BAKKEN PETROLEUM: THE SUBSTANCE OF ENERGY INDEPENDENCE

JOINT HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY &
SUBCOMMITTEE ON OVERSIGHT

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

HOUSE OF REPRESENTATIVES

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September 9, 2014

BAKKEN PETROLEUM: THE SUBSTANCE OF ENERGY INDEPENDENCE

TUESDAY, SEPTEMBER 9, 2014

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND SUBCOMMITTEE ON OVERSIGHT,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
Washington, D.C.

The Subcommittees met, pursuant to call, at 2:05 p.m., in Room 2318 of the Rayburn House Office Building, Hon. Cynthia Lummis [Chairwoman of the Subcommittee on Energy] presiding.

LAMAR S. SMITH, Texas
CHAIRMAN

EDDIE BERNICE JOHNSON, Texas
RANKING MEMBER

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Subcommittee on Energy
Subcommittee on Oversight

Bakken Petroleum: The Substance of Energy Independence

Tuesday, September 9, 2014
2:00 p.m. – 4:00 p.m.
2318 Rayburn House Office Building

Witnesses

Panel I

Mr. Chris Smith, Principal Deputy Assistant Secretary, Office of Fossil Energy, U.S. Department of Energy

Mr. Timothy Butters, Deputy Administrator, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation

Panel II

Ms. Kari Cutting, Vice President, North Dakota Petroleum Council

Mr. John Auers, Executive Vice President, Turner, Mason, & Company

Mr. Mark Zoanetti, Deputy Chief of Special Operations, Syracuse Fire Department

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEES ON ENERGY AND OVERSIGHT

JOINT SUBCOMMITTEE HEARING

Bakken Petroleum: The Substance of Energy Independence

Tuesday, September 9, 2014
2:00 p.m. – 4:00 p.m.
2318 Rayburn House Office Building

Purpose

The Energy and Oversight Subcommittees will hold a joint hearing titled *Bakken Petroleum: The Substance of Energy Independence* starting at 2:00 p.m. on Tuesday, September 9th in room 2318 of the Rayburn House Office Building. This hearing will examine the characteristics and behavior of crude oil produced from the Bakken region in North Dakota, Montana, and Canada pursuant to a report titled, "Operation Safe Delivery Update" released by the Pipeline and Hazardous Materials Safety Administration (PHMSA) in July 2014.

Witnesses

Panel 1

- Mr. Timothy Butters, Deputy Administrator, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation
  Mr. Chris Smith, Principal Deputy Assistant Secretary, Office of Fossil Energy, U.S. Department of Energy

Panel 2

- Ms. Kari Cutting, Vice President, North Dakota Petroleum Council
- Mr. John Auers, Executive Vice President, Turner, Mason & Company
- Mr. Mark Zoanetti, Deputy Chief, Special Operations, Syracuse Fire Department

Background

The Bakken shale formation underlying North Dakota, Montana, and Canada is a large unconventional petroleum and natural gas resource. As of April 2014, North Dakota crude oil production surpassed 1 million barrels per day (MMbbl/d) representing a substantial contribution

towards potential North American energy independence.[1] According to the Energy Information Administration's (EIA's) Annual Energy Outlook for 2014, U.S. crude oil production will peak over the next decade at around 9.6 MMbbl/d, an output of approximately 3.1 MMbbl/d above the 2012 U.S. production levels.[2] The United States currently satisfies approximately 66% of its demand for crude oil from North American resources.[3]

Due to increased production, insufficient pipeline capacity, and challenges associated with siting new pipelines, a substantial amount of the petroleum produced in the Bakken region is shipped by rail. In light of recent derailments, including accidents in Lac-Megantic, Quebec, and Casselton, North Dakota, Bakken petroleum shipped by rail has drawn increased scrutiny.[4] Yet, overall shipment of hazardous substances by rail has demonstrated and noteworthy safety record. According to the Association of American Railroads, "99.997 percent of the approximately 1.7 million carloads of hazmat successfully [reach] their final destination without a release caused by an accident."[5] Eastward shipment by rail of Bakken petroleum, which is a light sweet crude comparable to West Texas Intermediate (WTI) quality, has also increased the competitiveness of certain East Coast refineries that previously were reliant on higher cost petroleum from West Africa.[6]

PHMSA regulates the safety of hazardous materials transported by rail, and the Department of Energy (DOE) serves as a technical advisor to PHMSA for energy-related issues. The mission of PHMSA, a U.S. Department of Transportation agency, is "to protect people and the environment from the risks inherent in transportation of hazardous materials – by pipeline and other modes of transportation."[7]

The Department of Energy Organization Act established DOE in 1977 with the purpose of, among other things, "to develop plans and programs dealing with domestic energy production and import shortages."[8] The Department currently defines its mission "to ensure America's

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[1] See Energy Information Administration website, available here: http://www.eia.gov/todayinenergy/detail.cfm?id=17391.
[2] See Energy Information Administration, "Annual Energy Outlook 2014" (April 2014) at page MT-28.
[3] Congressional Research Services, "U.S. Rail Transportation of Crude Oil: Background and Issues for Congress" (May 5, 2014) at page 1.
[4] See The Huffington Post: http://www.huffingtonpost.ca/kenneth-p-green/oil-tanker-spill_b_5683431.html; See also The Christian Science Monitor: http://www.csmonitor.com/Environment/Energy-Voices/2014/0827/Train-delayed-again-Blame-the-oil-boom.
[5] See Association of American Railroads website, available here: https://www.aar.org/safety/Pages/default.aspx#.VAiNWfldWCk.
[6] See Congressional Research Services, "U.S. Rail Transportation of Crude Oil: Background and Issues for Congress" (May 5, 2014) at pages 2 and 5.
[7] See the PHMSA website, available here: http://www.phmsa.dot.gov/about/agency.
[8] P.L. 95-91, Section 102(3) (August 4, 1977).

security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions."[9]

In January 2014, PHMSA released a safety alert as part of its "Operation Classification," an initiative dating back to March 2013 following derailments in the United States and Canada that focuses on how shippers classify petroleum products originating in the Bakken region.[10] The PHMSA alert concluded that Bakken petroleum "may be more flammable than traditional heavy crude oil."[11] The PHMSA alert emphasized that offerors of hazardous materials must properly classify and describe hazardous materials before they may be transported, stressing the importance of appropriate packing group (PG) assignment of crude oil shipments. The alert also advised that "emergency responders should remember that light sweet crude oil, such as that coming from the Bakken region, is typically assigned a packing group I or II… this means the materials pose significant fire risk if released from the package in an accident."[12]

In July 2014, PHMSA released a report titled, "Operation Safe Delivery Update" which concluded that "after months of unannounced inspections, testing, and analysis, Operation Classification has determined that the current classification applied to Bakken crude is accurate under the current classification system, but that the crude has a higher gas content, higher vapor pressure, lower flash point and boiling point and thus a higher degree of volatility than most other crudes in the U.S., which correlates to increased ignitability and flammability."[13]

The North Dakota Petroleum Council (NDPC) also commissioned a comprehensive sampling and testing program on the physical and chemical characteristics of Bakken petroleum to establish a Bakken quality baseline and management best practices for field operations. Turner, Mason & Company (TM&C), an engineering consultancy, served as project coordinator for this program. Pursuant to this sampling and testing program, TM&C released a report, which concluded, among other things, that "Bakken is a light sweet crude oil with very consistent

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[9] See more at the Department of Energy's website, available here: http://www.energy.gov/mission.

[10] PHMSA Operation Classification: http://www.phmsa.dot.gov/portal/site/PHMSA/menuitem.6f23687cf7b00b0f22e4c6962d9c8789/?vgnextoid=4821ec1c60f23410VgnVCM100000d2c97898RCRD&vgnextchannel=d248724dd7d6c010VgnVCM10000080e8a8c0RCRD&vgnextfmt=print.

[11] See Pipeline and Hazardous Materials Safety Administration website, available here: http://phmsa.dot.gov/portal/site/PHMSA/menuitem.ebdc7a8a7e39f2e55cf2031050248a0c/?vgnextoid=c6efec1c60f23410VgnVCM100000d2c97898RCRD&vgnextchannel=0f0b143389d8c010VgnVCM1000008049a8c0RCRD&vgnextfmt=print.

[12] See Pipeline and Hazardous Materials Safety Administration website, available here: http://phmsa.dot.gov/portal/site/PHMSA/menuitem.ebdc7a8a7e39f2e55cf2031050248a0c/?vgnextoid=c6efec1c60f23410VgnVCM100000d2c97898RCRD&vgnextchannel=0f0b143389d8c010VgnVCM1000008049a8c0RCRD&vgnextfmt=print.

[13] Pipeline and Hazardous Materials Safety Administration, "Operation Safe Delivery Update" (July, 2014) at page 1.

properties throughout the entire production basin, and the properties measured meet all the requirements of 49 CFR 171-180 for safe transport by rail or truck."[14]

Additional Reading

United States Pipeline and Hazardous Materials Safety Authority, *Operation Safe Delivery Update*, July 2014, available at: http://www.phmsa.dot.gov/pv_obj_cache/pv_obj_id_8A422ABDC16B72E5F166FE34048CCCBFED3B0500/filename/07_23_14_Operation_Safe_Delivery_Report_final_clean.pdf

Turner, Mason & Company, *The North Dakota Petroleum Council Study on Bakken Crude Properties*, August 2014, available at: http://www.ndoil.org/resources/bkn/

[14] See Turner, Mason & Company, "The North Dakota Petroleum Council Study on Bakken Crude Properties" (August 2014) at page 9.

Chairwoman LUMMIS. The joint hearing of the Subcommittee on Energy and the Subcommittee on Oversight will come to order.

Good afternoon. Welcome to today's joint hearing. It is titled "Bakken Petroleum: The Substance of Energy Independence." Now, in front of each Member are packets containing the written testimony, biographies, and truth-in-testimony disclosures for today's witnesses.

Before we get started, since this is a joint hearing involving two subcommittees, I want to explain how we will operate procedurally so all Members understand how the question-and-answer period will be handled. After first recognizing the Chair and Ranking Members of the Energy and the Oversight Committees, we will recognize those members of the subcommittee present at the gavel in order of seniority on the full committee, and those coming in after the gavel will be recognized in order of arrival.

I now recognize myself for five minutes for an opening statement.

I want to welcome our witnesses to today's hearing. Today, the Energy and Oversight Subcommittees will inquire about the characteristics and behavior of petroleum produced from the Bakken region.

Petroleum from the Bakken region recently passed a million barrels per day, which accounts for approximately 12 percent of total domestic production. This is an important resource for the United States and it deserves due attention.

That said, we are not here today to debate the merits of rail or pipeline transportation, or their current and proposed regulation. Those are important issues, but today we have a scientific focus: the characteristics and behavior of Bakken petroleum.

As we will hear today, the DOT's Pipeline and Hazardous Materials Safety Administration has undertaken a broad sampling and testing program to better understand if or to what extent Bakken petroleum may be unique from other petroleum types.

In July 2014, PHMSAis that what—is that right? PHMSA, you call it PHMSA? Okay—released a report, titled "Operation Safe Delivery Update," which concluded that Bakken petroleum "is more volatile than most other types of crude, which correlates to increased ignitability and flammability." These conclusions regarding volatility without context and the assertion that volatility necessarily correlates to increased ignitability and flammability have generated significant controversy, which I am hopeful we can resolve at today's hearing.

The written testimony of our PHMSA and DOE witnesses clarifies the context of volatility: that petroleum from the Bakken region is properly classified as a light sweet crude oil and not outside the norms for light crude oils. And today's DOE written testimony states that "more scientific analysis is needed to better define the relationship between volatility and ignitability/flammability."

The Science Committee will be interested to hear about the results of DOE's research as it progresses. I look forward to further discussion and again thank today's witnesses for participating in today's hearing.

[The prepared statement of Mrs. Lummis follows:]

PREPARED STATEMENT OF SUBCOMMITTEE ON ENERGY
CHAIRWOMAN CYNTHIA LUMMIS

Good afternoon. I would like to welcome our witnesses to today's hearing titled Bakken Petroleum: The Substance of Energy Independence. Today, the Energy and Oversight Subcommittees will inquire about the characteristics and behavior of petroleum produced from the Bakken region.

Petroleum from the Bakken region recently passed 1 million barrels per day, which accounts for approximately 12% of total domestic production. This is an important resource for the United States and it deserves due attention.

That said, we are not here today to debate the merits of rail or pipeline transportation, or their current and proposed regulations. Those are important issues, but today we have a scientific focus: the characteristics and behavior of Bakken petroleum.

As we will hear today, the DOT's Pipeline and Hazardous Materials Safety Administration, also known as "PHMSA," has undertaken a broad sampling and testing program to better understand if or to what extent Bakken petroleum may be unique from other petroleum types.

In July 2014, PHMSA released a report, titled "Operation Safe Delivery Update," which concluded that Bakken petroleum "is more volatile than most other types of crude—which correlates to increased ignitability and flammability." These conclusions regarding: (1) volatility without context and (2) the assertion that volatility necessarily correlates to increased ignitability and flammability have generated significant controversy, which I am hopeful we can resolve in today's hearing.

The written testimony of our PHMSA and DOE witnesses clarifies the context of volatility: that petroleum from the Bakken region is properly classified as a "light, sweet crude oil" and not outside the norms for light crude oils. And today's DOE written testimony states that "more scientific analysis is needed to better define the relationship between volatility and ignitability/flammability."

The Science Committee will be interested to hear about the results of DOE's research as it progresses. I look forward to further discussion and again, I thank today's witnesses for participating in today's hearing.

Chairwoman LUMMIS. The Chair now recognizes Mr. Swalwell for his opening statement.

Mr. SWALWELL. Thank you, Chairwoman Lummis and Chairman Broun, for holding this hearing and I want to thank our witnesses for appearing today and for their forthcoming testimony.

We are clearly in the midst of a substantial boom in oil and gas production, and it is worth reminding my colleagues here today that this is a great example, whether you agree that this is a long-term solution for our country or not, that much of the advances that have allowed this boom have come from investments that have been made from and by the Department of Energy. And they have directly allowed advancements in directional drilling technologies and hydraulic fracturing practices that have made this boom possible.

But also it should come as no surprise that the rapid, massive growth and demand to transport these fuels has raised new issues. What kind of growth am I talking about? Well, according to the Association of American Railroads, there were 10,800 car loads of crude oil transported by rail in 2009. Now that may sound like a lot, but in 2013 there were over 400,000 carloads of crude oil or about 37 times as much. And it is unfortunately becoming increasingly clear that our current railway safety standards were not designed to handle anywhere near these levels and types of crude oil transport that we are seeing today. It is incumbent upon Congress, I believe, to make sure that the policies and regulations stay up with the advancements in technology.

There have been several significant accidents in recent years, one of which led to the tragic death of 47 people in a small town in

Québec last year. And we are frankly lucky that the location of some of these other accidents were remote enough to avoid similar or even worse outcomes.

My home State of California is projected to receive up to 150 million barrels of oil by rail by 2016 compared with just two million barrels in 2011, and much of that oil will be volatile crude from the Bakken region of North Dakota and Canada. And people in my district and at home in the East Bay are rightfully concerned about what this will mean for their safety and that is why I am glad that the Department of Transportation is finally addressing this issue head-on. So we must do all that we can to protect any persons who are in the path of this crude oil as it is being transported.

And I would also just like to address the title of the hearing, "Bakken Petroleum: The Substance of Energy Independence." I disagree that Bakken petroleum is true energy independence. I believe this provides at best an energy lifeline, but I think true energy independence in our country will be when we are able to fully harness and capture the renewables. And so I doubt that when we reach that point, and I hope it is soon, we will ever have to hold a hearing on the volatility of wind, solar, or fuel cells, and we should be reminded about the difference between the two.

Thank you again to all of our witnesses for being here today and providing us with an opportunity to hear from a wide range of stakeholders, and I yield back.

[The prepared statement of Mr. Swalwell follows:]

PREPARED STATEMENT OF SUBCOMMITTEE ON ENERGY
RANKING MINORITY MEMBER ERIC SWALWELL

Thank you Chairwoman Lummis and Chairman Broun for holding this hearing, and I also want to thank our witnesses for their testimony and for being here today.

We are obviously in the middle of a substantial boom in oil and gas production, and it is worth reminding my colleagues here today that this is a great example of how government research can pay off when it comes to energy development. It is widely recognized that DOE-supported research was key to advancing the directional drilling technologies and hydraulic fracturing practices that have made this boom even possible.

But it should also come as no surprise that the rapid, massive growth in demand to transport these fuels has raised new issues. What kind of growth am I talking about? Well, according to the Association of American Railroads, there were 10,800 carloads of crude oil transported by rail in 2009. Now that may sound like a lot, but in 2013, there were over 400,000 carloads of crude oil, or about 37 times as many. And it's unfortunately becoming increasingly clear that our current railway safety standards were not designed to handle anywhere near these levels and types of crude oil transport we're seeing today.

There have been several significant accidents in recent years, one of which led to the tragic death of 47 people in a small town in Québec last year. And we may frankly be lucky that the locations of some of the other accidents were remote enough to avoid similar—or even worse—outcomes.

My home state of California is projected to receive up to 150 million barrels of oil by rail by 2016, compared with just 2 million barrels in 2011, and much of that oil will be volatile crude from the Bakken region of North Dakota and Canada.

This is why I am glad that the Department of Transportation is finally addressing this issue head on. It appears to me that with this proposed rule we are ensuring that the United States not only continues to be a leader in the production and transportation of these fuels, but that we really do this in a safe and responsible manner.

Thank you again to all of our witnesses for being here today and providing us with an opportunity to hear from a wide range of stakeholders, and with that I yield back.

Chairwoman LUMMIS. Thank you, Mr. Swalwell.

The Chair now recognizes the Chairman of the Subcommittee on Oversight, Mr. Broun, for his opening statement.

Mr. BROUN. Thank you, Chairwoman Lummis, and I welcome all of our witnesses today.

While I look forward to hearing from both panels today, I must say I am very disappointed, though not surprised, that this Administration is continuing to have an unwillingness to work with the Congress. Chairwoman Lummis and I invited representatives from the agencies who are experts in the subject matter because we are interested in the science behind Bakken crude. Instead, both agencies appearing before the Committee today declined to provide the witnesses that we requested, sending us in their place, witnesses more knowledgeable on the politics behind Bakken crude. As I said, I am not surprised, I am just very disappointed.

Over the past few years, the United States has made significant technological advances in the production of energy, leading to an increased supply of our country's vast God-given resources to fulfill the energy needs of Americans. Much of this is due to the influx of crude oil output from the Bakken Shale region, which topped one million barrels per day earlier this year, and is expected to climb to 1.5 million barrels a day over the next three years.

Given the large volume of crude being transported across the country, the Department of Transportation began testing its characteristics to determine its flammability and volatility. Preliminary results of the review were published in July, which concluded that crude oil from the Bakken formation "is more volatile than most other types of crude, which correlates to increased ignitability and flammability."

The DOT report's comparison of the Bakken crude, which is classified as a light sweet crude, to crude oil in general, including heavier crudes, is a bit like comparing apples to oranges because light sweet crude as a class is generally considered to be more volatile than the heavier crudes. Separately, the North Dakota Petroleum Council commissioned a similar kind of study to the DOT study. While both the government and industry studies led to similar scientific results, the NDPC study concluded that Bakken crude is no more volatile, again, no more volatile than other types of light sweet crudes.

Energy independence creates a healthy economy, jobs at home, and directly correlates to our national security by limiting how much we rely on foreign energy imports to survive and prosper. America is on the road towards energy independence, with domestic crude contributing extensively, and it would be disastrous to impede on this extraordinary possibility.

While I have heard the Administration claim over the years that it supports an "all-of-the-above" energy plan, I hope that when all is said and done, Bakken crude does not become an example of a "none-of-the-below" practice that seems to be prevalent in this Administration.

Thank you again, Chairwoman Lummis, and I would like to yield the balance of my time to my good friend, Mr. Cramer, the Vice Chairman of the Oversight Subcommittee. Mr. Cramer.

[The prepared statement of Mr. Broun follows:]

PREPARED STATEMENT OF OVERSIGHT SUBCOMMITTEE
CHAIRMAN PAUL BROUN

Thank you, Chairwoman Lummis, and welcome to all of our witnesses. While I look forward to hearing from both panels today, I must say I am disappointed—though not surprised—at this Administration's continued unwillingness to work with the Congress. Chairwoman Lummis and I invited representatives from the agencies who are experts in the subject matter because we are interested in the science behind Bakken crude. Instead, both agencies appearing before the Committee today declined to provide the witnesses we requested, sending us in their place witnesses more knowledgeable on the politics behind Bakken crude. As I said, I am not surprised, just disappointed.

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While I have heard the Administration claim over the years that it supports an "all-of-the-above" energy plan, I hope that when all is said and done, Bakken crude does not become an example of a "none of the below" practice.

Thank you again, Chairwoman Lummis, and I would like to yield the balance of my time to my good friend, Mr. Cramer, the Vice Chairman of the Oversight Subcommittee.

Mr. CRAMER. I thank the Chairman, I thank Chairwoman Lummis and the Ranking Members, and certainly thank Chairman Smith of the overall committee for agreeing to call this hearing.

Being the sole Representative from the State known as Bakken, North Dakota, and being that North Dakota is the place where one of the rail accidents occurred, I am familiar with both sides of this issue and prefer that there not be sides but rather that we all pull in the same direction.

And I have to say that while I share Chairman Broun's perhaps disappointment that we didn't get the witnesses that perhaps we asked for, I am very pleased with the pre-filed testimony. I guess that is the right tone and look forward to the opportunity for Q&A in a reasoned and scientific manner that is true to the spirit of this committee and to the commission of this committee.

I think it is hard to move forward with a lot of rules until we know for sure what we are dealing with on the one hand. On the other hand, there is a sense of urgency about the safety of moving this product and we want to be able to have a rule that not just meets the urgency of the moment but also is a good rule and a correct rule. That said, I too, and have from the very beginning, want this hearing to focus specifically on the characteristics of Bakken

crude, perhaps talk about the differences and similarities in the various studies that have been done between industry and the government and make sure that we are all working together on the same team, pulling the same direction, and for the good of all of our constituents.

So with that, I appreciate the time that you yielded.

Chairwoman LUMMIS. Thank you, Mr. Broun, and thank you, Mr. Cramer.

The Chair now recognizes Mr. Maffei for his opening statement.

Mr. MAFFEI. Thank you very much, Madam Chair, and thank you for holding this hearing today.

Like Mr. Swalwell, I too found the title of this hearing rather curious. The title suggests that Bakken crude oil is part of America's path to energy independence and I certainly do want to talk about the various issues related to it. It is certainly one of those sources that has been increasing in recent years. But if we do truly want to explore "energy independence" in the United States, as the title of this hearing does suggest, and given the fact that we are the Science and Technology Committee, we should be exploring the use and development of domestic renewable sources of energy such as wind, solar power, biofuels, geothermal, even nuclear, those that do not add to the threats posed by global climate change, which we have already started to see.

That said, once one gets past the politically loaded title, I am truly grateful to both the Chairwoman of the Energy Subcommittee and the Chairman of the Subcommittee on Oversight for calling this hearing today. The issue of Bakken crude oil and railcar safety combined is particularly important to my constituency, my constituents, and my district in upstate New York since we have two train cars a day that carry Bakken crude oil that pass through the Syracuse, New York, area in my home district.

And while the production of crude oil from the Bakken region in North Dakota, Montana, and Canada has increased markedly in the past several years, jumping a bit more from—more than 100,000 barrels per day in 2007 to more than one million per day today, so have the fears about potentially catastrophic accidents as mile-long train cars transporting Bakken crude traverse the country.

Now, Bakken crude oil is more volatile, and what I mean by volatile is a lower flashpoint that could lead to an explosion. It is more than other heavy crude oils. But I agree with the Chairs that this volatility is consistent with other light sweet crude oils. We have no reason to think it is any worse or better than other light sweet crudes.

So to help address some of the known safety issues in transporting light crude oils, generally in working with the industry, the Pipeline and Hazardous Materials Safety Administration came out with a proposed regulation two months ago regarding crude-by-rail safety issues, including methods to help reduce the risk of accidents and areas for improved safety and response to these potential hazards, and I am very happy to have PHMSA witnesses today to discuss their efforts regarding improved safety on our rail.

I am also particularly pleased that we have a witness from my home district in Syracuse, New York, Mark Zoanetti, the Deputy

Chief of Special Operations for the Syracuse Fire Department, which I will say is one of the best mid-level city fire departments in the United States, and he will help us discuss the real-world consequences of these hazards and how first responders can train to address the threats and potential improvement that would help all of us—help all those departments respond to these and other hazards involving railcar safety.

Again, trains carrying Bakken crude oil traverse the length of my upstate New York district on their way to Albany, New York, and many East Coast refineries, as they do cross much of the United States. Using the rail lines, these trains can be up to a mile long and they can carry roughly 120 tank cars with 85,000 barrels of oil. So any substance with any volatility at all would obviously be a concern to me. I am not necessarily judging Bakken crude as any different or any more of a concern, but safety clearly is a concern and one we have to deal with.

And so, therefore, I do look very much forward to hearing all the witnesses on both panels today, and again, I want to thank both the Chairman and the Chairwoman for holding this hearing and also thank my fellow Ranking Member, Mr. Swalwell.

I yield back.

[The prepared statement of Mr. Maffei follows:]

PREPARED STATEMENT OF OVERSIGHT SUBCOMMITTEE
RANKING MINORITY MEMBER DAN MAFFEI

Thank you Mr. Chairman for calling this hearing today. The issue of Bakken crude oil and railcar safety is particularly important to me and my constituents since two trains a day carrying Bakken crude oil pass through Syracuse, New York, my home district. While the production of crude oil from the Bakken region in North Dakota, Montana and Canada has exploded in the past several years jumping from a bit more than 100,000 barrels per day in 2007 to more than one million barrels per day today, so have the fears about potentially catastrophic accidents as milelong train cars transporting Bakken crude oil traverse the country.

Bakken crude oil is more volatile than other heavier crude oils, although its volatility is consistent with other light sweet crude oils. However, since production of Bakken crude has surged in recent years and more than 70-percent of this crude oil is now shipped by rail there is legitimate concern about the volume of this oil being shipped by rail given its known potential volatility and an increasing number of train derailments and accidents involving Bakken crude over this same time period. These are legitimate concerns. While the focus of today's hearing seems to have shifted from originally examining safety issues associated with the transport of Bakken crude and other light crude oils to discussing how Bakken crude oil is part of America's path to energy independence, we must consider the safety issues associated with it. If we truly want to explore "energy independence," as the title of this hearing suggests, and given the fact we are the science and technology committee, we should be exploring the use and development of renewable sources of energy, such as wind and solar-powered technologies.

Bakken crude oil is an important contributor to our energy portfolio, is a vital economic resource, and helps keep domestic energy costs low. While we need to do all we can to keep energy costs low for hardworking middle class families, we must address the real world consequences associated with crude-by-rail safety issues and potential accidents. Both these concerns and consequences are increasing as more crude oil moves along more miles of track than ever before creating new risks and potential hazards. The National Transportation Safety Board (NTSB), for instance, describes nine significant crude oil accidents by rail from 2006 through February of this year. However, eight of those accidents have occurred since March 2013. The most significant accident occurred in Lac Mégantic in Québec, Canada in July 2013, involved 72 rail cars carrying Bakken crude oil and resulted in the destruction of 30 buildings and the death of 47 residents of that town. Other less serious accidents have occurred since then in Alabama, North Dakota and Virginia, for instance.

To help address some of the known safety issues in transporting light crude oils, and working with industry, the Pipeline and Hazardous Materials Safety Administration (PHMSA) came out with proposed regulations two months ago regarding crude-by-rail safety issues, including methods to help reduce the risk of accidents and areas for improved safety and response to these potential hazards. I am happy we have a PHMSA witness here today to help discuss their efforts regarding improved safety conditions for transporting crude oil by rail.

I am also particularly pleased that we have a witness from my home district of Syracuse, New York, Mark Zoanetti, the Deputy Chief of Special Operations for the Syracuse Fire Department who can help discuss the real world consequences of these hazards, how first responders need to train to address these threats, and potential improvements that would help them respond to these and other hazards involving railcar safety issues. Trains carrying Bakken Crude Oil traverse the length of my Upstate New York District on their way to Albany, New York and major East Coast refineries. Using CSX rail lines, these trains can be up to a mile and 120 tank cars long, carrying roughly 85,000 barrels of oil. Given the high frequency and volume of Bakken Crude Oil transport through my Upstate New York and other regions of the Country, it is important that we address the public safety concerns of this issue. Thank you for being here today Deputy Chief Zoanetti and I look forward to your testimony and the testimony of all of our witnesses.

With that I yield back.

Chairwoman LUMMIS. Thank you, Mr. Maffei. And I understand it is Maffei like buffet, not fi. And I am Lummis, rhymes with hummus so we are in the food groups—

Mr. MAFFEI. Exactly.

Chairwoman LUMMIS. —with our names. Okay. Thank you.

If there are Members who wish to submit additional opening statements, your statements will be added to the record at this point.

Chairwoman LUMMIS. It is now time to introduce our first panel of witnesses. Our first witness is Mr. Chris Smith, Principal Deputy Assistant Secretary for the Office of Fossil Energy at the Department Of Energy. Mr. Smith was appointed in 2009 as Assistant Secretary for Fossil Energy's Office of Oil and Natural Gas. Prior to joining DOE, Mr. Smith spent 11 years with international oil companies focused on upstream business development and LNG trading.

Our second witness today is Mr. Timothy Butters, Deputy Administrator for Pipeline and Hazardous Materials Safety Administration at the Department Of Transportation. Prior to joining PHMSA, he served as the Assistant Chief of Operations for the City of Fairfax Fire Department. He served as the Chairman of the Hazardous Materials Committee for the International Association of Fire Chiefs. Deputy Administrator Butters also previously served ten years as Managing Director of the Chemical Transportation Emergency Center.

As our witnesses should know, spoken testimony is limited to five minutes each, after which members of the committee will have five minutes each to ask questions. Your written testimony will be included in the record of the hearing.

It is the practice of the Subcommittee on Oversight to receive testimony under oath, so, gentlemen, if you would please now stand and raise your right hand.

Do you solemnly swear or affirm to tell the whole truth and nothing but the truth, so help you God?

Let the record reflect that the witnesses participating have taken the oath.

Thank you, gentlemen. You may be seated.

I now recognize our first witness, Mr. Smith, for five minutes.

**TESTIMONY OF MR. CHRIS SMITH,
PRINCIPAL DEPUTY ASSISTANT SECRETARY, OFFICE OF FOSSIL ENERGY,
U.S. DEPARTMENT OF ENERGY**

Mr. SMITH. Chairwoman Lummis and Broun, Ranking Members Swalwell and Maffei, and members of the subcommittee, thank you for the opportunity to appear before you today to discuss oil production in the Bakken formation.

As you know, the United States is experiencing a renaissance in oil and gas production. According to the Energy Information Administration, U.S. oil production averaged an estimated 8.5 million barrels per day in July, the highest monthly level of production since April of 1987. The 2015 forecast of 9.3 million per day represents the highest annual average level of oil production since 1972. This domestic oil boom is due primarily to the new unconventional production of light sweet crude oil from tight oil formations like the Bakken in North Dakota, as well as the Eagle Ford and the Permian Basin in Texas. These private developments were made possible in part by three decades of industrial research cost-shared by the Department of Energy into technologies such as hydraulic fracturing, horizontal drilling, and three-dimensional mapping.

The Department of Energy has been actively engaged with our colleagues at the Department of Transportation in addressing the challenges associated with moving this wealth of new production to market. While the Department of Energy does not collect data on the specific volume of petroleum products transported by rail, data from the North Dakota Pipeline Authority indicates daily export volumes by rail from North Dakota have increased over the past few years from 70,000 barrels per day to over 700,000.

There is growing public concern over the safety of transportation of crude oil by rail and the public is looking to the government for appropriate oversight and regulations to ensure their safety. These public concerns were voiced in Bismarck, North Dakota, last month at a public forum in which Secretary Ernie Moniz and Secretary of Transportation Foxx participated in as part of the Administration's Quadrennial Energy Review.

Ensuring public confidence in the safety of these shipments is a priority, particularly because this domestically produced oil is important for American energy security and our economic prosperity. To that end, it has become clear that the continued realization of this tremendous resource may require additional measures to address safety concerns of the communities where it is extracted and through which it is transported.

In light of this new and growing resource, various efforts have been launched by the Federal and State Governments and industry to better understand the safety aspects of moving Bakken and other crude oils from tight oil formations. The most detailed understanding of the chemical and physical characteristics of Bakken crude oil is based on two studies: PHMSA's Operation Safe Delivery report and a study by Turner, Mason & Company on behalf of the North Dakota Petroleum Council.

Based on our review of these two studies and drawing on our general knowledge of crude oil, the Department of Energy considers Bakken to be a light sweet crude oil that can be considered more volatile than some, but not necessarily all, of the other crude oils produced in the United States.

The North Dakota Petroleum Council and the PHMSA studies are based on test and analyses of the physical and chemical properties of a statistically significant set of Bakken crude samples collected from above-ground storage tanks at various individual leases and rail-loading facilities throughout the Bakken.

Volatility is a measure of the tendency for a material to vaporize; that is the ease with which it changes from a liquid to a gaseous state. Crude oil contains numerous different hydrocarbon components with different volatilities. The lower molecular weight hydrocarbon constituents such as ethane, propane, and butane are more volatile than hydrocarbons with high molecular weight, and the volatility of any particular crude oil will increase as the concentrations of these lower molecular weight constituents rise.

DOE has not attempted to make any detailed comparison between Bakken crude oil and other forms of crude oil. In support of the Department of Transportation, which has the preponderance of federal regulatory responsibilities in this area, the Administration is considering further investigation into the properties of these crudes from tight oil formations and how these properties may attribute to their safe handling and transport.

At the end of the day, if we are to realize the full potential of the type of oil found in the Bakken and other formations, we need to make sure that it is extracted and transported safely. The Department of Energy stands ready to lend its expertise and experience to that effort.

With that, I would be happy to answer any questions that the Committee might have at this time, and thank you for giving me the opportunity to testify today.

[The prepared statement of Mr. Smith follows:]

STATEMENT OF CHRISTOPHER SMITH

PRINCIPAL DEPUTY ASSISTANT SECRETARY FOR FOSSIL ENERGY

U.S. DEPARTMENT OF ENERGY

BEFORE THE

COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY

SUBCOMMITTEES ON ENERGY AND OVERSIGHT

UNITED STATES HOUSE OF REPRESENTATIVES

SEPTEMBER 9, 2014

Chairmen Lummis and Broun, Ranking Members Swalwell and Maffei, and members of the Subcommittees, thank you for the opportunity to appear before you today on the subject of *Bakken Petroleum: The Substance of Energy Independence*.

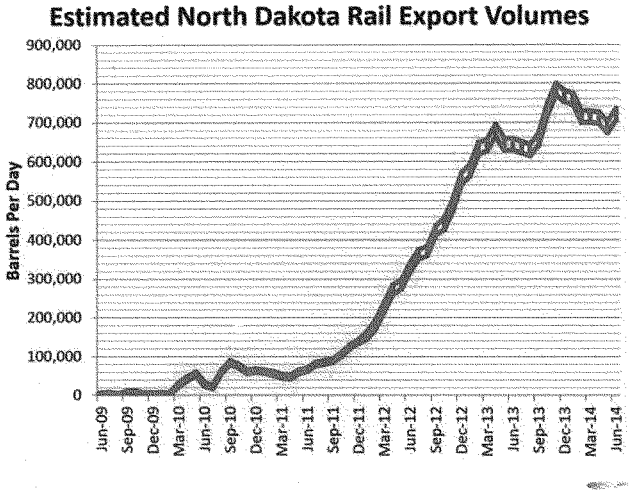
The U.S. is experiencing a renaissance in oil and gas production. According to the Energy Information Administration (EIA), U.S. oil production averaged an estimated 8.5 million barrels per day (bbl/d) in July, the highest monthly level of production since April 1987. The 2015 forecast of 9.3 million bbl/d represents the highest annual average level of oil production since 1972. This domestic oil boom is due primarily to new unconventional production of light sweet crude oil from tight-oil formations in North Dakota (Bakken) and Texas (Eagle Ford and Permian Basin). These private developments were made possible, in part by three decades of industrial research cost-shared by the Department of Energy into technologies such as hydraulic fracturing, horizontal drilling, and three dimensional mapping.

The Department of Energy (DOE) has been actively engaged with our colleagues at the Department of Transportation (DOT) in addressing the challenges associated with moving this wealth of new production to market. While DOE does not collect data on the specific volume of petroleum products transported by rail, the Energy Information Administration has examined data from the Association of American Railroads and indicated that there has been a steady increase in the volume of crude oil transported by rail in the past several years. This is due to the increases in crude oil production in not only North Dakota, but also Texas and other states. In some regions, crude oil production has exceeded the capacity of existing pipelines to move oil to refineries in other areas of the country; in other regions where significant crude oil production is a recent development (for example, in the Bakken region) the available pipelines may not serve the markets with the greatest demand for the oil and the market is still trying to determine whether there is sufficient customer demand for new pipeline capacity to support financing it. Furthermore, moving crude oil from the Bakken to east and west coast refineries via rail

often provides a higher value market opportunity for these light crude oils than moving the crude oils by pipeline to the Gulf Coast where there is an excess of light crude oil relative to refinery needs.

There is growing public concern over the safety of transporting crude oil from the Bakken and other tight oil formations. It has become clear that the continued realization of this tremendous resource may require additional measures to address safety concerns of the communities where it is extracted and through which it is transported.

Fundamentally, the responsibility for safe transportation of these materials rests with the transportation companies moving them, and the liability for accidents must remain with the private sector. Notwithstanding, the public has legitimate concerns and looks to the government for appropriate oversight and regulations to ensure their safety. These public concerns were voiced in Bismarck, North Dakota on August 8 at a public forum in which Secretary of Energy Moniz and Secretary of Transportation Foxx participated as part of the Administration's Quadrennial Energy Review (QER). At the forum, participants discussed the challenges associated with the increased transport of crude oil by rail. The graph below from the North Dakota Pipeline Authority shows the dramatic growth in rail transportation over the last five years.



With increasing volumes of crude oil being shipped by rail, ensuring public confidence in the safety of these shipments is a priority, particularly because this domestically produced oil is important for American energy security and our economic prosperity.

In light of this new and growing resource, various efforts have been launched by Federal and State governments and industry to better understand the safety aspects of moving Bakken and other crude oils from tight oil formations. I would be happy to talk about current studies that have been reviewed by DOE.

The most detailed understanding of the chemical and physical characteristics of Bakken crude oil is based on two external studies.

- One study was conducted by DOT's Pipeline and Hazardous Materials Safety Administration (PHMSA) as part of its Operation Safe Delivery, which focuses on examining the entire system

for delivery of crude oil and applying a comprehensive approach to ensure the safe transportation of crude oil moving by rail

- The other study was performed by Turner Mason and Company on behalf of the North Dakota Petroleum Council (NDPC).

The NDPC and PHSMA studies are based on tests and analyses of the physical and chemical properties of a statistically significant set of Bakken crude samples collected from aboveground storage tanks at various individual leases and rail loading facilities throughout the Bakken. DOE's review of these two studies indicates that Bakken crude oil is properly classified as a "light, sweet crude oil".

- Light crude oil refers to crude oil having a comparatively high American Petroleum Institute (API) specific gravity, which is a measurement of the density of the oil. The higher the API specific gravity, the lighter the crude oil. While there is no precise definition, light crude oil generally has an API gravity of 38 degrees or more, while medium crude falls in a range between 22 and 38 degrees. Bakken crude oil has an API gravity between 40 and 43.
- Crude oil containing generally more than 0.5 weight percent of sulfur is called sour crude oil and requires more processing. Crude oil containing less than 0.5 weight percent sulfur is considered sweet crude oil.
- Bakken crude oil as compared to other crude oils has a comparatively higher concentration of "lighter end" hydrocarbons (e.g., ethane, propane, and butanes), which contribute to its also having a somewhat higher vapor pressure than many crude oils, (on the order of 10-14 pounds per square inch absolute (psia)) which may have vapor pressures of less than 10 psia.

"Volatility" is a measure of the tendency for a material to vaporize – that is, the ease with which it changes from a liquid to a gaseous state. Crude oil contains numerous different hydrocarbon

components with different volatilities. The lower molecular weight hydrocarbon constituents such as ethane, propane and butanes are more volatile than hydrocarbons with higher molecular weights, and the volatility of any particular crude oil will increase as the concentrations of these lower molecular weight constituents rises.

Based on laboratory tests and analyses of the samples that it collected, PHMSA has preliminarily concluded that Bakken crude oil is more volatile than most other types of crude and has further indicated that this greater volatility correlates to increased ignitability and flammability. That conclusion takes into consideration such properties as gas content (i.e., the relative concentrations of ethane, propane and butanes), a low flash point, a low boiling point and high vapor pressure.

DOE has not attempted to make any detailed comparison between Bakken crude oil and other forms of crude oil. However, based on the work done by both PHMSA and the NDPC and drawing on its general knowledge of crude oils, DOE considers Bakken to be a light sweet crude oil that has a comparatively higher concentration of lighter end hydrocarbons and a higher vapor pressure than many other crude oils. On that basis, it can be considered more volatile than some, but not necessarily all, of the other crude oils produced in the U.S.

DOE believes that more scientific analysis is needed to better define the relationship between volatility and ignitability/flammability, to identify what characteristics of a complex mixture of hydrocarbons are most representative of its propensity to ignite, and to better understand the combustion characteristics of various types of crude oil in the context of the conditions typically experienced after a derailment or other type of train accident.

In support of DOT, which has the preponderance of Federal regulatory responsibilities in this area, the Administration is considering further investigation into the properties of these crudes from tight oil

formations, and how these properties may attribute to their safe handling and transport. DOE is currently working with PHMSA to finalize a statement of the scope of work for further technical assistance. This research is independent from the PHMSA rulemaking and study under discussion today. Any research undertaken will be peer reviewed prior to dissemination, and will follow government-wide information quality guidelines.

The key questions yet to be addressed are whether the chemical makeup of the crude oils from the Bakken and other tight oil formations differs from conventional crudes, and if so, how this difference influences the required conditioning and transportation. Understanding the interplay of the following characteristics will be important:

- Material properties (i.e. chemistry, phase behavior, and trace components)
- Reactivity (i.e. combustion and corrosion)
- Reservoir characteristics (i.e., mineralogy) and
- Mechanical agitation (i.e. ,tank dynamics)

Further work might also be done to discern our experience transporting similar crudes historically.

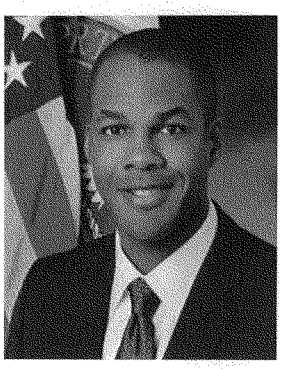
Any problem definition phase would be directed in large part toward the key questions identified by PHMSA for transportation safety. These could include collection and analysis of representative samples of Bakken and other tight crude oils as well as a review of available studies of the characteristics of these crude oils and could potentially benefit from using the information and testing methodology from the Strategic Petroleum Reserves. The analytical methods will include both chemical analyses to identify the presence of volatile constituents (e.g., methane, ethane, and propane) and an evaluation of physical properties that will determine the release of entrained hydrocarbons upon the type of pressure drop

expected in realistic tank rupture scenarios (i.e., at temperatures and pressures consistent with those seen during transportation by rail).

Finally, I would like to mention that support for additional research was acknowledged by North Dakota Governor Jack Dalrymple when he spoke with Secretary of Energy Moniz and Secretary of Transportation Foxx at the August 8 QER meeting in Bismarck, North Dakota. He shared the concern that any safety issues specific to Bakken and other tight oils need to be investigated and addressed.

Chairmen Lummis and Broun, and members of the Subcommittees, this completes my prepared statement. I would be happy to answer any questions you may have at this time.

Christopher Smith
Principal Deputy Assistant Secretary
Office of Fossil Energy
U.S. Department of Energy



Christopher Smith is Principal Deputy Assistant Secretary with responsibilities for office operations and managing the oversight of Fossil Energy's Research and Development program (encompassing coal, oil and natural gas) and the U.S. Petroleum Reserves.

He was appointed to the Department of Energy in 2009 as Deputy Assistant Secretary for FE's Office of Oil and Natural Gas.

Prior to joining DOE, Smith spent eleven years with two major international oil companies focused primarily on upstream business development and LNG trading, including three years negotiating production and transportation agreements in Bogotá, Colombia.

Smith began his career as an officer in the U. S. Army and served tours in Korea and Hawaii. Smith holds a bachelor's degree in Engineering Management from the United States Military Academy at West Point and an MBA from Cambridge University.

Chairwoman LUMMIS. Thank you, Mr. Smith.

I now recognize our second witness, Mr. Butters, for five minutes.

**TESTIMONY OF MR. TIMOTHY BUTTERS,
DEPUTY ADMINISTRATOR, PIPELINE AND HAZARDOUS
MATERIALS SAFETY ADMINISTRATION,
U.S. DEPARTMENT OF TRANSPORTATION**

Mr. BUTTERS. Good afternoon. Madam Chairwoman Lummis, Chairman Broun, Members Swalwell and Maffei, and other members of the committee, thank you for the opportunity to appear before you to discuss PHMSA's data results and testing of Bakken shale crude oil.

Safety is the number one priority for Secretary Foxx and everyone in PHMSA, as well as the other modal administrations within the U.S. Department of Transportation. It drives everything we do. PHMSA works diligently to protect people and the environment from the risks of hazardous materials by all modes of transportation, air, surface, marine, and pipeline.

The United States is seeing historic highs in domestic production and transportation of crude oil and natural gas. This is a positive development for our nation's economy and energy independence. These products are also considered hazardous materials and the safety responsibilities associated with their production and transportation are serious and significant. The volume of crude oil transported by rail, barge, pipeline, and truck throughout the United States is greater than ever, and it is DOT's responsibility to ensure these hazardous materials are transported safely.

The production of shale crude oil in the Bakken region has elevated North Dakota as the second-largest oil-producing State in the United States. As of March of 2014, over a million barrels of oil was produced every day in North Dakota, the majority of which was transported by rail. In 2009, as was noted earlier, approximately 11,000 carloads were moved by rail compared to more than 400,000 in 2013.

These compelling statistics and the recognition of DOT's regulatory responsibility for safety is why Secretary Foxx and Administrator Quarterman deemed it important to visit the crude oil production facilities in North Dakota several times last year. Within the last year, DOT has taken aggressive actions on multiple fronts to reduce risks and ensure the safe transportation of crude oil and other flammable liquids by rail. These actions include more than two dozen initiatives to strengthen the way shale crude oil is delivered, including conducting unannounced spot inspections, issuing emergency orders, safety advisories, and proposing new regulations to enhance the safety of rail tank cars using the transport of this oil.

In August 2013 we initiated Operation Classification in the Bakken Shale formation to verify and ensure that shippers were properly classifying crude oil for transportation in accordance with the Federal Hazardous Materials regulations. Observations by DOT field inspectors, coupled with the recent serious rail accidents in Canada and the United States involving shale crude oil led us to more closely examine crude oil being produced in the Bakken re-

gion in terms of its flammability and volatility. PHMSA wanted to better understand the unique characteristics of mined gases and oils from the Bakken region and ascertain the range of physical and chemical properties.

Operation Classification involved months of unannounced inspections, testing, and analysis of shade crude oil from the Bakken region. Our report, Operation Life Safety Update, which was released in July of this year, provides a summary of our testing and sampling activities from August of 2013 through May of 2014. During that period, a total of 135 samples were analyzed and are included in this summary. PHMSA contracted with Intertek Laboratories, a nationally recognized ISO 9001 certified lab to test all the crude oil samples. Operation Classification determined that Bakken Shale crude oil is more ignitable and flammable due to higher dissolved gas content, higher vapor pressure, lower flashpoint and boiling point than other types of crude and thus has a higher degree of volatility, which was noted as a tendency for a material to vaporize.

PHMSA's analysis notes that Bakken crude oil is more ignitable and flammable than any other types of—many other types of crude, specifically those heavy crude oils. Further, the majority of this crude oil displayed characteristics consistent with a Class 3 flammable liquid, Packing Group 1, which is the group designated for highest hazardous materials within a Class 3 flammable liquid category.

Since PHMSA's Operation Safe Delivery Update was issued, we continued our testing and sampling activities and we also refined our collection method. PHMSA now uses a closed sampling method through the use of a closed-type syringe to minimize the potential for any dissolved gases to escape during collection, thus providing increased accuracy. PHMSA is also taking samples at other shale locations around the United States to further compare and characterize crude oil with that of the Bakken region.

PHMSA plans to provide updates to its testing and sampling activities and work with other government agencies and the regulated community to ensure the safe transportation of crude oil across the country. DOT appreciates this committee's attention to this very important safety issue. If America is going to be a world leader in producing energy, it is the Department's commitment and our job to ensure that we are also a world leader in transporting it safely.

Thank you again for the opportunity to appear and I will be pleased to answer any questions you may have.

[The prepared statement of Mr. Butters follows:]

WRITTEN STATEMENT OF
TIMOTHY P. BUTTERS
DEPUTY ADMINISTRATOR
THE PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION
U.S. DEPARTMENT OF TRANSPORTATION
BEFORE THE SUBCOMMITTEES ON ENERGY AND OVERSIGHT
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

BAKKEN PETROLEUM: THE SUBSTANCE OF ENERGY INDEPENDENCE

September 9, 2014

Chairmen Lummis and Broun, Ranking Members Swalwell and Maffei, and Members of the Subcommittees, thank you for the opportunity to provide testimony on the Pipeline and Hazardous Materials Safety Administration's (PHMSA) data results on the testing of Bakken shale crude oil. While rail is safer today than it's been in a generation or more, high-profile train accidents, such as the ones we've seen in Lac-Mégantic, Quebec, Canada; Aliceville, Alabama; Casselton, North Dakota; and Lynchburg, Virginia, underscore how important it is to be ever-vigilant in protecting local communities and the environment.

Safety is the number one priority for Secretary Foxx, everyone at PHMSA, and the other modal administrations in the U.S. Department of Transportation (DOT). PHMSA continues to work diligently to protect the American people and the environment from the risks of hazardous materials transportation by all modes. PHMSA works to achieve its safety mission through efforts intended to prevent and mitigate transportation incidents involving hazardous materials. These efforts include, but are not limited to, developing regulations and guidance, engaging in rigorous inspection and enforcement actions, collaborating with stakeholders, and educating industry, public safety officials, and the public.

On August 1, 2014, DOT issued two comprehensive rulemakings: a Notice of Proposed Rulemaking on Enhanced Tank Car Standards and Operational Controls for High-Hazard

Flammable Trains and an Advance Notice of Proposed Rulemaking on Oil Spill Response Plans for High-Hazard Flammable Trains. Both proposals are designed to address the risks associated with increased shipments of bulk flammable liquids by rail. Concurrently, PHMSA also publicly released its data summary that detailed the agency's current testing and sampling program for Bakken crude oil. The data stressed the importance of proper classification of hazardous materials, provided the preliminary conclusions drawn of our testing from August 2013 through May 2014, and described the methods and tests used to attain the data. PHMSA's crude oil testing and sampling efforts have provided its field investigators a greater understanding of the characteristics of this mined material. This greater understanding is helping PHMSA achieve our safety mission.

This testimony will include a brief overview of our regulatory framework as it relates to the classification of hazardous materials, and the importance of proper classification as the foundation of our transportation safety system. In addition, a brief overview of the characteristics of crude oil from different sources, which have become more relevant because of the growth in production of energy products in the U.S., will be included in order to put the Bakken shale oil safety issue into context. Finally, this testimony will also include a comprehensive review of PHMSA's July 23, 2014 "Operation Safe Delivery Update" posted on PHMSA's Web site and will cover the following elements:

- The technical analysis and process PHMSA used to classify and characterize these crude oil samples (including limitations of the methods used);
- The specific accepted industry standards that are being used as part of our sampling and testing program; and
- The preliminary data gathered in 2014 indicates that crude oil from the Bakken region may be "more volatile than most other types of crude produced in the U.S. – which correlates to increased ignitability and flammability."[1]

[1] DOT's "Operation Safe Delivery Update," p. 16.

The initial testing and analysis conducted during Operation Safe Delivery has provided PHMSA with some valuable information. Given the range of data available on Bakken crude (from industry and other sources), PHMSA plans to validate preliminary conclusions discussed below.

I. PHMSA's Regulatory Framework

PHMSA issues the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180), which prescribe requirements for the safe transportation of hazardous materials in commerce by all modes. The proper classification of any hazardous material is required prior to offering it into transportation. Proper classification and characterization of hazardous materials are the foundation of our transportation safety system. Proper packaging selection, marking, labeling, shipping papers, and placarding are all dependent upon this first, critical step.

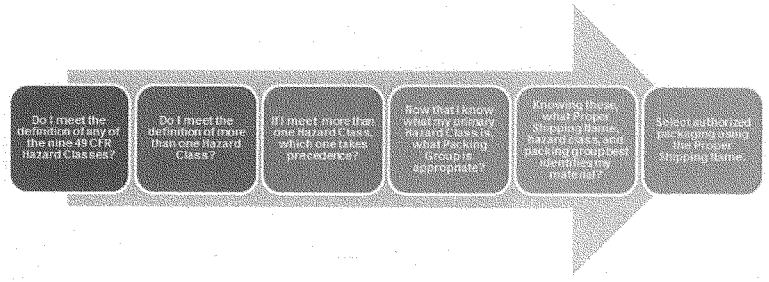
The HMR has nine hazard classes, which are defined to characterize the predominant risk that a hazardous material poses. Some materials meet the definition of more than one hazard class with primary risks and subsidiary risks. Once a hazardous material is classified into one or more hazard classes, the HMR further delineates risk of certain hazardous materials through specific packing groups (PG). Some hazardous materials are assigned to one of three PGs based upon their degree of hazard, ranging from high hazard (PG I), to medium hazard (PG II), to low hazard (PG III). The quality, damage resistance, and performance standards of the container or package authorized in each packing group are designed for the hazards of the material being transported.

The entity that offers hazardous materials for transportation is considered a shipper (e.g., both initial offerors and subsequent, downstream offerors). It is the shipper's responsibility to properly classify and to describe a hazardous material, including determining the constituents present and any multiple hazard classes present.

Each shipment of a hazardous material must be accompanied by a shipping document that must include a statement certifying that the material is in compliance with all appropriate regulations, including classification and packaging. In summary, anyone offering a hazardous material for shipment must do the following:

1. Properly identify all the **hazards** of the material.
2. Determine which of the **nine hazard classes** are applicable to the material as the primary and subsidiary hazards.
3. Assign the material to a **packing group**, if applicable.

The diagram below provides a summary of the process that a shipper must perform to properly classify crude oil and then select the appropriate shipping description and assign the proper packing group for the material. Each step in the process is critical to ensure the safe transportation of a hazardous material.



The HMR provides a safety system that, when implemented properly, can help prevent transportation incidents, mitigate the consequences of such incidents should one occur, and communicate the hazards and emergency response information. The effectiveness of this safety approach is, in part, dependent on the proper classification and characterization of the hazardous material being transported. The improper classification and/or characterization can diminish the intended effectiveness of the HMR.

II. State of Crude Oil

Oil and gas production is at an historic high in the United States – a positive development for our economy and our energy independence – but the responsibilities that come along with that production are serious. More crude oil is being shipped by all modes of surface transportation than ever before, and it is DOT's responsibility to ensure these crude oil shipments travel safely.

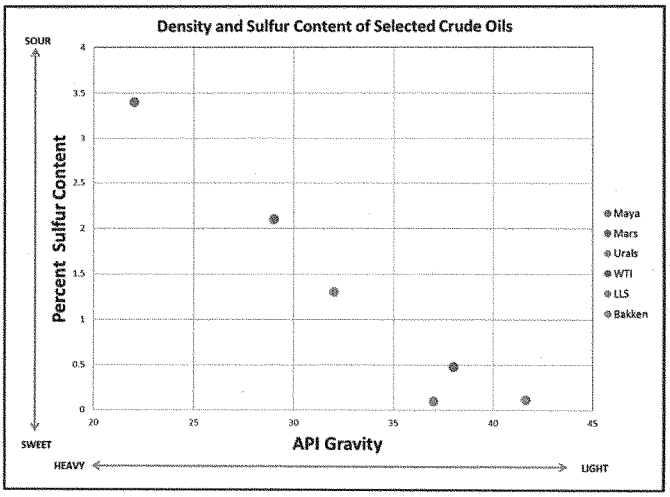
One important center of this increased crude oil production is the Bakken shale formation (Bakken Formation), occupying about 200,000 square miles (520,000 square kilometers) in the U.S. and Canada. Production from the Bakken Formation in recent years has elevated North Dakota to one of the most important sources of oil in the United States. As of August 2014, the Bakken Formation produced 1,136 thousand barrels per day compared to just over 200 thousand barrels per day in 2009.[2]

Unlike manufactured goods, mined natural resources, including crude oil, may have variable chemical compositions, presenting a challenge in regards to classification. Differences in the chemical makeup of a raw material such as crude oil can vary based on many factors including geographical location of the well, age of the well, and environmental factors such as temperature at which the oil is stored at the well site.

The chart below demonstrates that many types of crude oil mined around the world have varying chemical characteristics. In fact the market value of an individual stream of crude oil reflects its quality characteristics. Two of the most important quality characteristics are density and sulfur content. Density ranges from light to heavy, while sulfur content is characterized as sweet (low sulfur) or sour (high sulfur). The crude oils represented in the chart below are a selection of some of the crude oils marketed in various parts of the world. There are some crude oils both below and above the American Petroleum Institute's (API) gravity[3] range shown in the chart. In addition to these quality characteristics, there are other chemical characteristics that may affect transportation classification under the HMR. These chemical characteristics include flash and boiling points, as well as vapor pressure. These properties may differ considerably depending upon the percentage of dissolved gases, particularly lower-boiling point hydrocarbons, known as light ends.

[2] U.S. Energy Information Administration, *Bakken Region Drilling Productivity Report* http://www.eia.gov/petroleum/drilling/pdf/bakken.pdf

[3] "API gravity" is a measure of how heavy or light a petroleum liquid is compared to water, and is used to compare relative densities of petroleum liquids and also gives an indication of relative volatility.



Source: U.S. Energy Information Administration, based on Energy Intelligence Group—International Crude Oil Market Handbook. Bakken data is based on PHMSA sampling and testing

Note 1: Points on the graph are labeled by country and benchmark name. The graph does not indicate price or volume output values. MAYA = Mexico; MARS = United State offshore drilling site in the Gulf of Mexico; URALS = Former Soviet Union; WTI = West Texas Intermediate; LLS = Louisiana Light Sweet; and Bakken is the Williston Basin

DOT has taken steps to strengthen compliance and existing orders and regulations related to the safe transportation of flammable liquids, and Bakken crude oil in particular. Those steps include the issuance of emergency orders and the advancement of new rail safety and tank car safety regulations.[4] As the shipment and distance traveled of bulk quantities of Bakken crude oil is relatively new, and crude oils around the world have demonstrated that these products may vary in chemical characteristics, PHMSA launched its sampling and analysis program to further assess the characteristics of Bakken crude oil and determine the degree to which shippers were properly classifying and assigning packing groups prior to shipment. Specifically, the results of the sampling and analysis would be used to determine the potential volatility of Bakken crude oil compared with other crude oils.

[4] See Operation Safe Delivery Chronology at http://www.phmsa.dot.gov/hazmat/osd/chronology

III. Operation Safe Delivery Update

Prior to the launch of our sampling and analysis program, DOT inspectors identified that many crude oil loading facilities were basing classification solely on a generic Safety Data Sheet (SDS)[5], and often neglecting to conduct any sort of chemical testing or analysis to confirm the information on the SDS. SDS data can provide a wide range of material properties, including information such as boiling point, flash point, toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill-handling procedures. These inspections revealed that SDSs for crude oil were often out-of-date with unverified information and provided ranges of chemical and physical property values instead of specific measured values. Further, these ranges often crossed the thresholds between PG I and II and PG II and III, making it difficult to assign the proper packing group. Given the potential variability of crude oil, DOT believed that operators' reliance on generic information was a safety concern. In fact, in a letter to API, FRA enumerated concerns related to crude oil and informed industry that it would use PHMSA's test sampling program to ensure that crude oil is being properly tested and classified.[6]

In August 2013, the Department embarked on Operation Classification in the Bakken Formation, where crude oil production has skyrocketed and the practice of using generic and outdated SDSs to classify crude oil was observed. We were particularly focused on the Bakken region because there was some question of whether materials were properly classified and characterized by shippers. .

Operation Classification is focused on ensuring shippers are properly classifying crude oil for transportation in accordance with Federal regulations, and on better understanding the unique characteristics of mined gases and oils from the Bakken region. The intent of Operation Safe Delivery's sampling and analysis component is to determine whether shippers are properly classifying crude oil for transportation. The intent is also to quantify the range of physical and chemical properties of crude oil.

[5] Formerly known as Material Safety Data Sheets or MSDSs.
[6] See FRA letter http://www.fra.dot.gov/eLib/details/L04717

Technical Analysis

The initial activities of Operation Classification were conducted in two phases. The first phase was conducted from August through November 2013. In this phase PHMSA was focused on determining and verifying hazard classes and packing group selection. Tests focused on flash point and boiling point and then expanded to address other chemical characteristics of crude oil. Forty-seven total samples from rail loading facilities, cargo tanks, storage tanks, and pipelines used to load rail cars were collected.

In conducting the sampling and analysis for this phase, PHMSA used American Society for Testing and Materials (ASTM), industry-recognized testing and sampling methods. ASTM is a globally recognized leader in the development and delivery of international, voluntary consensus standards. Today, some 12,000 ASTM standards are used around the world to improve product quality, enhance safety, facilitate market access and trade, and build consumer confidence.

The collection of these samples to be analyzed in this phase was conducted by PHMSA field operations personnel. These personnel were trained in collection methods described in ASTM D4057 titled "Standard Practice for Manual Sampling of Petroleum and Petroleum Products." In addition a Crude Oil Sampling Plan was developed by our National Field Training Office. This plan detailed sampling and handling protocols designed to ensure consistency, accuracy and repeatability. All samples collected by PHMSA were sent to Intertek Laboratories, which is a nationally recognized lab to test crude oils. The specific standards used in the first phase are listed below with a brief description of the method and the levels of certainty of each test.

OPERATION CLASSIFICATION (PHASE 1)		
Test Method	**Summary**	**Test Limitations**
Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method) (ASTM D323).	Determines Reid vapor pressure measured with a vapor-to-liquid ratio of 4:1 and temperature of 100 degrees Fahrenheit (°F).	Utilizes open sampling and allows samples to mix with air before measurement. Minimizes the contribution of dissolved gases to vapor pressure

		measurement.
Standard Test Method for Determination of Individual Components of Crude Oil (ASTM D6730 MOD).	Determines concentration of individual hydrocarbon components with boiling ranges up to 437 °F using gas chromatography.	Sampling method could affect results.
Standard Test Method for Water and Sediment in Crude Oil (ASTM D4007).	Centrifuge method to determine water and sediment concentrations within crude oil.	May underestimate water content
Standard Test Method for Sulfur in Petroleum and Petroleum Products (ASTM D4294).	X-ray fluorescence spectrometry to determine sulfur concentrations within petroleum and petroleum products.	Limited to concentrations <4.6% by mass.
Standard Test Method for Measurement of Hydrogen Sulfide in the Vapor Phase Above Residual Fuel Oils Hydrogen Sulfide Content (ASTM D5705).#	Determines the concentration of hydrogen sulfide within the vapor phase above a material for understanding the health and safety risks posed.	Limited to concentrations between 5 and 4000 parts per million by volume
Standard Test Method for Density and Relative Density for Crude Oil (ASTM D5002).	Determines the density or relative density of crude oils which are capable of being handled as liquids between 59 °F and 95 °F.	Lighter crude oils require special handling to prevent vapor losses.
Standard Test Method for Flash Point by Tag Closed Cup Tester (ASTM D56).#	Determines the flash point of a material in controlled conditions. Flash point is the lowest temperature at which a material can vaporize to form an ignitable mixture in air.	Limited to liquids with a viscosity < 5.5 cSt at 104 °F and a flash point < 200 °F
Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure (ASTM D86).#	Determines the boiling range of a petroleum product using distillation. The initial boiling point is recorded as the temperature at the instant the first drop of condensate falls from the lower end of the condenser tube.	Designed for the analysis of distillate fuels and is not applicable to products containing appreciable quantities of residual material.

 # These tests were also used at part of the American Fuel & Petrochemical Manufacturers' report "A Survey of Bakken Crude Oil Characteristics."

The second phase of testing involved additional inspectors assigned on a continual rotation in the Bakken region to collect samples. The majority of the samples were collected at rail loading facilities from storage tanks and pipelines that were used to load rail cars. Several were collected from cargo tanks. Four of the samples collected were drawn using a closed syringe-style cylinder connected to loading pipelines to determine if there were differences from previous samples collected using the open container sampling method and to ensure a more accurate and

representative sample given the potential light end component losses when utilizing an open sampling method. In total 88 samples were taken between February 2014 through May 2014.

As with the first phase, the collection of these samples to be analyzed in this phase was conducted by PHMSA field operations personnel in accordance with ASTM D4057. In addition, our field operations personnel received information on how to use the syringe cylinders from the manufacturer of the cylinders, Welker Engineering.

As with the first phase, PHMSA utilized ASTM industry recognized testing methods to conduct the required analysis in the second phase, but also included alternative test methods to determine vapor pressure and corrosivity. The specific standards used in the second phase are listed below with a brief description of the method and the levels of certainty of each test.

OPERATION CLASSIFICATION (PHASE 2)		
Test Method	**Summary**	**Test Limitations**
Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method) (ASTM D323).	Determines Reid vapor pressure measured with a vapor-to-liquid ratio of 4:1 and temperature of 100 °F.	Utilizes open sampling and allows samples to mix with air before measurement. Minimizes the contribution of dissolved gases to vapor pressure measurement.
Standard Test Method for Determination of Individual Components of Crude Oil (ASTM D6730 MOD).	Determines concentration of individual hydrocarbon components with boiling ranges up to 437 °F using gas chromatography.	Sampling method could affect results.
Standard Test Method for Measurement of Hydrogen Sulfide in the Vapor Phase Above Residual Fuel Oils Hydrogen Sulfide Content (ASTM D5705).[8]	Determines the concentration of hydrogen sulfide within the vapor phase above a material for understanding the health and safety risks posed.	Limited to concentrations between 5 and 4000 parts per million by volume
Standard Test Method for Flash Point by Tag Closed Cup Tester (ASTM D56).[9]	Determines the flash point of a material in controlled conditions. Flash point is the lowest temperature at which a material can vaporize to form an ignitable mixture in air.	Limited to liquids with a viscosity < 5.5 cSt at 104 °F and a flash point < 200 °F

Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure (ASTM D86).#	Determines the boiling range of a petroleum product using distillation. The initial boiling point is recorded as the temperature at the instant the first drop of condensate falls from the lower end of the condenser tube.	Designed for the analysis of distillate fuels and is not applicable to products containing appreciable quantities of residual material.
Standard Test Method for Determination of Vapor Pressure of Crude Oil: VPCRx (Expansion Method) for both Vapor/Liquid ratios of 0.02 (at 122 °F) and 4 (at 100 °F).	Determines the vapor pressure of crude oils at varying vapor-to-liquid ratios from 4:1 to 0.02:1 and temperatures between 32 °F and 212 °F.	Suitable for materials with vapor pressures between 3.6 and 72.5 pounds per square inch.
U.N. Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Chapter 37 (corrosion to aluminum and carbon steel).	Determines the corrosion rate to steel and aluminum for a particular liquid, and its vapor.	Only necessary for transportation hazard classification

 # These tests were also used at part of the American Fuel & Petrochemical Manufacturers' (AFPM) report "A Survey of Bakken Crude Oil Characteristics."

The "Operation Safe Delivery Update" released on July 23, 2014 provides an update of our testing and sampling activities from August 2013 through May 2014. Since May 2014, PHMSA has continued its testing and sampling activities and refined the collection methods. PHMSA has purchased nine closed syringe-style cylinders and is collecting all sampling using these cylinders. Utilizing these types of cylinders minimizes the opportunity for any dissolved gases to be lost to the air during collection thus providing increased accuracy. In addition, PHMSA has taken samples at other shale play locations around the U.S. to further compare their characteristics against the Bakken region data.

Data Summary

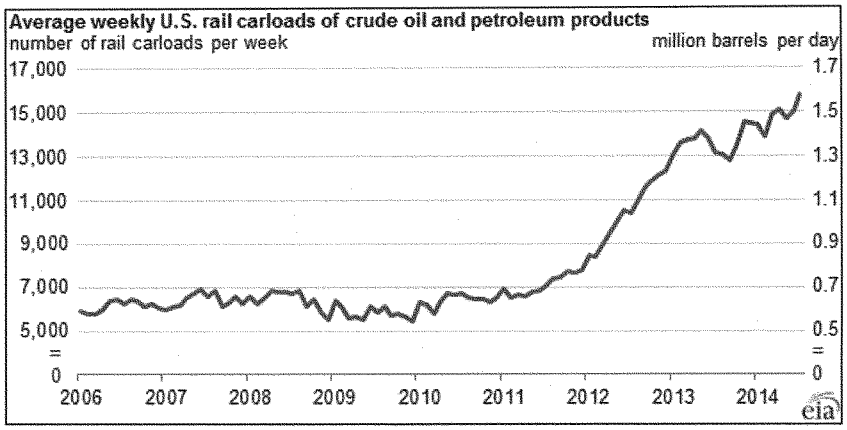
Our preliminary analysis of the results of months of unannounced inspections, testing, and analysis as part of Operation Classification suggests that the current classification applied to Bakken crude oil is appropriate under the current classification system detailed in the HMR. This is consistent with the findings of AFPM's "Survey of Bakken Crude Oil Characteristics." However, Operation Classification preliminary finding also suggest that Bakken crude oil may have a higher gas content, higher vapor pressure, lower flash point and boiling point and thus a

higher degree of volatility[7] than some other crude oils. Based on the data PHMSA collected, Bakken crude oil would be considered a "light sweet crude oil." The PHMSA data show that Bakken crude oil's gas content, flash point, boiling point, and vapor pressure are not outside the norm for light crude oils. Light crude oils often have higher gas content, a low flash point, a low boiling point, and high vapor pressure.

AFPM's "Survey of Bakken Crude Oil Characteristics" concludes Bakken crude oil, when compared with other light crude oils, is determined to be within the norm in the case of light hydrocarbon content, including dissolved flammable gases. PHMSA does not dispute this conclusion. The primary difference between PHMSA's analysis and AFPM's analysis is that PHMSA considered a broader range of crude oils for comparison to Bakken crude oil, though both analyses determine that Bakken crude oil is within the norm for light crude oils. PHMSA notes that light sweet Bakken crude oil may be more ignitable and flammable than some other types of crude oil, specifically "heavy crude oil." Further, preliminary analysis suggests that the majority of crude oil analyzed from the Bakken region displayed characteristics that may be more consistent with those of a Class 3 flammable liquid, PG I or II, with a predominance of PG I, the most dangerous type of Class 3 flammable liquids. The volatility of Bakken crude oil, and its usual identification as a PG I, "light" crude oil, may be attributable to its higher concentrations of light end hydrocarbons, which are more ignitable.

PHMSA's review of crude oil transportation data also confirmed that large volumes of this oil are moving at long distances across the country. At any given time, shipments of more than two million gallons are often traveling distances of more than one thousand miles (see figure below).

[7] "Volatility" is a relative measure of a specific material's tendency to vaporize.



Source: EIA http://www.eia.gov/todayinenergy/detail.cfm?id=17751

Given the volume of Bakken crude being transported in individual trains, there is an increased risk of a significant incident involving this material, especially considering the routes and the long distances it can travel by rail from North Dakota to refineries throughout the United States. Trains transporting this material, referred to as unit trains, can contain more than 100 tank cars, carrying at least 2.5 million gallons within a single train. Unit trains only carry a single type of product; in this case, flammable crude oil. These trains often travel over a thousand miles from the Bakken region to refinery locations along the coasts.

DOT plans to continue the sampling and analysis activities of Operation Safe Delivery through the fall of 2014 and to work with the regulated community to ensure the safe transportation of crude oil across the Nation. The Department will continue to keep the public, regulated entities, and emergency responders informed about our efforts.

IV. Closing Remarks

Effective standards and regulations are important mechanisms for keeping America's people and its environment safe while providing for the transportation of the Nation's energy supplies. PHMSA will continue to seek greater understanding of all hazardous materials and use that

knowledge to improve the effectiveness of our regulations and compliance activities and educate the regulated community and public on the risks of all hazardous materials.

In closing, the Department appreciates the Committee's attention to this important safety issue and will continue to work with Congress to address transportation related concerns, specifically those dealing with the bulk shipment of flammable liquids. Together, we will strive to keep America's people and its environment safe while providing for the reliable transportation of the Nation's energy supplies. Everyone at PHMSA is dedicated and committed to fulfilling our safety mission. Thank you again for the opportunity to speak with you today. I would be pleased to answer any questions you may have.

EXECUTIVE PROFILE

Timothy P. Butters

Deputy Administrator
Pipeline and Hazardous Materials Safety Administration
Department of Transportation

Timothy P. Butters is the Deputy Administrator of the US Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA). PHMSA's mission is to protect people and the environment from the risks inherent in transportation of hazardous materials - by pipeline and other modes of transportation. PHMSA's responsibilities include the development and enforcement of regulations for the safe, reliable, and environmentally sound operation of the nation's 2.3 million miles of the gas and liquid pipeline transportation system and the nearly 1 million daily shipments of hazardous materials by rail, highway, marine, and air.

Prior joining to his appointment as Deputy Administrator for PHMSA, he served as the Assistant Chief of Operations for the City of Fairfax Fire Department, located in Northern Virginia. His responsibilities included oversight of day-to-day fire department emergency response operations as well as training and emergency medical services. Other activities included developing regional emergency operations policies and procedures with other public safety agencies in the region. During his tenure as assistant fire chief, he also served as the chairman of the Hazardous Materials Committee for the International Association of Fire Chiefs (IAFC), and as a member of the National Capital Region Incident Management Team.

Previous professional experience includes nearly 10 years as Managing Director of the Chemical Transportation Emergency Center (CHEMTREC®), a 24-hour hazardous materials emergency communications center operated by the American Chemistry Council; Director of Government Affairs for the International Association of Fire Chiefs (IAFC); and senior manager with United States Fire Administration (USFA)/Federal Emergency Management Agency (FEMA). Prior fire and EMS experience includes over 25 years of volunteer service with the Burke Volunteer Fire Department in Fairfax County, Virginia, 15 years of serving as a command officer, including chief of the department.

Mr. Butters holds a Bachelor's Degree in Business Administration and Economics from James Madison University. He resides with his family in Springfield, Virginia.

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Chairwoman LUMMIS. I thank the witnesses for their testimony. And we will now have a period of questioning. Each member of the committee will have five minutes to ask questions, beginning with the Chairman. So I will begin the questioning with five minutes.

And, gentlemen, again thank you for being here today.

I want to focus very narrowly on the scientific characteristics of Bakken crude. And my first question, Mr. Butters, is is Bakken light sweet crude oil different from other light sweet crude oils?

Mr. BUTTERS. The Bakken Shale crude oil is generally consistent with other light sweet crude oils.

Chairwoman LUMMIS. So it is fair to say that if you are comparing Bakken light sweet crude oil to other light sweet crude oils that are produced outside of the Bakken, that you have not yet found any different characteristics when comparing light sweet to light sweet?

Mr. BUTTERS. Well, our data clearly shows that to this—the Bakken Shale crude oil is a highly flammable crude oil, and the data that has come from other sources, the petroleum industry, also suggest the same thing, that these lower boiling points, flashpoints, vapor pressures, et cetera, put this in a highly flammable category of oil.

Chairwoman LUMMIS. Okay. My question, however, is does the Bakken light sweet crude differ in characteristics from other light sweet crudes?

Mr. BUTTERS. Well, as I said, the data is consistent with flammability. And keep in mind that PHMSA's role—

Chairwoman LUMMIS. Excuse me.

Mr. BUTTERS. I am sorry.

Chairwoman LUMMIS. Consistent with flammability, so meaning light sweet crude from the Bakken compares equivalently with the flammability of light sweet crude from elsewhere? I am trying to compare apples to apples—

Mr. BUTTERS. I understand—

Chairwoman LUMMIS. —light sweet to light sweet.

Mr. BUTTERS. I understand that. Keep in mind that our analysis was—there were two objectives for our analysis. One was to better understand the chemical and physical properties of the Bakken crude oil—

Chairwoman LUMMIS. Um-hum.

Mr. BUTTERS. —and because of the risk in the volume that is moving across this country, that is why the focus was on that material.

Chairwoman LUMMIS. Okay. And—

Mr. BUTTERS. The second purpose was to ensure that shippers were classifying this oil properly prior to transportation.

Chairwoman LUMMIS. Excellent. Am I—I understand what the purpose was. Right now I am just concentrating on the science and I am trying to make an apples-to-apples comparison. Is Bakken crude more volatile than other light sweet crude that is not produced in the Bakken? Yes or no?

Mr. BUTTERS. All I can speak to is the analysis that we conducted on the Bakken shale oil, not-

Chairwoman LUMMIS. Okay. So you haven't studied other light sweet crudes? You have only studied Bakken light sweet crudes?

Mr. BUTTERS. We have taken samples of—from other shale plays, but the predominant sampling that we have taken is from the Bakken region. And again, it is because of our role in terms of the transportation of this—

Chairwoman LUMMIS. Um-hum.

Mr. BUTTERS. —hazardous material, we wanted to be sure that we, number one, understood what it was-

Chairwoman LUMMIS. Um-hum.

Mr. BUTTERS. —and, number two, that shippers were properly classifying this material, putting it in the proper container prior to transportation.

Chairwoman LUMMIS. Mr. Smith, is Bakken light sweet crude different from other light sweet crude in terms of volatility, flammability?

Mr. SMITH. Thank you for the question, Chairman—Chairwoman.

So, generally speaking, so I give an answer that is generally consistent with the answer that Mr. Butters gave, it is generally consistent in many cases with other light sweet crudes but I would note that crude oils vary—

Chairwoman LUMMIS. Yes.

Mr. SMITH. —in their composition, they vary in the geologic settings in which they are created, and therefore, every crude oil is going to be different. But as a general categorization, crude oil that is coming out of light—out of tight formations will tend to have a higher level of volatility than most but not necessarily every other light crude. But again, to emphasize that every crude oil—crude oils are complex—they are complex materials. They are all different, as anyone who has worked in the refining sector or other processing or chemical sectors will tell you, crude oils are different, they vary, and it is something that bears—

Chairwoman LUMMIS. Okay.

Mr. SMITH. —further study.

Chairwoman LUMMIS. Acknowledging that crude oils are different, all I am really interested in was the yes or no, whether Bakken has been found to be different from other light sweet crudes. I will take it that the answer is no, it has not been found to be different from other light sweet crudes; it has been found to be different from intermediate crudes and heavies?

Mr. SMITH. Well, that is not exactly the answer I gave. The answer is that all crudes are different and Bakken crudes would tend to be more volatile than many other light crudes. But again, all—

Chairwoman LUMMIS. Oh, so it is different?

Mr. SMITH. All—

Chairwoman LUMMIS. Do we know it is different? Is it different?

Mr. SMITH. So we do know that Bakken crudes, when you compare them to other—first of all, we do know that all crudes are different.

Chairwoman LUMMIS. Right.

Mr. SMITH. You look at chemical compositions of crude oil that comes from different sources, you do see lots of differences in crude oils. So there are things that we know, there are things that we don't know, so I can't categorically compare Bakken crude with every other crude that exists, but I can state that there are dif-

ferences within crude oils and oil that comes out of tight formations does tend to have a higher level of volatility than crudes that come out of other sources.

Chairwoman LUMMIS. My time is expired. I now recognize Mr. Swalwell for five minutes.

Mr. SWALWELL. Thank you, Chairwoman Lummis.

Mr. Butters, in PHMSA's July 23 report entitled "Operation Safe Delivery Update," did you find any substantial difference in the volatility of Bakken crude when compared to other light sweet crudes like West Texas Intermediate or Brent Crude just to try and clarify and follow up on the Chairman's question?

Mr. BUTTERS. I understand. The purpose of the report was not to compare different types of crude oil. The purpose of our study was to understand the physical and chemical characteristics of the product because of our role as the safety oversight agency in the transportation of hazardous materials.

Mr. SWALWELL. Would it be safe to say then that you did not intend to indicate any such difference?

Mr. BUTTERS. Our intent was to understand the product, the physical and chemical properties of the product in terms of its flammability, to ensure that it was being properly classified and categorized for transportation. If you look at the range of crude oils ranging from the very heavy to the very light, Bakken crude oil falls on the light side and therefore consistent with higher flammability ranges.

Mr. SWALWELL. And a Bakken crude oil on the light side, the light sweet crude, would be more volatile, correct, than a crude imported from Saudi Arabia or Venezuela categorized as a heavy crude?

Mr. BUTTERS. Well, that would have to be compared against its chemical and physical properties.

Mr. SWALWELL. Can you tell us how the chemical and physical properties can help us determine volatility?

Mr. BUTTERS. Certainly. In the case of the Bakken crude oil, it has a higher amount of dissolved gases, the C1's through C4's, for example. The flashpoint is lower, which is the temperature at which there is a higher propensity to ignite. The boiling point is lower, which is the point at which the liquid tends to vaporize. And all of that contributes to increased flammability.

Mr. SWALWELL. And is PHMSA in any way attempting to inhibit the development of Bakken crude or do you believe that it is solely focused on ensuring that when we develop and transport this domestic resource we do it as safely and as reasonably as possible?

Mr. BUTTERS. The latter. We—our responsibilities are to ensure that hazardous materials, no matter what form they are in, are properly classified and put in the proper container, properly communicated in accordance with the hazmat regulations.

Mr. SWALWELL. And Mr.—and thank you, Mr. Butters.

Mr. Smith, does DOE have any estimate on the size of this resource, meaning how long do you think Bakken crude will be around and explorable?

Mr. SMITH. Well, thank you for the question, Congressman.

So it is a very large resource. So our estimate is it is something over three billion barrels of crude resources, and that is indeed a

moving target because when you look at proven resources, the measure of proven resources is based on your economic and commercial ability to produce the formations. So it is safe to say it is a very, very large formation, it is a very large resource, and we think it is going to be an important part of our energy mix for years to come.

Mr. SWALWELL. Great, thank you. I yield back the balance of my time.

And if the Chairman has any further questions, I would be happy to yield to the Chairman for followup.

Chairwoman LUMMIS. I thank the gentleman and I will actually allow you to surrender that time and yield to Mr. Broun.

Mr. BROUN. Chairman, before we start my time and questioning, I would like to take a point of personal privilege just to make a statement, and that is that we can see now why did we invite technical scientific experts in the field instead of political witnesses?

Mr. Butters, your inability to provide us a clear answer to not only Chairman Lummis' questions but even my friend Mr. Swalwell's questions about this, you are not providing us straight answers, and that just reinforces what I said in my beginning statement.

So if I could have my time, I would appreciate it. That is the reason why I am so extremely disappointed in the Administration not providing technical witnesses.

Chairwoman LUMMIS. The Chair recognizes Mr. Broun.

Mr. BROUN. Thank you, Madam Chair. If you would start my time, thank you.

Mr. Butters, the PHMSA study claims that while Bakken crude "does not demonstrate the characteristics of a flammable gas, corrosive liquid, or toxic material, it is more volatile than other types of crude, which correlates to increased ignitability and flammability." Is the claim about ignitability and flammability a scientific assessment or are they synonymous with the term volatility, and if not, is the report projecting a false image of the properties of Bakken crude?

Mr. BUTTERS. If I understand—Congressman, if I understand your question, our analysis of the Bakken Shale crude oil clearly characterized this material as highly flammable due to its low flashpoint, low boiling point, vapor pressures.

Mr. BROUN. Well, we understand it is flammable—

Mr. BUTTERS. Yes.

Mr. BROUN. —but is ignitability and flammability synonymous with volatility?

Mr. BUTTERS. Well, volatility in the science vernacular is a material's propensity to vaporize, and so as a flammable liquid has a higher propensity to vaporize, then it introduces—it has a higher likelihood of ignitability because of the low pressure—

Mr. BROUN. Can you answer yes or no to this question? I don't get what these—

Mr. BUTTERS. Well, I am trying to answer the question.

Mr. BROUN. I have got limited time. I have got several questions.

Mr. BUTTERS. Okay.

Mr. BROUN. Okay. Obviously you can't answer it. Again, that just reiterates my disappointment.

Following up with you, Mr. Smith, according to your written testimony, "DOE believes that more scientific analysis is needed to better define the relationship between volatility and ignitability/flammability." This appears to contradict the PHMSA conclusion, what we heard this mumbo-jumbo from Mr. Butters. So just to be absolutely clear, is it fair to say that DOE's position is that volatility is not a sufficient indicator of a material's ignitability and flammability characteristics, and that this conclusion in the PHMSA report may be exaggerating the conclusiveness of volatility as it relates to other petroleum characteristics?

Mr. SMITH. Well, thank you for the question, Congressman.

So what I can speak to is DOE's experience and the research that we are doing and the science and the risk that has to do with moving these hydrocarbons. So I can—

Mr. BROUN. You all ask that there be more scientific analysis, that is correct?

Mr. SMITH. That is what we are undertaking.

Mr. BROUN. Okay.

Mr. SMITH. That is correct.

Mr. BROUN. And it is the discussion between the volatility versus the ignitability and flammability, you see that as two different issues from your own written statement, whereas Mr. Butters is saying they are basically one in the same—

Mr. SMITH. Well—

Mr. BROUN. —so you all contradict each other.

Mr. SMITH. I did not—

Mr. BROUN. Would you agree with that?

Mr. SMITH. I did not hear him say they are one in the same, but I can tell you what DOE's position is, which is generally consistent with the position coming out of PHMSA. Volatility, flammability, ignitability are different things. They are different characteristics. Volatility, as Mr. Butters explained, is the propensity of a material to vaporize, so that is your light ends coming out of the crude. Ignitability and flammability are properties of the material in terms of their propensity to ignite, to catch fire, or to burn, so—

Mr. BROUN. Well, water vaporizes, too, so it is not ignitable, so it is two different things here, is that—

Mr. SMITH. And—

Mr. BROUN. And that is what you all are saying but Mr. Butters is trying to equate them in my opinion. Let me ask you both this: Would you agree that gasoline and even more so ethanol is more volatile, particularly volatile and also has a greater flammability than does light crude? Would you both agree to that?

Mr. SMITH. Ethanol is—

Mr. BROUN. Yes or no? Ethanol more than light crude?

Mr. SMITH. Ethanol is a very well understood and consistent—

Mr. BROUN. Yes or no?

Mr. SMITH. I can't—

Mr. BROUN. Is it more volatile and more flammable than is light crude?

Mr. SMITH. I can't give you a yes or no answer to that question.

Mr. BROUN. Okay. Mr. Butters—

Mr. SMITH. I could explain the different between the two.

Mr. BROUN. —do you want to answer yes or no to this?

Mr. BUTTERS. That answer—a yes or no answer would not do the question justice, Mr. Congressman.

Mr. BROUN. Well, ethanol, it evaporates—if we were to pour out some ethanol on the desk right there, it would evaporate much quicker than light crude would, and if you set a match to it, it would be easier to set it on fire than it would be light crude no matter what kind of light crude, whether it is Bakken light crude. You all never answered Chairwoman Lummis' question because we really don't know. We need more scientific analysis.

The best way to transport all these things would be by pipeline, and this Administration has blocked pipeline production. And I am, as well as my Democratic colleagues are, very concerned about safety. I am a physician and to me it is tragic that this Administration is blocking the transportation of not only Bakken light crude but Canadian oil sands crude and any other crude. We need to have pipelines instead of—and transport these things in a very safe way.

Madam Chair, my time is run out. I yield back.

Chairwoman LUMMIS. The Chair now recognizes Mr. Maffei.

Mr. MAFFEI. Thank you, Madam Chair.

I am going to take this opportunity to do the rare thing of disagreeing with my friend from Georgia about these witnesses. And I don't know what—maybe I am misinterpreting what he is saying, but I feel—

Mr. BROUN. Would the gentleman yield—

Mr. MAFFEI. Well, let me tell you my disagreement first and then I am happy to yield.

So I—look, if you ask for specific witnesses and the Departments didn't give you those specific witnesses, that is fine. I don't see how it is a point of personal privilege, but that is something different.

But I will say this, the reason why these gentlemen are not able to answer your or the good Chairwoman's question are not because they are not qualified to answer them; it is because you are asking questions as if they are yes and no that don't have yes and no answers.

Now, we on the Science Committee have a bit of a responsibility I believe to at least respect the language that science uses, and science doesn't always have easy yes or no answers. If you want to go to the Committee on Oversight and—the full Committee on Oversight and question people about this email or that email being lost or something, that is when you can say yes or no, but you are actually—the gentlemen are frankly more in agreement I believe with the point of view that you are interested in getting, but because you are consistently badgering them by saying yes or no, yes or no, it is not going to lead to what you want.

And frankly, Mr.—Chairman Broun, using the term mumbo-jumbo to describe Mr. Butters' testimony I found offensive. He is here, he has, I thought, written very good and informed testimony, and I just—so I am taking this rare opportunity to say that. You and I don't disagree very often about the operations of this committee, but I really think that these two gentlemen deserve respect. For whatever reason they are the people from these—they are distinguished public servants from these particular agencies and they

are giving us good information to the best of their ability given the—what you are asking.

I am happy to yield.

Mr. BROUN. I thank the gentleman for yielding. The question was we invited scientific technical experts but the Administration refused to provide those to us. The witnesses we have are political experts, and the statement about mumbo-jumbo was basically geared towards—volatility is a scientific, measurable—as well as flammability are scientific, measurable issues, and what I was saying is that the answer I was getting was not based on science but it is because, as you say, they are doing the best they can and I do respect every—I apologize—

Mr. MAFFEI. Reclaiming my time, Mr. Butters, do you have any scientific qualifications? What is your background?

Mr. BUTTERS. My background is I have been in the emergency response business for well over 30 years, primarily in hazardous materials. I—as an operational officer with both Fairfax County and Fairfax City and as Chairman of the Hazardous Materials Committee for the International Association of Fire Chiefs. I have handled a number of hazardous materials incidents in the field. I understand how hazardous materials behave. I have had background training in hazardous materials chemistry. Am I a chemist by formal education? No. But I do have quite a bit of experience in this particular area and I have been managing—overseeing this Operation Safe Delivery since its inception. At the Department of Transportation I was specifically assigned this because of my background in this area, and—

Mr. MAFFEI. Thank you, Mr. Butters. I don't mean to interrupt you, but I will take the opportunity to thank you for your service and probably at personal risk to you at times during your career.

My point is simply that I am not sure if you are right, Mr. Broun. I acknowledge that when we asked for a particular witness, we should get a good reason for that—why that witness isn't coming forth from the Administration. But that said, I believe if these witnesses were—gave you even more scientific answers, you would be even more frustrated with them. You are asking for a comparison of volatility that both of you—but as far as I remember both of you asked for a comparison of volatility to all crude oils or to all light sweet crude oils, and they can't answer those questions because there are so many different variables. I, by the way, messed up in my opening statement. I defined volatility as something that I think is probably closer to flammability, and even that was probably a colloquial definition.

These are scientific issues and I just—I don't know, I implore that all of us should understand that the—when we are asking these questions that may have complex answers—you know, we are not on the campaign trail. We should allow the witnesses to give us that complex answer and—that you may be surprised that that answer actually comports fine. I mean my view on this is that it is going to be transported; sure, it is volatile but so is so many other things that we transport. It is just because of the increased volume that is being transported we need to look at the safety considerations, no more, no less.

I would—I am over time so thank you very much.

Chairwoman LUMMIS. The Chair now recognizes Mr. Cramer, the gentleman from North Dakota.

Mr. CRAMER. I thank the Chair and I thank the witnesses.

I want to also say I appreciate Secretary Moniz and Secretary Foxx, who have been very engaged with—at least with the North Dakota Delegation on this topic, and Administrator Quarterman as well.

And I wanted to focus a little bit—Mr. Butters, in your pre-filed testimony on page 7 you state that the focus on the Bakken region is because there was some question of whether materials were properly classified and characterized by shippers. Did you find any misclassified—obviously this would be an area of your expertise I suspect quite specifically, but find this classified material in the course of the research?

Mr. BUTTERS. Thank you, Congressman. Yes, we did. We did—as part of our inspections, we did find some shippers were using generic safety data sheets, MSDSs, as their tool for classifying this material. They were not analyzing the actual product that they were offering for transportation. And classification of the product correctly and accurately is critical to ensure that it is transported safely.

Mr. CRAMER. So I want—then I want to get to the packing group designation, which I think you speak to as well in your testimony. Why is light crude like Bakken or WTI—why is it—it is regulated under Packing Group 1—I think you testified to that—while ethanol, gasoline, and other flammables are—volatile Class 3 liquids are regulated under Packing Group number 2, which is less stringent is my understanding? Understanding these other Class 3 flammable liquids are being transported using the DOT 111's, how do we reconcile that with what we are seeing from the rules? So you have a less stringent fuel that is classified more dangerous or—more dangerous in my view if I understand this correctly being classified as less dangerous in terms of the packing class? Am I misreading this?

Mr. BUTTERS. Let me see if I can answer your question. Obviously, our safety regulations divide hazardous materials into 9 DOT classes. Bakken Shale oil is classified as a Class 3 flammable liquid. Within that class, as in all 9 classes, there are 3 packing groups. Packing Group 3 is considered the least hazardous, Packing Group 2, sort of median level—

Mr. CRAMER. Right.

Mr. BUTTERS. —and Packing Group 1 is considered the highest hazard of a—for material. So the Bakken crude oil, because of its flammability, has been determined to be a Packing Group 1 material.

Mr. CRAMER. So—and as I understand this, ethanol Packing Group 2 then?

Mr. BUTTERS. Yes.

Mr. CRAMER. So I want to get then to Chairman Broun's illustration and realize maybe you can't answer it from a compound standpoint, so let me ask it from a layman's standpoint. If I had a 1 gallon container of ethanol and a 1 gallon container of sweet light crude—let's call it Bakken today—and I drop a match in each one, which one is going to ignite?

Mr. BUTTERS. Well, they will both ignite. They both have flammable—flammability characteristics that they will ignite. I mean I—it is hard to say under the scenario you are describing but they both—both products have flammability—you know, flammability ranges that will support combustion—

Mr. CRAMER. But if one is a number 1 and one is a number 2, it seems that the number 1, which in this case is light crude, would be more flammable, more ignitable than the other unless there is something that I am not understanding. Is there some dynamic beyond that that I am not understanding? Because from a layman's standpoint it is hard to believe that light sweet crude is more ignitable then refined petroleum product like ethanol or gasoline.

Mr. BUTTERS. Well, again, it is based on its flashpoint and boiling point, and that determines which packing group the flammable liquid is assigned to under our regulations.

Mr. CRAMER. So an equal flame dropped in the two containers, they would respond roughly the same or differently?

Mr. BUTTERS. They would both ignite is—if that is—

Mr. CRAMER. Okay. And then I want to go with one other thing before I run out of time. Do you guys worry—you mentioned in your testimony that more study is necessary and we talked about a specific focus on Bakken sweet crude. Are there plans to broaden the study considering all the plays that might be out there and all the potential there might be for a lot more of this product to be moved by rail?

Mr. BUTTERS. Well, we are going to continue our sampling this year and then we will continue to look at the need for additional sampling as we go forward.

One point I would want to mention about the difference between the Bakken Shale oil and ethanol, ethanol is a refined product—

Mr. CRAMER. Um-hum.

Mr. BUTTERS. —unlike the Bakken oil, which is essentially a raw product that comes right out of the ground and essentially may go through—some goes through a heated treated process to remove some of the gas content, but it is transported in a very raw form, so that is important to understand in terms of how the product is treated for classification.

Mr. CRAMER. Sure, but we are talking—yes, I understand that, but if we are talking about flammability, what happens, I don't know that—beforehand that doesn't matter but I am way over time. Thank you.

Chairwoman LUMMIS. The Chair recognizes the gentleman from Texas, Mr. Veasey, for five minutes.

Mr. VEASEY. Thank you, Madam Chair.

I wanted to ask Mr. Smith just to help us understand and give me a better understanding of the difference between these psi readings because I was reading an article that said that in the Bakken there were vapor pressure readings of over 8 psi and sometimes those readings reached as high as 9.7 psi. Now, when you compare that to—according to this pipeline data, the Louisiana light sweet crude had a vapor pressure reading of 3.33 psi. How significant of a difference is that when we talk about volatility?

Mr. SMITH. Thank you, Congressman, for the question.

So when you look at these psi ratings, that is a measure of vapor pressure for the various types of crude. So the vapor pressure is a measure of the light ends that is included in the crudes, be it ethane, propane, butane. So light crudes generally have a psi rating, you know, somewhere around 10. The higher the rating, the more ethane, butane, propane will be in the crude. So when you look at those statistics, and I am not sure exactly where the ones that you cite are from but I can say directionally a higher psi rating will just include—will indicate that there is a greater content of the lighter ends within the crude.

Mr. VEASEY. Okay. The—also from this same article, this study that I am looking at, it says that Tesoro Corporation, which is a major transport of the Bakken crude to the West Coast, said that it regularly received shipments from the Bakken with psi readings sometimes up to 12 psi. Now, was it—would that be an unusually high reading?

Mr. SMITH. We would expect Bakken crudes to have vapor pressure readings from, say, 10 to 14—

Mr. VEASEY. 10 to 14, okay.

Mr. SMITH. —in that general range, so that would be fairly consistent for a crude coming from that part of the country.

Mr. VEASEY. Okay. Mr. Butters, I wanted to ask you, I know that the Chief of Staff for the Department of Transportation has said that it was really imperative that the petroleum industry and other stakeholders work with DOT to share data so you can make assessments as far as, you know, safety is concerned. Is that data-sharing—I mean that was from a quote from your Chief of Staff earlier this year. Are you getting the sort of cooperation you need to ensure public safety?

Mr. BUTTERS. Yes, we have been—the industry has been forthcoming in sharing the data that they have compiled, both the North Dakota Petroleum Council, the Association of Fuel Marketing, which represents the refiners, did some analysis. They shared that data with us. And individual companies have also shared their analysis with us as well.

Mr. VEASEY. Oh, well—yes, that is good. That is good. So I just wanted to close and ask you this—and I will yield back the time, depending on when you when you finish, to the Chairwoman—just from a public safety standpoint, from a pure public safety standpoint, is it better to ship this stuff by rail or by pipeline?

Mr. BUTTERS. Our role as the transportation safety agency is to ensure that any hazardous material, regardless of mode, is properly classified so it safely moves through that mode of transportation. There is a number of factors that can—that factor into which mode is selected, but again, our role is really to ensure that if it is moving in transportation, that it is properly classified and properly contained in the package that it is moving in to maximize safety.

Mr. VEASEY. Thank you, Mr. Butters. And, Madam Chair, if you don't mind, I would like to yield the remaining 45 seconds to Mr. Maffei, please.

Chairwoman LUMMIS. Mr. Maffei.

Mr. MAFFEI. I only have one quick question, but I think what we are all trying to get at is the same thing, which is this stuff more—

forgetting the word flammable, volatile—is it more dangerous? And of course it is hard because there are so many different kinds of light crude. But let me ask it this way. Assuming comparable safety precautions, Mr. Butters, would you be more concerned about a trainload full of Bakken crude oil or a trainload full of light crude oil from—imported? Would it be more—no, I am talking about light in both cases.

Mr. BUTTERS. Well, I guess I would need to understand again the flammability of both products. I mean if we are talking about everything being equal, that both products you are describing are—

Mr. MAFFEI. So the problem is you don't know what kind of light sweet crude it is—would be that I am comparing it to I would imagine but-

Mr. BUTTERS. Well, that is right. I mean you would need to know the chemical and physical characteristics—

Mr. BROUN. Why don't you just assume Bakken versus Bakken?

Mr. BUTTERS. Yeah.

Mr. MAFFEI. So same, Mr. Smith. Is there—there is nothing about this that makes it particularly more dangerous than other kinds of light sweet crude; it is just it depends on the particularities of both, is that right?

Mr. SMITH. I think that is an appropriate characterization.

The one thing I would say to that is that when—so again, we are not the rule makers so we work with the Department of Transportation in making the rule, but when we think about the risk of complex systems, be they the Deepwater Horizon offshore or issues with other unconventional oil and gas production, it is a systemic question. So the concern that we would have when we look at this is the fact that you have gone from 70,000 barrels per day of being moved by rail to 700,000 barrels being moved per day. It is up—it is an order of magnitude of 10, and so that is where the risk comes in and that is where—

Mr. MAFFEI. I am out of time and I don't want to impose on the Committee. But, yeah—no—but everything else being equal, that is the thing so—

Mr. SMITH. Yeah, but—

Mr. MAFFEI. —but we will explore the volume part later.

Mr. SMITH. If I might add that that is an important factor. If you describe risk as probability times consequence, this material as a flammable liquid has significant consequences, as this photograph from Castleton indicates. The more volume that moves, that probability also goes up, so risk goes up, and that is really why we have focused on ensuring that this product is transported safely.

Chairwoman LUMMIS. I assume you yield back?

Mr. MAFFEI. Oh, yeah, yeah. I am way out of time. I apologize, Madam Chair.

Chairwoman LUMMIS. Thank you. And I do appreciate your efforts at trying to get to the heart of this. I don't know why we are—yeah, I don't know why we are struggling so, but the Chair—perhaps Mr. Johnson can help us. The gentleman from Ohio is recognized.

Mr. JOHNSON. Well, we will see, Madam Chairman. Thank you.

Mr. Smith, I appreciated your phone call a few weeks ago, months ago about the newly revamped LNG export decision-mak-

ing process that your office recently implemented whereby you are electing not to consider export authorization applications until individual projects had completed their environmental reviews. Currently two major export projects in Texas and Louisiana that completed their environmental reviews months ago are still waiting on final authorizations from DOE. So how have you actually streamlined your process if these two major projects continue to suffer under these undue administrative delays? Because as I recall our conversation, we talked about a decision forthcoming within weeks, not months, and certainly not years. So help me out.

Mr. SMITH. Well, thank you for the question, Congressman. First of all, the new process ensures that instead of walking down some predetermined queue of projects, we are now considering those projects on a case-by-case basis once they are ready to be considered by the Department, which means they have finished all of their process—

Mr. JOHNSON. Okay. These two have, so what happened?

Mr. SMITH. So the next project in the queue is Cameron, which has recently finished the Notice for Rehearing at FERC. Once the project is finished the Notice for Rehearing, then it is eligible to be considered by the Department. So that project has not been waiting in the queue for months. It actually very recently finished that process, and we are right now going through the possibly—evaluating that project for consideration so—

Mr. JOHNSON. Do you have any idea on the timeline for it?

Mr. SMITH. I can't give a commitment on timing but what I can say is the Department is committed to moving as expeditiously as possible and we are moving through that process—

Mr. JOHNSON. But you are still committed to weeks, not months, as you talked to me about, correct?

Mr. SMITH. Each project is going to be different but certainly we think that the pace for doing these projects should be consistent with the pace that we have had in past projects, which has been on the order of weeks.

Mr. JOHNSON. What about Freeport?

Mr. SMITH. Indeed. So as these projects are ready to be considered, they will be considered in due course—

Mr. JOHNSON. Are they ready?

Mr. SMITH. Freeport is still passing through that process right now, but again, once they are finished with the rehearing, once they are done with the FERC process—

Mr. JOHNSON. So they are not done as far as you are—as far as you know?

Mr. SMITH. My understanding is that the Cameron project is finished with the rehearing and I am not sure off the top of my head about whether or not the Freeport project—

Mr. JOHNSON. Okay. We—it was our—it was my understanding that they were both completed with that process and had been waiting for—had been finished months ago and were now waiting on DOE authorization. So we have got differing things so I might reach out your office and let's compare notes and see what we have got.

Mr. SMITH. We would be happy to follow up—I will follow up on that.

Mr. JOHNSON. Also, in your prepared testimony you say that DOE believes that more scientific analysis is needed to better define the relationship between volatility and ignitability and flammability. So, Mr. Smith, did DOE review the methodology used by PHMSA to arrive at the conclusion that increased volatility correlates with increased ignitability and flammability?

Mr. SMITH. Well, thank you for the question. So we have an ongoing discussion with PHMSA, so our view on volatility, ignitability, and flammability, again, those are different properties of any material. We think that in a laboratory setting for crude oil, higher volatility is going to be consistent with higher light ends, which do have a higher degree of flammability and volatility. When you are actually looking at a very complex system like a railcar overturning within a containment system that may or may not have the crude contained, which may or may not have pressure regulation devices, et cetera, that is a much more complex question that has—that is worthy of a lot more study.

So to say categorically that over all cases that volatility is correlated with ignitability and flammability is probably further than we can demonstrate through our scientific studies, but we know in a laboratory setting when you know that the vapor—the material that is being vaporized is flammable, in a laboratory setting, again, there would be a correlation.

Mr. JOHNSON. Okay. Well, quickly because I am almost out of time, can you provide expected benchmarks to this committee explaining what DOE intends to learn about the characteristics and behavior of Bakken petroleum?

Mr. SMITH. So we are going through the Statement of Work right now for this study. This is a new area of research for the Department. It is worth noting that the rate at which tight oil has increased production recently has been very dramatic. This is a new issue for us in terms of detailed study of having these crudes by rail. So we are going through right now that Statement of Work, which essentially is going to be able to allow us to offer more precise questions to the question you just asked, which is in the real world with a real railcar with a real derailment with a real fire, what would be the relationship between vapor pressure, volatility, ignitability, flammability? Those are some things that we haven't done again in real practical applications so we need to move from the lab to kind of the real-world laboratory of real railcars. So those are the types of questions that we will be able to answer and our Statement of Work will make that much more clear as we develop it.

Mr. JOHNSON. Okay. All right. Thank you.

Madam Chairman, I yield back.

Chairwoman LUMMIS. The Chair now recognizes the gentleman from Texas, Mr. Weber.

Mr. WEBER. So that was an interesting exchange talking about the railcars overturning, and of course you know, my grandfather used to say that to a hammer everything looks like a nail, and I guess to a match everything looks like it is ignitable. So if a railcar overturns, what it really needs is an ignition source. Is that true, Mr. Smith?

Mr. SMITH. If there is going to be a fire, there has to be an ignition source.

Mr. WEBER. It has got to have an ignition source?

Mr. SMITH. That is correct.

Mr. WEBER. Mr. Butters, you mentioned earlier that PHMSA went out and collected crude oil samples and I think you said they got them from the tanks around and about presumably in North Dakota?

Mr. BUTTERS. Congressman, we drew samples from a number of different sources.

Mr. WEBER. Well, we are talking about the Bakken Shale.

Mr. BUTTERS. Right, but I am—we drew samples from tanks, from railcars, from different—

Mr. WEBER. Okay.

Mr. BUTTERS. —points in the transportation process. But—

Mr. WEBER. So you have had quite a bit of discussion about the hydrates that are located—the ethanes, the butanes, the propanes, and those types of liquids that are involved in that shale oil and the fact that it is lighter and sweeter?

Mr. BUTTERS. Right, the isomers that are—

Mr. WEBER. That is right. So—and I want to—Freon changes state twice in the system from a liquid to a gas and back to a liquid so I am familiar with the boiling off and the vaporization point. So is it safer for pipelines? There is a number of facilities that will take that crude and dehydrate it at various different places, assuming they can get the permit from the DOE and from the government. But the quicker they dehydrate that oil, the safer it is?

Mr. BUTTERS. Well, again, our role in this process is to ensure that any—

Mr. WEBER. Let me rephrase the question. Less ethanes, less butanes, less propanes in crude oil, less volatility?

Mr. BUTTERS. If you are reducing the flammable constituencies of a product, then, yes, it becomes-

Mr. WEBER. Okay. We finally got a yes. So we would think that any pipeline situation—and you may probably know that the pipeline history has a 99.9 percent safety rating. Were you aware of that?

Mr. BUTTERS. Both pipeline and rail are a very safe mode of transportation.

Mr. WEBER. But rail does not have the same rating as a pipeline, are you aware of that?

Mr. BUTTERS. I am very familiar with the transportation of hazardous materials by rail, pipeline, and other methods.

Mr. WEBER. Okay. And they do not have the same rating, is that true, in safety?

Mr. BUTTERS. Depending on the product that is moved—

Mr. WEBER. Okay. Well, let me—

Mr. BUTTERS. —the pipeline and—

Mr. WEBER. I am glad I could be here today if for no other reason than to help you. They don't. Okay. Pipelines are the safest. So with that in mind, pipeline would be the best way to move this product with a higher safety rating and less hydrates, agree?

Mr. BUTTERS. Again, PHMSA and DOT's role in this is to ensure—

Mr. WEBER. Okay. Let me move on.

Mr. BUTTERS. —that any product moving in transportation-

Mr. WEBER. Let me move on. When PHMSA went out and took those samples, and again my question was did they have less hydrates or more hydrates in them, but when PHMSA went out and took those samples, how did you get—how did the PHMSA employees get there? Did they drive?

Mr. BUTTERS. Did they—well, they went to the jobsites. Is that what your—the question?

Mr. WEBER. No, how did they get to those jobsites? Did they drive vehicles?

Mr. BUTTERS. Yes, they did.

Mr. WEBER. Did they have gasoline in those vehicles?

Mr. BUTTERS. Yes.

Mr. WEBER. Did they know the volatility ratings of that gasoline?

Mr. BUTTERS. Do I know the volatility of-

Mr. WEBER. I—

Mr. BUTTERS. —refined gasoline?

Mr. WEBER. I asked you first.

Mr. BUTTERS. I don't have that specific data in front of me but—

Mr. WEBER. Okay. Were you all concerned about that volatility when the—were you concerned about the employees' safety driving that vehicle with gasoline in it with the high volatility rate?

Mr. BUTTERS. Well, keeping in mind that the risk that we are addressing is the volume of the product that is moving through transportation. A 20-gallon gasoline tank on a vehicle doesn't pose the same degree of risk as a 105-car train with 20,000 gallons of product—

Mr. WEBER. You are making my argument for me. So now we can come back full circle and say that a pipeline is a safer way of moving that than a train.

Mr. BUTTERS. The question—Congressman, the question you asked is if a vehicle carrying gasoline is riskier than a train.

Mr. WEBER. And—

Mr. BUTTERS. That was the question.

Mr. WEBER. So you can compare those two risks and now you would also have to say that a pipeline with a 99.9 percent safety rating would be safer than a train. Do you know of any people in Canada, the 40 or so that was killed by rail accident here a year or so back? Do you know of any that will kill like that by pipeline with Bakken shale oil? Answer, no. So one could deduct at least in the short term that it is safer.

Madam Chair, I yield back.

Chairwoman LUMMIS. All right. The gentleman yields back.

The Chair recognizes the gentleman from Oklahoma, Mr. Bridenstine.

Mr. BRIDENSTINE. Thank you, Madam Chair.

I just wanted to ask a question about the thickness of the walls of the tank where your proposed rule is moving from 7/16 of an inch up to 9/16 of an inch. Do you have any analysis on the economic impact or what that is going to cost the industry to move from 7/16 to 9/16 of an inch?

Mr. BUTTERS. Thank you for that question, Congressman. Because the rulemaking is currently in the process, I can't really re-

spond to those specific types of questions. The rulemaking does address the issue of tank car thickness in terms of a number of different options, so we are looking forward to the comment period closing at the end of September so we can evaluate the next step in terms of that rulemaking.

Mr. BRIDENSTINE. So when you get that comment period, are you going to take it seriously?

Mr. BUTTERS. Of course.

Mr. BRIDENSTINE. Because yesterday I met with the American Fuel and Petrochemical Manufacturers. They said that they studied over 1,000 samples of Bakken crude and analyzed the data on your behalf at your request. The data points to Bakken crude were similar in characteristic to light crude extracted from other plays into the United States and the risks associated are fundamentally the same as well according to their study. And again, they spent their own money, their own time, their own effort developing thousands of samples that they tested.

Your proposed rule regarding oil by rail proceeded to ignore those findings and the science behind it and claims Bakken crude specifically to be inherently more dangerous. Can you see why people would look at this and think it is, you know, agenda-driven? Do you see why—like if you are requesting the information and then you are ignoring the information and going ahead with rules that don't take into account the science that they provided, do you see why some folks—my constituents, for example—might perceive it to be agenda-driven?

Mr. BUTTERS. Well, I will—I would say this, is that as part of the comment period for this rulemaking, which includes—again, this is a comprehensive approach to rail safety. It addresses prevention and, quite frankly, I think that is what—where the priority needs to be is preventing these incidents from occurring in the first place, so addressing prevention, mitigation, which is—addresses the safety and the strength of the railcar that is used to carry this product, as well as emergency preparedness and response. And it is part of—we welcome comments and input from the industry in terms of the products that will be carried in these cars and what those specifications need to be.

Mr. BRIDENSTINE. So when we move potentially from 7/16 of an inch to 9/16 of an inch, do you have any assessments on how much time that requirement might take?

Mr. BUTTERS. How much time?

Mr. BRIDENSTINE. Yeah, is it going to be one year, two year, three year, four year. When—how long are they going to have to make that transition?

Mr. BUTTERS. Well, that is part of our seeking comments from the industry, from the public, from anyone, and what—

Mr. BRIDENSTINE. So right now you are open. You haven't put a time on it as 3 years?

Mr. BUTTERS. We had—there is a number of proposals in the proposed rule that address time frame, and part of the—our desire is to hear back and get comment from those regulated entities and others that are affected by this proposed rule as to what the impact will be.

Mr. BRIDENSTINE. Apart from the costs associated with the tank cars, are you considering any modifications to the rail itself?

Mr. BUTTERS. Rail integrity is part of that proposed rule as well.

Mr. BRIDENSTINE. And as all of these costs are added up, do you see how this is going to increase the cost of energy for my constituents?

Mr. BUTTERS. As part of any rulemaking, Congressman, we—agencies are required to go through a cost-benefit analysis of any proposed rule. That is—was part of the process that was done for this Notice of Proposed Rule as well and we will continue to look for—ask for comments on cost impact of the proposed regulation.

Mr. BRIDENSTINE. Okay. One specific cost impact that I think is important—and I am running out of time here—is the impact on crude transportation out of North Dakota. Specifically, that is what I am interested in, the cost of crude coming out of North Dakota.

And with that, Madam Chair, I will yield back.

Mr. BROUN. [Presiding] Thank you.

Mr. BRIDENSTINE. I apologize for calling you Madam Chair. You were a Madam until just a few minutes ago.

Mr. BROUN. No, sir, I have never been a Madam or anywhere close, but thank you. My Navy colleague, my sailor colleague, I appreciate that.

I have got a unanimous consent request that we allow Mr. Rohrabacher to participate as if he is a member and ask unanimous consent request that we allow him to ask questions for five minutes.

Mr. SWALWELL. No objection.

Mr. BROUN. Okay. Having said that, Mr. Rohrabacher—

Mr. SWALWELL. I am sure I say that at my own peril though.

Mr. ROHRABACHER. Thank you very much, Mr. Chairman, and thank you to the Ranking Member as well for permitting me the opportunity to participate. I was here a little late and I didn't catch every detail of what you were announcing today, but we are—how do you say? It is very clear that people on this side of the aisle at least are very—not skeptical but we are hesitant to just accept that this Administration is moving forward in an open manner in discussing what and why they are trying to do. Frankly, it is—most of us believe and—on the side of the aisle that social engineering goals are being accomplished by this Administration by using regulatory powers that government has been given, and that is not what those regulatory powers were all about.

Now, in this case we have—you know, there is—you know, we have heard in the past with a—that people in other industries talk about foot-dragging and harassment, of producers' double standards of enforcement, for example, by different regulatory units on things that just don't go along with the basic goals of what the Administration wants to accomplish in their social and economic agenda.

I won't have to say, and I don't say this in a hateful, mean way, but Mr. Butters, your inability to what seems to me—I am setting off to the side. Your inability to answer directly these questions, will you confirm for us that there is game-playing going on and that you just won't answer anything that in any way could reflect badly on this whole idea of that—of what your agency is trying to

do because the agency may be involved in a play based on global warming theory trying to again suppress the usage and use and availability of fossil fuels and letting that be in the background forcing situations and forcing people like you to have to go through those verbal acrobatics not to answer a question? Please feel free to comment on it. And I am not impugning your integrity.

Mr. BUTTERS. I understand that and I appreciate your comments, Congressman.

DOT and PHMSA is a safety agency. That is our role. Energy and hazardous materials are critical to this nation's economy. I mentioned that. We strongly support that and we believe that, but our role is to ensure that this energy is moving safely through transportation. These crude oil lines that carry these large volume of flammable crude oil, which this material is, we need to ensure that it moves and gets to its destination without incident. That is our role and we are going to—want to address the risks associated with that and that is what we are doing and to better understand this material so it is properly classified that-

Mr. ROHRABACHER. Okay. Well, let me accept that that is what the stated goal is. And again, what makes us weary of having that used as perhaps a fãcade to obtain what we clearly have as a goal of this Administration, which is to reduce America's use of fossil fuel, even though it is now being presented to us as something about safety, let me ask you this: As compared to the loss of life and lack of safety in obtaining oil from offshore oil sources or the loss of life or lack of safety in coal-fired plants, the digging of coal and how to—coal plants and the transportation of coal, nuclear power—have there ever been any deaths caused from nuclear power? Is there any risk of nuclear power? And of course what about tanker-delivered oil from overseas?

Now, when you compare all of those to the amount of risk that could be—that we could face from getting our oil domestically from the—from North Dakota, why did you pick North Dakota to focus on your time and effort and resources on rather than all of these others? Aren't these others more dangerous than what has been going on in North Dakota?

Mr. BUTTERS. Well, first off, I am going to defer the first part of your question to my colleague Mr. Smith from DOE. He is probably in a better position to respond to that.

But again, to just reinforce the role of DOT in this arena is to ensure the transportation of energy and hazardous materials is done in a safe manner. There are a wide range of systems out there, of movements, and they all have a different level of risk.

The Bakken Shale oil issue, the reason that PHMSA and DOT is focused on it is because of the volume of product that is moving out of that area by rail. The incidents in—that have occurred and Castleton, North Dakota; Lac-Mégantic in Québec; Aliceville, Alabama; most recently in Lynchburg, Virginia, I went down to the incident scene on that derailment. This material poses a risk and we want to make sure that it moves safely. We are not trying to restrict the movement. We want to make sure it moves safely. That is our role.

Mr. BROUN. The gentleman's time is expired. I appreciate the colleagues in allowing Mr. Rohrabacher to speak.

And I will now ask unanimous consent to recognize Mr. Cramer for two additional minutes, realizing that—and this will be our last question of you guys. We have got votes in about 40, 45 minutes, so we are going to have to go to the second panel.

Very quickly, Mr. Cramer, you are recognized.

Mr. CRAMER. Thank you.

Mr. BROUN. Unless I hear objection. No objection?

Mr. CRAMER. Thank you, Mr. Swalwell and Mr. Chairman.

We have been talking about the issue but we haven't really talked about the two specific reports or at least named them. Of course there is the PHMSA report we referenced, but in a little bit we are going to have the second panel and we are going to have somebody from Turner Mason, and I just wanted to get some sort of a general statement from one or both of you. Did you see anything in the Turner Mason report that you found disagreement with or—because I know you relied on it. I have seen comments from time to time. But I am really interested frankly in reconciling if there are any differences and certainly in highlighting consistencies between the two, so if I could just get each of you to give a short comment on the Turner Mason report and your assessment of it.

Mr. SMITH. Well, thank you for the question, Congressman.

So I think it highlights that there are some uncertainties here. I mean this is an area of new study. When you go from 70,000 barrels per day to 700,000 barrels a day, you are in new waters in terms of risk and understanding the risks around complex systems. So PHMSA's job is to make sure that these things are moved by rail safely and there isn't a tremendous amount of research and development on the very complex question of the relationship between volatility, vapor pressure, ignitability, and flammability into the real world in which you have crude actually traveling in cars.

I think that is probably what these different studies highlight is that there are things that we know, things that we understand about the chemical compositions of these different types of crude. But there are some practical matters that we don't understand yet because we simply haven't had the necessity to do that research and development until now. So that is what the DOE brought out.

Mr. CRAMER. Thank you, Mr. Smith. Mr. Butters, just in the remaining seconds?

Mr. BUTTERS. Certainly. In our review of those studies, their data is consistent with ours in terms of the flammability of this product and the need to ensure that it is again packaged properly, it is communicated properly before it is offered for transportation. It is a flammable—highly flammable liquid and their data that they published is generally consistent with the data that we have found as well.

Mr. CRAMER. Thank you. I yield back.

Mr. BROUN. I want to thank the witnesses for you all's testimony here today and I thank the members for your questions. The members of this committee may have additional questions of you two guys and we ask that you respond to those questions in writing, and please do it so very expeditiously. The record will remain open for a very short period of time, so if you all would respond. And

if you want to flesh out anymore of the answers that you already gave to the oral questions, I encourage you to do so.

The witnesses are excused and I now call up the second panel of witnesses. And while we are doing so, I just want to tell my friend Dan Maffei that I was frustrated with the lack of answers and the words I utilized to indicate the filibustering and maybe I should have used that word better. I certainly didn't want to cause any hard feelings. But the thing is, we did ask for scientific technical witnesses and we were sent political witnesses by the Administration. And we could have, I think, had good answers from a scientific perspective. So if the second panel will please take your—

Mr. MAFFEI. Would the Chairman yield?

Mr. BROUN. Certainly.

Mr. MAFFEI. Just in response. Yeah—no, look, first of all, as I just mentioned, I do believe that that the Chairman, if your—if the Administration is not supplying the witnesses that you request, should inform you exactly why they are not and why some other witness would be more qualified. I fully respect that. And all I was really trying to do was just make sure that at least in my view that these two witnesses were, you know, providing good information to the best of their ability and were not trying to avoid the question in my view again. So that is all I was interested in.

Mr. BROUN. Well, I would agree with my colleague. I think they were trying to but the problem is that the Administration didn't supply us proper witnesses to answer scientific question. Just from a scientific perspective, we can measure volatility. They couldn't answer that question. We can scientifically measure flammability and those types of things and they were just not prepared because they just didn't have that expertise and the Administration refused to give us the proper witnesses.

Now it is time to introduce our second panel of witnesses. First is Ms. Kari Cutting, Vice President of the North Dakota Petroleum Council. Ms. Cutting brings over 30 years of experience in the North Dakota energy industry, and looking at her, she started very young at that—in that perspective. Previously, she has served as a Project Logistics Manager at the Dakota Gasification Company. The North Dakota Petroleum Council promotes environmentally responsible oil exploration and development, and we are all, on Republican as well as the Democrat side, believe that we have got to be good stewards of our environment. And you all audit and respond to oil and natural gas development impacts.

Our second witness is Mr. John Auers, Executive Vice President at Turner, Mason & Company, an international energy consulting firm. Mr. Auers leads assignments in the area of refining economics and planning, modeling, downstream asset valuation, crude oil valuation, and capital investment and strategic planning. Previously, he worked with Exxon Corporation.

And our final witness today is Mark—you want to pronounce it for me, please?

Mr. ZOANETTI. Zoanetti.

Mr. BROUN. Zoanetti, okay. Zoanetti. My family can't spell or pronounce this Broun but it is spelled with a U. So Zoanetti, Deputy Chief of Special Operations, Syracuse Fire Department. His current role—in his current role Mr. Zoanetti is responsible for

oversight at the—of the hazmat airport and the urban search and rescue components of the fire department. Mr. Zoanetti has been a member of the Syracuse Fire Department for 29 years. He has received certification as a hazardous materials technician, as well as other state and federal training courses and hazardous materials. Mr. Zoanetti is also the Deputy Coordinator for the—you want to tell me what county? I don't know how to pronounce that, too, so—

Mr. ZOANETTI. Onondaga.

Mr. BROUN. Say—

Mr. ZOANETTI. Onondaga.

Mr. BROUN. Onondaga, okay, County Department of Energy Management.

As our witnesses should know, spoken testimony is limited to five minutes each, after which members of the committee have five minutes each to ask questions. Your written testimony will be included in the record of the hearing.

Now, please, we have votes probably in 30 minutes now, 35 minutes, so if you can chop down to the time that you gave your oral testimony, and, Members, let's try to keep our questions as concise as we can so that we can get through this before votes.

It is the practice of Subcommittee on Oversight, which I chair, to receive testimony under oath. If you all would now please stand and raise your right hand.

Do you solemnly swear or affirm to tell the whole truth and nothing but the truth, so help you God?

Zoanetti? Okay. I didn't hear you Mr. Zoanetti. Please be seated.

Let the record reflect that all the witnesses participating have taken the oath.

I now recognize our first witness, Ms. Cutting, for five minutes.

TESTIMONY OF MS. KARI CUTTING,
VICE PRESIDENT,
NORTH DAKOTA PETROLEUM COUNCIL

Ms. CUTTING. Chairman Broun, Ranking Members Swalwell and Maffei, thank you for the opportunity to testify today on Bakken petroleum, a substance of energy independence.

The North Dakota Petroleum Council represents over 530 companies engaged in all aspects of oil and gas activity in North Dakota, South Dakota, and the Rocky Mount region. NDPC members produce 98 percent of all oil and gas in North Dakota.

The State of North Dakota is one of the only States with a multi-resource comprehensive energy policy. North Dakota is proactive and aggressive in addressing energy development and serves as a model for America in fostering innovation and long-term energy development to meet our nation's growing demand and need for energy security in an environmentally responsible manner.

North Dakota is now the second-largest oil-producing State in the Nation, reaching 1 million barrels of daily production in a 2014, up from 100,000 barrels in 2007. The industry has almost 11,000 producing oil wells, employs tens of thousands of direct and indirect jobs, has a $30 billion economic impact, and contributes $11 million per day to our state and political subdivision and oil reduction taxes.

The States of Texas and North Dakota combined produce nearly half of the crude oil produced in the United States and increased domestic production has helped stabilize energy prices despite turmoil overseas. In fact, this new domestic energy production has reduced imports by 4.4 million barrels per day since 2005. Imports from Saudi Arabia are down 25.3 percent while imports from Venezuela are down 47.8 percent. Because of shale oil and gas, North American energy security is now achievable and North Dakota is very proud of its role in this progress.

Although North Dakota oil and gas production has grown substantially in recent years, pipeline capacity to key markets has not, requiring 59 percent of the Bakken crude to be hauled via rail in June. Since the increase of crude being transported by rail, there have been eight railway incidences involving crude oil that have raised questions as to the chemical characteristics of Bakken crude, how it compares with other flammable liquids under U.S. Department of Transportation regulation, and whether it can be safely transported across North America under the current regulatory environment as enforced by the Pipeline and Hazardous Materials Safety Administration.

Three independent studies have now shown that Bakken crude is similar to other North American light sweet crude oils in gravity, vapor pressure, flashpoint, and initial boiling point, which are the key parameters in proper classification. According to these studies, Bakken crude oil chemical properties attest to its proper classification as a Class 3 flammable liquid. This category contains most of the valuable fuels and fuel feed stocks offered for transportation in the United States.

One of the studies was commissioned by the North Dakota Petroleum Council to answer questions raised about the chemical properties and transportation safety of Bakken crude oil. The study included a comprehensive and—comprehensive sampling and analysis plan and was conducted by Turner, Mason & Company, an internationally known and recognized group of engineering consultants with extensive crude oil expertise, at a significant cost.

The oil and gas industry in North Dakota has a very strong safety culture focused on zero incidences. All incidences large and small generate a safety investigation to determine the root cause of the safety incident. Procedural changes or additional safety measures are implemented to mitigate the root cause and prevent a recurrence of a similar incident. This is true whether the incident occurs during a drilling, completions, reduction, or transportation aspects of the industry's activities. Commissioning of the Turner Mason study is an example of the industry's desire to investigate safety incidences.

The Turner, Mason & Company study was designed to provide scientific answers to address the growing perception that light crude oil is more hazardous than other flammable liquid or hazardous materials being transported in the United States. The results of the study do not support the speculation that Bakken crude in particular is more volatile than other crude oils or other flammable liquids.

There are nine classes of hazardous materials transported by truck, rail, ship, and cargo air in the United States. Material from

all nine hazardous materials classes are transported safely every day in this country millions of times a year. Those who offer hazardous materials for shipment must be certified and are required to properly classify the material being offered for transportation.

All classes of hazardous materials transported by rail arrived safely at destination greater than 99.997 percent of the time. The efforts of all stakeholders, including PHMSA, the oil and gas industry, tank car builders and owners, the railroads, and the State of North Dakota are focused on affecting an incremental safety improvement for the remaining 0.003 percent incidences.

In conclusion, safety always has and continues to be a core value of the oil and gas industry. The NDPC and its members believe rail safety improvements must be developed using a holistic, comprehensive, and systematic approach that examines prevention, mitigation, and response. Safety solutions must be data-driven and produce measurable improvements to safety without creating new risks or inadvertently shifting the risks to other businesses or operations. To achieve this, collaboration is needed among government, shippers, railroads, and tank car builders.

All stakeholders recognize the important of implementing additional safety measures to reduce the probability of the remaining 0.003 percent. Efforts to improve safety of the rail car, routing analysis, infrastructure inspection and enhancements, as well as additional training and information for emergency management personnel, are all efforts being addressed. The oil and gas industry, it partnership with the railroads, is working to develop a common educational tool to be distributed broadly to fire departments either through web portal or DVDs. This information will also be available for companies to use in continued interaction with fire departments and other EMS personnel. Rail and oil industries in many States have worked collaboratively on drills and exercises, development of additional response resources, and periodic meeting to keep the lines of communication open to maximize information sharing of the latest data on emergency response for these type of incidences.

We look forward to continuing this work with the state and federal leaders to enhance safety and bringing this product to market and ensuring our State can continue to improve energy security by providing a reliable energy resource for our nation.

Thank you very much for allowing me to testify. I will be happy to answer-

[The prepared statement of Ms. Cutting follows:]

Bakken Petroleum: The Substance of Energy Independence

Subcommittees on Energy and Oversight

Joint Hearing – September 9, 2014

Oral Presentation

Kari R. Cutting—North Dakota Petroleum Council

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The states of Texas and North Dakota combined produce nearly half of the crude oil produced in the United States, and increased domestic production has helped stabilize energy prices despite turmoil overseas. In fact, this new domestic energy production has reduced imports by 4.4 million barrels per day since 2005. Imports from Saudi Arabia are down 25.3 percent, while imports from Venezuela are down 47.8 percent. Because of shale oil and gas, North American energy security is now achievable and North Dakota is proud of its role in this progress.

Although North Dakota's oil and gas production has grown substantially in recent years, pipeline capacity to key markets has not, requiring 59 percent of Bakken crude to be hauled via rail in June. Since the increase of crude being transported by rail, there have been eight railway incidents involving crude oil that have raised questions as to the chemical characteristics of Bakken crude, how it compares with other flammable liquids under U.S. Department of Transportation regulations and whether it can be safely transported across North America under the current regulatory environment as enforced by the Pipeline and Hazardous Materials Safety Administration.

Three independent studies have now shown that Bakken crude is similar to other North American light, sweet crude oils in gravity, vapor pressure, flash point and initial boiling point, the key parameters in proper classification. According to these studies, Bakken crude oil chemical properties attest to its proper classification as a Class 3 flammable liquid. This category contains most of the valuable fuels and fuel feed stocks offered for transportation in the United States.

One of these studies was commissioned by the NDPC to answer questions raised about the chemical properties and transportation safety of Bakken crude oil. The study included a comprehensive sampling,

and analysis plan and was conducted by Turner Mason & Company, an internationally known and recognized group of engineering consultants with extensive crude oil expertise, at a significant cost.

The oil and gas industry in North Dakota has a strong safety culture focused on zero incidences. All incidences, large and small generate a safety investigation to determine the root cause of the safety incident. Procedural changes or additional safety measures are implemented to mitigate the root cause and prevent a reoccurrence of a similar incident. This is true whether the incident occurs during drilling, completions, production or transportation aspects of the industry's activities. Commissioning of the Turner Mason study is an example of the industry's desire to investigate safety incidences.

The TM & C study was designed to provide scientific answers to address the growing perception that light crude oil is more hazardous than other flammable liquids or hazardous materials being transporting in the United States. The results of the study do not support the speculation that Bakken crude, in particular is more volatile than all other crude oils or other flammable liquids.

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All classes of Hazardous Materials transported by rail arrive safely at destination 99.997% of the time. The efforts of all stakeholders, including PHMSA, the oil and gas industry, tank car builders and owners, the railroads and the state of North Dakota, are focused on effecting an incremental safety improvement for the remaining 0.003% incidences.

Safety always has and continues to be a core value of the oil and gas industry. The NDPC and its members believe rail safety improvements must be developed using a holistic, comprehensive, and systematic approach that examines prevention, mitigation, and response. Safety solutions must be data-driven and produce measurable improvements to safety without creating new risks or inadvertently shifting the risks to other businesses or operations. To achieve this, collaboration is needed among government, shippers, railroads, and tank car builders.

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Written Testimony

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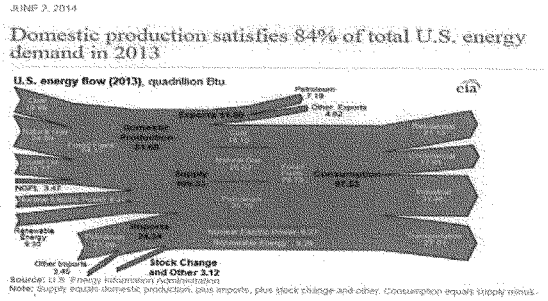

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Rail transport of crude oil from North Dakota will continue to play a vital role in providing this commodity to refineries on the East and West Coast of the U.S. Pipelines traditionally have been focused on product delivery to the U.S. Gulf Coast. Rail delivery of crude feedstock to the coasts is directly responsible for reduction in crude imports from the Middle East and Africa. In addition, Bakken crude oil is a less expensive feedstock, and combined with abundant supply and reliable domestic delivery has led to a revitalization of coastal refineries, resulting in job creation and job security in these locations. In larger terms, increases in domestic production are reducing the U.S. trade imbalance, strengthening the U.S. economy and reducing foreign influence.

Three independent studies have now shown that Bakken crude is similar to other North American light, sweet crude oils in gravity, vapor pressure, flash point and initial boiling point, the key parameters in proper classification.

- *A Survey of Bakken Crude Oil Characteristics Assembles For the U.S. Department of Transportation*, 14 May 2014
    - Submitted by American Fuel & Petrochemical Manufacturers, Prepared by Dangerous Goods Transport Consulting, Inc.
- *The Turner Mason & Company Study on Bakken Crude Properties,* 16 July 2014
    - Submitted by the Bakken Crude Characterization Task Force, Prepared by Turner, Mason & Co. Consulting Engineers
- *Operation Safe Delivery*, July 2014, including *Operation Classification*, August 2013, as pertaining to Bakken Crude
    - Pipeline and Hazardous Materials Safety Administration (PHMSA), U.S. Department of Transportation

According to these studies, Bakken crude oil chemical properties attest to its proper classification as a Class 3 flammable liquid. This category contains most of the valuable fuels and fuel feed stocks offered for transportation in the United States.

Bakken crude oil has an API gravity of approximately 42 degrees, which classifies it as a light sweet crude and comparable to other light crudes. The Energy Information Administration defines light crudes as those having an API gravity of 35 degrees or higher. There are many crude oils in the world, some are lighter and some are heavier in their component makeup than Bakken crude oil. API gravity is one measure the industry use to communicate crude oil properties. The higher the API number, the lighter the crude oil. Bakken crude oil with a gravity of 42 degrees, is very close to West Texas Intermediate and Brent, the most commonly discussed world crude oils. Light crude oils now compose 60% of all crude oils produced in the United States and this category of crude oils is a fast growing majority.

Heavier crudes, those having API gravity of less than 35 degrees, often require cracking and additional processing to yield create marketable transportation fuels.

CRUDE NAME	ORIGIN	API
Eagle Ford Light	Texas	58
Arabian Super Light	Saudi Arabia	51
Eagle Ford	Texas	48
Agbami	Nigeria	48
DJ Basin	Colorado	45
Sarahan Blend	Algeria	43
Bakken	North Dakota	42
West Texas Intermediate	Texas/New Mexico	41
Brent	United Kingdom	38
LLS	Louisiana	36
Alvheim Blend	Norway	35
Arabian Heavy	Saudi Arabia	28
Alberta Dilbit	Alberta	21

The Turner Mason & Company study (TM&C) was commissioned by the NDPC to answer questions raised about the chemical properties and transportation safety of Bakken crude oil. The study included a comprehensive sampling, and analysis plan and was conducted by Turner Mason & Company, an internationally known and recognized group of engineering consultants with extensive crude oil expertise, at a significant cost.

The oil and gas industry in North Dakota has a strong safety culture focused on zero incidences. All incidences, large and small generate a safety investigation to determine the root cause of the safety incident. Procedural changes or additional safety measures are implemented to mitigate the root cause and prevent a reoccurrence of a similar incident. This is true whether the incident occurs during drilling, completions, production or transportation aspects of the industry's activities. Commissioning of the Turner Mason study is an example of the industry's desire to investigate safety incidences.

The TM & C study was designed to provide scientific answers to address the growing perception that light crude oil is more hazardous than other flammable liquids or hazardous materials being transporting in the United States. The results of the study do not support the speculation that Bakken crude, in particular is more volatile than all other crude oils or other flammable liquids.

There are nine classes of hazardous materials transported by truck, rail, ship and cargo air in the United States. Materials from all nine hazardous materials classes are transported safely every day in this country, millions of times per year. Those who offer hazardous materials for shipment must be certified and are required to properly classify the material being offered for transportation.

9 HAZARDOUS MATERIALS CLASSES AUTHORIZED FOR TRANSPORT
Class 1: Explosives
Class 2: Flammable gas
Class 3: Flammable liquid
Class 4: Flammable solid
Class 5: Oxidizer
Class 6: Toxic
Class 7: Radioactive
Class 8: Corrosive
Class 9: Miscellaneous

All classes of Hazardous Materials transported by rail arrive safely at destination 99.997% of the time. The efforts of all stakeholders, including PHMSA, the oil and gas industry, tank car builders and owners, the railroads and the state of North Dakota, are focused on effecting an incremental safety improvement for the remaining 0.003% incidences.

Safety always has and continues to be a core value of the oil and gas industry. The NDPC and its members believe rail safety improvements must be developed using a holistic, comprehensive, and systematic approach that examines prevention, mitigation, and response. Safety solutions must be data-driven and produce measurable improvements to safety without creating new risks or inadvertently shifting the risks to other businesses or operations. To achieve this, collaboration is needed among government, shippers, railroads, and tank car builders.

All stakeholders recognize the importance of implementing additional safety measures to reduce the probability of the remaining 0.003%; efforts to improve safety of the railcar, routing analysis, infrastructure inspection and enhancements as well as additional training and information for Emergency Management personnel are all efforts being addressed. The oil and gas industry in partnership with the railroads is working to develop a common educational tool to be distributed broadly to fire departments either through web portal or DVDs. This information will also be available for companies to use in continued interaction with fire departments and other EMS personnel. Rail and oil industries in many states have worked collaboratively on drills and exercises, development of additional response resources and periodic meetings to keep the lines of communication open to maximize information sharing of the latest data on emergency response for crude incidents.

We look forward to continuing our work with state and federal leaders to enhance safety in bringing this product to market and ensuring our state can continue to improve our energy security by providing a reliable energy resource for our nation.

Kari Bjerke Cutting

Kari Cutting is vice president of the North Dakota Petroleum Council. Cutting has a diverse background, which includes analytical chemistry, sales, marketing, transportation, state and federal regulatory compliance and technological experience with over 30 years in the North Dakota energy industry. Cutting earned a Master of Science in Management from Minot State University and a Bachelor of Science from University of North Dakota.

The North Dakota Petroleum Council (NDPC), a member driven trade association, represents 530 companies involved in all aspects of the oil and gas industry in North Dakota, South Dakota and the Rocky Mountain Region. NDPC promotes environmentally responsible oil exploration and development, and monitors and responds to oil and natural gas development impacts under the guiding principles of listen first, develop partnerships and respect all stakeholders as part of NDPC's "Oil Can!" program.

Mr. BROUN. Thank you, Ms. Cutting.

Mr. Auers, you are recognized for five minutes.

And again, I want to reiterate we are pressed because of votes so if you all could try to get—we are going to get through with this questioning as quickly as we can, too, so if you could make sure they stay within the five minutes, I appreciate it.

TESTIMONY OF MR. JOHN AUERS,
EXECUTIVE VICE PRESIDENT,
TURNER, MASON, & COMPANY

Mr. AUERS. Okay. I want to first express my thanks to Chairman Broun, Ranking Member Swalwell and Maffei, and all the members of the Energy and Oversight Subcommittees for your time and attention.

As a result of several high profile rail incidents, questions as to whether Bakken is materially different from other crude oils and if the current railroad materials classification is appropriate have been raised. To answer these questions, the North Dakota Petroleum Council commissioned Turner, Mason & Company to conduct a comprehensive sampling and testing program. One hundred and fifty-two samples were taken over a four-week period from seven rail terminals and 15 well sites. The crude producers that provided the well samples account for 50 percent of the total North Dakota production and the rail facilities sampled represent a similar proportion of the total North Dakota crude-by-rail capacity.

The sampling locations covered the entire producing region and include those old and new wells, getting good representation of any property variation as a result from geography, production rate, or during processing and transit. I believe this program is the most thorough and comprehensive study of crude quality from a title production basin to date.

The results of this study are being used to establish a bottom quality baseline and to ensure continued crude quality and consistency. The study was also used to evaluate the impact of field operating conditions on Bakken qualities. These study results, together with followup effort, will be used to establish management best practices for operating field production equipment to best meet the proposed quality specifications.

Our study confirmed that Bakken crude is a light sweet crude oil with an API gravity generally between 40 degrees and 43 degrees and a sulfur content less than 0.28 percent. As such, it is similar to many other light sweet crude oils produced and transported in the United States and falls in the middle of the range defined by the Energy Information Administration for that category. Overall, over 60 percent of the crude produced in the United States falls into this or wider categories representing over five million barrels per day.

During our sampling program, Bakken had an average vapor pressure between 11.5 and 11.8 psi with 90 percent of the well samples and all of the rail samples measuring below 13 psi. This means Bakken is more than 60 percent below the 43.5 vapor pressures threshold for liquids under the Hazardous Materials regulation and almost 90 percent below the 100 psi rating that the railcars use for transport.

Because of the dearth of consistent data for other crudes, comparisons are difficult. The data that is available show Bakken vapor pressure to be within 2 to 3 psi of other light sweet crude oils with some lower but most other tight oils higher. While sampling occurred during a shoulder period, data outside that period provided by an NDPC member company showed some seasonality in vapor pressure with summer results averaging about 3 psi lower than those in the winter.

The light ends content, as defined by C2's through C4's, average just below 5.5 liquid volume percent for all the samples and under five percent for the rail samples. This is generally within one to two percent of most other light crudes with some showing lower levels and others having more light ends.

The flashpoint of Bakken measured below 73 degrees Fahrenheit, initial boiling point generally averaged between 95 degrees Fahrenheit and 100 degrees Fahrenheit, both of which are a normal range for light crude oil. The data supports the current Department of Transportation and Pipeline and Hazardous Materials Safety Administration classification for Bakken crude as a Class 3 flammable liquid which is similar to other crude oils, as well as gasoline, ethanol, and other materials containing light components. As a result, Bakken crude oil meets all specifications for transport using existing DOT 111 tank cars.

Flammable liquids fall into packing groups depending on the IVP as defined by the ASTM D86 method. Our results show some variability, especially on samples tested by different labs. This is because D86 was not developed for wide-boiling range of materials like crude oil. The difficulty with achieving consistent IVP results between different labs, other groups are working on recommendations for an alternative approach to determine packing group classification with a goal of obtaining DOT approval.

Based upon the findings of our study, the NDPC has decided to encourage all members to classify their Bakken crude as a Class 3, Packing Group 1 flammable liquid until more definitive testing protocol is established. It is critical to note the determination of Packing Group 1 versus Packing Group 2 has no impact on the type of rail car used or on first responder response to an incident. It had no impact on any of the incidents in which Bakken was involved.

We found that the qualities of Bakken were very consistent in our sample population and throughout the supply chain from wellhead to rail terminal to refining destination. Test results showed no evidence of spikes in natural gas leakage before a rail shipment. Due to the fact that crude from a number of wells is aggregated, samples taken at the rail terminal should have less variation and tighter averages than well readings. The test results from the study are also consistent with the recorded result of others, including the American Fuel & Petrochemical Manufacturers' Bakken report, the PHMSA Operation Safe Delivery report, NDPC member-gathered data, and other recent studies and presentations on the quality of Bakken crude oil.

The accuracy and precision of our test program was ratified by a series of round robin tests between both the SGS laboratories used in our study and Intertek, the testing company used by

PHMSA in their study. The results of the round robin testing showed excellent agreement on API gravity in vapor pressure. Significant variation did occur in the measured IVP from D86 testing due to the issues I mentioned earlier.

While the test results from PHMSA's report agree closely with the NDPC results, PHMSA did make some assertions in their executive summary which do not appear to be supported by their study or our findings. First, the PHMSA report makes a statement that "we conclude that while this product does not demonstrate the characteristics of a flammable gas, corrosive liquid, or toxic material, it is more volatile than most other types of crude." No comparative data was provided in the report to support this statement.

Second, PHMSA also claims that a higher degree of volatility correlates with increased ignitability and flammability. Again, no support is provided for this statement in the report. While we are aware that some groups are studying this very complex subject, we are not aware of any final conclusions from those studies to date.

I have submitted a separate written testimony which provides more detail and results from our study and our complete report is available on the NDPC website. With that, I conclude my prepared remarks and-

[The prepared statement of Mr. Auers follows:]

Bakken Petroleum: The Substance of Energy Independence

Subcommittees on Energy and Oversight

Joint Hearing – September 9, 2014

Written Testimony

John R. Auers – Turner, Mason & Company

In the past year, considerable attention has been focused on transportation and quality issues related to Bakken crude oil. As a result of several high profile railcar incidents in the U.S. and Canada, various investigations have been launched by governmental and industry groups to better understand the safety aspects of moving Bakken crude by rail. Questions as to whether Bakken is materially different from other crude oils and if the current railroad materials classification is appropriate have been raised. Investigations are ongoing as to the cause of the railcar accidents and potential hazards to the public associated with crude oil rail movements in general. In response to these concerns, the North Dakota Petroleum Council (NDPC) commissioned a comprehensive sampling and testing program to answer questions regarding the chemical and physical composition of Bakken, issues regarding proper classification and establishment of a Bakken quality baseline. This program collected samples from seven rail terminals and 15 well sites. The crude producers that provided the well samples account for over 50% of total North Dakota (ND) production, and the rail facilities sampled represent a similar proportion of total ND crude-by-rail capacity. The sampling locations cover the entire producing region and include both "old" and "new" wells, giving a good representation of any property variations that result either from geography, production rate, or during processing and transit. At this time, we are not aware of any field-level crude oil quality assessments as extensive or as controlled as this study in the Bakken or elsewhere.

The NDPC commissioned this program to establish Bakken crude properties (Quality Characterization) and to understand if these properties pose transportation and handling risks unique to Bakken compared to other light crude oils. The results from the study are being used to help establish and maintain a Bakken quality baseline to ensure continued crude quality and consistency. The study was also used to evaluate the impact of field-operating conditions (ambient temperature, tank settling times/production rates, and field equipment operating temperatures and pressures) on Bakken qualities. These study results, together with follow-up efforts, will be used to establish "management best practices" for operating production field equipment to best meet the proposed quality specifications.

NDPC engaged Turner, Mason & Company (TM&C), to serve as project coordinator. TM&C is an internationally recognized engineering consultancy firm with over 40 years of experience in the petroleum industry (including a significant background in crude oil quality and processing). The TM&C team included engineers with extensive refining and crude characterization/evaluation experience and a chemist with over 40 years of laboratory experience in crude oil analyses who serves as Executive Director of the Crude Oil Quality Association and on the Board of the Canadian Crude Quality Technical Association. Analyses of all primary samples were conducted by SGS, a global leader in testing and inspection with over 135 years in the business. Both the local ND and U.S. Gulf Coast SGS labs participated in the sampling and testing process.

The key findings were as follows:

Quality Characterization

- Bakken crude is a light sweet crude oil with an API gravity generally between 40° and 43° and a sulfur content <0.2 wt.%. As such, it is similar to many other light sweet crude oils produced and transported in the United States.
    - As a point of reference, the Energy Information Administration (EIA) categorizes crude oil that has an API gravity between 35° and 50° and <0.3 wt.% sulfur as light sweet. Bakken falls in the middle of those ranges for both properties.
    - Overall, over 60% of the crude produced in the U.S. falls into this or lighter categories, representing over 5 million BPD.
- Although testing for sulfur, Total Acid Number (TAN) and other corrosivity-specific testing were outside the scope of this project, results from other test programs (as summarized below in Table 1) indicate that Bakken has very low sulfur and TAN properties.
- Table 1 compares key Bakken qualities to other important domestic and international crude oils:
    - Note the quality data in Table 1 for crudes other than Bakken came from sources without the extensive controls and systematic sampling procedures used in the NDPC study.

Table 1: Comparison of Crude Properties

Domestic Light Sweet Crudes	API Gravity	Sulfur (wt. %)	TAN (mg KOH)
Bakken (1) (2)	40 to 43*	0.1	< 0.1
WTI (4) (5)	37-42	0.42	0.28
LLS (2) (4)	36-40	0.39	0.4
Eagle Ford (2)	47.7	0.1	0.03
Eagle Ford Light (2)	58.8	0.04	0.02
International Crudes			
Light Sweet	**API Gravity**	**Sulfur (wt. %)**	**TAN (mg KOH)**
Brent (2) (6)	37-39	0.4	< 0.05
Medium			
Arabian Light (2)	33	1.98	< 0.1
Arabian Heavy (2)	27.7	2.99	< 0.1
Heavy			
Western Canadian Select (Heavy Sour) (3)	21.3	3.46	0.93
Dalia (High TAN) (2) (7)	23.1	0.51	1.6

Sources:	
1 - NDPC Study Data	5 - Crude Oil Quality Association
2 – Capline	6 - BP Crude Assay
3 - crudemonitor.ca	7 - ExxonMobil Crude Assay
4 - AFPM Bakken Report, 5/14/2014	* Majority of NDPC samples in this range

- The qualities of Bakken were very consistent within our sample population and throughout the supply chain – from wellhead to rail terminal to refining destination. Test results showed no evidence of "spiking" with Natural Gas Liquids (NGLs) before rail shipment.
- The test results from this study are also consistent with reported results from others, including the American Fuel & Petrochemical Manufacturers (AFPM) Bakken Report, the Pipeline and Hazardous Safety Materials Administration (PHMSA) Operation Safe Delivery Report, NDPC member-gathered data and other recent studies and presentations on the quality of Bakken crude oil.

Table 2: Bakken Quality Comparison, NDPC to AFPM and PHMSA

	NDPC Rail Avg (1)	AFPM Report	PHMSA Report (5)
API Gravity	41.7	42	Not Reported
Vapor Pressure (psi)	11.5	7.83 (2)	12.3
IBP (°F)	100.3	69.6 (3)	87.0
Light Ends (C2-C4s) (Liq. Vol. %)	4.95	3.5-11.9 (4)	4.65 (6)

Comments:

(1) Rail chosen because AFPM samples from Bakken at point of delivery; rail data from NDPC closest to direct comparison.
(2) AFPM reported RVP, NDPC reported $VPCR_4$ (D6377) at 37.8°C. AFPM also reported $VPCR_4$ done at 50°C, results 13.9-16.7 psi.
(3) 87.3 Median, Multiple tests in AFPM data, some of which can report lower than D86, which skewed average lower.
(4) AFPM report, three respondents average 3.5%, fourth had 12 samples, range 5.9-11.9%.
(5) PHMSA data from Table E, data ranging from 3/17 to 5/2, to maximize overlap with NDPC study data timeframe.
(6) PHMSA does not report isobutane, and C2-C4 results do not appear to include isobutane. By comparison, NDPC C2-C4 without isobutane was 4.37 Liq. Vol. %.

- While the test results from PHMSA's report agreed closely with the NDPC results, PHMSA did make some assertions in their Executive Summary which do not appear to be supported by their study or our findings.
    - The PHMSA report makes the statement that, "We conclude that while this product does not demonstrate the characteristics for a flammable gas, corrosive liquid or toxic material, it is more volatile than most other types of crude." No comparative data was provided in the report to support this statement, and as I note elsewhere in this testimony, the limited data available on other light crudes would not support that conclusion.

    - PHMSA also claims that a higher degree of volatility "correlates to increased ignitability and flammability." Again, no support is provided for this statement in the report. While we are aware that some groups are studying this very complex subject, we are not aware of any conclusions from those studies to date.

- During the time frame of our sampling program, Bakken had an average vapor pressure of between 11.5 and 11.8 psi, which is more than 60% below the vapor pressure threshold limit for liquids under the Hazardous Materials Regulations (43.5 psi).
    - It should be noted that the vapor pressure testing was done using the EPA approved method for crude oils (ASTM D6377), which results in readings about 1 psi higher than if the Reid Vapor Pressure (RVP) test method (ASTM D323) was used.
    - Test data from an NDPC member's rail terminal taken over a seven-month period from August 2013 through March 2014 showed RVP's in the range of 8 to 11 psi; consistent with the NDPC test results when adjusted for seasonality and test method.
    - It is difficult to compare the "typical" vapor pressure of Bakken to other crudes because of the dearth of consistent data (regarding sampling and testing methodologies) for other crudes. Most data show Bakken vapor pressure to be within 2 to 3 psi of other light sweet crudes (some higher, others lower). The AFPM Bakken Report contained the following comparison (versus key crudes), shown below in Table 3. Comparisons from other studies show similar results.

Table 3: AFPM Bakken Report, Crude Quality Comparison Table

	RVP (psi)	Vol. % Light Ends (C2-C5s)
LLS	4.18	3.0
WTI	5.90	6.1
Alberta Dilbit	7.18	7.30 wt. %
DJ Basin	7.82	8.0
Bakken	7.83	7.2
Eagle Ford	7.95	8.3
Brent	9.33	5.28 wt. %

- The flash point of Bakken is below 73°F, and the Initial Boiling Point (IBP) generally averaged between 95°F and 100°F, both of which are in the normal range for a light crude oil.
    - The data supports the current Department of Transportation (DOT) Pipeline and PHMSA classification for Bakken crude as a Class 3 Flammable Liquid (similar to other crude oils, as well as gasoline, ethanol and other materials containing light components).
    - As a result, Bakken crude oil meets all specifications for transport using existing DOT-111 tank cars.
    - This conclusion is consistent with the recent AFPM Bakken Report, which stated "Bakken crude oil does not pose risks significantly different than other crude oils or other flammable liquids authorized for rail transport. Bakken and other crude oils have been classified as flammable liquids. As noted, Bakken crude poses a lower risk than other flammable liquids authorized for transport by rail in the same specification tank cars."

- Flammable liquids fall into packing groups (PG) depending on their IBP as defined by the ASTM D86 method. The testing performed in our study highlighted the difficulty with using this test method for PG determination. The results showed significant (10°F+) variability between labs on the same sample.
    - This is because D86 was not developed for *wide boiling range* materials like crude oil, with no specifically defined lab-operating parameters specified. Therefore, different labs used different operating conditions during testing, resulting in a wide variability of values for the IBP.
- Because of the difficulty with achieving consistent IBP results, groups including API are working on recommendations for an alternative approach to determine packing group classification with a goal of obtaining DOT approval.
    - Based upon the findings of our study, the NDPC is encouraging all members to classify their BKN crude as a Class 3 PG I flammable liquid until a more definitive testing protocol is established.
- It is critical to note that the determination of PG I versus PG II has no impact on the type of rail car used or on first responder response to an incident and had no impact on any of the incidents in which Bakken was involved.
- The accuracy and precision of our test program were ratified by a series of round-robin tests between both of the SGS laboratories (Williston, ND and St. Rose, LA) used in our study and Intertek, the testing company used by PHMSA in their study.
    - The results of the round-robin testing, using identical samples (from four locations) of Bakken (tested at each of the three laboratories) showed excellent agreement on API gravity and vapor pressure.
    - Significant variance did occur in the measured IBP from the D86 testing, as noted earlier.
    - A member company conducted a similar round-robin test comparison with samples of Bakken taken from four rail cars. Duplicate samples were sent to SGS and a second laboratory, and the results of this testing also showed excellent agreement on API and vapor pressure and significant differences on D86 IBP.
- A series of side-by-side tests were performed using both the standard sealed glass jars (Boston Rounds, used for testing during the study) and Floating Piston Cylinders (FPCs) which have been suggested by some industry groups for testing vapor pressure.
    - Preliminary results proved inconclusive. Results of samples taken from the atmospheric tanks using the glass bottles came back with higher vapor pressure readings than when tested using either glass bottles or FPCs on the pressurized tank discharge.
    - Due to the requirement to sample from a pressurized tap with FPCs, there are difficulties with sampling and finding appropriate sample locations, which restricts where samples can be collected.

- These initial results, though limited, indicate that sampling with the glass bottles was at least as representative as testing with FPCs for vapor pressure, and allowed for a greater variety of sample locations with greater consistency.

Table 4 below summarizes the results from our study's sampling and testing program

- API gravity of Bakken was generally in the low 40's which falls in the range of what is considered a light crude oil.
- Vapor pressure (via ASTM D6377 at 37.8°C/100°F) was in a fairly tight range, averaging between 11.5 and 11.8 psi, with over 90% of well and 100% of rail samples measuring below 13 psi. As noted earlier, D6377 shows readings about 1 psi higher than the RVP test method (ASTM D323).
- D86 IBP showed a range of approximately 15°F on samples. All samples measured as either a PG I or II, with most of the test results close to the 95°F determination threshold. Because of the limitations of the test and variability of test conditions, the exact result varied depending on which laboratory conducted the testing.
- The light ends (C2-C4s) content of Bakken, which averaged just below 5.5 liquid volume % for all the samples and fewer than 5% for the rail samples. This is generally within 1 or 2% of other light crudes. Comprehensive data comparable to that obtained in this study for the other major Light Tight Oil (LTO) basins is not available. However, the data, which is available, indicates that Bakken light ends content is more consistent; and in many cases, lower than for most of the light crudes and condensates produced in the major LTO basins.
- It is important to note that the DOT-111 cars used to transport this crude are rated for 100 psig, and the type of car used is the same for both PG I and PG II material transport.

Table 4: NDPC Bakken Crude Sampling Data Summary

Sample Date Range	**3/25 to 4/24/2014**		
Total (152 Samples)	**Avg**	**Min**	**Max**
API Gravity	41.0	36.7	46.3
Vapor Pressure (psi)	11.7	8.9	14.4
D86 IBP (°F)	99.5 (PG II)	91.9 (PG I)	106.8 (PG II)
Light Ends (C2-C4s)	5.45	3.33	9.30
Rail (49 Samples)	**Avg**	**Min**	**Max**
API Gravity	41.7	39.2	44.0
Vapor Pressure (psi)	11.5	9.6	12.9
D86 IBP (°F)	100.3 (PG II)	96.7 (PG II)	104.1 (PG II)
Light Ends (C2-C4s)	4.95	3.91	6.44
Well (103 Samples)	**Avg**	**Min**	**Max**
API Gravity	40.6	36.7	46.3
Vapor Pressure (psi)	11.8	8.9	14.4
D86 IBP (°F)	99.1 (PG II)	91.9 (PG I)	106.8 (PG II)
Light Ends (C2-C4s)	5.69	3.33	9.30

The results indicate that the well-to-well quality of Bakken is very consistent. Testing across the geographic area showed very limited geographical variation in key properties such as API, vapor pressure and light ends content. Data provided by one of the NDPC member companies (which involved

testing over an eight-month period) showed that while there was some seasonality in vapor pressure, it was not significant (3 psi lower in summer months vs. winter months) and it agreed very closely with the AFPM seasonality data. The data was also consistent with the NDPC test results during the period when the sampling overlapped.

Bakken quality, throughout the supply chain in our sample pool, was also consistent. There was no evidence of "spiking" of Bakken crude with NGLs between the well and rail terminals, with rail terminals showing less variation and tighter averages than well-readings. This was expected, given that regional rail facilities receive oil from many wells. Additionally, limited sampling at both the rail terminal and destination refinery showed no significant weathering or off-gassing of light ends in transit.

Operating Conditions/Impact on Bakken Quality

In addition to characterizing the quality of Bakken crude, our study looked at the impact that well site operating conditions have on the quality. These conditions include ambient temperature, production volume flow rates/field tank settling time, vapor capture status and field equipment operating parameters such as separator and treater temperatures and pressures. All of these measurements were recorded during the sampling program and have been correlated to determine how they impact test results. Based on this analysis, we offer the following observations and conclusions:

- The samples were gathered during the spring season (late March to late April) and ambient temperatures varied from a low of 10°F to a high of 65°F (average of about 34°F).
    - Vapor pressure will vary by season with lower vapor pressures (lower levels of dissolved light ends) in the hotter summer months and higher vapor pressures (higher levels of dissolved light ends) in the colder winter months. This was confirmed by the member-contributed data referred to earlier in this section (and included later in this report).
    - The results during this sampling program were in the intermediate range due to the mid range ambient temperatures experienced during sampling.
    - Although the temperature range was limited, vapor pressure levels did correlate with temperatures (consistent with the more extensive member contributed data and the AFPM data), and with higher measured vapor pressure for crude sampled with lower ambient temperatures.
- While the companies operating in the Bakken that participated in our sampling program use a variety of well-site production equipment and operating conditions (production rates, equipment operating pressures and temperatures) which varied across the study, key crude qualities from our study were distributed across a fairly narrow range.
    - The data consistency indicates that field equipment is limited in its ability to significantly impact vapor pressure and light ends content.
    - This is consistent with the expected capabilities of the equipment.
    - The field equipment is designed to separate gas, remove water and break emulsions to prepare crude for transport, and not remove significant levels of dissolved light ends from the crude.

- Despite the limitations of the field equipment, the data did show that the content of some of the lighter components, specifically ethane and propane, was reduced in a measureable way by running the equipment at higher temperatures.
    - The difference between running cold (50°F) and running at close to the maximum practical temperature (150°F) resulted in an average reduction of 0.13 liquid vol. % ethane and 0.25 liquid vol. % propane, and about 0.40 liquid vol. % of total light ends reduction.
    - Total ethane levels were almost universally below 0.20 liquid vol. % (and often closer to 0.10 liquid vol. %) when treaters were run at temperatures above 140°F, compared to levels averaging around 0.30 liquid vol. % (and as high as 0.40%) when temperatures were less than 100°F.
    - It is important to note that true "plant tests" were not conducted where the field equipment temperatures and pressures were varied systematically at individual well sites, but rather results correlated across all samples at all locations.
- Production rates were also obtained at the time of sampling in an effort to determine whether higher flowing wells retained more light ends and had a higher vapor pressure than lower flowing wells where there was more opportunity to "weather" off the light components.
    - The data from the study showed very limited correlation between production rates and vapor pressure.
    - There was also little difference observed in vapor pressure between samples which were obtained from wells directly connected to a gathering system (no settling time) versus those obtained from stock tanks (where there was an opportunity for settling).
    - As with the analysis of treater conditions impact on crude quality, the fact that this analysis was not done under systematic "plant test" conditions does not confirm that there is not some impact on vapor pressure, but rather that the impact is likely limited.

Conclusions and Recommended Action Steps

- Bakken is a light sweet crude oil with very consistent properties throughout the entire production basin, and the properties measured meet all the requirements of 49 CFR 171-180 for safe transport by rail or truck.

Based on the results of this study, the NDPC has developed a set of Field Operations Recommended Best Practices. These cover the operation of the field treating equipment, Bakken crude oil quality, testing procedures and shipping classification, and are detailed in Table 5 below:

Table 5: BKN Field Operations Recommended Best Practices

Field Treating Equipment (In an effort to minimize light ends in crude oil presented for market)

- Design and operate all equipment within manufacturers recommended operating limits.
- Operate Gas/Liquid Separator (if utilized) at the lowest pressure to accommodate gas sales and fluid delivery to the Emulsion Separator/Heater Treater.
- Operate Emulsion Separator/Heater Treater pressure to the lowest operating pressure to safely accommodate gas sales and fluid delivery to the production tank battery.
- Maintain all fired treating equipment (Emulsion Heater Treater, etc.) temperature between 90° and 120° F+ year round.
- Provide maximum tank settling time possible prior to shipment.
- Reduce stock tank pressure to lowest pressure possible to maintain vapor collection equipment (engineered flare, vapor recovery, etc.) operational integrity.

Typical **BKN** * Specifications (ranges reflect expected seasonality)

	Range	Typical
• API Gravity (hydrometer at 60°F)	35° to 45°	42°
• Vapor Pressure (ASTM D6377 @ 100°F)	8 to 15 psi	11.5 psi
• Initial Boiling Point (ASTM D86)	90°F to 105°F	95°F
• Sulfur	<0.3%	0.15%
• H_2S	<10 ppm	<1 ppm
• Light Ends (C2 – C4s)	3% to 9%	5%

***BKN** refers to light sweet crude aggregated at rail and pipeline terminals within the Williston Basin. This crude is predominantly sourced from the Bakken common source of supply, but also includes legacy production from various other producing formations located within the proximity of the Bakken field. **BKN** does not include nonstabilized condensate recovered from wet gas gathering pipelines or from product derived outside the U.S. Williston Basin. Individual well values may be higher or lower than the aggregated values observed at the rail terminals.

Testing Procedures

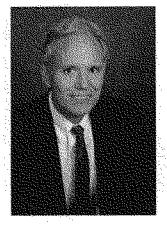
- Well Site Operators/Purchasers – Prior to each custody transfer or LACT EOM
  - API gravity corrected to 60° F using hydrometer
  - Basic Sediment & Water (BS&W) by field centrifugal grind-out
  - Spot test vapor pressure pending available field testing equipment
- Rail/Pipeline Terminal Operators
  - Test each unit train loading or tank shipment batch
    - API gravity corrected to 60° F using hydrometer
    - BS&W by field centrifugal grind-out
  - Test at least midmonth and EOM
    - ASTM D6377 @100° F vapor pressure using certified laboratory
- DOT PHMSA Hazmat Shipping Category
  - Flammable Liquid Category 3
  - Packing Group I**

** PG I is recommended even though the majority of samples tested for the study would fall within specifications for PG II. The margin of error for the test methodology can result in different labs testing the same sample with values meeting both PGs. PG I has the more stringent standards and is therefore recommended to avoid further confusion.

Testing Procedures (cont.)

• Other recommended procedures
  ○ DO NOT deliver fluid recovered from gas pipe lines (a.k.a. "pigging operations") to crude oil sales system unless processed by stabilization unit capable of lowering vapor pressure below 10 psi at 100° F.
  ○ DO NOT blend non-Williston Basin crude oils into the BKN common stream.
  ○ DO NOT blend plant liquids (plant condensates, pentanes, butanes or propane) into the BKN common stream.

John R. Auers, P.E.



John R. Auers (jauers@turnermason.com) is the Executive Vice President of Turner, Mason & Company, an international energy consulting firm located in Dallas, TX. He has been with the company for 27 years. He is the team leader of TM&C's subscription products, including *The Crude and Refined Products Outlook*, a biennial report that forecasts supply, demand, and pricing for crude oils and petroleum products worldwide, and both *The World Crude Oil Outlook* and *The North American Crude Oil Outlook,* detailed forecasts for crude oil supply and demand by region and by type. He also leads assignments in the area of refining economics and planning, LP modeling, downstream asset valuation, crude oil valuation and capital investment and strategic planning. Auers joined the firm in 1987 after 7 years with Exxon Corporation, with which he held various positions at its Baytown, Texas, refinery. He holds a BS (1980) in chemical engineering from the University of Nebraska and an MBA (1984) from the University of Houston-Clear Lake. He also speaks at various national and international industry workshops and conferences regarding developments in the petroleum industry. Auers is a licensed professional engineer in Texas and Nebraska and is a member of TSPE and AIChE.

Mr. BROUN. Thank you, Mr. Auers.
Mr. Zoanetti, you are recognized for five minutes.

**TESTIMONY OF MR. MARK ZOANETTI,
DEPUTY CHIEF OF SPECIAL OPERATIONS,
SYRACUSE FIRE DEPARTMENT**

Mr. ZOANETTI. Good afternoon, Chairman Broun, Ranking Members Swalwell and Maffei—
Mr. BROUN. Please turn on your microphone. Is the red light on there? Speak and so you—
Mr. ZOANETTI. Good afternoon, Chairman Broun, Ranking Members—
Mr. BROUN. No, that is not—could somebody help him get his microphone on, please? Mr.—maybe you could use Mr. Auers' microphone.
Mr. ZOANETTI. Good afternoon, Chairman Broun, Ranking Members Swalwell and Maffei, of the Energy and Oversight Committee. I am here on behalf of the City of Syracuse at the request of Congressman Maffei. I want to thank you for allowing me to share my experience in dealing with hazardous materials and rail transportation and the challenges that first responders face on a daily basis.

As a joint effort between the Syracuse Fire Department and the Onondaga County Department of Emergency Management, we contacted CSX for information about Bakken oil. Initially, shipment information was not made available. With persistent pressure from state and federal—and local government, CSX agreed to meet with the Syracuse Fire Department to discuss the movement of Bakken oil. In the meeting we received information about shipments and hazards associated with Bakken oil. We were able to establish a dialogue with CSX that eventually brought educational resources to first responders.

With information about the light sweet crude, we made a hazard assessment to determine what if any gaps existed in our response plans to an accident involving Bakken crude trains. It was determined that additional training and planning were two key components in dealing with this hazard.

Because of what we were—believed to be the lower ignition temperature of the crude as compared to other crude shipments, the hazard has increased. In reviewing incidents in Québec and North Dakota and information from several resources we recognized the hazard of transportation of Bakken crude. We were advised that the rail lines that run along the northern border of our city and are being utilized for the movement of this product. CSX lines border Onondaga Lake at the southernmost end and is adjacent to Destiny USA, a large shopping and entertainment center. The rail proceeds past the William F. Walsh Regional Transportation Center, a minor-league ballpark, and a light industrial area. Once out of the city's jurisdiction, the trains move to an East Syracuse rail yard, a village on the eastern border of the city.

Following the issuance of an emergency order from the U.S. Department of Transportation that required railroads—railroad carriers to release information in writing to state emergency response centers in each State in which the rail carriers transporting more

than—transporting one million gallons or more of Bakken crude, CSX disseminated information of commodities transported through central New York.

The data from the 2013 Hazardous Materials Density Study in Onondaga County reported the number of carloads and percentage of total hazardous materials as transported through our County. The Bakken crude compromised—comprised the greatest share of haz materials transported at 34 percent of the total. We found that many other hazardous materials were transported through the city, which we have known for a long time that these commodities move through the city, but were unaware of the amounts. There are large quantities of liquefied petroleum gas, sulfuric acid, propane, chlorine, and ethanol to name a few. There are shorter rail lines besides CSX that traverse through downtown Syracuse and move tank and bulk products.

The Bakken crude is moved through central New York by rail every day. There are two trains that daily traverse Syracuse at approximately 100 tank cars in each train. When a concern—the concerned for potential hazard of this commodity were brought—was brought to light that these trains were in our community, we had little information about shipment outside of media reports.

With information in hand, we determined a course of action. Training became the next step in our progression. A training program supplied by CSX was presented to our members that contained the DVD lessons that matched a workbook in dealing with rail emergencies. After completion of these lessons, CSX brought their safety training program into Syracuse for some hands-on training in working with DOT 111 tank cars. A total of 60 members of the Syracuse Fire Department attended this hands-on training. Those members are assigned to stations that respond to the rail incident should a Bakken crude train have an incident. Participants in this training include our hazardous material unit where the balance of our department is going to receive awareness training in rail incidents.

From the perspective of the Syracuse Fire Department, Bakken crude trains do not present the only challenge for first responders. The vast array of other hazardous materials that move through our jurisdiction require us to be prepared for all hazards. The Syracuse Fire Department hazardous material team must train and equip to deal with whatever emergency might come our way besides establishing procedures for dealing with Bakken train trains at present. However, I am confident we are prepared to respond should an incident happen. Because of the potential for a transportation accident, we train to meet all hazards. The Syracuse Fire Department is also working with the Local Emergency Planning Committee to help protect the public from an incident.

In November of 2011, a train derailed in a residential area of the city of Syracuse. Several tank trains and bulk hopper cars derailed. The tank car carrying non-odorized propane was our biggest hazard. Because of the potential hazard, we evacuated approximately 100 home. This also caused the closure of a main highway, Route Interstate 81. The origin of the incident was determined to be a bad section of track. The deficient track was identified in July and—of that year and was not repaired. The section of track that

caused the derailment was in the middle of the city causing the cars to be dragged up to one mile further before overturning. Fortunately, there was not a release of propane and the cars were eventually righted without further incident.

The city and the county have created a stockpile of firefighting foam and are acquiring appliances to deliver the foam at an incident. Additionally, with the production of an ethanol plant in the nearby city of Fulton, we are finding large quantities of ethanol being transported through central New York.

The hazardous materials team of the Syracuse Fire Department is comprised of 36 highly trained hazmat technicians. All members meet or exceed the standards for training set forth by CFR 29 1910.120 and NFPA 472. All hazmat officers as well as chief officers of the Syracuse Fire Department are trained in Hazardous Materials Incident Command. Syracuse Fire Department hazmat team is a regional response team for a three-county area in central New York. We are a FEMA Type I team, the only team in our region. We have responded outside of our area in New York State mutual aid assets for natural disasters that have affected the State.

At a time when increasing demand for emergency services is—are becoming more complex, local resources are becoming financially strapped very quickly. The assistance from state and federal resources and shippers would provide for responder training, development of effective response capabilities, and planning to be able to safely mitigate an incident and protect the public from harm.

I want to thank you for holding today's meeting about transportation of the Bakken petroleum and rail safety. The hazards of this product are not unlike others that are—others, but because of the volume that is moved across America through many small communities, it has created a tremendous concern. Should an accident happened similar to the ones that have already occurred—excuse me—local resources will be overtaxed quickly. To be able to protect the public, emergency response agencies need the tools to respond and mitigate accidents. Prevention of accidents should the—should also be on the forefront of this endeavor whether through engineered controls, track maintenance, or product safer transportation.

I will answer any questions.

[The prepared statement of Mr. Zoanetti follows:]

Paul M. Linnertz
Chief of Department

Kent A. Young
First Deputy Chief

Deputy Chiefs

Stephen Cavuto
William Elderbroom
Mark Zoanetti
Todd Milton
Robert Cussen

DEPARTMENT OF FIRE

Stephanie A. Miner, Mayor

Good afternoon, Chairman Lummis, Chairman Broun, Ranking Members Swalwell and Maffei of the Energy and Oversight Committee. I am Deputy Chief Mark Zoanetti of the Syracuse Fire Department in New York. My fire service experience began in 1979 as a volunteer firefighter and I have served as a career firefighter since in Syracuse since 1985. For much of my career I have been a member or supervisor of the Syracuse Fire Department's Hazardous Materials response team. I am currently responsible for the Special Operations Division. This division includes hazardous materials response, the airport, rescue services which include Urban Search and Rescue (USAR) components of building collapse, trench rescue, confined space and rope rescue.

I am here on behalf of the City of Syracuse at the request of Congressman Maffei. I want to thank you for allowing me to share my experience in dealing with hazardous materials in rail transportation and the challenges that first responders face on a daily basis.

As a joint effort between the Syracuse Fire Department and the Onondaga County Department of Emergency Management, we contacted CSX for information about Bakken Crude. Initially shipment information was not made available. With persistence and pressure from State and Local government, CSX agreed to meet with the Syracuse F.D. and the Onondaga County Department of Emergency Management to discuss the movement of Bakken Crude. In the meeting we received information about shipments and hazards associated with Bakken crude. We were able to establish a dialog with CSX that eventually brought educational resources to first responders.

With information about light sweet crude, we made hazard assessments to determine what if any gaps existed in our response plans to an accident involving Bakken crude trains. It was determined that additional training and planning were two key components in dealing with these hazards. Because of the lower ignition temperature of this crude, as compared to other crude shipments, the hazard has increased. In reviewing the incidents in Lac-Megantic, Quebec and Casselton, North Dakota and information from several sources we recognized the additional hazard of transportation of Bakken Crude. We were advised that the rail lines that run along the northern border of our City are being utilized for the movement of this product. The CSX lines border Onondaga Lake at its southern most end and adjacent to Destiny USA, a large shopping and entertainment center. The rail proceeds past the William F. Walsh Regional

Transportation Center, a minor league ballpark and past a light industrial area. Once out of the City's jurisdiction the trains move to the rail yards in East Syracuse, a village on the eastern border.

Following the issuance of an emergency order from the United States Department of Transportation that required railroad carriers to release information in writing to State Emergency Response Center (SERC) in each state in which railroad carriers operate trains transporting 1,000,000 gallons or more of Bakken crude, CSX disseminated information of commodities transported through Central New York. The data from the 2013 Hazardous Materials Density Study for Onondaga County reported the number of car loads and percentage of total hazardous material that is transported through the County. The Bakken crude comprised the greatest share of haz-mat transported at 34% of the total. We found that many other hazardous materials were transported through the City of Syracuse. We have known for a long time that these commodities moved through the City, but were unaware of the amounts. There are large quantities of liquefied petroleum gases, sulfuric acid, propane, chlorine and ethanol to name a few. There are shorter rail lines that traverse through downtown that also move tank and bulk products.

Bakken crude is moved through Central New York by rail every day. There are two trains that daily traverse Syracuse with approximately 100 tank cars in each train. When concerns for the potential hazards of this commodity were brought to light, that these trains were in our community, we had very little information about the shipment outside of the media reports.

With this information in hand we determined a course of action. Training became the next step in our progression. A training program supplied by CSX was presented to our members that contained DVD lessons that matched a workbook on dealing with rail emergencies. After the completion of these lessons, CSX brought their Safety Train program to Syracuse for Hands-On Training with DOT 111 type tank cars. A total of 60 members of the Syracuse Fire Department attended this hands-on training. Those members are assigned to stations that would respond to a rail incident such as Bakken crude trains. Participants in this training included our Hazardous Material Unit. The balance of our Department will receive awareness training for rail incidents this fall.

From the perspective of the Syracuse Fire Department, the Bakken Crude Oil trains do not represent the only challenge for first responders. The vast arrays of other hazardous materials that move through our jurisdiction require us to be prepared for all hazards. A single chlorine rail car release could be as catastrophic as a crude oil incident. The Syracuse Fire Department Hazardous Material Unit must train and equip to deal with whatever comes our way. Besides rail incidents, we must be prepared to handle fixed facilities and highway accidents. We are establishing procedures for dealing with the Bakken Crude oil shipments at the present. However, I am confident we are prepared to respond should an incident happen. Because of the potential for a transportation accident, we train to meet all hazards. The Syracuse Fire Department is also working with the Local Emergency Planning Committee (LEPC) to help protect the public from an incident.

In November 2011, a train derailed in a residential area of the City. Several tank and dry bulk hopper cars derailed. The tank cars carried non-odorized propane. Because of the potential hazard approximately 100 people were evacuated from their homes. This also caused the closure of a main highway, Interstate Rt. 81. The origin of this incident was determined to be a bad section of track. The deficient section of track was identified in July of that year but was not repaired. The section of track that caused the derailment was in the middle of the City; causing the cars to be dragged for up to a mile further before overturning. Fortunately there was not a release of propane. The cars were eventually righted without further incident.

The City and County have created a stock pile of firefighting foams and are acquiring appliances to deliver the foam at an incident. Additionally, with the production from an ethanol plant in nearby City of Fulton, we are finding large quantities of ethanol being transported in Central New York. The County has acquired two 275 gallon totes of foam concentrate that will be compatible with alcohol type releases. The Syracuse Airport has a foam trailer with 1000 gallons of Aqueous Film Forming Foam (AFFF) that is primarily for resupply in the event of an aircraft fire. It is available and can be brought into the City for a rail incident if needed. This supply of firefighting foam is a good start; however it would not support a long term incident.

The Hazardous Material team of the Syracuse Fire Department is comprised of 36 highly trained Haz-Mat Technicians. The members meet or exceed the standards for training set forth by CFR 29 1910.120 and NFPA 472. All Haz-Mat Company officers as well as all Chief Officers of the Syracuse Fire Department are trained in Hazardous Materials Incident Command. The Syracuse Fire Department Haz-Mat team is a regional response team for a three County area in Central New York. We are a FEMA Type I team, the only team in our region. We have responded outside of our area as part of New York State mutual aid assets for natural disaster that have affected the State.

At a time when increasing demands for many emergency services are becoming more complex, local resources can become financially strapped very quickly. The assistance from State, Federal resources and shippers could provide for responder training, development of effective response capabilities, and planning to be able to safely mitigate an incident and protect the public from harm.

Thank you for holding today's public meeting about the transportation of Bakken Petroleum and rail safety. The hazards of this product are not unlike others but because of the volume that is moved across America through many small communities it creates a tremendous concern. Should an accident happen similar to the ones that have already occurred, local resources will quickly be overextended. To be able to protect the public, emergency response agencies will need the tools to respond and mitigate accidents. The prevention of accidents should also be on the forefront of this endeavor whether through engineered controls, track maintenance, or making the product safer in transportation.

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DEPARTMENT OF FIRE

Stephanie A. Miner, Mayor

Mark A. Zoanetti
Deputy Chief
Syracuse Fire Department
511 South State St.
Syracuse, NY 13202

I have been a member of the Syracuse Fire Department for 29 years. I was assigned to the Hazardous materials Engine Company after completion of recruit training. At which time I received certification as a hazardous materials technician. I was assigned away from the Haz-Mat company for a few years, however I maintained my certification. I later rejoined the Haz-mat company for the next 18 years. I that time I have taken numerous State and Federal training courses that included hazardous materials advanced certifications, COBRA training at Anniston, Alabama; and leadership training. I have an AAS degree in Fire Protection Technology and an AAS degree in Emergency Management both from Onondaga Community College.

As a member and supervisor of the Syracuse Fire Department Haz-Mat Team I have responded to many incidents including rail accidents, most recently in November of 2011 train derailment in the City. We have several major universities in our City that have educational labs that have had accidents that required a Haz-Mat response.

The Syracuse Fire Department is a FEMA type I team and the only team of this kind in a three County region. In my current role I am the Deputy Chief of Special Operations. I am responsible for the oversight of our Haz-Mat, Airport, and Urban Search and Rescue (USAR) components.

I am also a Deputy Coordinator with the Onondaga County Department of Emergency Management. In that role I am tasked with assisting local first responders as a resource in incident management and hazardous materials. I am also trained to operate in Onondaga County's Emergency Operation Center EOC should the need arise.

Mr. BROUN. Thank you, Chief. I thank the witnesses for your testimony. The Chair will now at this point open the first round—well, I guess we only have time for one round of questions.

For Members' information, the last report we got from the cloakroom is we are going to have votes somewhere between 4:15 and 4:30, so just to inform the Members.

The Chair now recognizes himself for five minutes.

Ms. Cutting and Mr. Auers, the PHMSA report claims that Bakken crude is "more volatile than most other types of crude." Is it a fair comparison? Should the report have compared it Bakken crude with other light sweet crudes since they are in the same category? Is this just stating an obvious fact that it is more volatile than just other types of crude?

Mr. AUERS. As our report—

Mr. BROUN. Turn on your mic.

Mr. AUERS. As our report showed, Bakken is very similar to other crudes. Again, there is not extensive—the level of data on other crudes as there was on Bakken with ourselves, PHMSA, and others-

Mr. BROUN. And let me interrupt you because we are real tight on time. The question is PHMSA said it is more volatile than most other types of crudes. That includes heavy crudes, all crudes, and during your testimony you said that it is no more volatile than other light crudes if I remember correctly. So the question is is it just stating an obvious fact that they said that it is more volatile than other types of crudes?

Mr. AUERS. Light crude will generally have more light ends, so the answer is yes, it is stating an obvious fact.

Mr. BROUN. Ms. Cutting?

Ms. CUTTING. Bakken crude is a light sweet crude. It is the same as other light sweet crudes. When compared to heavier crudes, as PHMSA kind of was talking about, it could be considered to be lighter, have different composition than real heavy crudes, but it is a light sweet crude similar to other light sweet crudes.

Mr. BROUN. So you would agree that it is just stating an obvious fact in the PHMSA report that light—that Bakken crude is more volatile? And I take it from your answers, is that correct? Yes or no? I mean that is what we are trying to get at.

Ms. CUTTING. There is a different chemical composition between a heavy crude and a light crude.

Mr. BROUN. Well—

Ms. CUTTING. We have stated that, right? Because volatility is a lot more complex question than we can address—

Mr. BROUN. Well, I agree with that and that is the reason I am disappointed that we didn't get the scientific folks from DOE and DOT.

Ms. Cutting and Mr. Auers, you have heard me question the first panel about inconsistencies in their characterizations of the Bakken crude's ignitability and flammability characteristics. What impact does this have on industry when regulating agencies such as PHMSA appears to make a more incendiary statement about Bakken crude characteristics than a scientific agency such as the Department of Energy?

Ms. CUTTING. I think that the real issue here is how the public perceives that information when a regulatory body makes a comment like that. Of course it causes concern in the public. And I think that the other part of the public that becomes very concerned is the emergency response people, and because they knew how to deal with flammable liquid, and now when they are saying this is somehow different, it causes them to go back to the drawing board and try to figure out how it is different and how they are going to respond.

Mr. BROUN. Mr. Auers, do you want to make any comments?

Mr. AUERS. Yeah, I would agree with that. Again, Bakken is, you know, a very typical light crude. It is not an unusual, particularly hazardous material and, you know, the public, to their credit, wouldn't know the difference but when they hear that from an official source, Bakken is something different and more dangerous, that, you know, is sort of like screaming fire in an elevator, you know, or theater. It is just not something you should do. You should base it on facts, and the fact is Bakken is a very typical light crude, probably more similar to conventional light crude than most other tight oils.

Mr. BROUN. Well, and that is the purpose of this whole hearing is PHMSA is recommending that Bakken crude be characterized as Class 1 whereas my question about ethanol and gasoline, which is Class 2, you are recommending Class 3, and this is the reason we are trying to get into the scientific aspects of all this. And I thank you all for your testimony.

I yield now to—I guess Mr. Swalwell is gone so to my good friend Dan Maffei.

Mr. MAFFEI. Thank you. Thank you, Mr. Chairman. I appreciate it.

Just—I obviously am very, very pleased to have our deputy chief from the Syracuse Fire Department down here, and I appreciate yourself, the leadership of the Syracuse Fire Department and Mayor Miner for letting you come testify.

I am focused on the safety aspects of this. If there is any theme out of this hearing I think it is that this Bakken crude, while not necessarily any more dangerous in and of itself than any of the other volatile chemicals that we in a modern society have and have to transport, it is a much broader volume than it has been between 2011, 2012. It went from some 65,000 carloads to 257,000 carloads. The first panel was talking about basically a tripling—I am sorry, a multiplication by 10 over the period when we started doing this, so it is a lot more.

Mr. Zoanetti—Chief Zoanetti, are you seeing enough additional resources to handle that additional risk created not by necessarily the quality of this particular material but the volume?

Mr. ZOANETTI. Certainly improved training and planning. I know that in the other discussions safety features of either the railcars and train—track maintenance, things of that nature are going to help reduce risk. Resources for emergency service first responders is always going to be a need there. We need to increase our training capabilities and our capabilities to respond to that catastrophic incident that may or may not happen. We have to be prepared to

be able to meet the needs and the people are expecting us to meet those needs.

Mr. MAFFEI. Do you feel that you and other local fire departments are getting enough information, scientific and otherwise, to be able to assess any potential threat that could occur if there was a train derailment for instance?

Mr. ZOANETTI. I personally am often looking for information and most of the information I have received has not been completely scientific. I think I—not that I am a scientist, but I—more information would certainly be better. Information sharing is to me very critical.

Mr. MAFFEI. Mr. Zoanetti, in upstate New York, as you know, we have a lot of volunteer fire departments. How does that put increased pressure on a professional department like Syracuse in terms of its regional leadership?

Mr. ZOANETTI. Well, as I mentioned, we are the only hazardous materials team in the central New York region, so that responsibility does fall to us. Each volunteer department has a home responsibility if it happens in their districts, but quite honestly, if something does happen, they are going to be requesting our services and looking for us to help them solve their problem.

Mr. MAFFEI. So the resources you get, even though your responsibility is just to the city of Syracuse, you may very well use in all sorts of cases in the State should there be some sort of incident?

Mr. ZOANETTI. Yes, sir.

Mr. MAFFEI. Let me ask you this. Do you feel that there is any particular kind of safety provisions on the railcars? This has been some point of controversy. Or do you have any—a way to assess that or are you, you know, feeling like a—there is enough precautions as there already are or are you being asked these questions?

Mr. ZOANETTI. Well, I am not an engineer so I really don't know about the engineering part of it. I know that my training has told me that if an incident happened, I have to respond and deal with it to the best of my ability and the engineering part comes from some folks other than myself.

Mr. MAFFEI. In terms of mitigation, you were talking about the various foams used for this kind of hazardous material but also other things, liquid petroleum, other kinds of hazards, chlorine, et cetera. Is this foam expensive and are there varieties of it? Give us a sense of what that is.

Mr. ZOANETTI. The foam is roughly about $50 to $75 a gallon. That is foam concentrate. So the cost is definitely significant. As I mentioned, we are trying to stockpile a certain amount but I am not sure that a catastrophic incident we would have enough. We would have to reach out to other resources at the state and possibly at the federal level to get enough firefighting foam to really accomplish the goals that we need to accomplish.

Mr. MAFFEI. Has your budget gone up at all given this—because we have—I think in central New York has also seen about the same increase in the number of trains going through.

Mr. ZOANETTI. That has not affected our budget in a positive way at all.

Mr. MAFFEI. All right. So basically trying to do the same with what you had before but with more incidents?

Mr. ZOANETTI. Yes, sir.

Mr. MAFFEI. All right. Well, Mr. Chairman, my time is up but I would like this committee and other committees to just consider the volume of this, not with any—well, let me say this, without prejudice to whether the material itself is any more volatile or any less volatile but any other industrial material or energy source that we have to transport is simply that the volume of it requires that we look at ways to make sure that emergency departments and first responders do have the amount of resources needed to make sure that no minor incident or accident becomes a serious incident. And I will yield back.

Mr. WEBER. [Presiding] Thank you.

The gentleman from North Dakota is recognized for five minutes.

Mr. CRAMER. Thank you, Mr. Chairman. Thank you, Ranking Member.

I might just say with regard to the Ranking Member's most recent statement, I certainly don't disagree with that although I do think that Transportation and Infrastructure Committee is probably going to take up—and maybe the committee jurisdiction on some of those areas, so—but I appreciate-

Mr. MAFFEI. I just want to send them our transcript.

Mr. CRAMER. Yeah, very good.

Mr. Auers, you heard the—did you listen to or watch the testimony of the previous panel?

Mr. AUERS. I did.

Mr. CRAMER. And so, again, Chairman Broun previously, much like he did with the first panel, started down talking about the comparison between refined fuels and light sweet crude. With regard to the packing designation of 1 versus 2, 1 being more I guess safeguarded versus 2, and yet 1 is the Bakken crude and 2 is the ethanol gasoline. Is that a mischaracterization, and if so, why?

Mr. AUERS. Well, you know, I am not an expert on packing groups necessarily but ethanol is—and—you know, is flammable. So is gasoline. And I would—I did listen to the testimony earlier. I do believe if I threw a match in Bakken crude oil, it would not light. Gasoline and ethanol would. We don't burn crude oil on Bunsen burners. You know, we do burn ethanol. It wouldn't seem consistent that ethanol is in a less stringent packing group than crude oil, same with gasoline.

Mr. CRAMER. Thank you. Because this gets to my concern about a calming scientific approach versus a sort of hysterical approach if you want to know the truth because when we start packing and considering crude oil to be as flammable, as volatile as refined product—and then—and let me ask you this. I was somewhat personally confused by the end of the discussion—it wasn't a discussion; it was a question and it was an answer. Did you hear one of the witnesses say that because it is refined, somehow it—ethanol and gasoline should be safer? I mean because that didn't make sense to me or did I mishear it?

Mr. AUERS. Yeah, I mean there is no—I don't see any basis for that. I mean, you know, gasoline is a refined product. I don't think of ethanol as a refined product. It is a—

Mr. CRAMER. Sure.

Mr. AUERS. It is a pure component. Another thing about ethanol that, you know, the issue has been brought up is whether the volatility makes something more ignitable or flammable, and volatility—I don't really use that term. Volatility can't be measured. It is a—you know, most people when they talk about volatility they talk about a variety of different physical and chemical metrics that can be measured like IVP—

Mr. CRAMER. Um-hum.

Mr. AUERS. —like flashpoint, which are in the packing regulation, and also vapor pressure and light ends contents. In the case of ethanol it actually isn't volatile by those measures; it has actually got a very low vapor pressure, but it is only 2.3 psi.

Mr. CRAMER. Sure. Help me maybe better understand that then. Is there a linear relationship between all of these things that leads to volatility or is there something more dynamic that we should be considering?

Mr. AUERS. Well, again, the term volatility is defined by different people different ways so I don't tend to—

Mr. CRAMER. Sure.

Mr. AUERS. —use that term. We in the refining industry sometimes will directly talk about volatility directly as vapor pressure, but we are not talking about something that is more subject to being—to flammability. It is just the fact that it has a higher vapor pressure. And vapor pressure—and as I mentioned in my prepared testimony, there are no direct correlations between all of these metrics and ignitability and combustibility. And there are groups studying that. It is a very complex issue and there aren't any firm answers on that yet on what leads to—but certainly not a straight-line correlation. As I mentioned, ethanol has a very low vapor pressure but it is extremely flammable and ignitable.

Mr. CRAMER. And I do think—and I appreciate that all of the witnesses have said there needs to be further study and we are in sort of new territory. You clearly have done the most it seems at this point.

Also then in fairness could you sort of characterize for us in the few seconds you have remaining the Turner Mason study? And I don't want to say versus but compared to the PHMSA study, are there some stark differences or are they largely similar?

Mr. AUERS. The results are extremely similar in terms of the testing. What we found when we compared their results to our results, they were very close. I heard Director Butters confirm that as well. The differences are in the conclusions. They do two conclusions that we don't think were supported by any data that either they had or we have seen.

Mr. CRAMER. My time is expired. Thank you, Mr. Chairman. Thank you.

Mr. WEBER. Thank you.

Mr. Veasey, I believe you are up next or—Paul Broun recognized you, didn't he, Mr. Maffei?

Mr. MAFFEI. Yep.

Mr. WEBER. Yeah, good.

The gentleman from Texas.

Mr. VEASEY. Thank you, Mr. Weber. I appreciate that.

I want to ask either Ms. Cutting or Mr. Auers about an article that was in the Wall Street Journal earlier this year that analyzed data from Capline Pipeline. I am not sure if you are familiar with the company Capline Pipeline in Louisiana, but it tested crude from about 86 locations worldwide for—to measure vapor pressure, and it—and from what they found according to this article was that the light sweet crude from the Bakken had a higher vapor pressure than crude from dozens of other locations around the world. And I just wanted to ask you, like one of the companies in here, for instance, Tesoro Corporation, a major transporter of Bakken crude, said it regularly received oil from North Dakota with even more volatile pressure readings, sometimes up to 12 psi. Does that sound unusual to you at all?

Mr. AUERS. Twelve fits right in with what Bakken looked like. In our study it varied. And again, sometimes I get confused in talking about RVP and true vapor pressure and we use a true vapor pressure, which measures out about a pound higher than RVP does. But typically Bakken, from an RVP standpoint, will be 8 to 12 pounds from a true vapor pressure standpoint, 9 to 13 pounds. Again, it does vary seasonally a little bit. So 12 fits right in that range.

Mr. VEASEY. Is it—well, compared to other light sweet, was—would other light sweet be in that range as well?

Mr. AUERS. You know, as I mentioned in my testimony, some—within two or three pounds of that, some higher, some lower. A lot of the conventional pipeline crudes like the LLS, the West Texas crude at Cushing, some of those will be generally a little bit lower, more in the five to eight range. Almost—most of the tight oils are going to be potentially higher, the Eagle Fords, the Niobraras, the Uticas. So it varies, but within those ranges I don't know that there are substantive differences. What again others are studying, you know, and it was mentioned earlier, I don't think anybody knows—certainly vapor pressure doesn't correlate directly with flammability or ignitability as per the ethanol example, but to what degree it contributes to the ignitability or flammability, that is being studied. And we didn't—we are not doing that study. That is being studied by other groups.

Mr. VEASEY. Well, what about—it said by comparison that the Louisiana light sweet from the Gulf of Mexico had vapor pressure readings of 3.33 psi according to Capline. So when you compare that 3.33 psi compared to what is coming out of the Bakken, how large of a difference is that? Because you are talking about those being light sweet there.

Mr. AUERS. LLS actually is one of the—and that is pure LLS. You know, right now, you know, Bakken is part of the LLS stream. When Bakken comes into St. James, it gets blended into LLS. So LLS actually—a typical LLS is probably about that level now. It is probably more than a 5 or 6 psi range.

What is the difference between a three- or four-pound crude and a 10-pound crude as far as safety issues? I don't know that. I don't know the answer to that. People are studying that. I suspect that, again, in my example, ethanol has a vapor pressure of 2.3 psi, which is lower than LLS, but it is extremely flammable and ignitable. So it is a very—the ignitability and flammability question is

extremely complex, and one reason why there haven't been any results, any conclusions from those studies to date is because there are a lot of factors that go in to it beyond just vapor pressure, beyond just light ends content, beyond just flashpoint or initial boiling point.

Mr. VEASEY. I mean with your knowledge of, you know, transportation and quality issues related to the Bakken, I mean what is safer from a public safety standpoint? Is it better to transport this stuff by rail or is it more safe to have it in a pipeline?

Mr. AUERS. I believe, you know, as I heard in earlier testimony and I am sure Kari say that as well, it all depends. You know, I think all those forms of transportation can be safe, including marine, which you didn't mention. We transport crude oil products by all forms of—all those forms of transportation—

Mr. VEASEY. You are transporting Bakken by marine around the United States?

Mr. AUERS. Bakken will be—you know, they are putting in rail terminals on the West Coast. The idea is to rail it to the West Coast and transport by marine down to California. Bakken, as I said, does make it to the Gulf coast and some of those barrels do get blended in to an LLS stream. That—the potential is to transport that by marine around to the East Coast. So I anticipate that Bakken will be moved by marine at some point. Again, the plans are if those terminals on the Columbia River get built, then there will be Bakken moved by marine. So all forms of transportation are safe if they are done correctly.

Mr. VEASEY. Thank you. Thank you, Mr. Chairman.

Mr. WEBER. Thank you.

The Chair has a unanimous consent request. Our fellow member Jim Bridenstine from that North Texas community called Oklahoma isn't on the Committee but he would like to act as a member of the committee. Without objection, so ordered.

Mr. BRIDENSTINE. We are not North Texas. Texas is Baja, Oklahoma. Let's be clear.

The California guy laughs.

Ms. Cutting, would the hazardous material regulation cause you to treat Bakken crude any differently than crude from Eagle Ford in Texas or the DJ Basin in Colorado?

Ms. CUTTING. No.

Mr. BRIDENSTINE. So the regulations would not cause you to treat one differently from the other?

Ms. CUTTING. No. The regulations have a decision tree they must go through that initially you look at flashpoint in material and then you look at initial boiling point. And given that criteria that is used to determine packing group, all of those would be in either Packing Group 1 or Packing Group 2. And if I can take a moment to make a statement that part of the controversy that is going on as far as packing groups and some of what you have heard today is because the methodology—prescribed methodology used today with wide boiling range materials cannot tell the difference between Packing Group 1 and Packing Group 2. And that is really causing some of these issues. So I feel very safe in saying that all those materials would be Class 3 flammable liquids, Packing Group 1 or Packing Group 2. Further, Packing Group 1, Packing Group

2 designation does not change the railcar that is used to move the material and it does not change the emergency response.

Mr. BRIDENSTINE. Thank you for sharing that and clarifying.

Mr. Auers, what are the most unique characteristics of Bakken petroleum and please explain to what extent those characteristics distinguish Bakken petroleum from other types.

Mr. AUERS. Again, I don't think Bakken is particularly unique in general, but there are some things that make a difference in some of the other titles. For one, it is very consistent across the whole basin. Most other titles tend to vary quite a bit. Eagle Ford crude, for example, varies from very gassy areas to natural gas liquid area to a very light condensate down to, you know, a heavier crude oil. So even in the liquid part of Eagle Ford basin can vary from 30 gravity crude to 60 gravity crude. Bakken falls in a very tight range, generally between 40 and 43 API gravity. So it is a very mother's milk crude to the refiners, very high yields of gasoline and diesel. Refiners love it. It fits really well into the East Coast refining systems, the way they are configured. It fits pretty well into the Pacific Northwest refining complexes as they are configured. And it is—you know, it is one of the examples of why, you know, that works that way. I mean it has been very easy for those refiners to back out waterborne light crudes. It fits very well and it is a replacement for those offshore international crudes.

Mr. BRIDENSTINE. Is it true that petroleum produced from the Bakken region has an average lower sulfur content than the average sulfur content processed by U.S. refiners on average?

Mr. AUERS. Oh, yeah, quite a bit lower. It is less than, oh, .28 percent sulfur. I think the average sulfur of U.S. refinery crude runs somewhere in the 1.6/7 range.

Mr. BRIDENSTINE. What are the consequences of petroleum with lower sulfur content?

Mr. AUERS. It requires less intensive processing at the refinery level to produce clean products, you know, low sulfur transportation fuels. That makes it less expensive to process.

Mr. BRIDENSTINE. So this would be a more marketable, you know, crude than other crudes?

Mr. AUERS. It is a more valuable crude. The sulfur is not the biggest part of its value; it is the fact that it has very good distillation characteristics, again, a high yield of gasoline components and distillate diesel components, high-value transportation fuels.

Mr. BRIDENSTINE. Is it true that increased Bakken production has led to the continued operations of certain East Coast refineries?

Mr. AUERS. Yeah, I believe that is very true. Just 2 or three years ago there were several refineries that were threatened with shutdown. Before that time two or three—really four or five actually did shutdown. Once they were able to gain access to lower-cost domestic supply to be able to replace the high cost international barrels they were running, we were able to keep the Philadelphia Energy Systems plant, a big 330,000 barrel-a-day plant in Philadelphia operating. The Phillips 66, Conoco Phillips, was looking at shutting down their Marcus Hook plant south of—you know, close to the Philadelphia airport. Delta Airlines—that is a Monroe Energy subsidiary—bought that plant and it is operating. The Dela-

ware City plant has—that was shut down for a while has started up. So we—and I think continued access to that crude is crucial to keep the East Coast refineries running.

Mr. BRIDENSTINE. Thank you for sharing that. I am out of time. I just want to say it is true that what is happening in the Bakken is good for our country, and thank you guys for being here.

Mr. WEBER. The gentleman yields back.

Mr. Rohrabacher, did you have a question?

Mr. ROHRABACHER. Thank you very much. I guess we are going for votes so I will round things off.

I mentioned earlier to the first panel that there are dangers with offshore oil drilling, and I have visited offshore oil platforms. I am a surfer and a scuba diver. And—but there are people who lose their lives in building these things and also we have had fire flame outs and flares and oil spills and things in the Gulf of Mexico, et cetera.

We have had the of course Alaskan and Arctic oil production, which again is very expensive and many people probably over that time period of driving supplies and things lost their lives in making sure we had the production from the pipeline in Alaska.

And let's just note, by the way, we should all consider what our economy would have like in the last 20 years had we not thought through the Alaskan pipeline because the Alaskan pipeline only won by one vote in the United States Congress. And had we not had to that oil, what would our economy have been like during these last 30 years when the dependency on Gulf oil—meaning Persian Gulf oil—was sucking the life out of our system? You know, in coalmining there are people who die in coalmining and transporting coalmines, and of course in nuclear power we have got a waste left over that is there for 1,000 years.

So maybe, it seems to me when you have all these other resources for energy and that is what you are facing, we should be thanking God that we found oil and gas in North Dakota of all places.

And let me—I mean that was—and I am saying that as my father, mother were both from small farms in North Dakota and life was so tough in North Dakota on these small farms that my dad left the farm in order to fight in the Marine Corps to fight World War II. And life was so rough that the life of a Marine fighting World War II was actually more comfortable than the life on the farm and so he stayed in the Marine Corps.

And I—when I look and see how people in North Dakota are living now and what this means to people—ordinary people's lives, again, you should be thanking God rather than sending out an army of regulators to try to find—and using a microscope to find out any excuse to put a roadblock in the way and try to stop this wonderful gift that we have from being utilized to upgrading people's lives in our country. So that is the number one point.

Let me ask you about—and again, I think the motive that this Administration—that is why you are getting these type of very skeptical questions of the first panel is we can see that this Administration honestly believes in the global warming theory, and thus it really wants to stamp out the use of fossil fuels, and that would mean—and that is why we have the excuse of no pipeline, the Key-

stone pipeline, after all of this time not being approved. We are paying the price. We are paying the price for that and ordinary people in this country, like the people in North Dakota in particular, but ordinary people who live in this country are going to pay a price for not having this wealth that God gave us as a gift. And of course with our intelligence and the new fracking system—let me ask one question about your production there.

One thing—I have watched this develop in North Dakota because I have these family ties, gee, I sure hope there is some under my grandpa's old land but we haven't determined that yet so let me ask you this about flaring, which is one thing that I have been concerned about is that when you see these pictures at night, you see that there is enormous amounts of flaring going on in North Dakota. Now, flaring is a waste of resources. Flaring is a waste of natural gas and you are putting stuff into the air that you don't necessarily want to put in the air. I understand that North Dakota now is going out of its way to try to bring the flaring of natural gas in the Bakken under control. Is that right?

Ms. CUTTING. That is correct. The North Dakota Petroleum Council stood up a task force to look at this flaring issue and the industry itself identified the roadblocks to bringing infrastructure into place to capture that gas and a lot of that—the roadblocks had to do with landowner rights and easement. The fact that there needed to be better communication with companies who are building pipeline, this turned out to be a major roadblock. So through the effort of that task force and with working with the North Dakota Industrial Commission it was determined that one of the ways to better capture gas as quickly as possible was to have a gas capture plan required at the time of permitting, and that is now occurring.

Mr. ROHRABACHER. We are blessed with a great gift of oil and gas in North Dakota and I hope that we are able to get the flaring under control because that does reflect a waste of wealth and also something that could be harmful to people's health.

So with that said, thank you very much. This has been a very, I think, significant hearing.

Mr. WEBER. The gentleman yields back.

I will say, Dana—you know, he is being a little modest. He told me that his parents grew up on a farm that was so poor it took three acres just to rust one nail, so that is pretty poor. So perhaps they will find oil underneath your grandpa's old farm.

So with this, this hearing is concluded. Thank you for your testimony.

[Whereupon, at 4:37 p.m., the Subcommittees were adjourned.]

Appendix I

Answers to Post-Hearing Questions

ANSWERS TO POST-HEARING QUESTIONS

Responses by Mr. Chris Smith

QUESTION FROM REPRESENTATIVE CRAMER

Q1. Mr. Smith, during the hearing on September 9th titled "Bakken Petroleum: the Substance of Energy Independence," you testified that the Department of Energy is developing a statement of work for research on real-world implications of Bakken petroleum characteristics (including volatility, ignitability, and flammability), specifically as those characteristics relate to the behavior of Bakken petroleum in a rail car. Please provide the following to the Science Committee and my staff:

a. the impetus that led and the scope of this research;
b. preliminary drafts of the statement of work;
c. the final statement of work and related documents; and
d. a description of all interactions with and input from other federal, state, and local agencies, and stakeholders throughout this process.

A1-a. The Department of Energy (DOE) began to examine the properties of tight crude oils, crude oil from tight formations, after receiving a January 9, 2014 letter from U.S. Senators John D. Rockefeller IV and Ron Wyden that was addressed to both Secretary of Energy Ernest Moniz and Secretary of Transportation Anthony R. Foxx. The letter was citing their concerns that increasingly large quantities of crude oil were being shipped by rail, and that a number of catastrophic derailments of trains carrying crude oil had recently occurred. Senators Rockefeller and Wyden indicated that they considered it imperative that the Departments of Transportation and Energy understand and properly evaluate the safety of transporting crude oil by rail. Four State of New York Transportation Commissioners expressed similar concerns in a January 29, 2014 letter to Secretaries Moniz and Foxx and other Federal officials.

Following receipt of these letters and recognizing concerns regarding the shipment of crude oil by rail, DOE staff began familiarizing itself with both the quantities and general characteristics of crude oil that was being transported by rail. Our work consisted of reviewing the reports of studies done by others, including the Department of Transportation's Pipeline and Hazardous Materials Administration (PHMSA), the North

Dakota Petroleum Council (NDPC), the American Fuel and Petrochemical Manufacturers, and Transport Canada. DOE staff also interviewed various oil producers concerning what type of crude oil conditioning and processing practices were being performed in the Bakken region of North Dakota. DOE also held discussions with officials of the North Dakota Industrial Commission (NDIC), which is considering exercising State regulatory authority over such practices.

A1-b. As I stated in my testimony on September 9th, fundamentally, the responsibility for safe transportation of these materials rests with the transportation companies moving them, and the liability for accidents must remain with the private sector. No funds have been requested in the FY15 President's Budget for DOE to evaluate the flammability and safety hazards to the public of a potential transportation accident and spill of tight crude oil and the Administration has no intent to modify its FY15 request or submit a budget amendment in this area.

Going forward, whether any additional research activities would be the proper role of government, the appropriate approach for such research, and whether it would be undertaken by DOE or another agency in a future fiscal year are matters that have not yet been determined; any project to further characterize the nature of Bakken crude oil will be determined through the budget formulation process.

A1-c. We have not completed any final statements of work to further characterize the nature of Bakken Crude Oil.

A1-d. DOE staff, primarily within the Office of Fossil Energy, have spoken with staff at PHMSA, NDIC, NDPC, Transport Canada, and various oil producers. Such discussions have been solely concerned with the physical and chemical properties of tight crude oils

and on the practices that oil producers currently use to condition crude oil prior to shipment.

Responses by Mr. Timothy Butters

QUESTIONS FOR THE RECORD
The Honorable Cynthia Lummis (R-WY)
U.S House Committee on Science, Space, and Technology
Subcommittee on Energy
Subcommittee on Oversight

Bakken Petroleum: The Substance of Energy Independence

Questions for Mr. Timothy Butters

1. *Please compare and contrast the Department of Transportation's data and research regarding volatility of Bakken crude oil with respect to other hazardous commodities, including toxic inhalation hazard materials, poison inhalation hazard materials, and ethanol.*

The properties of mined gases and liquids, including crude oil, are variable based on time, method, and location of extraction. Whereas manufactured goods (e.g., toxic by inhalation materials, corrosives, and explosives) often undergo a strict quality assurance process to ensure characteristics are within defined parameters, mined gases and liquids do not. Unlike manufactured goods, organic materials from oil and gas production represent a unique challenge in regards to classification. Differences in the chemical makeup of the raw material can vary over time and geographical location. Typically, organic materials from oil and gas production at a well head are passed through a "separator" to remove the gas, sediment, and water from the crude. As such, there are multiple hazardous materials that are commonly shipped from the well-site including: crude, natural gas condensate, and natural gas. With regard to Bakken crude, it is important to note that the infrastructure to perform this separation varies from well to well.

The Pipeline and Hazardous Materials Safety Administration (PHMSA) issues the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) that prescribe requirements for the safe transportation of hazardous materials by all modes. PHMSA's regulations state that it is the responsibility for shippers to ensure the proper classification of hazardous materials (see § 173.22 of the HMR). The HMR specifies criteria to determine if a material is considered hazardous and the type of hazard a material may pose in transport. This criterion distinguishes different hazards by designation into various hazard classes. These hazard classes pose distinct and separate hazards from each other. Further, the HMR designates an order of precedent for a material containing multiple hazardous properties. The proper classification of any hazardous material is required prior to offering it for transport. The HMR then specifies packaging, handling, and transport conditions appropriate for the hazard. The HMR generally applies a rationalized approach to similar hazards. However, the types and levels of packaging, the handling and transport provisions, and response measures are specific to each hazard. Therefore, PHMSA does not typically assess the risk posed by the hazard of a commodity by comparison to a risk posed by a dissimilar hazard.

The data and research of PHMSA, as it relates to the classification of Bakken crude oil, is a necessary step to ensure proper classification of this raw material. Early indications from the July 6, 2013 derailment in Lac-Mégantic suggested that the Bakken crude oil was misclassified. Specifically, the product was assigned a PG III classification (lowest hazard), despite meeting the criteria for PG II. Therefore, there was an incorrect identification of the hazards. This was later confirmed by the Transportation Safety Board of Canada's (TSB) Railway Investigation Report R13D0054.[1]

Volatility is the tendency of a substance to vaporize. As such, it relates to vapor pressure and boiling points. Vapor pressure is defined as the pressure exerted by a vapor in thermodynamic equilibrium with its condensed phases (either solid or liquid) at a given temperature in a closed system. Boiling point is the temperature at which the vapor pressure of a liquid equals the pressure surrounding the liquid, and the liquid changes into a vapor. When referring to flammable liquids, the flash point will also be related to the volatility of a material, because the flash point is the lowest temperature at which a particular material vaporizes sufficiently to form an ignitable mixture in air. Volatility is typically used when referring to liquids, although it is also used when describing substances undergoing sublimation (solids changing directly from solid to gas/vapor). Chlorine, as an example of a toxic inhalation hazards material, has a boiling point of -29 °F, and it exists as a gas at ambient temperature and pressure. The vapor pressure of chlorine at 50 °F is 74 psi for comparison purposes. While these values are relevant for comparing volatility, the hazard associated with chlorine and other TIH materials are measured through LC50. LC50 is the lethal concentration required to kill half the members of a tested population over a specified duration. Chlorine has an LC50 of 293 ppm (parts per million) for 1 hour of exposure. To determine the extent of hazard posed by toxic inhalation hazard materials, vapor dispersion is utilized along with toxicity data to determine areas which would be impacted by a release.

With respect to manufactured materials such as ethanol, the chemical properties are well known, consistent, and understood. Ethanol is a flammable (Class 3) colorless liquid. It is a polar solvent that is volatile and completely miscible (mixes) in water. Vapors of ethanol are characterized as having a vinous or wine-like odor. Ethanol has a vapor density of 1.59, indicating that it is heavier than air and will seek lower altitudes (tend to collect closer to the floor level). Its specific gravity indicates that it is lighter than water, but it will thoroughly mix with water. Once mixed, it will not separate. It has a wider flammable range than gasoline, has a blue flame, and does not produce visible smoke unless denatured with gasoline.

The flammability of ethanol is affected by mixture with water, but remains flammable even with the presence of 80% water. At this concentration, the flash point is 97 °F, and it is still considered a flammable liquid. Ethanol blends will have properties affected by the percentage of ethanol in the blend.

[1] http://www.tsb.gc.ca/eng/rapports-reports/rail/2013/r13d0054/r13d0054.pdf

CHEMICAL/PHYSICAL PROPERTIES OF PURE ETHANOL

Formula	C2-H6-O
Molecular Weight	46.07
Color/Form	Clear, colorless, very mobile liquid
Odor	Mild, like wine or whiskey (vinous)
Ionization potential	10.47 eV
Boiling Point	173 °F
Melting Point	-173 °F
Liquid Density	0.79 at 68 °F
Vapor Density	1.59
Flammable Range	3.3 – 19%
Solubility	Miscible in water and organic solvents
Vapor Pressure	2.3 psi at 100°F 4.3 psi at 122°F
Flash Point	55 °F

The properties of ethanol are also affected by temperature. At colder temperatures (below 51°F), the vapor pressure of ethanol is outside the flammable range. The testing conducted under Operation Safe Delivery was done to confirm classification of the crude oil in the Bakken region. It is important to note that crude oil's properties will vary based on specific location as well as processing conducted prior to transportation and ambient temperature. The results seen under Operation Safe Delivery show that crude oil from the Bakken region has flash points below 73 F, initial boiling points ranging from 79.1 F to 123.8 F, and vapor pressures ranging from 7.70 psi to 15.1 psi at 100 F when tested with a vapor to liquid ratio of 4:1 and between 20.3 psi and 37.21 psi at 122 F when tested with a vapor to liquid ratio of 0.02. While specific flash points were not measured because the objective of the testing only needed to confirm a flash point below 73, many of the values measured were less the 50 F with some measured below 32 F.

2. *What methodology does the Department of Transportation employ to evaluate the risks associated with the transportation of specific materials?*

The Department of Transportation has established safety goals for PHMSA. The Department works toward the prevention of hazardous materials incidents involving death or major injury. Hazmat incidents with death or major injury have declined an average of about 5% every four years over the long term (1988-2013). Much of this success is attributed to PHMSA's efforts toward the prevention of deaths and injuries associated with the transportation of hazmat by all transportation modes. PHMSA continues to focus on its top safety rulemakings, the safe transportation of energy products, risk based inspection and outreach activities, and improving data quality.

The agency concentrates on the prevention of high-risk incidents identified through the evaluation of transportation incident data and findings compiled through the collection and review of incident reporting forms (Form 5800.1). This data provides detailed information regarding hazardous materials incidents, including, hazardous materials involved, damage to packaging, mode of transportation, impacts, and incident location. In addition, PHMSA also focuses our efforts on incidents identified through the NTSB investigation process. PHMSA uses all available agency tools to assess data; evaluate alternative safety strategies, including regulatory strategies as necessary and appropriate; target enforcement efforts; and enhanced outreach, public education, and training to promote safety outcomes.

The Hazardous Materials Regulations and Program serve as a risk-based approach to identifying hazards and the degree of risk posed within each hazard (classification); specifying packaging standards to prevent the release of material (containment); notification of hazards to transport workers, emergency responders, and the public (communication); a nation-wide oversight program to provide outreach and enforcement (compliance); and incident mitigation training through grants and emergency response guidance (consequence). However, PHMSA recognizes that modern risk management includes factors beyond what is captured by these conventional considerations. For example, PHMSA is entering Phase 2 of its Risk Management Framework (RMF) initiative. The objective of RMF is the development of a data-driven-system that systematically and comprehensively identifies the most significant hazmat hazards and consequences, manages and monitors direct or indirect risk signals. Completion of this phase of RMF will result in assessing the risk, predicting/mitigating the risks associated with the changes in commodity flow, supply, and demand. The input of the RMF includes:

- Models that identifies trends and draw conclusions from PHMSA data and other data sources.
- Analysis of the data produced by PHMSA to ensure it is of high quality, useful to the data users, and develops and maintains standards for data quality.
- Strategic assessments of the factors identified as particularly important to PHMSA safety programs (e.g. energy, environments, agricultural etc.).
- Evaluation of the effectiveness of PHMSA risk management programs including regulatory, enforcement, and outreach.

Responses by Ms. Kari Cutting

QUESTIONS FOR THE RECORD
The Honorable Cynthia Lummis (R-WY)
U.S. House Committee on Science, Space, and Technology
Subcommittee on Energy
Subcommittee on Oversight

Bakken Petroleum: The Substance of Energy Independence

Questions for Ms. Kari Cutting

1. Is Bakken crude more volatile than heavy crudes (API gravity less than 35 degrees)?

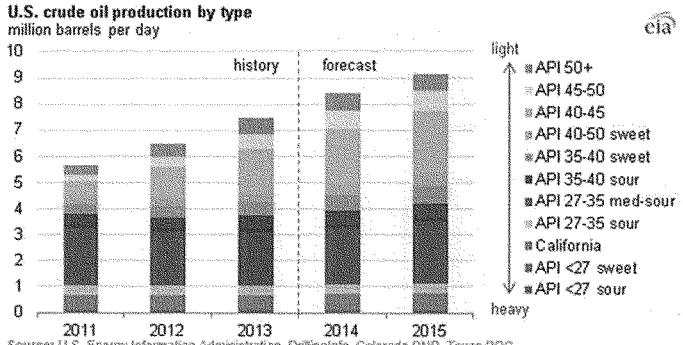
Current regulations require the danger of flammable liquids to be categorized by flashpoint and initial boiling point if the flammable liquid has a vapor pressure less than 43.5 psi. By that criteria, all flammable liquids are subclassified into Packing groups I, II and III with PG 1 considered the highest danger, PG II modest danger, and PG III less dangerous. Currently, Bakken crude oil tests as either a PG II or a PG I flammable liquid because of some issues with the testing methodology. The North Dakota Petroleum Council has recommended that all members label Bakken as a PG I material until better analytical methodologies can be agreed upon.

Heavier crudes may test as PG I, II or III material depending their composition and therefore in some cases, might be identified as being of lesser danger. For example, the Canadian dil bits, though heavy by API gravity, are mixed with significant amounts of diluent to make them pumpable and transportable, contributing to a low flash and initial boiling point and therefore are expected to also be classified as Flammable Liquids, PG I or PG II.

However, given the fact that light sweet crudes now make up 60% of domestic production and this fast growing majority will need an increasing level to rail transport, the focus should be on light sweet crude oils. All new regulations and safety improvements should look at light sweet crude oils and all flammable liquids moved in transportation (more robust railcars, track maintenance, employee and emergency response training etc.)

JUNE 6, 2014

Increases in U.S. crude oil production come from light, sweet crude from tight formations



Source: U.S. Energy Information Administration, DrillingInfo, Colorado DNR, Texas RRC
Note: Higher API numbers indicate lighter crude oil.

http://www.eia.gov/todayinenergy/detail.cfm?id=16591

2. Is Bakken crude more volatile than light crudes (API gravity greater than 35 degrees)?

EIA defines light sweet crudes as having an API gravity equal to or greater than 35 degrees. Formations that are now producing domestic light sweet crude include the Bakken, the Permian and Eagle Ford, and the Utica.

Their API gravities vary from less than 40 API to about 60 API while Bakken has an average API gravity of 42 degrees. West Texas Intermediate (WTI) the most common domestic crude oil has an average API gravity of 41 degrees, very close to Bakken. Conclusion, Bakken is lighter than some but heavier than others. Bakken is definitely not the lighter crude oil that will be moved by rail or truck in the United States. As Gulf Coast refineries are quickly reaching their capacity for light sweet crude oils, more Texas (Permian and Eagle Ford crude oil) will be looking for a market and will need to be railed to that market. Opening up export will help elevate the pressure on domestic markets.

CRUDE NAME	ORIGIN	API
Eagle Ford Light	Texas	58
Arabian Super Light	Saudi Arabia	51
Eagle Ford	Texas	48
Agbami	Nigeria	48
DJ Basin	Colorado	45
Sarahan Blend	Algeria	43
Bakken	North Dakota	42
West Texas Intermediate	Tex/New Mexico	41
Brent	United Kingdom	38
LLS	Louisiana	36
Alvheim Blend	Norway	35
Arabian Heavy	Saudi Arabia	28
Alberta Dilbit	Alberta	21

3. Is Bakken crude safe to transport by rail under the current regulations and can these regulations be improved?

Both the Turner Mason study and PHMSA "Operation Classification" agree that Bakken crude oil is properly classified as a Class 3 Flammable Liquid, PG I or II when offered for transportation.

Can these regulations be improved? Yes, the oil and gas industry in North Dakota believes in a goal of zero incidents and therefore believes in striving for a cultural of continual improvement. The PHMSA NPRM as well as the API RP 3000 investigated and offered modifications that will lead to incremental safety improvements for all flammable liquids offered for rail transport in the United States. The American Association of Railroads (AAR) reports that 99.9977% of all hazmat shipments arrive safely at destination, hundreds of manhours have been spent studying how best to provide incremental safety improvement on the remaining 0.0023%.

Appendix II

Additional Material for the Record

PREPARED STATEMENT OF FULL COMMITTEEE RANKING MEMBER
EDDIE BERNICE JOHNSON

OPENING STATEMENT

Ranking Member Eddie Bernice Johson (D-TX)
Committee on Science, Space, and Technology

Joint Subcommittee Hearing
"Bakken Petroleum: The Substance of Energy Independence"

September 9, 2014

Thank you Chairman Lummis and Chairman Broun for holding this afternoon's hearing to discuss issues related to the transportation of oil from the Bakken region. I am looking forward to hearing more about steps the Administration is taking to ensure that this is done as safely as possible and that measures are being taken to provide emergency personnel with all the information and training they need to do their job in the event of an accident.

No one wants to see another horrific train derailment and explosion like the one that happened in a small town in Quebec which claimed 47 lives last year. Unfortunately, more and more of these dangerous incidents are happening because there are more and more trains carrying light crude oil to refineries across the country. The Federal Railroad Administration estimates that the overall volume of crude oil moving by rail increased from just over 65,000 carloads in 2011 to more than 255,000 carloads in 2012, and more than 400,000 carloads last year. In addition, according to the Pipeline and Hazardous Materials Safety Administration the number of train accidents involving crude oil increased from zero in 2010 to five in 2013 and another five as of August of this year. Our first responders and fire fighters must be adequately prepared to act if a train derails and the leaking oil catches fire.

I have been a strong supporter of bills reauthorizing the Assistance to Firefighters Grant program and the Staffing for Adequate Fire and Emergency Response program. These grants provide money to fire departments throughout the nation, including in Dallas and the surrounding cities in my Congressional District in Texas, to purchase equipment, to fund training programs, and to hire additional firefighters. In fact, in May, the Federal Emergency Management Agency awarded the Lancaster Fire Department a grant that will provide critical help to meeting its firefighting and emergency medical response needs.

The firefighters in the cities and towns these trains pass through need to know what kinds of oil are going through their communities. Knowing the level of flammability and other key characteristics of the materials carried in these tank cars will help inform local fire departments and first responders on how to prepare for any future accidents and may well help save lives.

While I am certainly supportive of the responsible development of new sources of energy, we also have a responsibility to protect the welfare of the people. I look forward to this Committee doing what it can to support any additional research into the safety of crude oil transportation and to support the necessary emergency response training for our firefighters. I appreciate the witnesses' time and expertise.

Thank you, and I yield back.

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