

***Safe Rail Transport of Crude Oil:
What's On the Horizon, and Are We Prepared?***

INTRODUCTION AND OVERVIEW

Recent years have seen a boom in crude oil production from the Bakken region of North Dakota and Montana and the tar sands of Alberta, Canada. Because few pipelines currently exist and President Obama has yet to approve or deny TransCanada's Keystone XL proposal, energy companies have turned to railroads. By moving oil from production fields to refineries around the country, railroads increasingly connect supply with demand.

Large-scale shipment of crude oil by rail (crude-by-rail) is a relatively new phenomenon. According to the Association of American Railroads, roughly 400,000 carloads of crude oil traveled by rail to refineries located along the West Coast, Northeast, and Gulf of Mexico in 2013. This number is up from 9,500 in 2008 – a 4000% increase.

Because of this rapid change in the energy/transportation sector, state (and national) safety rules, regulations, and oversight may be mismatched with current conditions. Moreover, a series of derailments and explosions over the past year – including one last week in Pennsylvania – have raised the profile of this issue among local, state and federal officials. Diverse stakeholders recognize that the energy boom is good for business, yet safety cannot be compromised.

This is the first in a pair of informational hearings regarding the safety of crude oil transport by rail. The Senate committees on Environmental Quality and Natural Resources have scheduled a joint hearing on March 19th to consider emergency response to rail accidents. These hearings dovetail with an increased focus by the Governor's office on the implications of increased shipments of crude oil by rail. They also coincide with events sponsored by Congressional Committees and the U.S. Department of Transportation. In January, Washington regulators of crude oil shipments by rail met with railroad and oil industry representatives to discuss making changes to how crude is shipped by rail, from tank car design to operating speed to appropriate routing. Transportation Secretary Anthony Foxx called the meeting productive and said changes would be announced within the next 30 days.

This informational hearing will address the following general questions:

Who's in control?

- What is state vs. federal jurisdiction over rail safety and specifically crude-by-rail?

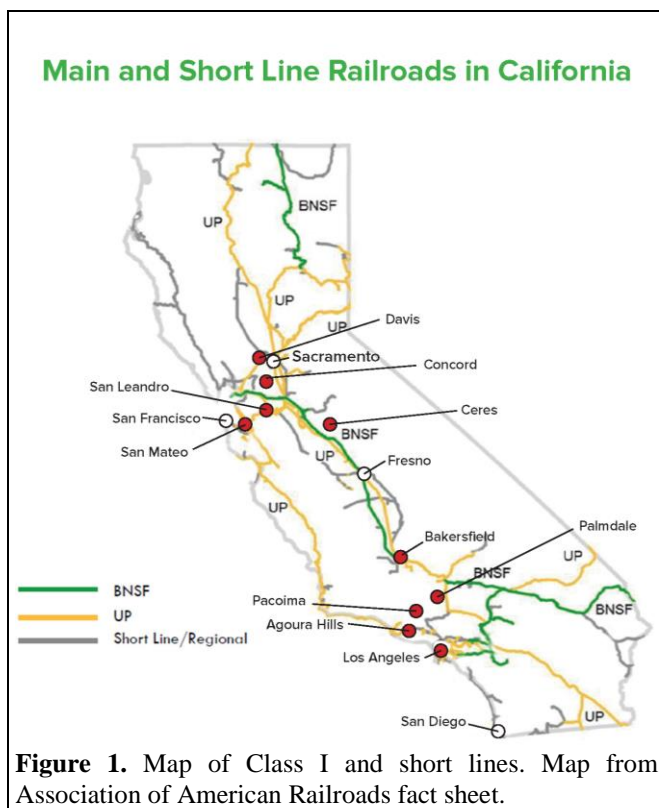
What, and how, are we doing?

- Does the California Public Utilities Commission's (CPUC) have a comprehensive and effective safety enforcement program in place?
- What are the past and current volumes of crude oil shipped by rail in California?
- What is the scope of the projected increase in crude-by-rail? Is the projection realistic?
- What safety rules, regulations, and practices are currently in place?

What's needed?

- Are changes in budgeting, staffing, and/or statutory changes needed to prevent spills and ensure public and environmental health and safety?

RAIL INDUSTRY IN CALIFORNIA



According to the Association of American Railroads,¹ 25 freight railroads operate on more than 5,325 miles of rail (excluding trackage rights) throughout California (Figure 1). Of these, two railroads are described as “Class I” railroads, that is, railroads with operating revenues at or exceeding \$433.2 million (according to the 2011 classification thresholds). California Class I include the Union Pacific Railroad (UP) and the Burlington Northern Santa Fe Railway (BNSF), which operated 3,287 and 2,125 miles of California track in 2011, respectively. Along their miles of track, UP maintains 3,099 bridges and BNSF maintains 1,098, for a total of 4,197 bridges along mainline rails in the state. The remaining railroads in California are “Class III” railroads, or local, switching and terminal railroads, with operating revenues of less than \$40 million. Class III railroads operate a total of 1,451 miles (with trackage rights), for a total of more than 6,860 combined miles in the state.

In 2011, 156.1 million tons of freight originated, terminated, or passed through California on rail, mostly on Class I rail. The California State Rail Plan put forth by the California Department of Transportation (CalTrans) in 2013² shows

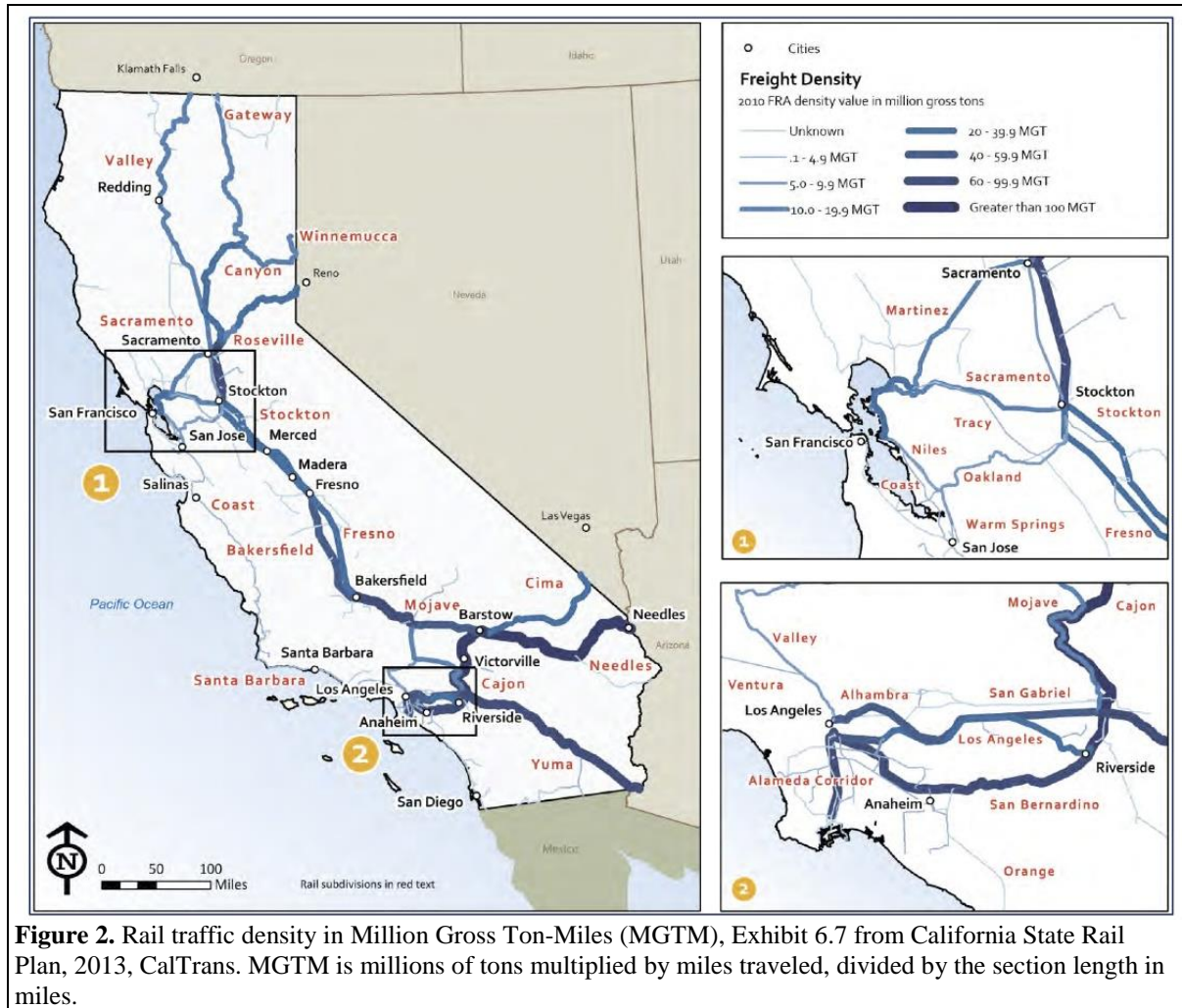
¹ AAR, Freight Railroads in California. <https://www.aar.org/keyissues/Documents/Railroads-States/California-2010.pdf>

² http://californiastaterailplan.dot.ca.gov/docs/Final_Copy_2013_CSRP.pdf

that rail traffic is heaviest in southern California but is also high in other parts of the state, such as the Central Valley and near Martinez (Figures 1 and 2).

RAIL BRIDGES IN CALIFORNIA

According to 49 Code of Federal Regulations (CFR) parts 213 and 237, track owners, and additional parties designated by the owners, are responsible for maintaining the safety of their railroad bridges.



Responsible parties are required to:

- Implement bridge management programs that include, at a minimum, annual inspections of railroad bridges;
- Maintain an inventory of all railroad bridges and know their safe load capacities;
- Maintain design documents and document all repairs, modifications, and inspections of each bridge;
- Ensure bridge engineers, inspectors, and supervisors meet minimum qualifications;

- Ensure bridge inspections are conducted under the direct supervision of a designated railroad bridge inspector; and
- Conduct internal audits of bridge management programs and inspections.

The two Class I railroads maintain approximately 4,200 bridges statewide. Additionally, when a railroad bridge rests on a state-owned bridge deck, CalTrans will also inspect the bridge; federal regulations in 23 CFR Part 650c require that each state's transportation department shall inspect or cause to inspect all highway bridges within state boundaries. On state-owned bridges, CalTrans inspects only the bridge substructure, meaning the bridge deck supporting the railway and all support structures but not the tracks themselves. In some instances, such as when a railroad bridge passes over a state highway, CalTrans may also inspect the bridge, provided they have signed a maintenance agreement with the owner (in most cases, the railroad). In all, there are just under 1,800 bridges (state-owned or with individual maintenance agreements) inspected by CalTrans in relation to railroads.

CRUDE OIL IN CALIFORNIA

Crude-by-rail is not new in California. For example, Southern Pacific Railroad transported crude oil from Saco (seven miles north of Bakersfield) to Dolores (near Carson) between 1983 and 1997. This train generally consisted of about 70 tank cars with a helper locomotive in the middle. Known as the "Oil Cans" train, it operated daily over Tehachapi Pass route.

Among the freight moving into, out of, and through California, crude oil is the fastest-growing in recent years. According to data reported by the California Energy Commission (CEC)³, the volume of crude oil imported to California by rail has gone from 45,491 barrels in 2009 to 6,169,264 barrels in 2013 – a 135-fold increase in 4 years (Figure 3).

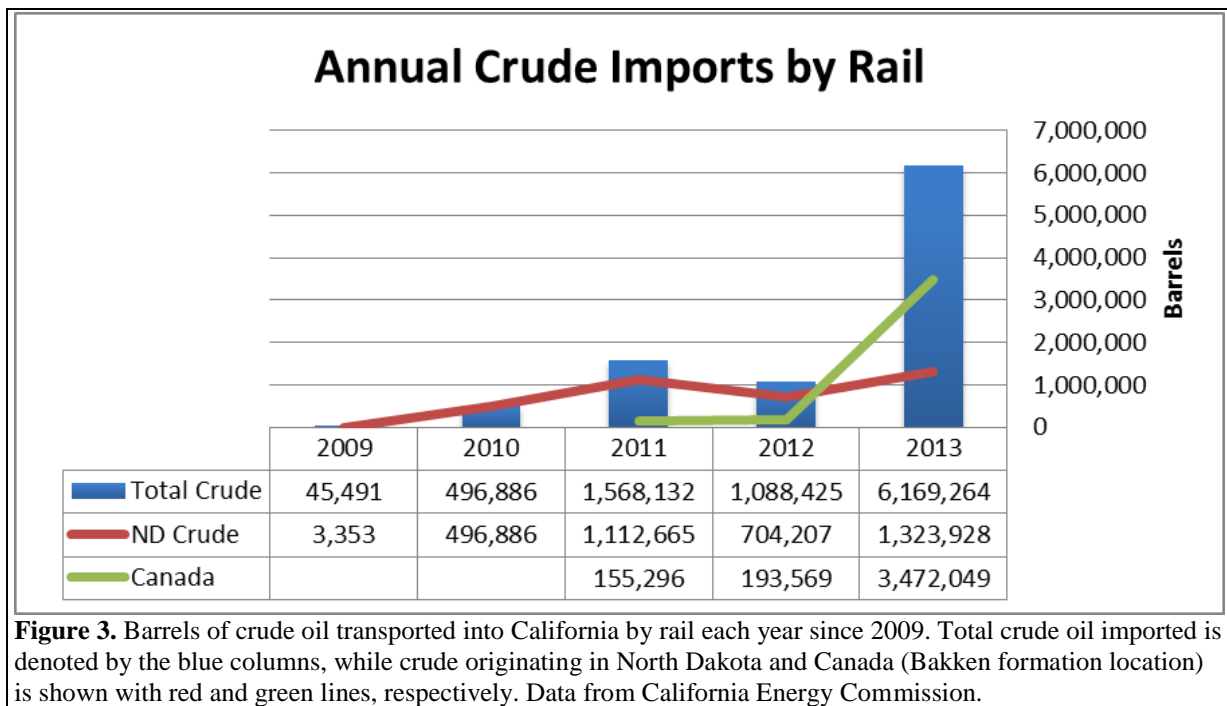
From 2009 to 2013, the state also increased from importing crude from 3 states to 5 states plus Canada, and from 63 tank cars to 8,608 tank cars⁴. In 2013 alone, the state's import of crude-by-rail jumped from 155,840 barrels in January to 1,053,100 barrels in December, a roughly 7-fold increase in 12 months. These increases still represent <1 percent (some say as little as 0.4 percent) of what the state processes, regardless of how the oil is transported. The shale oil boom in the Bakken formation in North Dakota/Montana and the 'tar sands' of Canada is largely responsible for driving this increase.

RAIL ACCIDENTS & FEDERAL RESPONSE

Train accidents involving large crude oil spills resulting in large fires and explosions have made headlines in the past year. According to data from the Pipeline and Hazardous Materials Safety Administration (PHMSA), the amount of crude oil spilled from rail cars in 2013 exceeded that spilled in the preceding four decades. In 2013, 1.15 million gallons of crude oil were spilled, compared with about 800,000 gallons spilled from rail cars between 1975 and 2012.

³ <http://energyalmanac.ca.gov/petroleum/statistics>

⁴ According to UP's Shale 2 Rail program, a single rail tank car will hold approximately 550 to 725 barrels of crude oil. In gallons, this is 23,100 gallons to 30,450 gallons.



One of the most serious of these recent accidents was the Lac-Mégantic derailment that occurred in the town of Lac-Mégantic in Canada on July 6, 2013. In this accident, a 74-car freight train carrying crude oil from the Bakken formation derailed, killing 47 people and destroying more than 30 buildings in the downtown area when multiple tank cars exploded and burned. In addition, the Chaudière River was contaminated by 26,000 gallons of crude oil.

A number of other accidents occurred in the last six months:

- On October 19, 2013, nine tank cars of propane and four tank cars of crude oil from Canada derailed as the train was traveling at 22 miles an hour. While three of the propane tank cars ignited, the crude tank cars were not punctured. There were no injuries but about 100 residents were evacuated.
- On November 8, 2013, a train carrying 90 cars of crude oil from North Dakota to a refinery at the Gulf Coast derailed in Aliceville, Alabama. Thirty tank cars left the tracks and about a dozen of these burned. There were no injuries or fatalities.
- On December 30, 2013, a train hauling 106 cars of crude oil collided with a grain train in Casselton, North Dakota. Between the trains, 34 cars derailed, including 20 carrying crude oil, which exploded and burned for over 24 hours. No injuries were reported, but over 1,400 residents were evacuated.
- On January 7, 2014, a mixed train carrying crude oil, propane, and other materials derailed in Plaster Rock, New Brunswick, with 17 cars from the track. Five of these cars carrying crude oil caught fire and exploded. About 45 homes were evacuated.

- On January 20, 2014, a 101-car train including five cars carrying crude oil derailed on a bridge over the Schuylkill River in Philadelphia, Pennsylvania. No leakage was reported in this accident.
- On February 13, 2014, another train carrying crude oil from Canada derailed in Vandergrift, Pennsylvania, at a bend by the Kiskiminetas River. Of the 120 cars hauled by the train, 21 left the tracks and 19 of these carried oil. Four tank cars spilled between 3,000 and 4,000 gallons of oil.

The explosions and fires occurring in several of these recent accidents have prompted a closer look into the characteristics of Bakken crude oil. The Pipeline Hazardous Materials Safety Administration (PHMSA) and the Federal Railroad Association (FRA) joined to initiate “Operation Classification,” also known as the “Bakken Blitz,” to test samples and verify correct labeling of crude oil coming from the Bakken formation. The organizations expect to release information about the crude’s gas content, corrosivity, toxicity, flammability, and other characteristics, including the more commonly tested flashpoint and initial boiling point. The flashpoint of crude oil from different locations is extremely variable, but there is evidence that Bakken crude overall is more corrosive and volatile than crude from other formations. Recent notices of probable violation issued by PHMSA⁵ after early inspections have shown on 3 occasions Bakken crude with flashpoints below 50°F and initial boiling points under 95°F (2 occasions) or 119°F (1 occasion). For comparison, pure ethanol has a flashpoint of 61.8°F and boiling point of 173°F.

PROJECTED CHANGES IN CRUDE-BY-RAIL

The Governor’s Budget states that <1 percent of the total crude oil processed by California refineries is shipped by rail currently, and projects that the figure will rise to as high as 25 percent by 2016. This projection translates to an increase from three million barrels per year by rail (now) to approximately 150 million barrels per year by rail (in 2016). The projection is based on information about projects that have been planned and/or permitted including the following:

Planned

- Valero has submitted applications for a permit to build a rail car unloading system at its Wilmington, CA, refinery that will allow the import of approximately 60,000 barrels of diluted bitumen per day from Canada.
- Alon USA Energy has submitted applications for permits to build a rail offloading system at its Bakersfield refinery. The new rail systems planned for the existing refinery site are estimated to allow offloading of an average of 150,000 barrels of crude per day, coming in on two “unit trains,” or 200 tank cars, each 24 hour period.

⁵<http://phmsa.dot.gov/portal/site/PHMSA/menuitem.6f23687cf7b00b0f22e4c6962d9c8789/?vgnextoid=9257b74180ad3410VgnVCM100000d2c97898RCRD&vgnnextchannel=d248724dd7d6c010VgnVCM10000080e8a8c0RCRD&vgnnextfmt=print>

Pending construction

- Modernize and reactivate existing crude oil storage and transfer facilities in Pittsburg, including a new rail car transload facility. Construction is expected to begin in 2014 and take 15 months. This facility is projected to handle up to 375,000 barrels of crude per day, with about one “unit train” being offloaded per day, or 100 tank cars (about 70,000 barrels) daily.
- Plains All American Pipeline LP plans a rail-to-pipeline facility just south of Bakersfield. Though the facility is designed to transfer 140,000 barrels per day, it is initially expected to take only half that amount, or 70,000 barrels per day, on a single “unit train,” or 100 tank cars daily.

Under construction

- Install a rail car unloading rack, repurpose an existing tank to include crude oil service, and construct associated infrastructure, including rail lines, to allow Valero to receive crude oil by train in Benicia. The project would permit Valero to receive crude oil by train in quantities up to 70,000 barrels per day (100 rail cars per day), but it would not increase the volume of crude oil delivered to the refinery because crude oil quantities delivered by train would replace crude oil quantities received by ship. The project is estimated to be operational by early 2015.

Projected shipments to planned/pending facilities total 545 tank cars per day, which translates to 198,925 tank cars per year. Presumably, these new shipments would add to, rather than offset or replace, tank car shipments to existing refineries in northern and southern California.

How certain is the “increase to 25 percent” projection?

The CEC estimate of crude-by-rail volumes approaching 25 percent of the total crude oil processed by California refineries in 2016 (which was referenced in the Governor’s proposed budget) assumes that all crude-by-rail projects will receive permitting approval and proceed with construction and begin operation at maximum capacity. Therefore, it should be considered the upper range estimate for when all crude-by-rail facilities described here come online. Some in the oil and railroad industry say that the projection is ‘too high, too soon’ and offer the following factors as constraints on the estimate:

- Limited tank car availability (e.g. by a concurrent surge in demand from agriculture);
- Price of crude-by-rail in the future;
- The number of permitted crude-by-rail projects that will pass CEQA;
- The number of facilities that will be operational by 2016;
- How close to maximum capacity these facilities operate; and
- The likelihood of delays and litigation at several steps in the process.

Why the emphasis on DOT-111 tank cars?

The DOT-111 tank car is commonly (though not exclusively) used to transport hazardous materials including crude oil, ethanol, chlorine, and various toxic inhalants. In 2008, the Railway Supply Institute Committee on Tank Cars initiated a task force to develop standards for these cars. In 2011, the Association of American Railroads adopted the Railway Supply Institute Committee on Tank Cars higher standards as requirements for new rail tank cars transporting crude oil and ethanol

ordered after October 1, 2011. These requirements include (1) a thicker, more puncture resistant shell or jacket, (2) extra protective head shields at both ends of the tank car, and (3) additional protection for the top fittings.

Thus, manufacturers began voluntarily building tank cars to a new standard (CPC-1232, jointly developed with the railroads) and petitioned the U.S. Department of Transportation (DOT) to issue a new regulatory standard. To date, DOT has not acted on this petition. On February 12, 2014, the Railway Supply Institute Committee on Tank Cars proposed additional safety requirements on newly manufactured rail tank cars, a prohibition on placing additional legacy rail tank cars into crude oil and ethanol service and a prioritization of the modification of existing crude oil and ethanol rail tank cars. The RSI tank car committee has estimated that it will take 10 years to modify existing legacy tank cars because DOT regulations require other work as well. If DOT allows the modification of crude oil and ethanol tank cars first, the time frame for addressing the highest risks could be shortened significantly.

According to comments submitted by the Railway Supply Institute, as of the third quarter 2013 there were 14,160 DOT-111 tank cars that were compliant to the more rigorous (CPC-1232) rail tank car standards for all rail tanker cars ordered after October 10, 2011. That number represents 15 percent of all rail tanker cars in flammable liquid service at that time. It is not known exactly what portion of those (CPC-1232 compliant) rail tank cars are in the service of moving crude oil or ethanol. According to the Association of American Railroads, National Transportation Safety Board and Transportation Research Board, approximately 220,000 DOT-111 cars are currently in service. Approximately 40 percent of those carry flammable liquid including crude oil. Of those, 13.6 percent were made to the higher standard (Figure 4).

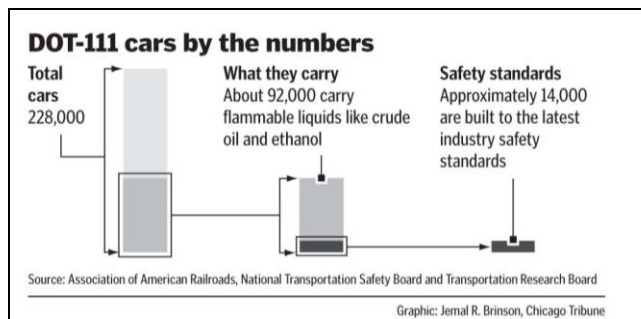


Figure 4. Schematic bar chart showing that only 16.3% of DOT-111 cars meet higher safety standards. SOURCE: Association of American Railroads, National Transportation Safety Board and Transportation Research Board. GRAPHIC: Jemal Brinson, Chicago Tribune.

With regard to construction of additional rail tanker cars, the latest Railway Supply Institute data indicates there were 8,440 new rail tanker cars delivered during the fourth quarter of 2013, alone, higher than the 7,336 delivered during the third quarter of 2013. Those 15,776 rail tanker car deliveries during the last half of 2013 were 59.9 percent greater than the 9,866 deliveries during the last half of 2012.

That means the rail tanker car manufacturers are producing cars at a rate of over 2,600 DOT-111 rail tanker cars per month that meet the more stringent post October 2011 standards. Again, what is unknown is how many of those new rail car deliveries are suitable for crude oil transport.

Federal officials and some railroads think older DOT-111 tank cars should be retrofitted to make them safer in the event of a derailment, an effort that could take years and cost upwards of \$1 billion. One proposal to increase safety in the meantime is to immediately remove from service those cars that do not meet newer safety standards. However, this would put a great logistical and economic strain on producers and shippers.

JURISDICTION

Federal vs. State – Railroad safety standards are generally a federal issue. The Federal Railroad Safety Act of 1970 (codified at 49 U.S.C. Chapters 201-213), gave FRA authority over “every area of railroad safety.” The statute declared that laws related to railroad safety shall be nationally uniform to the extent practicable, and that a state requirement related to railroad safety shall generally be preempted when the Secretary of Transportation has issued a rule or order “covering the subject matter of the state requirement.”

The Federal Railroad Safety Act of 1970 permitted states, in return for their loss of direct authority, to regulate almost any subject FRA has regulated, to participate in investigative activities under the federal safety laws through either an annual certification or agreement, and to recommend enforcement action under those laws (49 U.S.C. 20105).

A state may adopt or continue in force a law, regulation, or order related to railroad safety until the Secretary of Transportation (with respect to railroad safety matters), or the Secretary of Homeland Security (with respect to railroad security matters), prescribes a regulation or issues an order covering the subject matter of the state requirement. A state may adopt or continue in force an “additional or more stringent” law, regulation, or order related to railroad safety when the law, regulation, or order:

- (1) is necessary to eliminate or reduce an essentially “local safety hazard”;
- (2) is not incompatible with any federal law, regulation, or order; and
- (3) does not unreasonably burden interstate commerce.

Retrofitting DOT-111 rail cars

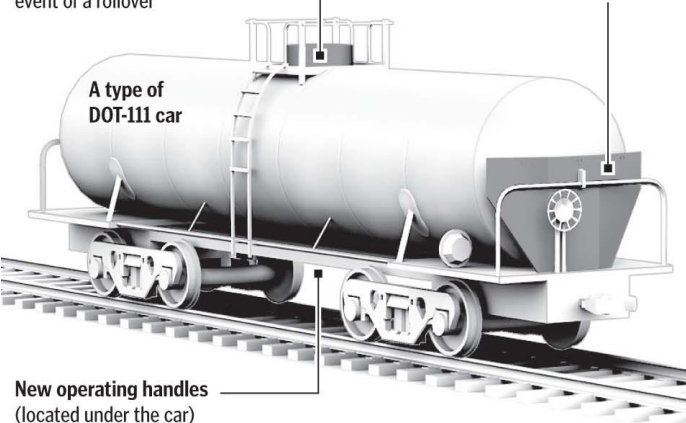
Federal officials and the railroad industry think older DOT-111 tank cars, which carry flammables like crude oil and ethanol, do not meet the latest safety standards and should be retrofitted to make them safer in the event of a derailment.

Upgrades for older DOT-111 cars

Upgrades for tankers carrying ethanol and crude oil

Stronger housing
Designed to prevent top-fitting damage in the event of a rollover

Head shields
Protect the head or end of the car from impacts



A type of DOT-111 car

New operating handles
(located under the car)
Designed to break free instead of opening in the event of a crash

Figure 5. Simplified diagram of a DOT-111 rail tank car, which is used to carry hazardous materials including crude oil, ethanol and chlorine as well as other products. Written comments detail changes proposed by U.S. and Canadian transportation officials and the rail and oil industries. SOURCE: Association of American Railroads, National Transportation Safety Board and Transportation Research Board. GRAPHIC: Jemal Brinson, Chicago Tribune.

The legislative history of 49 U.S.C. 20106 makes it clear that the first prong does not contemplate statewide laws or rules; an “essentially local safety hazard” is to be read as one peculiar to a particular locality (H.R. Rep. 1194, 91 Cong. 2d Sess. 4104 (1970)).

California example: As of 1994, the 14-degree Cantara Loop section of track in Siskiyou County was the tightest curve on the Southern Pacific route between Roseville and Klamath Falls, OR. Investigators noted that there were 42 derailments in the area over 20 years. Following a spill of 14,000 gallons of pesticide into the Sacramento River near Dunsmuir, the CPUC fined Southern Pacific for failure to report the spill immediately and failure to provide state officials with its hazardous material emergency handling guidelines. To improve public safety, the PUC first used its discretion to declare the Cantara Loop area south of Dunsmuir a “local safety hazard” and then imposed restrictions on the length and weight of trains in the area, and on the configuration of trains, i.e., the sequence of empty and loaded cars. The PUC’s new rules also prohibit use of a specific siding near the curve and restricted the use of “helper” locomotives.

Hazardous Materials – The Pipeline and Hazardous Materials Safety Administration (PHMSA) has also issued regulations under 49 U.S.C. Chapter 51 that cover the subject matter of hazardous materials transportation and inspection of shipments by rail. The rules call for inspection of hazardous materials shipments where they are accepted for transportation or placed in a train, and specifically permit this inspection to be performed in conjunction with the inspections required under FRA’s freight car and power brake rules (49 CFR 174.9). Under Chapter 51, states are generally free to develop and enforce their own hazardous materials regulatory scheme as long as the regulation is consistent with Federal law and regulations (49 U.S.C. 5125). With regard to placarding of hazardous materials shipments, a state or tribal rule is preempted unless it is “substantively the same” as the Federal rule. On other subjects, the state or tribal rule is preempted only if compliance with both that rule and the federal rule is not possible or the state or tribal rule is an obstacle to accomplishing the federal rule.

Accident Reporting – States are not preempted from requiring railroads to provide immediate notification of accidents in order to enable the states promptly to launch their own investigation. In addition, states may require railroads to furnish them copies of monthly reports railroads file with FRA. As a participant in the State Rail Safety Participation Program, California has immediate telephonic accident reporting requirements.

Positive Train Control – The Rail Safety Improvement Act of 2008 required the installation of Positive Train Control (PTC) by 2016 on all routes that share track with passenger trains and on all freight mainlines over which poison- or toxic-by-inhalation hazardous materials are transported. The CPUC is working closely with the Federal Railroad Administration in the implementation of this significant piece of legislation, including participation in the Rail Safety Advisory Committees for PTC and for System Safety Program Plans. Metrolink and Union Pacific voluntarily pledged to implement PTC on Union Pacific Railroad–Metrolink joint operation track by the end of 2012. In 2011, the CPUC continued to work with the FRA in PTC oversight, including oversight of Class I and commuter railroads in the Los Angeles Basin in their effort to achieve PTC implementation.

Inspectors – The FRA State Safety Participation Program (SSPP) at (49 CFR Part 212) establishes qualification requirements for state inspectors in the areas of track, signal and train control, motive power and equipment, operating practices, hazardous materials, and highway-rail grade crossings.

Every state has the opportunity to employ rail safety inspectors in all of the areas of railroad safety in which FRA has inspectors and, through its inspectors, to participate directly in inspection activities and enforcement of the federal railroad safety regulations. States may also cite a railroad or shipper for violations of federal regulations if they are certified participants in the SSPP.

FRA-certified state inspectors usually conduct planned routine compliance inspections and also may conduct additional investigative and surveillance activities. In most ways, an FRA-certified state inspector has the same role and authority as a certified federal inspector. In the area of their certification, they may inspect railroads and hazardous materials shippers and issue FRA inspection reports noting defects. They may cite violations of railroad safety regulations using the same forms as FRA inspectors, submit those violation reports for technical and legal review in the same manner, and participate in civil penalty negotiating sessions led by FRA attorneys (or, in the event of litigation, serve as witnesses) just as FRA inspectors do.

State (and FRA) inspectors both have the authority (depending upon their areas of expertise) to issue special notices for repair (49 CFR Part 216), requiring railroads to remove a particular freight car or locomotive from service due to safety defects or to reduce the speed of trains over defective track, neither has the authority to stop a train. Only the FRA Administrator, acting through the extraordinary tool of the emergency safety order (49 U.S.C. 20104) has such authority.

California Public Utilities Commission – The CPUC is the state regulatory agency with authority for railroad safety within California. Title 49 CFR Part 212, “State Safety Participation Regulations,” formally establishes the Commission’s relationship with the FRA and affirms the commitment both agencies share toward ensuring rail safety within California. The CPUC performs these railroad safety responsibilities through the Railroad Operations and Safety Branch (ROSB) of the Safety & Enforcement Division. ROSB is responsible for enforcing state and federal laws, regulations, commission general orders, and directives relating to the transportation of persons and commodities by rail. Several CPUC statutes prescribe its responsibilities. In particular, under Section 309.7, the CPUC is responsible for inspection, surveillance, and investigation of the rights-of-way, facilities, equipment, and operations of railroads and public mass transit guideways (a limited access rail that is not part of the general rail system).

Under the authority of Public Utilities Code Sections 309.7(b), 421(g), and 765.5(c), commission rail inspectors are federally-certified to enforce state and federal laws, regulations, orders, and directives pertaining to rail transportation. ROSB makes civil penalty recommendations to the FRA when ROSB Inspectors discover non-compliances with federal railroad safety regulations.

Public Utilities Code Sections 309.7 and 765.5(d) require the Commission to employ a sufficient number of federally-certified inspectors to ensure that railroad locomotives and equipment and facilities located in Class I railroad yards in California are inspected not less frequently than every 120 days, and that all main and branch line tracks are inspected not less frequently than every 12 months. In performing its duties, the CPUC’s Safety and Enforcement Division (SED) consults with representatives of railroad corporations, labor organizations representing railroad employees, and the FRA. Under Section 765.5(e), the commission also conducts focused inspections of railroad yards and track, either in coordination with the FRA, or as the commission determines to be necessary. The

focused inspection program targets railroad yards and track that pose the greatest safety risk, based on inspection data, accident history, and rail traffic density.

Public Utilities Code Section 765.5(b) requires the commission to “dedicate sufficient resources to implement the State Participation Program to regulate the rail transportation of hazardous materials as authorized by the Hazardous Materials Uniform Safety Act of 1990 (P.L.101-615).” The commission employs federally-certified Railroad Safety Inspectors to fulfill this mission. Inspectors conduct a variety of activities, including the investigation of accidents involving the actual threatened release of hazardous materials as reported by the California Emergency Management Agency’s (CEMA) 24-hour Warning Center. Inspectors also conduct unannounced inspections at the facilities of shippers, consignees, freight forwarders, intermodal transportation companies, and railroads.

General Orders – Rules established by the Commission are called general orders or GOs. Commission GOs cover regulatory requirements such as the reporting of accidents on railroads, clearances on railroad and street railroads as to side and overhead structures, parallel tracks and crossings, and posting of railroad timetables and changes. General Orders enforced by ROSB include:

- GO 22-B – Reports of accidents on railroads
- GO 26-D – Clearances on railroads and street railroads as to side and overhead structures, parallel tracks and crossings
- GO 27-B – Filing and posting of railroad timetables and changes
- GO 118-A – Construction, reconstruction and maintenance of walkways and control of vegetation adjacent to railroad tracks
- GO 135 – Occupancy of public grade crossings by railroads
- GO 161 – Rules and regulations governing the transportation of hazardous materials by rail

CPUC Inspections – The CPUC ROSB currently employs 36 federally certified inspectors to ensure that railroads comply with federal railroad safety regulations. The CPUC’s railroad safety federal and state participation program is the largest in the nation. The CPUC’s railroad operations safety work responsibilities generally include:

- Inspecting railroads for compliance with state and federal railroad safety;
- Investigating rail accidents and safety related complaints;
- Recommending rail safety improvements to the CPUC and federal government; and,
- Ensuring efficient enforcement of rail safety requirements.

Inspections are divided into five railroad disciplines:

- *Operating Practices* – oversight of main, branch and yard train operations, including hours of service, carrier operating rules, employee qualification guidelines, and carrier training and testing programs to determine compliance with railroad occupational safety and health standards, accident and personal injury reporting requirements, and other requirements;
- *Track* – oversight of track construction, maintenance and inspection activities;

- *Signal & Train Control* – oversight of signal system construction, maintenance and inspection activities;
- *Motive Power & Equipment* – oversight of locomotives, freight and passenger rail cars, air brakes, and other safety appliances maintenance and inspection activities;
- *Hazardous Materials* – oversight of the rail movements of hazardous materials, such as petroleum and chemical products; and inspection of hazardous materials shippers.

Frequency of Inspections – ROSB Inspectors also conduct an annual Security Review Audit at each railroad located in California. Railroad locomotives and equipment and facilities are mandated to be inspected at least once every 180 days, and all main and branch line tracks are inspected at least once each year. The CPUC reports that its rail safety inspectors achieve 100 percent of the mandate that all locomotive and equipment repair facilities be inspected every 120 days. The track-inspection mandate has not been achieved since 2005-06, which was the last year that ROSB had fully staffed certified track inspectors. In 2012-13, ROSB only fulfilled 72 percent of the statutory track-inspection mandate, due to track position vacancies.

Inspections Completed – During fiscal year 2010 - 2011, the latest year for which data are available online, CPUC rail safety staff inspectors inspected 21,662 units of equipment (a unit is one locomotive or one car) and 12,399 miles of track. In addition, the CPUC conducted 866 inspections at facilities that handle hazardous materials (39,561 hazardous materials inspection units), conducted 768 inspections (6,113 units), and inspected 6,515 units of signal and train control systems. They also responded to 32 complaints from railroad employees and the public during the same time period.

Risk Assessment Plans – In July 1991 a Southern Pacific train derailment occurred on particularly winding track near Dunsmuir, California, which spilled thousands of gallons of pesticide in the Upper Sacramento River. The effect was to kill all plant and wildlife as far as 38 miles downstream from the spill. In response to this accident the Legislature enacted a comprehensive system for identifying railroad sites that are local safety hazards. Also, fines were increased for oil and chemical spills into rivers and other state waters (Chapter 89, Statutes of 1991).

The CPUC was required to annually report to the Legislature on the type, quantities, and locations of hazardous materials transported by railroads and a list of railroad derailment accident sites for the previous five years. Much of the effort at identifying local safety hazards was later voided by the courts based on a challenge by the railroads to California's jurisdiction.

The Local Community Rail Security Act (Chapter 867, Statutes of 2006) requires, among other things, all rail operators to provide a risk assessment to the CPUC, the Director of Homeland Security, and CEMA that describe all of the following:

- (a) The location and functions of the rail facility.
- (b) All types of cargo that are moved through, or stored at, the rail facility.
- (c) Any hazardous cargo that is moved through, or stored at, the rail facility.
- (d) The frequency that any hazardous cargo is moved through, or stored at, the rail facility.
- (e) A description of the practices of the rail operator to prevent acts of sabotage, terrorism or other crimes on the rail facility.
- (f) All training programs that the rail operator requires for its employees at the rail facility.

- (g) The emergency response procedures of the rail operator to deal with acts of sabotage, terrorism, or other crimes at the rail facility.
- (h) The procedures of the rail operator to communicate with local and state law enforcement personnel, emergency personnel, transportation officials, and other first responders, in the event of acts of sabotage, terrorism, or other crimes at the rail facility.

The Act also requires that by January 1, 2008, every rail operator shall develop and implement an infrastructure protection program (PUC § 7665.4). Commission staff, in consultation with OHS & OES shall review all infrastructure protection plans, and may conduct inspections in order to evaluate railroads compliance with their own plans.

Representatives from the Commission, the Governor's Office of Homeland Security and Office of Emergency Services conduct the risk assessment and infrastructure protection plan reviews in person at the railroad location where those documents are normally stored. The review team provides feedback to the railroad representative on the risk assessment/protection plan sufficiency, and/or areas for improvement.

Enforcement – Commission Resolution ROSB-002 established a civil penalty citation program for enforcing compliance with safety requirements for railroad carriers throughout California. In 2011, ROSB issued two citations under this Resolution for violations of GO 26-D. The violations totaled \$60,000, which was deposited to the State General Fund.

Safety Promotion – CPUC employees volunteer for Operation Lifesaver, an international organization committed to reducing the number of grade crossing and trespasser related accidents through education, enforcement, and engineering. CPUC employees provide presentations to schools and community groups and raise public awareness of safety measures that should be taken near railroad tracks. The CPUC's bilingual presenters ensured that this safety message was communicated to a larger audience. Outcomes: In 2011, Operation Lifesaver-certified presenters from the CPUC educated more than 10,000 people through 191 presentations and 12 events.

ACRONYMS

CEC – California Energy Commission

CPUC – California Public Utilities Commission

OSPR – Office of Spill Prevention and Response

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Portions of this document were taken from media articles as well as the websites of the California Public Utilities Commission and the American Association of Railroads. The author also relied on personal communication with representatives of BNSF, UP, Western States Petroleum Association, and the CPUC.

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APPENDIX A: SELECT TANK CAR ACCIDENTS IN THE US AND CANADA

Crude Oil

2014

January 7 – Plaster Rock, New Brunswick (oil fire)

2013

July 6 – Lac-Mégantic, Quebec (explosion, 47 dead, burned much of the downtown area)

September 25 – Landis, Saskatchewan (lube oil leak)

October 19 – Gainford, Alberta (explosion)

November – Aliceville, Alabama (spill and fire)

December 30 – Casselton, North Dakota (explosion)

1991

July 14 – Dunsmuir, California (State's largest inland water disaster: 19,000 gallons of the water-soluble pesticide, metam sodium, leaked into a pristine stream and caused 200,000 dead fish, 300 ill residents, and millions of dollars in damage and lost tourist business). Of the ten thousand disinfectants and pesticides registered for use in California, only 2,000 have been given the designation "hazardous" by the EPA, and metam sodium wasn't one of those.

July 28 – Seacliff, California (Axle bearing failed, causing a train to jump the tracks and spill steel drums full of aqueous hydrazine. The toxic chemical is a component of jet fuel and is used in manufacturing.)

Ethanol

2012

August – Plevna, Montana

2011

July – Columbus, Ohio

October – Tiskilwa, Illinois

February – Arcadia, Ohio

2010

February – Tehachapi Pass, California (rupture of an ethanol car and lit a car of plastics on fire, which burned for a day, caused an evacuation)

2009

June 19 – Cherry Valley, Illinois (19 tank cars derailed and 13 of those ruptured, resulting in either leakage or fire, 1 fatality, 9 injuries, evacuation of 600 residences within one half mile of the accident)

APPENDIX B: RAIL SAFETY ACTIVITY OUTSIDE THE CALIFORNIA LEGISLATURE

Federal Level – Transportation Secretary Anthony Foxx has said that broad action is needed to enhance safety through improved enforcement, prevention and emergency response and that he will be working to implement a comprehensive set of safety and infrastructure investments. “We’ve got some work to do convincing our leaders in Congress to give us the resources we need to do inspections in a much more robust way,” he said.

In January 2014, The U.S. National Transportation Safety Board (NTSB) and the Transportation Safety Board of Canada (TSBC) released a joint statement calling for better route planning that avoids more densely populated areas. The organizations also recommended more robust efforts to correctly classify hazardous materials before they’re shipped and oversight to ensure companies have emergency response plans for dealing with disasters. They also are discussing tougher standards for the DOT-111 tank car, the type of car that is frequently used to transport crude oil and ethanol. The National Transportation Safety Board has frequently cited the DOT-111A’s deficiencies.⁶ Neither board has the power to issue or enforce standards.

Wells Fargo & Co. analysts said modifying tank cars could cost \$5,000 to \$45,000 apiece. An estimated 70,000 to 80,000 cars are possible candidates, putting potential cost to upgrade the rail fleet at \$350 million to \$3.6 billion. Those costs probably will be passed on to the oil industry and other shippers. Modifying the tank cars identified by the NTSB and TSBC may cost leasing companies and shippers as much as \$5.2 billion according to estimates by Bloomberg Government. The NTSB has recommended phasing out the cars if they can’t (or won’t) be retrofitted to be made safer.

At the Governor’s Office - Governor Brown’s state budget plan bolsters the State Office of Oil Spill Prevention and Response (OSPR), increasing its budget by \$6.7 million and adding 38 staff members “to address the increased risk of inland oil spills.”⁷ A fee of 6.5 cents per barrel on all crude oil shipped to refineries will fund expansion of the 245-member oil-spill unit. Currently, the fee only applies to marine shipments.

City Level - Chicago Mayor Rahm Emanuel is proposing a national freight fee for hazardous materials to improve rail safety and help cities respond to accidents. The federal government would impose the fee on companies that extract crude oil and “the industrial consumers of it,” according Emanuel’s office. The mayor said the fee would fund new investments in rail safety and infrastructure, first responders in the locations of disasters and rebuilding efforts. The fee would require Congressional authorization. “If not through a national effort, the burden will fall mostly on individual cities” Emanuel said.⁸ Moreover, according to Butch Brown, Mayor of Natchez, Mississippi, “It’s not just critical to the metropolitan areas; it’s very critical to the smaller areas that have fewer resources to deal with these issues than larger metropolitan areas do.”⁹

⁶ <http://www.thenewstribune.com/2014/01/27/3013650/poor-record-of-tank-cars-dates.html#storylink=cpy>

⁷ <http://www.bnd.com/2014/01/10/2998703/california-expects-more-crude.html#storylink=cpy>

⁸ http://www.governing.com/news/headlines/gov-emanuel-calls-for-national-fee-to-respond-to-train-spills.html#.Uuaad_OjpOA.email

⁹ *Ibid.*

APPENDIX C: FEDERAL RAILROAD ADMINISTRATION'S ACTION PLAN FOR HAZARDOUS MATERIALS SAFETY¹⁰

The Federal Railroad Administration (FRA) and the Pipeline Hazardous Material Safety Administration (PHMSA) have taken a number of steps to ensure the highest standards of safety for shipment of hazardous material on rail, including the Emergency Order and Safety Advisory issued to railroads today. These actions build on FRA's rigorous safety program. All freight railroads are required to develop and implement risk assessments and security plans in order to transport any hazardous material, including a plan to prevent unauthorized access in rail yards, facilities and trains carrying hazardous materials. All railroads that carry hazardous materials are also required to develop and follow a security protocol while en route, which can range from hiring security personnel to coordinating with local law enforcement. Some of the actions FRA and PHMSA have already taken and plan to take moving forward are listed below.

December 2012

FRA has taken several steps to address increases in rail traffic in the Bakken Oil Region, the point of origin for most crude oil by rail shipments in the U.S. Under our Bakken Rail Accident Mitigation Project (RAMP), FRA is conducting additional hazardous materials safety inspections in the area as well as facilitating hazardous materials safety training seminars with shippers, consignees, contractors, and sub-contractors. In addition, FRA is working with stakeholders, participating agencies, local officials and rail carriers on highway-rail grade crossing safety and trespass prevention, which includes increased law enforcement patrols at grade crossings and expanded educational outreach to motor carriers (including several public service announcements and indoor print advertisements at major truck stops in the area)."

July 18, 2013

FRA announced a two-day public meeting on August 27th and 28th in Washington, D.C. to receive public input on improving the safe transport of hazardous materials by rail, including a discussion on enhanced design specifications for the "DOT 111" tank cars commonly used to transport petroleum crude oil and ethanol. The meeting was jointly held by the Federal Railroad Administration (FRA) and the Pipeline Hazardous Materials Administration (PHMSA).

July 29, 2013

In a letter to the American Petroleum Institute, DOT informed the industry that the FRA will utilize PHMSA's test sampling program to ensure that crude oil is being properly tested and classified for shipment in HMR authorized tank cars.

August 2, 2013

In the wake of the *Lac-Mégantic* rail accident, the FRA issued Emergency Order No. 28 requiring the railroads to properly secure rolling equipment. The Order provides directives about unattended trains, train securement, the use of locks and the reverser on a locomotive, communication between train dispatchers and train crews, recording information, daily job briefings and notification to railroad employees. The Order comes with the full force of regulatory law and violators will be subject to enforcement actions.

¹⁰ <http://www.fra.dot.gov/eLib/details/L04721>

The FRA and PHMSA jointly issued a Safety Advisory to railroad owners and commodity shippers detailing recommended actions the industry are expected to take in order to better ensure the safe transport of hazardous materials. These recommendations include guidance on train crews, operating, testing and classification procedures, system-wide evaluations of security and safety plans, as well as risk mitigation.

August 29, 2013

The Railroad Safety Advisory Committee (RSAC) met in emergency session to consider additional safety measures that may be required following the issuance of Safety Advisory 2013-06. The RSAC committee is the technical and policy stakeholder body that discusses and makes recommendations to the FRA on pending and future regulatory issues. The RSAC includes representatives from all rail industry perspectives.

Following the emergency meeting, the RSAC constituted three working groups to examine possible regulatory issues in greater detail. The working groups will cover the following substantive areas: hazardous materials; appropriate crew sizes; and train securement. Each working group is expected to produce a formal recommendation for consideration and a vote by the full RSAC on or before April 2014.

Finally, following the emergency meeting, the Department of Transportation announced that FRA and PHMSA had launched a joint inspection operation (“Bakken Blitz”) in North Dakota’s Bakken oil region to verify that crude oil is being properly classified in accordance with federal regulations. This includes activities such as unannounced spot inspections, data collection and sampling at strategic terminal and transloading locations that service crude oil.

Fall, 2013

FRA Administrator Joseph C. Szabo sent a letter to railroad industry organization asking they detail actions they’ve taken in response to the Safety Advisory issued August 2. A Web page was created for the public to see these letters and the responses from the industry.

APPENDIX D: OTHER RAIL ENTITIES AND ORGANIZATIONS¹¹

Federal Railroad Administration – The Federal Railroad Administration (FRA) was created by the Department of Transportation Act of 1966 and is not one of 10 agencies within the U.S. Department of Transportation concerned with intermodal transportation. The purpose of FRA is to: promulgate and enforce rail safety regulations, administer railroad assistance programs, conduct research and development in support of improved railroad safety and national rail transportation policy, and consolidate government support of rail transportation activities.

National Transportation Safety Board - The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating railroad accidents involving passenger trains or any train accident that results in at least one fatality or major property damage. NTSB also investigates releases of hazardous materials in all forms of transportation and selected railroad accidents that involve problems of a recurring nature. It is not part of DOT or affiliated with any of the modal agencies. NTSB investigators investigate significant accidents and develop factual records and safety recommendations. NTSB investigations have priority over FRA investigations, but NTSB does not have the authority to preempt FRA.

Association of American Railroads - The Association of American Railroads (AAR) is a business trade association representing major freight railroads in the United States, Canada, and Mexico, as well as Amtrak. Based in Washington, DC, the AAR is focused on representing railroad interests to Congressional and government leaders. AAR subsidiary organizations, the Transportation Technology Center, Inc., and Railinc, identify and develop improvements in railroad technology.

American Short Line and Regional Railroad Association - The American Short Line and Regional Railroad Association (ASLRRA) is a nonprofit trade association that represents the interests of its more than 400 short line and regional railroad members in legislative and regulatory matters.

Operation Lifesaver - Operation Lifesaver is a nonprofit, international continuing public education program established in 1972 to end collisions, deaths, and injuries at places where roadways cross train tracks, and on railroad rights-of-way. Operation Lifesaver programs are sponsored cooperatively by the nation's railroads, highway safety organizations, and federal, state, and local government agencies.

¹¹ <http://www.railsafety.idaho.gov/Docs/managers%20hand%20book.pdf>