Methods of Crude Oil Transport: Relative Risks and Benefits

Summary

As America's oil and natural gas boom spreads across the country, producers are finding it difficult to get oil from the wells to market. Pipeline capacity is limited, and shipping crude by rail has raised concerns in the media. What are the relative risks and merits of different methods of shipping crude oil long distance? Rail, ship, and pipeline each have pros and cons, risks and benefits. On May 7, 2014, the Environmental Law Institute convened a panel of experts to explore the regulatory realm of each option. Without demonizing any form of transport, the session raised awareness about the complex trade offs between these options, when they are options. Below, we present a transcript of the event, which has been edited for style, clarity, and space considerations.

Kris Barney, Manager, Professional Education Program, Environmental Law Institute
John J. Jablonski, Partner, Goldberg Segalla (moderator)
George "Casey" Hopkins, Partner, Vinson & Elkins LLP
Michaela E. Noble, Chief, Environmental Law Division, Office of Maritime and International Law, United States Coast Guard/The Judge Advocate General, U.S. Department of Homeland Security
Connie S. Roseberry, General Attorney, Union Pacific Railroad Company
Anthony Swift, Staff Attorney, International Program, Natural Resources Defense Council

I. Introduction

Kris Barney: Welcome everyone. My name is Kris Barney. I'm with the Environmental Law Institute. Today's seminar is called Methods of Crude Oil Transport: Relative Risks and Benefits. We're very excited to be presenting this particular topic, which is very timely. And I thank you all for being here. I'd like to introduce our moderator, who will in turn introduce our wonderful panel. John J. Jablonski is a partner at Goldberg Segalla LLP that has offices in New York, London, and Chicago. John began his environmental law career in law school, where he was the co-founder and editor of his law school's environmental law review. In the early 1990s, he worked at a large firm compiling large databases for use in litigation related to the federal and state Superfund Cost Recovery Act. John continues to work on a wide array of environmental matters as chair of the firm's environmental practice group, recently focusing on oil spill response litigation.

John is a seasoned trial lawyer with 20 years of experience in litigation. He has tried numerous cases to verdict in state and federal court. In addition, John has represented Class I, short-line, and small regional railroads in litigation for over 15 years. And I'd just like to say personally it's been great to work with John. He's been very engaged in putting this panel together and the focus of it, and is really committed to sharing information about the safety of all these different methods of oil transport. With that, thank you all for being here. This is a fantastic group of people. John, please.

John Jablonski: Thank you. The seminar topic of different methods of crude oil transport is obviously a very important topic to all of us, but more importantly, it's becoming an important topic to the public at large. From my standpoint, being involved in the various industries that are represented here, there's been work going on behind the scenes, so to speak, outside the public eye for years and years with respect to environmental safety of crude oil transport.

We have a very esteemed panel today. They're all at the highest level in their industries. We're going to hear from representatives from the rail transport industry, the pipeline transportation industry, and the maritime shipping industry, and then we're going to have someone who's going to talk about the environmental impacts of crude oil transportation.

First, Connie Roseberry is an attorney at Union Pacific Railroad. She joined Union Pacific in 2005 in their Chicago office, where she was responsible for all aspects of railroad litigation including the Federal Employee's Liability Act (FELA) (which are employee lawsuits), trespasser fatalities, and grade-crossing incidents. She also worked with government affairs at METRA, the commuter rail division of the Regional Transportation Authority of the Chicago metropolitan area, on other local government issues. Since 2010, she is responsible for safety and operating regulatory issues, primarily dealing with the Federal Railroad Administration and other governmental agencies with safety over-

sight. Connie is a member of the Railroad Safety Advisory Committee and represents Union Pacific's legal interest in agency rulemaking and also supports the centralized engineering and mechanical departments with operating and safety issues. Connie received her bachelor's degree in political science and history from Benedictine College and has her law degree from the University of Missouri-Kansas City. She'll be representing the rail transportation industry on our panel today.

Next, Casey Hopkins is a partner with Vinson & Elkins in their Washington, D.C., office. Casey advises and represents clients in a wide variety of matters relating to environmental laws. In the transactional context, he has structured allocations of liability and mergers and acquisition, assisted clients in creative approaches to restructuring environmental requirements, and led the conduct of diligence and negotiations on environmental requirement in connection with asset sales and project financing with the United States and internationally. More specific to what we're doing today, Casey has represented the pipeline industry for many years. He has also defended civil and criminal enforcement actions in federal and state courts and before administrative agencies. He has also advised companies on various regulatory issues, including pipeline and fuel regulatory issues. Some of his most recent projects include representing companies with hazardous liquids, pipeline involving several *Pipeline and Hazardous Materials Safety Administration (PHMSA)* enforcement actions, disclosure of other violations, and outsourcing of operation and maintenance of pipelines. He has also represented various pipeline companies on issues related to fuel-blending requirements under federal law. Casey definitely knows his stuff when it comes to pipelines.

To Casey's immediate left is Michaela Noble. We're honored to have Michaela here from the U.S. Coast Guard. She is the Chief of the Environmental Law Division within the Office of Maritime and International Law. The environmental law division provides legal support regarding environmental crimes and enforcement and compliance of Coast Guard operations, facilities, and vessels, as well as public vessels. Ms. Noble began her government service as the senior environmental attorney at the Maritime Administration (MARAD) at the U.S. Department of Transportation. While at MARAD, Ms. Noble was detailed to the Coast Guard to assist with the *Deepwater Horizon* oil spill response effort. Before joining MARAD, she worked for several private law firms in New Orleans, practicing maritime and environmental law. She received her bachelors of science in maritime administration at Texas A&M University at Galveston and a certificate in maritime law from Tulane University. Ms. Noble is licensed to practice law in Louisiana, Texas, and before the U.S. Supreme Court.

Last, but certainly not least, is Anthony Swift. Anthony is an attorney with the National Resources Defense Council (NRDC). He works within their international program on tar sands development, the proposed Keystone XL pipeline with respect to tar sands, and other energy issues. Anthony has testified before the U.S. House of Representatives on pipeline safety oversight, Keystone XL and tar sands; Canada's National Energy Board on Enbridge's Northern Gateway pipeline proposal; the Nebraska Senate on pipeline siting issues; and the National Academy of Sciences on pipeline safety. Prior to joining NRDC, Anthony worked as a policy analyst for the Office of the Secretary of Transportation, where he worked on alternative fuels, efficiency standards, and the National Environmental Policy Act (NEPA) review process. His areas of focus are petroleum markets, tar sands, pipeline safety, energy infrastructure, dirty fuels, and climate changes. He has a law degree from the University of Pennsylvania and a B.A. in biology and political science from Austin College.

I'm very much honored to be among this group of experts today. What I want to do, before we get to our individual speakers, is to talk a little about the background of what has brought us here today. If you've seen the *Wall Street Journal* in the last couple of weeks, you'll see that as early as today [May 7, 2014], they had an article on pipelines and bringing crude oil from Canada through the middle of the United States. If you saw the *Wall Street Journal* last week, you will see that not too far from here, there was a derailment involving a tanker train with crude oil aboard it. Fortunately, no one was injured. We've all heard about the consternation over the Keystone XL[1] pipeline and what it may be bringing for us in the future, the purpose of the Keystone pipeline. All of these events have really brought to the public's attention transportation of crude oil within the United States.

I would think if you had reached out to the public just last year or maybe even before last year and asked them about the volume of crude oil transportation throughout the United States, they would have had no idea what you're talking about. They would say, sure, I get gas at the gas pump, so there must be fuel oil or gasoline coming to the United States on tanker trucks or by rail. But they would have no idea of the extent of the crude oil transportation industry and how it's grown over the last four to five years. Obviously, with increased public awareness, we now have the public looking in earnest at the safety issues involved. As we'll hear from our panel, some of the public awareness of the safety issues comes from the increase in the volume of crude oil transportation in the United States. Some of it has come from specific events that I'm sure we'll hear about during our discussion today.

But I think what you'll find when you hear from our speakers is that there has been a concerted effort by many groups—many of them with divergent interests—at

1. The Keystone XL is a 1,700-mile pipeline that would transport crude oil from the Alberta, Canada, oil sands through the United States to Gulf Coast refineries. For information on the controversy, see, e.g., http://www.washingtonpost.com/business/economy/state-to-release-keystones-final-environmental-impact-statement-friday/2014/01/31/3a9bb25c-8a83-11e3-a5bd-844629433ba3_story.html. The U.S. Department of State released its final statement of environmental impact in January 2014, *see* http://keystonepipeline-xl.state.gov/documents/organization/221135.pdf, but delayed its final decision on approval, *see* http://www.nytimes.com/2014/04/19/us/politics/us-delays-decision-on-keystone-xl-pipeline.html.

reaching a consensus solution to some of the safety issues that we'll hear about today. From my standpoint, representing industry, to me, that is one of the most interesting and significant developments over the past few years—where you have groups that really have divergent interests coming together to try to work out the issues that we'll discuss today.

II. Panelists' Presentations

Connie Roseberry: Thank you for the opportunity to come and speak with you today. I'm going to talk about crude oil transportation from the rail perspective. We'll start with a general overview of how crude oil, the volumes, the car loads have grown; what do volumes look like now; some incidents that raised the safety radar on transporting crude by rail; some of the regulatory actions that have come into place as a result of some of these safety concerns; and then end with—from the rail perspective—how we view the pathway to safely transporting crude oil. With that in mind, let's go ahead and get started.

As John said, the fact that we're sitting in this room and on the phone having this conversation, it shows you right now there is probably not a hotter regulatory topic in the transportation world than the transportation of crude oil and oil materials. Over one million articles have been written in the last couple of months on this, and interest exists at every level—federal, state and local—down to the local communities that are along the railroad or the communities through which these commodities flow. So, the interest level is at an all-time high at every single level. You can pick up any newspaper—it doesn't have to be the *Wall Street Journal*; it can be the local newspaper in a town—and there are several hundred articles that are written every day on this topic. So, it really is a timely and important topic.

Ten years ago, nobody was really talking about crude oil shipments. I think it's safe to say that even five years ago, nobody was really talking about crude by rail. I've tracked the U.S. crude by rail volume, specifically for AAR, the Association of American Railroads, whose members are the North American railroads. As recently as 2011, three years ago, we just had a tiny oil train that transported about 30,000 carloads per year. Then, right around 2011, we saw about 67,000 carloads, and it was primarily from the Bakken,[2] from up in North Dakota down to Louisiana, the Gulf of Mexico. That represents where we are seeing this commodity on the rail network here in the United States.

By 2012, the car loadings increased, and so we went from 67,000 in 2011-2012 to about three times that volume. You'll see not just these commodities flowing north to south, from North Dakota down to the end of the Gulf, but also heading to both the eastern and western seaports. So, we're really seeing an influx of the commodity through most of the North American rail network. And these figures are from just two years ago. We had some drillings, some shale there in Texas as well, which is contributing to some of the car loadings. So, a significant improvement or a significant increase in the crude oil volumes from 2011 to 2012.

And if you look at last year's numbers, we're almost doubling what we saw the year prior; the same network, north to south, east to west. It's the growth of volume has just increased. It really shows you how this industry kind of, for lack of a better term, came out of nowhere and really became a significant part of the carloads that are going through the U.S. rail network.

This represents a couple of things. It was really helpful for the economy because it got the economy moving, having these sorts of car loadings. Job creation in North Dakota: I think their unemployment rate is probably in the negative numbers. They're looking for people. If anybody is interested in winter, I hear North Dakota is a great place to live. Crude oil production and shipments also has another component where it is assisting the United States in its goal of energy independence. There are many benefits with regards to this commodity and its transportation through the rail network.

Unfortunately, there was a horrible accident in July 2013 in the Canadian province of Quebec, Lac-Mégantic,[3] which highlighted some of the risks that are associated with transporting crude oil from the Bakken. I'm sure most of you have heard about this incident. There was a train that was parked, left unattended on the mainline with 74 cars of Bakken crude oil. There was a fire on the locomotive after the engineer had tied down the train and left to get his rest for the evening. The fire department and the engineer responded, and they put out the fire and shut down the locomotive.

There were some other intervening events, but the end result is the train got away and it rolled down an incline at an estimated speed of about 60 miles per hour, and it went around a 10-mile-an-hour curve and derailed right in the middle of the town. After about 1:00 in the morning, there was a very large explosion. Half of the downtown was leveled. There are 42 people confirmed dead. There are still several missing. Right after this incident, the radar was up on, okay, what do we need to do to make sure that railroads are transporting this crude oil safely? What can railroads do to reduce the risks that are associated with transportation of this commodity? So, there's some immediate regulatory action right after this, right after the Lac-Mégantic incident.

Transport Canada, which is Canada's version of the Federal Railroad Administration (FRA) and regulates railroad safety, came out with an Emergency Directive. Its

2. The Bakken Formation oil fields are located in Montana and North Dakota (as well as two Canadian provinces). Information on this source of crude oil can be found at http://www.usgs.gov/faq/categories/9778/4003 and http://www.nytimes.com/2013/02/03/magazine/north-dakota-went-boom.html?pagewanted=all&_r=0.

3. The Lac-Mégantic derailment disaster of July 6, 2013, resulted in numerous deaths and sparked a criminal investigation by Canadian authorities. *See, e.g.*, http://bigstory.ap.org/article/train-carrying-crude-oil-derails-quebec; http://bigstory.ap.org/article/focus-earlier-blaze-quebec-train-derailment.

basic objective was train securement, what needed to be accomplished before leaving a freight train unattended on the mainline. Railroads needed to revise their securement matrix. Basically, there is a formula, an algorithm that talks about how big your train is, how much it weighs. If you're on a grade, how many hand brakes need to be tied to make sure that the train is secured effectively. All cabs have to be locked to protect them from unauthorized access. And the reverser must be removed, which is a component inside of the locomotive that allows it to be operated.

In conjunction with that, here in the United States, FRA came out with Emergency Order No. 28,[4] which had the same requirements with regard to taking a look at where North American railroads are leaving the trains that carry these commodities out on mainlines, making sure that railroads develop a plan. So, if you are going to leave them unattended, there is a procedure and a process you need to follow to ensure that they're being secured appropriately, that the dispatcher knows where they are, that there's a job-briefing between the crew, a system of checks and balances to make sure that the failures that happened at Lac-Mégantic will never be repeated.

The National Transportation Safety Board (NTSB) weighed in as well.[5] They had in prior incidents talked about the survivability of tank cars and other operating procedures that they believe would reduce the risk of these sorts of incidents happening. Because of the public outcry and because of the horrific nature of the Lac-Mégantic incident, the U.S. Congress got involved. When Congress gets involved, that allows things to happen generally at a quicker pace, especially if they're as a result of a tragic accident like this. And then as I mentioned before, it's not just from the federal perspective. You have the states and the local communities getting involved as well because there's no mayor that wants what happened in Lac-Mégantic to happen in their town. It really heightened the awareness about what was going through their communities, what safeguards were in place, what railroad companies are doing to ensure the safety of transporting these goods.

An emergency session of the Railroad Safety Advisory Committee (RSAC)[6] convened shortly after Lac-Mégantic. RSAC is essentially a first step of the administrative rulemaking procedure that gets regulations enacted. It consists of FRA, the railroads' regulatory agency, industry—all the rail carriers—and then labor. They get together and they basically engage in consensus rulemaking. As a result of that derailment in Lac-Mégantic, we have new regulations on securement, operations testing, transporting hazardous materials, and then also crew size was thrown into this rulemaking. The train that derailed in Lac-Mégantic was operated by a short line. It had a one-person crew, so it was just an engineer. As a result, there were some discussions from Transport Canada, from the Canadian regulatory bodies, and then here at FRA about the feasibility or whether or not having a one-person crew is something that needs to be reviewed.

The Class Is (railroads) in the United States, all of our mainline trains currently are staffed with a two-person crew, so that issue is something that is still under consideration because while railroads operate that way now, the industry is not getting in line with FRA on the appropriateness of that because it's a complicated issue. But that is something that's out there as a result of this accident as well.

RSAC had a report that was due to FRA on April 1st. Everything is going forward. There was a consensus reached on securement and the operations testing. There are a couple of things that are left on the hazardous materials, and a lot of that has to do with the classification of what's actually going into the tank cars. Because from the railroads' perspective, we rely on the shippers to tell us what's in a tank car, and we don't necessarily have a way to check, to make sure what they're telling us is in there. We're looking at ways to make that process more efficient.

You can't have a discussion about crude oil transportation without talking about tank car standards. I'll try and keep it at a pretty high level because this can get pretty technical. But we as an industry are looking at the tank car committee standards, both with our partners that ship in the shipping communities and through our AAR tank car committees. There is consensus on things that we can do to improve the crash worthiness and survivability of a tank car in the case of a derailment. For example, there are improvements that can be made that will help the survivability of these tank cars in the case of a derailment so they won't puncture, there won't be a release, or an ensuing explosion.

Increased tank car standards have been on the radar for a while. In fact, the rail industry had proposed new tank car standards prior to Lac-Mégantic; the rulemaking never gained traction until there was heightened awareness based on both the Lac-Mégantic accident and then some subsequent crude oil derailments here in the United States.

The industry also came to a voluntary agreement with the U.S. Department of Transportation (DOT) on procedures from an operating practices perspective that would reduce the risk of these kinds of derailments—applying routing protocols to shipments that are carrying these commodities, these restrictions, doing increased inspections—all things that the railroads are doing to harden their infrastructure and make the transportation of these commodities safer. A couple of weeks ago, Canada came

4. FRA Emergency Order No. 28, Notice No. 1, 768 Fed. Reg. 48218 (Aug. 7, 2014), Emergency Order Establishing Additional Requirements for Attendance and Securement of Certain Freight Trains and Vehicles on Mainline Track or Mainline Siding Outside of a Yard or Terminal, *available at* http://www.fra.dot.gov/eLib/details/L04719.
5. Press Release, Nat'l Transp. Safety Bd., NTSB Calls for Tougher Standards on Trains Carrying Crude Oil, Jan. 23, 2014, *available at* http://www.ntsb.gov/news/2014/140123.html.
6. In 1996, FRA established the Railroad Safety Advisory Committee (RSAC) to provide advice and recommendations to FRA on railroad safety matters. RSAC provides a forum for collaborative rulemaking and program development. It includes representatives from all of FRA's major stakeholder groups, including railroads, labor organizations, suppliers, manufacturers, and other interested parties. More information is available at https://www.fra.dot.gov/Page/P0015.

out again with some directives to the railroads on ways to make the shipments safer. The most important one is the phaseout of the older tank cars. That's one of the key ways that you can improve safety: having crude oil travel in sturdier, more puncture-resistant tank cars.

To wrap up from the rail perspective, the foundation and the future of the safety of transporting hazardous materials requires that we know what's going in the tank cars and what the components are of this crude oil; we need higher tank car standards; and we must harden our infrastructure. Make the track the best track it can be in order to prevent derailments. Educate our employees and use the safest and most secure routes with the best track when transporting these materials.

Casey Hopkins: Before getting into the scope of the discussion about safety of transporting crude oil by pipeline, I thought I'd just give some background. In 2012, liquid pipelines delivered about 7.5 billion barrels of crude oil and another 6.6 billion of petroleum products. As everyone is probably aware from all of the advances in exploration and production, there's been an increase in crude oil production, and hence a need to increase the transportation. Forty-three percent of our refining capacity is in southeast Texas and Louisiana. There are 42 refineries there, about 9 million barrels per day of capacity. Pipelines and ocean-going tankers deliver the bulk of those materials. Other modalities like trucking and rail accounted for about 7 percent. As Connie mentioned, the rate of increase for these other modes of transport, particularly by rail, is pretty sharp. Rail transportation is a little higher per barrel than pipelines, and that reflects a number of different considerations.

One of the fundamental questions is how realistic of an option are pipelines for transport by crude? All told, there are about one-half-million miles of pipelines in the United States. About 57,000 of those miles are crude oil pipelines. There are about 140,000 miles of rail lines. That gives you an idea of what that industry offers. Moreover, rail is undeniably a quicker way of transporting crude oil. It's much faster. Crude oil shipped by unit trains from 70 to 120 cars—there can be some moving into modalities and things depending on where you are. But on the other hand, you can have some incredible capacity with a pipeline. Keystone XL, if it's approved, the capacity is 900,000 barrels per day of crude oil.

Pipelines have been used in the United States for about 75 years. The industry has some very favorable metrics overall: 14.1 billion barrels of petroleum materials delivered in 2012; 99.99 percent of petroleum was safely delivered. Moreover, the industry is in the process of an incredible amount of investment in literally all aspects of its operation, maintenance, and inspection procedures. We'll discuss that a little more going on, but certainly from a historical standpoint, and prospectively, pipelines offer a lot of promises of safe transport of petroleum materials.

I'm going to briefly review the extent of federal legislation governing pipeline safety, which began in 1969 and continues up to this day. Actually, DOT's PHMSA just yesterday [May 6, 2014] released the lessons learned regarding the Enbridge incident.[7] Though it's a continual process of updating the requirements, updating the regulations, updating the obligations imposed on pipelines, there are some benefits in that. There are challenges to the industry, and it's important that all the various stakeholder groups work together on this.

In 1969, the Hazardous Materials Regulation Board established the first safety regulations.[8] This covered the design, construction, operation, and maintenance of pipelines. They created Part 195 of Title 49 of the *Code of Federal Regulations* governing work in that area. That's when it all began. There were some exceptions: In particular, low-stress pipelines, gathering lines in rural areas, were not necessarily captured in the initial regulation. In 1979, there was a Hazardous Liquid Pipeline Safety Act.[9] In the intervening period, there had been a Natural Gas Pipeline Safety Act,[10] and some of that legislation was designed to catch liquid pipelines back up. Title II of that legislation applied to liquid pipeline safety. Hazardous liquids basically included many petroleum or any petroleum product. And the Secretary of Transportation was directed to create standards for the design, installation, emergency plans and procedures, testing, operation, replacement, and maintenance of pipeline facilities. Again, there were certain exceptions: gathering lines in rural areas and pipelines that are either within refineries or not very far outside them, one mile or so. That Act also established the first committee, Technical Hazardous Liquid Pipeline Safety Committee.[11] Moreover, owners and operators were for the first time required to submit plans for inspection and maintenance of their pipeline facility.

Fast-forward to 1992 with another piece of federal legislation.[12] This legislation did a number of things. Among other things, it seems incredible to us now, but it added the environment into the types of things that need to

7. On July 25, 2010, a segment of a pipeline owned and operated by Enbridge, Inc., ruptured near Marshall, Mich., releasing an estimated 843,444 gallons of crude oil into wetlands. *See* U.S. Dep't of Transp. Pipeline & Hazardous Mats. Safety Admin. [PHMSA], Pipeline Safety: Lessons Learned From the Release at Marshall, Michigan, 79 Fed. Reg. 25990 (May 6, 2014), *available at* http://www.gpo.gov/fdsys/pkg/FR-2014-05-06/html/2014-10248.htm.
8. Shortly after the Hazardous Materials Transportation Act was enacted in 1975, the Hazardous Materials Regulation Board was terminated and the responsibilities of the Office of Hazardous Materials were transferred to the newly formed Materials Transportation Bureau.
9. Hazardous Liquid Pipeline Safety Act of 1979, as amended, 49 U.S.C. §§60101-60133.
10. Natural Gas Pipeline Safety Act of 1968, Pub. L. No. 90-481 (Aug. 12, 1968).
11. PHMSA has two pipeline advisory committees mandated by 49 U.S.C. §60115: the Technical Pipeline Safety Standards Committee (TPSSC) and the Technical Hazardous Liquid Pipeline Safety Standards Committee (THLPSSC). PHMSA informally refers to the committees as the Gas Pipeline Advisory Committee (GPAC) and the Liquid Pipeline Advisory Committee (LPAC).When referenced together, the two are known as the Pipeline Advisory Committees (PACs). *See* http://www.phmsa.dot.gov/pipeline/regs/technical-advisory-comm.
12. Pipeline Safety Act of 1992, Pub. L. No. 102-508 (Oct. 24, 1992).

be considered in connection with the safe operation and maintenance of pipelines. In addition, the Act called for regulations to identify unusually sensitive areas or high-consequence areas, high-density population areas, and the need for special requirements. Moreover, the Act gave the Secretary the authority to increase inspection requirements and in certain cases to require a technology that's called by a number of different names; in-line inspection, pigging, magnetic flux radiation. There are a number of different names for it.

The composition of the Technical Safety Committee was adjusted to include folks who have experience in environmental protection and public safety and also to make sure that there was one person who had no affiliation with industry. And then, in 1992, Congress called for a narrowing of the exception for the rural low-stress pipelines and also wanted to look at an emergency flow-reduction device. These are self-implementing valves that act in the event of a significant loss of pressure within the pipeline. Acting on that authority in 1994, PHMSA narrowed the set of exceptions for rural low-stress pipelines.

In 1996, Congress acted again with the Accountable Pipeline Safety and Partnership Act.[13] Among other things, this Act required that certain areas where pipeline rupture would likely cause long-term environmental damage be considered. In addition and importantly, Congress directed that regulations be issued for the qualification and testing of certain pipeline personnel, so operators needed to be qualified, people had to be trained, and there were a series of requirements like that.

The Pipeline Safety Improvement Act of 2002[14] was an omnibus piece of legislation that addressed a number of different aspects of pipeline safety regulation, calling for PHMSA to promulgate regulations regarding various safety provisions. It expanded the one-call notification program, third-party damage that's significant risk for pipelines, called for public education programs (which are vital), expanded whistleblower and penalty provisions, and also called for standards of inspection for pipeline facilities.

The 2006 legislation was principally directed at these low-stress rural pipelines. And phasing out the exceptions, there have been some incidents that occurred in connection with them. There still remain a few exceptions, but those are largely pipelines that are regulated by the Coast Guard or that are very small in areas outside of existing refineries and other things.

And then in 2011, finally, there was some additional legislation increasing penalties, increasing the number of government inspectors, and requiring consideration of a number of things including the remote-controlled shut-off valves, leak-detection systems that we'll address in a little bit, and further evaluation of integrity management plans.[15]

There has been continual upgrading and strengthening of the regulatory program, which yielded a number of different results. Currently, safety and reliability are heavily regulated by PHMSA through general safety measures for pipelines, operational pipeline monitoring systems, and the like. Most of the larger pipelines are subject to these and have employed these systems. They're useful in any number of respects, including business reasons, not just related to safety. The Integrity Program is actually one of the more forward programs that PHMSA has. This requires continual updating of the risk assessment. In any event that occurs, you have to evaluate how it happened and look at ways to address and prevent it in the future and also to deal with impacts.

There are a number of regulations that directly address risks related to populated and high-consequence areas. They're robust, and industry is held to a high standard here. And most importantly, the risk analysis is vital because in addition to doing what is prescribed by the regulations, the pipeline operator is obligated to assess the risks. And if further action is required to abate risks, pipeline operators are expected to do that.

There are a number of additional ways to further mitigate risks. Markers at all areas may seem like a pretty low-technology approach, but in a situation where a number of accidents are caused by someone digging where they shouldn't be digging or doing something like that, it has a lot of benefits. Leak-detection system is an area where there is a lot of work going on right now. Generally speaking, what they do is they focus on the percentage of loss relative to flows, so if you have a high flow in your pipeline, you can have a correspondingly high number of leakage before it kicks in. It's an area where the industry is doing a number of different things to try to narrow that down.

Looking at the situation from a raw data standpoint—you can access all this information from PHMSA; that's where I got it—certainly, it seems like there are a large number of incidents relative to pipelines. But I think if you look at it more closely, the situation is a little different than it would appear. Most failures occur at facilities like pumping stations and things like that. It's unusual to have mainline pipeline failures. Moreover, when they happen, a lot of materials are recovered. Generally speaking, the amount that's lost is smaller than you might think.

Seventy-six percent of the leaks between 2002 and 2012 involved fewer than 30 barrels. Certainly, there are exceptions; what happened to Mayflower[16] last year, what happened to Enbridge, for example. But generally speaking, hazardous liquid pipelines transported more petroleum materials than any other modality and had the lowest rate of incidents. And if you look at the data from a big-picture standpoint, the situation is improving. We're seeing a reduction in the number of releases, the reduction in the barrels that are released, and then the causes are

13. Pub. L. No. 104-304 (Oct. 12, 1996).
14. Pipeline Safety Improvement Act of 2002, Pub. L. No. 107-355 (Dec. 17, 2002).
15. Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011, Pub. L. No. 112-90 (Jan. 3, 2012).
16. A ruptured pipeline spilled approximately 5,000 barrels in Mayflower, Ark., on March 29, 2013. *See, e.g.*, http://www.reuters.com/article/2013/04/11/us-exxon-spill-mayflower-insight-idUSBRE93A0PI20130411.

going down significantly. And with that, I will pass this to Michaela.

Michaela Noble: Hello. Thank you very much for having me here. I really appreciate the work that ELI does, and I'm very happy to be able to participate in today's panel. Just a note, I have to provide a disclaimer that any views that I may present today are not necessarily reflective of the Coast Guard, the U.S. Department of Homeland Security (DHS), or any component of DHS.

For an understanding of the regulatory regime and the risks and benefits of carriage of crude oil in tanker vessels, I think it's important to understand what it was like before there really was any regulation. For approximately 50 years following the *Titanic*, there were virtually no changes in the regulation of vessels, including tanker vessels. And right around that time (the late 1960s and early 1970s) was also when the world was changing from coal as the fuel source to petroleum, so there was heightened, increased demand.

So, vessels such as the *Torrey Canyon*, which originally was built to carry about 60,000 tons, have been enlarged to literally double its ton capacity to 120,000 tons. Split the vessel in half, stick in a middle section, fill it up, send it on its way—really, there was no regulation. And in 1967, it hit a reef off England and discharged between 32 and 38 million gallons of oil. That got the attention of the international community. And the IMO, the International Maritime Organization, established the International Convention for the Prevention of Pollution From Ships (MARPOL)[17] in 1973. That system essentially created the traffic-separation schemes or vessel lanes, so that vessel operators had known lanes of traffic that they would be travelling in to help reduce the effects or impacts or risks of groundings or hitting reefs.

Very little changed after that until 1976, when the *Argo Merchant* grounded off Nantucket, Massachusetts. It was carrying 7-8 million gallons of oil, all of which discharged after the vessel broke in half. Then, in about a 10-week period, there were about 14 other tanker accidents in or around the United States, which very much galvanized the U.S. government and international community. In 1978, MARPOL was amended for some additional regulation, and there were additional changes to the Ports and Waterways Safety Act and the Port and Tanker Safety Act, of which I'll get into more details later. And those all still focused on prevention, setting up traffic schemes, and then setting some design requirements.

And then, very little changed until the *Exxon Valdez*. In 1989, it was a very large crude carrier, single hull. It grounded on Bligh Reef in Prince William Sound. While it was only the 54th largest oil spill from a vessel in the world at that time, national reaction was due to the very sensitive nature of Alaska, the difficulty of getting response equipment there, the lack of preparation in having systems there to already address an oil spill, as well as the TV coverage. The disaster was able to galvanize and get Congress moving at a very fast pace, and the Oil Pollution Act (OPA) of 1990[18] was enacted.

The Ports and Waterways Safety Act[19] was amended by the Port and Tanker Safety Act and also further amended under the OPA later on, where Congress found that navigation and vessel safety, protection of the marine environment, and safety and security of U.S. ports and waterways are matters of major national importance. So, it was recognition that protection of the marine environment was important when we're dealing with and regulating the maritime industry. Title I of the Ports and Waterways Safety Act is, again, the vessel traffic-separation schemes. Those are actually set up, and the Coast Guard is the agency that does the studies for that information, but it's still regulated on the international scale by the IMO. And then, Title II had been the Port and Tanker Safety Act, and that's the technical, construction, and design of additional requirements and regulation for tanker vessels.

The most significant improvements, though, were all set up under the OPA. The Ports and Waterways Safety Act was still more focused on prevention: "What can you do to prevent an accident from occurring?" But the OPA addressed prevention, response, as well as the ability to fund and pay for response. So, it was the OPA that set up double-hull requirements, set new requirements for crew licensing, training, and contingency planning by the federal government agencies and by the tanker owner industry and the oil companies. It significantly changed and broadened enforcement liability and created a new research and development for how to respond and, again, the financial responsibility requirement.

As for the double hulls, most vessels at this point for tanker vessels have already been phased out and now have double-hull requirements. So, for tankers, when I say tankers, I'm usually referring to tanker vessels versus tanker barges. And at this point, all tanker vessels are double-hull. There are still some single-hull barges, or vessels that are single-hull but have double sides or double bottom, but they're not a true double-hull. But that will be phased out starting January 1, 2015, and there will be no single-hull vessels, including barges, allowed in U.S. waters.

For the vessel carriage in the United States of crude oil going inland, so that it will be more competitive with pipelines and rail, those are generally going to be on barges. Not tankers, because tankers require a great deal more draft than most U.S. inland waterways can take. So, there still is, and will be, some crude oil carried on single-hull barges, but, again, it's a much smaller number, and by 2015, the barges will all be double-hull.

Turning to the issue of safety and response: While the volume of transportation of crude oil on vessels has continued to increase since the 1970s, particularly since 1990 and the enactment of the OPA, we've continued to

17. *See* http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-%28MARPOL%29.aspx.

18. 33 U.S.C. §§2701-2761, ELR Stat. OPA §§1001-7001.

19. 33 U.S.C. §§1221 et seq.

see a decreasing trend in the number of spills from tank vessels. This is a result of the industry's high compliance and the Coast Guard's emphasis on safety and prevention from discharges.

For the vessel-monitoring system, the Coast Guard's duty is to continuously monitor and study the cost and benefits of requiring different monitoring systems. So, for instance, most tanker vessels and certain commercial towing vessels are required to be equipped with automatic identification systems (AIS), and these systems allow for vessels to be able to see each other in real time, to make their passing arrangements, to avoid collisions. It also allows for information real-time to go to shore facilities, so they are able to see where vessels are going, and to be able to intervene and provide assistance if they are seeing something that is not going right. They're able to project that there could be potentially a collision or grounding.

And we have aids to navigation, radio responders on different landmarks and buoys, marking reefs and other areas, and that information is transmitted directly to ship's radar system so they can receive that information. We also continuously study the waterways and vessel traffic, traffic patterns and size, and we study that through the PARS, Port Access Route Study, so that if we believe that there is a need to change or alter a traffic-separation scheme, the information can be studied, put together, and submitted to the IMO for updates and changes to improve the safety of marine navigation and protection of the environment. Those are all means of prevention.

The port state control inspections are for prevention too, but also for enforcement. There are approximately 85,000 U.S. port calls by about 10,000 individual vessels in the United States in any given year, which results in 9,000-10,000 port state control inspections of those vessels. Of all those inspections and all those visits, we usually have only about 100 vessel detentions for safety and environmental issues, some of which get referred for actual criminal prosecution. Again, that's for enforcement and prevention, to be able to detain a vessel if we see an issue, until the issue is addressed and resolved and before we allow the vessel to go back into the waterway.

We also have the national contingency plans under the OPA that are area contingency plans and require vessel response plans. These contingency plans address the response issue. The area contingency plans set up the different requirements of studies in a particular area, identify that unique environment and what type of equipment should be available, and are ready to address a potential spill in that area. It also sets up the type of dispersants that could be used and the best technology to be used under an area contingency plan. So, during an event, we already have identified means and methods to immediately respond. Vessel response plans are also required; every vessel is required to submit their plan to the Coast Guard for approval. Those plans must be consistent with area contingency plans, showing their plan for responding to a worst-case discharge from their vessels.

The relative risk of carrying oil on tankers is the amount of oil that is discharged at any one particular time, but the benefit is that we have now been regulating this industry effectively since the 1990s. And despite the increase of traffic of crude oil and amount of crude oil being carried on vessels, we have not seen a correlation as far as increase of discharges. So, the regulations are working and the industry is complying, which helps to protect the environment.

John Jablonski: Thank you, Michaela. Anthony?

Anthony Swift: Thank you. I have 14 minutes to cover a broad swath of information, and this is definitely a big topic. So, I'm going to have to apologize in advance for not being comprehensive in what I cover, but I'll try to hit some of the major issues from the environmental perspective. I'd like to start by taking the 20,000-foot picture. As John mentioned, there is a dramatic change in North American energy development ongoing. Some of those changes have very long-term consequences. So, as we look at long-term infrastructure, we need to consider also our long-term climate goals and where we want to be in terms of our energy use 50 years down the line.

As many of you know, the national assessment on climate was released yesterday.[20] We know that our climate is already posing a significant impact to Americans in terms of health, whether it be respiratory diseases or heat-related incidences. So, the need to begin to take real measures to decarbonize our economy has never been greater, and it continues to grow, and that's where our long-term energy plans need to play into long-term infrastructure decisions. Keystone XL is a good example of that.

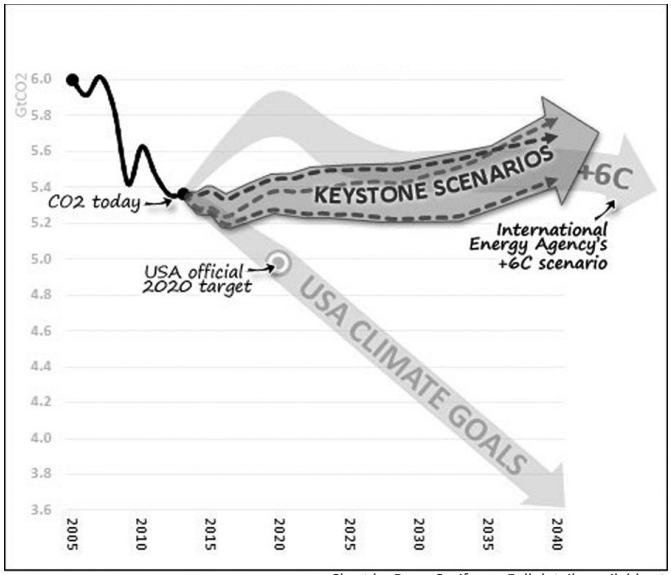

Chart by Barry Saxifrage. Full details available at http//priceofoil.org/content/uploads/2014/02/KXL-FEIS-chart-detailsFINAL2.pdf

This PowerPoint slide [above] shows the energy-consumption scenarios under which Keystone XL was evaluated, assuming what are called business-as-usual policies continue through the pipeline's lifetime. While business-

20. *See* http://nca2014.globalchange.gov/.

as-usual policies are the policies we have today, the reality is that they lead us in a direction and they assume carbon emissions in the United States and globally consistent with 6 degrees of warming at levels that contradict commitments that the United States has already made internationally. So, it's important when we consider these infrastructure projects to take a climate lens that some of them may move forward with that lens, but many of them may not have a role in a world in which energy consumption and carbon emissions are consistent with a 2-degree warming scenario. That's just a point to keep in mind when looking at all of these modalities; to some extent, infrastructure's destiny. Inasmuch as we make long-term 50-year decisions on infrastructure, we want to make sure that they lead us in a direction that we can live with.

The other speakers have done an excellent job in orienting people on the various modalities and where they're primarily located. What I want to highlight briefly is the fact that when moving crude oil out of the interior continent, looking at pipeline and rail, the reality is that for the most part, it's not a rail-versus-pipeline question. There are areas in which rail works better for industry for a variety of market reasons; other areas where pipelines have better benefits. In many cases, this has to do with the type of oil reserve being produced in the economics of those reserves.

What we have found is that for the Canadian tar sands in Alberta, pipelines are the preferred way and, in many cases, the only way, to supply the level of growth that industry hopes to reach by 2030. Rail has not proven to be a particularly viable form for the tar sands industry in the way that it has for the Bakken.

And what we found is that if you look at crude by rail in the United States, the vast majority of it is light crude coming from tight oil formations. Much of it, particularly in North Dakota, is going to places that are not served by pipeline. Much of it is going through refineries in the West and East Coast. An interesting point on that is that right now, about three-quarters of crude oil shipped from North Dakota is moved by rail, and North Dakota producers have actually turned down two major pipeline proposals with over one-half-million barrels per day of capacity, simply because they weren't interested in signing long-term contracts on pipelines. Rail offers them the flexibility to reach a wider variety of markets without the long-term production requirements, and that's particularly important given uncertainties when it comes to production profiles and depletion amounts.

But moving forward, I'm going to try to briefly cover some of the major issues we found with pipelines and rail, crude by pipeline and crude by rail, on the spill frequency and magnitude side, and then I'm going to briefly talk about some of the issues when it comes to spill response. As an example, there was a spill in the summer of 2013, in a town called Mayflower, Arkansas, where about 5,000 barrels of Canadian tar sands was spilled from the Exxon Pegasus line. That's just for information, more of a backdrop for the issues that we found with many of the spills that have happened recently in the United States.

There are major regulatory shortfalls and gaps, but I think they can all be articulated in the frame of whether our pipeline regulator, PHMSA, is able to serve a role as a safety net that prevents pipeline spills, or merely as a coroner that diagnoses what went wrong after it went wrong. All too often, we're finding that our pipeline regulators have primarily served in the latter role. We've seen that with the spill in Kalamazoo, Michigan, where PHMSA found after the spill that Enbridge had been in violation of 24 regulations—but, of course, only the investigation after the spill brought those issues to light. A similar spill into the Yellowstone River[21] on an Exxon pipeline revealed the same thing. PHMSA had confirmed with Exxon that the pipeline had at least 12 feet of cover under the river bed, but it did not, and a flooding period caused the pipeline to rupture.

So, in many cases, violations tend to be found after catastrophic failures happen. In addition to that, there are areas where pipeline regulators at the federal level are simply not engaged. One such area is in the routing of pipelines. One issue that we found is there are sensitive resources throughout the United States, whether it be water resources or other sources of sensitive areas. And PHMSA doesn't tend to engage in this pipeline-siting process. States have some jurisdiction over it, but there is an issue where the federal pipeline safety jurisdiction and the state siting jurisdictions leave a lot of space in between where pipelines could be sited in less vulnerable areas to avoid potential spills that could not be cleaned up.

In addition, throughout the process, PHMSA doesn't tend to have significant staff, and we found a litany of issues when it comes to the inspection-of-construction-site clause being built into pipeline systems. Another issue has come to light from Nebraska's 2011 pipeline siting law.[22] One of the requirements of that Act was to evaluate the sufficiency of pipeline leak detection, and PHMSA did a study to evaluate how leak detection was working across the industry. What it found was that most detection systems or leak-detection systems used by the industry are generally ineffective. And if you look at pipeline spill data, you will see that pipeline leak-detection systems missed 19 out of 20 spills. In fact, more alarming, in four out of five spills, it's greater than 1,000 barrels.

One of the things PHMSA found was that in many cases, regulations did not push industry to increase its standards, which resulted in industry not pushing leak-

21. On July 1, 2011, a pipeline owned by ExxonMobil Pipeline Co. ruptured near Laurel, Mont., spilling approximately 63,000 gallons of crude oil into the Yellowstone River and floodplain. *See* https://doj.mt.gov/lands/yellowstone-river-oil-spill/.

22. *See* Major Oil Pipeline Siting Act (Neb.), http://nebraskalegislature.gov/FloorDocs/102/PDF/Slip/LB1_S1.pdf.

detection technology providers to provide better systems. So, we're in a bit of a chicken-and-egg situation with leak detection, where the technology isn't there because our regulatory system isn't incentivizing better leak-detection technology. And what that leaves us with is the Enbridge rupture, which ended up taking about eight hours to identify. But perhaps the biggest issue is the type of spills. It was a pinhole spill in an Enbridge pipeline in the Northwest Territories that spilled about 60,000 gallons of crude before being identified by a landowner who came across it. Small spills are a major problem with pipelines, and the bigger the pipeline, the bigger the blind spot. I mean, again, if you take Keystone XL, which is an 830,000 barrel-per-day pipeline, its leak-detection systems can detect leaks above 1.5 to 2 percent of its capacity. The problem is that for an 830,000 barrel-per-day pipeline, that means that its real-time leak-detection system has a blind side of between 500,000 and 750,000 gallons per day, which creates a fairly large amount of wiggle room.

Another issue: Pipelines don't have abandonment plans. We have a problem with aging pipelines that are being repurposed. And in many cases, they haven't been rebuilt, and they were placed in areas that were particularly sensitive because they were built before the National Environmental Policy Act.[23] We saw that with the Pegasus pipeline, an older pipeline that ruptured in the Mayflower, Arkansas, spill I mentioned earlier. There are plans to repurpose other pipelines in the United States. There's one in the Northeast that is under consideration for reversal. It's over 60 years old. So, our pipeline system is aging. I think the average age of our pipelines is in the vicinity of 60 years now, and it's getting older. So, that creates a real problem moving forward.

I'm going to briefly go into rail as well. As has been noted today, the crude-by-rail transport boom appeared relatively recently. It's caught, in many cases, both industry and regulators off guard. We're seeing now unit trains of over 100 cars moving crude in continuous fashion. This new mode of transportation creates a very new risk. One of the things that has been noted is that DOT-111 tank cars are being used to move crude oil. Over three-quarters of our rolling stock is in the form of this defective DOT-111,[24] so transitioning those out is critical. The problems on those tank cars have been known for 20 years, and it is critical that we move those out.

To some extent, there are other issues with the movement of unit train cars. When you're moving 100 tank cars in a row, an accident on one tank car can cause a chain reaction. One of the key issues is how do we prevent the sorts of reactions that led to the Lac-Mégantic explosion and others? There are several things that have been proposed. One is to create buffer cars between the tank car rows. Another is speed reduction. It's useful to note that, while the industry's voluntary speed-reduction of 40 miles per hour in heavily populated areas is helpful, the Lynchburg, Virginia, train derailment happened on a train that was moving 24 miles per hour. So, the key question we have to consider is whether a certain speed-reduction will result in safety in the event of spills.

Very quickly, I just want to mention that we're finding that new types of crude have different properties. The Bakken crude, we're finding it to have a particularly high vapor pressure, and there seems to be an increasing argument that it should be treated as a flammable gas, rather than a flammable liquid. There has been a significant controversy on the labeling of the Bakken crude. DOT is in a place where I believe it still hasn't received the information from the industry on the properties of Bakken crude that it was promised in January [2014].

On the other side, you see heavy tar sands, which have shown to present significant impacts when spilled in waterways because unlike conventional crude bitumen, tar sands bitumen is actually heavier than the water. So, once tar sands sink into the water column, it becomes very difficult to deal with using conventional technology. That's one of the reasons that the Enbridge spill became the most expensive pipeline spill in U.S. history, costing over one billion dollars to clean up. We still have tar sands in about 40 miles of the Kalamazoo River. We need to work on spill-response measures appropriate to the new type of crudes that are moving and ensure that those risks are accurately identified to begin with.

III. Discussion and Audience Questions

John Jablonski: Thank you very much, Anthony. I want to take a moment right now to follow up with our speakers on some of the topics that they discussed. Since you just spoke, Anthony, I think you would be a fitting start, and maybe we'll come back across the table on this issue. You mentioned that you felt that there was a need for more proactive regulatory conduct on behalf of the regulators in the various industries. I'm wondering if we can take 30 seconds or a minute on the types of proactive conduct that you would like to see.

Anthony Swift: Certainly. One issue is the staffing issue. We need regulatory agencies to have more inspectors who can be engaged at various parts of the process, to have a more hands-on approach. But the other issue is we also need our regulatory agencies to have the enforcement piece to be able to serve as a preventative measure. So, for instance, the Kalamazoo spill cost over one billion dollars. Enbridge was in violation of two dozen regulations, and yet it was fined $3.7 million. That is a small cost of doing business and not a preventative measure. We need our regulators to be well-staffed, to have the jurisdictional enforcement piece, and to have the

23. National Environmental Policy Act (NEPA), 42 U.S.C. §§4321-4370f, ELR Stat. NEPA §§2-209.

24. For information on the deficiencies of this tank car design, see, e.g., Paul L. Stancil, NTSB, Office of Railroad, Pipeline, and Hazardous Mats. Safety, *DOT-111 Tank Car Design* (2012), *available at* http://www.ntsb.gov/news/events/2012/cherry_valley/presentations/hazardous%20materials%20board%20presentation%20508%20completed.pdf.

political will to exercise serious enforcement measures, so that there is an incentive for industry to be proactive in implementing regulation.

John Jablonski: Thank you. Very interesting, actually. Michaela, coming back across the board, you're one of the enforcement arms, if you will, that was just mentioned. What is the Coast Guard doing on the enforcement side of the fence in addition to some of the things that you talked about, or if you wanted to highlight one or two things that the Coast Guard is doing as far as transportation enforcement?

Michaela Noble: For vessels, again, we have our general port state control inspections, and we are very much looking for various different violations and ensuring compliance with the safety regulations. For an environmental response end to that, the Coast Guard is the federal on-scene coordinator in charge of all discharges of oil, whether it's crude or not, in the coastal zone. So, whether it be pipeline or facility or vessel, if it's in the coastal zone, the Coast Guard is the lead coordinator for that work. We're continuing to refer those matters and to follow up for enforcement with the U.S. Department of Justice for any discharges. So, those are the names that we continue to work with.

John Jablonski: Thank you very much. Casey, maybe you could touch upon the pipeline industry's response to spillage that was a major issue that Anthony pointed out.

Casey Hopkins: In terms of planning for them and executing responses, I think the industry is trying to do the best it can. I think what you see is industry doing a lot of things to try to be in a position to respond. I agree with Anthony about the age of the infrastructure. I think I probably would have a different perspective on the role of the regulators and the incentives that they're creating within industry. But the fact of the matter is that a lot of the pipes are buried, and a lot of the tools that are the most sensitive and the best tools that we have, have some limits in detection. So, I think being in a position to plan and to do the best you can to find these things and in the event something happens, to plan and respond is about the best you can do.

With respect to leak-detection, certainly, as I mentioned, there are some limits currently to what the technology can do, but I think that's an area where there's an awful lot of work going on right now. The industry has created some self-governance principles that go beyond what PHMSA is requiring. And so, I think that what you're going to see is a lot of money, a lot of efforts directed at trying to come up with varied solutions because the size of pipelines is different, because materials to carry can be different, because where they are located is different and elevation differs—all these factors influence integrity issues. Any one-size-fits-all solution is really not workable.

John Jablonski: Connie, there's been some concern, and you mentioned that the Canadian regulatory body is phasing out the standard tank cars that they're using. I've seen reports that there is concern that those tank cars will find their way into the United States. What do you know about industry's efforts to prevent that from happening? I know you touched upon it briefly in your presentation.

Connie Roseberry: The question is about industry's efforts to prevent the DOT-111 cars that are not being allowed in Canada to come into the United States?

John Jablonski: Yes.

Connie Roseberry: I don't know much about it, except anecdotally. I do know, however, that we're awaiting a rulemaking procedure from PHMSA that's going to have requirements for tank cars. We anticipate, based on some feedback that we've received from the regulators, that they're going to take the AAR Tank Car Committee standards into the rulemaking and strengthen these requirements. So, regardless of whether those cars from Canada find their way here, if the regulatory action comes up the way that the industry hopes, then those tank cars wouldn't be allowed to be used here either after a certain phaseout period.

John Jablonski: The specific question relates to the industry sounding an alarm that until the regulatory framework for rail safety in North America and Canada comes into clear focus, current and potential legislative and regulatory uncertainty is stifling some needed investment in safer rail cars because the standards haven't been finalized per se. Those are the standards that you have just mentioned. When do you expect some new standards to come out?

Connie Roseberry: The latest word that we have is that the rule is at OMB [Office of Management and Budget] right now, with focused pressure both politically and from other agencies. We anticipate getting a rulemaking by the end of the summer if not sooner. So, we anticipate that those steps are going to be taken here pretty quickly.

John Jablonski: And then, with respect to suppliers of rail cars, how long do you think it may take them to actually turn out rail cars that meet the new standards?

Connie Roseberry: I'm not 100 percent sure on this. We hear different things from different suppliers. Obviously, the demand is going to be very large, and so I think it's in our best interest to get them out as quickly as possible.

John Jablonski: Another question: Given the abundance of North American shale gas now and projected into the future, is there a movement toward converting the existing

crude oil rail transport locomotives and others to natural gas engines? Do you have any knowledge on natural gas engine testing or others in the rail industry?

Connie Roseberry: I would direct people to the AAR. They have pilot programs underway that are looking at liquefied natural gas (LNG) locomotives. Obviously, they want to make sure that they get it right from a safety perspective and that it's something that's feasible, but it's fair to say that those studies are underway. And given the right approvals, those will probably be something that we'll see in the future.

John Jablonski: Thank you. At this moment, I want to make sure that we have enough time for additional questions from our audience here. A question from the audience: We heard some safety figures from the pipeline industry with respect to deliveries. Does Connie have similar numbers for the rail industry?

Connie Roseberry: I can tell you that it's either 99.7% or 99.97% of all hazardous material shipments by rail have reached their destinations safely.

John Jablonski: Next question: If the standards for tank cars create a smaller tank car, does that mean there'll be additional tank car volume to carry the same amount of crude oil?

Connie Roseberry: I'm speculating, but I think that's probably a pretty common conclusion that people have reached. But I don't have any information on that. It would be based mostly on the demand and the growth volume.

John Jablonski: Another audience question: If there was an incident in the United States involving crude oil transportation by rail, what sort of liability scheme is in place to hold individuals responsible for that disaster, if you will?

Connie Roseberry: I've never been a plaintiff's lawyer, but I've dealt with them a lot, and I can tell you that their perspective is that everybody is responsible. So, as far as specific allocations, I imagine it's going to be very incident-specific. I can tell you that my railroad, the railroad that I work for, in the event of an incident would make every effort to respond appropriately to the incident. So, as far as who is specifically responsible, I think that's pretty fact-intensive and it would depend on the circumstances of the accident. But my sense is that all parties will be brought into the litigation.

Anthony Swift: I just wanted to add one point. As we learn more about the nature of some of the oil that's being moved, particularly from North Dakota, I think the marking of oil trains and the train cars used to move them—some of that liability is also going to be pushed onto the producer when it comes to being responsible for marking the properties of their crude accurately. The failure to do that results in not only derailment, but explosive derailment, and I think that does create a liability potential.

John Jablonski: Another audience question concerns capacity: If the Keystone pipeline is not approved, is there enough capacity by rail?

Connie Roseberry: As far as the nationwide network, I can say that there is certainly capacity. How much capacity depends on what the circumstances are, but I would say the answer would be yes.

Anthony Swift: There have been a number of financial firms that have taken a look at that question. Goldman Sachs has found that one of the bottlenecks for moving tar sands by rail is the lack of sufficient insulated tank car capacity. But the bigger issue is whether crude by rail offers an economically viable mode when tar sands producers get in their high production cost. I think that in the scenario in which new pipelines aren't built, current producers will get their crude out by whatever means are possible. But we're currently at about two million barrels per day in the tar sands. Industry plans to expand to nearly seven million barrels per day in the next 15 years. Those projects—many of them simply are not economic, given the higher cost of rail. They can't bear the extra cost in the way that North Dakota producers can, because their break-even point for many of these projects is between $90 and $110 per barrel.

Audience Member: I'm interested in learning more about the regulatory gas and shortfalls that we see in our current system. We're expanding so much in the transfer of oil pipeline and rail. My question is, it seems to me that FRA regulates railroads and PHMSA regulates the transport of oil enhancers into those regardless of the mode of transport. In this supply chain and transport system, we've got a lot of trans-shipment points where we're offloading and loading. I think your map shows that. What's the state of regulations on the loading and offloading from rail to tanker trucks, to pipelines? Who is regulating that? Is it something that's falling through the cracks?

John Jablonski: To repeat the question, with respect to regulatory gaps, we've heard about rail, and we've heard about pipeline, and we've heard about maritime shipping. But who is regulating the offload and onload in trans-shipment points? From my viewpoint, it's likely the trucking industry. I believe DOT is working on those regulations and has had them in place for some time. Maybe Anthony knows more.

Anthony Swift: I think that's right, but one area in which regulatory overlap has caused the gap is when it comes to a spill response plan. DOT, when looking at pipelines, is responsible for approving spill response plans. One issue NTSB has is that, time and time again, PHMSA is not taking that responsibility seriously and it's just rubberstamping these things. The problem comes in because the U.S. Environmental Protection Agency (EPA) is the one that's responsible for executing these plans if something happens. So, the dual jurisdiction results in a much weaker regime for cleanup than you would otherwise have.

Casey Hopkins: I might look at that a little differently. In particular, the Coast Guard regulates some of the transfers between barge to terminals and things. Terminals are regulated. In the Clean Water Act,[25] they'll have spill-response plans that they're required to deal with. Most terminals are held to integrity standards under the API 653 program,[26] and every 10 years, you have to do integrity inspections. With respect to spill response, any company understands that you're dealing with federal landscape regulators, and it's a group of people at EPA and these other agencies as well.

I think the other thing to understand about spill response is that, like a lot of other things we do, it's iterative, and you learn lessons from one that you apply to another context. Certainly, if you look at what has happened in offshore in response to Macondo and *Deepwater Horizon*, there have been a lot of increases in input and technology in understanding what's required. That's carried through. The same thing happens in the pipeline industry. There are always enforcement events, but I think people do learn from them and they're better prepared for the next event when it occurs.

John Jablonski: I think it's important to point out for those listening and those here in the audience that the OPA and the various state iterations of that Act—it's basically a strict liability statute with respect to spill response. Companies find themselves spending a lot of money to put the environment back to the way it was before the spill took place.

Here is a follow-up audience question to Anthony's comment. The question was, in light of PHMSA not having a role in siting as great as Anthony would like it to have, who does he believe from the federal government should be at the table, and what should be the states' roles?

Anthony Swift: Certainly, PHMSA is the agency that has the authority to engage siting on the federal level dealing with safety concerns and resources of that sort. So, I think that PHMSA would be the lead agency to be at the table, and you would look at engagement between PHMSA and state agencies to ensure that resources were protected in the development of the route. What you have is that some states don't even have siting laws, so it's a Wild West when it comes to moving or routing pipelines. States are limited in what concerns they can incorporate in the routing of pipelines because PHMSA is occupying the field of federal pipeline safety and preempting states from incorporating that into their siting regimes.

John Jablonski: We reached the end of our time. I appreciate everyone's attention in the audience, as well as the presentations from our panel. I think they deserve a round of applause. Thank you so much.

25. 33 U.S.C. §§1251-1387, ELR Stat. FWPCA §§101-607.
26. *See* http://www.api.org/certification-programs/individual-certification-programs-icp/ icp-certifications/api-653.