravenes these industry efforts to improve the safety of transporting hazardous materials, and it also contravenes the requirements of the HMR.

2. Title 49 CFR § 173.24b(a) sets the minimum tank car outage for crude oil at 1 percent at a reference temperature based on the existence of tank car insulation. A crude oil shipper must know the specific gravity of the hazardous material at the reference temperature as well as the temperature and specific gravity of the material at that temperature when loaded. This information is then used to calculate the total quantity that can be safely loaded into the car to comply with the HMR's 1-percent outage requirement. Because it is likely that the temperature of the hazardous material loaded into the car is lower than the reference temperature, the outage after the car is loaded will likely be greater than 1 percent. If the outage is not properly calculated because the material's specific gravity is unknown (or is provided only as a range), the tank car could be loaded such that if the temperature increases during transportation, the tank will become shell-full and the material will leak from the valve fittings or manway.

[1] Section 172.102, Special Provision B1, states, "If the material has a flash point at or above 38 °C (100 °F) and below 93 °C (200 °F), then the bulk packaging requirements of § 173.241 of this subchapter are applicable."

Since 2004, approximately 10 percent of the one-time movement approval (OTMA) requests that FRA has received have been submitted to move overloaded tank cars.[2] Of these requests, 33 percent were tank cars containing flammable liquids. FRA notes that tank cars overloaded by weight are typically identified when the tank cars go over a weigh-in-motion scale at a railroad's classification yard. As indicated above, crude oil is typically moved in unit trains, and the cars in a unit train do not typically pass over weigh-in-motion scales in classification yards. Therefore it is unlikely that FRA would receive many OTMA requests for overloaded tank cars containing crude oil. Moreover, crude oil accounted for the most nonaccident releases (NARs) by commodity in 2012, nearly doubling the next highest commodity (alcohols not otherwise specified, which accounts for a comparable annual volume transported by rail). FRA's data indicates that 98 percent of the NARs involved loaded tank cars. Also, less than 2 percent of the NARs occurred at the bottom outlet valve. Product releases through the top valves and fittings of tank cars when the hazardous material expands during transportation suggest that loading facilities may not know the specific gravity of the hazardous materials loaded into railroad tank cars, resulting in a lack of sufficient outage.

3. FRA's review of the OTMA data also indicates an increasing number of incidents involving damage to tank cars in crude oil service in the form of severe corrosion of the internal surface of the tank, manway covers, and valves and fittings. A possible cause is contamination of the crude oil by materials used in the fracturing process that are corrosive to the tank car tank and service equipment. Therefore, when crude oil is loaded into tank cars, it is critical that that the existence and concentration of specific elements or compounds be identified, along with the corrosivity of the materials to the tank car tanks and service equipment. Proper identification of these elements will enable a shipper to ensure the reliability of the tank car. Proper identification also enables a shipper to determine if there is a need for an interior coating or lining, alternative materials of construction for valves and fittings, and performance requirements for fluid sealing elements, such as gaskets and o-rings.

As a result of the concerns outlined above, FRA is investigating whether crude oil is being properly classified and, subsequently, whether the proper tank car packagings are being used for transportation. As part of this investigation, FRA will be requesting analytical data supporting the current classification of a shipper's crude oil, as well as information related to shipper crude oil loading practices. If analytical data regarding the current classification of crude oil is not available, FRA, in partnership with the Pipeline and Hazardous Materials Safety Administration (PHMSA), may use PHMSA's Hazardous Materials Testing Program. Under this program, a sample of a shipper's hazardous material is sent to a certified laboratory for testing, and the results of the laboratory testing are then shared with the shipper. FRA may also consider exercising its authority under 49 CFR § 109.9 to determine whether crude oil is being properly classified and transported in HMR-authorized packaging. If an investigation reveals that crude oil is not being properly classified per the HMR, FRA may use its enforcement tools to address noncompliance. Some of these enforcement tools

[2] Per 49 CFR § 174.50, an OTMA is required to move a nonconforming DOT-specification bulk packaging for cleaning and/or repair.

include the issuance of compliance orders, emergency orders, and civil penalties. See 49 CFR Parts 209 and 211.

FRA recommends that shippers evaluate their processes for testing, classifying, and packaging the crude oil that they offer into transportation via railroad tank car. The frequency and type of testing should be based on a shipper's knowledge of the hazardous material, with specific consideration given to the volume of hazardous material shipped, the variety of sources that the hazardous material is generated from, and the processes that generate the hazardous material.

FRA welcomes the opportunity to assist crude oil shippers in their efforts to comply with the HMR. Please contact Mr. Karl Alexy, Staff Director, Hazardous Materials Division, at (202) 493-6245 or Karl.Alexy@dot.gov to discuss this matter further.

Sincerely,

Thomas J. Herrmann
Acting Director, Office of Safety Assurance and Compliance

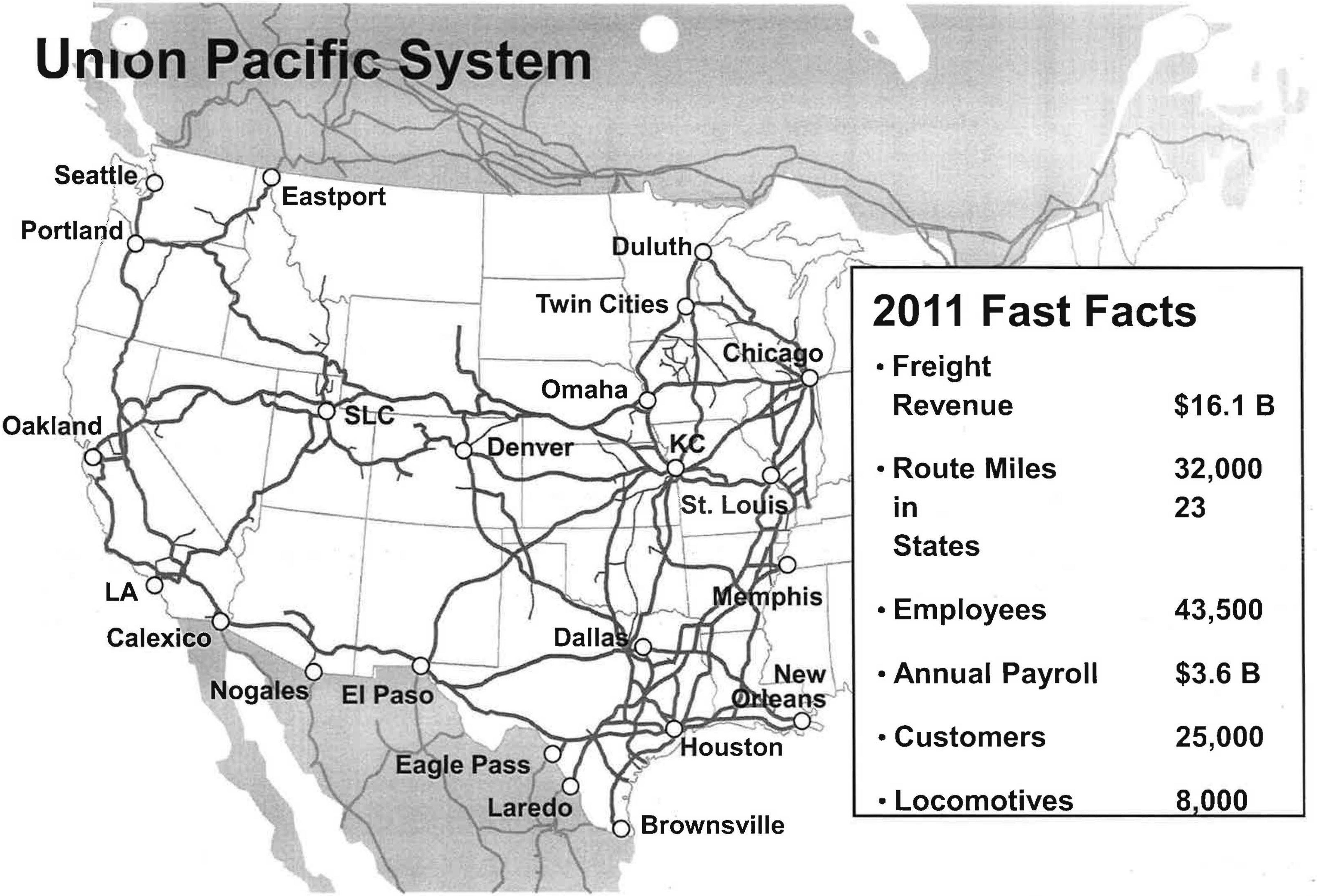
ATTACHMENT 2

Crude Oil Tank Car Securement Training

Craig Johnson – Gen. Director - CTS

UNION PACIFIC BUILDING AMERICA®

Union Pacific System



2011 Fast Facts

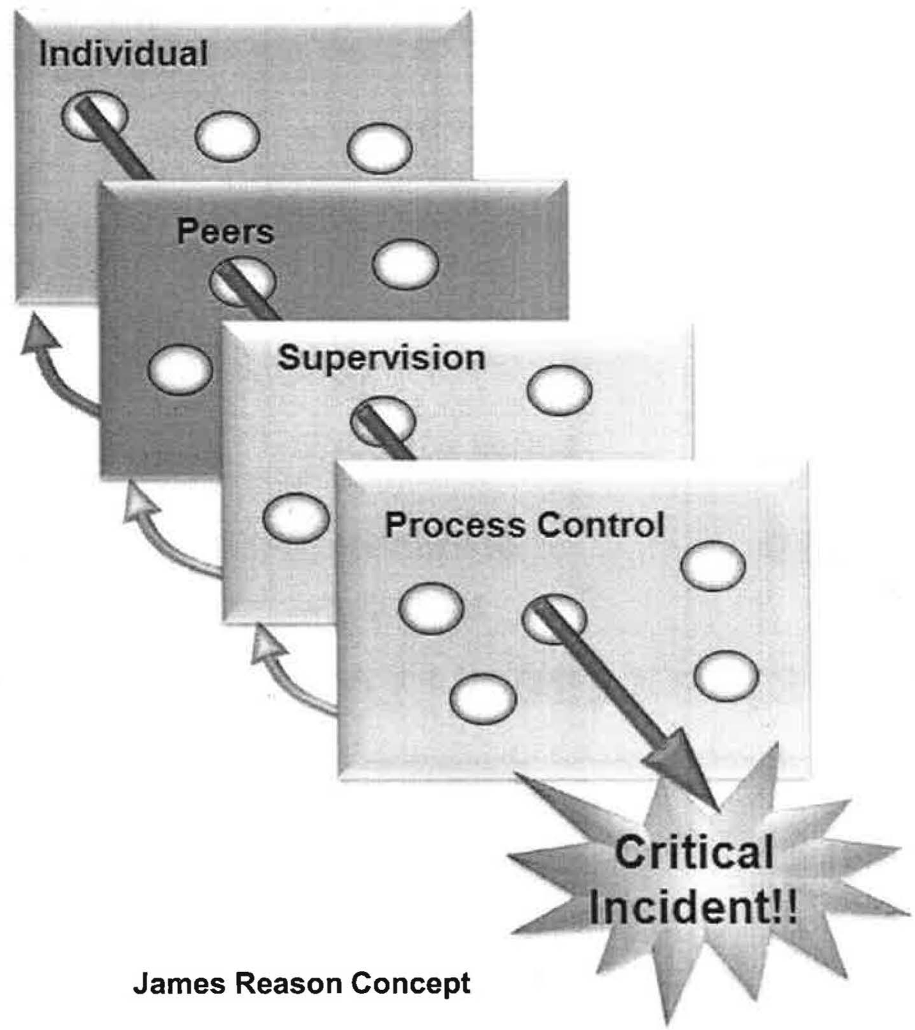
• Freight Revenue	$16.1 B
• Route Miles in States	32,000 23
• Employees	43,500
• Annual Payroll	$3.6 B
• Customers	25,000
• Locomotives	8,000

Safety Strategy

Consistent Approach

- **Risk Identification & Mitigation**
- **Engagement**
- **Standardized Work / Training**
- **Technology**
- **Capital Investment**

"Zero Tolerance" Model



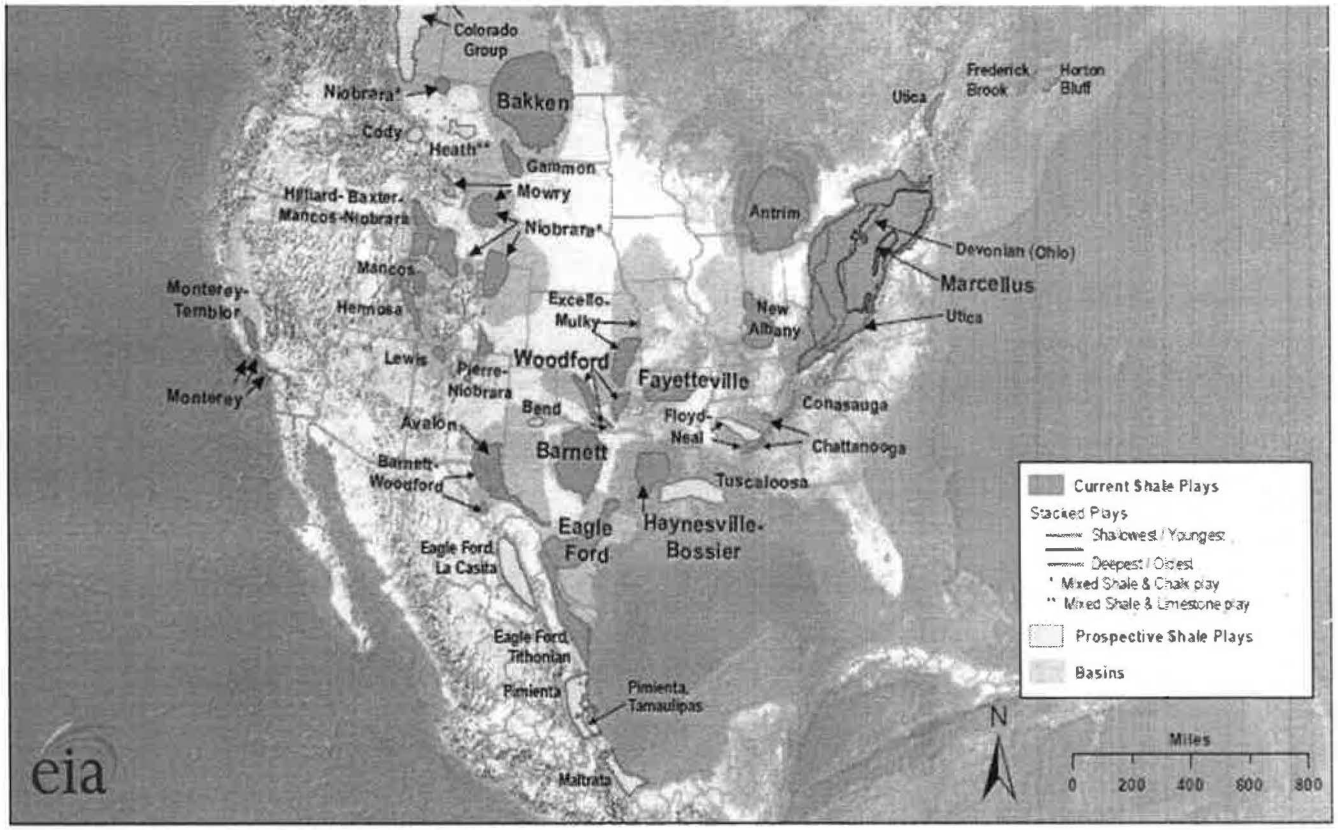
James Reason Concept

Lower 48 states shale plays

BUILDING AMERICA®

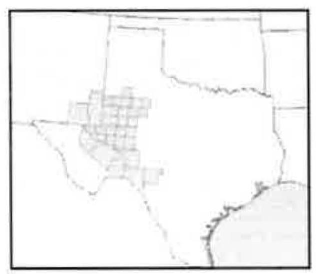
Gas/Oil Shale Deposits

- "New" US Oil & Gas
  - Bakken Formation (ND/MT/ and SK)
  - Eagle Ford Formation San Antonio Laredo /Corpus Christi Hondo
  - Permian Basin Midland/Odessa
  - Niobrara/DJ Basin NE, CO, d WY
  - Unita Basin Rock Springs, WY/W. CO
- Add. large developments
  - Haynesville Shale Shreveport, LA area
  - Western Colorado area
  - Woodford Shale (W. OK)
  - Marcellus Shale (PA/NY)
  - Canadian Oil Sands Northern AB and SK



Source: Energy Information Administration based on data from various published studies.
Updated: March 21, 2011

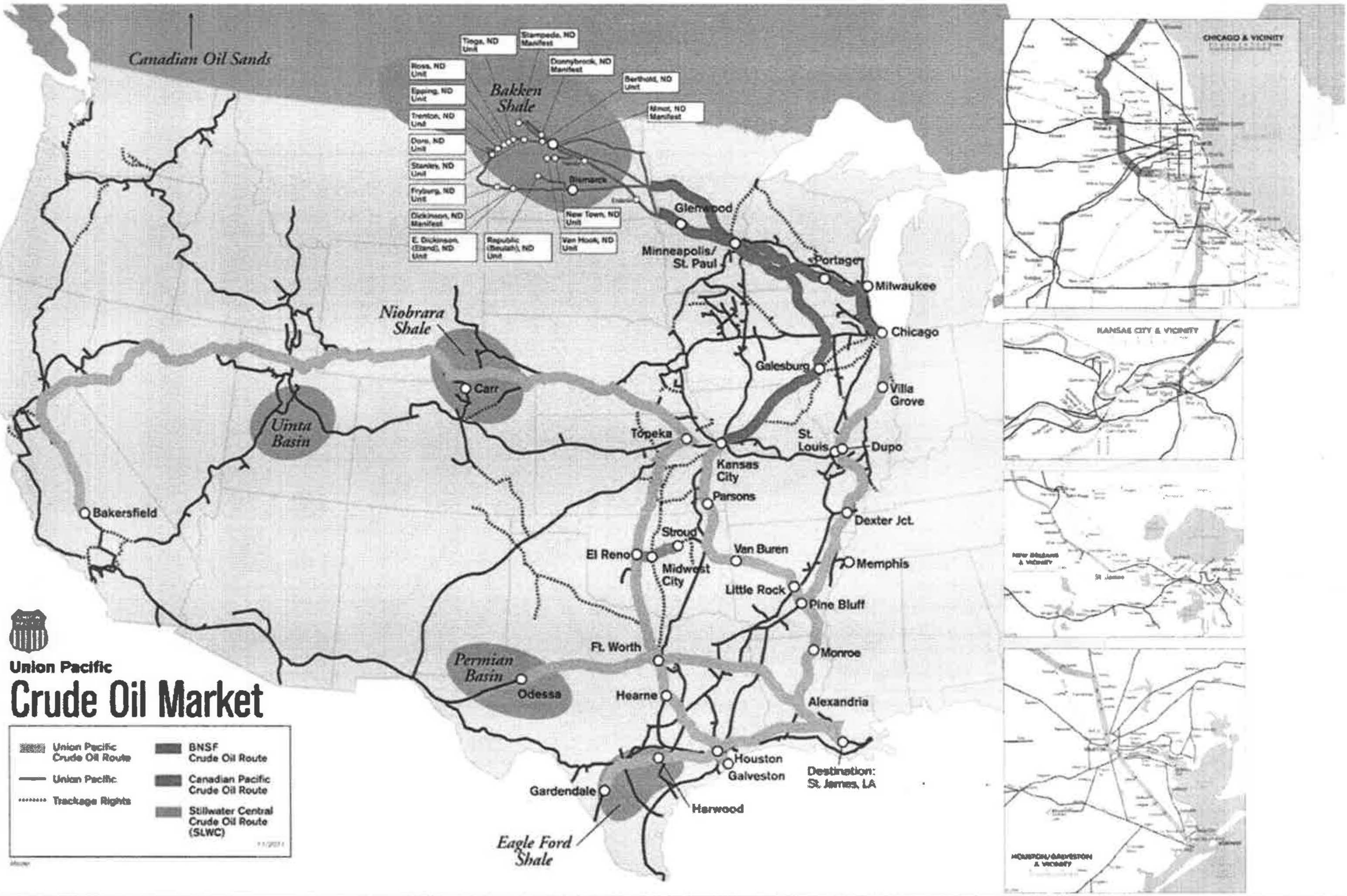
Eagle Ford



Permian

Haynesville

Niobrara



Canadian Oil Sands
Bakken Shale
Tioga, ND Unit
Stampede, ND Manifest
Ross, ND Unit
Donnybrook, ND Manifest
Epping, ND Unit
Berthold, ND Unit
Trenton, ND Unit
Minot, ND Manifest
Dore, ND Unit
Stanley, ND Unit
Fryburg, ND Unit
Dickinson, ND Manifest
E. Dickinson, (Eland), ND Unit
Republic (Beulah), ND Unit
New Town, ND Unit
Van Hook, ND Unit
Bismarck
Glenwood
Minneapolis/ St. Paul
Portage
Milwaukee
Chicago
Galesburg
Villa Grove
Niobrara Shale
Carr
Uinta Basin
Topeka
Kansas City
St. Louis
Dupo
Parsons
Bakersfield
Dexter Jct.
Stroud
Van Buren
El Reno
Midwest City
Memphis
Little Rock
Pine Bluff
Ft. Worth
Monroe
Permian Basin
Odessa
Hearne
Alexandria
Houston
Galveston
Destination: St. James, LA
Gardendale
Harwood
Eagle Ford Shale
Union Pacific
Crude Oil Market
Union Pacific Crude Oil Route
Union Pacific
Trackage Rights
BNSF Crude Oil Route
Canadian Pacific Crude Oil Route
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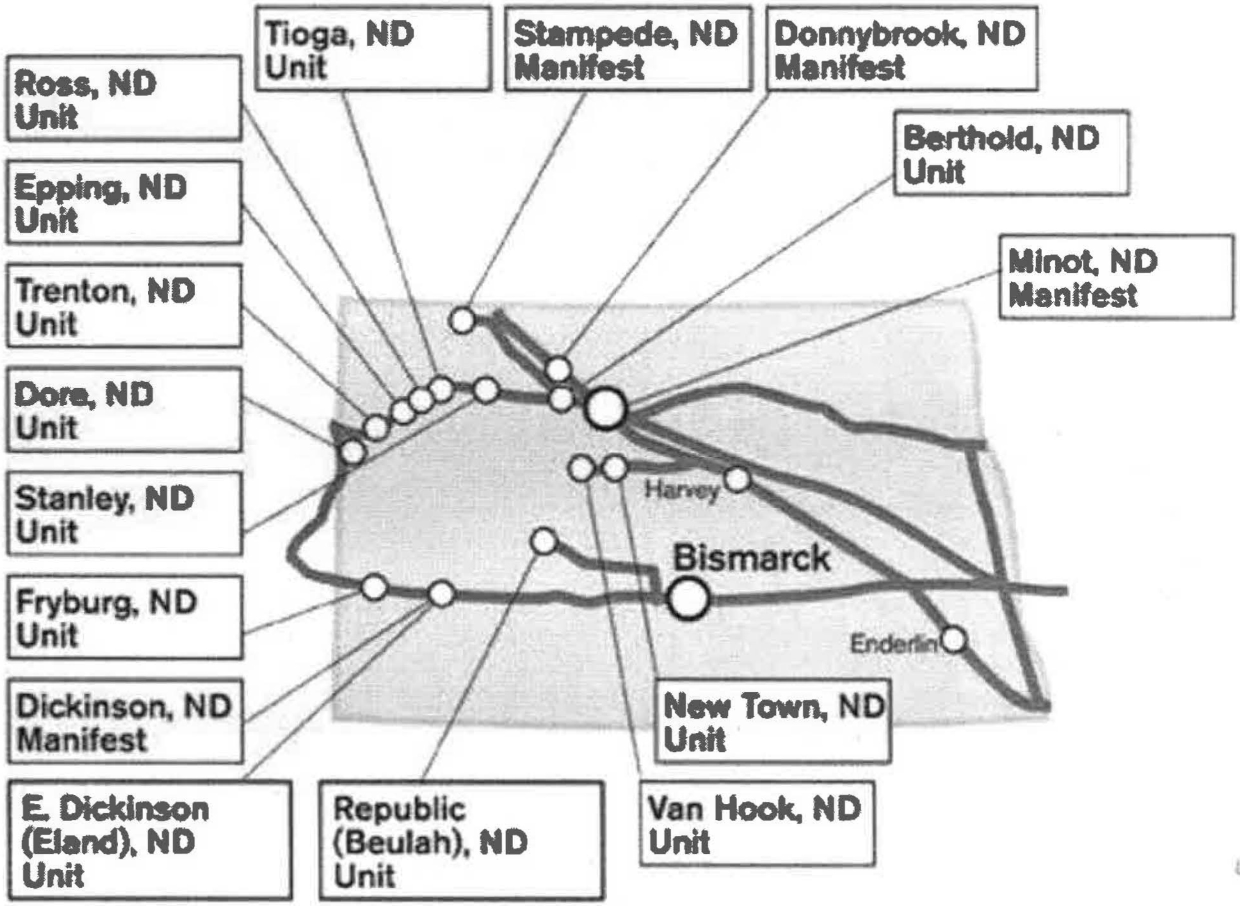
KANSAS CITY & VICINITY
NEW ORLEANS & VICINITY
HOUSTON/GALVESTON & VICINITY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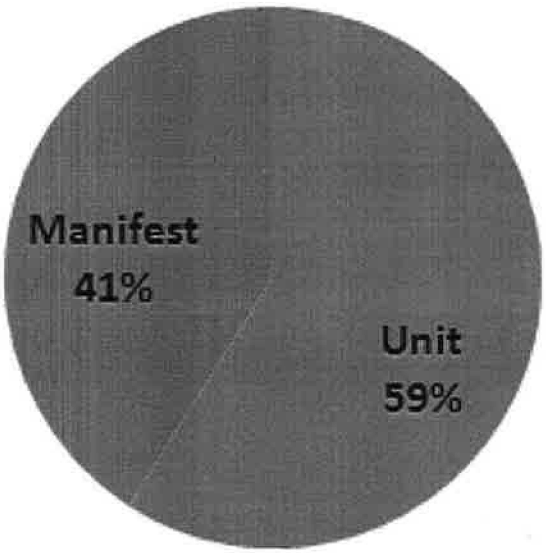
Tioga, ND Unit
Stampede, ND Manifest
Donnybrook, ND Manifest
Berthold, ND Unit
Minot, ND Manifest
Epping, ND Unit
Trenton, ND Unit
Dore, ND Unit
Stanley, ND Unit
Fryburg, ND Unit
Dickinson, ND Manifest
E. Dickinson (Eland), ND Unit
Republic (Beulah), ND Unit
Van Hook, ND Unit
New Town, ND Unit
Harvey
Bismarck
Enderlin

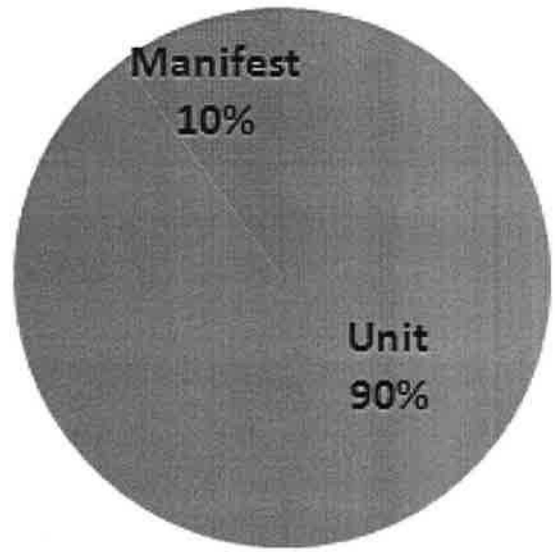
UPND 11/2011

Crude Oil
Manifest vs. Unit Trains

July 2011

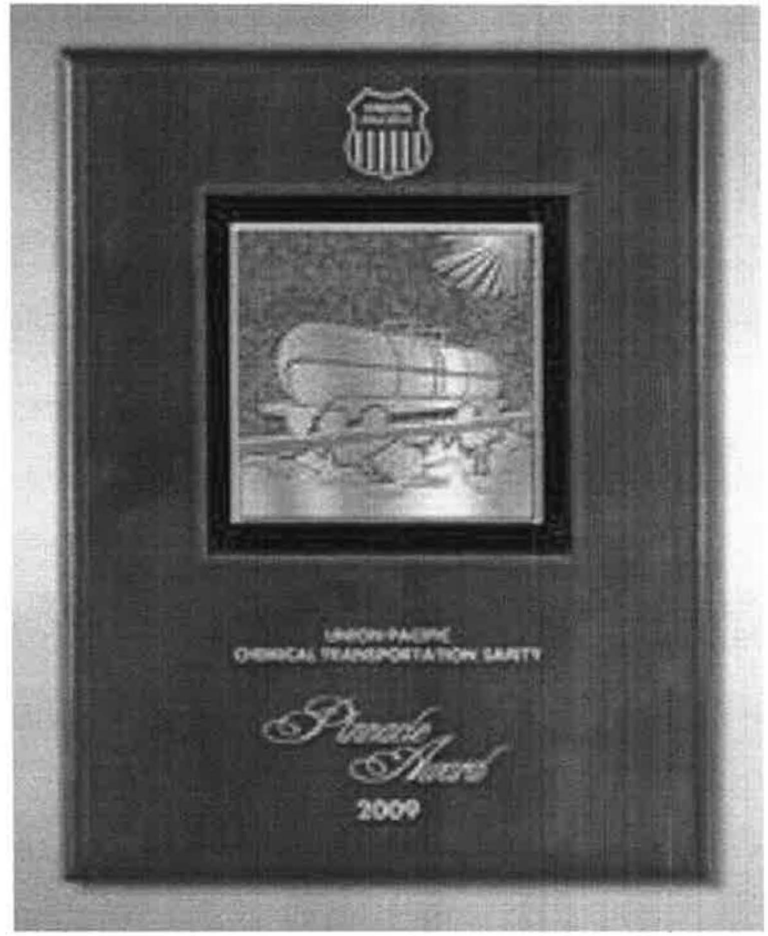


January 2012



Pinnacle Award – Reward Best Practices !

- Annual securement training for loaders
- Documented loading procedures
- Recognition program for safest loaders
- Pre-trip inspection and testing
- Incident investigation
- Strategic NAR prevention efforts



Thank You!!

ATTACHMENT 3

Analysis of the Potential Costs of Accidents/Spills Related to Crude by Rail

Prepared

by

Ian Goodman
Brigid Rowan

on behalf of
Oil Change International

Before the
Pipeline and Hazardous Materials Safety Administration
in the Context of
Hazardous Materials: Rail Petitions and Recommendations to Improve the Safety of Railroad Tank Car Transportation
Docket No. PHMSA-2012-0082 (HM-251)

the goodman group, ltd.
http://www.thegoodman.com/

November 8, 2013

Table of Contents

1. Introduction

This analysis was prepared by The Goodman Group, Ltd. (TGG), a consulting firm specializing in energy and regulatory economics,[1] on behalf of Oil Change International. Any findings, conclusions or opinions are those of TGG and the authors and do not necessarily reflect those of Oil Change International.

The costs of crude by rail (CBR) accidents/spills can be very large. This analysis demonstrates that a major crude by rail (CBR) unit train accident/spill could cost $1 billion or more for a single event.

The following examples provide key support for our findings:

1. The explosion, fire and spill of Bakken crude from a train derailment in Lac-Mégantic, QC (2013): The Lac-Mégantic rail accident/spill will likely have costs in the order of $500 million to $1 billion. Costs/damages for a similar incident could have been substantially higher had it occurred in a more populated area. Lac-Mégantic is also relevant in that it shows how an accident involving highly flammable light crude (such as the Bakken crude) can have devastating consequences even in a small town in terms of loss of human life and widespread explosion and fire damage to surrounding property.

2. The spill of tar sands dilbit[2] from Enbridge's Line 6B in Marshall, MI (2010): This rupture had costs of about $1 billion for Enbridge. The spill volumes at Marshall were within the range of the amount of spill possible (and, in fact, substantially less than the maximum spill) if a crude by rail unit train released much of its cargo. Costs/damages for similar incident could have also been substantially higher had it occurred in a more populated area. Marshall is also relevant in

[1] www.thegoodman.com This analysis was co-authored by Ian Goodman and Brigid Rowan.
[2] Diluted bitumen. Raw bitumen (a very heavy asphalt-like crude produced from the Alberta tar sands) is diluted for the purposes of rail and pipeline transport. Bitumen is transported in various forms, including a) SCO (raw bitumen upgraded to light synthetic crude oil), b) raw bitumen mixed with a petroleum-based diluent (such as naphtha or condensate) to make it less viscous, or c) raw bitumen (no diluent). SCO and dilbit (diluted bitumen to pipeline specifications, 25–30% diluent) can be transported in standard (non-coiled and non-insulated) tank cars and pipelines. Railbit (bitumen with 15–20% diluent) and raw bitumen can be transported in coiled and insulated tank cars (which are also sometimes used to transport dilbit). Keystone XL Draft Supplemental EIS, p. 1.4-49. Accessed October 30, 2013. http://keystonepipeline-xl.state.gov/documents/organization/205654.pdf

showing the high potential cost of dilbit spills into water (and rail lines are often highly proximate to water).[3]

The AAR petition for rulemaking states:[4]

> AAR surveyed its members for information on derailments involving packing group I and II materials from '2004-2008. The derailments resulted in one fatality and eleven injuries, the release of approximately 925,000 gallons of these hazardous materials, and cleanup costs totaling approximately $63 million.

The Village of Barrington petition for rulemaking responds:[5]

> Furthermore, while AAR claims that derailment costs totaled approximately $64 million over the past five years, including equipment, lading, response and environmental remediation costs," [footnote 17 in original: March 9, 2011 Petition for Rulemaking letter to Dr. Magdy El-Sibae from Michael Rush of the Association of American Railroads at page 2, footnote 7.] Petitioners question the accuracy of industry's cost-benefit claims. In reviewing the derailment cost chart at Attachment B of AAR's petition, PHMSA should note that there is no apparent accounting for costs associated with civil litigation in the wake of derailments. However, in the Cherry Valley/Rockford derailment, CN paid over $36 million in October of 2011 to settle a lawsuit brought by the family of only one victim. AAR's chart, however, reflects costs of only $8 million for that incident. [footnote 18 in original: At the very least, Petitioners believe it would make sense for the PHMSA to ascertain the costs stemming from civil litigation for the entire list of derailments incidents that the AAR provided to your office on March 9, 2011. Even if it doesn't yet completely balance the cost-benefit equation in favor of public safety, Petitioners would guess that the plaintiffs' bar would look forward to securing ever higher awards for future victims of derailments based on the public record demonstrating that industry chose to do nothing meaningful in terms of investing in a retrofit program of tank cars that are known to be dangerous and that are increasingly serving as a rolling pipeline for the ethanol and crude oil industries.]

[3] The discussion of the costs of the Lac-Mégantic disaster and the Marshall, MI pipeline rupture is partly based on excerpts from a TGG report filed as written expert testimony at Canada's National Energy Board:
"The Relative Economic Costs and Benefits of the Line 9B Reversal and Line 9 Capacity Expansion," August 8, 2013, pp. 38-41. Accessed October 23, 2013.
https://www.neb-one.gc.ca/ll-eng/livelink.exe?func=ll&objId=985663&objAction=Open

[4] See http://www.regulations.gov/#!documentDetail;D=PHMSA-2012-0082-0005 p. 2. Accessed October 29, 2013.

[5] See http://www.regulations.gov/#!documentDetail;D=PHMSA-2012-0082-0006 p. 8. Accessed October 29, 2013.

In fact, even a single accident relating to a crude by rail unit train can have dramatically higher costs than the costs taken into account in the AAR's cost-benefit claims. As further explained in this briefing, this analysis will demonstrate that a major crude by rail unit train accident/spill, involving either dilbit or a very light crude such as Bakken, could cost $1 billion or more for a single event.

We have limited our cost analysis to environmental and socio-economic impacts that directly affect economic activity and can be somewhat readily (albeit approximately) quantified using market economics. These costs escalate very quickly in more densely populated urban areas. Moreover, as we have witnessed firsthand in Quebec, in summer 2013, unconventional crudes (such as Bakken and dilbit) have hazardous characteristics (notably flammability), such that their unsafe transport can result in the loss of human life. We have not attempted to assign a cost to potential effects on human health and safety or to broader effects on ecosystems (notably residual effects).[6]

As noted above, two relevant examples to support our findings that a single unit-train accident/spill could result in very large costs are the following:

1. the explosion, fire and spill of Bakken crude from a train derailment in Lac-Mégantic, QC (2013).
2. the spill of tar sands dilbit from Enbridge's Line 6B in Marshall, MI (2010).

For each example, TGG will provide:

1. description of the disaster;
2. the cost and sources of the cost data;
3. the relevance of the example to estimating the potential costs of CBR accidents/spills.

[6] Residual effects are those effects remaining after implementation of mitigation measures, such as emergency response and decontamination efforts.

2. Estimated Costs of the Crude by Rail Disaster at Lac-Mégantic

2.1. Description of Disaster

According to the Transportation Safety Board of Canada (TSB), "[o]n July 6 2013, a unit train carrying petroleum crude oil operated by Montreal, Maine & Atlantic Railway (MMA) derailed numerous cars in Lac-Mégantic, Quebec, and a fire and explosions ensued."[7]

The train with five locomotives was pulling 72 DOT-111 tanker cars full of light crude oil from the Bakken shale play in North Dakota to the Irving Oil refinery in Saint John, New Brunswick. The train was operated by Montreal Maine & Atlantic Railway. The train broke away and derailed, unleashing an explosive ball of burning Bakken crude, which incinerated the downtown core of this small Quebec town.[8]

Quebec's Department of Sustainable Development, Environment and Parks reports that this rail accident released 6.0 million litres[9] of crude oil into the environment (affecting soil, water and air).[10] Among its other findings (as of October 28, 2013):

A total of 7.7 million litres[11] of crude oil were on the runaway MMA train

from a total of 72 tankers, 63 spilled and 9 avoided spilling during the accident

43 million litres of oily water have been recovered from Lac-Mégantic's city centre (sewer system, lake, and grounds)

52,000 litres of oily water removed from the nearby Chaudière River

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[7] See TSB website, Railway investigation R13D0054. Accessed October 29, 2013. http://www.bst-tsb.gc.ca/eng/enquetes-investigations/rail/2013/R13D0054/R13D0054.asp

[8] "Lac-Mégantic: What we know, what we don't," Montreal Gazette, July 22, 2013. Accessed August 2, 2013. http://www.montrealgazette.com/news/M%C3%A9gantic+What+know+what+know/8626661/story.html

[9] Equivalent to 1.6 million gallons.

[10] See Quebec Department of Sustainable Development, Environment and Parks website, Train Accident in Lac-Mégantic (content in French: *Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs (MDDEFP), Accident ferroviaire à Lac-Mégantic*),.Accessed November 8, 2013 http://www.mddep.gouv.qc.ca/lac-megantic/index.htm; and specifically Summary Table on quantities of oil estimated as of October 28, 2013 (*Tableau-Synthèse: Estimation au 28 octobre 2013 des quantités de pétrole brut léger impliquées dans l'accident à Lac-Mégantic*) http://www.mddefp.gouv.qc.ca/lac-megantic/20131028-tableau-synthese-petrole.pdf

[11] Equivalent to 2.0 million gallons.