AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

HOW THE CHANGING ENERGY MARKETS WILL AFFECT U.S. TRANSPORTATION

(114–3)

HEARING

BEFORE THE

SUBCOMMITTEE ON
RAILROADS, PIPELINES, AND
HAZARDOUS MATERIALS

OF THE

COMMITTEE ON
TRANSPORTATION AND
INFRASTRUCTURE
HOUSE OF REPRESENTATIVES

ONE HUNDRED FOURTEENTH CONGRESS

FIRST SESSION

FEBRUARY 3, 2015

Printed for the use of the
Committee on Transportation and Infrastructure

Available online at: http://www.gpo.gov/fdsys/browse/
committee.action?chamber=house&committee=transportation

U.S. GOVERNMENT PUBLISHING OFFICE

93–069 PDF WASHINGTON : 2015

For sale by the Superintendent of Documents, U.S. Government Publishing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2104 Mail: Stop IDCC, Washington, DC 20402–0001

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

BILL SHUSTER, Pennsylvania, *Chairman*

DON YOUNG, Alaska
JOHN J. DUNCAN, JR., Tennessee, *Vice Chair*
JOHN L. MICA, Florida
FRANK A. LOBIONDO, New Jersey
SAM GRAVES, Missouri
CANDICE S. MILLER, Michigan
DUNCAN HUNTER, California
ERIC A. "RICK" CRAWFORD, Arkansas
LOU BARLETTA, Pennsylvania
BLAKE FARENTHOLD, Texas
BOB GIBBS, Ohio
RICHARD L. HANNA, New York
DANIEL WEBSTER, Florida
JEFF DENHAM, California
REID J. RIBBLE, Wisconsin
THOMAS MASSIE, Kentucky
TOM RICE, South Carolina
MARK MEADOWS, North Carolina
SCOTT PERRY, Pennsylvania
RODNEY DAVIS, Illinois
MARK SANFORD, South Carolina
ROB WOODALL, Georgia
TODD ROKITA, Indiana
JOHN KATKO, New York
BRIAN BABIN, Texas
CRESENT HARDY, Nevada
RYAN A. COSTELLO, Pennsylvania
GARRET GRAVES, Louisiana
MIMI WALTERS, California
BARBARA COMSTOCK, Virginia
CARLOS CURBELO, Florida
DAVID ROUZER, North Carolina
LEE M. ZELDIN, New York

PETER A. DEFAZIO, Oregon
ELEANOR HOLMES NORTON, District of Columbia
JERROLD NADLER, New York
CORRINE BROWN, Florida
EDDIE BERNICE JOHNSON, Texas
ELIJAH E. CUMMINGS, Maryland
RICK LARSEN, Washington
MICHAEL E. CAPUANO, Massachusetts
GRACE F. NAPOLITANO, California
DANIEL LIPINSKI, Illinois
STEVE COHEN, Tennessee
ALBIO SIRES, New Jersey
DONNA F. EDWARDS, Maryland
JOHN GARAMENDI, California
ANDRÉ CARSON, Indiana
JANICE HAHN, California
RICHARD M. NOLAN, Minnesota
ANN KIRKPATRICK, Arizona
DINA TITUS, Nevada
SEAN PATRICK MALONEY, New York
ELIZABETH H. ESTY, Connecticut
LOIS FRANKEL, Florida
CHERI BUSTOS, Illinois
JARED HUFFMAN, California
JULIA BROWNLEY, California

SUBCOMMITTEE ON RAILROADS, PIPELINES, AND HAZARDOUS MATERIALS

JEFF DENHAM, California, *Chairman*

JOHN J. DUNCAN, JR., Tennessee
JOHN L. MICA, Florida
SAM GRAVES, Missouri
CANDICE S. MILLER, Michigan
LOU BARLETTA, Pennsylvania
BLAKE FARENTHOLD, Texas
RICHARD L. HANNA, New York
DANIEL WEBSTER, Florida
TOM RICE, South Carolina
SCOTT PERRY, Pennsylvania
TODD ROKITA, Indiana
JOHN KATKO, New York
BRIAN BABIN, Texas
CRESENT HARDY, Nevada
MIMI WALTERS, California
LEE M. ZELDIN, New York
BILL SHUSTER, Pennsylvania *(Ex Officio)*

MICHAEL E. CAPUANO, Massachusetts
CORRINE BROWN, Florida
DANIEL LIPINSKI, Illinois
JERROLD NADLER, New York
ELIJAH E. CUMMINGS, Maryland
RICK LARSEN, Washington
STEVE COHEN, Tennessee
ALBIO SIRES, New Jersey
RICHARD M. NOLAN, Minnesota
ELIZABETH H. ESTY, Connecticut
GRACE F. NAPOLITANO, California
JANICE HAHN, California
PETER A. DEFAZIO, Oregon *(Ex Officio)*

CONTENTS

Page

Summary of Subject Matter vi

WITNESSES

Jason M. Thomas, Ph.D., CFA, Managing Director and Director of Research, The Carlyle Group:
- Testimony 4
- Prepared statement 40

Jack N. Gerard, President and Chief Executive Officer, American Petroleum Institute:
- Testimony 4
- Prepared statement 47

Edward R. Hamberger, President and Chief Executive Officer, Association of American Railroads:
- Testimony 4
- Prepared statement 50
- Responses to questions for the record 73
  - Letter to Illinois Department of Transportation regarding the CREATE Program 86
  - PTC Timeline 88
  - Association of American Railroads, "AAR Calls for Regulations to Enhance the Safety of Flammable Liquids Transport and Keep the Network Efficient" 89

Andrew J. Black, President and Chief Executive Officer, Association of Oil Pipe Lines:
- Testimony 4
- Prepared statement 92

Greg Saxton, Senior Vice President and Chief Engineer, The Greenbrier Companies:
- Testimony 4
- Prepared statement 101
- Responses to questions for the record 109
  - Cambridge Systematics, Inc., "Analysis of Tank Car Fleet Options and Retrofitting Capacity in Connection with Docket No. PHMSA–2012–0082 (HM–251)" Technical Report, March 20, 2015 113

Committee on Transportation and Infrastructure
U.S. House of Representatives

Bill Shuster
Chairman

Washington, DC 20515

Peter A. DeFazio
Ranking Member

January 30, 2015

SUMMARY OF SUBJECT MATTER

TO:	Members, Subcommittee on Railroads, Pipelines, and Hazardous Materials
FROM:	Staff, Subcommittee on Railroads, Pipelines, and Hazardous Materials
RE:	Subcommittee Hearing on "How the Changing Energy Markets Will Affect U.S. Transportation"

PURPOSE

The Subcommittee on Railroads, Pipelines, and Hazardous Materials will meet on Tuesday, February 3, 2015, at 10:00 a.m. in 2167 Rayburn House Office Building to receive testimony on issues related to the Nation's energy renaissance and what this growth in production means for the U.S. transportation system. The Subcommittee will receive testimony from energy, pipeline, railroad, and rail car manufacturer stakeholders regarding their investment and views of the nexus between energy production and private infrastructure investment.

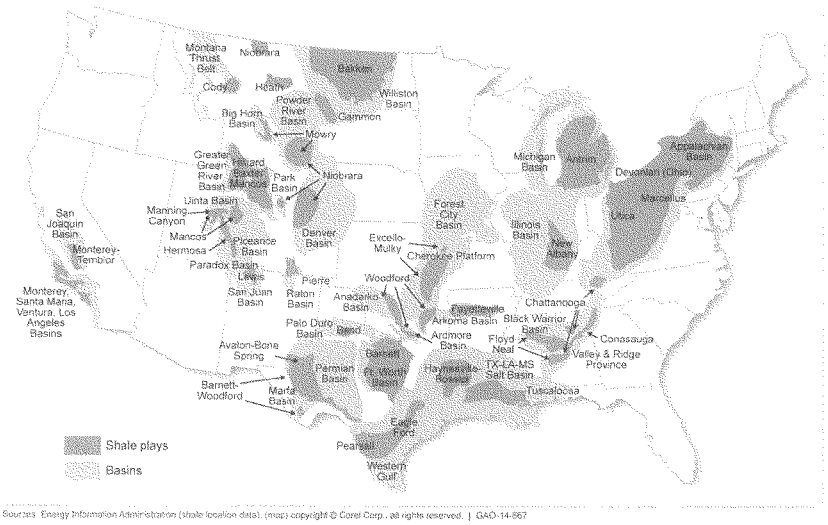
BACKGROUND

Over the last several years, domestic production of oil and gas has increased due to technological advances in resource recovery methods. Specifically, horizontal drilling and hydraulic fracturing, and the combination thereof, allow producers to recover oil and natural gas from tight sandstone and shale plays. The use of horizontal drilling in conjunction with hydraulic fracturing has greatly expanded the ability of producers to profitably recover natural gas and oil from low-permeability geologic plays—particularly, shale plays. While the use of fracturing techniques dates back to the 1950s, it was not until the mid-1970s that a partnership of private operators, the federal government, and researchers began to develop technologies for the commercial production of natural gas from shale in the eastern United States.[1] This partnership led to technologies that eventually became crucial to the production of oil and natural gas from shale rock, including horizontal wells, multi-stage fracturing, and slick-water fracturing.[2]

[1] U.S. Energy Information Administration, *Review of Emerging Resources: U.S. Shale Gas and Shale Oil Plays* 4 (July 2011).
[2] Id.

Below is a map of the shale plays and basins throughout the continental United States:

Figure 1: Shale Plays and Basins in the Contiguous 48 States



Sources: Energy Information Administration (shale location data), (map) copyright © Corel Corp., all rights reserved. | GAO-14-667

These new opportunities for resource development have led to a significant growth in both oil and natural gas production. Indeed, from 2007 to 2012 average domestic crude oil production from shale and tight sandstone formations increased more than six-fold, from 0.34 million barrels per day (bbl/d) in 2007 to 2.25 million bbl/d in 2012.

Domestic natural gas production in 2012 increased about five-fold compared with production in 2007, from less than 2 trillion cubic feet in 2007 to more than 10 trillion cubic feet in 2012.[3] These trends appear to be continuing, as the United States is now the largest producer of petroleum and natural gas in the world, far outpacing Russia and Saudi Arabia.[4]

Growth in Petroleum and Other Liquids

In terms of oil production, U.S. crude oil production in 2014 averaged 8.7 million bbl/d.[5] The U.S. Energy Information Administration (EIA) of the U.S. Department of Energy forecasts

[3] U.S. Government Accountability Office, GAO-14-667, *Oil and Gas Transportation: Department of Transportation is Taking Actions to Address Rail Safety, but Additional Actions are Needed to Improve Pipeline Safety* (2014)
[4] U.S. Energy Information Administration, *Oil and Gas Outlook* (Nov. 13, 2014).
[5] U.S. Energy Information Administration, *Short-Term Energy Outlook* 6 (Jan. 2015).

that production in 2015 will average 9.3 million bbl/d, and again rise to an average of 9.5 million bbl/d in 2016, the second-highest annual average bbl/d production level in U.S. history (1970 was the highest annual average at 9.6 million bbl/d).[6] To be clear, not all U.S. production is from shale plays, however, as the EIA noted in the *Annual Energy Outlook 2014*, "the growth in lower 48 onshore crude oil production is primarily a result of continued development of tight oil resources in the Bakken, Eagle Ford, and Permian Basin formations."[7]

This increased production coincides with increases in U.S. consumption of liquid fuels. In 2014, total liquid fuel consumption rose by an estimated 100,000 bbl/d, to 19.06 million bbl/d.[8] The EIA forecasts that liquid fuel consumption will grow to 19.32 million bbl/d in 2015 and 19.43 million bbl/d in 2016.[9] This growth in production and consumption means that the crude oil must move from production point to its destination. To do so, domestic crude oil primarily utilizes pipeline and rail transportation.

Growth in Natural Gas Production

With regard to natural gas production, the EIA expects continued growth in natural gas production through 2015 and 2016, which will be due to growth in the lower 48 states, even though production in the Gulf of Mexico is expected to decline.[10] In 2014, dry natural gas production was 70.1 billion cubic feet per day (Bcf/d); the EIA expects production to increase to 72.3 Bcf/d in 2015 and 73.9 Bcf/d in 2016.[11] The EIA projects that much of the growth in natural gas production will come from the Marcellus Shale formation where wells are drilled but uncompleted as they await new pipeline infrastructure to come online to support the production growth.[12]

Similar to oil production, natural gas production forecasts coincide with consumption forecasts. U.S. natural gas consumption in 2014 was estimated at 73.6 Bcf/d.[13] The EIA projects this consumption will increase in 2015 to an average of 73.8Bcf/d and then an average of 74.8 Bcf/d in 2016.[14] Growth is expected in the industrial, electric power, and transportation use sectors, with residential and commercial consumption declining in 2015.

Oil and gas industry leaders maintain that new infrastructure is needed to meet the continued growth in production and consumption capacity.

The Freight Rail Network

There are more than 650 freight railroads in the country employing nearly 180,000 workers. These are privately owned companies that operate over more than 140,000 miles of

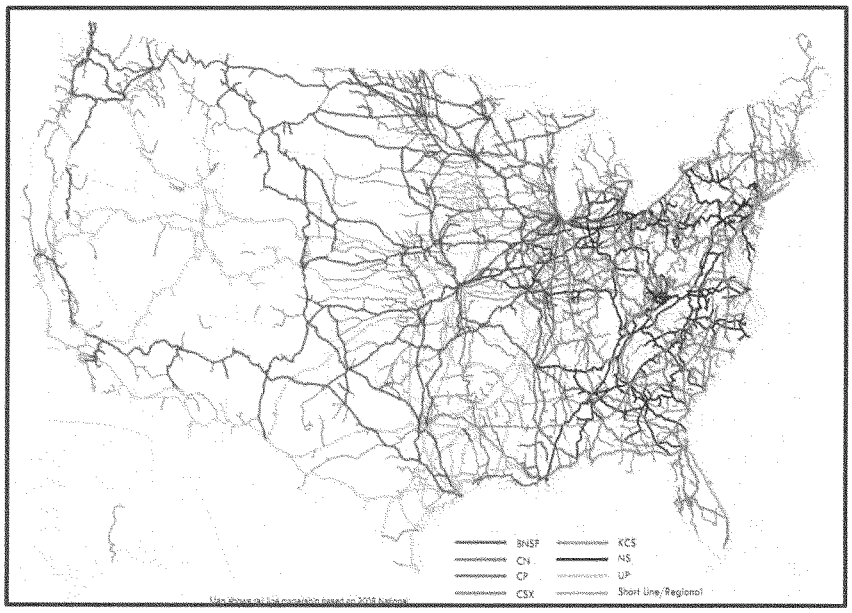
---

[6] Id. at 1, 6.
[7] [7] U.S. Energy Information Administration, *Annual Energy Outlook 2014* MT-28 (April 2014).
[8] *Short-Term Energy Outlook* at 5.
[9] Id. at 5-6.
[10] Id. at 8.
[11] Id. at 8 and 28
[12] Id.
[13] Id.
[14] Id.

track throughout the Nation. Freight railroads are divided into three groups, called classes, based upon their annual revenues (measured in 1991 dollars):

- Class I railroads are defined by the Surface Transportation Board as having an annual carrier operating revenue of $250 million or more;
- Class II railroads are defined as having an annual carrier operating revenue between $20 million and $250 million; and
- Class III railroads are defined as having an annual carrier operating revenue of less than $20 million.

There are seven Class I freight railroads: BNSF Railway; CSX Transportation; Canadian National; Canadian Pacific; Kansas City Southern; Norfolk Southern; and Union Pacific. The majority of railroads, however, are Class II and III railroads, known generally as regional or short line railroads. The map below provides a visual overview of the freight railroads.



While Class I railroads generally provide long-haul services, the Class II and III railroads often provide the first and last mile of rail freight movements. The products moved by rail include everything from automobiles, agricultural goods, and consumer products to chemicals, lumber, and energy resources. In all, freight rail carries over 40 percent of intercity freight, which is more than any other mode, and for every one rail job, 4.5 other jobs are supported elsewhere in the economy.

Coal is the largest commodity transported by U.S. railroads, representing about 40 percent of tonnage and 22 percent of revenue for Class I railroads in 2012, and the majority of this coal is used for domestic electricity production. Over the last few decades, intermodal movements (long-haul transport of shipping containers and truck trailers by rail) have grown significantly.

More recently, freight railroads have seen increasing shipments of crude by rail, as technology advances have led to a significant increase in domestic energy extraction. As recently as 2008, U.S. Class I railroads transported under 10,000 carloads of crude oil; in 2013 that number had jumped to over 400,000 carloads.

The majority of this increased movement of crude by rail is done using unit trains, which are trains that carry only one commodity to a single destination. Crude oil unit trains may consist of 80 to 120 tank cars, each carrying about 30,000 gallons of product, for a total of about 2.4 million to 3.6 million gallons of crude oil per train. This has resulted in an increase in demand for tank cars. According to the railroads, during 2013 through April 2014, there were 104,597 tank cars used to transport flammable liquids by rail, including 49,182 tank cars used for crude oil.[15]

From 2000 through 2013, nearly all – 99.97 percent -- of the approximately 825,000 carloads of crude by rail shipments made it to their destination without incident. However, as the total number of movements has significantly increased along with U.S. growth in energy production, individual incidents have also increased. Hazardous materials incident data show that in 2008, eight rail crude oil incidents occurred in the United States out of 9,500 carloads, compared to 119 incidents out of approximately 400,000 carloads in 2013.

Freight Railroad Investments

Meeting the increased movement of energy products means that the freight railroads and railcar manufacturers must increase their private capital investment. The freight railroads own the infrastructure over which they operate, requiring them to invest heavily to maintain those networks. Since 1980, railroads have reinvested more than $250 billion into their track, bridges, yards, locomotives, and other equipment. In the last few years, the railroads have invested around $25 billion annually in capital projects. This investment is due in large part to the movement toward de-regulation of the freight railroads beginning in the 1970s through the Staggers Rail Act of 1980 (P.L. 96-448), and culminating in the Interstate Commerce Commission Termination Act of 1995 (P.L. 104-88).

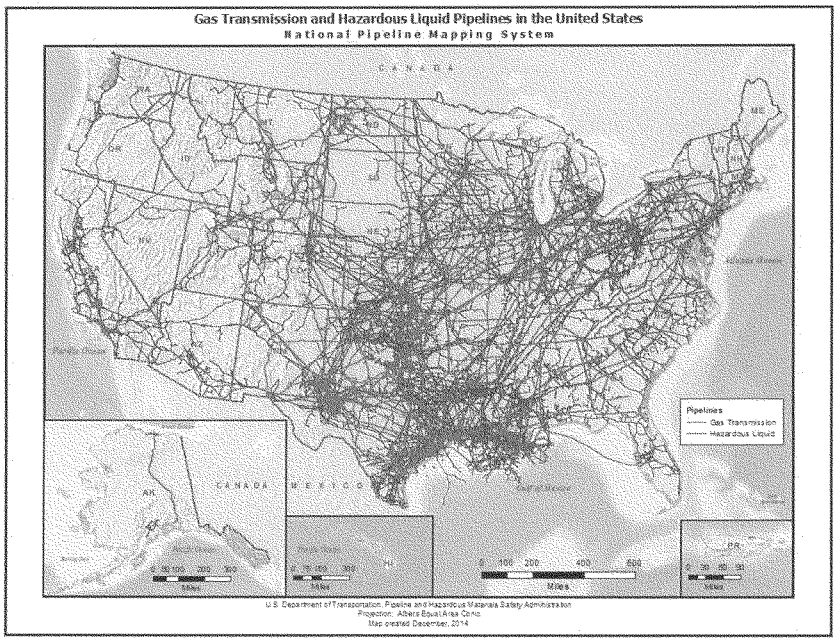
[15] *Oil and Gas Transportation* at 31.

The Pipeline Network

The pipeline transportation network consists of over 2.6 million miles of pipelines, built, operated, and maintained by private sector companies. Pipelines transport roughly two-thirds of all energy supplies in the United States. Since 1986, the volume of energy products transported through pipelines in the United States has increased by one-third, yet the number of reportable incidents has declined by nearly a third.

According to PHMSA, this network consists of approximately:

- 2,066,000 miles of natural gas distribution mains and service pipelines;
- 321,000 miles of onshore and offshore gas transmission and gathering pipelines;
- 175,000 miles of onshore and offshore hazardous liquid pipeline; and
- 114 active liquefied natural gas (LNG) plants connected to the natural gas transmission and distribution system.[16]



[16] Pipeline and Hazardous Materials Safety Administration, *Facts & Stats: Pipeline 101*, https://opsweb.phmsa.dot.gov/pipelineforum/facts-and-stats/pipeline-101/ (last visited Jan. 28, 2015).

Pipelines can be grouped into three main categories:

1) **Gathering pipelines.** These pipelines collect natural gas, oil, and petroleum products from the production areas, and transport them to processing facilities, where they are refined. Gathering pipelines tend to be smaller in diameter, from about 2 to 12 inches, and operate at pressures of about 5 to 800 pounds per square inch (psi). Gathering pipelines tend to be located in rural areas, though not exclusively, and PHMSA estimates there are about 230,000 to 240,000 miles of gas and hazardous liquid gathering pipelines.[17]

2) **Transmission pipelines.** After being processed, transmission pipelines carry hazardous liquid or gas over longer distances, and are larger in diameter, typically between 12 to 42 inches. They also operate at higher pressures, generally 400 to 1440 psi, levels which are maintained by compression stations (for gas pipelines) or pumping stations (for liquid pipelines) along the routes and PHMSA estimates there is approximately 400,000 miles of transmission pipelines.[18]

3) **Distribution pipelines.** Distribution pipelines feed end-use customers, providing product from mainline transmission pipelines. These lines tend to be smaller, less than 1 inch in diameter, and operate at lower pressures, normally between 0.25 and 100 psi. They tend to be located in populated areas.[19]

Pipeline Investments

As described earlier, the increased energy extraction taking place in North America is expected to strain capacity of all modes of transportation, but especially the Nation's pipeline network. Industry leaders maintain new pipelines will be needed to move energy products from the extraction area to where they will ultimately be used, which may require entirely new pipelines, or additional capacity in some areas.

According to a recent industry study, significant infrastructure investments are needed to meet the Nation's energy transportation needs.[20] It projects each year, the Nation will need to build 850 miles in new natural gas transmission lines, 14,000 miles in new natural gas gathering lines, 730 miles in new oil transmission lines, and 7,800 miles in new oil gathering lines.[21] The cost of these annual investments is substantial: about $30 billion per year.[22] About one-third of that amount is needed for new oil and gas lease equipment; another third is required for new or expanded oil and gas transmission capacity; and, the remainder is required for related infrastructure, such as plants and LNG facilities.

---

[17] U.S. Government Accountability Office, GAO-12-388. *Pipeline Safety: Collecting Data and Sharing Information on Federally Unregulated Gathering Pipelines Could Help Enhance Safety* 3 (March 2012).
[18] Id.
[19] Id.
[20] The INGAA Foundation, Inc., *North American Midstream Infrastructure through 2035: Capitalizing on Our Energy Abundance*, (March 2014), available at http://www.ingaa.org/Foundation/Foundation-Reports/2035Report.aspx.
[21] Id. at 38-39.
[22] Id. at 39.

INVITED WITNESSES

Mr. Edward R. Hamberger
President and Chief Executive Officer
Association of American Railroads

Mr. Jack N. Gerard
President and Chief Executive Officer
American Petroleum Institute

Mr. Andrew J. Black
President and Chief Executive Officer
Association of Oil Pipe Lines

Mr. Jason Thomas
Managing Director and Director of Research
The Carlyle Group

Mr. Greg Saxton
Senior Vice President and Chief Engineer
The Greenbrier Companies

HOW THE CHANGING ENERGY MARKETS WILL AFFECT U.S. TRANSPORTATION

TUESDAY, FEBRUARY 3, 2015

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON RAILROADS, PIPELINES
AND HAZARDOUS MATERIALS,
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:04 a.m. in Room 2167, Rayburn House Office Building, Hon. Jeff Denham (Chairman of the subcommittee) presiding.

Mr. DENHAM. Good morning. The subcommittee will come to order. Before we begin I have an administrative item to cover. I would like to ask unanimous consent that Representative Sean Patrick Maloney be permitted to join the subcommittee for today's hearing and ask questions.

[No response.]

Mr. DENHAM. Without objection, so ordered.

Good morning, and welcome to the first hearing of the Subcommittee on Railroads, Pipelines, and Hazardous Materials. I want to welcome the new members to our committee, as well as Representative Capuano. He is not here yet. They are facing still some challenges in the Northeast. But he and I will have a great partnership in moving this subcommittee forward.

We have a full plate ahead of us with passenger rail, pipeline safety, and hazmat reauthorizations all up this year. I look forward to working on all of these issues with each of the members of this committee. We are going to be very busy in a very, very bipartisan fashion.

Over the last decade, this country has undergone an unprecedented energy renaissance. Due to American technology and construction advances, we are unlocking previously unavailable gas and oil resources. This means we no longer have huge domestic problems with energy, while also creating good-paying jobs right here in the United States.

Oil production in this country is now approaching levels not seen since the 1970s, and natural gas production is projected to continue its recent growth trends. This helps consumers with lower energy prices, and makes America more secure by relying less on energy from other countries. However, to continue this momentum, our infrastructure needs to keep pace with the advances of the energy sector.

Just about all modes of transportation are ultimately involved in the movement of energy products, but railroads and pipelines are

especially critical. Our freight rail system is the envy of the world, transporting over 40 percent of our intercity freight, more than any other mode of transportation. Freight railroads have long been key to America's energy needs, supplying most of the coal used for domestic electricity production. However, in the last few years, railroads have also been called upon to transport more crude, as pipeline capacity has not kept pace with production.

Like railroads, pipelines have long supplied our Nation's energy needs. America's pipeline network is immense: 2.6 million miles of pipe, transporting natural gas, oil, and hazardous materials. This system takes product from the production field to refining facilities, and then to the American consumer or for export.

Over the last 25 years, the volume of energy products transported by pipelines has increased by one-third. However, the rapid development that oil and gas plays in this country has outpaced the pipeline network.

We want to hear today from our witnesses about the investments they are making to increase the capacity of our rail and pipeline network. We also want to understand how Government can be supportive of their efforts, and if there are roadblocks, what we can do to remove them.

In closing, I look forward to hearing from our witnesses.

At this point I would like to go to Mr. DeFazio for any opening statement he may have.

Mr. DEFAZIO. Thank you, Mr. Chairman. Mr. Capuano, up in Boston, they don't know how to deal with snow, it is such an infrequent occurrence. And so he is unduly delayed. But I will sit in for a while.

I want to thank the chairman for calling this hearing. The safe transport of oil and gas from the production sites, which are becoming more and more dispersed in the U.S. with fracking technology, both to refineries and to consumers, is critical.

Obviously, we have two major means of transport. A massive pipeline network, which, at this point, much of it is pretty aged: 1950s, 1960s, 1970s major construction booms. It has been updated, it has been added to, but there are identified problems. We had the Enbridge failure with tar sands crude, a Canadian company, exempt from paying into the Oil Spill Liability Trust Fund, because it is oil sands, tar sands: a stellar ruling by the Internal Revenue Service, that doesn't constitute crude oil. And they are still cleaning that one up, 4 years later. And it was quite some hours before it was known.

We had the spectacular and very deadly gas explosion in California. Subsequently, Congress adopted legislation, the Pipeline Safety Regulatory Certainty and Job Creation Act of 2011.

Unfortunately, the Pipeline and Hazardous Materials Safety Administration has been incapable of implementing any of the ordered regulatory reforms. Likewise, even though we have known that DOT–111 tank cars are not adequate or safe since 1993, PHMSA has yet to promulgate a rule for a new standard. In fact, the industry itself is so frustrated that they proposed a new standard to the agency. But the agency couldn't even look at that and act quickly. It got lost somewhere in the bowels of the administra-

tion between the agency and the trolls over at the Office of Management and Budget who will further delay the ruling.

We need a new standard for railcars, so we can move ahead with production. They have managed to mangle the rule by merging it together with operational issues, which are much more difficult to deal with, and controversial. I have asked them to sever the rule. Let's just have a standard for tank cars, get it done, get it done now, start the production, create jobs here in America, transport the oil more safely. And also, by the way, do your job in implementing the 2011 law.

So, with that, I look forward to hearing from the witnesses about how we can more safely transport oil and gas, which is so critical to our economy.

Mr. DENHAM. Thank you, Mr. DeFazio. I now call on the full chairman—full committee chairman, Mr. Shuster.

Mr. SHUSTER. Thank you, Chairman Denham. And welcome to our witnesses here today. I echo much of what has been said by the chairman and the ranking member, so I will keep my statement very, very brief.

As we all know, in production, we are outpacing the world, and are the leading producers of oil and gas in the world. And that continues to grow. And with that growth, we have to make sure that we have the modes of transportation available to move those products, and the infrastructure that moves those products, whether it is rail, whether it is pipelines, that they do it in a very safe manner.

We will continue to push safety to make sure that that is the number-one issue for us. We want to make sure that these things move—especially after we have seen a couple of incidents—even with those incidents, you still look at the safety record, and it is very good. But, as I said, I think we can do better.

My State of Pennsylvania has Marcellus shale gas production, which continues to increase. Slowed down now, but part of the slowdown is not just the price, but we don't have the pipeline in place to move the quantity of gas that is necessary. And if we don't make sure that these private companies making private investments are able to invest their money without Government interference, without Government slowdown in many cases, we are not going to have the modes of transportation we need to continue to move this energy throughout the country.

I know that the freight rails last year hired 17,000 people, and there is more growth to come. As we study the pipeline needs, if we are making—if those companies are making those kinds of investments in the future, they will create 80,000 to 100,000 jobs a year, as we move forward.

So, today I am looking forward to hearing from our panelists, hear what they have to say, hear how their investments are going to be made, and how they are looking at the safety that we need to continue to push, and ensure that the rail and pipeline network are meeting the needs and, as I said, with safety being at the forefront.

And, with that, I yield back.

Mr. DENHAM. Thank you, Mr. Chairman. Now I would like to welcome once again our witnesses that are here today: Jason

Thomas, managing director and director of research for The Carlyle Group; Jack Gerard, president and CEO, American Petroleum Institute; Ed Hamberger, president and CEO, Association of American Railroads; Andrew Black, president and CEO, Association of Oil Pipe Lines; and Greg Saxton, senior VP and chief engineer of The Greenbrier Companies.

I ask unanimous consent that our witnesses' full statements be included in the record.

[No response.]

Mr. DENHAM. Without objection, so ordered.

Since your written testimony has been made part of the record, the subcommittee would request that you limit your oral testimony to 5 minutes.

Mr. Thomas, you may proceed.

TESTIMONY OF JASON M. THOMAS, PH.D., CFA, MANAGING DIRECTOR AND DIRECTOR OF RESEARCH, THE CARLYLE GROUP; JACK N. GERARD, PRESIDENT AND CHIEF EXECUTIVE OFFICER, AMERICAN PETROLEUM INSTITUTE; EDWARD R. HAMBERGER, PRESIDENT AND CHIEF EXECUTIVE OFFICER, ASSOCIATION OF AMERICAN RAILROADS; ANDREW J. BLACK, PRESIDENT AND CHIEF EXECUTIVE OFFICER, ASSOCIATION OF OIL PIPE LINES; AND GREG SAXTON, SENIOR VICE PRESIDENT AND CHIEF ENGINEER, THE GREENBRIER COMPANIES

Mr. THOMAS. Thank you very much. Thank you for the opportunity to testify——

Mr. DENHAM. Can you pull it closer?

Mr. THOMAS. Thank you. Thank you for the opportunity to testify this morning. I am director of research at The Carlyle——

Mr. DENHAM. So close that it feels really uncomfortable.

[Laughter.]

Mr. THOMAS. I am sorry, I thought it was immovable. Thank you very much for the guidance; I appreciate that.

So, I am the director of research at The Carlyle Group, which is the—one of the largest global alternative asset managers. We have about $203 billion under management.

From our perspective, an investor's perspective, the domestic energy revolution has three related, but distinct layers.

The first and most obvious is direct investment in energy resources, energy exploration and development companies. These investments generally involve the purchase and development of acreage or mineral rights.

The second layer involves investments in the infrastructure necessary to transport energy from where it is produced to where it is consumed. These investments can be direct investments in specific transportation or storage——

Mr. DENHAM. Mr. Thomas?

Mr. THOMAS. Yes?

Mr. DENHAM. Pull that mic really close to you; I am having trouble picking up——

Mr. THOMAS. I am sorry, Mr. Chairman. So, the second, as I mentioned, is investments in infrastructure projects to move the energy from where it is produced to where it is consumed. These

can be investments in specific projects, or investments in the debt or equity of companies that operate in this space.

Finally, the third layer—I think that is underappreciated—that we focus on is investments in companies that are energy-intensive, companies for whom energy accounts for a large share of value-added or total costs.

Carlyle is active in all three layers, through our strategic relationship with NGP Energy Capital Management. And through our Energy Mezzanine Opportunities Fund, we intend to invest $7 billion over the next 3 to 4 years to develop energy resources and invest in E&P companies.

Carlyle invests in energy infrastructure projects and companies that own energy infrastructure through our Energy Mezzanine Opportunities Fund and our Carlyle Power Partners funds.

Finally, Carlyle invests in energy-intensive businesses through our U.S. buyout and growth capital funds. Of special note, in 2012 Carlyle Funds partnered with Sunoco to form Philadelphia Energy Solutions, which is the longest continuously operating oil facility in the U.S., and the largest oil refining complex on the U.S. eastern seaboard. And since 2013, PES has undertaken a number of capital projects to diversify oil supplies, reduce energy cost inputs, and improve efficiency. Foremost among those was a high-speed unloading rail facility capable of receiving 160,000 barrels of domestically produced crude oil per day.

So, quickly, right now I think the decline in the price of oil has a lot of complex origins. And I think that it is difficult to make forecasts about how quickly the price is going to adjust backward up towards an equilibrium level, and it is difficult to know what that equilibrium level happens to be.

But right now I think it is clear that most of the attention among the E&P players is focused on reducing costs to make production economical, even in light of the decline in the price of crude. And also, among investors, looking at the potential for distressed opportunities. There is about $730 billion of bonds outstanding that are linked to E&P companies or energy, more generally. And there is a concern that the compressed cash flows, in light of the decline in the price of oil, and the decline in the collateral value of the acreage, is going to create the potential for many bankruptcies, many distressed securities. And I think that, for the most part, the E&P space is—investors in that space are very focused on identifying those opportunities in the next several years.

As a consequence, I think most of the investment in new capacity, new fixed investment, is likely to transition to the transportation infrastructure, and then also continued investment in companies that make use of low-cost energy. Whereas the attractiveness of developing resources, of course, depends on the price of the resources, the midstream transportation infrastructure can be invariant to the price.

And then, of course, the returns on new fixed capital among companies that burn energy actually increase as the price declines. So the dramatic decline in the price of oil, natural gas liquids, and then, of course, natural gas, actually increases operating profits of energy-intensive businesses, petrochemical manufacturers, et cetera. And I would note that the master limited partnerships in

the midstream space actually have a—their returns have a lower correlation with the price of oil than the S&P 500, as a whole. So there is no reason to suspect that the price of oil is going to dramatically reduce their—the interest and attractiveness of investment in that space.

Finally, given time constraints and my inability to use the microphone correctly, I would just like to say that the number-one issue that we would focus on, in terms of transitioning investors' focus from E&P and development towards infrastructure, would just be a concern for the time associated with permitting. From a very investor-centric perspective, an additional year-and-a-half actually would reduce the internal rate of return for a typical project by about 36 percent. So you could take projects that, for a provider of discretionary risk capital, look quite attractive, and turn them into a project whose returns do not meet your investors' expectations and, as a consequence, have to be passed on.

So, again, I think time is a very important consideration, and it can make the difference between attracting capital and building interest early in the process, and actually not being able to identify capital providers. Thank you very much, Mr. Chairman.

Mr. DENHAM. Thank you, Mr. Thomas.

Mr. Gerard, you may proceed.

Mr. GERARD. Thank you, Mr. Chairman, and Chairman Shuster, Ranking Member DeFazio. It is a pleasure to be here with you today.

America's 21st-century energy reality is far different than it was just a few short years ago. Gone are the days of American energy scarcity and insecurity. Today, the United States is the world's leading producer of natural gas, and leading refiner of petroleum. And soon our Nation will be—or, as some experts already assert, will be the world's number-one producer of oil.

There is a growing awareness that this is a unique American moment. It is a moment that marks the transition from endemic energy dependence to energy security and global energy leadership, both of which have been public goals of every President and every Congress since 1970. But to be clear, to secure this unique American moment will depend heavily on our ability to build necessary infrastructure to achieve our Nation's full energy potential.

Investing in our Nation's infrastructure means more: more jobs, more revenue to State, local, and Federal Governments; a more dynamic and efficient economy; and an improvement in our Nation's trade balance. On the jobs front, an analysis from the IHS consulting group found that essential infrastructure improvements in just the oil and natural gas area could, over the next decade, encourage as much as $1.15 trillion in new, private capital investment, support 1.15 million new jobs, and add $120 billion, on average, per year to our Nation's GDP.

This level of potential infrastructure investment eclipses the pending highway bill. But if they were to occur together, could mean thousands of well-paying jobs, improve our Nation's global economic competitiveness at a time we need it most. That is why decisions to improve our Nation's electrical grid, roads, pipelines, rail freight lines—particularly those built by the private sector—should be driven by what is best for the American energy con-

sumer, our Nation's economy, and status as a global energy superpower.

In this year of American energy abundance, we must think differently when it comes to how and where we invest in our Nation's infrastructure. The past year of energy scarcity required a silo approach to energy policy, each mode considered in isolation and competition with the other modes. In this era of energy abundance, we need more of all.

Investing in our Nation's infrastructure means that products from all industries move more efficiently within our Nation, which lowers costs to consumers and gives our businesses and manufacturers a competitive edge in the global marketplace. Given the integral part America's infrastructure plays in job creation and economic growth, and our Nation's role as an energy leader, globally, our efforts must transcend political philosophies and partisan wrangling. Infrastructure investment and improvements benefit us all, regardless of our political persuasion.

We agree with what the President said just a few short days ago during his State of the Union speech that, "21st-century businesses need 21st-century infrastructure." The oil and natural gas industry stands ready to work with anyone interested in safely and responsibly improving our Nation's energy infrastructure so that it supports our Nation's game-changing energy opportunity to benefit all Americans.

It is our view that we should adopt policies that sustain and expand, not pull back our Nation's drive towards energy security, and reject policies that would result in a return to scarcity and uncertainty. Together, we have a once-in-a-generation opportunity to show the world how energy abundance can be used as a positive force, and expanding and modernizing our infrastructure will be essential to our success.

As you and your colleagues deliberate on how best to improve our Nation's infrastructure, I urge you to consider the historic opportunity before us, and to support policies that transform this unique American moment into an enduring legacy of American energy security and global energy leadership.

Thank you for the opportunity to testify, and I look forward to answering your questions.

Mr. DENHAM. Thank you, Mr. Gerard.

Mr. Hamberger, you may proceed.

Mr. HAMBERGER. Thank you, Mr. Chairman, Chairman Shuster, Ranking Member DeFazio. And a special recognition to the new Members who won their struggle to get a seat on the most powerful subcommittee in the House of Representatives.

As you pointed out, Mr. Chairman, America's freight railroads are indeed the envy of the world. They move vast amounts of goods, connecting consumers and businesses over a 140,000-mile network. Importantly, they are privately owned, operating almost exclusively on infrastructure that they own, build, maintain, and overwhelmingly pay for themselves. That is in stark contrast to trucks and barges, who compete against railroads for freight traffic, but mainly use infrastructure supplied and paid for by the taxpayer.

The global superiority of U.S. freight railroads is a direct result of a balanced economic regulatory system that relies on market-based competition to establish rate and service standards with a regulatory safety net available to rail customers who need it. This balanced regulation has allowed our freight railroads to improve their financial performance and condition from once very poor conditions to much healthier levels today.

That, in turn, has allowed railroads to pour massive amounts of money back into the locomotives, freight cars, tracks, bridges, tunnels, and other infrastructure and equipment that keep our economy moving. In fact, just yesterday, we were able to announce that Class I railroads planned to invest $29 billion in 2015. That is on top of the $27 billion mentioned by the chairman in 2014, $25 billion in 2013. Private capital going back into the system. They announced that we will plan to hire 15,000 new employees, of whom we expect 1 in 5 will have served in the armed forces.

All told, freight railroads have spent $575 billion of private capital since 1980 on improving the performance of their infrastructure and equipment. It is often said that our Nation's infrastructure is crumbling. But, thanks to their massive spending back into the networks, Class I freight railroad infrastructure today is in its best overall condition ever. As our service challenges of last year indicated, however, we just need more of it.

The challenge for railroads is to ensure that the current high quality of rail infrastructure is maintained, and that adequate capacity exists in the future to meet our Nation's growing needs. This committee has a particularly crucial role to play. At a time when you are wrestling with how to fund other surface modes, it makes no sense to enact public policies that would discourage these private investments in rail infrastructure that boost our economy and enhance our Nation's economic competitiveness.

Turning to energy, the huge growth in domestic oil and gas production has moved our Nation closer to energy independence. The benefits are clear: tens of billions of dollars in reduced oil imports from unstable countries whose interests don't always match our own; increased economic development, including manufacturing jobs; thousands of new well-paying jobs; and, in recent months, a sharp decline in gasoline and heating oil prices that is the functional equivalent of giving the average American household hundreds of dollars in additional spending money.

Railroads have played a key role in delivering these benefits. In 2008, Class I railroads originated 9,500 carloads of crude oil. Final numbers for 2014 are not yet in, but we estimate about 500,000 carloads in 2014. This growth is largely because railroads offer capacity where there is none, and the flexibility to transport product quickly to different places in response to market needs.

In addition, rail facilities can almost always be expanded much more quickly than pipelines or refineries. And, in some areas, the ability of a railroad to serve a refinery can make the difference between that refinery continuing to operate or closing down.

Railroads devote enormous resources to safe operations, no matter what we carry. That said, railroads recognize that more work must be done to ensure public confidence in the transportation of crude oil, specifically. From 2000 through 2014, when U.S. rail-

roads originated a total of approximately 1.33 million carloads of crude oil, 99.995 percent of those carloads arrived at their destination without a release caused by an accident. In 2014 alone, exactly 7 cars were in an accident that released crude oil out of about 500,000. That is 99.999 percent safety.

We are not standing still. Addressing accident prevention, accident mitigation, and emergency response, railroads, in concert with our customers, are helping to ensure that our Nation is able to safely and reliably utilize the tremendous national asset that domestic crude oil represents. Railroads provide a vital link for our farmers, manufacturers, and resource producers to both the domestic and global marketplaces.

But the challenges of creating, maintaining, and operating a rail system capable of meeting present and future needs will require the benefit of effective public policy. We look forward to working with this committee to help assure this outcome.

Thank you, Mr. Chairman. I apologize for running late.

Mr. DENHAM. Thank you, Mr. Hamberger.

Mr. Black, you may proceed.

Mr. BLACK. Good morning, Chairman, Ranking Member. I am Andy Black, president and CEO of the Association of Oil Pipe Lines, AOPL. We represent transmission pipeline operators who deliver crude oil, refined products like gasoline, diesel fuel, and jet fuel, and natural gas liquids, such as propane and ethane. Our pipelines extend 192,000 miles across the U.S., safely delivering 14.9 billion barrels of crude oil and energy products in 2013.

Americans benefit when our pipelines deliver the gasoline they need to drive to work, commute; the propane they use for rural heating, crop drying, and livestock; and the raw materials like ethane used for manufacturing. As domestic oil production has grown, American pipelines have responded by delivering 1.35 billion additional barrels of crude oil per year over the last 5 years, with 10,000 miles of new pipeline added into service in just the last 4 years.

Still more pipeline capacity is needed to bring the full benefits from increased North American production of crude oil to American workers and consumers. In many cases, our existing pipeline network needs more capacity to move crude oil from producing regions to where it can be manufactured into refined products, such as gasoline, and sent to communities that would benefit from new supply options.

And our existing pipeline network needs more capacity to move increasing amounts of natural gas liquids, such as ethane, to petrochemical plants, where good-paying manufacturing jobs produce plastics, chemicals, containers, and a host of other consumer products.

While our Nation needs additional pipeline capacity greatly, this is a difficult time to expand pipeline capacity. First, pipelines must secure long-term agreements with shippers to provide financial support for expansion projects. Second, pipeline operators need prompt decisions from Government agencies for environmental permits and approvals needed for pipeline routes and border crossings. While the multiyear delays imposed on the Keystone XL project are well known, some other State and Federal permitting decisions are

also taking longer, growing more complicated, and resulting in unnecessary delays.

While pipeline operators know there is a role for rail delivery of crude, pipelines are the best way to transport large volumes. A single pipeline can deliver 800,000 barrels per day, all day, every day. As much as crude by rail has increased over the last few years, the 8.3 billion barrels of crude oil delivered by pipeline in 2013 were more than 20 times the volumes delivered by rail. Pipelines are also the lowest cost way to transport petroleum products, with rates only a fraction of other modes.

Not only are pipelines the safest mode of transportation, they are getting safer. Since 1999, the number of releases from liquid pipelines is down 50 percent. Incidents due to corrosion are down 76 percent since then. These pipeline safety improvements are the result of hard work and resources spent by pipeline operators.

In 2013, pipeline operators spent over $2.1 billion evaluating, inspecting, and maintaining their pipeline infrastructure. Pipeline operators also conducted 1,455 in-line inspections covering 47,000 miles of pipeline with so-called "smart pigs" to scan and survey the inside of their pipelines.

Pipeline operators conducted more than 12,000 excavations of pipeline segments for further inspection or maintenance in 2013. Our industrywide safety improvement efforts are embodied in the API–AOPL Pipeline Safety Excellence initiative, which reflects the shared values and commitment of pipeline operators to building and operating safe pipelines.

Pipeline operators share an industrywide goal of zero pipeline incidents. It drives us to constantly examine our performance results and continue to improve overall safety.

Pipeline operators also have a long history of working together on safety. Our members may be commercial competitors, but they work together to improve safety. Today we are releasing the "2015 API–AOPL Annual Liquids Pipeline Safety Performance Report and Strategic Plan." It represents the top initiatives approved by the leadership of the pipeline industry for executive-level attention, support, and resources. This year's plan has industrywide goals to, one, improve inspection technology capabilities; two, enhance safety threat identification and response; three, expand safety culture and management practices; and, four, boost response capabilities.

In 2015 we will undertake strategic initiatives to improve cracking inspection technology, and implement new industrywide recommended practices for finding and managing pipeline cracking, managing leak detection programs, and improving emergency planning and response. We would be happy to meet with any member of the committee or other staff to review these efforts.

The ongoing North American energy production renaissance is bringing tremendous benefits to the American public. Pipelines are the best way to transport these benefits, and we will continue expanding and working hard to make them even safer. Thank you.

Mr. DENHAM. Thank you, Mr. Black.

Mr. Saxton, you may proceed.

Mr. SAXTON. Chairman Denham, Ranking Member DeFazio, members of the subcommittee, thank you for the opportunity to testify today at this important hearing. My name is Greg Saxton, and

I am the senior vice president and chief engineer for The Greenbrier Companies, a leading supplier of transportation equipment and services to the railroad industry. I am responsible for all tank car and freight car engineering for the four manufacturing facilities Greenbrier operates in North America. I also chair the Association of American Railroads' Equipment Engineering Committee, and am a member of the RSI and AAR Tank Car Committees.

In recent years the rail supply industry has experienced a significant increase in the demand for railcars. Responding to the needs of our customers, Greenbrier has made significant investments in capital in our manufacturing and repair facilities. We have tripled our capacity to perform repairs and retrofits. We have 39 railcar repair and retrofit shops, including a shop in Modesto, in the chairman's home district. And we built 4,000 tank cars last year; we expect to build 8,000 tank cars this year.

A key driver in the increased demand for railcars is the surge in the volume of crude oil moving by rail. In 2013, U.S. rail systems transported over 400,000 carloads of crude oil, up from just 9,500 carloads in 2008.

The rail industry has a very good record of providing safe transportation of crude oil. However, the increased volumes and demands placed on the network have come with significant safety and environmental risks. These risks are highlighted by a number of major incidents involving crude oil being transported by rail, including a catastrophic fire that caused 47 fatalities and destroyed part of Lac-Mégantic, Quebec, in 2013.

Contributing to this risk are the tens of thousands of outdated legacy DOT–111 tank cars that carry this volatile crude oil. The rail industry has acknowledged the need to update this rail tank car standard. Nearly 4 years ago, the industry and the AAR petitioned the U.S. Government to mandate a more robust design, and the industry voluntarily adopted this robust standard we call CPC–1232.

Unfortunately, the Federal Government has still not acted on this petition to mandate standards requiring stronger, safer tank cars, and the DOT–111 specification remains the Government-specified design in the United States. This lack of Federal action continues to allow oil to be transported in tank cars lacking the latest safety ideas, causing the NTSB to say, "the current tank cars moving these flammable liquids are not up to the task. It is crucial to strengthen these existing rail tank cars."

Greenbrier agrees. We strongly urge the Pipeline and Hazardous Materials Safety Administration, PHMSA, to adopt its proposed option number two contained in the notice of proposed rulemaking. Adopting option two as the fixed and final standard for new tank cars placed in service after October 1, 2015, is key. This should be combined with requiring retrofit of all existing tank cars by 2020. This is an aggressive timeline, but we believe it is achievable.

Greenbrier has not waited on the Federal Government to design a safer tank car. We are already making major capital investments to address this need. We are investing in our production capacity to support strong demand for our Tank Car of the Future. This car has features that inhibit discharge of contents during derailment, to reduce the penetration of the tank car shell, and to limit pool

fires that can result when hazardous contents of the car escape and are ignited. With this design, the likelihood of tank car spills in a derailment at 50 miles per hour can be improved by up to approximately seven to eight times, compared to the majority of cars now operating in hazardous service in the North American fleet.

Customer response to the Tank Car of the Future has been very positive. We currently have orders for more than 3,500 of these cars, and we have begun delivering them to customers. In fact, a unit train of more than 100 of these tank cars built to this highest safety standard received its initial cargo in Bakken crude in the fields of North Dakota very recently. This is the option number two car that we would like to see PHMSA adopt.

A final rule establishing clear, robust standards for new tank cars and timelines for retrofitting of existing cars will permit the industry to make the necessary upgrades to these facilities that will make these cars possible.

Mr. Chairman, thank you for allowing Greenbrier the opportunity to share our views on this important topic. We are proud to be a player in the Nation's energy renaissance. Thank you, sir.

Mr. DENHAM. Thank you, Mr. Saxton. Time permitting, we should be able to have two rounds of questions here. I will start this afternoon—or this morning out.

Mr. Thomas, despite the recent drop in the price of oil per barrel, will there still be a need for significant investment in midstream infrastructure?

Mr. THOMAS. Yes. I would say the scale of the opportunity is really unchanged. When you think about the risk of—facing midstream operators, it is volume-metric, not really related to price. It is how much the resource actually goes through the pipelines, goes through the rail. And at this stage, I think that even the development is slowing, the amount that is actually anticipated to go through pipelines, rails, over the next few years is unchanged. I think the development cycle is likely to be elongated. So the same amount of resources will ultimately be developed, it is just going to be over a longer period of time at current prices. So, again, I don't see any reason to suspect that the needs are changed.

Also, when you think about the basic economic opportunity, it is really related to basis differentials. The notion that you are paying—you are receiving prices for gas, for natural gas liquids, at the place it is produced that are substantially below the market price, and that the profit that can come from developing the infrastructure is from reducing those basis differentials, that you are actually able to receive what is a market-clearing price in other parts of the country.

Mr. DENHAM. And, based on where the products are being extracted and where they actually need to go, where do you view the greatest need in infrastructure improvements, as well as new infrastructure?

Mr. THOMAS. Well, first, with the natural gas liquids, most of the production, the cracker facilities that actually produce the end chemicals, are located in Louisiana, Texas, other parts of the Southwest. But then you have most of the wet gas that is being produced in Bakken, Marcellus, certainly. So I think that connecting those areas is paramount.

Secondly, just with natural gas, you have prices for natural gas in the Northeast that are still quite high, relative to where they should be, so you have the connecting Marcellus natural gas to the Northeast for households, for businesses, that energy infrastructure is greatly needed.

Again, one final point. With natural gas liquids, I think that this is really a national issue, because there just hasn't been really much in the way of investment over the last 20 years, and natural gas liquids really cannot be transported over the existing natural gas infrastructure. So that is more national. The other two, again, I think it is connecting Marcellus and Bakken to the Southwest, Louisiana, Texas, where most of the processing facilities lie.

Mr. DENHAM. So what type of infrastructure? Rail? Pipelines?

Mr. THOMAS. Well, yes, both. But certainly, I think, you know, there is going to be an emphasis on the construction of pipelines for—prospectively. But, again, I think that—you know, we owned a company for a period of time—we were an investor in a company, I should say—Genesee & Wyoming, which was a short line rail, and that helped with getting the Marcellus and Utica shales, transporting liquids and crude. And I think that this is going to continue.

I think, you know, in the fullness of time you would expect pipelines—you know, perhaps 12,000 to 15,000 miles of pipelines—to account for the natural gas liquids transportation. Right now we have about $125 billion of fixed investment planned for petrochemicals in the United States. And a lot of this is international players moving here because of lower feed stock prices. And this is going to be serviced largely by pipeline development, in my opinion.

Mr. DENHAM. And currently we have 2.6 million miles of pipeline. We have added about 10,000 more miles in the last year. I mean, how much more is needed? How much capacity is needed with that current infrastructure that we have today?

Mr. THOMAS. Well, again, I do want to——

Mr. DENHAM. The question is, do we ever catch up?

Mr. THOMAS. Well, I think we have the opportunity to catch up, because, again, my impression of the E&P market is focused on, now, cost reduction and distress. So there is going to be less fixed investment related to development. Now is the opportunity for the investment in midstream infrastructure to catch up to the past resource development that has occurred. So that is the opportunity today.

And again, I do want to emphasize that natural gas liquids, the pipelines associated with the transport for petrochemical production, do require a—they cannot simply be transported over the existing natural gas infrastructure; they require quite a bit of construction on their own. And that market is, again, completely dependent on development of transportation infrastructure, going forward.

The investment in the end production is there, it is coming online. It is growing this year—the amount—the value of facilities the petrochemical space put online has grown by 70 percent. So it is the—the downstream is there, it is a question of whether the midstream and infrastructure will ultimately be developed to support that.

Mr. DENHAM. Thank you. Mr. DeFazio?

Mr. DEFAZIO. Thank you, Mr. Chairman. Is there anybody on the panel who disagrees with the need for a more robust rail tank car than the DOT–111s?

[No response.]

Mr. DEFAZIO. OK, good. We start there. Now, let's talk about how quickly we can move there.

Now, Mr. Thomas, I assume some of your people are looking at investments in railcars, since most railcars are not owned by the railroads, they are owned by investors. Is regulatory uncertainty regarding a new design holding people back from making those investments?

Mr. THOMAS. The problem with uncertainty is that it is very difficult to calibrate, in terms of your investment model. So you don't know what it ultimately means for——

Mr. DEFAZIO. Right. So if we have a—if we had a known design, and a time period in which to phase it in, you know, people could figure out, you know, how they're going to amortize that investment, what the investment is, and decide whether or not, rationally, to be in the tank car business or not. Right? But right now, without knowing what the design is going to be, that is probably causing some hesitation.

Mr. THOMAS. And I would also note that, very often, you can have—when you assume a certain level—degree of risk aversion among managers, that you could actually have less investment because of uncertainty than you do with an almost bad outcome with the regulatory.

Mr. DEFAZIO. OK, excellent.

Mr. Hamberger, in—you know, with the rule that is proposed, we have both a mix of operations. Has to do with braking and speeds and design. Now, do you think—are the operations and braking issues going to raise concerns? Have they raised concerns?

Mr. HAMBERGER. Indeed they have, Mr. DeFazio. But let me just expand, if I can, on your first question. I am aware of a manager of at least one major tank car leasing company who has been told by her lawyers 2 years ago not to spend any money to replace the DOT–111s until there is a final rule on what is—out of PHMSA. So——

Mr. DEFAZIO. OK. Thank you.

Mr. HAMBERGER [continuing]. To Mr. Thomas's point——

Mr. DEFAZIO. That is very helpful.

Mr. HAMBERGER [continuing]. That lack of certainty has, in fact, reduced——

Mr. DEFAZIO. OK. Let me put it this way. Could we expedite the rulemaking if it was divided between a design criteria and operations issues?

In fact, when I have asked, "Why are they combined?" I am basically told, "Well, we think we are going to have trouble with those two, so we want to move it through on the back of the tank car." Well, I want to get the tank cars in process.

Mr. HAMBERGER. If memory serves, I testified in the Senate last fall, and recommending exactly that.

Mr. DEFAZIO. OK.

Mr. HAMBERGER. We need certainty. We have already adopted voluntary speed limits. We have already adopted improved braking systems. So I think that what Mr. Saxton has indicated as well is we need certainty so that the new tank cars can——

Mr. DEFAZIO. Right. I mean you are never supposed to ask a question you don't know the answer, but, Mr. Saxton, you went to Lac-Mégantic. Those were DOT–111s, I understand.

Mr. SAXTON. Yes, sir.

Mr. DEFAZIO. Do you think there would—I mean that was a pretty high-speed incident. Do you think a new tank car design would have made a difference in the destruction and the deaths?

Mr. SAXTON. I do believe it would have made a difference. I think there would have been fewer breaches. We put 1.6 million gallons of crude oil on the ground up there, and I think we would have put significantly less amounts of crude on the ground if we had had a more robust car.

Mr. DEFAZIO. OK. And you used a statistic. I think you said at 50 miles per hour. What factor of additional safety did you get out of the improved design?

Mr. SAXTON. Seven to eight times.

Mr. DEFAZIO. Seven to eight times?

Mr. SAXTON. Less likely to breach——

Mr. DEFAZIO. So what does that mean, in terms of probability of rupture? One-seventh, one-eighth probability of rupture, then?

Mr. SAXTON. Yes, sir. That is exactly right. I definitely believe we would have breached a lot fewer cars.

Mr. DEFAZIO. OK, great.

Now, Mr. Black, I just—I think you briefly mentioned it in your testimony—I couldn't find it in the written testimony—but an issue I have is why does it take so long to detect leaks? Because we have a number of incidents listed where pressures went down, and they actually increased input, because they thought maybe there was a problem other than a leak. In the case of the Enbridge in Marshall, Michigan, it was 17 hours. Another Enbridge incident was 3½ hours. Why do we have so much trouble detecting leaks?

Mr. BLACK. Well, the Marshall, Michigan, incident was an exception. The leak detection system that was in operation detected the signs of the leak, but the operators did not recognize it was a leak. They thought, in the NTSB investigation, it was something else. So they tried to increase the pressure in a pipeline to address what they thought it was, and they magnified the——

Mr. DEFAZIO. So is that operator education? Operator error? Is it a problem with the detection system?

Mr. BLACK. Control room training. And our industry has embarked on a recommended practice for leak detection and recognition and response, learning from that incident.

Mr. DEFAZIO. OK, thank you. My time has expired. Thank you, Mr. Chairman.

Mr. DENHAM. Thank you, Mr. DeFazio. Mr. Shuster?

Mr. SHUSTER. Thank you very much, Mr. Chairman.

Mr. Gerard, are there areas of this country that oil and gas exploration and extraction have been hindered because of the lack of infrastructure? Could you give us a few examples, if they are out there?

Mr. GERARD. Well, clearly, today, Mr. Chairman, as we look at this significant expansion that we have occurred, up to 3 million barrels a day more in oil production, significant increases in natural gas, I think, as Mr. Thomas pointed out, when you look at the Northeast, you look at your good State and the Marcellus shale play, if we could move a lot more of that natural gas up into that area, I think you would see the impacts to the consumers reduced, and consumers would benefit.

So, what does that do to production? Well, the production is going to stay where, obviously, the market allows it to go, just like we are seeing today, in terms of the price of crude oil. But fundamentally, that infrastructure, that network to move it, makes the system far more efficient.

So, yes, it does have some impacts, based on investment judgments. Where will those dollars go? They will go to the road of least resistance. And that is why we are hopeful we can move more of the Bakken on the oil side, more of the natural gas out of Marcellus to the Northeast and then down to our major facilities in the gulf, et cetera.

Mr. SHUSTER. Thank you.

Mr. Black, you said 10,000 miles of pipe in the last 4 years. Mr. Thomas, you mentioned 12,000 to 15,000 miles of more pipelines. What time period is that? In the next 5 years, both of you, either of you, how many miles of pipeline do we need to build?

Mr. THOMAS. Well, I would say that would be over about a 5- to 10-year period. And again——

Mr. SHUSTER. A 12,000 to 15,000——

Mr. THOMAS. That is right. And I think that depends on the pace of growth.

I think one of the good things about the decline in the price of oil is that you are going to have much greater asset utilization. For a period of time it was—you know, if you got one anchor shipper that you could just build the pipeline, and that—you wouldn't really worry about how much was being used. Now there is going to be more attention paid to the amount of the asset that is being used, and that is going to lead to less risk of overbuilding.

Mr. BLACK. The stats that I have for you in terms of barrels per day of crude oil and liquids to move towards consumers and workers, we have got more than 8 million barrels per day of new pipeline capacity. Right now that is either under construction, under firm agreements with pipeline shippers, or in open season. So pipeline operators continue to expand capacity to move these liquids to where they need to go.

Mr. SHUSTER. Thanks. Mr. Thomas, you mentioned in your written testimony about the delays and the permitting process and the costs that can be incurred. Can you talk about some of those, the significance those costs can make?

Mr. THOMAS. Sure. When there is a potential investment opportunity, and there is interest from a provider of discretionary capital, and the—if you have to put the upfront money, the amount—the delay is going to be quite considerable. Again, if you have a 3-year project, a delay of a year-and-a-half on top of that is a 36-percent decline in the return.

Mr. SHUSTER. What 36-percent decline?

Mr. THOMAS. In the internal rate of return associated with that project.

So, when you are thinking about targeting a 12- to 15-percent per year return for your investor, a delay could be the difference between whether this is an attractive opportunity or not. Alternatively, if you want to wait to actually make the cash outlay into the future, that means you have to segment part of your fund for a future opportunity that may not ultimately materialize. That is very difficult to do, because you are under pressure from investors, your investors, to put as much of the capital to work as quickly as possible.

So, if you raise money today with the expectation of investing over 3 years, it is very difficult to wait 18 months for a potential project. So it is just a complication.

Mr. SHUSTER. So streamlining the permitting process helps those private dollars get into the field and——

Mr. THOMAS. It can——

Mr. SHUSTER [continuing]. Build pipeline——

Mr. THOMAS. It can be—again, for a marginal investment, it can be the difference between whether it is something that you wish to pursue and something that you prefer not to.

Mr. SHUSTER. Mr. Hamberger, you mentioned $29 billion, and that is a lot of money.

Mr. HAMBERGER. Yes, sir.

Mr. SHUSTER. But I think that, in perspective, what percentage of the rail industry's revenues or profits does that $29 billion make up? I think it gives—at least for me, it gives me a better understanding of how——

Mr. HAMBERGER. I appreciate that. The CAPEX is about 18 percent of revenue. When you combine the two, it is about 40 percent of all revenue back into——

Mr. SHUSTER. Out of your revenue, not your profits.

Mr. HAMBERGER. Out of revenue. Yes, sir.

Mr. SHUSTER. Yes. And how does that compare to other industries? Utilities industries, the——

Mr. HAMBERGER. With respect to CAPEX, per se, the average in America is 3.5 percent for all manufacturing. For the last decade we have been around 17 to 18 percent.

Mr. SHUSTER. Significant amounts——

Mr. HAMBERGER. Yes, sir.

Mr. SHUSTER. OK, thank you. And I yield back.

Mr. DENHAM. Thank you, Mr. Shuster.

Mr. Larsen, you are recognized for 5 minutes.

Mr. LARSEN. Thank you, Mr. Chairman. I just want to remind the panelists. People on the west coast use natural gas and oil, too. And we have refineries. You make it sound like everything is east of the Mississippi, or at the mouth of it. So we got five refineries in Washington State, alone. And in the last 2 years, we have gone from zero gallons of crude oil transported on rail lines through Washington State to nearly 1 billion gallons. And that same time, we have seen a decrease in oil, crude oil, by tanker by about the same amount. So it is almost a one for one. In that same amount of time, the pipeline—crude oil from pipelines to the refineries has stayed about the same. So we have sort of seen its replacement.

As a result—and I have talked to several of you about this—as a result, we have seen an increase in crude by rail, and an increase in the community's knowledge of it, and insistence that something be done about it to ensure safety. And so, I have a couple of questions on that line.

And, first, is for Mr. Hamberger. And kind of how would you characterize this relationship between your capital investment and your maintenance and repair investment in safety? How do you talk about the return on investment from the safety investment that you make?

Mr. HAMBERGER. There is a direct correlation, and I will be glad—I think it may actually be in my written testimony, of the amount of money spent and the accident rate. A direct correlation between a well-maintained railroad and a safe railroad.

Now, it is not just the maintenance, it is also the training of the employees. But new equipment is safer. So that—and if you go back to the bad old days when we were owned—25 percent of the track was in—owned by companies in bankruptcy, the Interstate Commerce Commission actually kept track of something called standing derailments. Deferred maintenance was the hallmark of the day. Deferred maintenance is a euphemism for not getting out and taking care of your railroad. We don't have deferred maintenance now. And so, there is a direct correlation between that spending and safety.

Mr. LARSEN. Yes, thanks. And, Mr. Saxton, the discussion Mr. DeFazio and others have brought up about the tank car design and such, obviously, if you all are either building new tank cars, the "Tank Car of the Future," or retrofitting tank cars, that is putting people to work. As well, people who aren't currently working today, I assume, and you have to hire up.

In your opinion, can your side of the industry ramp up fast enough to do retrofits and to build a "Tank Car of the Future" to address concerns about a potential shortage of tank cars to move crude?

Mr. SAXTON. The short answer to that question is yes. Of course, what you are alluding to is the fact that the PHMSA document, or proposal, has certain dates by which events have to occur. And they are aggressive, but we believe they are doable.

Mr. LARSEN. So why do you believe they are doable, and some folks say they are not doable?

Mr. SAXTON. Well, for example, last year we built 4,000 tank cars. This year we will be building 8,000 tank cars. That is a lot more to do.

I have this deep abiding faith in the American economy. But I also believe that if we set the bar low, we will not quickly do things that we need to do to build safer tank cars. And I think it is really incumbent on us to do that. Because, as a railroad person, or as someone in the rail industry, if we were to have additional derailments that caused more fatalities, I think we could lose our franchise, the trust that the American people put in us to do this. So I think it is really important for us to get on with it. Give us a bar, let us get over it.

Mr. LARSEN. I think if we set it low enough, you will be sure to hit it.

Mr. SAXTON. You have it.

Mr. LARSEN. Yes. That is good enough for me. Thanks. Thank you, Mr. Chairman.

Mr. DENHAM. Thank you, Mr. Larsen.

Mr. Hanna, you are recognized for 5 minutes.

Mr. HANNA. Thank you, Chairman.

I am curious. You mentioned, Mr. Thomas, that if we had a better pipeline system, we would have cheaper natural gas in certain areas. And you said that, specifically, the price was higher than it should be. Natural gas is trading about 2.68 today, something like that. In those areas that you might be speaking of, what would you expect the marginal cost to be to the consumer without those improvements?

Mr. THOMAS. Well, I mean, they can be a multiple of the Henry Hub price. So, again, it is—the economic potential value added for infrastructure investment is not the price so much as the differential between the price at Henry Hub and the price that you pay at the end market. And you could have a savings that actually, in today's market, are three to four times the actual spot price.

So, it can be quite dramatic. And, again, I think that as long as those——

Mr. HANNA. So it is a direct cost to the consumer that could be helped with infrastructure.

Mr. THOMAS. Yes.

Mr. HANNA. Mr. Hamberger, you mentioned that you have 99.95 percent, seven cars, thousands and thousands of cars out there. And yet, it sounds like, from the ridiculous to the sublime, with all due respect to Mr. Saxton, that the urgency associated with his line of testimony and the actual on-the-ground, knowing that you have improved speed, you have improved braking conditions on your own, and—what am I missing, here?

How much, Mr. Saxton, do you think you are going to reduce those seven cars with forcing an industry to expedite something the way you think it should? And I am not arguing with the idea that it needs to be done, just that I am—have a problem with the urgency associated with the conversation here.

So, Mr. Hamberger, would you like to——

Mr. HAMBERGER. Let me start. It is a coordinated effort of prevention, mitigation, and response, and the tank cars in the mitigation piece, when the accident does happen, you want to have as safe a tank car that still allows the efficient movement of the product.

As some of us mentioned, we took the initiative in 2011—in March of 2011, we petitioned PHMSA to adopt a standard which we submitted to them. They delayed. In October of 2011, Jack and his members and other shippers agreed to adopt that on a voluntary basis, because we wanted to get to the next level of safety. We have now agreed to take that even a little bit further, from a safety standpoint. And I think where we are—where I am, at least—is tank car owners don't know what to order. And so, instead of ordering even the new voluntary agreement that we reached, they are waiting for PHMSA to decide what the regulatory standard is going to be.

And so, meanwhile, the 2011s are still being used. The number I have is that if the tank car that API and AAR recommended in our joint comments in the regulatory process last fall is adopted, it would reduce the probability of a release in an accident by 81 percent. That is a pretty good safety improvement, and we just need to know that that is the standard that DOT——

Mr. HANNA. To be fair to Mr. Saxton, maybe you would like to weigh in. I——

Mr. SAXTON. Well, first, I want to agree with everything Mr. Hamberger has said. I want to point out a couple nuances here.

It has already been testified that at least one major leasing company will not order any of these new cars until regulatory certainty occurs. It is important to realize the railroads are common carriers. When a shipper—and, Mr. Hamberger, correct me if I get any of this wrong—when a shipper presents a properly packaged commodity to the railroad—in this case, often crude oil, for example—if it meets DOT standards, the railroad has to move it.

So, you have got to get beyond this uncertainty regarding the car that will be required in the future. Because economic forces, the market, will crush an overpackaged commodity, eventually. It will have to go to the cheapest commodity car. So that is what we are here, asking you for.

For over 20 years, we have been doing this dance, according to NTSB, and I agree.

Mr. HANNA. Sure. I just want to mention, too, that the House passed H.R. 161, the Pipeline Reform Act, which seeks to take from 558 days, which is the current permit process, down to under a year. So what you are asking for is in the works right now, in the House.

So, thank you. My time has expired.

Mr. DENHAM. Thank you, Mr. Hanna.

Mr. Sires. No?

Mr. Cohen.

Mr. COHEN. Thank you, Mr. Chair. Mr. Hamberger, you have testified that railroads are 99.99 percent safe. And Mr. Black said that the most—the safest way to transport is by pipeline. Is he 100 percent safe, or is he somewhere between 99.99 and 100, or is he just wrong?

Mr. HAMBERGER. We have statisticians that are taking a look, and I think we are arguing about decimal points here. The fact of the matter is we are safe, pipelines are safe, and this product has to move, and is a good news story that is leading this country to energy independence.

And so, we are not quibbling over thousandths of a percent. I think we are both very safe and trying to get safer.

Mr. COHEN. If something happens with the railroad, and you have a train derail, you have got a limited amount of oil that is at risk. But—could risk the public, if so many cars lose their load. Pipeline has a problem, it is unlimited, is it not?

Mr. BLACK. In the event of a pipeline release, the operator turns off power to the pump stations and isolates—and turns off valves to isolate the amount of the release, limiting the amount that can be released. When a pipeline operator responds properly to an incident, it is a small amount of barrels that are released.

Mr. COHEN. Is that what happened in the Enbridge spill? Was there a limited amount of oil? Obviously, it was limited, because it is still not going on. But was it not a great quantity?

Mr. BLACK. Correct. Pipeline operators want to properly detect the release and begin to respond. In that case, they did not. That is the exception. A lot of learnings have occurred from that. We have had a lot of investments in leak detection technologies and recommended practices being developed at API on several different issues to minimize pipeline releases and improve responses.

Mr. COHEN. Mr. Black, the EPA has stated that tar sands poses serious environmental risks, and more serious than other crude oils. Do you agree or disagree that tar sands is a more serious environmental risk than other crude oils?

Mr. BLACK. I disagree. It is like any heavy crude oil. National Academy of Sciences is studying that issue right now. They have already studied one issue about whether it is more corrosive inside a pipeline. An expert review panel concluded that it was not.

Mr. COHEN. So you don't agree with the opinion that tar sands, environmentally, are more likely to affect the environment if there is a spill.

Mr. BLACK. Behaves like any other heavy crude oil.

Mr. COHEN. Do you believe tar sands—right now they have an exemption from contributing to the fund that we have on—Oil Spill Liability Trust Fund. Do you think that liability is appropriate?

Mr. BLACK. Well, I want to reassure you that any pipeline operator is responsible for any release, and the Oil Spill Liability Trust Fund will apply in any release.

Now, the IRS, the ruling that Mr. DeFazio mentioned, has apparently given a private ruling that some importers of crude oil don't pay into the Oil Spill Liability Trust Fund. But, regardless of what is carried, if there is a release from a pipeline, the pipeline operator is financially responsible, and the Oil Spill Liability Trust Fund is there, as a backup, for that on-scene Federal coordinator, or for any claims. There is no exemption of that. It is just a question of what importers pay the per-barrel excise tax into the fund. I don't have a position on that.

Mr. COHEN. Mr. Hamberger, there are several cities in this country that are significant railroad centers. Which one is the best city for railroads?

[Laughter.]

Mr. HAMBERGER. I feel confident in saying that Memphis ranks right up there, sir.

Mr. COHEN. Exactly. That is what I thought. Absolutely, positively. I yield back the balance of my time.

Mr. DENHAM. Thank you, Mr. Cohen.

Mr. Hardy, you are recognized for 5 minutes.

Mr. HARDY. Thank you, Mr. Chair.

Mr. Thomas, thank you for supplying your expert analysis on the energy markets. In your testimony you stated that there are roughly five reasons for the drop in oil prices. You state that the current spot price is roughly about $45. I was wondering if you could expand on your analysis of and discuss how the decrease in prices might be affecting natural gas.

Mr. THOMAS. Yes. Well, let me—first, I think that the—there is lots of moving parts. And that is why I think it is so difficult to make a judgment as to where the price is ultimately going to end up, or how quickly it is going to get there.

One of the issues with respect to natural gas is that, very often, in wet plays you have economies of scope, so that the price of natural gas, the—is less—it has less of an impact on your interest in continuing the development, because you are also getting liquids associated with that. And then the liquids can be sent to different end markets. There is also associated gas that you can get with oil production, so that there is, again, economies of scopes that you are—you are getting more than a single product. The total revenue you are getting out of the resource development is greater than any one product.

Right now, I think that the increase in the foreign exchange value of the U.S. dollar, which has increased by about 12 percent over the last year, is playing a big role, and perhaps a role that is less appreciated by market participants. And if you look at the price of iron ore, copper, natural gas, other commodities, you see a decline. The price of diamonds is another example, which has declined by 9 or 10 percent, again, roughly in line with the decline with the increase in the foreign exchange value of the dollar.

So, I would say that that seems to be playing a role, as well. And then, again, just to the extent that the decline in some of the natural gas liquids, you see about a 60 percent decline in some of the spot prices with natural gas liquids that has come down with the price of oil, as well. So these markets are very closely related.

Mr. HARDY. Thank you. Followup on that question, you state in your testimony that credit spreads on energy-related high-yield bonds have doubled over the past year, and that there is a potential for a significant default risk. A 5-percent reduction in the GDP is not a small number.

Mr. THOMAS. No, 50 basis points, excuse me. Five-tenths of a percent.

Mr. HARDY. Five-tenths of a percent?

Mr. THOMAS. Yes. No, I think that it is a real risk. If you look at—there was about $30 billion of annual high-yield bond issuance to support energy development. So E&P companies have now about $205 billion high-yield bonds outstanding. The total market for E&P-linked credit is about $730 billion. This credit was underwritten at prices that are obviously very different than those today. I think, in most cases, probably expectations for a barrel of oil of $80.

So, you know, if you think about a 70 loan-to-value ratio, that there is a lot of acreage that is potentially under water, where the decline in the value of oil has—means that the underlying collateral is worth less than the face value of the outstanding loan. And if prices continue to be $50 per barrel for the next 2 years or so, I think the potential for defaults is very, very high.

Mr. HARDY. Thank you. I want to change direction just a little bit, and discuss the regulatory process. You mentioned that in the GAO report, the case that the interstate natural gas pipelines averages about 558 days between pre-filing certification. This seems burdensome and unruly, I guess. Is there anything that we can do

in this process to help speed that up? And I don't know whether you would like to answer that, or Mr.—thank you.

Mr. THOMAS. I would defer to other panelists. I would just say that, you know, to the extent that you can eliminate sequential reviews and have them concurrent would, to me—just to make sure that you have the same degree of supervision and the same degree of oversight, but that it doesn't occur sequentially to delay the ultimate approval or denial.

Mr. BLACK. That legislation applies to natural gas liquids, not the liquids pipelines that I represent. But the spirit is the same. We need decisionmaking, whether it is Federal or State, to be more timely, so that pipeline operators can respond, and not have these unnecessary delays.

Mr. HARDY. Thank you, Mr. Chairman.

Mr. DENHAM. Thank you, Mr. Hardy.

Mrs. Napolitano?

Mrs. NAPOLITANO. Thank you, Mr. Chairman. And I have multiple questions, so I will try to be fast as I can.

One of the things that I have encountered in my area, with the Alameda Corridor, of course, is the grade separations. How much do you invest in grade separations?

Mr. HAMBERGER. I don't have an overall number for that. Under the highway and DOT regulations, we are required to pay up to 10 percent.

Mrs. NAPOLITANO. Up to 10 percent.

Mr. HAMBERGER. Yes.

Mrs. NAPOLITANO. Currently, how much of that percentage is the norm?

Mr. HAMBERGER. I don't have an answer for that.

Mrs. NAPOLITANO. I can give you one. Three percent. And that is because the Alameda Corridor, which has 24 grade separations, have been working on them for a couple of decades.

And one of the things that has come up here is the—Mr. Saxton, you talked about the 3,500 cars that are being ordered. Are those 1232s?

Mr. SAXTON. They are—actually, but I would call them Super 1232s. They include additional features that would be required under option number two.

Mrs. NAPOLITANO. OK. So they are better than——

Mr. SAXTON. Yes, they are PHMSA's option number two.

Mrs. NAPOLITANO. OK. And, Mr. Hamberger and Mr. Saxton, on page 13 you indicated there were 60,000 new—the 1232s. Yet I understand there are 228,000 DOT–111s. Is that correct, roughly? I am looking at page 13 of Mr. Hamberger's statement.

Mr. HAMBERGER. I am sure it is correct, Mrs. Napolitano, yes. But not all of those are in crude service. The DOT–111 is the workhorse of the fleet, and carries all sorts of commodities.

Mrs. NAPOLITANO. Mr. Saxton?

Mr. SAXTON. That sounds about right, according to my numbers, too, yes.

Mr. HAMBERGER. What I have is that there are 19,680 nonjacketed DOT–111s currently in crude oil, and 3,337 jacketed DOT–111s, for a total of 23,000 moving crude right now.

Mrs. NAPOLITANO. Is there a way to prioritize these when you are moving some of the more flammable, or the more——

Mr. HAMBERGER. We, unfortunately, pull what the customers present to us.

Mrs. NAPOLITANO. Who owns the cars?

Mr. HAMBERGER. The cars are owned either by a leasing company, or by the individual shippers.

Mrs. NAPOLITANO. Not by the railroad?

Mr. HAMBERGER. Not by the railroads.

Mr. SAXTON. But there is a way to prioritize this, certainly. These—we are talking Class III flammables, and there are three packing groups. And Packing Group I is the most flammable, Packing Group II, Packing Group III——

Mrs. NAPOLITANO. Are the Class I railroads the only ones that carry it, or Class II and III also carry?

Mr. HAMBERGER. Class II and III also carry, yes.

Mrs. NAPOLITANO. OK. The human error is the leading cause of most of train accidents, 38 percent, anyway. Have you done a breakdown of what some of those human errors entail? And what are you doing to train your staff, your operators, your people, to maybe reduce the amount?

Mr. HAMBERGER. Well, you put your finger on it. It is a matter of training. It is a matter of focus. It is a matter of having daily safety briefings. Each railroad is working on fatigue management systems. Clearly, fatigue is a part of human error. And then, of course, we also are installing Positive Train Control, which is there to——

Mrs. NAPOLITANO. Which is one of my subjects. You mentioned in—that the Security and Emergency Response Training Center in Pueblo, you are training firefighters. What are you doing to train firefighters, or give the information to the handling of railroad emergency contact phone numbers to the fire department, to the 911s in the areas where you operate heavier transportation of these oil—crude oil, et cetera, especially coming from the ports and other areas that have a high volume of these liquids?

Mr. HAMBERGER. We have been moving hazardous material for quite some time. This is not new, just because of the crude oil development. And so, we have working relationships with the communities in which we operate. They have the numbers——

Mrs. NAPOLITANO. Real time. Real time. Real time. Because you—according to this, you let the locals know, but not in real time. It is upon request, a general list of the hazards transported through the communities, but the information is not in real time.

Mr. HAMBERGER. The information is not in real time. We have just rolled out an AskRail app, where an emergency responder can type in the number of the tank of the car, find out what is in it, what is the contact, what is the recommended practice——

Mrs. NAPOLITANO. Has that been available—I am sorry, my time is short—has that been made available to all those that not only train——

Mr. HAMBERGER. Yes, it is being made available to the emergency responders in the communities in which we operate. By April 1st we will have an ability, if you put in one carload, one car num-

ber, you will know what the entire—contents of the entire train——

Mrs. NAPOLITANO. I would love to have that information, sir.

Mr. HAMBERGER. Yes, ma'am.

Mrs. NAPOLITANO. Because we have heavy use of that. We had a derailment, a hairline rail fracture, in my area years ago. Has that been improved? Have you gotten technology that is going to help you determine if there is a chance for derailment because of a hairline fracture on the rail?

Mr. HAMBERGER. It is something—we are continuing to try to develop new technologies. We have been working with Mr. Gerard and his members who have similar issues of—steel cracking in the North Sea, for example, taking a look at what kinds of technologies are there. More inspections, more railcar inspections——

Mrs. NAPOLITANO. Could this be shared with this committee?

Mr. HAMBERGER. Of course.

Mrs. NAPOLITANO. And thank you, Mr. Chair.

Mr. DENHAM. Thank you, Mrs. Napolitano.

Mr. Katko?

But, real quickly, Mr. Hamberger, can you just clarify? There is 125,000 tank cars out there in the fleet. You used a 23,000 number. What is that number you——

Mr. HAMBERGER. Let me submit for the record, but what I have is that there are a total number of DOT–111s of 228,000. But those in crude oil is 19,680, and for nonjacketed DOT–111s, jacketed DOT–3337. These are cars making at least one loaded shipment in 2013 through the second quarter of 2014.

Mr. DENHAM. Thank you.

Mr. Katko?

Mr. KATKO. Thank you very much. Mr. Saxton, the CPC–1232 standard which you are advocating for, is that considered by you to be the state of the art for the industry?

Mr. SAXTON. No, sir. We are definitely advocating for the option number two car, which PHMSA has proposed. And it is a step up from the CPC–1232.

Mr. KATKO. OK. What, in your mind, would be considered probably the state of the art for rail transport of crude oil?

Mr. SAXTON. Well, we definitely want option number two. That is the best car that we think is available. We do not believe the CPC–1232 car is what we want to go with in the future. It is better than the plain DOT–111 car, but we need to step our game up.

Mr. KATKO. OK. And I have heard a lot of discussion between yourself and Mr. Hamberger about the rail industry themselves taking it upon themselves to do these improvements. And you have done that, is that correct?

Mr. SAXTON. Yes, sir.

Mr. KATKO. Mr. Hamberger?

Mr. HAMBERGER. And, to be fair, we have done it in conjunction with our customers, including API.

Mr. KATKO. Correct. And I believe you said you spent about $28 billion in the last couple years in security improvements. Correct?

Mr. HAMBERGER. Not security, just——

Mr. KATKO. Safety.

Mr. HAMBERGER. Well, in maintenance and capital expenditures, which has a direct correlation.

And, to answer Mr. Larsen's question, I do have in my testimony that since 2004 we have increased spending by 40 percent, and our accident rate has gone down by 40 percent.

Mr. KATKO. Right.

Mr. HAMBERGER. So it is a direct correlation.

Mr. KATKO. And that is a good thing, because nobody wants liability, correct?

Mr. HAMBERGER. We want safety, sir.

Mr. KATKO. That is right. That is right. So I guess that is my question. We have a vehicle out there that is available that is seven times safer. And I think you said it was 81-percent reduction in chances of spillage. So why do you need the Government to tell you to do that? It sounds like you are doing it yourselves, right?

Mr. HAMBERGER. The problem is that the Government—this is a voluntary standard. The Government can override that. And if they have a rulemaking in which they are considering doing something different, if you are buying a tank car to the voluntary standard, you are concerned that your investment may be—your investment timeline may be cut short if the Government declares that that car is no longer——

Mr. KATKO. I understand that. They can move the goal post, in effect, correct?

Mr. HAMBERGER. And so, what we need is for them to establish that goal post, so that the tank car owners can know what they are expected to buy.

Mr. KATKO. OK. But perhaps just my background as a former litigator for 20 years or 25 years, but isn't there an incentive, anyway, regardless of what the Government does, if you have a vehicle that is seven times safer, to get that on the tracks as soon as possible, regardless of what the Government tells you to do?

Mr. HAMBERGER. Exactly why we have been doing it since 2011 on a voluntary basis. Yes, sir.

Mr. KATKO. OK. I yield back my time. Thank you.

Mr. DENHAM. Thank you, Mr. Katko.

Mr. Maloney? You are recognized for 5 minutes.

Mr. MALONEY. Thank you, Mr. Chairman. I want to thank the chair and ranking member for allowing me to participate in today's hearing.

I don't sit on this subcommittee; I sit, of course, on the full committee. But I do represent an area of New York, in the Hudson Valley, which sees an enormous volume of oil being moved, both by rail and by barge, down the Hudson River. I want to thank Mr. Hamberger for working with my staff.

In the past you have been so responsive and helpful to us. I appreciate that very much. I also appreciate your comments on the emphasis you place on safety, and the statistics are obviously impressive. Of course, you know, to those of us who are concerned about safety, the issue is not the number of times it moves safely. The issue is the possibility that one train won't. And, in that case, the overwhelming statistics don't mean much if it happens in the wrong place and the wrong way. And I know you appreciate this very much.

I just want to direct your attention to the issue not of accidents for a moment, but to terrorism. And, of course, before 9/11 it had never happened, as far as I know, that terrorists had taken control of an aircraft and used it as a directed weapon to inflict mass casualties. What concerns me very much is the possibility that an oil train could be similarly taken and directed and used as a weapon of mass destruction.

These trains move, as you know, through highly populated areas. They move through sensitive military assets. I represent the U.S. Military Academy at West Point. The train goes right under the main building. Can you comment for a minute, please, on the steps you are taking to guard against an intentional act with respect to one of these trains?

In particular, what concerns me very much, just the extraordinary amount of unguarded track where a shaped charge, an IED, could be placed and remotely detonated. And, if that were done in the right place at the right time, the results could be catastrophic, through no fault of the operator. Not through human error, not through an accident. And I am interested in the degree to which the upgrades in the cars could mitigate that.

But could you comment for a minute on this issue?

Mr. HAMBERGER. Yes, sir. In 2001 we put together a security plan for the freight railroads. We have four levels of alert. We weren't very creative. We called them alert levels one, two, three, and four, instead of a color code. But each level of alert is based on information received from the Government.

We have, and have had since 2002, a full-time railroad employee sitting over at the National Joint Terrorism Task Force desk, helping analyze data that comes in. We are connected, we have an operations center at the AAR here in Washington, connected through secure phones to all of the dispatch centers of the Class I's. And, of course, the only way to—not the only way, but the best way to prevent that is by having information and intelligence. Is there a threat? Is there a risk? And so that is why we take that very seriously, to stay in touch with the agencies.

The issue of hijacking a train, given the control from the dispatch centers, you know, it could happen, but we think that we would be able to disable that train before, you know, it was——

Mr. MALONEY. Let me just pick up on that point. I mean—and just—and I appreciate your answer, I really do. But if, while we are speaking, somebody in a small boat travels alongside the side of the Hudson River and hikes up a short distance onto the rail embankment and digs a trench and puts a shaped charge in it and slides back off into the river and detonates by cell phone, is there anything to prevent that right now at any point along the Hudson River? How would anyone know in time? How would anyone prevent it——

Mr. HAMBERGER. I cannot speak——

Mr. MALONEY [continuing]. Where and when they wanted. Isn't that true?

Mr. HAMBERGER. I cannot speak to the specifics of the Hudson River bridges. I do know, when we went into Iraq and Afghanistan, that we had a very specific plan with the Department of Homeland

Security to guard certain bridges, rail bridges around the country. I don't know whether——

Mr. MALONEY. I am not even speaking about a bridge, but just, really, anywhere along the track.

But just on your last point—and, Mr. Chairman, my—here it is. I didn't realize—I don't have the time in front of me, so I am sure I will be gaveled down if I exceed it, and deserve to be, but the question I have is, with respect to the implementation of Positive Train Control, it is an issue I am very interested in, following the crash which occurred near my district, and it took the life of someone from my home town of Cold Spring.

The fact of the matter is that PTC implementation, which we are trying to enhance through measures like opening up Railroad Rehabilitation and Improvement Financing, you know, the RRIF funds.

Mr. HAMBERGER. Yes, sir.

Mr. MALONEY. Isn't it the case that that would be very helpful in the situation where we are discussing, where you had an instant where a train was being hijacked, or being taken control of by a terrorist? Wouldn't we be able to stop that train remotely?

Mr. HAMBERGER. That would provide another level, another layer of control at the dispatch center.

We are—again, I am sure we will have a hearing on this before too long—we have spent over $5 billion trying to implement Positive Train Control. We are not dragging our feet in any way. We are not going to make the deadline of the end of this year, but we are committed to getting it done, and we will get it done right.

Mr. MALONEY. I appreciate that. I see my time has expired.

Thank you, Mr. Chairman.

Mr. DENHAM. And thank you, Mr. Maloney. I would like to point out that, as he brought up the Passenger Rail Reform and Investment Act, which we are going to be seeing here shortly, we do address RRIF funding, being able to use that, and PTC-eligible. So any time we can shout out PRRIA, we like to do so.

Mr. MALONEY. Well, I appreciate that, Mr. Chairman, very much. It is very important. Thank you.

Mr. DENHAM. Thank you. Now recognize Mr. Webster for 5 minutes.

Mr. WEBSTER. Thank you, Mr. Chair, for putting this on. I have a question of Mr. Hamberger.

When you—in your submitted testimony there was a list of—I think they are sort of do's and don'ts of how we could support rail investments. And one of those was public-private partnerships.

Mr. HAMBERGER. Yes, sir.

Mr. WEBSTER. And in there you stated that arrangements under this, private freight railroads and Government entities could combine resources to a project, offer mutually beneficial ways to bring about critical transportation problems and solve them.

And I guess, in order to do these mutually beneficial critical transportation problems and solve them, there appears to be maybe one opportunity, and that is through Railroad Rehabilitation and Improvement Financing. Are you familiar with that?

Mr. HAMBERGER. Yes, I am.

Mr. WEBSTER. Can you tell me if it has lived up to its potential?

Mr. HAMBERGER. It has clearly not lived up to its potential, Mr. Webster. I must say that the Class I freight railroads do not see much benefit and value in the RRIF program. They have a balance sheet that enables them to finance investments without resorting to RRIF. But it is very important for the Class II and Class III railroads.

What I am told is that the process to go through to get a loan approved, the default premium that you have to pay, it just makes it very difficult and, actually, more expensive. And so, I believe not very many RRIF loans have occurred in the life of the program.

Mr. WEBSTER. How would you retool it to make it work?

Mr. HAMBERGER. I would—if I might, sir, respond on that to the record, I know there are some specific thoughts, particularly that the American Short Line and Regional Railroad Association has developed. I don't have those off the top of my head, but there are some very specific ways to improve the process and lower that risk premium burden.

Mr. WEBSTER. Well, in your testimony you talked about the fact that the dollar amount spent by each entity, the public and private, would be based on the benefit that they would receive.

Mr. HAMBERGER. Yes, sir.

Mr. WEBSTER. Could you give me an example of benefits for both? I know they would not be necessarily mutual—I mean the same, but both would have benefits. What would they be?

Mr. HAMBERGER. Well, in honor of Mr. Lipinski having just arrived, I will use the CREATE program in Chicago, which is one of our best public-private partnerships. We actually used a model out of UC Berkeley, I believe, which—this is about 10 years ago—went through and identified public and private benefits. We have put a couple of hundred million dollars in, the State of Illinois has. There has been some TIGER grant money that has gone there. And what that has done is one of the best projects. It has taken a passenger track and run it over the freight track, so that it is like a grade crossing separation, if you will, but for railroads.

So that—in this particular case, there was a—up to over 100 trains a day which had to stop, as they—sort of like a four-way stop sign intersection, and that has been eliminated, and that has helped immensely, both for passenger and for freight rail.

Mr. WEBSTER. Do you think they would be best administered by a State, as opposed to the Federal Government? Maybe the Federal Government ponies up the money, instead of TIGER grant——

Mr. HAMBERGER. Yes, sir.

Mr. WEBSTER [continuing]. Federal money. Would it be better that way?

Mr. HAMBERGER. Well, in this case, that is exactly the way it is run. It is a partnership among the State of Illinois, the city of Chicago, and the freight railroads operating in Chicago through the AAR. And we have a very close working relationship, and, you know, ground rules laid out as to how to go forward, if we are going to do other projects.

And so, it is—the Federal Government has regulatory authority, we have got to get approvals from EPA and Federal highways. And, because of the TIGER grant, we did get some Federal money. But they are not part of the partnership.

Mr. WEBSTER. Of all of the investment do's that you had in here, what percentage do you think public-private partnership would play? If we just did them, OK? We just adopt all these. Which—what—do you have a percentage of how much——

Mr. HAMBERGER. Well, let me put it in this perspective. Through the first four years—that is to say 2009 through 2012, $600 million of Federal money, through the States, went into Federal rail projects. A lot of money, $600 million in 4 years. During that same 4-year period, freight railroad spent $90 billion of their own money—$90 billion private, $600 million Federal, in the course of 4 years. So whatever that percentage works out to be.

Mr. WEBSTER. Thank you very much.

Mr. HAMBERGER. Thank you.

Mr. WEBSTER. Yield back.

Mr. DENHAM. Thank you, Mr. Webster.

Mr. Lipinski. And, Mr. Lipinski, before you start, I would like to point out that Mr. Webster did mention the RRIF process, which, again, in PRRIA we will be streamlining. That bill will be coming up here shortly. Any time we get an opportunity to talk about PRRIA in our bipartisan work on this committee we like to do so. We are looking forward to streamlining that, and forcing quicker decisions. Mr. Lipinski?

Mr. LIPINSKI. Thank you, Mr. Chairman. And, yes, it is great to see bipartisan cooperation here. We are continuing that into this Congress. So hopefully we can continue that in a lot of things here, on this committee.

I certainly—I will leave some time at the end for another area of questioning, but since we are talking about Chicago—and I know Mr. Hamberger wasn't serious when he said Memphis was the best rail town——

[Laughter.]

Mr. HAMBERGER. Let the record show. I said Memphis is right up there.

Mr. LIPINSKI. So, CREATE. We have now made a tremendous amount of progress on CREATE. But a lot of the big projects are left undone. And for me, as someone who has to go home and talk to my constituents who are stuck at rail crossings all the time—and that is their biggest concern—that is a big—you know, that is something I hear about all the time. And we have not made great progress on, you know, grade separations.

The other part of it that is a big thing that is left to do, other big projects, are the rail flyovers. So it is the big projects, the really big projects, that aren't done yet.

So, I just wanted to ask you, Mr. Hamberger, what your—if you have any particular suggestions for how we get these big projects done. Because everybody knows, when it comes to the big projects, you have got to have all that money. We got the Englewood Flyover project done. It was part of high-speed rail funding. I think high-speed rail funding is going to be—we are not going to have a whole lot of money there, to say the least, I believe, going into the future, unfortunately.

But—so how are we going to get these big projects done, and what are the railroads willing to do, you know, both for the fly-

overs, which are important, but also the grade separations? I want you—will you talk about both of those?

Mr. HAMBERGER. I will submit for the record a letter I sent to the former Secretary of Transportation of the State, making a commitment to live up to our obligations on all of those grade crossings, as well as to increase the amount of money that we had committed to the 75th Street CIP.

To me, the big question is—your question is tied up in the bigger question of what will be the funding for the overall surface transportation bill. We are committed to continuing to work with the State and with the city.

We continue to spend our own money in Chicago, as you know, so——

Mr. LIPINSKI. But to get the big projects done, you are going to need big chunks of money. It is not going to—if money is just coming in formula funds from the—through the State, for example, the State is not going to put huge chunks of money towards these projects. So we are going to need big chunks of money to get these projects done.

I mean do you have any recommendations for that, as we move forward? What can the Federal Government do? Let me ask you that.

Mr. HAMBERGER. Well, as I say, to me that is tied up in what is the funding level of the bill going to be, whether it be a TIGER program, whether it be a project of national significance, like there was. And so that really would be dictating whether or not there would be big dollars available.

Mr. LIPINSKI. Yes, and I certainly think the projects of regional national significance—we really need to move forward, get that into this next——

Mr. HAMBERGER. Yes, sir.

Mr. LIPINSKI [continuing]. Next bill that we are working on.

The other thing I want to talk about is, you know, safety questions. You know, we have the three-legged approach of prevention, mitigation, response for crude-by-rail safety. And with regards to response, as you know, I have introduced legislation in this Congress that I had put in last Congress to move us towards a modernized shipping paper system by establishing standards to help both users and responders.

I appreciate the railroads have put—what you have put forth to develop this technology, the paperless system, electronic system. Of course, we still aren't at the point where we can move away from physical paper, but we are making progress to ensure that first responders can access the information they need without necessarily having to board a locomotive there, in an emergency, which we know could be difficult.

Moreover, the more we develop the technology, the greater the opportunity we have to deploy it for other modes. Can you tell me at what point you expect the railroads to have a system in place that will allow first responders to input the identification number of a car for the train?

Mr. HAMBERGER. Yes, sir. It is an app we call AskRail. We started rolling it out, I guess, last October to communities. Currently, it only allows inputting the car number, and it will tell you what

is in that car, how to deal with the contents of that car, and emergency contact information. By April 1st—that is, in the next 2 months—we hope to be able to roll out—and it is in beta testing now—that if you put in one car number, it will give you the entire consist, what is in each car, how to deal with that, from a hazardous materials response, and, again, the contact information.

So, that would be just another level. We would still have the paper, of course, the telephone number, if you know it, the railroad to call the dispatch center. But this would then be a third way to get that information to the emergency responder in real time.

Mr. LIPINSKI. Thank you. I know it is important across the country, but especially in the Chicago area, in my district. So thank you.

Mr. HAMBERGER. Yes, sir.

Mr. DENHAM. Thank you, Mr. Lipinski.

Mr. Barletta?

Mr. BARLETTA. Thank you, Mr. Chairman. Last winter my constituents suffered severe propane shortages and very high heating costs during one of our coldest winters. At the same time, in Pennsylvania we have more than 1,000 shut-in wells. These Marcellus shale wells are already drilled, and they are ready to be tapped. But they are waiting for the infrastructure to move the gas.

Mr. Thomas, what steps does Pennsylvania, this Congress, and industry need to take to make sure that we can catch up on our infrastructure needs?

Mr. THOMAS. Well, again, I think, just from the perspective of a provider of capital for prospective projects, it is to ensure that they—the projects can be—that the process of permitting can be done in an expeditious manner, so that when you are contacted about a potential investment opportunity, that there is some certainty about when the construction can begin, when it can be completed, and you can make judgments about the relative attractiveness of that investment opportunity, based on hard numbers with regard to ultimate timing.

Mr. BARLETTA. And this question is going to go to Mr. Black and Mr. Gerard. In my district we have a local steel manufacturer, Dura-Bond. They produce pipeline. I have been to their facility, and I was very, very impressed by all the double and sometimes triple checks that are done to make sure that each segment of the pipeline is safe.

Now, I know that the Chinese steel manufacturers are trying to sell their steel pipe here, in the United States, Mr. Black and Mr. Gerard. How are we making sure that every segment of imported pipe is meeting the same safety inspections and standards as United States manufacturers?

Mr. BLACK. Well, the quality of the steel is very important. A lot of pipeline operators participate in the API monogram process that Mr. Gerard's organization runs, where, globally, there are specifications on the manufacturing of that steel. I know pipeline operators buy a lot of American steel. I know in the Keystone XL, it is a majority of American steel.

Mr. GERARD. I will just add to that. As Andy talked about, is we at the API, we were originally established as a standard-setting organization. So, clearly, the industry will look for those with our

label or monogram on them, where we actually go out and audit manufacturing facilities and give them our monogram, if you will, based on their ability to produce to the criteria or the requirements necessary to make sure it is good-quality steel.

So, we do that, as an industry. And, typically, in contractual obligation amongst the various providers and all, they will make sure they achieve that standard.

The other thing I would just add, Mr. Barletta, if I could, in response to what you asked Mr. Thomas, the other thing I would suggest is we—and back to my earlier opening statement—when we think about the energy equation in the United States today, you talk about your shut-in wells in Pennsylvania and elsewhere, we need to think more broadly now, because we need to look for the global markets. If we start looking at LNG exports—we need to get back to crude export issues—our capacity in the United States today is such that we really have the ability to be the dominant superpower.

So, if we want domestic production job creation here at home, by allowing for LNG exports, permitting, and all the good things you are working on to date, it makes a big difference, because it translates right back to the local community, where we will produce that steel, we will put those people to work, and produce it for a new market that we haven't been in before.

Mr. BARLETTA. I agree with you. Pennsylvania can be a leader——

Mr. GERARD. Absolutely.

Mr. BARLETTA [continuing]. With all the gas we have there. And in my district alone, four major pipelines are being built under the backyards and farms of my constituents.

Mr. Black, what are the pipeline companies doing to ensure that these pipelines are safe on my constituents' property?

Mr. BLACK. Well, there is a comprehensive series of PHMSA construction codes that pipeline operators are expected to comply with. Pipelines today are using the high-quality steel, most of which, perhaps, is from your area of Pennsylvania. And they are employing inspectors to inspect the construction activities in pipeline.

Pipeline operators are x-raying the welds that are done there in the trench at a far greater rate than is required by Government regulations, to make sure that these pipelines are constructed safely. We are embracing a new construction quality management system in liquids pipelines. And, before any liquids pipeline goes into service, it is subject to a hydrostatic pressure test, where the pipeline is pumped to a greater degree of pressure than whatever it operated at, commercially, to make sure that the manufacturing and construction is solid before that pipeline goes into service.

Mr. BARLETTA. Thank you.

Thank you, Mr. Chairman.

Mr. DENHAM. Thank you, Mr. Barletta.

Mr. Hamberger, $25 billion in private capital expenditures you have spent—your companies have spent on different types of projects. How many jobs has that created? What types of jobs?

Mr. HAMBERGER. Well, last year we projected this time that we would hire 12,000. I believe we exceeded 15,000 direct jobs. But

each one of our jobs is responsible for about 4.5 other jobs, the Department of Commerce data show.

And in our own industry, we are hiring across the board, whether it is—of course, about 80 percent of them are in the operations and maintenance and signal systems, about 20 percent would be in the management side of the house. All in, a railroad employee benefits and salary—$109,000. So they are very good jobs, they are secure jobs. And we have, over the years, noticed that when an employee joins the rail industry, he or she ends up making it a career, not just a job.

Mr. DENHAM. Thank you, Mr. Hamberger. And PRRIA—that is the Passenger Rail Reform and Investment Act that we are going to be seeing here shortly, a great bipartisan bill that this committee has been working on for quite some time—that has a number of streamlining provisions in there. Could you explain, when that bill is passed, if it were implemented today, what those streamlining provisions would—how those would affect the dollars that you spend?

Mr. HAMBERGER. Indeed. Let me commend you, as the chair of the subcommittee and, of course, Mr. Shuster, chair of the full committee, for your bipartisan effort to get that out of committee last year. Look forward to it moving again this year.

I think it is a great step. You are directing the Secretary to take actions to improve the permitting process. Frankly, what Congress did in MAP–21 was actually take those steps. And we would urge you to consider that, as well. But what it does is it would say that each agency, with review, has to look at it simultaneously, not in the seriatim way, not consecutively, that there are timelines, that there is a lead agency, and it has paid a great return in the highway and transit side.

My example, if you look out the window, perhaps, you will be able to see the Virginia Avenue Tunnel, CSX's main line north/south. It is one of two choke points left on their main line. The other is the Baltimore and Potomac Tunnel. And it is a 100-year-old tunnel. It is a single track, and cannot accommodate the double-stack intermodal trains that can take 300 trucks off the road at one time. They started the permitting process 7 years ago. Not one penny of Federal dollars. The reason they need an environmental impact statement or review is because they are going to close the ramp to 395 for a week during construction. So that is the Federal interest.

Because of that, it has taken 7 years. They finally got a record of decision. You will be surprised. They have been sued. They are in court. But they did get their first permit just last week. They had $140 million set aside for this project. It is now $210 million. So that is $70 million that could have gone into other projects.

And, of course, just the opportunity cost of not having that tunnel—and I see it, we look out on the main line every day from our office—you will see a train stopped until the—southbound, until the northbound train—and then it can go through. It is a tremendous drag on the fluidity of their network. And I think that your permitting reforms would have made that be in existence today, rather than still going through the permitting process.

Mr. DENHAM. And the PRRIA bill that is the bipartisan bill that will be coming before this committee here shortly, that——

Mr. HAMBERGER. Yes, sir. I think that would have helped immensely, sir, that bipartisan PRRIA bill. Yes.

Mr. DENHAM. And, real quickly, Mr. Gerard and Mr. Black, the permitting processes can be a big burden on your members' ability to deliver projects. What types of streamlining would help your industry? Mr. Gerard first.

Mr. GERARD. Well, at the risk of stating the obvious, we have a similar example that Ed just referenced, called the Keystone XL Pipeline.

[Laughter.]

Mr. GERARD. I am sure nobody has heard of this before. However, we are now in our seventh year of permitting that pipeline. It is an $8 billion project, 42,000 jobs are dependent upon that final approval, and we are hopeful that eventually happens.

So, when you come back to the broader permitting issues, let me suggest one other thing, Mr. Chairman. I would ask you to think about it, I know the jurisdiction doesn't necessarily lie here. What we are seeing across the country today is there is a small group of individuals who are using permitting processes and infrastructure as surrogates to stop economic activity that they disagree with. And we see this often in the energy production arena, particularly the development of oil and natural gas, where others have decided, and we hear this clearly on the Keystone XL Pipeline. It is not really about the pipeline, it is about oil sands production coming out of Canada.

And so, I would just suggest, as you think about streamlining the permitting process, which are critically important to all of us, that we recognize there are some who abuse the processes to accomplish other means. And so we have got to tighten up timeframes, we have got to bring certainty to the process, so those that are willing to invest the private capital Mr. Thomas talked about, holding out for 6, 7, 8 years, just like Ed talked about, can come to some conclusion as to a go/no-go decision in such a way that we can take that risk capital and put it somewhere else.

So, we would like to work with you and work with some of your colleagues and other committees in the Congress. This is the big deal, and it directly impacts our ability in the broader role of our energy leadership to assert our dominance, because we have got to have systems in place that operate efficiently.

Mr. DENHAM. Thank you, Mr. Gerard.

Mr. Black?

Mr. BLACK. You have heard us talk about this North American energy renaissance. As great as it is, there are workers and consumers that are not fully benefitting from it, because we haven't been able to expand the pipeline infrastructure necessary.

Border crossings, Keystone XL is the poster child for the problems we have had right now in getting timely decisions on border crossings. After Keystone gets its permit, it may be time to revise this process. The House has passed good legislation to change what the review is, to—just that border crossing facility.

Second, these Federal agencies that are a part of environmental permits, they need to be resourced properly, and they need to get

the signals from Washington that they can approve permits where they are due.

Mr. DENHAM. Thank you. And, lastly, Mr. Saxton, I just wanted to touch on something that I know that you have a PR staff that is very active in working with a lot of op-ed boards around the country. So, as they continue to have those discussions, I want to make sure they deal in some factual information: 125,000 fleet cars, tank cars in the fleet currently today. You have the capacity to build, how many, 8,000 a year?

Mr. SAXTON. Yes, sir. We will build 8,000 this year.

Mr. DENHAM. So, if you are building 8,000 a year, the backlog would be about a decade to replace the fleet?

Mr. SAXTON. Well, we are not the only builder, sir. We are one of——

Mr. DENHAM. But you are well ahead of your competition.

Mr. SAXTON. I like to think that, but, from a numbers standpoint, we——

Mr. DENHAM. According to your previous testimony, you are looking forward to seeing a quick 3-year implementation versus some of your competitors, who would like to see a 10-year implementation. That would lead me to believe that they are significantly behind.

But let me address it from a different standpoint. Canada also—I have talked to my counterparts in Canada. They are looking at a very similar rule. Would Greenbrier be willing to take the position that an American company would sell to American companies first, and make sure that, as we are expanding across the United States, we actually have the safest tank cars?

Mr. SAXTON. Well, you are probably talking to the wrong person about that, because I am chief engineer——

Mr. DENHAM. I am making sure that the wrong people are not talking to the ed boards across the country that would give a wrong perception of our current situation.

I, just like many others, would like to see the administration move quicker. And we certainly want to work with them. But I want to make sure, as the administration drags their feet, or reorganizes, or does some shuffling, that there is not a misperception out there in the American public that our current tank cars are not safe; that our industry does not have a safe record; and, most importantly, that there is not a—some magic, quick, fast track to get all of these new tank cars online very, very quickly. So I just want to make sure we are all singing the same tune, that we have a very safe industry, and we want to work together in improving that industry.

Mr. SAXTON. Well, sir, we do have a very safe industry. What I do want to say is that the dates in the PHMSA proposal for both retrofit and new cars, I believe, are doable. And I don't think we will have to do just Canada and the United States. I think that would be a nightmare. I think we can make those goals happen in both countries.

Mr. DENHAM. I would like to see the numbers to back that up, so that we can make sure that, as we both go out and talk to ed boards, that we are making sure that they are hearing the correct information.

We are short on time on finishing this hearing. I will allow very quick last lightning round. Mr. Maloney, if you have got a couple of things that you would like to add or get answered——

Mr. MALONEY. Appreciate that, Mr. Chairman, and appreciate the comments about the bipartisan PRRIA legislation that many of us are interested in moving through this committee.

Won't keep you long, gentlemen. I am interested in the displacement of oil shipments from pipelines to rail, because of delays in permitting or other factors. In the Hudson Valley of New York we have seen a massive increase in the amount moving by barge and by rail. Is it fair to say that that is—and each of you could answer, if you choose, or any of you—is it fair to say that that is because of an inadequate supply of pipelines to move that same crude?

Mr. HAMBERGER. I can't speak to the pipeline on capacity on the Hudson Valley, but I assume that it is—I don't know if it is displaced from current pipeline capacity, but I believe what it is doing is replacing what would—used to serve those refineries by maritime. And so it is domestic energy coming through by rail, because the rail capacity is there, and we were able to adjust and adapt to it to move it quickly. But I don't know what the——

Mr. BLACK. I mean, generally, my understanding is many of those refineries were getting Atlantic Basin crude, rather than crude from the mid-continent. Railroads have first mover advantage in moving new supplies of crude oil to an area.

So, what you have seen in these early stages is railroads moving Bakken crude over to that area. Operators, as they make long-term agreements with their customers, may expand pipeline capacity and compete with those railroads for the business.

Mr. MALONEY. And so, it is fair to say that the volume being moved by rail is related to the volume being moved by pipelines, and could either increase or decrease, relative to how much we invest in those pipelines in the future.

Mr. BLACK. Yes.

Mr. MALONEY. Isn't that a point you just made?

Mr. BLACK. Yes.

Mr. MALONEY. Mr. Saxton, real quickly, is there an additional benefit in the case of the option two cars, in the event of an intentional disrailment, or a derailment, or in terms of an explosive charge that is set off? I mean it really would make an impact, not just in accidents, but in decreasing the damage caused by an intentional terrorist act against one of these trains, wouldn't it?

Mr. SAXTON. Well, yes, there is. And the benefit, quite frankly, is it utilizes thicker steel. It is that simple. You have got more between you and the commodity.

Mr. MALONEY. It is also really not quite that simple. The, I believe, major safety and security step up is the requirement for a ⅛-inch jacket and thermal protection, combined with the high-capacity pressure-relief valve. What has made these accidents—and if there was a security attack—so severe is that one car breaches, it catches on fire, it heats up the next car, it explodes, and so on.

And what this new car is designed to do is, as it heats, the oil turns into a vapor, it will be spouted through the high-capacity pressure-relief valve, the thermal protection will keep it from heating too quickly, so that there won't be another thermal tear, as

they call it. It won't explode, so that the only product that will spill is that that occurs in the first incident, the first rupture. And that then limits the severity. And, to me, that then limits the effect, whether it is an accident or a security breach.

I will yield back.

Mr. DENHAM. Thank you, Mr. Maloney.

Mr. Webster?

Mr. WEBSTER. Thank you, Mr. Chairman. I just had a followup with Mr. Hamberger.

You had talked about a number, $90 billion, versus $600 million. I think that was what it was.

Mr. HAMBERGER. Yes, sir.

Mr. WEBSTER. My question is, if we were to increase that, or make it a little more balanced, the amount of investment, is there a number of return on investment of the money that is put up, versus what the economic benefit is?

Mr. HAMBERGER. Each railroad, of course, has its own hurdle rate as to what they want to get in return for their investment. We are an incredibly asset-heavy industry, and so we have got about $2.40 of assets out there for every dollar of revenue. But that is—again, each company, as it takes a look at its CAPEX plan and its maintenance plan, has its own return on investment rate. I don't know what it is.

Mr. WEBSTER. OK. Thank you very much.

Mr. DENHAM. Thank you, Mr. Webster.

Ms. Brown?

Ms. BROWN. Thank you. And thank you, Mr. Chairman. Just one quick question.

First of all, Mr. Hamberger, how are you?

Mr. HAMBERGER. I am——

Ms. BROWN. And secondly——

Mr. HAMBERGER [continuing]. Glad to see you here.

Ms. BROWN [continuing]. Can you give us—first of all, let me just say that I am committed that the Department come up with the final rule as soon as possible. And I know that we will work together to make sure that happens.

And can you give us a brief update on the status of Positive Train Control?

Mr. HAMBERGER. Yes, I can. Thank you, Congresswoman. We—I will submit for the record the exact numbers. But we have exceeded $5 billion in money spent trying to implement that. We are about—between a third and halfway done in actually installing on the right-of-way, installing back in the back offices and on the locomotives.

We will not make the 2015 deadline and, as you are well aware, one of the unforeseen hurdles that we had there was the Federal Communications Commission. We had about a 15-month period where we could not actually install antennas. And then, to their credit, they now have a process in place. But it is—takes about 50, 60 days to get an antenna permitted.

And so, if you count all of that, it is about a 2-year delay right there. And so, we would be looking to this committee to change the statutory deadline before the end of the year by 5 years. And that would allow time to complete the installation, but, just as impor-

tantly, allow time for the continued testing, particularly in places like Chicago—and I will say Memphis—where a number of railroads are operating: short lines, passenger, Amtrak, commuter rail, Class I's. They all have to be able to talk to each other, as they move from one track to another with run-through power. You have to make sure it works right. If it doesn't work right, it can have a safety—negative safety impact, as well as, of course, a negative impact on the operation of the network.

Ms. BROWN. Thank you. I yield back my time.

Mr. DENHAM. Thank you, Ms. Brown. I would like to thank each of our panelists today for their testimony. Your comments have been very helpful.

If there are no further questions, I would ask unanimous consent that the record of today's hearing remain open until such time as our witnesses have provided answers to any questions that may be submitted to them in writing, and unanimous consent that the record remain open for 15 days for any additional comments and information submitted by Members or witnesses to be included in the record of today's hearing.

[No response.]

Mr. DENHAM. We will have a number of questions that we would like answers to, as well as the ones that were asked today, and we will, as a committee, be reaching out to each of you before we have our safety hearing. We will have a number of questions that we would like answered prior to that hearing, as well.

Without objection, so ordered. Again, I would like to thank our witnesses again for their testimony. If no other Members have anything to add, the subcommittee stands adjourned.

[Whereupon, at 12:04 p.m., the subcommittee was adjourned.]

Testimony of Jason M. Thomas, Ph.D., CFA
Director of Research, The Carlyle Group

Before the
House Subcommittee on Railroads, Pipelines, and Hazardous Materials
On "How the Changing Energy Markets Will Affect U.S. Transportation"

February 3, 2015

Mr. Chairman and Members of the Committee:

Thank you very much for the opportunity to testify before you this morning on recent developments in the energy markets and the outlook for energy transportation infrastructure. The Carlyle Group is one of the world's largest alternative asset managers firms, with $203 billion in assets under management.

From an investment perspective, the domestic energy revolution has three related, but distinct layers:

(1) The first, and most obvious, is direct investment in energy resources and energy exploration and production (E&P) companies. These investments generally involve the purchase and development of acreage or mineral rights.

(2) The second layer involves investments in the infrastructure necessary to transport energy from where it is produced to where it is consumed. These investments can be direct investments in specific transportation or storage projects, or investments in businesses that operate in this space, such as utilities, pipeline companies, or railroad operators.

(3) Finally, investors may also seek to capitalize on the domestic energy revolution by investing in energy-intensive businesses. Specifically, investors can buy debt and equity in businesses where energy accounts for an especially large share of operating costs, or invest in

specific projects to add productive capacity or switch the business' fuel use towards cheaper domestic energy sources.

Carlyle is active in all three layers. Through our strategic relationship with NGP Energy Capital Management and through our Carlyle Energy Mezzanine Opportunities (CEMOF) fund, we intend to invest over $7 billion to develop energy resources and invest in E&P companies over the next few years. Carlyle invests in energy infrastructure projects and companies that own energy infrastructure assets through our Carlyle Energy Mezzanine Opportunities (CEMOF) and Carlyle Power Partners (CPP) funds. Finally, Carlyle invests in energy-intensive businesses through our U.S. buyout and growth capital funds. Of special note, in 2012 Carlyle funds partnered with Sunoco to form Philadelphia Energy Solutions, which is the longest continuously operating oil facility in the U.S. – possibly in the world – and the largest oil refining complex on the U.S. Eastern seaboard. Since 2013, PES has undertaken a number of capital intensive projects to diversify oil supplies, reduce energy input costs, and improve efficiency. Foremost among these projects was a high speed unloading rail facility capable of receiving roughly 160,000 barrels of domestically produced crude oil per day.

Background

Over the last several years, investors' main focus has been on the first layer of the domestic energy revolution. Between 2009 and 2014, fixed investment in structures, facilities, and equipment necessary to develop oil and gas reserves accounted for 70% of *net* industrial investment in the U.S.[1] and reached an estimated $245 billion in 2014, equal to 11% of total

[1] Carlyle Analysis of Federal Reserve, G.17.

nonresidential investment and 1.4% of GDP.[2] The boom in energy investment provided a major boost to the economy at a time when business investment growth in other sectors had been unusually subdued.[3]

The unexpected collapse in the price of oil has dramatically altered the outlook for energy-related investments. While most observers believe the equilibrium price of oil is well above the current spot price of $45, there is considerable uncertainty regarding the timing of the upward price adjustment and its ultimate magnitude. That is because the price drop has complex origins and can be attributed, in part, to: (1) the decline in oil demand due to the slowdown in oil-intensive emerging market economies; (2) the dramatic increase in the supply of unconventional oil in North America; (3) the 10% increase in the foreign exchange value of the dollar, which has led to a decline in the market price of most dollar-invoiced commodities like oil, copper, iron ore, etc.; (4) a change in the reaction function of Saudi Arabian oil production, which had previously adjusted downward to maintain a higher market price; and (5) the decline in the size of Wall Street broker-dealer inventories, which has reduced liquidity in the $730 billion market for energy-related corporate bonds and forced holders of these securities to hedge their exposure using short positions in oil futures.[4] Currently, futures markets suggest that oil prices will only gradually rise to $60 per barrel by the end of next year.

While the drop in the price of oil is likely to benefit the economy by increasing real incomes and reducing input costs in the transportation sector, it is almost certain to result in a sharp decline in E&P-related capex. Cash flows among E&P firms have been compressed and external

[2] Estimated from NIPA Table 5.3.5, Bureau of Economic Analysis.
[3] Clare, P. and Thomas. J. (2014), "The Opportunities from Underinvestment," Economic Outlook, The Carlyle Group.
[4] Bank of America Merrill Lynch, Global Index System Database, Accessed January 28, 2015.

financing costs have spiked. Credit spreads on energy-related high-yield bonds have doubled over the past year, suggesting the potential for significant default risk if prices remain at current levels. The price decline has also made much incremental development uneconomic, as the per barrel cost exceeds the current market price. In these circumstances, it would not be surprising to see a decline in capex proportional to the drop in oil prices that shaves as much as 0.5% off of U.S. GDP this year.

Current Outlook

Today, investors in the E&P space are more focused on identifying distressed companies than funding new resource development. With investments in new oil production likely to slow considerably, investors' attention is likely to shift to the second and third layers of the domestic energy revolution. While the optimum quantity of E&P investment tends to depend on the price of the energy resource, expected returns on investments in the second layer – "midstream" assets like pipelines, rail and barges, gas storage, and gathering systems – can be invariant to the market price of energy. For example, monthly returns on midstream Master Limited Partnerships (MLPs) have exhibited a lower correlation with changes in the price of oil than the overall S&P 500.[5] And, of course, the expected operating profits of energy-intensive businesses are inversely related to the price of energy. In the absence of frictions, one would anticipate that fixed investment activity would move from resource development to energy transportation infrastructure and manufacturing.

[5] Bloomberg, Monthly Returns over the five years ending January 28. 2015. When including upstream MLPs, the correlation is about the same as for the S&P 500.

As I said at the outset, the three layers of domestic energy investment are distinct, but ultimately closely related. It has become commonplace over the past several years for energy industry analysts in the public and private sector to produce reports forecasting startlingly large increases in domestic natural gas development. Implicit to all of these forecasts are trillions of dollars in investment in infrastructure, generation, and industrial facilities to transport, store, and burn the gas once it's extracted from the ground.

The most recent estimates from the Energy Information Administration (EIA) assume that domestic U.S. natural gas consumption will rise by 6 quadrillion BTU over the next 15 years.[6] To achieve this increase, the EIA assumes that energy-intensive industrial production will grow by 53% in real terms over the next decade. This means that rather than declining as a share of U.S. GDP and energy consumption, as assumed four years ago, the industrial sector is now expected to account for ***all*** of the net increase in U.S. energy consumption over the next decade. For this forecast to be internally consistent, the EIA estimates that the most energy-intensive manufacturing subsectors – paper, chemicals, cement and stone, iron and steel, aluminum, and glass – will grow 26% faster than the economy as a whole through 2025.

This forecast is not fantasy; some of the industrial investment is already apparent. Over the twelve months ending in November 2014, construction of new chemical manufacturing plants increased by 70%.[7] The increase in domestic chemical manufacturing capacity is tied to the multi-year decline in the price of natural gas liquids (NGLs), a key feedstock in the production of ethylene and other bulk chemicals. The decline in NGL prices has dramatically reduced the cost of producing bulk chemicals in the U.S., which has increased the expected returns per

[6] Energy Information Administration, 2014 American Energy Outlook.
[7] Census, Construction Survey, January 2, 2015.

dollar of installed capital and resulted in the aforementioned investment growth. The same dynamic is likely to take hold in other industries where energy accounts for a large share of output. The greater risk to the energy development forecast comes from potential roadblocks to infrastructure investment.

Streamline Permitting Process

To ensure the domestic energy revolution is sustained in this period of low prices, Congress should focus on enhanced transportation and storage infrastructure. Much of the new oil and gas produced in the U.S. is located in parts of the country bypassed by the existing energy infrastructure. These bottlenecks result in a fragmented market that imposes huge deadweight costs on the economy, as producers accept depressed prices, while utilities and industrial users in other parts of the country experience seasonal shortages and price spikes. An estimated $650 billion to $900 billion of fixed investment is required to connect new shale plays with existing energy infrastructure and build new pipelines and storage facilities to accommodate the growth in domestic energy production.[8]

Congress can accelerate the pace of this investment by streamlining the permitting process. A recent Government Accountability Office (GAO) report found that the regulatory review for the average interstate natural gas pipeline averages 558 days between pre-filing and certification.[9] The process is so time consuming because of the number of federal, state, and local agencies involved, the differences in practices across states, and the absence of a single

[8] The range represents results from "North American Midstream Infrastructure through 2035: Capitalizing on Our Energy Abundance," ICF International, March 2014; and "Oil & Natural Gas Transportation & Storage Infrastructure: Status, Trends, & Economic Benefits," IHS International, December 2013.
[9] GAO, "Interstate and Intrastate Natural Gas Permitting Processes Include Multiple Steps, and Time Frames Vary," GAO-13-221.

"lead" agency charged with coordinating the process. The federal government should take steps to expedite the review process without undermining any necessary environmental assessments.

For a firm that raises *ex ante* callable capital to invest in midstream opportunities, such delays can make otherwise attractive projects uneconomic. For example, consider a pipeline project with an expected two-times multiple on invested capital that would otherwise take three years to complete. Adding 558 days to this project would reduce its internal rate of return by 36%. The uncertainty created by the permitting process makes it harder for projects or operating businesses to secure capital early in the planning process. Investment firms seek to deploy their capital as rapidly as practicable and cannot afford to segment large portions of their dry powder to future projects that may not come to fruition.

Conclusion

Increased investment in energy infrastructure has the potential to boost near-term employment and offset some of the drag from the expected decline in E&P capex, but its real promise comes from its potential boost to long-run economic activity. The case for an energy-based "reindustrialization" in the U.S. depends not only on abundant reserves of low-cost natural resources, but also the infrastructure capable of transporting those resources seamlessly across the country. The recent decline in energy prices should focus investors' attention on the hundreds of billions of dollars of investment in transportation, storage, generation and industrial facilities implicit to the most optimistic energy development projections.

Thank you once again for the opportunity to testify.

U.S. House of Representatives

Committee on Transportation and Infrastructure

Subcommittee on Pipelines, Railroads and Hazardous Materials

How the Changing Energy Markets Will Affect U.S. Transportation.

Testimony of Jack N. Gerard

President and CEO of the American Petroleum Institute

February 3, 2014

Good morning Chairman Denham, Ranking Member Capuano and members of the Subcommittee. Thank you for the opportunity to testify today.

API is the national trade association representing all facets of the oil and natural gas industry, which supports 9.8 million U.S. jobs and 8 percent of the U.S. economy. API's almost 650 members include large integrated companies, as well as exploration and production, refining, marketing, pipeline and marine businesses, and service and supply firms.

America's 21st century energy reality is far different than it was just a few short years ago. Gone are the days of American energy scarcity and insecurity. Today, the United States is the world's leading producer of natural gas and leading refiner of petroleum. And soon our nation will be, or as some experts assert, already is, the largest crude oil producer in the world.

There is a growing awareness that this is a unique American moment. It is a moment that marks the transition from endemic energy dependence to energy security and global energy leadership. Both of which have been public policy goals of every president and every Congress since the 1970s.

But to be clear, to secure this unique American moment will depend heavily on our ability to build the necessary infrastructure to achieve our nation's full energy potential.

Investing in our nation's infrastructure means more: more jobs; more revenue to local, state and federal governments; a more dynamic and efficient economy and an improvement in our nation's trade balance.

On the jobs front, an analysis from the IHS consulting group found that essential infrastructure improvements in just the oil and natural gas area could, over the next decade, encourage as much as $1.15 trillion in new private capital investment, support 1.15 million new jobs, and add $120 billion on average per year to our nation's GDP.

This level of potential infrastructure investment eclipses the pending highway bill, but if they were to occur together could mean thousands of well-paying jobs and improve our nation's global economic competiveness at a time when it is most needed.

That's why decisions to improve our nation's electrical grid, roads, pipelines and rail freight lines, particularly those built by the private sector, should be driven by what's best for the American energy consumer, our nation's economy and status as a global energy superpower.

In this era of American energy abundance we must think differently when it comes to how and where we invest in our nation's infrastructure. The past era of energy scarcity required a silo approach to energy policy – each mode considered in isolation and in competition with other modes. In this era of energy abundance we need more of all.

And investing in our nation's infrastructure means that products from all industries move more efficiently within our nation, which lowers costs to consumers and gives our business and manufacturers a competitive edge in the global market.

Given the integral part America's infrastructure plays in job creation and economic growth domestically and our nation's role as an energy leader globally, our efforts must transcend political philosophies and partisan wrangling. Infrastructure investment and improvements benefit us all regardless of our political persuasion.

We agree with what the president said just a few days ago during his State of The Union speech that "21st century businesses need 21st century infrastructure."

The oil and natural gas industry stands ready to work with anyone interested in safely and responsibly improving our nation's energy infrastructure so that it supports our nation's game-changing energy opportunity to benefit all Americans.

It is our view that we should adopt policies that sustain and expand, not pull back, our nation's drive toward energy security and reject policies that would result in a return to scarcity and uncertainty.

Together, we have a once-in-a-generation opportunity to show the world how energy abundance can be used as a positive force, and expanding and modernizing our infrastructure will be essential to our success.

As you and your colleagues deliberate on how best to improve our nation's infrastructure, I urge you to consider the historic opportunity before us and to support policies that transform this unique American moment into an enduring legacy of American energy security and global energy leadership.

Thank you for the opportunity to testify, and I look forward to your questions.

STATEMENT OF

EDWARD R. HAMBERGER
PRESIDENT & CHIEF EXECUTIVE OFFICER
ASSOCIATION OF AMERICAN RAILROADS

BEFORE THE

U.S. HOUSE OF REPRESENTATIVES

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
SUBCOMMITTEE ON RAILROADS, PIPELINES AND HAZARDOUS MATERIALS

HEARING TO EXAMINE THE EFFECTS OF THE U.S. ENERGY RENAISSANCE ON THE TRANSPORTATION SYSTEM

FEBRUARY 3, 2015

Association of American Railroads
425 Third Street SW
Washington, DC 20024
202-639-2100

Introduction

On behalf of the members of the Association of American Railroads (AAR), thank you for the opportunity to discuss the importance of transportation infrastructure investment in light of the United States energy renaissance. AAR's freight railroad members account for the vast majority of freight railroad mileage, employees, and traffic in Canada, Mexico, and the United States.

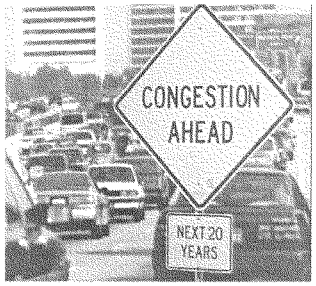
Freight railroads operating in the United States are the best in the world. They move vast amounts of just about everything, connecting businesses with each other across North America and with markets overseas over a rail network spanning 140,000 miles. Their global superiority is a direct result of a balanced regulatory system that relies on market-based competition to establish rate and service standards with a regulatory safety net available to rail customers where there is an absence of effective competition. This balanced regulation has allowed our nation's railroads to improve their financial performance from once anemic levels to much healthier levels today, which in turn has allowed them to spend $575 billion since 1980 on improving the performance of their infrastructure and equipment — to the immense benefit of their tens of thousands of customers and our nation at large.

The long-term demand for freight transportation in this country will undoubtedly continue to grow. In fact, the Federal Highway Administration forecasts that U.S. freight tonnage will rise 45 percent by 2040. Railroads are the best way to meet this demand:

- America's freight railroads are privately owned and operate almost exclusively on infrastructure that they own, build, maintain, and overwhelmingly pay for themselves. When railroads reinvest in their networks — which they've been doing in record amounts in recent years — it means taxpayers don't have to.
- Railroads are, on average, four times more fuel efficient than trucks. That means that moving freight by rail helps our environment by reducing energy consumption, pollution, and greenhouse gases.

- In 2013, the most recent year for which data are available, railroads moved a ton of freight 473 miles, on average, per gallon of diesel. That's roughly equivalent to transporting one ton from Buffalo to Boston, or Long Beach to Tucson, on a single gallon of fuel.
- Highway congestion constitutes a drag on the economy and is an "inefficiency tax" that we all pay: according to the Texas Transportation Institute, Americans waste some 5.5 billion hours and 2.9 billion gallons of fuel each year stuck in traffic. But because a single train can carry the freight of several hundred trucks — enough to replace a 12-mile long convoy of trucks on the highways — railroads cut highway gridlock, as well as the high costs of highway construction and maintenance.
- Thanks to competitive rail rates — 42 percent lower, on average, in 2013 than in 1981[1] — freight railroads save consumers billions of dollars every year. Millions of Americans work in industries that are more competitive in the global economy thanks to the affordability and productivity of America's freight railroads.
- Railroads are very safe and getting even safer. Recent years have been the safest in rail history; preliminary data suggest that 2014 saw the lowest train accident rate in history.

With highway congestion becoming more acute and with public pressure growing to reduce emissions, conserve fuel, and promote safety, railroads are likely to be called upon to do even more in the years ahead, given their substantial advantages in these areas over other transportation modes. Demands for use of freight-owned track by passenger trains are mounting and will probably continue to grow. And, of course, as our economy evolves — as exemplified in recent years by the growth in rail intermodal traffic, chemicals, crude oil, sand, and other rail commodities — railroads will continue to be called upon to make additional investments in their networks to provide the efficient, reliable, and cost-effective freight transportation service that rail customers, and our nation, need to prosper.



In my testimony below, I will discuss the importance of rail infrastructure, ways it differs from other types of transportation infrastructure, and its crucial role in the development of

[1] Based on inflation-adjusted revenue per ton-mile.

energy and other markets. I will also discuss ways policymakers can help ensure that our nation has the freight rail capacity it needs now and in the future.

Overview of Freight Rail Infrastructure and Investments

Freight railroading requires vast amounts of capital and maintenance spending for infrastructure such as track, signals, and structures; for communications and information technology; for equipment such as locomotives and freight cars; and for technology research, development, and implementation.

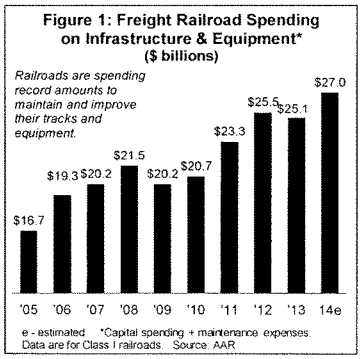
Prior to passage of the Staggers Rail Act of 1980, much of the U.S. rail infrastructure base was in miserable condition, mainly because railroads lacked the funds to properly maintain it.[2] By the mid-1970s, more than 47,000 route-miles had to be operated at reduced speeds because of dangerous track conditions. The amount of deferred maintenance was in the billions of dollars and the term "standing derailment" — when stationary railcars simply fell off poorly maintained track — was often heard.

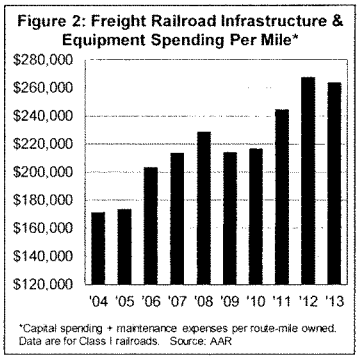
All this changed with the passage of the Staggers Act and the balanced regulatory structure it brought about. Railroads responded to the deregulatory reforms implemented by the Staggers Act by rationalizing and upgrading their systems, dramatically increasing productivity, improving service, sharply lowering average rates for their customers, and reinvesting heavily in productive rail infrastructure and equipment.

---

[2] In a nutshell, the Staggers Act eliminated many of the most damaging regulations that hindered efficient, cost-effective freight rail service. Among other things, Staggers allowed railroads to base most of their rates on market demand; allowed railroads and shippers to enter into confidential contracts; streamlined procedures for the sale of rail lines to new short line railroads; and explicitly recognized railroads' need to earn adequate revenues. Under Staggers, regulators retained authority to protect shippers and consumers against unreasonable railroad conduct and unreasonable railroad pricing in the absence of effective competition; regulators still have this authority today. For more on the Staggers Act, see https://www.aar.org/BackgroundPapers/The%20Impact%20of%20the%20Staggers%20Rail%20Act%20of%201980.pdf.

Indeed, from 1980 to 2014, America's freight railroads have spent $575 billion — of their own funds, not government funds — on capital expenditures and maintenance expenses related to locomotives, freight cars, tracks, bridges, tunnels and other infrastructure and equipment. That's more than 40 cents out of every revenue dollar, invested back into a rail network that keeps our economy moving. In recent years, despite the recession, railroads have been spending more than ever before, including more than $25 billion in 2012 and 2013 and an estimated $27 billion in 2014 (see Figure 1). Put another way, America's freight railroads are spending more than $500 million per week on infrastructure and equipment. In 2015, that number will likely be even higher.

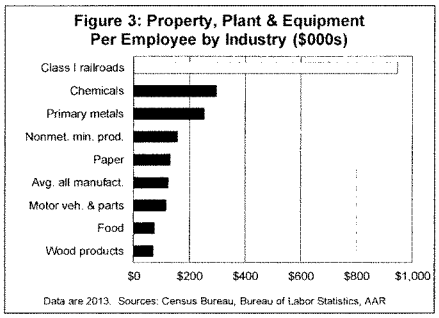




Railroad spending on infrastructure and equipment has soared over the past decade and now exceeds $260,000 per mile of railroad (see Figure 2). This is an extraordinary level of funding, and is a clear indication of the remarkable diligence with which railroads have been approaching capacity and infrastructure issues.

By any of a number of measures, the capital intensity of freight railroading is at or near the top among all U.S. industries. For example, freight railroads today spend an average of about 18 percent of revenue on capital investment. The comparable figure for the U.S. manufacturing

sector as a whole is around 3 percent. Similarly, railroad net investment in plant and equipment per employee — a measurement that incorporates cumulative capital spending over many years — is far higher than other industries. As Figure 3 shows, the figure for railroads for 2013 — $946,000 per employee — is more than seven times the average for all U.S. manufacturing ($124,000).



Railroads also have significantly higher asset needs for each dollar of revenue produced than other industries. As Figure 4 shows, based on Fortune 500 data, the figure for railroads for 2013 ($2.81) is two and a half times the Fortune 500 average for industrial firms ($1.14). Firms with more assets, like railroads, need higher profits to cover the costs of those assets.

Figure 4: Ratio of Assets to Revenue - 2013

Industry		Industry	
Utilities, Energy	3.52	**Fortune 500 Median***	**1.14**
Railroads	**2.81**	Aerospace and Defense	1.14
Mining, Crude Oil Prod.	2.67	Packaging, Containers	1.13
Pharmaceuticals	2.30	Industrial Machinery	1.11
Telecommunications	2.11	Motor Vehicles & Parts	1.08
Beverages	1.78	Electronics, Electrical Equip.	1.01
Household & Personal Prod.	1.41	Metals	0.95
Pipelines	1.36	Food Production	0.73
Construction & Farm Machin.	1.34	Package & Freight Delivery	0.70
Chemicals	**1.32**	Petroleum Refining	0.70
Airlines	1.25	Trucking & Logistics	0.58
Forest & Paper Products	1.22	Retailers	0.46

*Excludes real estate and financial firms. Source: *Fortune* June 16, 2014

Thanks to their massive investments, Class I freight rail infrastructure today is in its best overall condition ever. The challenge for railroads, and for policymakers, is to ensure that the current high quality of rail infrastructure is maintained and that adequate freight rail capacity exists to meet our nation's current and future freight transportation needs.

Constraints on Rail Infrastructure Funding

As noted above, unlike other transportation modes, freight railroads overwhelmingly finance their infrastructure spending with private, not public, funds.

Because U.S. freight railroads must fund the vast majority of their infrastructure spending themselves, these investments in rail infrastructure are accompanied by substantial financial risk. Accordingly, railroads' capacity investments must pass appropriate internal railroad investment hurdles, and the investments will be made only if they are expected to generate an adequate return over a long period of time.

For this reason, adequate rail earnings over the long term are critical if railroads are to be able to make the capacity investments they need to meet their customers demand and propel the economy forward. If a railroad is not financially sustainable over the long term, it will not be able to make capacity investments to maintain its existing network in a condition to meet current transportation demand, or make additional investments in the replacement or expansion of infrastructure required by growing demand.

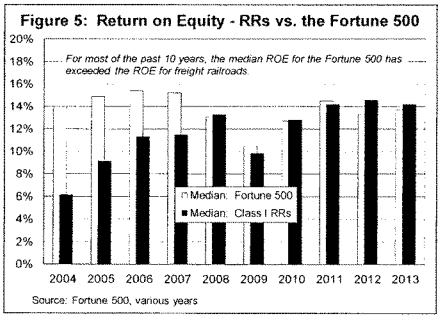
Major freight railroads face additional constraints because they are either publicly traded or are subsidiaries of publicly traded companies. As such, they must provide their shareholders a return commensurate with what those shareholders could obtain in other markets with comparable risk. If railroads are viewed as returning less to shareholders, for whatever reason, than comparable alternatives, then capital will flee the rail industry or will only be available at much higher costs.

I respectfully suggest that these points — that railroads must be able to earn sufficient revenue so that they can invest in and grow their networks, and that, as public companies, they must provide their shareholders with a return that will entice them to invest their money with

railroads — are crucial for members of this committee and other policymakers to keep firmly in mind as they consider rail-related legislation and regulation.

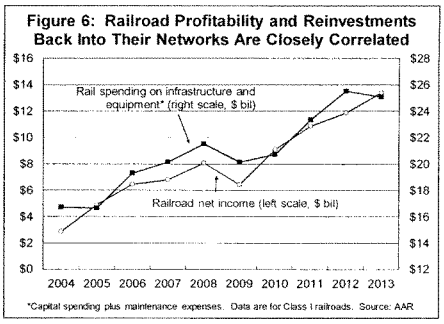
There is no question that freight railroad financial performance in recent years has been much improved compared to earlier years, with some railroads recording "record profits." Until recently, rail profitability was generally poor relative to most other industries. Thus, an improvement from earlier years may be a "record," yet may still yield levels of profitability that are only about average compared with the earnings achieved by most of the other industries against which railroads compete for capital.

One example that illustrates this point is return on equity (ROE), a measure of profitability that reveals how much profit a company generates with the money shareholders have invested. Figure 5 shows that the ROE for the rail industry has improved over the past few years, but it is still only about average compared to the Fortune 500. To use a baseball analogy, a hitter with a lifetime batting average of, say, .225 isn't automatically headed to the Hall of Fame when his batting average goes up to, say, .250.



It would be a tremendous mistake for policymakers to view recent improvements in rail earnings as a reason to cap rail earnings through price controls, artificial competitive constraints, or by other means. This would cause capital to flee the industry and severely harm railroads' ability to reinvest in their networks. Figure 6 shows that, as rail industry profitability has risen in recent years, so has rail spending back into their networks. You can't have one without the

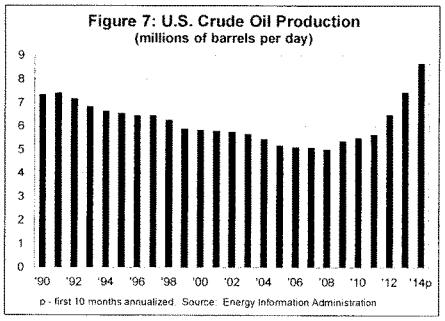
other. Indeed, if our freight rail industry is to fully deliver its potential benefits to the economy, its current financial performance should only be regarded as a step along the path toward sustainability, not as a final destination.



At a time when the pressure to reduce government spending on just about everything — including transportation infrastructure — is enormous, it makes no sense to enact public policies that would discourage private investments in rail infrastructure that would boost our economy and enhance our competitiveness. Improvements in rail profitability reflect the fact that the current system of rail regulation is working. After all, long-term sustainability through higher earnings is precisely what Congress meant for railroads to achieve when it passed the Staggers Act in 1980.

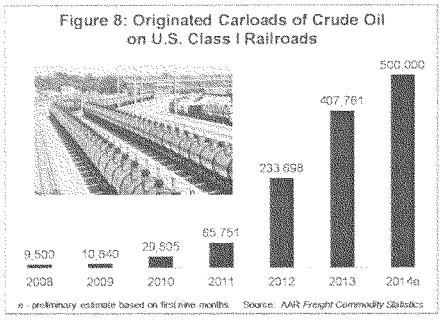
The Transportation Demands of New Energy Resources

The development of shale oil in the United States is well known. The huge growth in domestic oil production — to close to 9 million barrels per day in 2014 (see Figure 7) — has moved our nation closer to energy independence. Already, the benefits to our nation have been pronounced: tens of billions of dollars in reduced oil imports from unstable countries whose interests do not correspond to our own; increased economic development around the country;



thousands of new well-paying jobs; substantial amounts of new tax revenue; and, in recent months, a sharp decline in gasoline and heating oil prices that is the functional equivalent of giving the average U.S. household hundreds of dollars in additional spending money. Rail has played a key role in delivering these benefits to our country.

Railroads have seen dramatic recent increases in demand to transport crude oil. In 2008, U.S. Class I railroads originated 9,500 carloads of crude oil.[3] By 2013, they were up to more than 407,000. Final numbers for 2014 aren't in yet, but they were probably around 500,000 (see Figure 8). In the first nine months of 2014, crude oil accounted for about 1.7 percent of total originated carloads on Class I railroads, up from just 0.03 percent in 2008.



Assuming for simplicity that a rail tank car holds about 30,000 gallons (714 barrels) of crude oil, railroads' approximately 500,000 carloads of crude oil in 2014 equal around 980,000 barrels per day, or around 11 percent of U.S. crude oil production.

Of course, crude oil has little value unless it can be transported to refineries, but most U.S. refineries are located in traditional crude oil production areas (Texas, Oklahoma) or on the coasts where crude oil transported by tanker ship is readily accessible (California, Washington, New England, Gulf of Mexico).

Historically, most crude oil has moved from production areas to refineries by pipeline. However, in many of the new shale oil production areas, especially North Dakota, the existing

[3] "Originated" means a loaded railcar began its rail journey.

pipeline network lacks the capacity to handle the higher volumes, and it lacks the flexibility and geographic reach to serve many potential markets. Railroads, though, have these attributes. They offer market participants the flexibility to transport product quickly to different places in response to market needs, and rail facilities can almost always be built or expanded much more quickly than pipelines and refineries. Essentially, railroads are the only transportation mode that can expand capacity quickly enough to keep up with production growth in the emerging oil fields. In some areas, the ability of a railroad to serve a refinery can make the difference between the refinery continuing to operate or closing down.

At this writing, the crude oil market continues to be wracked by uncertainty, with prices down sharply from where they were six months ago. No one knows what the future will bring, except that railroads will continue to work very hard to provide reliable, safe, cost-effective transportation to crude oil producers and consumers. Even as more pipelines are built or expanded, railroads will continue to provide a set of advantages — especially flexibility — that will enable them to continue to play a key role in the petroleum-related market long into the future.

Safety is Paramount

Railroads share the deep concern of members of this committee and the public at large regarding the safe transport of crude oil. From 2000 through 2013, a period during which U.S. railroads originated approximately 832,000 carloads of crude oil, more than 99.98 percent of those carloads arrived at their destination without a release caused by an accident. That said,

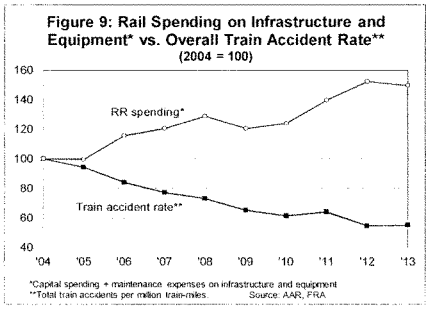
railroads recognize that more work must be done to ensure public confidence in the transportation of crude oil by rail. Working cooperatively with government agencies, our customers, our employees, and our suppliers, we're applying what we've learned over the past few years as rail crude oil traffic has surged to help ensure that our nation is able to safely and reliably utilize the tremendous national asset that domestic crude oil represents.

Railroads devote enormous resources to enhancing safety no matter what they are carrying. That said, railroads have adopted special measures when it comes to moving crude oil by rail. Rail actions in this regard fall into three broad categories: accident prevention, accident mitigation, and emergency response.

Accident Prevention

Railroads' overall safety record, as measured by Federal Railroad Administration (FRA) data, has been trending in the right direction for decades. In fact, preliminary data indicate that 2014 saw the lowest train accident rate in history. Railroads are proud of this fact, but they know the pursuit of safety never ends. Railroads are always looking for ways to prevent accidents, including through the following means:

- Reinvestments. One of the most important ways railroads have reduced accidents is through significant and consistent investments back into their networks. For example, a railroad might replace lighter weight rail with heavier rail made from a higher quality steel that is more durable and can better handle heavy trainloads than the rail it replaced. Despite a weak economy, railroads have invested far more back into their networks over the past five years than in any five-year period in history. For many of these investments, improving safety is a primary reason the investments are made. As Figure 9 shows, in the 10 years from 2004 to 2013, rail spending on their networks rose 50 percent while the train accident rate fell close to 50 percent.



- Technological advancements. Railroads are constantly incorporating new technologies to improve rail safety, including sophisticated detectors along tracks that identify defects on passing rail cars and specialized inspection cars that identify defects in tracks.
- Defect detectors. As of July 2014, specialized track side "hot box" detectors have been installed at least every 40 miles along routes with trains carrying 20 or more cars containing crude oil. These detectors help prevent accidents by measuring if wheel bearings are generating excessive heat and therefore are in the process of failing. This allows the freight cars to be taken out of service and repaired before an accident occurs.
- Routing model. Several years ago, the rail industry and several federal agencies jointly developed the Rail Corridor Risk Management System (RCRMS), a sophisticated statistical routing model designed to help railroads analyze and identify the overall safest and most secure routes for transporting highly hazardous materials. The model uses a minimum of 27 risk factors — including hazmat volume, trip length, population density along the route, availability of alternate routes, and emergency response capability — to assess the overall safety and security of rail routes. Major U.S. railroads are now using the RCRMS for trains carrying at least 20 carloads of crude oil.
- Inspections. FRA regulations dictate the types and frequencies of inspections railroads must perform. New FRA regulations regarding inspections for internal rail defects became effective on March 25, 2014. For main line tracks on which trains carrying at least 20 carloads of crude oil travel, railroads have agreed to perform at least one more internal rail inspection each calendar year than the new FRA regulations require. In addition, railroads will conduct at least two automated comprehensive track geometry inspections each year on main line routes over which trains with 20 or more loaded cars of crude oil are moving, something FRA regulations do not currently require.
- Speed restrictions. In August 2013, railroads self-imposed a 50-mph speed limit for trains carrying 20 or more carloads of crude oil. As of July 2014, if a train is carrying at least 20 cars of crude oil and at least one of those cars is an older "DOT-111" car (these cars are discussed further below), that train will travel no faster than 40 mph when travelling within one of the 46 nationwide "high threat urban areas" designated by the Department of Homeland Security.
- Train braking. As of April 1, 2014, trains operating on main line tracks carrying at least 20 carloads of crude oil have been equipped either with distributed power locomotives (i.e., locomotives placed in locations other than the front of the train) or with two-way telemetry end-of-train devices. These technologies allow train crews to apply emergency brakes simultaneously from both the head end and locations further back in the train in order to stop the train faster.

Accident Mitigation

In addition to their efforts to prevent accidents from occurring, railroads have long been taking steps to mitigate the consequences of accidents should they occur. Many of these mitigation efforts focus on increased federal tank car safety and design standards. For example:

- In March 2011, the AAR petitioned the Pipeline and Hazardous Materials Safety Administration (PHMSA) to adopt more stringent requirements for new tank cars used to transport certain types of hazardous materials, including crude oil. These tougher standards called for more puncture resistance and additional protection for the fittings on the top of a car that enable access to the inside of the car.
- In July 2011, after it had become clear that PHMSA adoption of the AAR's proposal was not imminent, the industry committee that oversees tank cars adopted the PHMSA proposal as the basis for new industry standards for tank cars used to carry ethanol or crude oil. The new standards, referred to as "CPC-1232," apply to new tank cars ordered after October 1, 2011. To date, around 60,000 tank cars have been built to this tougher CPC-1232 standard.
- In November 2013, the rail industry called on PHMSA to adopt standards even more stringent than CPC-1232. Railroads expressed support for requiring that new tank cars be equipped with jackets and thermal protection, full-height head shields, top fittings protections, and bottom outlet handles that will not open in a derailment. The November 2013 proposal also called for aggressively retrofitting or phasing out of tank cars used to transport crude oil or ethanol that don't meet appropriate standards.
- Since November 2013, the rail industry has continued to evaluate what other standards might be appropriate to enhance tank car safety. For example, railroads now support strengthening tank cars used to transport crude oil with even thicker shells than in their 2011 proposal.
- Approximately 228,000 tank cars are so-called "DOT-111" general service tank cars. Around 100,000 DOT-111 cars are used to transport crude oil or other flammable liquids. To the extent that DOT-111 cars are used to transport crude oil or ethanol, the rail industry believes they should be retrofitted or replaced as described above.

Emergency Response

Railroads have extensive emergency response functions, which work in cooperation with federal, state and local governments, to assist communities in the event of an incident involving crude oil or other hazardous materials:

- Railroads' emergency response efforts begin internally:
  - ✓ All the major railroads have teams of full-time personnel whose primary focus is hazmat safety and emergency response, as well as teams of environmental, industrial hygiene, and medical professionals available to provide assistance during hazmat incidents.
  - ✓ Railroads maintain networks of hazmat response contractors and environmental consultants, strategically located throughout their service areas, who can handle a wide variety of air, water, waste and public health issues.

- ✓ Railroads have comprehensive "standard of care" protocols that ensure that impacts to the community (such as evacuations) are addressed properly.

- Each year, railroads actively train well over 20,000 emergency responders throughout the country. This training ranges from general awareness training to much more in-depth offerings. The training programs vary from railroad to railroad, but in general they consist of a combination of some or all of the following aspects:
  - ✓ Safety trains. Several railroads utilize "hazmat safety trains" and other training equipment that travel from community to community to allow for hands-on training for local first responders.
  - ✓ Training centers. Several railroads operate centralized hazmat training sites where they train employees, first responders, customers, and other railroad industry personnel in all aspects of dealing with hazmat incidents.
  - ✓ Local firehouse visits. In aggregate, railroads visit hundreds of local firehouses each year to provide classroom and face-to-face hazmat training.
  - ✓ Table top drills. Railroads regularly partner with local emergency responders to conduct simulations of emergency situations in which general problems and procedures in the context of an emergency scenario are discussed.
  - ✓ Self-study training courses. Railroads make available self-study programs for emergency responders that allow students to learn at their own pace.

- Railroads also support our nation's emergency response capability through the Security and Emergency Response Training Center (SERTC), a world-class facility in Pueblo, Colorado, that is operated by the Transportation Technology Center, Inc. (TTCI). Since its inception in 1985, SERTC has provided in-depth, realistic, hands-on hazmat emergency response training to well over 50,000 local, state, and tribal emergency responders and railroad, chemical, and petroleum industry employees from all over the country. Most of the training at SERTC is advanced training that builds on basic training responders receive elsewhere.

- Many railroads regularly provide funding to emergency responders in their service areas to attend SERTC. In addition, railroads last year provided $5 million to develop a specialized crude-by-rail training and tuition assistance program for local first responders. The funds were used to design a curriculum at TTCI specifically devoted to crude oil emergency response, to provide tuition assistance for an estimated 1,500 first responders to attend TTCI for training, and to provide additional training to local emergency responders closer to home.

- For years, railroads have provided appropriate local authorities, upon request, with a list of the hazardous materials, including crude oil, transported through their communities.

- Railroads have developed an inventory of emergency response resources along their networks. This inventory includes locations for the staging of emergency response equipment and contact information. Railroads provided the DOT with this information.

- Since October 2014, major railroads have had in place a web-based system — www.askrail.com — that allows emergency responders to input the identification number

of a particular rail car and immediately determine the commodity contained in that car, its hazard class, its four-digit identification number, whether the car is loaded or empty, the handling railroad, the handling railroad's emergency contact phone number, and emergency response information associated with the commodity.

- Emergency responders have control of railroad accidents in which hazardous materials are spilled, but railroads provide the resources for mitigating the accident. Railroads also reimburse local emergency agencies for the costs of materials the agencies expend in their response efforts.

What Policymakers Should and Should Not Do to Support Rail Investments

I respectfully suggest that it is in our nation's best interest to allow the huge public benefits of freight railroading to accrue as quickly as possible. Policymakers can help by enacting policies that encourage railroads to make investments in their networks and by avoiding policies that discourage private rail investment.

Keep Economic Regulation Balanced

The post-Staggers structure of rail regulation relies on competition and market forces to determine rail rates and service standards in most cases, with maximum rate and other protections available to rail customers where there is an absence of effective competition. This deregulatory structure has benefited railroads *and* their customers. However, despite the severe harm caused by excessive railroad regulation prior to Staggers and the substantial public benefits that have accrued since its enactment, some groups want to again give government regulators control over crucial areas of rail operations.

It is beyond the scope of this testimony to describe in detail why rail reregulation would be so destructive to railroads and to the broader economy. In essence, it would use what amounts to price controls to restrain rail rates to below-market levels for a certain segment of rail customers, at the expense of other shippers, rail investors, rail employees, and the public at large. Rail earnings would necessarily fall, potentially by several billions of dollars per year. This would

cause tremendous harm to our nation because it would make it far more difficult for railroads to make the massive investments they need year after year to meet current and future freight transportation demand.

Any policy, including a swing in the regulatory environment back to micro-management of rail operations, that endangers future revenue and capital cost recovery threatens the sustainability of our nation's rail system and must be avoided. If counterproductive, artificial restraints restrict rail earnings, rail spending on infrastructure will shrink, the industry's physical plant will deteriorate, and rail service will become slower and less reliable. Eventually, either the government will have to make up the difference in earnings in the form of major subsidies to railroads, or rail management will have to reduce what they are able to spend on rail network improvements that allow railroads to improve safety, provide the service levels their customers demand, and create the efficiencies we need to ensure our economy is competitive in the global economy.

Don't Add Unnecessary Uncertainties or Inefficiencies to Rail Operations

America's freight railroads are the most productive and efficient in the world, and their productivity has skyrocketed since the Staggers Act was passed. Today, U.S. railroads generate approximately double the freight volume they had in 1980, but they do so far more safely and reliably, and with far fewer miles of track, employees, locomotives, and gallons of fuel, than they needed back then. Future rail efficiency gains will require continued significant expenditures on infrastructure and equipment (including large amounts of new capacity) and innovative new technologies, but they will also require appropriate public policies.

For example, the need for efficiency helps explain why railroads strongly oppose efforts to reverse existing policy under which the STB must first find that a railroad serving a terminal

area is engaged in anti-competitive conduct before the STB can order the railroad to "switch," or interchange, traffic to another railroad when such an interchange is not necessary for freight delivery. Adding an interchange to a movement that is currently handled in single-line service adds substantial time, complexity, and costs to that movement. Over the years, railroads have invested tens of billions of dollars and enormous effort into concentrating traffic onto routes that are the most efficient for rail customers as a whole; part of this effort has been the development of very efficient and streamlined terminal switching. The result? Sharply higher productivity, reliability, and asset utilization, and lower freight rates for most rail customers. Forced reciprocal switching would destroy these terminal efficiencies, compromise the service improvements they have created for rail customers, and raise rail costs. The added switching activity that would be required, the increased possibility of service failures caused by that new switching activity, and the complex operations that would be required to bring about the new interchanges would disrupt rail traffic patterns, produce congestion in rail yards, and undermine efficient service to customers.

The need for efficiency also helps explain why railroads oppose a variety of other proposals that have been proffered in recent years, including (but not limited to) reversing existing "bottleneck" policy[4], forcing railroads to prioritize certain types of traffic over other types, the imposition of speed limits on certain types of traffic that are not necessary from a safety standpoint, and local bans on the transport of certain commodities in certain areas. When considering these and similar proposals, policymakers should take great care in weighing the

[4] In "bottleneck" situations, one railroad can move freight from an origin to an intermediate point, and from that intermediate point on to a final destination, and at least one other railroad can also move the freight from that intermediate point to the final destination. For a more detailed explanation of the bottleneck issue, see: https://www.aar.org/BackgroundPapers/Bottleneck%20Policy%20-%20Dont%20Fix%20What%20Isnt%20Broken.pdf.

supposed benefits of the proposals with the substantial harm they would cause to railroad efficiency and, consequently, to our nation's economic well-being. It's also crucial that policymakers remember that railroads are integrated and interconnected networks: what happens regarding rail infrastructure and operations in one location could have ramifications in locations hundreds or even thousands of miles away.

Enhance Rail Capacity Through Permitting Reform

Under existing law, state and local regulations that unreasonably interfere with freight rail operations are preempted by federal regulations. These federal regulations protect the public interest while recognizing that freight railroads form an integrated, national network that requires a uniform basic set of rules to operate effectively.

Nevertheless, rail expansion projects often face vocal opposition from members of affected local communities or even larger, more sophisticated special interest groups from around the country. In many cases, railroads face a classic "not-in-my-backyard" problem, usually based on allegations of violations of various environmental or historic preservation laws, even for projects for which the benefits to a locality or region far outweigh the drawbacks. This means that the amount of time and energy it takes to get projects from the drawing board to construction and completion is growing longer every day.

In the face of local opposition, railroads try to work with the local community to find a mutually satisfactory arrangement, and these efforts are usually successful. When agreement is not reached, however, projects can face lawsuits, seemingly interminable delays, and sharply higher costs. Rail capacity, and railroads' ability to provide the transportation service upon which our nation depends, suffer accordingly.

Some of the ways that policymakers can streamline rail-related environmental permitting include:

- *Extend environmental review provisions of MAP-21 to railroads.* MAP-21 contains a number of provisions to facilitate the construction of transportation projects, such as timelines, but the relevant statute is written in a way that excludes rail projects.
- *The U.S. Department of Transportation (DOT) should have a single, uniform set of categorical exclusions.* A uniform set of categorical exclusions for all DOT agencies would lead to better coordination of project review.
- *Extend highway exemption in Section 106 of the National Historic Preservation Act to railroads.* In 2005, the DOT generally exempted federal agencies from the Section 106 requirement of having to review interstate highway projects for historic preservation impacts. This exemption should be extended to railroad rights-of-way.

Railroads are not asking policymakers to allow railroads to avoid reviewing all historical and environmental consequences of a proposed project. They do want policymakers to help improve the movement of freight by taking steps to shorten the time it takes for reviews of rail expansion projects in ways that do not adversely affect the quality of those reviews.

We appreciate this committee's leadership on the issue of streamlining project delivery/permitting reform. Your "Passenger Rail Reform and Investment Act" directs the Secretary of Transportation to issue rules to streamline the environmental review, permitting, and approval or disapproval of rail projects and includes procedures for creating process efficiencies, such as conducting concurrent reviews, establishing deadlines for decisions, providing for improved agency coordination, and considering expanded categorical exclusions. You also took meaningful steps in this legislation to streamline the historic preservation review process that would help address challenges that the rail industry has encountered in positive train control (PTC) deployment. Your efforts on these issues are a critical step forward toward creating a more efficient process in getting projects completed.

Engage in Public-Private Partnerships

Public-private partnerships — arrangements under which private freight railroads and government entities both contribute resources to a project — offer a mutually beneficial way to solve critical transportation problems.

Without a partnership, many projects that promise substantial public benefits (such as reduced highway congestion by taking trucks off highways, or increased rail capacity for use by passenger trains) in addition to private benefits (such as enabling faster freight trains) are likely to be delayed or never started at all because neither side can justify the full investment needed to complete them. Cooperation makes these projects feasible.

With public-private partnerships, the public entity devotes public dollars to a project equivalent to the public benefits that will accrue. Private railroads contribute resources commensurate with the private gains expected to accrue. As a result, the universe of projects that can be undertaken to the benefit of all parties is significantly expanded.

Perhaps the most well-known public-private partnership involving railroads is the Chicago Region Environmental and Transportation Efficiency Program (CREATE), which has been underway for several years. CREATE is a multi-billion dollar program of capital improvements aimed at increasing the efficiency of the region's rail infrastructure. A partnership among various railroads, the city of Chicago, the state of Illinois, and the federal government, CREATE includes 70 projects, including 25 new roadway overpasses or underpasses; six new rail overpasses or underpasses to separate passenger and freight train tracks; 35 freight rail projects including extensive upgrades of tracks, switches and signal systems; viaduct improvement projects; grade crossing safety enhancements; and the integration of information

from dispatch systems of all major railroads in the region into a single display. To date, 22 projects have been completed, 10 are under construction and 18 are in the design phase.

Railroads are confident that, as CREATE proceeds, rail operations in Chicago will become more fluid and better able to withstand shocks such as those presented by extreme weather.

Implement Corporate Tax Reform

Today more than ever, countries around the world are competing to attract new businesses and investments to help their economies grow and create jobs. One step many countries have taken — but not the United States — is reducing their corporate income tax rate. The United States should follow their example. Today, the U.S. corporate income tax rate is the highest in the developed world. A lower rate would improve the prospects for economic growth, job creation, and inbound foreign direct investment in manufacturing. It would also encourage capital investments, including by railroads, that would enhance productivity, inspire innovation, and ultimately lead to a higher standard of living for all Americans.

Railroads also urge members of this committee to support an extension of the "Section 45G" tax credit program. Originally enacted in 2004, Section 45G creates a strong incentive for short line railroads to invest private sector dollars on freight railroad track rehabilitation. The credit expired on December 31, 2014. Short line freight rail connections are critical to preserving the first and last mile of connectivity to factories, grain elevators, power plants, refineries, and mines in rural America and elsewhere.

Conclusion

While railroads have made tremendous strides in improving their ability to serve their customers efficiently and reliably, the challenges of operating a rail system capable of meeting

present and future needs is daunting and will require the benefit of effective public policy. Freight railroads look forward to working with this committee, others in Congress, and other appropriate parties to develop and implement policies that best meets this country's transportation needs.

Responses to Questions for the Record
February 3, 2015 Hearing
House Transportation and Infrastructure Committee
Subcommittee on Railroads, Pipelines, and Hazardous Materials

1. At the hearing, we discussed the total number of tank cars in flammable liquid service. Could you please provide for the record, the breakdown of how many DOT-111s and CPC-1232s there are in crude oil and ethanol service, both jacketed and unjacketed.

The information provided below is based on the movements of all flammable liquids that took place during the first quarter of 2015. It is important to understand that this information represents the tank car fleet at a moment in time and that there are substantive changes that take place in the composition of the fleet as it evolves to meet the needs of the marketplace. With the exception of the total number of tank cars and total number of DOT-111s, the data reflects movements in the United States.

Total number of tank cars in North America:[1]	389,969
Total number of DOT-111 specification tank cars in North America:[1]	270,448

	Crude Oil[2]	Ethanol[2]	Other Flammable Liquids[2]	Total
Non-Jacketed DOT-111[3]	5,975	27,098	12,518	45,591
Jacketed DOT-111[4]	1,107	73	4,470	5,650
Non-Jacketed CPC-1232	15,640	1,333	1,670	18,643
Jacketed CPC-1232	12,862	394	995	14,251
Sub-Total	35,584	28,898	19,653	84,135
Less - Cars double counted above that were used for multiple commodity groups:				590
Total unique cars used in flammable liquid service in 1Q-2015				83,545

Notes:

1. Total number of tank cars and DOT-111s from UMLER system.
2. Cars made at least 1 loaded trip in 1Q-2015.
3. Includes 184 Non DOT-111 cars of similar specification.
4. Includes 422 Non DOT-111 cars of similar specification.

2. **Q: At the hearing we discussed your members' concerns with the time it takes to conduct environmental reviews. Could you please provide several more examples of projects that could have been helped by streamlining provisions were the applicable to your members?**

BNSF Example

The Tower 55 Multimodal Transportation Improvement Project is a good example of a rail-related project that would have benefitted from currently contemplated improvements to and streamlining of the permit and project delivery process, resulting in both time and money saved with no adverse impacts to the environment or historic properties.

One of the nation's busiest rail intersections – where BNSF's north-south MidCon route and Union Pacific Railroad's east-west main lines cross near downtown Fort Worth – now has expanded capacity, thanks to the completion in 2014 of the $104 million Tower 55 project. The project was partially funded with $65 million from BNSF and UP and, in partnership with the North Central Texas Council of Governments (NCTCOG), the City of Fort Worth and the Texas Department of Transportation (TxDOT), successfully secured a matching $34 million U.S. DOT TIGER II grant. The city, NCTOG and TxDot also contributed funding for the project.

About 90 freight and passenger trains pass through this intersection, which also affected commuters on the roadways that cross those tracks. The project included the construction of a new north-south main railroad track, a redesigned rail signal and interlocker system, improvements to bridges, closure and renovation of several at-grade road and pedestrian crossings, and an underpass in adjacent neighborhoods. Also, several pedestrian and car crossings near downtown were revamped.

During last year's ribbon cutting ceremony, then FRA Administrator Joe Szabo said the federal grant shows "Americans are recognizing the importance of passenger rail and freight rail." The project is anticipated to boost the local economy, create jobs and tie together the fastest-growing markets in Texas. Other benefits include reduced emissions and fuel savings for railroads and local road traffic.

One important component of the overall project involved replacement of an old rail bridge still in operation, a structure that was eventually determined to not be historic or significant, and not eligible for listing in the National Register of Historic Places. This determination was important to avoid having the project fall outside of the Federal Railroad Administration's categorical exclusion for rail bridge construction, which exists to facilitate just such a project, and requiring a more costly and time consuming environmental review. However, getting to that conclusion involved a lengthy and unfortunately all too familiar bureaucratic process that plays out time and again across the country with respect to common older rail bridges.

In this case, and in order to avoid further delay while countering calls from state historic preservation officials for extensive mitigation surrounding replacement of the aged structure, the railroad found it necessary to enlist the support and expertise of historic transportation structure experts, including a recently named Curator Emiritus of the Smithsonian Institution with 26 years of service to that esteemed organization. With the aid of these experts, the railroad was essentially compelled to prove a negative, that the bridge in fact was not significant, historic or eligible for listing in the register. While the Tower 55 multimodal transportation improvement project was ultimately completed and deemed a success, the added time and costs associated with just one aspect of one discreet component of the larger effort was discouraging and ultimately proved unnecessary. Fortunately in this instance the delays and push for ever more government involvement and review did not kill the project. However, it is a good reminder and prime example of why policymakers should continue to look for ways to further streamline and improve the project delivery and related environmental review and permitting processes.

CSX Examples

Project: **Central Florida Intermodal Logistics Center (CFILC) – Winter Haven, FL**

Cost: $100M+

Public Benefits: 1,800 direct jobs, 8,500 indirect jobs and $10 billion in economic development over 10 years with the construction of a warehousing and distribution center surrounding the terminal. Reduction of trucks on I-75 and I-4 as truck volume is shifted to rail and replaced by local Florida traffic.

Link to Project: http://www.transdevelopment.com/?project=winter-haven

Background: This project was part of the SunRail transaction in which CSX sold the state 61 miles of track for $432 million to accommodate SunRail commuter service in Orlando. CSX reinvested all of the proceeds into its Florida network, including the development of the CFILC to provide a geographically central freight hub and economic growth center in central Florida.

Timeline: Agreed upon in 2008; Construction began in 2012; Completed and operational in 2014

Length of NEPA process: 828 days (2.5 years).

One example of delay from the lack of concurrent review is the US Fish and Wildlife Service took nine months to complete its opinion resulting in a delayed Corps of Engineers approval.

Issue: Historical Preservation Act (HPA) remediation – unlike highways and roads, railroads have not been exempted from the Historical Preservation Act requiring sign off and mitigation from State Historical Preservation offices for work on rail projects.

Project: **Replacement of CSX Virginia Avenue Tunnel – Washington, DC**

Cost: Initially in 2008 project estimated at $122M, but after completion of NEPA in 2014, costs had increased by more than $70M.

Link to Project: http://www.virginiaavenuetunnel.com

Background: Despite this project being a FHWA Corridors of the Future Grant finalist in 2007; discussions and requests to start the NEPA review beginning in 2008; support from the local MPO (Greater Washington Council of Governments) in September 2009; the US DOT Funding Phase I of the National Gateway project February 2010; DDOT leading TIGER II effort for tunnel in July 2010 – the official NEPA process did not begin until after CSX announced it would fully fund the project in May 2011.

Despite government and local support to begin the NEPA review to replace the tunnel, it took 4 years for the NEPA process to just begin. Numerous projects do not require full funding commitments before NEPA is allowed to start. This start up delay is also not ultimately counted as part of the NEPA review process, giving an impression that the review was shorter than it actually was.

These delays and increased costs limit other investments, negatively impacting both planned and future projects across CSX's system.

3. **Q: Will you please provide for the record, in response to Rep. Webster's question, what improvements could be made to the Railroad Rehabilitation and Improvement Financing Program?**

There are a series of adjustments to the RRIF program regulations that could be made to help the program operate more efficiently, including:

- Specify that the following activities are eligible uses of RRIF funds: intercity passenger rail projects, PTC investment, and engineering/environmental review/pre-construction activities for passenger and freight railroads;
- Count the Net Present Value of a future stream of pledgeable revenue as collateral;
- Allow the initiation of loan repayment to begin up to five years after substantial completion of the project, and allow the interest cost of this repayment initiation deferral to be capitalized and added to the value of the loan;
- Eliminate the application of modern BuyAmerica standards to the refinancing of assets that were purchased under previous standards; and
- Require the FRA to produce new regulations within one year to implement these changes, further encourage participation in RRIF, and make the administration of the RRIF program more efficient.

4. Could you please provide the letter Rep. Lipinski requested that AAR sent the State of Illinois regarding railroads' commitment to CREATE?

The letter is attached.

5. Ms. Brown requested that you provide for the record an update of where the railroads are with implementing PTC.

Attached is a PTC status report. This report was also provided to FRA. *[**Editor's note**: A PTC timeline is attached to these responses. The PTC status report is available online at the Government Publishing Office's Federal Digital System (FDsys.gov) at http://www.gpo.gov/fdsys/pkg/CPRT-114HPRT94577/pdf/CPRT-114HPRT94577.pdf on pages 1-47.]*

6. Q: Human error is the leading cause of all train accidents (38% of all accidents). What actions are the railroads taking to reduce human factor-caused accidents?

The rail industry's excellent safety record reflects its unwavering commitment to safety, particularly for the more than 180,000 rail employees who keep America's freight moving 24 hours a day, 365 days a year. Through rigorous safety training programs, technological advancements, special operating procedures and partnerships with their employees, customers and government safety agencies, railroads have lowered employee injury rates by 84 percent since 1980 and 47 percent since 2000. According to data from the Bureau of Labor Statistics, railroads today have lower employee injury rates than most other major industries, including trucking, inland water transportation, airlines, agriculture, mining, manufacturing and construction.

Railroads instill a culture of safety from the start. They provide rigorous on-the-job training and classroom instruction. Many positions, such as locomotive engineers, have extensive requirements for certification and licensing as outlined by FRA. Certification eligibility is based on a variety of factors, including prior safety conduct, compliance with alcohol and drug regulation, knowledge of operating rules, and performance testing.

Railroads' dedication to keeping their employees safe goes beyond training. The Association of American Railroads is one of the founding members of the Switching Operations Fatality Analysis Working Group, a voluntary, non-regulatory, workplace-safety partnership formed to develop recommendations that help prevent railroad employee deaths during switching operations. Additionally, Class I railroads work with their operating employees to ensure they are well-rested and ready for duty, which is important to employees who work flexible schedules in a 24 hours a day, seven days a week business.

Ensuring that employees are properly rested is another important component of reducing human error, which is why railroads have long been working to find innovative, effective solutions to fatigue-related problems. Combating fatigue in the rail industry is

a shared responsibility: employers need to provide an environment that allows employees to rest during off-duty hours, and employees must set aside time when off duty to obtain the rest they need. Because factors that can result in fatigue are multiple, complex, and frequently inter-twined, efforts to combat fatigue should be based on sound scientific research. That's why railroads and their employees are pursuing a variety of scientifically-based fatigue countermeasures.

Not every countermeasure is appropriate for every railroad, or even for different parts of the same railroad, because circumstances unique to each railroad influence the effectiveness and practicality of specific countermeasures. That said, individual railroads have been using countermeasures to help combat fatigue. These include:

- Offering fatigue education programs for employees and their families. Education is critical, since the effectiveness of fatigue initiatives depends on the actions of employees while off duty. Employees must make appropriate choices regarding how they spend their off-duty time, and education is important in encouraging sound decision making.
- Increasing the minimum number of hours off duty and providing more predictable calling assignments and rest opportunities between shifts.
- Focusing, when possible, on returning crews home rather than lodging them away from home and making away-from-home lodging more rest-inducing.
- Allowing employees to request an extra rest period when they report off duty if they feel excessively fatigued.
- Devising systems (including web sites, e-mails, pagers, and automated telephone systems) to improve communication between crew callers and employees.
- Allowing employees who have been off work more than 72 hours (e.g., on vacation) to begin their first shift in the morning rather than the middle of the night.
- Encouraging confidential sleep disorder screening and treatment.

Separately, since 2008 the railroads have spent more than $5 billion to install Positive Train Control (PTC) technology on their systems. PTC is a set of highly advanced technologies designed to automatically stop or slow a train before certain types of accidents occur. Specifically, PTC, once fully installed and operational, will be designed to prevent several types of human-factor caused accidents, including train-to-train collisions, derailments caused by excessive speed, unauthorized incursions by trains onto sections of track where maintenance activities are taking place, and the movement of a train through a track switch left in the wrong position.

As outlined in the attached document in response to #5 above, railroads are working diligently to complete installation of PTC systems across 60,000 miles of track. *[**Editor's note**: A PTC timeline is attached to these responses. The PTC status report is available online at the Government Publishing Office's Federal Digital System (FDsys.gov) at*

http://www.gpo.gov/fdsys/pkg/CPRT-114HPRT94577/pdf/CPRT-114HPRT94577.pdf on pages 1-47.]

7. Q: Track defects remain the second leading cause of all train accidents (31%) of all accidents). You mentioned that the railroads have agreed to perform at least one more internal rail inspection each calendar year for mainline tracks on which trains carry at least 20 carloads of crude oil. What additional actions are the railroads taking to reduce accidents caused by track defects?

The railroad industry is continuously improving the science and technology of rail defect detection in an effort to reduce the in-service failures and broken rail derailments. Also contributing to this effort is continuous improvement in the metallurgy and manufacture of rails and rail welds, as well as improved rail maintenance methods such as friction control and rail grinding.

The primary technology used for detecting rail defects on heavy haul railroads is ultrasonic. Conventional ultrasonic inspection uses single crystal probes at fixed angles to inspect portions of the rail head and web. The fixed angles are optimized to catch the majority of common rail flaws, but some internal flaws are missed with this approach. The roller search units (RSU), where the ultrasonic probes are placed, run on top of the rail head and transmit sound waves through the rail at different angles. The transducer coverage is from the top of the rail, through the web and down to the base.

Certain types of rail-head flaws are difficult to detect with current equipment because of their shape, size, or orientation; and flaws in parts of the rail base cannot be detected. Furthermore, there are common rail conditions that can mask flaws or impede defect detection; these include rolling contact fatigue damage, rail shells, and rail surface contamination.

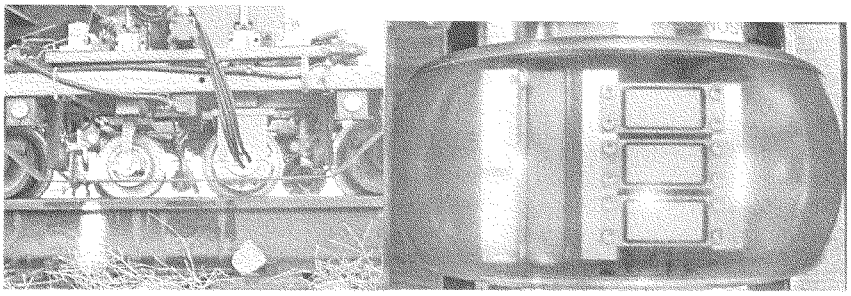
The Transportation Technology Center Inc. (TTCI), a wholly owned subsidiary of the AAR, is currently working on a phased array ultrasonic rail-inspection system under its Strategic Research Initiatives Program. Phased array ultrasonic rail inspection is the evolution of conventional ultrasonic inspection. It adds the ability to steer and focus the inspection beam. This is accomplished by replacing the single inspection crystal at the tip of the probe with rows of crystals (an array.) With phased array, it is possible to direct the inspection beam to all portions of the rail head even with rail head wear. Surface profile affects the direction that the ultrasonic wave moves when it steps into the rail material.

The TTCI prototype has three matrix phased array probes and one linear phased array probe. This configuration puts 429 inspection crystals in one RSU. The probes are shown below inside the RSU. Phased array provides accurate flaw sizing and locating. While still under development, the TTCI system is expected to detect all types of defects with a higher level probability of detection at inspection speeds of up to 20 mph. The

prototype system is based on a conventional rail inspection platform. The conventional RSU's fit onto a conventional carriage. No modifications are required to the inspection truck or the carriage.

One other advantage of the phased array inspection system is expected to be the reduced need to dismount the vehicle to hand scan defects. When defects are detected, the vehicle can be backed up and put into a high resolution scan mode. The operator can scan the defect from inside the vehicle.

The AAR has accelerated the development of this research in 2015. The phased-array inspection technology is expected to result in a more reliable rail inspection and fewer service failures when the North American rail inspection supply industry adapts and/or incorporates them in their existing inspection platforms. The development of the production systems by the rail vendors could be available for real-world deployment in 2016-2017.



8. Q: State hazmat teams and fire fighters are growing concerned about whether they have adequate resources and information to respond to incidents involving the transportation of crude oil by rail, particularly in rural areas where there may be no road access to derailment sites. Please tell me how the railroads are addressing those concerns.

Railroads work closely with state and local leaders and emergency responders across their network to ensure that communities understand how railroads operate and are prepared in the event of an accident. Railroads are always willing to cooperate with local officials on a case-by-case basis to determine in advance the best access points for emergency response.

To this end, railroads actively participate in state emergency planning committees and state agency conferences on emergency response. They also help communities develop and evaluate their own emergency response plans. These activities include

representatives from local fire and health departments, education institutions, industry organizations, transportation departments and the public. Due to geographic diversity across the country, the particular methods for accessing an incident location varies.

Each year, thousands of emergency responders and railroad and shipper employees receive specialized training through individual railroad efforts and industry programs. The Security and Emergency Response Training Center (SERTC) at the AAR's Transportation Technology Center (TTCI) has trained more than 50,000 transportation, emergency response, chemical, government agency and emergency response employees and contractors from all over the world to safely handle accidents involving tank cars carrying hazardous materials.

In accordance with a February 2014 agreement between DOT and AAR, railroads developed a $5 million specialized crude by rail training and tuition assistance program for local first responders at TTCI. The funding supported program development and tuition assistance for more than 1,500 first responders in 2014. An additional 1,500 first responders are expected to complete the program this year.

Railroads also support industry partnership such as TRANSCAER® (Transportation Community Awareness and Emergency Response) and Chemtrec (Chemical Transportation EmergencyCenter). TRANSCAER® is a voluntary national outreach effort that focuses on assisting communities to prepare for and respond to a possible hazardous material transportation incident. Chemtrec is a 24/7 resource for emergency responders that provides access to critical resources, such as chemical product, medical and toxicology experts, to assist in mitigation of incidents involving hazardous materials. Railroads train more than 20,000 emergency responders each year through their own efforts and through these industry partnerships.

9. Q: For years, railroads have provided appropriate local authorities, upon request, with a general list of the hazmat transported through the communities, but the information is not in real-time. What is the industry doing to provide State emergency officials with real-time information about shipments of crude oil and other flammable and hazardous materials?

In 2014, the AAR developed AskRail, an invitation-only free mobile application that provides immediate access to information about the contents of railcars on a train. It serves emergency responders who arrive first to the scene of a rail emergency and is available in the US, Canada, and Mexico.

If emergency responders at the scene of a rail incident cannot locate the train consist, they can use AskRail™ to query the contents of a railcar with a simple railcar ID search and see whether a railcar is carrying hazardous materials. By inputting a single railcar ID, a first responder can pull up the entire consist of a train.

They can also find emergency contact information for Class I railroads and Amtrak. Access to this accurate, real-time data can help emergency responders make informed decisions about how to respond to a rail emergency.

AskRail™ is designed to be a backup resource in case an emergency responder cannot locate the conductor or the train consist or while the emergency responder is waiting to receive the proper shipping document from a railroad representative. If the railroad is already aware of the incident, it will contact the appropriate local authorities and provide the train consist.

Emergency responders can also use AskRail™ as a training aid. The application includes a list of the 125 hazardous materials most commonly shipped by rail, which they could use to prioritize their training and prepare for various scenarios. AskRail™ also integrates information from the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration's (PHMSA) Emergency Response Guidebook (ERG) and can be used as a reference resource.

Railroads participating in the AskRail™ app include all Class I railroads—BNSF, UP, NS, CSX, KCS, CN, CP—and Amtrak.

The AskRail™ app was launched in October 2014. It is available to emergency responders that have completed training provided by Class I railroads and the Security and Emergency Response Training Center (SERTC) at the Transportation Technology Center, Inc. (TTCI), a subsidiary of the Association of American Railroads. Select users may also be provided access to AskRail™ at the discretion of Class I railroads, without participating in industry-sponsored training. Information about AskRail™ will now be part of the standard training emergency responders receive from Class I railroads.

Railinc, a subsidiary of the AAR, is responsible for developing the application.

In addition, railroads provide commodity flow information to emergency response planning agencies for all hazardous materials transported through their communities upon request. This practice is embodied in AAR's OT-55 – Recommended Railroad Operating Practices Transportation of Hazardous Materials.

Questions from Rep. Dan Lipinski

Tank Car Safety

1. **Mr. Hamberger, I appreciate the effort that the railroads have put forth to modernize consists. Of course, we still aren't at the point where we can move away from physical paper consists, but we're making progress to**

ensure that a first responder can access the information they need without necessarily having to board a locomotive during an emergency. Can you tell me at what point you expect the railroads to have a system in place that will allow a first responder to input the identification number of a single car and receive the consist for the entire train?

I am pleased to report that the system is in place today. In 2014, the AAR developed AskRail, a free mobile application that provides immediate access to accurate, real-time information about the contents of railcars on a train. It serves emergency responders who arrive first to the scene of a rail emergency and is available in the US, Canada, and Mexico.

If emergency responders at the scene of a rail incident cannot locate the train consist, they can use AskRail™ to query the contents of a railcar with a simple railcar ID search and see whether a railcar is carrying hazardous materials. By inputting a single railcar ID, a first responder can pull up the entire consist of a train.

2. **While I'm on the topic of last summer's NPRM, I'd like to ask about the braking systems that PHMSA proposed for the enhanced tank car model. Mr. Hamberger and Mr. Saxton, I noticed in both of your comments to the NPRM that you had concerns with electronically controlled pneumatic brakes. Can you elaborate on why you prefer the end of train device and distributive power systems?**

Requiring the use of ECP braking systems on flammable liquid trains is neither justified by federal and industry safety data, nor practical given the industry's intense focus on improving network fluidity to better serve our customers and delivering for America's growing economy. The safety data simply isn't there to justify implementing this complex and costly system – not to mention significant potential efficiency downsides.

The industry has been running trains with ECP brakes on a test basis for many years. A fundamental problem is that the brakes are unreliable. Simply put, ECP brake technology is not mature. As a result, DOT's ECP mandate will adversely affect the fluidity of the railroad network. In proposing ECP brake regulations in 2007, FRA could not justify requiring ECP brakes on a cost-benefit basis and thus did not mandate their use. Instead, FRA offered the industry incentives in the form of regulatory relief, Significantly, FRA recognized that ECP brakes were limited in the effect they could have on accidents. FRA stated that "at speeds greater than those on Class 1 track (maximum train speed of 10 mph) or class 2 track (maximum speed 25 mph), the engineer would not have enough reaction time to prevent a collision, even with ECP brakes.

In its Regulatory Analysis for its 2008 ECP rule, FRA postulated $190 million in safety

and environmental benefits over a 20-year period. In contract, FRA estimated the costs would be $1.7 billion, a cost/benefit ratio of almost 9 to 1. FRA assumed that business benefits would more than compensate for the costs of ECP brakes, but industry to this day has not identified business benefits that would justify transitioning to ECP brakes. Note that FRA's estimated costs were based on a limited number of trains using ECP brakes as a result of the incentives FRA offered.

Although the fundamental economics of ECP brakes have not changed, DOT has moved to require them. Apparently, the rationale for this rule is not that ECP brakes would help avoid accidents. Rather, the rationale is that the consequences of accidents would be mitigated by resulting in fewer cars being punctured. Still, the same problem exists today that exited in 2008: ECP technology does not offer safety benefits commensurate with costs.

President Obama pledged to advance common-sense regulations that are based on the best available science, promote predictability and reduce uncertainty. ECP brakes meet none of these conditions.

Attention and resources should be allocated to addressing the underlying causes of rail accidents and brakes simply aren't on that list. Unjustified regulations such as this trigger a reallocation of investments that will not generate the kind of safety benefits the industry and the public expects. The regulation does not take into account the disruption the ECP mandate will wreak on railroad – both freight and passenger – operations.

The rail industry has worked cooperatively with the government during this rulemaking process, as our goal has always been to make a safe rail network even safer. We support tougher tank cars and we see many of the rule's components building on our crude-by-rail safety achievements. However, the industry is extremely disappointed with how the ECP mandate unfolded. DOT's study is flawed and ECP brakes do not significantly improve safety and are unreliable. No justified safety case for ECP brakes has ever been made.

Attached are the comments that AAR filed with PHMSA in conjunction with its proposed rule, which further detail why the use of end-of-train devices or distributed power systems are preferable methods of enhancing train braking. *[**Editor's note**: A summary of the comments is attached ("AAR Calls for Regulations to Enhance the Safety of Flammable Liquids Transport and Keep the Network Efficient"). The comments in their entirety are available online at the Government Publishing Office's Federal Digital System (FDsys.gov) at http://www.gpo.gov/fdsys/pkg/CPRT-114HPRT94577/pdf/CPRT-114HPRT94577.pdf on pages 48-154.]*

3. **[Follow-up] Are these systems improvements over the brakes on the DOT-111?**

Distributed power and end-of-train device systems provide substantial safety benefits relative to conventional air brake systems.

Infrastructure

1. **What challenges still exist in implementing PTC? What else, in addition to the streamlining provisions in PRRIA, should be done to move this along?**

Please find attached a comprehensive PTC status report, which outlines the challenges that still exist in implementing PTC and suggestions for actions Congress can take to ease the implementation of PTC. *[**Editor's note**: The PTC status report is available online at the Government Publishing Office's Federal Digital System (FDsys.gov) at http://www.gpo.gov/fdsys/pkg/CPRT-114HPRT94577/pdf/CPRT-114HPRT94577.pdf on pages 1-47.]*

Regulatory Proposals

1. Mr. Hamberger, as you and I both know very well, congestion and Chicago are often mentioned in the same sentence. I know that this can be very frustrating and I appreciate the contributions made by railroads like Norfolk Southern, BNSF, CSX, Union Pacific, and Canadian National to the CREATE Program to help untangle the snarls and improve freight efficiency and quality of life in the area. If we can help reduce congestion in Chicago, then we help the rest of the network. I'd like to know how some of the regulatory proposals will affect the movement of trains in Chicago. How will it affect investment in the area?

Proposals to mandate so-called reciprocal switching—the exchange of traffic between a railroad serving a terminal area and another railroad—are short-sighted attempts to obtain lower rail rates for a group of favored rail customers at the expense of the shipping community at large. Mandatory switching would lead to sharp reductions in the quality of rail service and in rail operational efficiency, particularly in congested areas of the railroad network like Chicago. It would also mean sharply lower rail revenue, which would greatly harm railroads' ability to continue to make the massive reinvestments they need to ensure that our nation's freight rail network remains the best in the world and is able to meet our future transportation needs. Existing STB regulations already protect rail shippers and allow railroads to make investments in their networks to improve rail service and reduce community impacts, such as the CREATE project. It makes no sense to enact policies that would discourage private investments in rail infrastructure that would boost our economy and enhance our competitiveness.

Other proposals to artificially cap railroad rates or mandate service for a particular rail customer at the expense of others will result in an overall reduction in the rail industry's ability to make investments that improve safety and customer service.

ASSOCIATION OF
AMERICAN RAILROADS

Office of the President
Edward R. Hamberger
President and Chief Executive Officer

January 20, 2012

The Honorable Ann Schneider
Secretary
Illinois Department of Transportation
2300 S. Dirksen Parkway
Springfield, Illinois 62724

Dear Secretary Schneider:

The freight railroads sincerely appreciate IDOT's cooperation and efforts as a Stakeholder in the CREATE Program and I want to assure you that the freight railroads' commitment to the CREATE Program remains unwavering as well. In that regard, it is the freight railroads' desire to move expeditiously with IDOT toward achieving a mutually acceptable agreement for the obligation of all available public funds.

In view of the limited amount of time for discussion that we understand is available prior to the next meeting of the Illinois General Assembly, the CREATE Program freight railroads' Chief Operating Officers held a conference call on January 18, 2012 to discuss the January 4th IDOT counter proposal to the AAR's June 8, 2011 proposal for CREATE funding. Based on that discussion, I am pleased to provide you with the freight railroads' revised proposal as detailed below.

1. The freight railroads propose to use the State's remaining 2009 CREATE funding of $210.9 million to complete the "Corridor Program" (i.e. the attached list of 11 projects that was enclosed with my letter of June 8, 2011). Construction on many of these projects can begin immediately, thereby creating jobs and benefits. And if I understand correctly, this funding is a part of the Illinois Jobs Now Program.

2. Upon the State's commitment of $210.9 million, the freight railroads would agree to fund the potential Corridor Program shortfall (i.e. $42.6 million based upon the estimates in the attached Corridor Program project list) through increased contributions and/or completing projects under budget therefore freeing up funding which would be applied only toward remaining Corridor Program projects. This combination of State and freight railroad funding in paragraphs no. 1 and 2 would obligate 100% of the remaining freight railroads' current CREATE funding commitment of $170.65 million as well as the balance of the current CREATE public funding commitment. No further public funding would be required for the completion of the 11 projects in the Corridor Program.

3. Additional public funding, as it becomes available for the CREATE Program, would be applied to those projects which would result in passenger and/or public benefits.

4. The railroads would also fund and participate with IDOT in the development and submission of the TIGER IV application that gives both IDOT and the freight railroads collectively the best chance of success and the best possible result.

5. The railroads would continue to stand by their $50 million commitment toward the 75th Street CIP as a match to State funds for the project provided that there is agreement between the freight railroads and IDOT for the remaining full funding of the CIP by IDOT.

6. The freight railroads would return to making their 5% participation in the cost of the remaining Grade Separations in the CREATE Program contingent upon the remaining full funding of each of those Grade Separations becoming available from sources other than the freight railroads.

With this proposal, the freight railroads estimate that their CREATE contribution would effectively increase from $170.65 million up to a potential of $365.75 million.

I hope that the proposal outlined in this letter and our commitment to work with you toward an agreement will allow you to take the necessary steps within your organization.

We look forward to your reply.

Sincerely,

Edward R. Hamberger

cc: Joe Shacter (IDOT)
Greg Garrison (CPG)
Jeff Harris (CPG)

PTC Timeline

Railroads: Alaska, BNSF, CN, CP, CSXT, KCS, NS, UP

Component	Thru 2014	2015	2016	2017	2018	2019	2020	Totals
Locomotives Partially Equipped	9,734	1,115	172					
Locomotives Fully Equipped	3,376	5,557	7,354	4,467	2,292			23,046
Percent Complete	15%	39%	71%	90%	100%			
Wayside Interface Units installed	19,245	6,728	4,115	2,412	1,860			34,360
Percent Complete	56%	76%	88%	95%	100%			
Base Station Radios Installed	1,504	1,222	412	478	473			4,089
Percent Complete	37%	67%	77%	88%	100%			
PTC Route Miles Implemented	3,182	8,263	15,474	16,759	10,653	5,250	2,783	62,364
Percent Complete	5%	18%	43%	70%	87%	96%	100%	
Employees Trained	19,741	12,705	19,714	20,704	13,541	5,814	3,752	95,971
Percent Complete	21%	34%	54%	76%	90%	96%	100%	
PTC Spending ($M)	5,190	1,354	1,125	648	349	173	97	8,936
Percent of Spend	**58.08%**	**73.23%**	**85.82%**	**93.07%**	**96.98%**	**98.91%**	**100.00%**	

Assumptions:

1 -70% confidence factor in accomplishing the above metrics.

2 - Costs represent capital expenses only, no operating or maintenance expenses.

3- PTC route miles implemented means PTC routes equipped for revenue demonstrations

April 15, 2015

AAR Calls for Regulations to Enhance the Safety of Flammable Liquids Transport and Keep the Network Efficient

The Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) on August 1, 2014 published an NPRM aimed at improving the safe transportation of flammable liquids by rail. The proposed rule primarily addresses operating rules; specifications for new tank cars; and the retrofit of existing tank cars. Concurrently, PHMSA issued an Advance Notice of Proposed Rulemaking regarding comprehensive oil spill response planning. Specifically, PHMSA asked for comments on expanding the applicability of comprehensive response plans to the rail industry based on volumes of oil transported. AAR provided robust comments on all of the NPRM's and ANPRM's focus areas, the key points of which are summarized below:

PHMSA's "High-Hazard Flammable Train" Definition Should Reflect its Focus on Unit Trains

PHMSA suggests the application of speed restrictions to high-hazard flammable trains (HHFTs), defined as any train with 20 or more cars containing a flammable liquid. Seemingly contrary to PHMSA's intent to address unit trains, these requirements would apply to manifest trains transporting blocks of flammable liquids that amount to less than 20 tank cars individually, but together exceed the 20-car threshold. While AAR agrees that crude oil, ethanol and other flammable liquids should be covered by the regulation, we support defining an HHFT (1) for purposes of crude oil as 20 or more cars in a train; and (2) for purposes of other flammable liquids as either 20 cars in a single block, or a total of 35 cars in a train. Using a 20-car block threshold, subject to an overall limit of 35 tank cars, as the basis defining a HHFT is consistent with PHMSA's previous actions and general focus on unit trains.

An Expanded 40 MPH Speed Restriction Could Dramatically Impair Railroad Service

PHMSA asked about imposing a 40 mph speed restriction (1) nationwide; (2) in cities with a population of more than 100,000; and (3) in "High Threat Urban Areas" (HTUAs), as defined by DHS. These limits have the potential to substantially impact the fluidity of the railroad network – to the detriment of both railroads and their customers. Widespread speed limits would affect not only trains carrying flammable liquids, but also other freight and passenger trains, thus dramatically impairing railroad service. AAR urges PHMSA to apply a 40 mph speed restriction only in HTUAs on a temporary basis until legacy DOT-111 tank cars can be replaced or retrofitted and as long as network fluidity is maintained. This additional speed restriction would be on top of industry's self-imposed nationwide 50 mph limit for trains with 20 or more carloads of any hazardous material.

Benefits of Proposed Braking System Requirements Are Not Supported

One of the options PHMSA has proposed for tank car specifications would require electronically-controlled pneumatic (ECP) brakes. AAR strongly opposes any requirement to use ECP brakes. In 2008, the Federal Railroad Administration (FRA) estimated the cost of ECP brakes at $1.7 billion, with a negative cost/benefit ratio of almost 9 to 1. In fact, this estimate significantly understates the cost of ECP brakes. The fundamental economics of ECP brakes have not changed. ECP brakes are unjustified in terms of improved safety benefits as analysis shows they have minimal impact on the severity of a derailment. They could also result in negative operational impacts on the network. Beyond this, through their March 2014 voluntary agreement with DOT, railroads already have committed to specific braking systems for trains moving crude, using either distributed power or two-way-telemetry end-of-train devices.

PHMSA Should Strengthen New Tank Car Standards

At the request of the Secretary of Transportation in letters on April 9th and July 11th to reach consensus on new tank car standards, AAR discussed the tank car issues with various parties, taking into account all the factors that must be considered in setting tank car specifications. AAR reached areas of agreement with the American Petroleum Institute (API) on recommendations for shell thickness, jackets, and other features for tank cars. For new tank cars, AAR and API jointly propose that PHMSA adopt a requirement for a ½" shell for new cars in flammable liquid service, plus a 1/8" inch jacket and thermal protection. New tank cars should also have full-height head shields, appropriately-sized pressure relief devices, bottom-outlet handle protection and top-fittings protection. These standards would result in a dramatically safer tank car over the current federal standard and reduce the likelihood of a release in an accident by up to 81 percent over current non-jacketed DOT-111 tank cars.

Existing Tank Cars Should Be Retrofitted or Phased Out on an Aggressive Schedule

For existing tank cars carrying flammable liquids, AAR and API propose distinguishing between jacketed and non-jacketed cars. We suggest that existing jacketed cars be retrofitted with appropriately-sized pressure relief devices and bottom-outlet handle protection. Non-jacketed legacy DOT-111 cars would be retrofitted with jackets, thermal protection, full-height head shields, appropriately-sized pressure relief devices, bottom-outlet handle protection and valve protection. CPC-1232 cars without a jacket would be retrofitted with jackets, thermal protection, full-height head shields, appropriately-sized pressure relief devices and bottom-outlet handle protection. AAR and API support placing a priority on crude oil and ethanol since they account for most unit train service for flammable liquids.

PHMSA Should Reconsider the Scope of Routing Analyses in the NPRM

PHMSA has proposed to require routing analyses for trains carrying flammable liquids. However, requiring railroads to adjust their routes for all HHFTs as PHMSA has defined in the absence of a significant safety advantage would impair network fluidity unnecessarily. PHMSA could limit the adverse impact on fluidity by restricting the scope of High Hazard Flammable Trains as suggested by the AAR. (See previous page.)

Related Issues in the NPRM Require Clarification

AAR and API agree that PHMSA should require thermal blankets meeting a specification designed to provide at least 800 minutes of protection in a "pool" fire.

PHMSA has proposed two types of top-fittings protection for new tank cars: a performance standard designed to withstand a rollover accident at a speed of nine mph and an AAR design standard set forth in AAR's specifications for tank cars. AAR and API oppose requiring a performance standard for top-fittings protection. A performance standard cannot be justified. For existing cars, AAR suggests that PHMSA require protection of the valves when the cars are retrofitted.

AAR believes that cars carrying Canadian oil sands – non-diluted bitumen – should not be covered. Based on their chemical composition, oil sands do not pose a threat comparable to flammable liquids.

AAR Proposes a New Regulatory Framework for Spill Response Plans

In its ANPRM, PHMSA is proposing that railroads owning routes where significant volumes of crude move comply with comprehensive crude oil spill response planning requirements. AAR, with other stakeholders, took this opportunity to propose a new regulatory framework regarding spill response plans for railroads. AAR's proposal exceeds current federal requirements and follows the logic and scope of spill response regulations for the pipeline industry. Specifically, AAR and the American Short Line and Regional Railroad Association (ASLRRA) would define routes subject to comprehensive crude oil spill planning requirements as those railroad lines where there is a minimum of one train per month that transports 1,000,000 gallons (approximately 35 cars) of petroleum crude oil that is located within 800 feet of a river or waterway that is used for transportation and commerce for a distance of more than 10 miles. The 1,000,000-gallon is consistent with the regulatory threshold for facility response plans for bulk petroleum storage facilities. The 10-mile figure is based upon what is presently required of pipelines by PHMSA regulations.

Beyond this, the regulatory proposal submitted by AAR and ASLRRA would cover such issues as who is required to submit a plan and to whom the plan should be submitted; defines worst-case scenario for discharge from a tank car; outlines required response resources; and addresses the issue of training. Notably, AAR and ASLRRA support providing oil spill response plans only to relevant emergency responders. For security reasons, they should not be released to the general public.

Testimony of Andrew J. Black
Association of Oil Pipe Lines, President & CEO
before the
U.S. House Committee on Transportation & Infrastructure
Subcommittee on Railroads, Pipelines, and Hazardous Materials
Hearing on "How Changing Energy Markets Will Affect U.S. Transportation"

February 3, 2015

Thank you, Subcommittee Chairman Denham, Ranking Member Capuano, and Members of the Subcommittee, for asking me to testify before you today. I am Andrew Black, President and CEO of the Association of Oil Pipe Lines (AOPL). We represent transmission pipeline operators who deliver crude oil, refined products like gasoline, diesel fuel and jet fuel, and natural gas liquids such as propane and ethane. Our pipelines extend 192,396 miles across the United States, safely, efficiently, and reliably delivering approximately 14.9 billion barrels[1] of crude oil and petroleum product each year.

American consumers benefit when our pipelines deliver the gasoline they need to drive their cars and commute to work. American consumers and businesses benefit when diesel fuel is used to power trucks and trains to deliver commercial goods. American homeowners benefit with propane for their gas grills and rural heating. American farmers benefit with propane to dry their crops and keep their livestock warm in winter. American manufacturers benefit from plentiful, affordable raw materials like ethane. All of these products are delivered by pipeline safely, reliably, and cost effectively, day in and day out.

---

[1] Association of Oil Pipe Lines, *U.S. Liquids Pipeline Usage & Mileage Report,* Oct. 2014, p. 5.

AOPL members have also done a remarkable job delivering the North American energy renaissance to American consumers and workers. Domestic oil production has grown by 3 million barrels per day since January 2011.[2] American pipelines have responded by delivering 1.35 billion additional barrels of crude oil per year over the last 5 years.[3] Pipeline operators have added 10,000 miles of new pipe into service in just the last four years, and 25,000 miles of pipe in the last ten years.

Still more pipeline capacity is needed in order to bring the full benefits from increased North American production of crude oil to American workers and consumers. In many cases, our existing pipeline network does not have sufficient capacity to move crude oil from producing regions to where it can be manufactured into refined products such as gasoline and sent to communities that would benefit from new supply options. Also, our existing pipeline network does not have sufficient capacity to move increasing amounts of natural gas liquids such as ethane to petrochemical plants where good-paying manufacturing jobs produce plastics, chemicals, paints, containers and host of other consumer products.

Challenges to New Pipeline Construction

While our nation needs additional pipeline capacity more than ever before, this may be the most difficult time ever to expand pipeline capacity. *First*, pipelines must secure long-term agreements with shippers to provide financial support for expansion projects, which are very capital intensive. At a time when pipelines are competing heavily with other pipelines and other

---

[2] Today In Energy, *U.S. Liquid Fuels Production Growth More than Offsets Unplanned Supply Disruptions,* U.S. Energy Information Administration, Aug. 27, 2014.
[3] *Supra* note 1.

modes of transportation, pipeline operators often have difficulty attracting customers willing to make long-term financial commitments necessary to support a project. Pipeline operators need continued stability and certainty on long-term contracts and economic regulatory oversight from the Federal Energy Regulatory Commission (FERC), which regulates the rates and conditions of service for crude oil and petroleum product pipelines.

Second, pipeline operators need prompt decisions from government agencies for environmental permits and approvals needed for pipeline routes and border crossing. While the multi-year delays imposed on the Keystone XL project are well known, some states are slowing down their consideration of pipeline route issues. This is important because, unlike natural gas pipelines, oil and petroleum product pipelines do not have the opportunity for federal eminent domain; the states control oil pipeline siting. At a time when we need more energy transportation infrastructure to take away growing energy production, federal permitting decisions are also taking longer, growing more complicated, and resulting in more unnecessary delays. These delays have caused companies to abandon some projects and could cause other projects to fail on the drawing board. To improve federal infrastructure permitting, AOPL encourages additional resources for federal permit review, common-sense decision-making, and more regulatory certainty.

As pipeline operators, we know that there is and will always be a role for rail delivery of crude. Indeed, some AOPL members as midstream infrastructure companies operate both pipelines and rail terminals to facilitate crude-by-rail deliveries. Rail offers geographic flexibility delivering to and from new production locations across the country. Because of our national rail

network and the relative ease of expanding it, rail can enter new markets quickly. Thus, rail can transport crude along routes where there are no pipelines and is doing so today from North Dakota to the American Northwest and Northeast, as examples.

That said, pipelines are the best way to transport large volumes of petroleum product. A single pipeline can deliver 800,000 barrels per day, all day, every day. As much as crude-by-rail has increased over the last few years, the 14.9 billion barrels of crude oil and petroleum products that pipelines transported in 2014 were more than 10 times the volumes delivered by rail. Pipelines are also the lowest cost way to transport petroleum products with rates only a fraction of other modes of transportation.[4] As a result, they are generally the preferred option for shippers when available. When pipelines are able to compete head-to-head with rail, as the lower cost service provider, pipelines typically win.

Pipeline transportation efficiency also translates into environmental benefits. The environmental impact analysis for Keystone XL found transport by pipelines is the safest and most environmentally favorable way to transport crude oil and other energy products. A barrel of crude oil has a better than 99.999 percent chance of reaching its destination safely by pipeline[5], safer than any competing transportation mode.

---

[4] *Petroleum Transportation North America,* Argus, Jan. 2015. (See e.g. Edmonton to Houston Canadian heavy crude rail unit rate of $16.20/bbl and Hardisty to Cushing heavy crude pipeline tariff of $6.82/bbl).

[5] AOPL Comparison of PHMSA Incident Data and FERC Transmission Data.

Working to Make Pipelines Even Safer

Not only are pipelines safe, they are getting safer. Since 1999, the number of releases from liquids pipelines is down 50%.[6] Incidents due to corrosion are down 76% since 1999, and third party excavation damage is down 78% since 1999.[7]

These pipeline safety improvements are the result of a lot of hard work and resources spent by pipeline operators. In 2013, pipeline operators spent over $2.1 billion dollars evaluating, inspecting and maintaining their pipeline infrastructure.[8] This included $1.7 billion managing the integrity of pipelines and related facilities and $400 million on storage tanks and facilities. Pipeline operators also conducted 1,455 in-line inspections with so-called "smart pigs" to scan and survey their pipelines from the inside.[9] Pipeline smart pigs can use magnetic resonance and ultrasonic wave technologies to detect pipe corrosion and cracking. The 2013 smart pig runs covered over 47,000 miles of pipeline.[10]

The basic strategy of the integrity management program is to evaluate pipe segments, inspect them, and then perform maintenance on any detected issues. To that end, on top of the number of tool runs conducted and miles of pipeline inspected, pipeline operators conducted 12,734 excavations of pipeline segments for further inspection or maintenance.[11]

---

[6] Pipeline Right of Way Incidents, API Pipeline Performance Tracking System.
[7] Id.
[8] AOPL Survey of Member Companies, Sep. 2014.
[9] Id.
[10] Id.
[11] Id.

Pipeline operators share an industry-wide goal of zero pipeline incidents. This may be aspirational, but it drives us to constantly examine our performance results and continue to improve overall pipeline safety. Analysis of this sort guides the pipeline industry and the industry-wide safety improvement efforts we undertake each year. Our industry-wide safety improvement efforts are embodied in the *Pipeline Safety Excellence*™ initiative. Launched in 2014, to further the industry's previous success in improving pipeline safety, the *Pipeline Safety Excellence*™ initiative reflects the shared values and commitment of pipeline operators to building and operating safe pipelines. PSE includes: 1) shared pipeline safety principles, 2) continuous industry-wide safety efforts, 3) annual pipeline safety performance reporting, and 4) annual pipeline safety strategic planning.

Industry-wide pipeline safety principles cover values such as: zero incidents, organization-wide commitment, safety culture, continuous improvement, learning from experience, safety systems, using technology and communicating with stakeholders. The values reflect our drive to always look for ways to improve our safety performance, learn from experience and listen to our stakeholders.

Pipeline operators also have a long history of working together on industry-wide efforts to improve safety. Our members may be commercial competitors, but they work together to improve industry-wide pipeline safety. The Pipeline Safety Excellence Steering Committee is a group of pipeline operator executives guiding and ensuring pipeline safety performance achievement. Our Performance Excellence Team is composed of senior managers sharing safety improvement techniques and advancing data management, safety culture and damage prevention

initiatives. The Operations & Technical Group is composed of pipeline operations and engineering managers overseeing industry-wide pipeline recommended practices and coordination of research and development. In addition, we have groups on pipeline integrity management, control systems, public awareness, operator qualifications, research and development, and emergency planning and response.

As you can see, we have many different groups working to improve different aspects of pipeline performance. Many are undertaking specific projects to develop new inspection technologies, establish new recommended operating practices, or reach out to the public and our partners. While each of these initiatives is important, the top strategic initiatives we are undertaking are embodied in an annual strategic plan of pipeline safety improvements.

The *2015 API-AOPL Annual Liquids Pipeline Safety Strategic Plan* represents those top initiatives approved by the leadership of the pipeline industry for executive-level attention, support and resources. This year's plan has industry-wide goals to 1) improve inspection technology capabilities, 2) enhance safety threat identification and response, 3) expand safety culture & management practices, and 4) boost response capabilities.

Industry-wide strategic initiatives under these goals include: improved pipeline inspection technology capabilities to detect pipeline cracking, implementation of a new industry-wide recommended practices on crack detection, analysis and response, pipeline safety management systems, leak detection program management, and emergency planning and response. Implementation is a big theme for 2015. Pipeline operators developed in 2014, or will

soon complete, industry-wide recommended practices in these areas. Strategic initiatives in 2015 will educate, encourage and assist pipeline operator adoption of each of these efforts. New in 2015 are strategic initiatives to develop industry-wide guidance on the appropriate use of hydro-testing and construction quality management systems for pipelines.

Finally, the liquids pipeline industry is publicly reporting its pipeline safety performance for the second year in a row. The numbers included in today's testimony come from our 2015 performance report. We embraced public reporting as a component of the *Pipeline Safety Excellence*™ initiative as a way to share with the public both where we are doing well and where we need to improve. We recognize we are members of the community in which we operate. Publicly sharing performance results holds us accountable to our core values of communicating with stakeholders, continuous improvement and zero incidents.

Our performance results also help form our strategic improvement plans. By measuring our performance, we know we are reducing overall incident numbers, corrosion incidents and third party damage. We also know that we need to do better in other incident cause areas such as materials, seam and weld failure. Thus, we include in the strategic plan initiatives to improve cracking inspection technology and a new industry-wide recommended practice for finding and managing pipeline cracking. This week we are releasing our *2015 API-AOPL Annual Liquids Pipeline Safety Performance Report & Strategic Plan.* We look forward to your review of the performance results and strategic plans we will undertake in 2015. We would be happy to meet with any of the members of the committee or their staffs in the coming weeks and months to review our efforts.

The ongoing North American energy production renaissance is bringing tremendous benefits to the American public. Gas prices approaching $2.00 per gallon is a testament to the benefits of this bounty. Liquids pipelines are playing a crucial role in delivering these new energy supplies from production areas, to refineries and on to the American public. Pipelines are the safest way to transport liquid energy and we will continue working hard to make them even safer. Thank you.

####

Written Statement of Greg Saxton,
Senior Vice President and Chief Engineer at
The Greenbrier Companies

Before the United States House of
Representatives Subcommittee on Railroads,
Pipelines, and Hazardous Materials

"How the Changing Energy Markets Will Affect
U.S. Transportation."

February 3, 2015

Introduction

Chairman Denham, Ranking Member Capuano, members of the Subcommittee, thank you for the opportunity to testify before you today at this important hearing. My name is Greg Saxton, and I am Senior Vice President and Chief Engineer at The Greenbrier Companies. In this capacity, I am responsible for all tank car and freight car engineering for the four manufacturing facilities Greenbrier operates in North America. I currently chair the American Association of Railroads' (AAR) Equipment Engineering Committee, and serve as a member of the Rail Supply Institute's (RSI) Tank Car Committee and the AAR's Tank Car Committee.

About The Greenbrier Companies

The Greenbrier Companies is a leading supplier of transportation equipment and services to the railroad industry. We operate as an integrated provider of railcar services that combines freight car manufacturing, wheel services, repair, refurbishment, retrofitting, component parts reconditioning, leasing, and fleet management services. Our customers include railroads, leasing companies, financial institutions, shippers, carriers and transportation companies. Greenbrier's commitment to high quality products, technological leadership in developing innovative products and competitive pricing of our railcars has helped us maintain our long-standing relationships with our customers.

Overall, Greenbrier owns approximately 8,500 railcars, and performs management services for approximately 238,000 railcars. We are also one of the leading designers, manufacturers and marketers of railroad freight car equipment in North America and Europe; manufacturing a broad array of railcar types. Greenbrier's four manufacturing facilities build new railroad freight cars for the North American market. In addition, we provide railcar repair, refurbishment and retrofitting services in North America through 50/50 joint venture partner with Watco Companies, LLC. The joint venture, GBW Railcar Services, LLC, provides repairs and refurbishment services at 39 locations across North America, including 14 tank car repair and maintenance facilities ready to meet regulatory and market-driven demand for tank car recertification, repairs and retrofits.

One of GBW's repair, refurbishment, and maintenance facilities is located in Modesto, California, which is in Chairman Denham's district. We were pleased to host the Chairman for a visit to the facility a few years back.

Greenbriers' Investment Manufacturing and Repair Facility Capacity

To better provide for the needs of our customers and respond to market demands, Greenbrier has made a significant investment of private capital in our manufacturing facilities. Over the past five years alone, our capital expenditures in manufacturing facilities have grown nearly 5 times – from $17.4 million in 2011 to $88.2 million in 2015. Of this amount, approximately $40 million is being invested in new rail tank car production facilities.

This increased investment in our manufacturing production capacity is the result of a growing demand for rail car units. Since 2011, our delivery of rail car units in North America increased

from 8,698 to 15,290 in 2014. We anticipate that total deliveries will increase to over 20,900 units this year.

Greenbrier has also made a significant investment in increasing our capacity to handle tank car upgrades and retrofit, committing over $20 million through our joint venture with Watco – GBW Railcar services. These investments have more than tripled GBW's ability to do retrofits.

Greenbrier is committed to continuing to make the investment in our facilities necessary to meet the demands and needs of our customers.

Crude by Rail

One of the key drivers in the increased demand for rail car units is the surge in the volume of crude oil moving by rail. According to the U.S. Energy Information Administration, U.S. crude oil production has increased from 5 million barrels per day in 2008 to 8.5 million barrels per day in 2014.[1]

This dramatic growth in domestic energy production has led to significant challenges in transporting crudes efficiently and safely. Increasingly, crude oil producers are utilizing rail to deliver crude supplies to U.S. markets. According to the Association of American Railroads, the United States rail system transported 407,642 carloads, or roughly 300 million barrels, of crude oil in 2013, up from 9,500 carloads in 2008.[2]

While rail provides safe and efficient transport of oil, the increasing volumes being transported through communities have raised significant safety and environmental concerns. Railroads consistently spill less crude oil per ton-mile transported than other modes of land transportation. Despite the industry's track record of safe transportation of crude, the increased volumes and demands on the network are not without significant safety and environmental risks. These risks have been highlighted by a number of major incidents involving crude oil being transported by rail—including a catastrophic fire that caused 47 fatalities and destroyed much of Lac Mégantic, Quebec, in 2013.

A contributing factor to concerns is the fact that tens of thousands of outdated railroad tank cars are carrying volatile crude oil. The industry continued reliance on legacy DOT-111 tank cars to handle the transport of crude is placing communities through which these cars travel at risk. Despite this risk of oil being transported in tank cars lacking the latest safety technology, the Federal government has been slow to develop standards to require stronger, safer tank cars.

New Tank Cars Standards Needed

As crude moves by rail across America, delivering great benefits to our economy, moving it and other flammable commodities safely must be our top priority. The rail industry utilizes tank cars for the transportation of a range of products such as caustic soda, urea ammonium nitrate,

[1] Energy Information Administration crude oil production data, by state, available at http://www.eia.doe.gov.
[2] Association of American Railroads, "Moving Crude Oil by Rail," September 2014.

vegetable oils, bio-diesel, ethanol and crude oil. The industry has long acknowledged the need to update rail tank car standards. In March, 2011, after years of study, industry and the AAR petitioned the U.S. government to mandate a more robust tank design with thicker steel shells, and protection for the top, bottom and both ends of the tank car. When government action did not appear imminent, industry and the AAR voluntarily adopted the more robust standard — called CPC-1232 — for new tank cars ordered after Oct. 1, 2011.

Today, more than three years after the more robust CPC-1232 standard was proposed by this consensus industry group, DOT-111 specification remains the government-specified design in the United States. The railroads are common carriers and by law, they are required to move any car that properly "packages" commodities to U.S. Department of Transportation (DOT) specifications.

In the wake of Lac-Mégantic and several other high-profile tank car derailments, it has become clear that there is a need for improved tank car design for both newly-built tank cars and for tank cars currently in service. The significant safety concerns about the existing legacy fleet of older DOT-111 cars requires the Federal government to develop a safer tank car design standard for crude oil and ethanol service and the transport of other hazardous materials. The enhanced safety standards should apply to all tank cars containing flammable liquids - not just those carrying crude oil and ethanol. Ultimately the rail industry should transition all hazardous materials to a more robust tank car—regardless of the flash point at which these materials ignite.

The National Transportation Board (NTSB) has long recognized safety concerns with legacy tank cars. We strongly support NTSB including "Improving Tank Car Safety" on its 2015 "Most Wanted Transportation Safety Improvements List." In identifying tank cars for safety improvements, the NTSB made clear its view that ". . . the current tank cars moving these flammable liquids are not up to the task. It's crucial to strengthen existing rail tank cars and new rail tank car regulatory requirements."[3] Greenbrier could not agree more.

Tank Car of the Future

Despite the Federal government's inability to provide the industry with a more robust tank car design standard, Greenbrier voluntarily announced its "Tank Car of the Future" in February 2014 (see attachment). Prominent features of this more robust tank car include:

- 9/16 inch thick steel tank;
- high capacity pressure relief valve to protect the tank from internal pressure resulting from a fire;
- 1/2 inch full-height head shields at both ends of the tank car;
- bottom outlet valve handle that disengages so it does not unintentionally open during derailment; and
- ceramic thermal jacket around the tank shell and an outer steel jacket around the car to additionally protect against punctures and fire.

[3] http://www.ntsb.gov.

These new design features combine to inhibit discharge of contents during a derailment, to reduce penetration of the tank shell and to limit "pool fires" that can result when hazardous contents of a tank car escape in a breach and are ignited. The new design is also equal in capacity volume to the legacy DOT-111 tank car with a loading volume of 30,000 gallons.

With the Tank Car of the Future design, the Conditional Probability of Release (CPR) — which measures the likelihood of tank car spills in the event of a derailment at different speeds and by different car types — for a derailment at 50 mph would improve by up to approximately 7 to 8 times compared with the majority of tank cars now operating in hazardous service in the North American fleet. Using the accepted CPR measurements, the Tank Car of the Future is also twice as safe as a fully jacketed and insulated CPC-1232 car.

So far, customer response for our Tank Car of the Future has been favorable. Greenbrier currently has more than 3,500 orders for tank cars with 9/16-inch shell thickness and has begun delivering these tank cars to customers. In fact, a unit train of more than 100 tank cars built to this highest safety design recently received its initial cargo of Bakken crude from the field in North Dakota.

GBW Railcar Retrofit Solutions

In addition to delivering our new Tank Car of Future, Greenbrier through our joint venture with Watco, GBW Railcar Services, is delivering retrofit solutions for the legacy DOT-111 tank cars. These retrofit solutions permit extended service for DOT-111 tank cars in flammable liquids service and for other hazardous materials transport as these cars are placed in lower risk service over time. GBW also offers retrofit alternatives for the most recently built CPC-1232 tank cars. Combined, these retrofits meaningfully improve the safety performance of all tank car types in existing service.

The GBW joint venture established the largest independent railcar repair shop network in North America, owning and operating the combined network of 39 railcar repair, refurbishment and maintenance shops of Greenbrier and Watco, 14 of which are certified to work on tank cars. This allows us to deliver on retrofit designs for the legacy DOT-111 tank cars that include:

- optimally sized pressure relief valves;
- head shields;
- top fittings protection;
- thermal protection; and
- steel jackets for additional puncture protection.

Appropriate retrofit choices permit extended service for DOT-111 tank cars in flammable liquids service and for other hazardous materials transport as these cars are placed in lower risk service over time.

GBW's retrofit alternatives for the most recently built CPC-1232 tank cars include enhancements to the bottom outlet valve controls, and pressure relief valves that will reduce the likelihood of tank cars releasing contents in derailments.

Combined, these retrofits meaningfully improve the safety performance of all tank car types in continued service.

Pipeline and Hazardous Materials Safety Administration's Rulemaking

While Greenbrier and GBW are moving forward unilaterally to address safety concerns raised by outdated tank car design standards, it is clear that DOT must act to strengthen rail tank car design standards with features that exceed even the CPC-1232. The only thing holding the industry back is the government's inaction on proposed new tank car design standards and a deadline for having an upgraded rail tank car fleet.

On August 1 of last year, the Pipeline and Hazardous Material Safety Administration (PHMSA), in conjunction with the Federal Railroad Administration, issued a Notice of Proposed Rulemaking (NPRM), which, among other things, proposes to enhance standards for new tank cars and sets a timeline for retrofitting all exiting tank cars.

Greenbrier fully supports PHMSA's proposed "Option 2" design for new tank cars in flammable service built after October 1, 2015. Adding 9/16-inch shell thickness produces a 21.6 percent reduction in the CPR performance. At a derailment speed of 50 mph, CPR improves from 45 percent in bare DOT-111 legacy tank cars to just over 5 percent with the new design standard required in Option 2 (which is consistent with the design of the Tank Car of the Future). Under this design standard, CPR improves by about 7-8 times from the least protected tank car to the most protected tank car, and twice as safe as a fully jacketed and insulated CPC-1232 car.

While Greenbrier believes that tank cars built to the new robust standards will provide the greatest safety benefits, we also supports PHMSA's effort to retrofit the existing fleet of tank cars currently used in the transport of all flammable commodities. GBW agrees with PHMSA that every packing group classification—PG I, II and III—within the Class 3 flammables category must be transported in a retrofitted tank car by 2020. This is an aggressive timeline, we believe it is achievable, which is why we established our GBW joint venture with Watco. GBW is making significant investments in expanding retrofit capacity. Others in the repair industry have also announced similar investments in increasing their retrofit capacity. We are making these investments in anticipation of a new car standard. Yet these private investments are in jeopardy if the final rule is delayed.

Immediate Release of Final Rule Critical to Industry Certainty

Adopting Option 2 as the fixed and final standard for new tank cars, combined with establishing clear standards and timelines for the retrofits of existing cars, will produce a safer North American tank car fleet in the shortest possible time. Ensuring that limited capital is targeted to the appropriate tank car designs and modifications—those that maximize the safety benefits accruing to the public—and that this happens expeditiously should be a core priority of PHMSA as it completes this rulemaking. While we believe it is important that PHMSA get this done quickly, it is also just as critical that the final rule "gets it done right".

Prompt implementation of proposed new tank car design and retrofit standards will ensure safer communities and provide railcar manufacturers, like Greenbrier, with the regulatory certainty needed to continue investments already underway to deliver more robust tank cars. We are very disappointed that PHMSA's announcement that the publication of the final is not anticipated until May 12 of this year, and share Congressman DeFazio's call in his January 22 letter to Secretary Foxx that DOT take immediate action to address this serious safety issue.

Greenbrier is making major capital investments in new facilities and equipment to respond rapidly to PHMSA's new standards. A final rule establishing clear, robust standards for new tank cars and timelines for retrofits of existing cars will permit the industry to make the necessary upgrades to their facilities as rapidly as possible. From Greenbrier's perspective, the urgency for a final rule is apparent. We are already responding to this imperative by delivering general purpose tank cars with the most robust safety features we can offer. We are ready to move even more quickly upon issuance of a final rule.

It is also critically important for the DOT to act soon as Transportation Canada has taken the lead by adopting new tank car standards earlier this year and moving forward to establish an even higher standard soon. A similarly prompt decision in the U.S. will provide industry with the regulatory certainty it needs to continue investments already underway to produce more robust tank cars. We are hopeful the DOT will act soon to enact strong designed standards, and then move quickly to harmonize the U.S. standards with new Canadian rules to create a unified North American tank car standard.

While the urgency of upgrading the safety of the North American tank car fleet should be apparent, there are some who suggest that the industry requires six, seven or even up to 10 years to fully enhance the puncture resistance of tank cars. This is simply wrong. The rail supply industry can move faster than that and we will. Greenbrier and others are already making necessary investments to address this need. Greenbrier currently builds tank cars at a rate of 4,000 cars per year, and we are increasing our production capacity to meet higher demand for tank cars related to the energy renaissance in America. Greenbrier is investing with a goal of doubling our capacity by later this year to support strong demand for our Tank Car of the Future.

Despite the commitment of Greenbrier and others in the industry to invest in their production and retrofit capacity, critics of the PHMSA NPRM remain. This should not, however, be a debate between service and safety. Service requirements are very important, but our customers do not expect us to provide improved service at the price of diminished safety. The railroads have earned a reputation as safe handlers of cargo because they utilize the right equipment. To preserve this legacy, the standards in the proposed rule should be finalized immediately.

Conclusion

Thank you for allowing Greenbrier the opportunity to share our views on this very important topic. We are proud to be a player in the Nation's ongoing energy renaissance, and stand committed to working with this Subcommittee, DOT, and industry stakeholders to provide the safest possible transport of crude oil and other energy products.

Tank Car of the Future Increases Railcar Safety

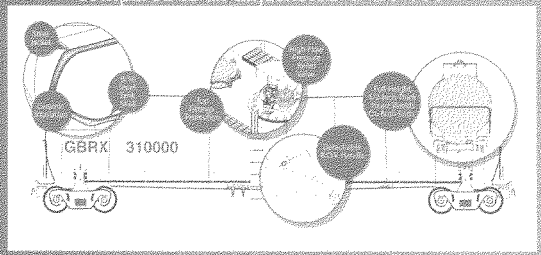
The New Tank Car Standard

OPTION 2 *"Tank Car of the Future"*

GBX and GBW Railcar Services supports this option

This tank car is up to **8x safer** when compared to an unjacketed DOT-111

- 9/16 inch steel tank shell
- Minimum 11-gauge steel jacket
- Ceramic Insulation
- Top Fittings Protection
- High-Flow Pressure Relief Valve
- Full height ½-inch-thick head shields on both ends
- Detachable bottom outlet valve handle



OPTION 1

- 9/16 inch steel tank shell
- Electronically controlled pneumatic (ECP) brakes
- Rollover protection

OPTION 1 CONCERNS:

- For ECP brakes to make a difference, they must be installed on both rail cars and locomotives. This can only be done via separate rulemaking.
- Benefits of TIH Rollover Protection are unproven and would add significant cost to the industry.

OPTION 3

- 7/16 inch steel tank shell

OPTION 3 CONCERNS:

- 7/16 inch shell thickness significantly increases the threat of puncture and product release in the event of derailment vs. a thicker 9/16 inch shell

Retrofits of Existing Fleet

JACKETED CPC-1232

Should continue in Class 3 flammable service subject to:

- Reconfigured bottom outlet valves
- Increased size of the pressure relief valves

NON-JACKETED CPC-1232

Should continue subject to modifications such as:

- 11 gauge steel jacket
- Addition of 1/2" ceramic insulation
- Reconfigured bottom outlet valves
- Resized pressure relief valves

DOT-111 ("LEGACY")

Should continue subject to significant modifications such as:

- Addition of full-height 1/2" head shields
- Reconfigured bottom outlet valves
- Resized pressure relief valves
- Existing steel in heads and shells
- Top fitting protection that conforms to industry standards

The Greenbrier Companies, Inc.

One Centerpointe Drive Suite 200
Lake Oswego Oregon 97035
503 684 7000 Fax 503 684 7553

April 8, 2015

The Honorable Jeff Denham

House Subcommittee on Railroads, Pipelines and
Hazardous Materials
2165 Rayburn House Office Building
Washington, D.C. 20101

Dear Representative Denham:

Thank you for your interest and hard work on this important transportation issue. You have posed six questions for the record from the Subcommittee on Railroads, Pipelines, and Hazardous Materials' February 3, 2015 Hearing on "How the Changing Energy Markets will Affect US Transportation". For your convenience, I have copied each question and will provide my answers to each one:

1. *In Greenbrier's written statement and at the hearing, you stated that Greenbrier's Tank car of the Future" is 7-8 times safer even at speed of 50 MPH and that the Conditional Probability of Release ("CPR") improves by about 7-8 times compared to a non-jacketed DOT-111. However, the Tank Car Safety Project data indicates that CPR improves by 5.0 to 5.5 times when comparing to 9/16" thick jacketed tank car to a non-jacketed DOT-111 under a defined set of detainment parameters. In light of this fact can you please explain your statement regarding the improvement of CPR by 7-8 times?*

   The Tank Car Safety Project data does not take into account two important improvements over the standard non-jacketed DOT-111 car that our Tank Car of the Future has.

   The first improvement is a safety linkage that now operates the Bottom Outlet Valve (BOV). In a derailment, the BOV handle can be snagged by debris and cause the valve to open.

   The second improvement is ceramic thermal insulation. This improvement is designed to stop otherwise sound tanks that are in a pool or torch fire from breaching by thermal tear. At the recent derailment near Galena, Illinois, only one car was initially breached by the derailment event. But this one leak soon fueled a fire and eight more cars ruptured from thermally induced tears. These thermally induced tears are violent events that often shoot fireballs hundreds of feet into the air. The ceramic thermal insulation is designed to mitigate these events.

   Accordingly these two additional safety features account for Greenbrier's estimated improvement compared to the Tank Car Safety Project.

At the hearing you also commented in relation to Lac Megantic that a new tank car design would have put significantly less amounts of crude oil on the ground had that derailment involved a more robust tank car. Can you please elaborate on your statement and how you were able to calculate the fact that less crude would have been released? Is this statement based on the improvement of CPR by 7-8 times you referenced at the hearing?

My statement is based on my assessment as an engineer with over 38 years of experience in the railroad industry that a more robust tank car would be less likely to breach in a derailment compared to a less robust tank car. But let me try to give you a more complete answer. By their nature, tank car derailments are very chaotic events. There are numerous variables and factors that contribute to the severity of the incident. So the word "calculate" implies a level of precision that cannot be determined. But I can consider some of the known failure modes of the tank cars involved in the Lac Megantic derailment and discuss how a new tank car design can address them to limit the release of crude oil. For examples:

- Shell Breaches: Thirty-seven of the sixty-three tank cars that derailed at Lac Megantic had shell breaches caused by impact damage. By adding a jacket and increasing the shell thickness we will decrease the tendency for the shell to puncture.
- Head Breaches: Thirty-one tanks also had head breaches caused by impact damage. By adding a full height head shield and increasing the thickness of the head we will also decrease the tendency for the head to puncture.
- Valve Breaches:
    - Weather-only Top Fittings: Sixteen of thirty-one cars with weather only top fittings covers were breached at the valves.
    - Top Fitting Protection: But thirty–two of the cars had Top Fittings Protection. It was not required by the code, but these thirty-two cars had it. Only four of these cars with Top Fittings Protection were breached at the valves. All of our Tank Cars of the Future would have this type of protection.

So while it is not possible to calculate the exact amount of crude oil that would not have spilled in the Lac Megantic tragedy, it is clear that adding protective features to new tank cars will lessen the amount of oil that will be released in future incidents.

2. *At the hearing you noted, that the industry can comply with PHMSA's proposed timeline for modifying legacy DOT-111s in three years, which would necessitate modifying approximately 1,800 tank cars per month. Industry estimates indicate the maintenance and repair network is only capable of modifying approximately 550 tank cars per month. Can you please explain your numbers and how you calculated them? In your assumptions, what portion of these tank car modifications would Greenbrier be responsible for at its facilities? What evidence does Greenbrier have that the industry is capable of creating the additional capacity in time to meet PHMSA's deadlines.*

Retrofits should be staged to account for the risk and usage levels of the cars and associated commodities. In this case, DOT-111 legacy and unjacketed, uninsulated CPC-1232 cars in unit train crude oil and ethanol service present the greatest exposure to the public and retrofit capacity should be applied to them first. The key issue is what capacity is available for cars in the highest risk service, and how does this translate into a timeline.

It is important to note that the 1,800 car per month figure includes all cars in flammable service, and does not distinguish between those presenting high risk and those which do not, such as single shipment, low mileage cars. It also does not appear to take into account projected retirements or replacements that are a normal part of industry practice. A realistic retirement figure of 10% over the retrofit window is consistent with current industry practice, although The Brattle Group's report conducted for the Rail Supply Institute suggests that 28% of the DOT-111 legacy fleet would be retired. If this is so, these cars should be removed from the needed capacity to complete the retrofits. This level of assumed retirements is inconsistent with industry norm, and artificially inflates the shortage of rail tank cars.

Essentially, retrofit capacity comes from three sources – new capacity, utilization of currently unused capacity in the industry, and improved efficiencies such as opportunistic maintenance and "learning effects".

Announced new retrofit capacity includes new facilities that have been publicly announced, such as those in Arkansas and Mississippi, and announced expanded capacity at existing shops by adding workers. Cambridge Systematics (CS), which undertook an independent review of The Brattle Group's report, conservatively estimated new capacity as being at least 8,400 cars per year, without making assumptions of adding second shifts. To demonstrate the conservative nature of this estimate, consider that GBW alone has announced capacity expansion of 2,520 cars per year in steady state.

In addition to new capacity, there is considerable unused capacity in the industry. Published figures for current shop utilization show that 70% of shops capable of performing retrofits are running at less than 75% of capacity. CS estimates that under the most conservative assumptions there is unutilized retrofit capacity of at least 4,500 cars per year.

In addition, by moving from individual cars to programs of cars, there are considerable opportunities for greater efficiency in retrofitting cars. Using figures that are well below those from inside and outside the industry, and ignoring compounding of the effects, CS estimated these efficiency gains at 20%.

In sum, CS estimates the industry retrofit capacity as being at least 13,600 cars per year and possibly as high as 19,600 cars per year. When coupled with Brattle's assumptions about retirement levels, CS estimates that the industry can complete retrofits of the highest risk fleet (unjacketed DOT-111legacy crude oil cars) in 2 1/2 years, and the entire crude oil and ethanol fleet in 6 years.

3. *How does PHMSA's proposed rule compare to your "Tank Car of the Future" which you unveiled in February 2014? How would that tank car improve safety compared to unpacked DOT-111 tank cars?*

The tank car PHMSA describes as Option Number 2 and our Tank Car of the Future are identical. Greenbrier's Tank Car of the Future would improve safety compared to unjacketed DOT-111 cars by adding jackets, thicker shells, thicker heads, full height head shields, top fittings protection, tougher (normalized) steel, ceramic thermal insulation and safer bottom outlet valve linkages to new tank cars. Taken together these improvements will lead to impressive gains in safety.

4. *The Railway Supply Institute commissioned a report by The Brattle Group which states that rail tank cars cannot be modified by the PHMSA proposed deadline of five years. What is your response to that?*

   The Brattle Study contains a number of assumptions regarding capacity that make it unreliable for estimating the implementation timeline. For example, they do not explicitly account for the existing unused capacity in the industry, which has been shown to be on the order of 4,500 cars. In addition, their estimate of new industry capacity did not reflect new facilities and plant expansions that have been publicly announced. In fact, their capacity estimates for 2015 put the entire industry below the figure for GBW alone. Thus, the available and announced capacity thus comes close to accomplishing PHMSA's aggressive timeline.

5. *Please provide for the record the final analysis of Cambridge Systematic of the industry capacity to handle the retrofit schedule proposed by PHMSA.*

   We have attached a copy.

Once again, thank you for your interest and hard work on this important transportation issue. Please feel free to ask any additional questions.

Sincerely,

Gregory J. Saxton

Gregory J. Saxton, P.E.
Chief Engineer

Enclosure

Analysis of Tank Car Fleet Options and Retrofitting Capacity

In Connection With Docket No. PHMSA-2012-0082 (HM-251)
Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains

Technical Report

prepared for

Greenbrier Companies

prepared by

Cambridge Systematics, Inc.

with

Dr. Patrick Little
Harvey Mudd College

March 20, 2015

Table of Contents

Executive Summary **1**

1.0 Introduction **1-1**

1.1 Purpose and Objective 1-1

1.2 Critical Elements 1-2

1.3 Approach 1-3

1.4 Report Structure 1-3

2.0 Tank Car Fleet Composition **2-1**

2.1 Affected Tank Car Fleet 2-1

2.2 Utilization of Tank Car Fleet for Crude and Ethanol Transport 2-3

2.3 Fleet Demographics and Retirements 2-4

3.0 Contract Shop Retrofit Capacity **3-1**

3.1 New or Expanded Retrofit Capacity 3-1

3.2 Underutilized Existing Shop Capacity 3-4

3.3 Improved Practices and Opportunistic Maintenance 3-7

3.4 Model Results 3-8

4.0 New Tank Car Production Capacity **4-1**

5.0 Conclusions and Recommendations **5-1**

List of Tables

Table 1. PHMSA DRIA Projected Tank Car Fleet Assigned to Crude Oil and Ethanol Service *2015* 2-2
Table 2. December 31, 2015 Flammable Liquids Tank Car Fleet as Projected by RSI-CTC ..2-2
Table 3. 2013 Crude and Ethanol Transport by Tank Car Class and Size 2-3
Table 4. Expanding or New Tank Car Retrofit Facilities 3-2
Table 5. Estimated Time to Retrofit (years)....3-9
Table 6. Announced New Tank Car Construction Capacity 4-1

List of Figures

Figure 1. North American Tank Car Fleet Composition *2013* 2-1
Figure 2. Large Tank Cars (27,500 gallons and larger) by Age *2013*....2-5
Figure 3. Projected Retirement Year by Size, 2-Year Intervals, 35-Year Life 2-6
Figure 4. Distribution of Projected Tank Replacements by Size, 2-Year Intervals, 35-Year Life 2-6
Figure 5. Facilities Certified for Extensive Tank Car Work....3-3
Figure 6. Repair Facilities contacted by AllTranstek 3-5
Figure 7. Estimated Speed-Dependent Conditional Probability of Release (CPR)....5-2

Executive Summary

This memorandum presents the results of analysis conducted by Cambridge Systematics, Inc. (CS) on several specific issues associated with the potential impacts of the proposed Pipeline and Hazardous Material Safety Administration PHMSA-2012-0082 (HM-251) rulemaking, *Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains.* During the rulemaking process, various stakeholders have weighed in on the feasibility and economic impacts associated with the proposed new rules. One such review was conducted by Neels and Berkman of the Brattle Group (BG) on behalf of the Railway Supply Institute Committee on Tank Cars (RSI-CTC).[1] The Brattle Group relied on analytical results first provided in an earlier RSI-CTC's filing,[2] and extended them to challenge the analysis and outcomes developed by the Pipeline and Hazardous Materials Safety Administration (PHMSA) under their Notice of Proposed Rulemaking (NPRM) and associated Draft Regulatory Impact Analysis (DRIA)[3] regarding the movement by rail of ethanol, crude oil, and other "high-hazard flammable train" (HHFT) commodities.

At the request of the Greenbrier Companies (GBRX), CS undertook an independent review of the BG Report and its critiques of PHMSA's NPRM. This memorandum builds on a January 23, 2015 memorandum and provides an examination of three key issues: the capacity of contract shops to perform retrofits, new car manufacturing capacity, and fleet composition and projected retirements. Each of these elements directly impact the overall capacity of North American railroads to handle existing and projected crude oil and ethanol traffic while the fleet is being upgraded to meet proposed standards for safety. Since the BG Report maintains that PHMSA's proposed timeline is too short and will cause economic harm, the ability to accurately gauge the rate at which retrofits can be completed and new cars can be placed in service is the critical issue. To this end, CS developed a model to examine contract shop capacity utilizing publically available resources as well as multiple interviews with industry experts.

Our analysis shows that the industry has the capacity to complete a retrofit of the tank cars presently being used for crude and ethanol service within the timelines proposed in the NPRM. At full capacity, the actual ability of the industry to conduct Tier I retrofits is between 8,400 and 19,600 cars per year as compared to RSI-CTC's projection of 6,400 tank cars per year maximum. Combined with accelerating production of new cars, the industry can retrofit or produce all the tank cars necessary to meet the conditions set forth by PHMSA in Option 2 for the crude oil and ethanol fleets in approximately six years.

---

[1] Neels and Berkman, *A Review of the Pipeline and Hazardous Materials Safety Administration's Draft Regulatory Impact Analysis*, Docket No. PHMSA-2012-0082 (HM-251), November 14, 2014.

[2] Comments of the Railway Supply Institute, Committee on Tank Cars regarding the Pipeline and Hazardous Materials Safety Administration Notice of Proposed Rulemaking for Hazardous Materials: Enhanced Tank Car Standards and Operational Control for High-Hazard Flammable Trains, Docket No. PHMSA-2012-0082 (HM-251), September 30, 2014.

[3] U.S. DOT/PHMSA, *Draft Regulatory Impact Analysis – Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains*; Notice of Proposed Rulemaking, Docket No. PHMSA-2012-0082 (HM-251).

In summary, CS' analysis found that:

- The RSI./BG analysis significantly underestimates the known capacity of the contract shop industry to meet the deadlines in the proposed rule.
- Using RSI/BG's assumptions on fleet size and retirements, along with data developed in this analysis, the retrofit process for unjacketed cars in crude oil and ethanol service can be completed in five and one-half years, and the entire fleet in six years.
- If implementation of the regulation is staged to address particular cars in specific service based on risk, it is possible to address the most at-risk cars – the unjacketed DOT-111 cars used in unit train crude oil service in as few as two and one-half years, even with a six-month run-up included.
- The final rule should prioritize unjacketed legacy DOT 111 and CPC-1232 cars to remove risk as quickly as possible from tank cars in high-mileage flammable liquids service, since these cars have a far higher probability of spillage in the case of an incident.
- Contract shops and new car manufacturers will respond to changes in demand, as evidenced by announcements of shop expansions and new car manufacturing capacity, leading to substantial job creation and a safer fleet.
- Delay in making the rules final or extending the timeline for compliance penalizes firms that are being proactive.
- Aggressive retrofit timelines as proposed by PHMSA for cars in crude and ethanol service are achievable.

1.0 Introduction

1.1 Purpose and Objective

The increasing frequency of derailments of trains carrying crude oil or ethanol have raised alarms about the safety of the tank car fleet. Between 2006 and May 2014,13 spills ranging in size from 5,000 gallons to 834,000 gallons took place, of which 10 resulted in fires. Most catastrophic was a derailment in Lac Mégantic, Quebec, which caused an estimated $650 million in damage and resulted in 47 deaths. Since then, a series of further derailments have occurred, with at least four taking place in the first two months of 2015 – in Dubuque, Iowa; Northern Ontario; Crowsnest Pass, Alberta; and Mount Carbon, West Virginia.[4] Three of these derailments resulted in fires. The Pipeline and Hazardous Materials Safety Administration's (PHMSA) Notice of Proposed Rulemaking 2012-0082 (HM-251) (NPRM) *Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains* is a response to those safety concerns in the United States. In Canada, a parallel process is underway under the auspices of Transport Canada.

PHMSA's and Transport Canada proposed rulemakings cover a broad range of issues affecting tank car construction and operations, and since the proposed rules were issued, several analyses have been conducted by industry stakeholders on the potential impacts. At the request of Greenbrier Companies (GBRX), Cambridge Systematics, Inc. (CS) undertook an independent review of the Brattle Group's (BG) Report, *A Review of the Pipeline and Hazardous Materials Safety Administration's Draft Regulatory Impact Analysis.*[5] Conducted on behalf the Railway Supply Institute's Committee on Tank Car Safety (RSI-CTC), the BG Report offers a comprehensive analysis of the NPRM, as well as the prior Draft Regulatory Impact Analysis (DRIA).[6] Many of these issues were broadly reviewed in an earlier memorandum developed by CS,[7] while this memorandum presents an analysis of three interrelated core issues: the capacity of contract shops to perform retrofits, new car manufacturing capacity, and fleet composition and projected retirements. Each of these elements directly impact the overall capacity of North American railroads to handle existing and projected crude oil and ethanol traffic while the fleet is being upgraded to meet proposed standards for safety. Since the BG Report maintains that PHMSA's proposed timeline is too short and will cause substantial economic harm, gauging the rate at which retrofits and new cars can enter service is central to improving the safety of transporting flammable liquids by rail.

---

[4] Fuel Freedom Foundation, *Big difference between crude, ethanol train crashes*, February 27, 2015. Information current as of February 28, 2015.

[5] Neels and Berkman, *A Review of the Pipeline and Hazardous Materials Safety Administration's Draft Regulatory Impact Analysis*, Docket No. PHMSA-2012-0082 (HM-251), November 14, 2014.

[6] U.S. DOT/PHMSA, *Draft Regulatory Impact Analysis – Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains; Notice of Proposed Rulemaking*, Docket No. PHMSA-2012-0082 (HM-251).

[7] Aeppli and Little, *RSI-CTC Brattle Group Report Key Issues*, January 26, 2015.

1.2 Critical Elements

Our analysis specifically focused on Section IV of the BG Report, which asserts that PHMSA understated the impacts on the tank car fleet associated with the imposition of strengthened regulations on tank car integrity. The goals of the analysis were to:

- Examine key characteristics of the affected tank car fleet and its impact on a retrofit program;
- Examine in greater depth the contract shop industry's capacity to retrofit tank cars to the potential proposed standards; and
- Explore implications of timing and sequencing of retrofit program.

Of particular concern in the BG analysis was:

- Omission of new car manufacturing and shop capacity for retrofits;
- Incorrect specification of existing shop utilization;
- Double counting of tank car requalification required under HM-216B[8] or other planned maintenance and retrofits that overstates out of service times; and
- Assumed retirement rate of 28 percent, combined with a lack of consideration of increasing new tank car production capacity overstating potential transportation capacity shortfalls.

The focus of this analysis was on the fleet used in the transportation of ethanol and crude oil. Our analysis relies on data produced by and on behalf of RSI to the greatest extent possible, so as to allow a consistent comparison. In some areas, notably fleet composition and size, there are significant differences between PHMSA and RSI, which could affect the schedule by which the retrofit process can be accomplished.

In addition to the cars that are currently in crude and ethanol service, the retrofit requirements for the estimated 39,000 tank cars that are in other hazardous/flammables service also will need to be considered. These cars have far greater variation in configuration and age than the cars devoted to ethanol and crude oil service, and thus cannot be assumed to have the same retrofit needs. These were not examined in this study due to the short amount of time available, and the difficulty in obtaining suitable data.

[8] Tank cars in hazardous service require periodic recertification to permit continued use. During this process, the condition of the car is examined, and repairs made to address any deficiencies. The frequency and activities associated with recertification are performance-based, subject to requirements set forth in FR Doc No: 2012-13960.

1.3 Approach

The general approach taken in the analysis was to first establish a baseline regarding fleet size, utilization, and characteristics. Of particular interest was to find common ground with the BG report on such topics in order to permit direct comparisons of the two analyses. In that regard, the CS analysis on the fleet used fleet size and commodity characteristics from the BG report. With respect to the age of the fleet, CS developed a new analysis because specific information was not provided in the BG report. This fleet information was subsequently used to evaluate BG's claims regarding retirements and retrofit capacity. In addition, because of demonstrable errors in the BG analysis regarding new retrofit capacity, a model of new capacity was developed and applied.

As noted, CS developed a model to examine contract shop capacity in terms of new capacity, unused current capacity, and existing maintenance or regulatory activities that affect retrofit capacity. Data utilized in the model included publically available resources such as the record associated with the proposed rulemaking, materials from the Association of American Railroads and Railinc, as well as multiple interviews with industry experts. Whenever decisions were required regarding parameters or circumstances relevant to the model, conservative assumptions were made, i.e., the values that tended to lower overall capacity were assumed. Our approach and analysis is detailed in Sections 2 through 4 below.

1.4 Report Structure

The remainder of this report is broken into four sections as follows:

- Section 2 discusses the current and projected composition of the North American tank car fleet;
- Section 3 examines industry capacity for completing tank car retrofits;
- Section 4 discusses new car manufacturing trends and capacity; and
- Section 5 contains conclusions and recommendations, including how sequencing might best be accomplished.

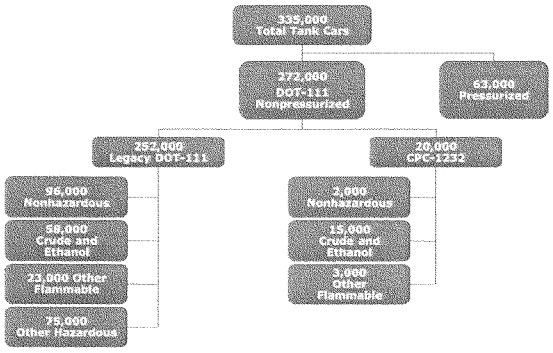
2.0 Tank Car Fleet Composition

To understand the scope of the potential need for retrofits and the resulting time required, it is necessary to gauge the anticipated fleet composition on the effective date of the final rule. In addition to the overall composition, the fleet's distribution by age affects decision-making as to whether or when a car may be upgraded, redeployed, or retired. It also will affect scheduling of shopping cars for major work, including retrofitting as well as HM-216B requalification, painting and relining, and other major work. In this section, we examine the estimated size of the affected tank car fleet, its utilization, and demographic characteristics; and draw comparisons between the BG Report, the NPRM, and other related data.

2.1 Affected Tank Car Fleet

Since 2005, the U.S. tank car fleet has expanded rapidly, first to meet the demand for the transportation of ethanol, and subsequently to transport a rapidly expanding volume of crude oil. Based on estimates produced by RSI-CTC reflecting the state of the fleet in December 2013, the composition of the North American tank car fleet totaled approximately 335,000 cars. Of this total, 63,000 were pressure cars, while the balance of 272,000 were unpressurized DOT-111 cars that could be used to transport a variety of hazardous and nonhazardous liquid commodities, including ethanol and crude oil, as shown in Figure 1.

Figure 1. North American Tank Car Fleet Composition, 2013



Source: DOT NPRM, RSI, AAR.

Ninety-eight thousand cars were in nonhazardous service, leaving potentially 174,000 Legacy DOT-111 and CPC-1232 cars affected by the NPRM. Cars handling flammables, which will be most directly affected by the rulemaking, amounted to a population of 99,000 cars. Of these, 18,000 conformed to CPC-1232, the voluntary standard that was adopted by the industry for cars ordered from October 2011 onward.

Using industry forecasts, PHMSA estimated the crude and ethanol fleet composition for year-end 2015. The results are shown in Table 1 below. The 2015 projection represents an increase of 37,000 cars carrying crude and ethanol over the two-year period following 2013.

Table 1. PHMSA DRIA Projected Tank Car Fleet Assigned to Crude Oil and Ethanol Service, 2015

	CPC 1232		DOT 111		
Service	**Jacketed**	**Unjacketed**	**Jacketed**	**Unjacketed**	**Total**
Crude/Ethanol Fleet	30,150	22,380	5,600	51,592	**109,722**

Source: PHMSA DRIA Table TC5.

The BG Report raises a number of issues with PHMSA's estimates. First, it asserts that PHMSA overestimated the delivery rate for jacketed and non-jacketed CPC-1232 cars that were on order in 2014. PHMSA assumed that all non-jacketed CPC-1232s on order in 2014 were delivered that year, and that another 5,000 jacketed CPC-1232s were also delivered. PHMSA also assumed that only enhanced jacketed CPC-1232 cars would be delivered in 2015 and beyond. This ignores the minor repair work that may be required depending on the selected retrofit option, the absence of final rules at the beginning of 2015 causing uncertainty and delay in manufacturing upgraded cars, and the backlog of non-jacketed CPC-1232s on order through 2015 that would require contract renegotiation in order to change them to enhanced jacketed cars. RSI-CTC membership estimated that the number of deliveries would be much higher, increasing the size of the fleet requiring retrofits. Indeed, tank car deliveries in 2014 amounted to over 35,000 units, of which approximately 25,000 were assigned to crude or ethanol service.

Table 2 below is the best estimate of RSI-CTC members of what the flammable liquids tank car fleet will look like by the end of 2015, taking the above information into consideration. The largest differences appear in the jacketed CPC-1232 and jacketed DOT 111 fleet estimates, both of which RSI-CTC projects as higher than PHMSA, while the number of unjacketed DOT 111s projected is lower than PHMSA.

Table 2. December 31, 2015 Flammable Liquids Tank Car Fleet as Projected by RSI-CTC

	CPC 1232		DOT 111 Legacy		
Service	**Jacketed**	**Unjacketed**	**Jacketed**	**Unjacketed**	**Total**
Crude Oil	35,408	21,993	7,016	23,090	87,507
Ethanol	23	751	88	27,037	27,899
Total Crude/Ethanol	*35,431*	*22,744*	*7,104*	*50,127*	*115,406*
Other	1,975	2,944	9,413	24,790	39,122
Total	**37,406**	**25,688**	**16,517**	**74,917**	**154,518**

Source: Brattle Group Report, Table 4.

Cambridge Systematics utilized this RSI-CTC fleet estimate in the subsequent analysis of shop capacity and retrofit timelines. This ensured consistency with the BG Report assumptions and provides a level comparison not only for retrofit capacity but also fleet replacement needs.

2.2 Utilization of Tank Car Fleet for Crude and Ethanol Transport

In order to identify the typical capacity of cars that are being used to carry crude and ethanol, data from the Surface Transportation Board's (STB) Public Use Waybill Sample was examined for the years 2006 to 2013. Using this data, the number of carloads per year could be examined by commodity, capacity, and major tank car class. Table 3 below details ethanol and crude oil shipments by tank car type and size handled in 2013.

Table 3. 2013 Crude and Ethanol Transport by Tank Car Class and Size

	Carloads by Tank Car Size (Thousands of Cars)					
DOT Tank Car Type	**19-21k**	**22-24k**	**25-27k**	**28-31k**	**31k+**	**Total**
103CW, 103EW, 111A100W6, 111A60W6, 111A60W7, 120J200W	–	–	>0	–	–	0
103EW, 111A100W6, 111A60W7, 111S100W6	–	> 0	> 0	–	–	0
105J300W	–	–	> 0	–	–	0
111S100W1, 111S100W2, 111S100W3, 111S100W5	–	–	8	44	21	73
203, 203W, 211A100W1, 211A60W1, 211J100W1/103, 103W, 104W, 111A100W1, 111A100W3, 111A100W4, 111A60W1	1	18	24	573	54	670
Total Carloads by Capacity	1	18	32	617	75	743
Percent of Carloads by Capacity	0%	2%	4%	83%	10%	100%

Source: 2013 Surface Transportation Board Public Use Waybill Sample.

Note: 18,500-19,499 gallons shown as 19,000 gallons capacity. 20,500-21,499 gallons shown as 21,000 gallons capacity, etc.

Notably, 93 percent of all ethanol and crude oil shipment were handled in the two largest classes of tank cars, those exceeding 28,000 gallons capacity. This was actually a decrease from previous years, where the two largest tank car size categories handled between 95.1 percent in 2012 and 97.9 percent in 2008. The lower level experienced in 2013 is likely a reflection of very high demand pressing smaller equipment into crude and ethanol service. As the fleet continues to expand and the growth in demand for crude oil shipping levels off, shipment of ethanol and crude oil will shift back to the largest cars. With the vast majority of crude and ethanol shipments being handled in the largest tank cars, our subsequent analysis focused on this element of the fleet.

2.3 Fleet Demographics and Retirements

An important element of the impact of the NPRM is its effect on fleet retirements. Fleet owners will have an economic decision to make as to whether cars that are not compliant with the new standards should be retrofit, retired, or redeployed to other uses not requiring a retrofit. Railcars built since 1974, including tank cars, can generally be operated in interchange service over a 50-year period. However, the characteristics of tank cars, and the regular recertification requirements mandated through HM-216B for those in hazardous service, typically means that most will not be in commercial service for the full duration over their permissible regulatory lifespan. Repairs associated with recertification increase as a car ages, while at the same time an aging car's commercial viability declines as more modern and efficient designs are adopted. Furthermore, the durability of tank cars experiencing high mileage is a relative unknown, as the 60,000 annual mileage of tanks cars in crude service far exceeds historic usage patterns where these cars often provide a stationary storage function as part of the supply chain.

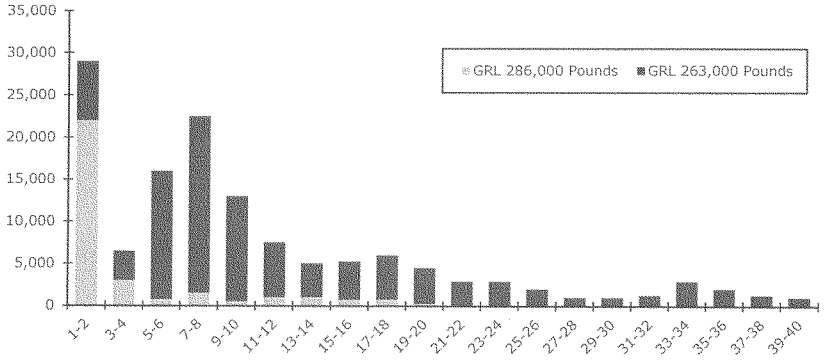
BG asserts that 28 percent of the affected fleet will be prematurely retired if the schedule specified in the NPRM is followed. It is not clear over what time horizon the claimed 28 percent retirement would occur, and BG applies it using the same value for each year. There is no evidence that BG accounts properly for retirements that would naturally occur in the absence of the modification requirements. However, the RSI-CTC comments use an approximation that 2.5 percent of the fleet is retired annually (page 30), while the report produced by ICF on behalf of the American Petroleum Institute (API) discusses a "typical 35-year economic life" for a tank car.[9] For purposes of our analysis, we utilized a 35-year life, which would represent a renewal rate of 2.9 percent annually for a fleet uniformly distributed in age.

Since the tank car fleet is not uniformly distributed in age, we examined its actual age distribution and projected retirements by year using data compiled by Railinc. The distribution by age for the large tank car fleet (27,500 gallons and higher), shown in Figure 2, indicates that the composition of the fleet that is being used for ethanol and crude oil transport is relatively young.

As of year-end 2013, approximately 65 percent of the fleet was 10 years of age or less, and 86 percent was 20 years old or less. Acquisitions in the last 10 years have been quite uneven, with the newest acquisitions associated largely with the rapid growth of crude oil transport, while those between 5 and 10 years of age reflect the time during which the ethanol industry came of age. The shift to 286,000 from 263,000 pound railcars also is recent, with the higher capacity cars accounting for the majority of deliveries only during the years from 2010 onward.

[9] ICF, et.al, *The Economic Impacts of Changes to the Specifications for the North American Rail Tank Car Fleet*, December 9, 2014, page 27.

Figure 2. Large Tank Cars (27,500 gallons and larger) by Age, 2013

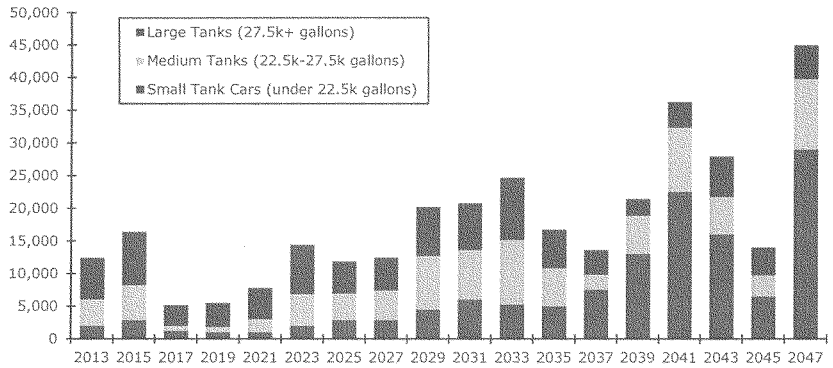


Source: David Humphrey, Ph.D. RailInc, *North American Railcar Review*, March 3, 2014.

Applying a projected 35-year lifespan, we estimated natural retirements by two-year period for large tanks, as well as medium and small tanks (see Figures 3 and 4 on following page). For the entire tank car fleet, approximately 56,000 cars will be retired through 2020, and 90,100 through 2025, or 26 percent of the fleet. Reflecting their newer demographics, a smaller proportion of large tank cars face retirement, totaling approximately 9,400 through 2020, and 15,300 through 2025. Thus, over the coming 10-year period that would coincide with a retrofit program, 10 percent of the large tank fleet as it stood year-end 2013 would be retired irrespective of any new mandates.

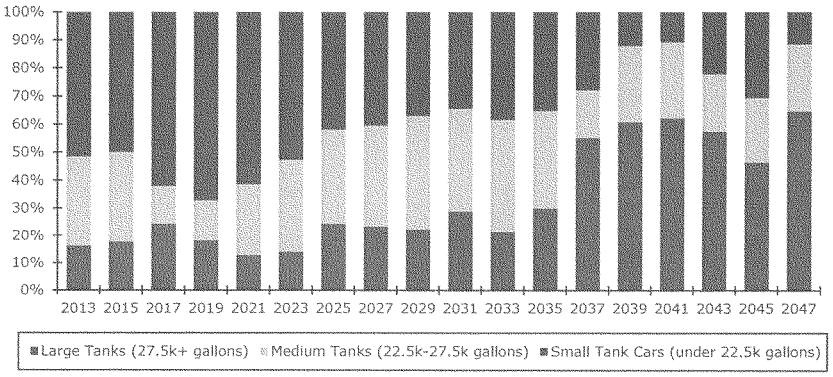
The duration of a retrofit program will have an effect on the number of retirements, as car owners make the calculation as to whether a car should be retrofit, and if so, when. For cars that will not be upgraded and alternative deployments are not available, their owners will maximize their economic returns by keeping them in service through the end of the implementation period. BG cited an estimate that 28 percent of the affected fleet would be subject to premature retirement; if one were to assume that this rate will indeed occur, then the actual impact of the new rules would be the difference between this projected rate and the natural fleet retirement rate. Thus, if all retrofits must be completed by 2020, forced retirements could approach 21 percent; over a 10-year period, this would decline to 18 percent. These are maximums; given the young age of this fleet, it seems far more likely that these cars will be retrofit, or, if not, redeployed in other services where they can substitute for other older equipment that is approaching retirement. Nevertheless, for the examination of retrofit staging (discussed in Section 5), we adopted BG's 28 percent rate, as well as the natural retirement rate of 10 percent through 2025.

Figure 3. Projected Retirement Year by Size, 2-Year Intervals, 35-Year Life



Source: David Humphrey, Ph.D. RailInc *North American Railcar Review*" March 3, 2014.

Figure 4. Distribution of Projected Tank Replacements by Size, 2-Year Intervals, 35-Year Life



Source: David Humphrey, Ph.D. RailInc *North American Railcar Review*, March 3, 2014.

3.0 Contract Shop Retrofit Capacity

RSI-CTC and the Brattle Group assert that the entire capacity of contract shops to conduct retrofits will be on the order of 6,400 cars per year, but there are serious issues with their methodology. The capacity to retrofit cars comes from three primary sources – new facilities or capacity expansion, unused current capacity, and improved techniques as a result of production techniques and repetitive processes. Each of these is relevant in the proposed tank car retrofit requirements, and the RSI-CTC estimates are low in each area.

To address these concerns and develop more realistic estimates of industry capacity, CS built a model to analyze shop capacity. Specifically, CS used a share model to estimate the new contract capacity that will go on-line in response to a rulemaking, estimated the unused capacity in the industry based on data given in other reports, and attempted to estimate the productivity gains in the areas of learning, improvements from repeated processes, and opportunistic maintenance. Whenever possible, model parameters came from published industry sources. When this information was unavailable, conservative assumptions were used. The primary intent of the model was to provide a lower bound on capacity, along with some insight into confidence limits.

In the following sections, the concerns with the previous estimates are discussed, and the modeling approach used by CS is described.

3.1 New or Expanded Retrofit Capacity

BG asserts that for the first six months after final rules are put in place, the entire industry capacity for Tier I modifications will be 80 cars per month (Table 9, page 29). This estimate is clearly low. GBW Railcar Services, LLC (GBW) alone will exceed this number by April 2015.[10] BG further asserts that in steady state the industry capacity will be 536 cars/month (Table 9, page 29), basing this on the RSI-CTC projections (versus 1,400 cars/month projected by PHMSA). GBW expects to be able to retrofit 175 cars per month by October 2015, increasing to 210/month in 2016 when fully expanded. Another major shop operator, Trinity Industries, is ramping up capacity to conduct retrofits in a former wind generator tower facility in Jonesboro, Arkansas.[11]

Given that tank car modifications are potentially profitable for car shop operators, it seems highly likely that other shop operators will follow GBW and Trinity's lead and increase capacity either through additional hiring or through plant expansions once PHMSA finalizes its rules. Within the last 18 months, 10 companies have announced increases in retrofit capacity, either through hiring additional labor or through expanding facilities, in 14 locations throughout North America. These companies along with available details are listed in Table 4.

---

[10] Interviews with GBW managers by the authors.

[11] Talk Business & Politics. Trinity Industries to Locate Railcar Facility at Nordex Factory in Jonesboro. June 5, 2014. Online at: http://talkbusiness.net/2014/06/trinity-industries-re-open-nordex-factory-jonesboro/.

Table 4. Expanding or New Tank Car Retrofit Facilities

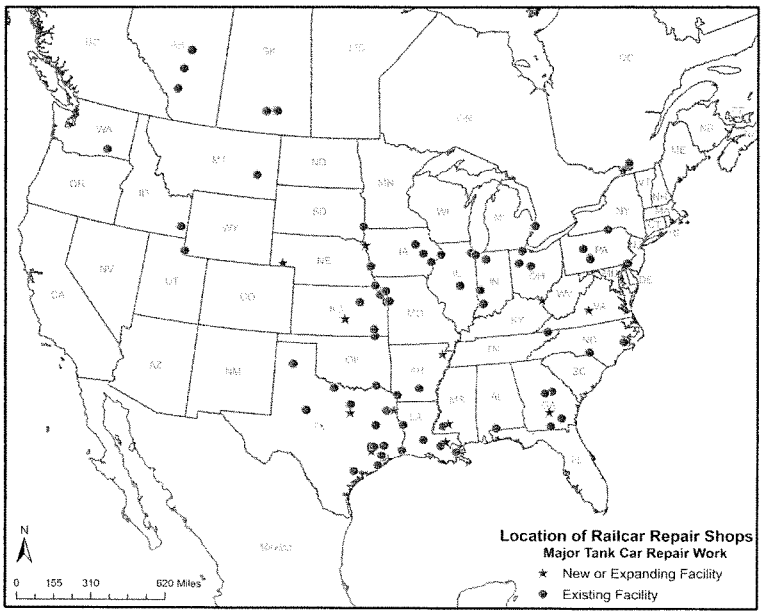
Date On-Line	Company	Location	Projected Tank Car Capacity	Projected Employees	Comments
Jan. 2015	American Railcar Services acquires BRC Railcar	Lynchburg, VA Elk Mills, MD	Repair facilities can process 125 cars per month (primary service is for tank cars)	Doubles ARS workforce, adding 100 in next 3 months.	Cost unknown
Unknown	Trinity Rail	Jonesboro, AK	Can service up to 250 cars per month.	350	Cost unknown
December 2014	GBW Railcar Services, Inc.	Hockley, TX Fitzgerald, GA Marshall, TX Cleburne, TX	85 per month current, 175 per month by October 2015	Hire 400 new employees over next year	$20m
March 2016	Mervis Industries	Hutchinson, KS	Unknown – constructing four buildings, 224,000 total square feet	150	$35m (additional $750,000 state block grant)
2014	American Railcar Industries Inc.	Brookhaven, MS	Approximately 80 per month	30	$7 million.
2015?	Bayou Railcar Services	Holden, LA	6,000 square feet addition –Estimate 8-10 cars per year	Unknown	Cost unknown
2015	Transco Railway Co.	Sioux City, IA	Approximately 80 per month.	Hiring and training 100 employees	$8 million
2015	Progress Rail Inc.	Raceland, KY Sidney, NE	Unknown Unknown	200 Unknown	Cost unknown
September 2013	Ronsco	Coteau-du-lac, QB Canada	Unknown	Unknown	Cost unknown

Sources: http://www.railwayage.com/index.php/m_and_w/appalachian-railcar-services-makes-buy.html?channel.
http://talkbusiness.net/2014/06/trinity-industries-re-open-nordex-factory-jonesboro/.
http://www.gbrx.com/files/PDF/PHMSACommentsGBW.pdf.
http://www.hutchnews.com/news/local_state_news/oil-boom-spurs-need-to-restore-rail-cars/article_a416f508-4228-549c-b05a-4d56491bbcfe.html.
http://www.mervis.com/wp-content/uploads/2014/11/Mervis-Railcar-Announcement-10.30.14-F.pdf.
http://brookhavenchamber.org/wp/plant-will-bring-30-new-jobs-and-7-million-investment-in-brookhaven/
http://www.bayourailcar.com/.
http://thegazette.com/subject/news/transco-nicc-to-partner-on-training-recruiting-100-railcar-workers-20150202.
http://www.communitynewspapergroup.com/oelwein_daily_register/news/article_0259bbd8-db7c-11e3-976f-001a4bcf887a.html.
http://www.progressiverailroading.com/mechanical/article/Tankcar-retrofits-to-drive-freightcar-repair-activity-in-2015-43154.
http://ronsco.com/2013/09/.

It is noteworthy that these publicly announced capacity increases totaling 720 cars per month are greater than the total industry capacity claimed in the BG report. Mervis Railcar, a division of Mervis Industries based in Danville, Illinois, is a particularly intriguing project. With 224,000 square feet and 150 employees, the shop would be able to handle a significant number of retrofits each month once completed in March 2016, even though specific numbers of cars are not publicly available and are therefore not included in the above count.

Figure 5 shows the geographic distribution of facilities capable of extensive tank car repair work based on an examination of the AAR's list of approved facilities with B24 and RL2 codes. Combined with announced capacity expansions from Table 4, there are 93 facilities that currently can or are planned to handle heavy tank car repair work. An additional facility – Transco Railway Co. in Sioux City, Iowa – is expanding cleaning and inspection services.

Figure 5. Facilities Certified for Extensive Tank Car Work



Source: Association of American Railroads, Casualty Prevention Letter CPC-1313, AAR Approved M-1002 Tank Car Facilities, January 30, 2015.

It is important to note that even expansions of facilities that will not directly retrofit tank cars will indirectly aid fleet retrofit capacity. For example, an additional tank car cleaning and inspection facility can transfer that work from a facility focused on retrofits, increasing retrofit capacity. Cleaning for reassignment as a result of a change in product or customer is one of

the most common activities performed on tank cars, and is done by specialty cleaning firms as well as contract shops. The assertion by BG that the cleaning process would utilize limited resources needed for retrofits (page 20) is overstated.

In discussing the possibilities of opening greenfield facilities, BG raised concerns about the availability of a suitable labor force, and the period of time that it would take for such facilities to become operational. While the issues raised must certainly be addressed, and many of the new facilities and expansions will not be on-line as soon as the retrofit rulemaking becomes effective, the time required to become operational will be a matter of months and not years. Discussions with industry insiders indicate that full AAR certification that is required to work on tank car retrofit and repairs is achievable in nine months after initial application. The likely biggest challenge will be attracting and retaining a productive workforce, issues that shop managers contacted by the CS team are well aware of and working to address in light of the expected demand.

To address these expansions more reasonably, CS developed a share model, using GBW as a basis figure. The model uses reliable information from a subset of the industry, determines if there are special conditions or unique circumstances from that source, and then projects the overall industry level. In this case, the model used the planned and implemented GBW retrofit expansion as the base share, and then modeled total industry capacity using three different shares. The number of shops certified to undertake retrofits, estimated market share of tank car maintenance, and estimated number of HM-216B's done by GBW versus overall industry HM-216B actions in 2013 were considered as possible projection variables. There was no evidence to suggest that GBW has unique or proprietary advantages in expanding and performing this work. The lowest of the share-based industry new retrofit capacity results was 8,400 cars per year, and the highest was 19,600 cars per year. In the interest of conservative estimation, the 8,400 cars per year figure was used as the new capacity value in all subsequent analysis. This number is lower than that which can be found simply by summing the announced capacity expansions in Table 4, further supporting its use as a conservative estimate.

3.2 Underutilized Existing Shop Capacity

A second source of retrofit capacity is underutilization of existing facilities. There is strong evidence that such capacity exists. For example, AllTranstek estimated contract shop capacity in June 2014, the results of which have been used by the BG (pages 28-29) and ICF/API reports (page 24), among others.[12] They report on surveying 104 certified shops, with a response rate of approximately 80 percent. Figure 6 provides the list of shops contacted for the survey (highlighted in yellow).[13] The survey found that over one-half the contract shops

[12] AllTranstek, Tank Car *C Shop Estimated Capacity for Retrofit*, PowerPoint dated June 2, 2014.

[13] Statement of the Railway Supply Institute, Committee on Tank Cars. United States House of Representatives Committee on Transportation and Infrastructure, Subcommittee on Railroads, Pipelines, and Hazardous Materials. February 17, 2015.

are capable of performing retrofits, and 70 percent of them are running at less than 75 percent of capacity. It is important to note that their estimate of capacity does not appear to include consideration of adding additional shifts. CS developed a modeling tool to estimate the unused capacity for retrofits. Again, conservative values were used to increase the usefulness of the model results.

Figure 6. Repair Facilities contacted by AllTranstek

ADM
Cedar Rapids, IA
Alabama Railcar Service, Inc.
Ozark, AL
Alpha Technical Services Corporation
Pasadena, TX
American Railcar Industries
Bude, MS
La Porte, TX
Longview, TX
Marmaduke, AR
North Kansas City, MO
Tennille, GA
Archer Daniels Midland Railcar Repair
Decatur, IL
ARI Fleet Services of Canada, Inc.
Sarnia, ON
Bayou Railcar Services, Inc.
Holden, LA
BRC Rail Car Service Company
Elk Mills, MD
Lynchburg, VA
BW Services
Angleton, TX
Washington, IN
Westlake, LA
CAD Industries, Ltd.
Lachine, QC
CALTRAX, Inc.
Calgary, AB
Chart Industries, Inc.
New Prague, MN
Columbiana Boiler Company LLC
Columbiana, OH
Cryogenic Vessel Alternatives
Mont Belvieu, TX
Crystal Car Line Div.
Bedford Park, IL
Dana Railcare
Wilmington, DE
Eagle Railcar Repair
Elkhart, TX
Eagle Railcar Services-Roscoe, Inc.
Roscoe, TX
Economy Coating Systems, Inc.
Camanche, IA
Equipos Ferroviarios Del Norte, S.A. de C.V.
Gomez Palacio, Durango, Mexico
Equipos Ferroviarios Del Sureste, S.A. de C.V.
La Granja, Veracruz, Mexico
Frit Car Inc.
Brewton, AL
Bridgeton, NC
GATX
Waycross, GA
GATX Corporation
Colton, CA
Donaldsonville, LA
Freeport, TX
Galena Park, TX
Macon, GA
GATX Corporation
Terre Haute, IN
GATX Rail Canada Corp.
Corunna, ON
Montreal, QC
Moose Jaw, SK
GATX Rail Canada Corporation
Red Deer, AB
GATX Rail Corporation
East Chicago, IN
Hearne, TX
Kansas City, KS
Plantersville, TX
GE Equipment Services - Rail Services
Omaha, NE
Regina, SK
Sayre, PA
Texarkana, AR
Waterloo, IA
GreenBrier Rail Services
Atchison, KS
Kansas City, MO
Greenbrier Rail Services - Finley
Kennewick, WA
Gunderson
Frontera, COAH C.P. , Mexico
Hammond Machine
Hammond, IN
Hayes Manufacturing Company
Pineville, LA
Kelso Technology (USA) Inc.
Bonham, TX
McKenzie Valve and Machining LLC
McKenzie, TN
Midwest Railcar Repair, Inc.
Brandon, SD
On-Track Properties, Incorporated
Montgomery, TX

Procor Limited
Blackfalds, AB
Edmonton, AB
Fort Saskatchewan, AB
North Vancouver, BC
Oakville, ON
Pincher Creek, AB
Regina, SK
Sarnia, ON
Trail, BC
Progress Rail Services
Amarillo, TX
Rail Services Inc.
Calvert City, KY
Rescar
Gordon, GA
Rescar Companies
Channelview, TX
Dubois, PA
Kingsport, TN
Longview, TX
Longview, TX
Savanna, IL
Rescar, Inc
Orange, TX
Safety Railway Service
Houston, TX
Victoria, TX
Safety Railway Service, L.P.
Belle Chasse, LA
Safety Railway Service, LP
Knox, IN
Seaboard Railcar Repair and Cleaning
Hugo, OK
Talleres de Equipo Rodante del Bajio, S.A. (TERBSA)
Irapuato, Guanajuato, Mexico
Tank Lining of Paris, Inc
Paris, TN
Texana Tank Car & Manufacturing, Inc.
Nash, TX
TMC Engineering Services
Houston, TX
Transco Railway Products Inc.
Miles City, MT
Transco Railway Products, Inc.
Sioux City, IA
Trinity Industries de Mexico, S de RL de CV
Huehuatoca, Edo. de Mexico
Trinity Rail Car, Inc.
Longview, TX
Trinity Rail de Mexico
CD. Castanos, Coahuila, Mexico
Frontera, Coahuila Mexico
Trinity Rail Sabinas
Sabinas, Coah. Mexico
Trinity Tank Car
Fort Worth, TX
Trinity Tank Car Repair, Inc.
Saginaw, TX
Trinity Tank Car, Inc.
Longview, TX
Longview, TX
Longview, TX
Longview, TX
Oklahoma City, OK
Saginaw, TX
Tulsa, OK
Union Tank Car Company
Altoona, PA
Catlettsburg, KY
Cleveland, TX
Columbus, MS
El Dorado, KS
Evanston, WY
Galena Park, TX
Marion, OH
Mounds, IL
Muscatine, IA
Valdosta, GA
Ville Platte, LA
UTLX Carotanques Servicios, S.A. de C.V.
Celaya, Guanajuato, Mexico
UTLX Manufacturing
Alexandria, LA
Houston, TX
Watco
Fitzgerald, GA
Watco Mechanical Services
Hockley, TX
Hollidaysburg, PA
Houston, TX
Junction City, KS
Neodesha, KS
Omaha, NE
Scottsville, TX
Zwolle, LA
WW Metal Products, Inc.
Texarkana, TX

Source: "Tank Car Committee Certified Tank Car Facilities (Classes A, B, C, D) and Registered Tank Car Facilities (Classes F, G, L)." Table B2. Association of American Railroads. Casualty Prevention Circular. June 14, 2013

To estimate the existing shop capacity of the industry, the model first determines the total number of hours used, and then backs out the number of additional available shop hours by dividing by the percentage capacity actually used. This requires an estimate of the actual shop activities. Consistent with the goal of conservative estimation, the model uses only an estimate of the hours associated with HM-216B recertifications, adjusted for the expected age of the fleet in the study year. This substantially underestimates shop capacity, since it excluded planned maintenance activities outside of the 10-year recertification and unplanned maintenance.

In addition, an interpretation of what is meant by below 75 percent of capacity and what would constitute a reasonable estimate of full capacity is required. In both of these cases, the model can accept parametric inputs; the decision was made to conservatively assume that all those shops below 75 percent capacity were at 75 percent, that all those above 75 percent capacity were at 100 percent of capacity, and that under full capacity the industry would only work at

90 percent of the available capacity. Using these assumptions, an estimate was made of the number of additional car hours available for retrofit work. CS conservatively estimates that there are at least 1.53 million shop hours available for retrofit work in addition to the new capacity discussed in Section 4.1.

This can be translated into the number of hours required to complete a retrofit. This is a function of the type and condition of the car, including whether or not the car is jacketed or not, and other features. In consultation with GBW managers, the number of shop hours required for retrofitting an unjacketed DOT 111 legacy car (exclusive of transit time and cleaning) was 437 shop hours, and for retrofitting an unjacketed CPC 1232 car was 332 shop hours. Additional figures for retrofitting jacketed cars also were made available. Based on the composition of the fleet, it is possible to project the total unused retrofit capacity in cars per year. CS estimates that in steady state the industry has unutilized capacity to at least 4,500 cars per year.

3.3 Improved Practices and Opportunistic Maintenance

A third factor in assessing the ability of the industry to successfully complete the proposed retrofits is the question of whether the retrofits will be subject to factors such as learning effects, economies of scale, and opportunistic maintenance savings. The Brattle Group Report is rather dismissive of these effects (page 21), arguing that the time pressure of completing the retrofits will lead to less effective practices. There are a number of problems with BG's assertion. CS was unable to find any evidence that a high rate of work in any industry is typically characterized by declining efficiencies, and found a number of counterexamples. Senior managers at one of the major car manufacturers indicated that they typically can gain 25 percent improvements in production when they are working on large volume orders. They further indicated that production line work is inherently more efficient than the one-at-a-time work associated with current tasks.

In addition, CS conducted an interview with Professor Kash Gokli, who specializes in production process gains in manufacturing and heavy industries. He indicated that a reasonable estimate for the production efficiency gains in a large-scale retrofit program would be on the order of 30 percent within one to two years. In the interest of conservative estimation, the CS model assumes an increase in efficiency of only 20 percent. This is less than both the senior managers and Professor Gokli. The model also does not assume any compounding of such effects, even though this is commonly done in the literature on learning effects.

An area where the previous analyses have been particularly prone to overstate the time and costs associated with retrofits is the transit time to and from shops. This is because they fail to account for the fact that car owners will almost certainly scheduled retrofits to coincide with planned maintenance activities such as the 10-year recertification and planned maintenance due to high mileage. Currently, cars in the crude oil fleet are estimated as operating about 60,000 miles per year. It is unlikely that any responsible owner is allowing these cars to travel 600,000 miles between inspection and maintenance. Given these facts, virtually all the cars in this service would reasonably be expected to transit into a shop during a five-year window of implementation. As a result, we assume the simplest of planning by car owners and

managers, including out of service time going to and from the shops is essentially double counting. This is the only explicit example of opportunistic modeling built into the modeling and estimation. It is highly likely that there would be others as well in practice.

3.4 Model Results

It is clear from the analysis that the annual shop capacity is at least 8,400 cars per year, assuming no utilization of existing unused capacity, no learning or productivity improvements, and continuing to perform independent HM-216B and preventive maintenance actions on cars subject to retrofits. Using the entirely reasonable assumptions that the industry will use most but not all of the unused current capacity and that fleet managers will attempt to combine maintenance and retrofit events, the retrofit capacity should be increased by at least 3,450 cars per year to 11,850 retrofits per year. In addition, applying a conservative one-time learning raises the effective industry capacity to least 13,600 cars per year.

This estimate of shop capacity is based on a weighted average of car types, ages, utilization rates, and general mechanical condition. A more useful approach is to apply the available capacity to specific types of cars (e.g., jacketed or not, in crude oil, ethanol or other service, new versus older cars, etc.) and evaluate the ability of the contract shop industry to implement specific timelines. Of particular interest is the time required to address the highest risk cars moving in high-volume unit train service. Using the fleet demographics from the BG report along with estimates from GBW managers for retrofit and maintenance activity times, it is possible to estimate the time needed to implement fleet-specific retrofits. CS did this analysis, using the model to explore a variety of staging options, including requirements that legacy DOT 111 legacy unjacketed cars used in crude oil service be given priority in the implementation schedule.

In Table 5, the steady state times needed to retrofit specific subgroups of the fleet are given, assuming both the BG retirement times and the natural retirement rate of 10 percent through 2025. In essence, the entire fleet assigned to crude and ethanol can be retrofit over a period of six years assuming the BG retirement rate; with the natural retirement rate, the estimated period of completion extends by 1.7 years to 7.7. Within the individual subfleets, the most at-risk cars, unjacketed DOT-111s in crude oil service can be completed in less than two years, with the next highest-risk fleet, the unjacketed CPC-1232s adding another 1.3 years.

An important issue here is which cars are included in a retrofit program and which cars would instead be reassigned to other service, stored, or retired. The BG report asserts that 28 percent of the fleet would be retired in response to the regulatory requirement. CS examined this figure and believes that it substantially overstates the number of retirements, as documented in Section 2.3. For the purpose of retrofit timing, however, the results shown in Table 5 illustrate an important point, namely that if such cars are retired they will not consume shop capacity, making it easier to meet aggressive timelines for the remaining fleet.

Table 5. Estimated Time to Retrofit (years)

	Crude Oil		Ethanol	
Specification	**Jacketed**	**Unjacketed**	**Jacketed**	**Unjacketed**
With 28 percent retirement from Brattle Report				
DOT-111	.2	1.9	0	2.2
CPC-1232	.4	1.3	0	0
Totals	**.6**	**3.2**	**0**	**2.2**
With 10 percent retirement				
DOT-111	.3	2.3	0	2.7
CPC-1232	.5	1.6	0	.1
Totals	**.8**	**3.9**	**0**	**2.8**

4.0 New Tank Car Production Capacity

In addition to contract shop capacity, the capacity of railcar manufacturers to produce new cars also will have a major bearing on the rate at which the industry can achieve compliance with the proposed new tank car standards. As discussed in Section 2.3, the average annual replacement rate for tank cars of all types through 2025 is approximately 9,000. However, the tank car manufacturing capacity is substantially higher, capacity that can be used to accommodate growth in demand as well as potential replacement of cars that may be prematurely retired as a result of the NPRM. With car manufacturing capacity expected to increase further over the next two years, the rate at which new cars can be delivered will further increase, which may provide an increasingly attractive alternative for some fleet owners.

During 2014, railcar manufacturers announced plans for new railcar manufacturing capacity at at least three locations. All of these three facilities, of which none are identified in the BG report, are scheduled to be on-line 2015, and will be capable of constructing tank cars. If fully dedicated to tank car construction, these facilities, listed in Table 6, would be able to produce at least 4,500 to 10,500 cars annually once fully on-line.

Table 6. Announced New Tank Car Construction Capacity

Date On-Line	Company	Location	Projected Capacity	Projected Employees	Comments
Second Quarter, 2015	Vertex Rail Manufacturing	Wilmington, NC	4,500-5,000 per year	1,300	$60m at North Carolina site (additional $500,000 in public funding)
Second Quarter, 2015	Freight car America	Barton, AL	6,000-8,000 per year	500 current, 150-200 additional	Facility not dedicated to tank car manufacturing at announcement – $33 million total investment
January 2015[a]	Trinity Rail de Mexico	Coahuila State, Mexico	Unknown	Unknown	Cost unknown

[a] Association of American Railroads. *Casualty Prevention Circular (CPC-1313).*

One substantial new facility that will be solely dedicated to new tank car manufacturing is Vertex Rail Manufacturing. Vertex is completing a $60 million retrofit of a wind turbine plant in Wilmington, North Carolina. This facility will be able to produce between 4,500 and 5,000 new

cars per year when it comes on-line in late spring of 2015.[14] Freight Car America also is investing in a large facility in Barton, Alabama. Though not currently dedicated to building tank cars, the facility can produce between 6,000 and 8,000 cars per year. Some of this production could switch to tank cars given favorable market forces.[15]

The net effect is that these additions would increase the potential annual tank car manufacturing capacity from 2014 deliveries of 35,000 to over 40,000 cars. Out of 2014's deliveries, 25,000 were projected to enter crude and ethanol service, while the remaining 10,000 replaced retiring capacity and supported growth in other commodities. Assuming continuation of a similar pattern during the NPRM's proposed implementation period would allow at least 30,000 new cars flow into the crude and ethanol pool annually.

---

[14] Wayne Faulkner, "Vertex Rail on track to begin hiring blitz." *Star News Online.* January 21, 2015. http://www.starnewsonline.com/article/20150121/articles/150129931?p=1&tc=pg.

[15] Lucy Berry, "FreightCar America announces $10M Colbert County expansion, 150-200 new production jobs," December 8, 2014. On-line at: http://www.al.com/business/index.ssf/2014/12/freightcar_america_announces_1.html
Bernie Delinkski, "FreightCar production underway in Barton," TimesDaily.com. July 17, 2013. On-line at: http://www.timesdaily.com/news/local/article_fcea304a-eef7-11e2-9f01-10604b9f6eda.html.

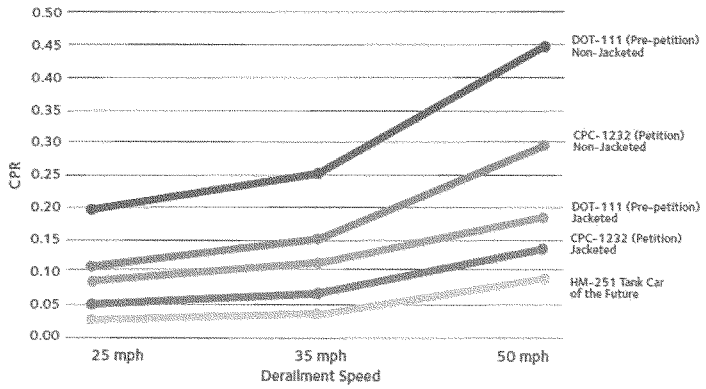
5.0 Conclusions and Recommendations

This analysis offers an examination of the duration that it will take to make the tank car fleet in crude and ethanol service compliant with the new tank car standards and timeline proposed within PHMSA's NPRM. The most important influence on the ability to make the proposed timeline is the capacity of the contract shop industry, the size of the fleet that must be upgraded, and the degree to which it might be retired or redeployed into service that would not require a retrofit. With the available capacity for new tank car construction in excess of 40,000 units annually exceeding virtually any foreseeable growth in demand, the decision about retrofitting versus replacement becomes purely economic for fleet owners.

At full capacity, the actual ability of the industry to conduct Tier I retrofits is between 8,400 and 19,600 cars per year as compared to RSI-CTC's projection of 6,400 tank cars per year maximum. As a result the industry can retrofit or produce all the tank cars necessary to meet the conditions set forth by PHMSA in Option 2 for the affected 115,400 unit crude oil and ethanol fleets in approximately six years (using RSI-CTC's retirement rate). However, from the standpoint of PHMSA, the public, and industry stakeholders, it is not just the total elapsed time, but also how cars are sequenced for retrofitting which will affect the rate at which the risk associated with the existing fleet can be reduced. The key distinctions are whether a car subject to retrofit is jacketed or unjacketed, and whether it conforms to the DOT-111 or newer CPC-1232 specification. Each of these types of cars require varying amounts of work, as well as varying risk of a breach in the event of a derailment.

The differences in the likelihood of a breach following a derailment are substantial among the different configurations. A study performed by the AAR and others examined the Conditional Probability of Release (CPR) for different tank car configurations at different speeds, the results of which are shown in Figure 7 on the following page. The differences in risk among the different car types, particularly at higher speeds, are rather consequential. At 50 miles per hour, an unjacketed DOT-111 has a three-fold higher probability of release at 45 percent than a jacketed CPC-1232 at 15 percent. Thus, staging the retrofit process in a manner that addresses the highest CPR fleets first would achieve the quickest gains in risk reduction. These may be further segregated by commodity, with those handling the most volatile products retrofitted first. With unjacketed DOT-111s in crude oil service having the highest risk, these could be addressed first and completed in less than two and one-half years, including a six-month run-up. Unjacketed CPC-1232's, also in crude oil service, could follow, with an expected completion period of 1.3 years. Subsequently, the similar cars in ethanol service could be retrofit, with the jacketed DOT-111 and CPC-1232 cars coming last. In effect, the entire unjacketed DOT-111 and CPC-1232 fleets in crude oil and ethanol service could be retrofit over a period of less than five and one-half years.

Figure 7. Estimated Speed-Dependent Conditional Probability of Release (CPR)



Source: Data obtained and extrapolated from RSI-AAR Railroad and Car Safety Research and Test Project, April 2014.

In evaluating the feasibility of adopting the timeline as envisioned in the NPRM, there are several additional factors that merit consideration. These are as follows:

- Moderation of demand for crude by rail transport resulting from the recent decline in crude oil prices. While the demand for tank cars remains high, the decline in crude prices is creating some excess capacity in the fleet. These surplus cars could be used to help bridge potential shortfalls in the fleet while tank cars are undergoing retrofits.[16]

- New build capacity exceeding 40,000 tank cars per year. With the long-standing tank car replacement and expansion needs for tank cars in service beyond ethanol and crude oil amounting to around 10,000 cars annually through 2025, by the end of 2015 the industry will have an annual new build capacity of over 30,000 tank cars solely to meet the demands for crude oil and ethanol shippers. In effect, the entire crude oil and ethanol fleet of 115,400 cars projected for year-end 2015 could be replaced over a period of less than four years. While such an investment would clearly be costly, it nevertheless provides an alternative baseline against which implementation of an improved fleet could be accomplished.

- The focus of this analysis is on the capacity of the contract shop and new car manufacturing industry to meet the schedule in the NPRM. We thus did not examine the economic impacts of the NPRM, and the potential tradeoffs between retrofits and new car

[16] Interviews with senior managers.

purchases. Furthermore, also not explored are the more subtle economic tradeoffs between the varying costs of retrofits among the different car configurations, their age, and the type of service that they are in – high-mileage unit train versus low-mileage manifest, crude oil versus ethanol.

More generally, the following observations and recommendations can be drawn from this analysis:

- The final rule should prioritize unjacketed cars to remove risk as quickly as possible from tank cars in high-mileage flammable liquids service.
- Contract shops and new car manufacturers will respond to changes in demand, as evidenced by announcements of shop expansions and new car manufacturing capacity, leading to substantial job creation and a safer fleet.
- Delays in making the rules final or extending the timeline for compliance penalizes firms that are being proactive.
- Aggressive retrofit timelines as proposed by PHMSA for cars in crude and ethanol service are achievable.