

REVIEW OF RECENT ENVIRONMENTAL PROTECTION AGENCY'S AIR STANDARDS FOR HYDRAULICALLY FRACTURED NATURAL GAS WELLS AND OIL AND NATURAL GAS STORAGE

HEARING

BEFORE THE

SUBCOMMITTEE ON CLEAN AIR
AND NUCLEAR SAFETY

OF THE

COMMITTEE ON
ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE
ONE HUNDRED TWELFTH CONGRESS

SECOND SESSION

JUNE 19, 2012

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ONE HUNDRED TWELFTH CONGRESS
SECOND SESSION

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REVIEW OF RECENT ENVIRONMENTAL PROTECTION AGENCY'S AIR STANDARDS FOR HYDRAULICALLY FRACTURED NATURAL GAS WELLS AND OIL AND NATURAL GAS STORAGE

TUESDAY, JUNE 19, 2012

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON CLEAN AIR AND NUCLEAR SAFETY,
Washington, DC.

The Subcommittee met, pursuant to notice, at 10 a.m. in room 406, Dirksen Senate Office Building, Hon. Thomas R. Carper (Chairman of the Subcommittee) presiding.

Present: Senators Carper, Inhofe, Cardin, Merkley, Barrasso, Sessions, and Johanns.

Also present: Senators Udall and Gillibrand.

**OPENING STATEMENT OF HON. THOMAS R. CARPER,
U.S. SENATOR FROM THE STATE OF DELAWARE**

Senator CARPER. The hearing will come to order.

We welcome you, one and all. Appreciate the efforts of our witnesses to join us today.

As you know, today's hearing is an oversight hearing. It's focused on air rules for the oil and natural gas industry which the EPA finalized, I believe, in April. Senators will have 5 minutes for their opening statements, and I'll then recognize the Assistant Administrator for the Office of Air and Radiation at EPA to offer her statement to the Committee.

Following the Assistant Administrator's statement, we will have one round of questions. Then our second panel of witnesses will come forward, and their testimony will be followed by another round of questions.

Today we hear a lot about the incredible boom in natural gas production in this country. Some call it a blessing, and I think there is something to that. We hear how this boom has allowed us to see extremely low natural gas prices. Low prices not only bring our energy costs down, but also help to make our manufacturers even more competitive throughout the world.

The surge of production is mainly due to a technique called hydraulic fracturing, or fracking. And as the low hanging fruit of easily accessible reservoirs dry up, natural gas producers have increasingly turned toward fracking to access more unconventional shale gas formations.

Recently the use of fracking has skyrocketed to an estimated 11,400 new fractured wells each year. These numbers are expected to grow. As the use of fracking increases, we have a responsibility to ensure that developments happen responsibly and our shared environment remains protected, especially the air we breathe. Without control technology, fracking can result in the release of natural gas and methane into the atmosphere. Beyond wasting a limited energy resource, these emissions can damage our air and our health.

The natural gas emissions contain harmful pollutants that form ozone and can also cause cancer. The methane released by fracking is a greenhouse gas that is more than 20 times—20 times—as potent as carbon dioxide.

Before April of this year, only States like Colorado and Wyoming required the capture of these emissions. There were no Federal regulations regarding fracking emissions. I was encouraged when the Environmental Protection Agency stepped up to address the lack of regulation for this growing industry and growing source of emissions this April with the release of new air standards for oil and gas production. These new standards focused on fractured natural gas wells, asking industry to clean up their air pollution emissions by 2015.

Mirrored after State regulations in Wyoming and Colorado, these new rules are a common sense, win-win solution for both industry and the environment. The rules will significantly reduce the amount of smog producing, cancerous air pollutants released by fractured wells, primarily through a process known as reduced emissions completions, or green completions.

Green completions use special equipment to capture the natural gas that normally escapes into the atmosphere during the fracking process. This green completion approach represents a victory both for clean air and for industry, because once the emissions are captured using the green completion method, the gas companies can turn around and sell that natural gas instead of letting it escape unused into the atmosphere. The additional profits earned by selling this captured gas are expected to offset the cost of the new equipment and training that are necessary to implement this rule.

Not only will these standards significantly reduce harmful air pollution, the industry may well come out ahead in the end, too, a win-win for industry and the environment. That is why Colorado and Wyoming and a number of municipalities already require green completions, and many operators are using the technique voluntarily.

After reviewing over 150,000 comments, EPA has also provided a reasonable schedule for producers to capture their excess natural gas through green completions. Producers will have until 2015 to fully comply with these new rules. The result will be significantly improved air quality for everyone.

This regulation shows that the choice between clean air and a strong economy is a false choice. We can have both clean air and a strong energy sector in this economy. And we need both.

Our shale gas formations have enormous potential and will certainly play a key role in America's energy future. But this potential must be utilized responsibly. The new EPA air standards strike the

proper balance between a healthy environment and our energy needs.

On that note, I look forward to having open and thoughtful dialogue with our witnesses and colleagues today. I am pleased to recognize one of our two Senators from that State of Wyoming, Senator Barrasso.

**OPENING STATEMENT OF HON. JOHN BARRASSO,
U.S. SENATOR FROM THE STATE OF WYOMING**

Senator BARRASSO. Thank you very much, Mr. Chairman.

I want to also thank and welcome the witnesses here today. Especially I want to welcome John Corra, the Director of the Wyoming Department of Environmental Quality. John was appointed as the Director of the Department by then-Democrat Governor Dave Friedenthal and confirmed by the State senate in March 2003, when I was a member of the Wyoming State Senate. So John, thanks so much for coming back from Wyoming for a visit.

Mr. Chairman, the White House has touted its strong support for natural gas as a viable alternative, they say, to cheap, affordable American coal. President Obama stated during his 2012 State of the Union speech that “We have a supply of natural gas that can last America nearly 100 years.” He said, “My Administration will take every possible action to safely develop this energy.”

The rhetoric of this White House does not match the actions of this Administration and its allies in the environmental community. On May 9th, 2012, a Bloomberg news story highlights an important point made by Jack Gerard, President of the American Petroleum Institute, and Dave McCurdy, President of the American Natural Gas Association. The Bloomberg article states that both Gerard and McCurdy have been emphasizing one point. While Obama had called for more gas production, as many as a dozen Federal agencies—as many as a dozen Federal agencies—were considering various rules or policies that could deal drilling a setback.

Among these rules, Mr. Chairman, are proposed EPA rules governing hydraulic fracturing. This week we will debate whether the Senate will endorse President Obama’s war on coal, when we vote on Ranking Member Inhofe’s amendment to block the EPA’s Utility MACT rule. This rule makes it nearly impossible for energy companies to build new coal fired power plants. The war on coal by this Administration has been devastating to communities across the West, the Midwest, and Appalachia.

What we are going to discuss here today is this Administration’s upcoming war now on natural gas. The war on natural gas should be no surprise to those who have followed the words of then-Candidate Senator Barack Obama, who campaigned against natural gas as part of his cap and trade climate change agenda. In a 2008 interview with the San Francisco Chronicle, then-Candidate Obama stated that “Because I’m capping greenhouse gases, coal fired power plants, you know, natural gas, you name it, whatever the plants were, whatever the industry was, they would have to retrofit their operations.” That is Candidate Barack Obama, 2008, against natural gas.

It is important to note that the Sierra Club has once again endorsed President Obama for President. On May 3d, the Sierra Club

announced their “Beyond Natural Gas” campaign. In a May 7th of this year Energy Environment Daily article, the Executive Director of the Sierra Club spelled out his intentions toward new natural gas plants when he stated, “We’re going to be preventing new gas plants from being built wherever we can.”

I suspect that many in this Administration agree with this goal, while they still tell folks across America that natural gas will be there to supply their needs after they are done with their war on coal. What I want my colleagues to understand is that we cannot simply allow the same tactics that are hurting the many working men and women across this country who work in the coal industry to have those same tactics used to drive natural gas out of business.

Organizations like the Sierra Club have praised these tactics and have celebrated the closing or blocking of hundreds of coal plants. These same organizations now fully expect this EPA to begin using the same tactics to attack natural gas. They are advocating this just as the first shovels are hitting the ground to build the natural gas well pads and new natural gas plants to replace coal mines and power plants that are being forced to close. If we do not change course, the end result will be an expensive, rationed, and foreign supplied energy future for our country.

Mr. Chairman, I believe we must make American energy as clean as we can as fast as we can, and do it in ways that don’t raise energy prices for American families or cost thousands of jobs. I believe this Administration has been on the wrong track to accomplish this goal.

Thank you, Mr. Chairman. I look forward to the testimony.

Senator CARPER. You are welcome.

I was sitting here wondering, did we read the same rule? We will find out.

Senator Inhofe.

**OPENING STATEMENT OF HON. JAMES M. INHOFE,
U.S. SENATOR FROM THE STATE OF OKLAHOMA**

Senator INHOFE. Thank you, Mr. Chairman.

I also want to welcome on the second panel Darren Smith, who will have a great story to tell. It is incredible, some of the good things that are happening out there.

But today’s hearing is to review the EPA’s air rules and highlights on ongoing war waged by the Obama administration against fossil fuels in the development of America’s abundant domestic energy resources. Ironically, this hearing comes at a time when President Obama’s top environmental team is in Rio. That is called the Rio Conference Plus 20, the first one was in 1992. They are down there working on policies that would significantly weaken this country and which have failed time and time again, not only in the U.S. Congress, but in the arena of public opinion as well.

It is also important to mention that this hearing comes while Congress is in the middle of a debate about the Obama EPA’s economically devastating Utility MACT that was mentioned by Senator Barrasso. This was my CRA to try to stop this rule that would essentially do away with coal in America.

The oil and gas production in America is increasing despite the Obama administration's best efforts to shut down domestic energy production in favor of their radical green agenda. They are working to stop hydraulic fracturing through 13 Federal agencies and have attempted to implement their agenda to "crucify" American energy producers.

We got a glimpse of this crucify philosophy in a rare moment of honesty by the Sixth District Regional Administrator of the EPA. Because of the EPA's unprecedented actions in Parker County, Texas, I launched an investigation to begin with a letter to the agency on April 25th. I am extremely disappointed that despite my attempt to conduct oversight as a ranking member of the authorizing committee with jurisdiction over the agency, EPA has met my request with a disappointing lack of responsiveness and transparency. While I certainly don't blame the witness on the first panel, I would like to have your help in trying to get a response from this letter.

Almost 2 months after sending the letter, I have received no response from the EPA, let alone the comprehensive and substantive answers required to ensure legitimate congressional oversight of an agency that is becoming increasingly rogue and defiant. Due to the importance of this investigation and the EPA's lack of cooperation, I am pleased to announce today that I, along with Senators Vitter, Boozman, Coburn, Cornyn, and Hutchison, that is every Republican member that is in the Region 6, we have a letter sent formally to request that the EPA Inspector General launch an official investigation into the EPA's actions in Parker County, Texas.

Hydraulic fracturing has been used more than a million times, and it started in my State of Oklahoma, back in 1949, was the first time that they used hydraulic fracturing. Since that time, it has been very successful. It has been regulated in a fine way by the States. While I often disagree with one of the persons, a witness that is on the second panel, Fred Krupp, in this case I did agree with him when he said that "Given the dysfunction in DC, a State by State approach will be more effective." I agree with that statement.

The EPA Administrator admitted in April, "In no cases have we made a definitive determination that the fracking process has caused chemicals to enter groundwater." So there we have a statement that is made by two individuals, the last one by Lisa Jackson. I have a great deal of respect for her honesty in response to the question that I had asked. And she said there is not a case that is out there where they can identify groundwater contamination.

So these rules that we are talking about are somewhat—are rules that we have looked at, and we have a concern that we are not just killing it as the vote tomorrow at 12:30 on the CRA on Utility MACT, not just on coal, but on all fossil fuels. It is kind of interesting to me that people who are opposed to fossil fuels—and they have the war on fossil fuels—are starting with coal. But the war goes on after that.

My concern is this. We have a country called America, and we have to provide energy to run this machine called America. And you can't do it without fossil fuels.

So I look forward to this hearing, and particularly those witness who are familiar with the process of hydraulic fracturing. I think it should be a very revealing hearing, and I appreciate your coming.

[The prepared statement of Senator Inhofe follows:]

STATEMENT OF HON. JAMES M. INHOFE,
U.S. SENATOR FROM THE STATE OF OKLAHOMA

Today's hearing to review EPA's air rules highlights the ongoing war being waged by the Obama administration against fossil fuels and the development of America's abundant domestic energy resources. Ironically, this hearing comes at a time when President Obama's top environmental team is in Rio working on policies that would significantly weaken this country and which have failed time and time again—not only in the U.S. Congress but in the arena of public opinion as well. It is also important to mention that this hearing comes while Congress is in the middle of a debate about the Obama EPA's economically devastating Utility MACT rule designed to kill coal in America, effectively waging open war against an industry which supplies our economy with thousands of jobs and affords us cheap and reliable domestic energy.

Oil and gas production in America is increasing despite the Obama administration's best efforts to shut down domestic energy production in favor of their radical green agenda. They are working to stop hydraulic fracturing through 13 Federal agencies and have attempted to implement their agenda to "crucify" American energy producers. We got a glimpse of this "crucify" philosophy in a rare moment of honesty from a former Obama EPA Regional Administrator, and unfortunately, we have seen this approach played out across the country.

Because of EPA's unprecedented actions in Parker County, Texas, I launched an investigation which began with a letter to the Agency on April 25. I am extremely disappointed that despite my attempt to conduct oversight as the ranking member of the authorizing committee with jurisdiction over the Agency, EPA has met my request with a disappointing lack of responsiveness and transparency. Almost 2 months after sending the letter, I have received no response from EPA whatsoever, let alone the comprehensive and substantive answers required to ensure legitimate congressional oversight of an agency that is becoming increasingly rogue and defiant.

Due to the importance of this investigation and EPA's lack of cooperation, I am pleased to announce today that I, along with Senators Vitter, Boozman, Coburn, Cornyn, and Hutchison—that is, every Republican from EPA Region 6—have sent a letter formally requesting that the EPA Inspector General launch an official investigation into EPA's actions in Parker County, Texas.

Hydraulic fracturing has been used on more than 1 million wells since it was first performed over 60 years ago just outside of Duncan, Oklahoma. The practice has always been safely regulated by the States, and as a matter of fact, in February one of our witnesses was quoted in a New York Times article discussing who should be responsible for regulating hydraulic fracturing. Fred Krupp said, "Given the dysfunction in DC, a State by State approach will be more effective." This is a statement I very much agree with. Despite ongoing efforts by EPA to manufacture a link between hydraulic fracturing and groundwater contamination—including an ongoing water study which many have raised serious concerns over—EPA Administrator Lisa Jackson admitted in April, "In no cases have we made a definitive determination that the fracking process has caused chemicals to enter groundwater."

The rules we are discussing today are little more than a thinly veiled attempt to regulate greenhouse gases from hydraulic fracturing and are an obvious attempt to wrest power from States' control and instead place it in the hands of the Federal Government. They are critically flawed and are predicated on faulty and inaccurate data and analysis that over-exaggerate emissions—in some estimates more than 1,400 percent. Additionally, these rules mandate the use of technologies that are not readily available and further exaggerate emissions through an inadequate accounting of production and gathering facilities.

The combination of hydraulic fracturing with horizontal drilling has led to an American energy revitalization that has created thousands of American jobs, brought in revenues to State, local, and Federal governments, and helped enhance our nation's energy security. It has occurred in States that effectively and efficiently regulate hydraulic fracturing absent unnecessary Federal impediments. Current efforts by the Obama administration are designed to eliminate hydraulic fracturing by putting more and more authority over the process into the hands of the Federal Government. States have successfully regulated this practice for over 60 years and

are in the best position to protect their citizens and understand their unique challenges and geologies. For these reasons, we should keep the States in charge of hydraulic fracturing and continue the benefits to consumers, jobs, economic growth and expansion, and our nation's energy security that have resulted from the safe and responsible development of America's vast resources.

I would like to thank our witnesses for coming today, particularly Darren Smith from Devon Energy, and I look forward to hearing the testimony.

Senator CARPER. All right.
Senator Cardin.

**OPENING STATEMENT OF HON. BENJAMIN L. CARDIN,
U.S. SENATOR FROM THE STATE OF MARYLAND**

Senator CARDIN. Thank you, Mr. Chairman. Thank you very much for calling this hearing.

First, let me just take issue with the comments of Senator Inhofe and Senator Barrasso as it relates to the record of the Obama administration on energy security. Domestic oil production has increased—increased—every year President Obama has been in office. In 2011 U.S. crude oil production reached its highest level since 2003, increasing by an estimated 120,000 barrels per day over the 2010 level to 5.6 million barrels per day.

Since 2009 the United States has been the world's leading producer of natural gas. In 2011 U.S. natural gas production easily eclipsed previous all-time production records set in 1973. Overall, oil imports have been falling since 2005, and net imports as a share of the total consumption declined from 57 percent in 2008 to 45 percent in 2011, the lowest since 1995.

Mr. Chairman, I put that on the record because I think the Obama administration has tried to be balanced as we relate to energy security. We desperately need an energy policy for this country. An energy policy that makes us energy secure, that builds jobs that can't be exported. And we know green energy is where we will create more jobs. And one that is friendly toward our environment. The good news is that the answer for all three lies in a similar solution.

So I just really want to put on the record that the Obama administration has been very sensitive to energy security issues, as well as dealing with our future for jobs and for our environment.

We have—Marylanders have a direct interest in this hearing. The Marcellus Shale deposits run through the western part of Maryland, so I am very much interested. And Senator Inhofe knows the Subcommittee on Water and Wildlife held a similar hearing as it relates to water quality issues. And Senator Inhofe has pointed out rather accurately that Oklahoma has been doing fracking for a long time, and its record is very positive.

We now know that there are 11,000 new fracking wells that have been placed into service in the last year. So there is a lot going on. The challenge is that not every geological area is the same as Oklahoma.

Another problem we have is that the pollution issues—whether they be water or whether they be air—know no State boundaries. So if a State is not doing what it needs to do, and pollutants enter our air flow, if it happens in West Virginia, it is going to come into Maryland.

So Maryland can have the tightest rules that there are, and we have seen that in regard to the utility issues that we will be talking about later today on Senator Inhofe's resolution. Maryland has taken steps as it relates to our utilities. The problem is the rest of the nation has not. And this is a national problem. We need national solutions.

As a result, we passed the Clean Air Act. We also passed the Clean Water Act. And the Environmental Protection Agency is charged with carrying out the responsibilities under the Clean Air Act, and that is exactly what they are doing. In fact, the court is directing them to come in with regulations because we have an issue.

The good news is that every time we do these regulations, we look at cost-benefits. What is the cost versus the benefits? In every case, the ratios are well in favor of the benefits to our society by having clean air. I am sorry Senator Lautenberg is not here because he tells, I think, a very clear story, a personal story about asthma in his family and the impact that dirty air has on children and on parents that have to stay home and miss work.

So clean air is an important responsibility. I think we all want to make sure that we have clean air. But here is the good news. The good news is if we get this done right we can expand our natural gas collections in this country in a way that will be more cost effective and also reduce pollutants. And that is, I think, what the Department is trying to do. One of their proposals, as I understand, captures some of the gas that is being emitted for sale, providing another revenue flow and more energy for this country and helping our environment.

And that is, I think, what we are trying to find, ways that we can get energy from a variety of sources, including natural gas, do it in a way that creates more jobs, and is friendlier to our environment. And I would hope, in compliance with very important laws such as the Clean Air Act, which has helped the safety of people in this nation.

So I look forward to this hearing, and I hope that we can stay straight as to the issues that are really before us. Thank you.

Senator INHOFE. Mr. Chairman.

Senator CARPER. Senator Inhofe.

Senator INHOFE. As my good friend Senator Cardin knows, when another member's name is mentioned, he can respond. So I want to do that. If you will just briefly.

Senator CARPER. Please.

Senator INHOFE. It is true that production has expanded since 2008 during this Administration. However, it has all been done in the private sector. With all the advances that are out there right now, and we are booming, it is the answer to our energy problem, it is the answer to unemployment, and all of that, it is all happening in the private sector. It is unbelievable to me that in the public sector, that which the Obama administration has control over, it has actually reduced by 17 percent.

So it is booming, and it is booming in spite of his effort toward percentage deletion, Section 199, manufacturers' exemption and all of the tax things that he has had that would be punitive to development of gas and oil.

Senator CARPER. All right. Let's just hold it there.

Senator CARDIN. I do know Senator Inhofe wanted to nationalize our energy industry.

Senator CARPER. Let's just hold it there.

Senator Gillibrand, you are next; thank you.

**OPENING STATEMENT OF HON. KIRSTEN GILLIBRAND,
U.S. SENATOR FROM THE STATE OF NEW YORK**

Senator GILLIBRAND. Thank you, Mr. Chairman, and thank you for letting me participate in this hearing, since I am not on the Subcommittee. I appreciate your generosity.

Thank you for being here. I just want to inquire on two areas. Now, obviously natural gas drilling in New York State is a huge economic opportunity that many of our farmers and rural landowners are very interested in pursuing. But many of our communities are also concerned about what would happen to quality of drinking water, what risks are being taken, are there any health effects.

And the two major questions that I am hoping you can respond to are this: many members of our community are interested in knowing what the formulas are, what the concentrations are, and what chemicals are being used in the hydro-fracking process. They believe that it is a fundamental right to know what chemicals are being placed into the ground and whether those chemicals have had tests concerning health effects. Have there been studies? Have there been tests? Do we know whether they have any negative health effects? Are there any carcinogens preset?

The second question is, obviously when you engage in hydro-fracking, when you push the water deep into the earth, you will bring up water that has then been tainted with natural elements that are found within the earth. Oftentimes that may include radium. So the question is, is there a way to clean this water from any heavy metals or any other contaminants safely enough to have it then reintroduced into the water supply in some way?

So those are the two areas of concern that New Yorkers have come to me most often with. Can we get full disclosure? Is there a way to mandate that disclosure so we know that no chemicals being used have negative health effects and know in advance that studies have already been done? And two, can we require treatment of water that comes up to make sure we are not contaminating groundwater? And I know that this is just opening statements, but I won't be here for later. So when it is appropriate, I would be grateful if you either would respond to those questions or submit for the record. Those are my two areas of interest for New York State.

Senator CARPER. Thanks for joining us today.

Senator Udall.

**OPENING STATEMENT OF HON. TOM UDALL,
U.S. SENATOR FROM THE STATE OF NEW MEXICO**

Senator UDALL. Thank you very much, Senator Carper. I also appreciate your allowing me to participate.

I just wanted to note, Senator Inhofe, in the Permian Basin, we are booming in terms of oil. This is mostly BLM land, and we are

at a 12- to 14-year high in terms of oil production on Federal lands. Gas isn't nearly as high, as you know, because of the economics and the low gas price. But we see different things around the country, but I thought that should be noted for New Mexico and the Permian Basin flows over into Texas and then southeastern New Mexico.

I believe that natural gas has great potential as an energy source in the U.S. It is a significantly cleaner burning fuel for power plants and vehicles and coal or oil. And America has a very large supply due to shale gas reserves. Like any growing resource, extraction sector, the natural gas industry will need to minimize its impact on the environment to maximize its potential. EPA put a lot of work collaborating with industry, developing the standard to reduce fugitive emissions from hydraulic fracturing of oil and gas wells.

I am encouraged by reports that many oil and gas producers already meet the proposed standard, since it is in their interest to minimize methane emissions.

I would like to thank our witnesses today. In particular, Assistant Administrator Gina McCarthy, Fred Krupp from EDF, and Mr. Darren Smith of Devon Energy. Devon has a significant presence in New Mexico and contributes a good deal to efforts like BLM's Restore New Mexico program to mitigate their impacts.

So with that, Senator Carper, I would yield back.

Senator CARPER. All right, thanks for joining us.

Let me welcome our first witness, no stranger to this Committee, Gina McCarthy. As we know, Ms. McCarthy is the EPA Assistant Administrator for the Office of Air and Radiation. I think she is doing an exemplary job since joining the EPA. We welcome you back here today.

You will have roughly 5 minutes to present your opening statement, and the full content of your statement will be included in the record. Again, welcome, thanks for joining us. Please proceed.

STATEMENT OF HON. GINA MCCARTHY, ASSISTANT ADMINISTRATOR, OFFICE OF AIR AND RADIATION, U.S. ENVIRONMENTAL PROTECTION AGENCY

Ms. MCCARTHY. Thank you, Chairman Carper, Ranking Member Barrasso, members of the Subcommittee.

Mr. Chairman, I appreciate the opportunity to appear before you today regarding EPA's recently issued emissions standards for the oil and gas industry. These standards will significantly reduce emissions of harmful air pollutants. They are achievable through current technologies already available and being used by leading companies as well as States. They will not slow natural gas production, and the result will be substantial cost savings.

A year ago, the President set a bold but achievable goal of reducing oil imports by a third in a little over a decade. In the last year alone, we have already cut net imports of oil by 10 percent, or a million barrels a day, putting the United States on a pace to meet our goal by the end of the decade.

Domestic oil and natural gas production has increased every year President Obama has been in office. In 2011 American oil production reached the highest level in nearly a decade, and natural gas

production reached an all-time high. The Obama administration is committed to ensuring the development of these vital domestic resources occurs both safely and responsibly.

The rules we are here to discuss today include the first Federal air pollution standards for hydraulically fractured natural gas wells, along with requirements for several other oil and gas emission sources, such as storage tanks and natural gas processing facilities that currently are not regulated at the Federal level. These standards will reduce ozone forming air pollution and cancer causing air toxics, providing health benefits for Americans across the country.

Combined, these rules are expected to reduce between 190,000 and 290,000 tons of volatile organic compounds and emissions reductions of 12,000 to 20,000 tons of air toxics each year. Exposure to ozone is linked to increased asthma attacks, hospital admissions, and emergency room visits as well as premature deaths. EPA's rules also protect against potential cancer risks from emissions of several toxic air pollutants, including benzene.

As a co-benefit, the technologies also reduce methane emissions. Methane is an ozone precursor, and is a greenhouse gas that is more than 20 times as potent as carbon dioxide. These standards are expected to reduce methane emissions by the equivalent of 19 million to 33 million metric tons of carbon dioxide annually.

EPA worked with the regulated industry, and we worked with affected States to develop these new standards. After considering extensive public comment, we made changes in the final rules to help ensure that pollution reductions are achieved without slowing natural gas production. Most importantly, the rules include a transition period during which industry can control volatile organic compound emissions from hydraulic fracturing using one of two approaches. Until January 2015 VOC emissions can be controlled either through flaring or through the use of so-called green completions, or reduced emission completions, which capture natural gas that otherwise would escape to the air.

After January 1, 2015, green completions will be required for most wells covered by the standards. This will provide the time necessary to order and manufacture enough equipment to ensure that these green completions can be done cost effectively.

Gas captured through green completions can be treated and sold, and the revenues from the sales are expected to more than offset the cost of compliance. EPA's analysis shows a cost savings of \$11 million to \$19 million annually when the rules are fully implemented in 2015.

These standards are achievable. Information provided to EPA indicates that green completions already are being used at about half of the fractured natural gas wells in the United States because of the leadership of those in the natural gas industry. Green completions already are required by leading States like Wyoming and Colorado and by some cities, including Fort Worth and South Lake, Texas.

In crafting these rules, we made a special effort to ensure the program aligns with the existing programs in these States. We learn from them; we align with them. We do not duplicate their ef-

fort, but we ensure that there is a level playing field across the United States.

EPA standards support responsible growth in oil and natural gas development while protecting public health and the environment. They do level the playing field, requiring wells across the country to implement what is cost effective in proving technologies that are already used by the leading companies.

Finally, EPA standards will save millions of dollars annually by encouraging recovery of natural gas that currently is wasted. To sum up, these are win-win standards that represent an important addition to the more than 40-year success story of the Clean Air Act.

Thank you very much, and I look forward to responding to your questions.

[The prepared statement of Ms. McCarthy follows:]

Opening Statement of Regina McCarthy
Assistant Administrator, Office of Air and Radiation
U.S. Environmental Protection Agency

Hearing on Oil and Gas New Source Performance Standards (NSPS) and National Emission
Standards for Hazardous Air Pollutants (NESHAPs)
Committee of Environment and Public Works
U.S. Senate
June 19, 2012

Chairman Carper, Ranking Member Barrasso, and members of the Subcommittee, I appreciate the opportunity to appear before you today regarding the U.S. Environmental Protection Agency's (EPA) recently issued New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants for the Oil and Gas Industry. These cost-effective standards will significantly reduce emissions of harmful air pollutants from the oil and gas sector, are achievable through technologies and practices that are already being used by leading states, cities, and companies, and will result in substantial cost savings through reduced waste and increased recovery of natural gas.

A year ago, the President set a bold but achievable goal of reducing oil imports by a third in a little over a decade. In the last year alone, we have already cut net oil imports by ten percent – or a million barrels a day – thanks to booming domestic oil and gas production, more efficient cars and trucks, and a world-class refining sector that last year made the United States a net exporter of gasoline, diesel and other fuels for the first time in 60 years. These efforts have put the United States

on pace to meet our goal by the end of the decade. Domestic oil and natural gas production has increased every year President Obama has been in office. In 2011, American oil production reached the highest level in nearly a decade and natural gas production reached an all-time high.¹

Natural gas plays a key role in our nation's clean energy future, and the Obama Administration is committed to ensuring that the development of this vital resource occurs safely and responsibly. On April 17, 2012, EPA issued regulations, required by the Clean Air Act, that are cost-effective and that reduce harmful air pollution from the oil and natural gas industry, while allowing continued, responsible growth in U.S. oil and natural gas production. The final rules include the first federal air pollution standards for natural gas wells that are hydraulically fractured, along with requirements for several other sources of pollution in the oil and gas industry, such as storage tanks and natural gas processing facilities, that currently are not regulated at the federal level. Based on public comment, EPA made a number of changes to the proposed rules to increase compliance flexibility while maintaining comparable environmental benefits, streamlining notification, recordkeeping and reporting requirements, and strengthening accountability.

Benefits of the New Standards for the Oil and Gas Industry

The New Source Performance Standards and the National Emission Standards for Hazardous Air Pollutants for the Oil and Gas Industry will allow continued, responsible growth in U.S. oil and natural gas production while reducing harmful air pollution from the oil and natural gas industry. President Obama's April 13, 2012, Executive Order Supporting Safe and Responsible Development of Unconventional Domestic Natural Gas Resources states: "[I]t is vital that we take full advantage of our natural gas resources, while giving American families and communities confidence that natural

¹ EIA, U.S. Petroleum Supply Monthly, Released June 5, 2012; and EIA, Natural Gas Monthly, Released May 31, 2012.

and cultural resources, air and water quality, and public health and safety will not be compromised.”

EPA’s oil and gas standards, which are required by the Clean Air Act, do just that. These standards will reduce ozone- or smog-forming air pollution and cancer-causing air toxic emissions, providing health benefits to Americans across the country. Combined, these rules are expected to reduce between 190,000 and 290,000 tons of Volatile Organic Compound (VOC) emissions, and 12,000 to 20,000 tons of air toxic emissions each year. While summer violations of the ambient air quality standards for ozone are common in large metropolitan areas, winter ozone has become a problem in some areas where significant natural gas production occurs.² For example, parts of the Upper Green River Basin in Wyoming were recently designated nonattainment for ozone for the first time ever due to wintertime exceedances. The oil and gas standards will reduce these ozone-forming emissions.

The standards are cost-effective, relying on proven technology and practices that industry leaders already are using today at about half of the fractured natural gas wells in the United States.³ EPA’s analysis of the rules shows a net cost savings to the regulated industries of \$11 to \$19 million annually when the rules are fully implemented in 2015; and as explained below, EPA’s standards achieve these savings largely by reducing waste of valuable natural gas that otherwise would escape into the air.

The Standards for the Oil and Gas Industry are Needed to Protect Public Health

The oil and gas industry is a significant source of VOC emissions, which contribute to the formation of ground-level ozone, or smog. In 2009, about 1.1 million wells were producing oil and

² Schnell et al. (2009), Rapid photochemical production of ozone at high concentrations in a rural site during winter; and Carter and Seinfeld (2012), Winter ozone formation and VOC incremental reactivities in the Upper Green River Basin of Wyoming

³ Based on the total methane reductions reported to EPA’s Natural Gas Star Program in 2008-2010. Detailed information can be found in the Background Supplemental Technical Support Document for the Final New Source Performance Standards. April 2012. Docket ID EPA-HQ-OAR-2010-0505-4550.

natural gas in the United States.⁴ The majority of new gas wells drilled today use a process known as hydraulic fracturing or “fracking.” In this process, a mixture of water, chemicals and a “proppant” (usually sand) is pumped into a well at extremely high pressures to fracture rock and allow natural gas to escape. An estimated 11,400 new wells are fractured each year.⁵ EPA estimates another 1,400 existing wells are re-fractured to stimulate production or to produce natural gas from a different production zone. Data provided to EPA show that some of the largest air pollution emissions in the natural gas industry occur in both urban and rural areas of the country, as natural gas wells that have been fractured are being prepared for production.

These standards will achieve nearly a 95 percent reduction in emissions of VOCs from more than 11,000 new hydraulically fractured gas wells each year. The VOC emission reductions from wells, combined with emission reductions from storage tanks and other equipment, are expected to help reduce ozone- or smog-forming air pollution in areas where oil and gas production occurs. Exposure to ozone is linked to increased asthma attacks, hospital admissions and emergency room visits, and premature death. These rules will additionally protect against potential cancer risks from emissions of several toxic air pollutants, including benzene.

As a co-benefit, the technologies and practices that capture and reduce emissions of VOCs and toxic air pollutants also reduce methane emissions. Methane, which is the primary component of natural gas, is an ozone precursor as well as a greenhouse gas that is more than 20 times as potent as carbon dioxide (CO₂). EPA estimates that these standards will result in reducing methane emissions by up to 1 to 1.7 million tons – or the equivalent of about 19 to 33 million metric tons of CO₂.

⁴ EIA. U.S. Energy Information Administration, Annual Energy Review 2010.

⁵ EIA. Annual Energy Outlook 2011 Reference Case (successful completions in tight sands, shale, coalbed methane formations in 2015)

Rules Support Oil and Gas Production

EPA's Natural Gas STAR Program is a voluntary partnership with U.S. oil and gas companies, started in 1993, to promote proven, cost-effective technologies and practices that improve operational efficiency and reduce methane emissions. Through this Program, participating companies identify and implement emission reducing technologies and practices based on corporate goals and resources and then report those activities to EPA on an annual basis. Building in part on this longstanding work, EPA sought technical advice from the regulated industry to develop the new standards. After considering extensive comments on our proposed rules, EPA made changes in the final rules to ensure that pollution reductions are achieved without slowing natural gas production. Specifically, the final rules establish a transition period during which industry can control VOC emissions from hydraulically fractured wells using one of two approaches. During the transition period that extends until January 1, 2015, VOC emissions can be controlled either through flaring (essentially burning off the gas) or through the use of a proven process – known as a “reduced emissions completion” or “green completion” – which captures natural gas that otherwise escapes to the air. Green completions are conducted using special equipment that separates gas and liquid hydrocarbons from the flowback that comes from the well as it is being prepared for production. The gas and hydrocarbons can then be treated and sold. This process avoids wasting gas by routing the captured gas into a pipeline. The estimated revenues from selling the captured gas, which currently is wasted, are expected to offset the costs of compliance while significantly reducing pollution from this expanding industry. After January 1, 2015, most wells covered by EPA's standards will be required to use green completions. New exploratory (“wildcat”) wells or delineation wells are exempt because they are not near a pipeline to bring the gas to market, and low pressure wells are

exempt because gas cannot be routed to a gathering line from these wells. This approach will provide the time necessary for industry to order and manufacture enough equipment to conduct green completions.

Green completions are required in Wyoming and Colorado, as well as in some cities, including Forth Worth and Southlake, Texas. Additionally, data provided to EPA's Natural Gas STAR program and through the public comment process show that a number of companies are using green completions voluntarily. In creating these rules, we made a special effort to ensure the program aligns with existing programs in states that require green completions, and to respect states' choices on how to regulate them in the future. EPA's rules build on the emission reductions that state, local, and oil and gas industry leaders already are achieving, helping to level the playing field across the industry and to ensure that this win-win practice is used in all states where gas wells are fractured.

The Clean Air Act

EPA's new standards for the oil and gas industry represent another important addition to the Clean Air Act's longstanding and continuing success story. For more than 40 years, the Clean Air Act has fostered steady progress in reducing the threats posed by pollution and allowing us all to breathe easier. In 2010 alone, programs implemented pursuant to the Clean Air Act Amendments of 1990 are estimated to have reduced premature mortality risks equivalent to saving over 160,000 lives; spared Americans more than 100,000 hospital visits; and prevented millions of cases of respiratory problems, including bronchitis and asthma attacks.⁶ They also enhanced productivity by preventing 13 million

⁶ USEPA (2011). The Benefits and Costs of the Clean Air Act from 1990 to 2020. Final Report. Prepared by the USEPA Office of Air and Radiation. February 2011. Table 5-6. This study is the third in a series of studies originally mandated by Congress in the Clean Air Act Amendments of 1990. It received extensive peer review and input from the Advisory

lost workdays; and kept kids healthy and in school, avoiding 3.2 million lost school days due to respiratory illness and other diseases caused or exacerbated by air pollution.⁷

However, few of the emission control standards that gave us these huge gains in public health were uncontroversial at the time they were developed and promulgated. Most major rules have been adopted amidst claims that that they would be bad for the economy and bad for employment. In contrast to doomsday predictions, history has shown, again and again, that we can clean up pollution, create jobs, and grow our economy all at the same time. Over that same 40 years since the original Act was passed, the Gross Domestic Product of the United States grew by more than 200 percent.⁸ It is misleading to say that the Clean Air Act is bad for the economy and employment. It isn't. Families should never have to choose between a job and healthy air. They are entitled to both.

Some may find it surprising that the Clean Air Act also has been a good economic investment for our country. A study led by Harvard economist Dale Jorgenson found that implementing the Clean Air Act actually increased the size of the US economy because the health benefits of the Clean Air Act lead to a lower demand for health care and a healthier, more productive workforce. According to that study, by 2030 the Clean Air Act will have prevented 3.3 million lost work days and avoided the cost of 20,000 hospitalizations every year.⁹ Another study that examined four regulated

Council on Clean Air Compliance Analysis, an independent panel of distinguished economists, scientists and public health experts.

⁷ Ibid.

⁸ Bureau of Economic Analysis, National Economic Accounts, "Table 1.1.5. Gross Domestic Product,"

<http://bea.gov/national/index.htm#gdp>

⁹ Dale W. Jorgenson Associates (2002a). *An Economic Analysis of the Benefits and Costs of the Clean Air Act 1970-1990. Revised Report of Results and Findings.* Prepared for EPA. [http://yosemite.epa.gov/ee/epa/eeerm.nsf/vwAN/EE-0565-01.pdf/\\$file/EE-0565-01.pdf](http://yosemite.epa.gov/ee/epa/eeerm.nsf/vwAN/EE-0565-01.pdf/$file/EE-0565-01.pdf)

industries (pulp and paper, refining, iron and steel, and plastic) concluded: "We find that increased environmental spending generally does not cause a significant change in employment."¹⁰

The EPA's updated public health safeguards under the Clean Air Act will encourage investments in technology upgrades that can put current unemployed or under-employed Americans back to work. Environmental spending creates jobs in engineering, manufacturing, construction, materials, operation, and maintenance. For example, EPA vehicle emissions standards directly sparked the development and application of a huge range of automotive technologies that are now found throughout the global automobile market. The vehicle emissions control industry employs approximately 65,000 Americans with domestic annual sales of \$26 billion.¹¹ Likewise, in 2008, the United States' environmental technologies and services industry of 1.7 million workers generated approximately \$300 billion in revenues and led to exports of \$44 billion of goods and services,¹² larger than exports of sectors such as plastics and rubber products.¹³ The size of the world market for environmental goods and services is comparable to the aerospace and pharmaceutical industries and presents important opportunities for U.S. industry.¹⁴

Jobs also come from building and installing pollution control equipment. For example, the U.S. boilermaker workforce grew by approximately 35 percent, or 6,700 boilermakers, between 1999 and 2001 during the installation of controls to comply with EPA's regional nitrogen oxide reduction

¹⁰ Morgenstern, R. D., W. A. Pizer, and J. S. Shih. 2002. "Jobs versus the Environment: An Industry-Level Perspective." *Journal of Environmental Economics and Management* 43(3):412-436.

¹¹ Manufacturers of Emissions Control Technology (http://www.meca.org/cs/root/organization_info/who_we_are)

¹² DOC International Trade Administration. "Environmental Technologies Industries: FY2010 Industry Assessment." [http://web.ita.doc.gov/ete/eteinfo.nsf/068f3801d047f26e85256883006ffa54/4878b7e2fc08ac6d85256883006c452c/\\$FILE/Full%20Environmental%20Industries%20Assessment%202010.pdf](http://web.ita.doc.gov/ete/eteinfo.nsf/068f3801d047f26e85256883006ffa54/4878b7e2fc08ac6d85256883006c452c/$FILE/Full%20Environmental%20Industries%20Assessment%202010.pdf) (accessed February 8, 2011)

¹³ U.S. Census Bureau, Censtats Database, International Trade Data--NAICS, http://censtats.census.gov/naic3_6/naics3_6.shtml (accessed September 6, 2011)

¹⁴ Network of Heads of the European Environment Protection Agencies, 2005. "The Contribution of Good Environmental Regulation to Competitiveness." http://www.eea.europa.eu/about-us/documents/prague_statement/prague_statement-en.pdf (accessed February 8, 2011).

program.¹⁵ Over the past seven years, the Institute for Clean Air Companies (ICAC) estimates that implementation of just one rule – the Clean Air Interstate Rule Phase 1 – resulted in 200,000 jobs in the air pollution control industry.¹⁶

Conclusion

This administration’s “all of the above” approach to American energy includes a strong focus on responsibly increasing domestic oil and gas production. Domestic natural gas production has never been higher while domestic oil production, currently at an eight-year high, will help to continue to reduce our nation’s vulnerability to the ups and downs of the global markets. EPA’s recent Clean Air Act standards for the oil and gas industry help to support this policy. These standards support responsible oil and natural gas exploration and production while protecting public health and the environment. They also help to level the playing field, requiring wells across the country to use cost-effective and proven technologies that leading states, cities, and companies already are using. Finally, they encourage operators to capture and sell natural gas that currently escapes into the air, resulting in more efficient operations, while reducing harmful emissions that can impact air quality in surrounding areas and nearby states. In short, these win-win standards protect public health in a way that supports responsibly increasing domestic production, and the standards ultimately pay for themselves as industry captures more of a valuable natural resource.

¹⁵ International Brotherhood of Boilermakers, *Boilermaker Labor Analysis and Installation Timing*, March 2005, EPA Docket OAR-2003-0053 (docket of the Clean Air Interstate Rule).

¹⁶ November 3, 2010 letter from David C. Foerter, Executive Director of the Institute of Clean Air Companies, to Senator Thomas R. Carper (http://www.icac.com/files/public/ICAC_Carper_Response_110310.pdf) (accessed February 8, 2011).

Enclosure

Environment and Public Works Committee Hearing
June 19, 2012
Follow-Up Questions for Written Submission

Questions for Gina McCarthy

Questions from: Senator James Inhofe

New Source Review Aggregation

1. In September 2009, you withdrew (without notice and comment rulemaking) the previous Administration's determination that oil and gas fields do not need to be aggregated for purposes of New Source Review permitting. You replaced the previous law and policy that provided certainty to oil and gas development with a case-by-case subjective analysis, which has created uncertainty, lawsuits, and challenges to oil and gas permits throughout the United States. What led the Agency to determining the previous law or policy was incorrect? Was there any concern at the Agency that replacing the previous law or policy with a case-by-case subjective analysis would lead to substantial uncertainty in the development of oil and gas resources?

Response:

Source determinations under the New Source Review (NSR) program have always been made on a case-by-case basis, using three regulatory criteria (whether activities are under common control, are contiguous or adjacent, and whether they are part of the same industrial grouping). The January 12, 2007, guidance memorandum "Source Determinations for Oil and Gas Industries" issued by Acting Assistant Administrator William Wehrum (the 2007 memo) was not a "determination that oil and gas fields do not need to be aggregated" and did not mandate application of a particular approach to determining whether oil and gas fields need to be aggregated for purposes of NSR and Title V permitting. Rather, it was a non-binding policy statement that set forth a possible methodology for making source determinations in the oil and gas industry. The 2007 memo attempted to simplify the analysis required by the existing NSR and title V regulations by focusing on only one of the three regulatory criteria for source determinations, looking at proximity to determine whether activities are "contiguous or adjacent." This focus on just one of the three regulatory factors caused confusion. To avoid this confusion, in 2009 the EPA withdrew the 2007 memo and affirmed that all three regulatory criteria still apply, and must be assessed as usual when making a case-by-case determination of whether activities should be aggregated. This is consistent with our existing NSR regulations (40 C.F.R. 52.21), as explained in the 1980 preamble to the promulgation of those regulations (45 FR 52676) and as demonstrated through almost 30 years of historical practice making source determinations across a number of industries, including the oil and gas industry.

2. I understand that there is an on-going pilot program in EPA Region 8 that resulted from an appeal of a permit issued pursuant to the case-by-case subjective policy that you placed into effect. The pilot program requires the oil and gas industry to provide a vast amount of information in its permit applications that were never before required to demonstrate why oil and gas fields should not be treated as a traditional industrial facility. Why and under what authority did EPA require such an increase burden on the oil and gas industry? What affects would EPA estimate this new level of documentation would have on future litigation, paperwork, and regulatory certainty to oil and gas developers?

Response:

As discussed in the response to question one above, the EPA has not changed the regulatory factors used to determine whether emissions activities belong to the same major stationary source. The pilot program was developed for the purpose of studying, improving, and streamlining the way the regulatory criteria are used in making oil and gas source determinations in new or renewal title V permits. The pilot program was developed to settle a challenge to a permit-to-operate issued by the EPA. In this case, the applicant had to provide similar information to the EPA fairly late in the permitting process so that the Agency could provide a required response to public comments regarding the source determination. The pilot program avoided further proceedings in that matter, while developing information that could strengthen the EPA's record in making future source determinations. This will ultimately result in less paperwork and provide earlier and greater regulatory certainty as to the application of the regulatory criteria to the oil and gas sector. The pilot program is time and location limited. It only applies to the first six title V permit applications (new or renewal) submitted to EPA Region 8, or until October 2013, whichever comes first. To date, no permit applications have been received under the pilot program.

3. Does EPA intend for New Source Review permitting to be applicable to oil and gas fields? How could an oil and gas field be permitting under the NSR pre-construction permitting program when the expansion and development of an oil and field evolves over time and is not a traditional industrial source?

Response:

The Clean Air Act requires that NSR permitting apply to any new or modified source that has the potential to emit regulated pollutants greater than threshold amounts. NSR permitting is not limited to specific industry categories and thus also applies to oil and gas sources if they have sufficiently large potential emissions. There are oil and gas sources that are major sources and have sought permits. Many industries have sources that evolve over time, and the NSR program applies to changes at sources that make physical or operational changes that result in an increase in emissions greater than the significance threshold.

4. Emissions at well-sites have never been regulated under NSPS because well pad emissions are extremely low. How does EPA justify regulating the oil and gas industry given that emissions from these sites are well below any threshold of concern?

Response:

Natural gas well completion activities are a significant source of volatile organic compound (VOC) emissions, which occur when natural gas and non-methane hydrocarbons are vented to the atmosphere during flowback of a hydraulically fractured gas well. VOCs are precursors to ozone and PM_{2.5}, both of which have been shown to have adverse health effects at low levels of exposure. The EPA estimates that uncontrolled gas well completions involving hydraulic fracturing vent substantially (approximately 200 times) more VOCs than uncontrolled completions not involving hydraulic fracturing (i.e., conventional gas wells). Specifically, the EPA estimates that uncontrolled well completion emissions for a hydraulically fractured gas well are approximately 23 tons of VOCs, whereas emissions for a conventional gas well completion are around 0.12 tons VOCs. Prior to this rulemaking, the last NSPS for the Oil and Gas Sector was promulgated in 1985. At that time, hydraulically fractured gas wells were not common, thus VOC emissions at wells sites were far lower than they are today. Additionally, the

information the EPA received on hydraulically fractured oil wells suggests that emissions from these wells are far lower than gas wells, and thus emissions from hydraulic fracturing of oil wells are not covered under this NSPS.

5. Other Clean Air Act programs, such as minor source permitting programs that are implemented by the States, were already regulating the low emitting sources in the oil and gas industry. Why did EPA find it necessary to regulate these low emitting sources when the States were already doing so under the Clean Air Act?

Response:

This rulemaking draws from successful aspects of existing state programs in Wyoming and Colorado and applies these standards nationally, leveling the playing field across all states and providing substantial and cost-effective health and environmental benefits. As described in the response to question four, well completions at hydraulically fractured gas wells are a substantial source of VOC emissions. Colorado and Wyoming are already regulating these emissions, but hydraulic fracturing is rapidly spreading across the country and into states without permitting programs designed for this new form of gas exploration and production. A national program based on the successes of existing state programs yields significant benefits to human health and the environment.

6. In the 2008 Consolidated Appropriations Act, Congress directed EPA to inventory of greenhouse gas (GHG) emissions above "appropriate thresholds." Subpart W is the section of the resultant EPA rule targeting onshore oil and natural gas production. In theory, only a facility that meets the threshold of 25,000 tons/year would be required by the rule to purchase and install monitoring equipment and report GHG emission levels to EPA. However, even though most individual wells would never come close to meeting the GHG thresholds, EPA's sweeping definition of a single "facility" will require operators to install costly equipment on every well. This is because in its novel definition, EPA defines a "facility" as a bundling of all petroleum or natural gas equipment on a well pad or associated with a well pad in a single hydrocarbon basin. Significantly, some of these hydrocarbon basins are so large that under this expansive approach all wells under common ownership along the Gulf Coast of Texas and Louisiana and are treated as one facility. Likewise, all wells under common ownership in State of Pennsylvania would be considered one facility. Why has EPA created this unprecedented definition of "facility?" Why did EPA not use a definition equivalent to the definition of a facility under the Clean Air Act as modified by the intent of Section 112 (n)(4)?

Response:

When the EPA proposed subpart W of the Greenhouse Gas Reporting Rule, its goal was to provide a facility definition that all producers can directly apply, and that would be both practical and cost-effective. The EPA sought public comment on a range of possible options for defining the facility that would report with respect to onshore petroleum and natural gas production, ranging from defining the facility at the individual well pad, to defining the facility at the field-level, to defining the facility at the basin-level. Taking into account public comments, the EPA finalized the definition of a facility with respect to onshore petroleum and natural gas production using a basin-level approach because the operational boundaries and basin demarcations are clearly defined, widely known, and the approach covered over 80 percent of emissions from onshore petroleum and natural gas production.

In addition, the EPA developed subpart W in a way that would maximize rule coverage while keeping reporting burden to a minimum, including the reporting burden on small facilities. For example, the EPA provided a threshold for reporting, and certain methodologies for specific emission sources allow for alternative methods that would reduce burden and maintain data quality. The GHG calculation methodologies used in the rule generally include the use of engineering calculations, emissions modeling software, and emission factors, or, when other methods are not feasible, direct measurement of emissions.

Subpart W is a reporting rule that collects information on the location and magnitude of GHG emissions from petroleum and natural gas systems. In contrast, Clean Air Act section 112 is a standard setting requirement to regulate air toxics (also referred to as “hazardous air pollutants” or “HAP”) listed in that section.

7. Despite the exploration and production industry being such a small contributor to GHG emissions, with the more significant amounts coming from an even smaller subset of wells, EPA has put forth a proposal that would impose costly, confusing compliance burdens on almost all operators. Even of the smallest wells, at the real risk of having them be shut-in, must conduct what was supposed to be one year inventory on whether industry's GHG emissions are closer to 3 or 6 percent. What was EPA's rationale for selecting an this expansive approach burdening all producers as opposed to a more strategic proposal that would target the few sources with the greatest potential to emit GHGs?

Response:

All producers are not required to report under subpart W of the Greenhouse Gas Reporting Rule. The EPA did consider options to minimize burden, and finalized a threshold for reporting from onshore petroleum and natural gas production of 25,000 metric tons CO₂ equivalent, meaning that facilities that fall below the threshold are not required to report. Many industry stakeholders expressed support for a 25,000 metric ton CO₂ equivalent threshold because it sufficiently captures the majority of GHG emissions in the United States, while excluding many of the smaller facilities and sources.

8. Inexplicably, EPA has already promulgated NESHAPS and NSPS for the very emissions it purports to inventory. If this rule really needed for EPA to obtain accurate and reliable emissions measures, why did EPA already set NESHAPS and NSPS requirements before obtaining these inventories?

Response:

The purpose of the oil and gas regulations was not to inventory GHG emissions, but to control VOC and hazardous air pollutant (HAP) emissions from this sector. The EPA used several sources of data in order to base these rules on the most accurate information on the oil and gas industry possible. Some examples of these sources are:

- Data provided by the oil and natural gas industry to the EPA Natural Gas STAR Program. The program has been working collaboratively with industry since 1993.
- Data provided as part of the formal public notice and comment process during the rulemaking.
- Gas composition profiles from the Western Regional Air Partnership (WRAP).
- Data from the National Emissions Inventory (NEI) to perform the Risk Assessment.
- Data from the 2011 update of the U.S. Inventory of Greenhouse Gas Emissions, which included over 1,000 production wells across the United States.

While the EPA is confident that our current rules were based on the best information available when they were released, including the 2011 update of the U.S. Inventory of Greenhouse Gas Emissions, the EPA will continue to refine and improve our knowledge of the oil and gas industry as data and information become available. This process of continual improvement requires updating the U.S. Inventory of Greenhouse Gas Emissions as emissions change and new data become available.

General

9. EPA cannot regulate technology into existence. Experts have serious concerns that the equipment prescribed to conduct Reduced Emission Completions will simply not be available in time to comply with the final rule schedule. If it takes years to manufacture sufficient specialized equipment and adequately train operators how to safely conduct these operations, how will EPA accommodate these anticipated impracticabilities?

Response:

Through EPA and industry events and collaborative studies, the EPA has interacted with operating companies that have extensive experience implementing reduced emissions completions (REC). In particular, the EPA developed a detailed study on RECs in collaboration with oil and gas companies (Lessons Learned from Natural Gas STAR Partners Reduced Emissions Completions for Hydraulically Fractured Natural Gas Wells, available at: http://www.epa.gov/gasstar/documents/reduced_emissions_completions.pdf). Based on information received in public comments following proposal, the EPA believes that, currently, there is already significant demand for REC equipment. For example, Colorado, Wyoming, the City of Fort Worth, Texas, and the City of Southlake, Texas, require REC under certain conditions. Additionally, public comments, reports to the EPA's Natural Gas STAR Program and press statements from companies indicate that some producers implement REC voluntarily, based upon economic and environmental objectives.

Under the rule, RECs are not immediately required of all well completions. Through 2014, the required "best system of emission reduction" (BSER) for well completions is to combust completion emissions. REC as an alternative to combustion is permitted by the rule so that facilities that are able to obtain REC equipment may still capture completion emissions using REC. This period will provide flexibility for industry to ensure equipment is available to capture natural gas in time to meet compliance deadlines. After January 1, 2015, capturing completion emissions using REC will be considered the BSER and will be required under the NSPS.

10. How do the EPA's economic analyses take into consideration the vast differences between formations and types of operations? Specifically what did EPA study and consider related to considerations and variations based on: (1) wet v. dry plays; (2) tight formations; (3) wildcat and exploratory wells; (4) depth of the fracturing; (5) directional drilling; and (6) size, type, and complexity of operation. Does EPA include all possible compliance costs and operational variables? When or under what circumstances do completion controls cease to be economically profitable?

Response:

Economic analyses conducted by the EPA to support the NSPS rulemaking can be found in the

Regulatory Impact Analysis released with the final rule. In the United States, thousands of hydraulically fractured natural gas wells are completed annually across a wide geographic range. These gas wells are completed in a variety of formation types using a wide range of technical approaches. Given this high variability and the fact that the economic analysis supporting the NSPS must rely upon forecasts of future natural gas exploration and development, the data are not available to estimate cost impacts for every possible combination of factors. Rather, to estimate national-scale cost impacts of the NSPS, the EPA relied upon costs estimates that were representative of a wide range of conditions using the best data available to the EPA. It should be noted, however, that Reduced Emissions Completions (RECs) requirements in the NSPS do not apply to all hydraulically fractured natural gas well completions. RECs are not required of hydraulically fractured wildcat and delineation natural gas wells and hydraulically fractured natural gas wells where reservoir pressure is not sufficient to perform an REC. These low pressure wells are predominantly located in coalbed methane basins.

However, the EPA recognizes that the variability of certain assumptions used to estimate the national-level regulatory costs can influence national cost estimates, such as the assumptions about natural gas prices at the wellhead, the costs to perform green completions, and the potential emissions from hydraulically fractured natural gas well completions. As result, the EPA performed sensitivity analyses of the influence of these key factors on the engineering costs estimate of the final NSPS. These sensitivity analyses identify the combinations of wellhead natural gas prices, green completion costs, and potential emissions levels at which the NSPS requirements break-even financially. For further details on this sensitivity analysis, please refer to Section 3.2.2 of the Regulatory Impact Analysis (RIA) for this rulemaking.

11. What was the price of natural gas used by when completing the economic analyses for these rules? Did EPA's economic analysis accommodate for vast swings in spot prices for natural gas? Did EPA review historic figures and analysis? Did EPA make future pricing projections?

Response:

In its economic analysis, the EPA assumed that onshore producers in the lower 48 states received \$4/Mcf for natural gas at the wellhead, an assumption that was based on the commonly referenced Annual Energy Outlook 2011 forecast. As the price assumption is very influential on estimated annualized engineering costs, the EPA performed a sensitivity analysis of the influence of the assumed wellhead price paid to natural gas producers on the overall engineering annualized costs estimate of the promulgated NSPS. For further details on this sensitivity analysis, please refer to Regulatory Impact Analysis (RIA) for this rulemaking. The EPA also examined historical gas prices in the Industry Profile chapter of the RIA.

12. The Director of Wyoming Department of Environmental Quality, John Corra, explained a very unique phenomenon experienced in the Upper Green River Basin during the winter of 2008. When the problem arose, the state had the immediate flexibility to rapidly study the localized issue, pinpoint the problem, and work with industry to quickly tailor unique solutions and contingency plans. This agile model is the antithesis of a nationalized, one-size-fits-all approach. What steps is the EPA taking to ensure that the new oil and gas NSPS and future regulations will not interfere with the minor source programs states have in place? How can EPA replicate the speed, accuracy, and efficiency demonstrated by local regulators working in conjunction with industry to find workable solutions to unique problems? What is EPA doing to ensure the local

flexibility required to create effective, common-sense regulations?

Response:

This rulemaking draws from the successful aspects of existing state programs in Wyoming and Colorado and applies them nationally, leveling the playing field across all states and providing substantial and cost-effective health and environmental benefits. Colorado, Wyoming and Fort Worth, Texas already require reduced emission completions (RECs) at hydraulically fractured well sites. The NSPS does not impose additional requirements for control of emissions from well completions on operators in those locations.

Throughout the development of the rule, the EPA consulted with state agencies through teleconferences and site visits. In August of 2010, the project team conducted several days of site visits arranged and accompanied by the Colorado Department of Public Health and Environment and by the Wyoming Department of Environmental Quality. These consultations and site visits enabled the EPA to design a rule that works in conjunction with successful existing state programs and avoids undermining those programs. For example, notifications submitted by operators per state advance well completion notification requirements are considered by the EPA to satisfy the advance notification requirements for well completions under the NSPS. Additionally, the rule is not prescriptive regarding the steps that must be performed as part of an REC, allowing flexibility for operators to adjust to site-specific situations. The EPA has continued its consultation with state agencies as it has moved into the implementation phase of the rule.

13. What is the anticipated carbon footprint of compliance with the rules? (Including the life-cycle impact of paper work, man hours, transit, recordkeeping, technology, and other related compliance costs?)

Response:

Based on available data, the EPA believes that the carbon footprint associated with complying with these rules would be small, particularly in relation to the very large climate co-benefits associated with reducing methane emissions. The control techniques used to avoid VOC and HAP emissions can create secondary impacts, which may partially offset the benefits of these rules by increasing emissions of carbon monoxide, NO_x, particulate matter and other pollutants. Also, these rules could slightly alter the distribution of national fuel consumption between natural gas, petroleum, and coal (which have different carbon footprints). The EPA estimated the magnitude of these secondary impacts in the Regulatory Impact Assessment (RIA) for the rules, finding that the magnitude of these secondary air pollutants is likely to be small. According to the RIA, the averted CO₂-equivalent emissions reductions from new sources are estimated at 19.2 million metric tons in 2015, while additional CO₂-equivalent emissions from control techniques and shifts in fuel consumption are estimated at 1.6 million metric tons in 2015, indicating a net decrease of CO₂-equivalent emissions of 17.6 million metric tons. The EPA does not have data regarding the carbon footprint of paperwork and recordkeeping, but it is likely to be very small.

14. EPA has indicated that it expects all future fossil fueled power plants to use natural gas rather than coal. Now EPA has issued a proposal to tighten the PM standards and create non-attainment areas in the very states (PA & OH) where that natural gas is and will be produced. How will we be able to tap that gas, fuel our electricity and create jobs if EPA proceeds with its proposal to

create more non-attainment areas?**Response:**

The EPA has not proposed additional nonattainment areas for PM. Rather, on June 14, 2012, the Agency issued a proposal to strengthen the nation's air quality standards for fine particle pollution to improve public health and visibility. The EPA anticipates that if these standards are finalized, few additional areas would have air quality that does not meet the standards. Furthermore, the EPA's modeling indicates that virtually all areas, including all counties in Pennsylvania and Ohio, would be in attainment with the standards by 2020 due to existing rules and programs.

If new PM standards are finalized in December 2012, the EPA anticipates making attainment/nonattainment designations for any counties that do not meet the standards by December 2014, with those designations likely becoming effective in early 2015. States would have until 2020 (five years after designations are effective) to meet the proposed health standards.

Recent Clean Air Act rules are projected to help states meet the proposed standards by dramatically cutting pollution both regionally and across the country. These rules include rules to reduce pollution from power plants, clean diesel rules for vehicles, and rules to reduce pollution from stationary diesel engines. The EPA does not anticipate that investments in oil and gas development would significantly interfere with this rapid progress toward reducing particle pollution.

15. Industry recently released a comprehensive study relying on data from ten times the number of wells as the previous EPA estimate for methane emissions and found that EPA's emissions estimate in some instances were a factor of 2 too high and other studies have found overestimations of closer to 1400%. How long will it take for EPA to update its emissions inventory to reflect the more comprehensive data? How does the more comprehensive industry methane emissions data affect EPA's cost-effectiveness assertions in the oil and gas rule?

Response:

The EPA evaluated all data received through the comment period to the New Source Performance Standards, including the above referenced emissions study on hydraulically fractured well completions. As a result of this assessment, the EPA concluded that the original EPA emission factor provides a valid central estimate of emissions from this source in the U.S. The EPA is confident that its emissions estimates and cost analyses were based on the best data available at the time of the calculations. More details on our review of emissions data and comments received through the NSPS can be found in the Technical Support Document to the NSPS at: <http://www.epa.gov/airquality/oilandgas/pdfs/20120418tsd.pdf>.

The EPA notes that the most recent industry study it is aware of does not include new emissions data on sources covered by the NSPS, but rather only includes new activity data (e.g., hydraulically fractured wells counts). The EPA will continue to evaluate all new data relevant to estimating emissions, including data received after the NSPS comment period, such as the recent industry study, for potential incorporation in the Inventory of U.S. Greenhouse Gas Emissions and Sinks (Inventory). The EPA welcomes stakeholder feedback on the natural gas sector estimates in the Inventory, and new data and information on updates to the estimates. For the upcoming Inventory development cycle, the EPA will be holding a stakeholder workshop on key aspects of the estimates of GHG emissions from the natural

gas sector in the Inventory.

16. Methane occurs naturally in ambient air. Atmospheric methane surveys and soil gas sampling can be used to establish baseline methane levels and then detect changes in methane concentration as shale gas well development occurs. DOE's NETL lab is undertaking such a research effort, which will include fugitive emissions in PA. For example, methane from both natural seeps and from pre-existing wells and pipelines is expected to be present at the Washington County site prior to development. What is EPA's role in this effort? What are the opportunities for the broader oil and natural gas industry (not just the single operator) to participate in this study? How is the information being shared with interested stake holders? How will these results be used to re-evaluate the rules?

Response:

The EPA is not involved in the DOE/NETL research effort to measure methane from fugitive sources in Pennsylvania. Although there may be opportunities for the broader oil and natural gas industry to participate in the study, such opportunities would need to be explored through DOE. DOE has consistently shared information from their studies with interested stakeholders, and the approaches to such information transfer will be determined by DOE. The information they develop can provide data that will add to our understanding of fugitive methane emissions from oil and gas development activities. This may allow the EPA to update methane emission estimates in certain EPA programs, such as the U.S. Greenhouse Gas Inventory.

17. The proposed rule purports to not regulate GHGs, but rather VOCs. However, many natural gas streams produced today contain little or no VOCs. Despite this, EPA calculated cost effectiveness based on natural gas that is 18% by weight VOC. The cost effectiveness (in dollars per ton of VOC reduced) approaches infinity as VOC content approaches zero. How does EPA economically justify its regulations for not just for the average "model" facility, but for reasonably expected variations? Why did EPA ignore this reality and select a one-size-fits-all approach instead of focusing regulations on streams with a minimum VOC content? Do these rules regulate any facilities that emit no VOC's or HAP's at all? If so, how does the Agency justify this?

Response:

The EPA did not set a VOC threshold for well completions, because available data does not support establishing a threshold and because of implementation concerns. Specifically, even if such a VOC concentration threshold were applied, to ensure compliance with the rule, an operator would have to determine with certainty before the beginning of flowback whether a particular well was going to be above or below the threshold in order to mobilize the necessary capture equipment and secure a flow line, etc. This would require the operator to determine the reservoir composition, e.g., the gas composition prior to separation, in advance of the well completion (i.e., the determination of whether the well would be subject to the NSPS would have to be performed before the information on which to base such a determination would be available). Although nearby existing wells could potentially provide some indication of the general VOC content of the gas from the future well in question, there would be no assurance of certainty. Although the EPA did not set a VOC threshold for well completions, it improved the final rule by including a subcategory of "low pressure" wells that will not be required to perform green completions. This will remove over 85 percent of the coalbed methane wells (which may be relatively low in VOC content) from those required to perform green completions (these wells will

only be required to use flaring to control emissions).

The EPA did include a VOC emissions threshold for application of the storage vessel standards. During the rulemaking, the EPA evaluated the cost-effectiveness of regulating storage tanks with various levels of crude oil and condensate throughput rates. The EPA estimated that storage vessels with a throughput rate of one barrel per day of crude oil, or twenty barrels per day of condensate, emit about six tons per year of VOC. The EPA determined that regulation at these throughput levels was cost-effective. Accordingly, affected storage vessels are limited to those which emit at least six tons per year of VOCs.

With regard to low VOC streams, the EPA did not finalize proposed requirements for pneumatic controllers and compressors located in the transmission and storage segment, since these devices handle and emit pipeline quality gas, which is very low in VOC content.

18. Emissions data was recorded from several NOAA observation towers throughout the country, including two in California, two in Colorado, and one each in Texas, Oklahoma, and Wisconsin. According to the NOAA study, the Wisconsin tower, "in the middle of the Chequamegon National Forest" recorded a higher methane level than the tower in the middle of the Denver-Julesburg Basin. Why would a tower located in a federally protected forest and far removed from any industrial activity record higher methane emissions than measurements taken in a natural gas field?

Response:

The EPA did not participate in this study and cannot comment on the specific conditions and data collected from the towers in the study.

19. Economic analysis of emission control strategies should be representative of real-world operations, include the full variety of conditions, and consider all of the costs of compliance with the proposed rule. For example, API found the cost effectiveness for tanks to vary from \$5,271/ton of VOC to \$1,519,667/ton of VOC. The "average model facilities" that EPA has used in the economic analysis do not represent the great variation seen across the U.S. Why did EPA ignore these realities and refuse to narrow the proposed regulations to operations in which the proposed emission control practices can be applied in a cost effective manner?

Response:

As discussed in question ten, natural gas exploration and development in the United States is highly variable across geography, formation type, and technical approach. Given this high variability and the fact that the economic analysis supporting the NSPS must rely upon forecasts of future natural gas exploration and development, the data are not available to estimate cost impacts for every possible combination of factors. Rather, to estimate national-scale cost impacts of the NSPS, the EPA relied upon costs estimates that were representative of a wide range of conditions using the best data available to the EPA. As noted in the response to question seventeen, the EPA could not set a VOC threshold for well completions, because available data did not support establishing a threshold and because of implementation concerns. However, the EPA did set a VOC emissions threshold for application of the storage vessel standards based on cost-effectiveness.

20. Most producers do not normally track the information EPA requires to be reported for this rule. To begin tracking the GHG emissions required by this rule, America's oil and natural gas producers will be required to purchase costly equipment to affix to their operations merely to inventory GHG emissions. As the rule goes into effect, it is most damaging to America's smaller independents who will have to bear the cost of affixing this inventory equipment to their operations. What specifically is EPA doing to ensure that the rule will be economically feasible for these smaller producers?

Response:

The EPA established the Greenhouse Gas Reporting Program in 2009 and finalized the requirements for the petroleum and natural gas sector (subpart W) in 2010 after a full notice and comment process. The EPA developed subpart W of the Greenhouse Gas Reporting Rule in a way that would maximize rule coverage while keeping reporting burden to a minimum, including reporting burdens to small facilities. For example, the EPA provided a threshold for reporting, and certain methodologies for specific emission sources, which allow for alternative methods that would reduce burden and maintain data quality. In addition, the GHG calculation methodologies used in the rule generally include the use of engineering calculations, emissions modeling software, and emission factors, or, when other methods are not feasible, direct measurement of emissions.

21. Ms. McCarthy, in your testimony you stated that ICAC estimated that the implementation of the Clean Air Interstate Rule Phase I created jobs in the air pollution control industry. How many jobs were lost (or alternatively, you used the term "shifted") in other sectors?

Response:

ICAC did not look at jobs gained or lost in other industries. However, investing in control technologies to reduce air pollution from the U.S. power sector does lead to new opportunities for American businesses, including steel manufacturers, by increasing demand for American workers to install, operate, and maintain pollution control equipment. ICAC looked at the employment effect of CAIR in the control technology industry and estimated that implementation of CAIR Phase 1 resulted in 200,000 jobs in the air pollution control industry. This large-scale assessment is supported by evidence from specific emission reduction projects. For example, at its peak, Alabama Power's \$1.7 billion scrubber initiative, which was launched in 2005 and contributes to CAIR compliance, created more than 2,300 jobs. According to Charles McCrary, Alabama Power president and CEO, "this investment [was] not only good for the environment, it [was] also good for Alabama's economy."

22. 42 USC 7411(f) requires consultation with State Governors and air pollution control agencies before expanding the listed categories or promulgating new NSPS. Has EPA conducted the required consultations with the States with significant the oil and gas transportation and distribution sectors? Will EPA revise the requirements for reduced emission completions requirements, storage vessels, pneumatic controllers, and compressors in NSPS, Subpart OOOO based on continued consultation?

Response:

The EPA interprets 111(f)(3) to apply only to the initial promulgation of the NSPS regulation for a listed source category. The NSPS regulation for the listed oil and natural gas source category was promulgated in 1985. Furthermore, the EPA did not expand the category listing in the recent revision to

the oil and natural gas NSPS, because the EPA concluded that the current listing covers the new emission sources. The EPA therefore does not believe that section 111(f)(3) is implicated in this instance.

However, during development of the rule, the EPA consulted with state agencies. In August of 2010, the project team conducted several days of site visits arranged and accompanied by the Colorado Department of Public Health and Environment and by the Wyoming Department of Environmental Quality. The EPA arranged several teleconferences with the States of Texas, Colorado, and Wyoming as we continued to develop the rulemaking. Further, the EPA briefed the Western Regional Air Partnership (WRAP), participated in WRAP teleconferences, and referred to data developed by WRAP in our rulemaking. The EPA participated in several teleconferences, and, in February of 2011, briefed the Marcellus Shale Working Group, which included the EPA, industry, and state agencies. After the public comment period, the EPA arranged teleconferences to obtain further clarification of comments submitted by Colorado and Wyoming. The EPA believes this state consultation improved the quality of the final action. In addition, the EPA incorporated provisions in the final rule that it believes will help minimize permitting burden on state agencies, owners, and operators. For example, existing gas wells that are refractured are not "affected facilities" under the NSPS if the well completion operation is conducted using REC and meets notification, reporting, and recordkeeping requirements. By not being "affected facilities" under the NSPS, these sources may not be subject to state permitting requirements. Another example of this concept is that, in provisions for pneumatic controllers located in the oil and natural gas production segments (upstream of custody transfer to gas processing plants or oil pipelines), the EPA limited applicability of the final NSPS to only "high bleed" natural gas driven pneumatic controllers. All other pneumatic devices in these segments are not "affected facilities" under the NSPS. Similarly, the EPA removed centrifugal compressors with dry seal systems from final NSPS applicability. The final rule therefore provides flexibility for industry while maintaining the environmental benefits from the rule.

23. The notifications, monitoring, recordkeeping, testing and reporting requirements for a major source NESHAP regulation are overly burdensome for NSPS Subpart OOOO. Because of the remote, dispersed and unmanned nature of facilities that lack electrical power, make the requirements logistically impractical, technically difficult and uneconomic. Furthermore, the use of NESHAP compliance requirements for storage vessels is confusing and unjustifiably stringent for NSPS. With these considerations in mind, what specific O&G industry appropriate notification, recordkeeping, reporting, and performance testing sections requirements will be included in Subpart OOOO?

Response:

The EPA understands that the upstream oil and natural gas production industry is unique with regard to the number and remote location of facilities. With this in mind, the final NSPS will achieve significant emission reductions while minimizing burden on operators. In the final rule, the EPA streamlined notification, recordkeeping, and reporting requirements significantly. For example, operators are required to provide only a 2-day advance notification of well completions. This notification may be submitted via e-mail. To avoid duplicative and potentially conflicting advance notification requirements,

the final rule provides that operators who have met advance well completion notification requirements under state regulations are considered to have met the advance notification requirements of the NSPS. Further, the final NSPS exempts operators from pre-construction notifications for wells, pneumatic controllers, and storage vessels that would have been required under the NSPS general provisions. The EPA has also added flexibility to annual reporting requirements by providing a streamlined annual reporting option for well completions in which operators need only submit digital images of each green completion in progress, combined with a list identifying all wells completed during the reporting period, in lieu of submitting detailed records of each well completion.

Monitoring and testing requirements have been balanced with operator burden as well. Operators may rely on results of manufacturer-conducted performance tests for specific models of combustor control devices, instead of conducting performance field tests on each individual combustor.

To avoid confusion, and in response to public comments on the proposed NSPS, the EPA incorporated the storage vessel requirements directly into the NSPS, rather than referring to the NESHAP provisions for storage vessels.

24. The equipment necessary to comply with the REC requirements is currently not available and will require time to manufacture. Furthermore, industry will have a shortage of experienced contractors or staff for safely doing "reduced emissions completions." Due to the limited availability of appropriate and safe equipment and experienced and trained personnel to perform REC's, what steps is EPA taking to ensure timely manufacturing of equipment and training of operators without premium costs associated with short time-frames?

Response:

Capturing completion emissions using REC will not be required under the NSPS until January 1, 2015. This period will provide flexibility for industry to ensure equipment is available to capture natural gas in time to meet compliance deadlines. See the response to question nine for more detail.

Senator CARPER. Thank you.

We have been joined by Senator Johanns, recovering from his birthday yesterday, looking none the worse for wear. Nice to see you.

I was born in West Virginia. They mine a lot of coal there in my native State. While we are not using as much coal today for generating electricity as we were a decade ago or even 5 years ago, we are going to be using coal for a long time in this country. Fortunately, we will be able to use a lot of natural gas in this country. We are already the Saudi Arabia of coal. We have become the Saudi Arabia of natural gas.

And I understand that we are well on our way to becoming a net exporter of oil. That is not a bad success story. And we shouldn't stop there. There is more that we can do.

I think what EPA is trying to do is to say, as we make progress on those fronts, let's just make sure that we are being smart with respect to the emissions that come from the fracturing or the fracking process.

Senator Johanns and I are recovering Governors, and served together for a while in the National Governors Association. I used to say when I was Chairman there that the States are laboratories of democracy. And rather than us at the Federal level reinventing the wheel every time, why don't we look to the other 50 States and see if we can learn some lessons from them.

Why have we picked Wyoming and Colorado for those lessons, and what are those lessons that we can implement today?

Ms. MCCARTHY. Colorado and Wyoming really have gone out in front on these issues, recognizing that there are opportunities for their States to actually accrue revenues and to preserve the natural resources of this country by using this process called green completions. What we attempted to do in looking at applying those to the national level was to coordinate with them as much as possible as well as with the industry to ensure that we understood the technologies that are available that we did what the law required, which is to make sure that those technologies would be out in commerce and be effective in producing these cost effective reductions.

For that reason, we made quite a bit of adjustment between the proposal and the final rule, on the basis of all the comments we received from those States and from the industry itself as well as the environmental community and other stakeholders.

Senator CARPER. OK, thanks.

It is my understanding that EPA has made some changes from the proposal, the original proposal to the final new source performance standards for the fractured natural gas wells. Could you take a minute or two and just discuss or describe some of those changes that you have made?

Ms. MCCARTHY. Yes. Senator, we made a number of changes that increased compliance flexibility for well owners that streamlined notification, reporting, that eliminates unnecessary expenditures at the State level and ensures coordination with States like Wyoming and Colorado. Primarily, we did this phase-in process for green completions to allow until January 2015 to move toward green completions. In the meantime, you can either do green completions or

flaring. That was in direct response for the industry concern that the equipment may not be readily available.

Now, the second big thing we did was we recognized that there are formations in the U.S. where hydro-fracking is actually happening where there is a low pressure issue which precludes that from being cost effectively captured. And we created a subcategory that recognized that and understood that in areas, that in certain area formations, we wouldn't be needing to look at green completions where they weren't cost effective, and able to technology-wise be achieved.

We also identified lots of ways in which we could streamline the reporting, including recognizing that if you are already pre-notifying to States, you don't have to do the same thing to the Federal Government. We also took a look at removing some requirements for some of the more downstream transmission areas where the VOC content wasn't as high in response to comments. So we made a number of changes here that directly respond to industry concerns and that ensure that we can provide these reductions cost effectively.

Senator CARPER. OK, thanks.

I think in our second panel today some of the witnesses may claim that EPA has overestimated emissions from hydraulically fractured natural gas wells. What do you have to say in response to those assertions?

Ms. MCCARTHY. EPA is confident that our emissions estimates for gas well completions are reasonable, that they don't overestimate the total emissions, and they are based on the best data currently available. We will continue, however, to work with stakeholders to ensure that we understand their concerns and that the misconceptions that we are hearing do not continue.

I think the interesting thing about this, Senator, is we are not really arguing about the standards or the availability of the technology. What we are really talking about is how good is this rule. Is it good, or really good? Now, that is an argument that I can embrace.

You will hear things like EPA only had four data points. We had four studies, a thousand wells engaged. You will hear issues about whether we overestimated our emissions factor. Does it take a really long time to do a completion? Does it take a short time? Well, no matter how much time, we have one emission factor. We don't talk about enhancing that for longer periods of time. It is one average that is based on formations across the country and a wealth of data.

So we can work through those issues. You will hear some confusion, however, but we will work through those, because we have leaders in the industry here testifying that we want to make sure is appreciative of this rule.

Senator CARPER. All right, thank you.

One last question, and I will yield to Senator Barrasso. Some critics claim that EPA's cost benefit analysis numbers are off base. Could you just briefly explain how you came to those numbers, and could you address those criticisms?

Ms. MCCARTHY. Yes, there was, this is one area where again we made significant changes between the proposal and final on the

basis of comments that we received. EPA takes a look at what activities are happening out in the field, what the equipment level is that people are using, and we do an estimate of what the emission inventory is, if you will, across the country.

But then we reduce that by what is being voluntarily reduced. Because there are some great leaders in this industry. And we know that half the well completions where there is hydraulic fracturing are using green completions now. And we take a look at areas where green completions aren't effective, and we make those adjustments, and we understand where States are already regulating, and we don't want to double count that.

Then we come out with information on what the costs are on the basis of what those emissions are and what the costs are in order for capital and for the installation of that equipment. I think we did a good job. We understood that there is a balance here. We looked at the cost, but we also looked at the money that you make when you actually collect the methane. And in the end, we are talking about a rule that saves millions of dollars.

Senator CARPER. All right, thanks.

Senator BARRASSO, you are recognized for 7 minutes.

Senator BARRASSO. Thank you very much, Mr. Chairman. I appreciate it.

I would assume that you would agree with President Obama that we need an all out, all of the above energy strategy?

Ms. MCCARTHY. I would.

Senator BARRASSO. So I talked about in my opening statement, earlier this year the Director of the Sierra Club said about new natural gas plants. He said as we push to retire coke plants, he said we are going to work to make sure we are not simultaneously switching to natural gas infrastructure, and we are going to be preventing new gas plants from being built wherever we can.

What does the EPA plan to do to fight back against that approach, to make sure that all these plants and everything are able to continue to be developed?

Ms. MCCARTHY. Senator, the rules that EPA has been finalizing as well as those that are being proposed are not about a specific fuel supply. They are about needed reductions in pollution and the public benefits that accrue.

Senator BARRASSO. So when an organization, an extreme environmental group, they are bragging that they have closed coal fired power plants, using the courts, manipulating environmental laws, now they want to move on to natural gas using the exact same tactics. If you are for natural gas development, do you think that we have to change something in the law then, to prevent these groups from blocking construction and development of natural gas?

Ms. MCCARTHY. I think the Administrator and the Administration has been very clear that natural gas is part of the mix moving forward, that it offers a clean energy supply. And we are doing everything we can, like we did in this rule, to ensure that it recognizes that, it does not slow the development of oil and natural gas, and that we find a way to achieve reductions cost effectively.

Senator BARRASSO. Well, the Utility MACT vote is set to occur this week. I want to ask you about the EPA's policy in regard to this. The EPA Region 1 Administrator, Curtis Spalding, was talk-

ing to a group of students about Utility MACT, about EPA regulations.

And he went on about the regulations, saying that gas plants are the preferred standard, which means if you want to build a coal plant, he said, you have a big problem. He said it was a huge decision, one made by Lisa Jackson. He said, you can't imagine how tough the decision was, referring to Utility MACT, because you have to remember if you go to West Virginia, Pennsylvania, and all those places, you have coal communities who depend on coal.

We are talking about communities with families, men and women working in the industry. There are additional businesses in those communities, schools, people who teach the kids. So he goes and he says, to say that we just think those communities should just go away, we can't do that. But she, meaning Lisa Jackson, had to do what the law and policy suggested. He said it is painful, it is painful every step of the way.

So my question to you is, what is going to happen to these communities in the West and the Midwest and Appalachia? Where do they go when they "go away"? What is going to happen to them? What is going to happen to the jobs, what is going to happen to the communities? What is going to happen those people and their families?

Ms. MCCARTHY. Senator, I did watch the video of Regional Administrator Spalding. I think, in my opinion it is fear that he was speaking about the challenges associated with coal today. And it is lack of competitiveness against natural gas, with low gas prices and with steady and low demand, that there are challenges associated with coal being competitive. Not necessarily just with the rules that are being initiated, although they are one factor. It really is a market issue. And I think he was trying to speak to the challenge associated with working with communities when you have job shifting that happens as a result of these market shifts.

Senator BARRASSO. And the regulations that are coming out of your organization and the Administration relating to those jobs and those communities which will have higher unemployment. And we talk about the cause of benefit analysis, I think that you underestimate the cost, you overestimate the benefits and that the cost to these communities of people being out of work is very high in terms of there is not really any future saved health care cost, any great degree, compared to the amount of additional cost by people in chronic unemployment with increased illness, increased hospitalization, premature death, a whole host of components that affect the community.

You started your testimony, you said that the domestic oil and natural gas production has increased every year since the President has been in office. Most of that development, as Senator Inhofe has said, has been on private land, not public land. And the Administration is responsible for public land, not the private land.

If those oil and gas operations had been on public land, would they be operational today, do you believe?

Ms. MCCARTHY. Senator, I don't want to make predictions about anything. I do know that there has been a concerted effort to work with DOI and other agencies and pull them together on the admin-

istrative level to ensure that we are fully taking advantage of the natural gas resources.

Senator BARRASSO. EPA has indicated that it expects all future fossil fueled power plants to use natural gas rather than coal. Now, the EPA has issued a proposal to tighten the particulate matter standards, create non-attainment areas in the various States where the natural gas is being produced, will be produced. How will we be able to tap the gas, fuel our electricity, create jobs if the EPA proceeds with its proposal to create more non-attainment areas? It seems like you are just playing right along with the Sierra Club and their efforts to go to what they describe as beyond gas, and eliminate gas as the next target in the efforts of this Administration.

Ms. MCCARTHY. Senator, the rules that we have put out in the analysis indicates that coal now is a large portion of the energy supply in this country and that it will remain almost at the same level. So we are looking at a future where coal remains very much a part of the energy supply for this country. That is with the rules; that is without the rules. And we are using a wealth of data to show that.

It also shows that those rules increased jobs, not decreased them. Although we recognize that there are shifts in jobs, and we have to work with communities all along the way. So I am not seeing that any of our rules are actually working against the way in which the market is already driving this industry.

The most recent particulate matter announcement was a proposal. When you looked at that, the levels that we were talking about, that we need to scientifically decide what levels of protection are necessary in terms of the level of pollution that people breathe across this country, those levels will be readily achievable for all but six counties on the basis of already enacted Federal rules.

Senator BARRASSO. Mr. Chairman, my time is expired. I would like to submit additional questions in writing.

Senator CARPER. That will be quite all right.

Senator BARRASSO. Thank you.

Senator CARPER. You bet.

Senator INHOFE.

Senator INHOFE. Thank you, Mr. Chairman.

Let me just say it one more time, because I think it has been repeated by Senator Barrasso, but I think it is important, because it is a point that kind of floats by, and nobody seems to understand it.

And that is, with all of the good things that are happening right now, the Marcellus chain, and all these things that are happening, not just in the West, but in Pennsylvania and New York, and all the opportunities that are out there, and this massive explosion that we are in the middle of right now in terms of the production, that the increase that we keep talking about, or that the Obama administration keeps talking about, is all in the private sector. And if you look at his budgets, since he has now had four budgets, and in his last budget, No. 1, he had percentage depletion, he had Section 199 manufacturers exemption that he was going to single out the oil and gas industry to do away with, the IDCs, that is an in-

tangible drilling cost, all these things are punitive to the oil and gas industry.

The fact is that in spite of all these wonderful things that are going on, it is all happening in the private sector. And in spite of that, the public sector, the public lands, and I wonder if my friend from New Mexico has stepped out, but just stop and think about the number of jobs, if we were able to do the same thing on the public lands. Instead of that, we have had a 16 percent reduction. In spite of all this boom that is going on in the public sector. It bears repeating over and over again.

I would say for Administrator McCarthy, President Obama frequently touts about the job creation potential in the natural gas industry and has said many times we have the supply of natural gas that can last America nearly 100 years. That is true, I have been using 90 years gas and 60 years oil. That is if we would get the politicians out of the way so that we could explore our own resources here. And I might add, we are the only country in the world that doesn't exploit its own resources.

In your testimony, you mentioned that gas plays a key role in the nation's clean energy future. My question is simply, does this Administration believe that natural gas is a long-term part or just a bridge in terms of its filling this function?

Ms. MCCARTHY. Senator, I can only speak to what I know to be the case, which is that right now there is a change in the energy supply where natural gas is becoming more and more the fuel of choice that is driven by the market. I expect that that will continue. It doesn't mean that coal is being driven out of the system in any appreciable way. That will continue as well.

And how long that continues, I don't know. But there is an overall impetus to move to cleaner and cleaner supplies, and then to also bring renewable energy into the mix. But natural gas is likely to be here for quite some time.

Senator INHOFE. Well, I am sure it is, with the opportunities that are out there right now. It is just that we need to do that on public land as well as private land.

I would only say this, this is a quote that I don't think has been made yet by President Obama. He said, "So if somebody wants to build a coal powered plant, they can. It is just that it will bankrupt them." To me, that doesn't sound he is very supportive of continuing to use that. But I want to have time to get my second question in.

This year, documents came to light revealing a dispute during the interagency review of the Utility MACT rule between the EPA and FERC. These documents revealed a startling pre-determination by EPA that natural gas cannot be relied upon for a viable fuel switch alternative due to the agency's concern over the "environmental impacts of hydraulic fracturing." Recently, the EPA Administrator in District 6—and this has already been referred to, but I want to get the exact quotes down here, then ask you the question. He resigned after publicly stating that EPA's "general philosophy was to crucify and make examples of the oil and gas companies."

The EPA Region 1 Administrator, Curt Spalding, which was quoted by Senator Barrasso, was quoted as saying, this is an exact quote, "Lisa Jackson has put forth a very powerful message to the

country that if you want to build a coal plant, you've got a big problem." He went on to explain that the decision was painful, which we have already talked about. West Virginia, Pennsylvania, and all those places you have coal communities who depend on coal and to say that we just think those communities will just go away, we can't do that.

Well, all these statements which have been made by some of the most influential people within the EPA, were made at the same time the President has been touting the all of the above energy approach. My question to you is this. After these statements were made, we had some disclaimers coming from the EPA, saying those are perhaps just some rogue statements that were made out there some place and are not really the philosophy of the EPA.

So the question would be, is it possible that your colleagues at the EPA are actually telling the truth about your radical agenda, or is it that all of these bureaucrats are simply mis-speaking this frequently? Which of the two?

Ms. MCCARTHY. So let me take your questions in order. The first, you were talking about the FERC and EPA and potential differences of opinion relative to MATS. I just want to confirm that EPA, FERC, and DOE are working closely on the Mercury and Air Toxics Standard in terms of its implementation. We have been working together to look at what technologies are available, any potential impact on reliability. So I do not see any difference in terms of that.

Senator INHOFE. No, that wasn't the question. The question was, these statements that were made, the statements that I just now made, quoting the Region 6, Region 1, and some of the others who have made about the oil and gas industry, is that just them or is that—would you in your position refute that as a policy of the EPA?

Ms. MCCARTHY. Yes, let me hit that issue head-on. I just thought it was a little bit different. I know that Al Armendariz, the Region 6 Administrator, used unfortunate words that were inflammatory. He says that, the Administrator indicated that. They do not give a clear picture of EPA and its enforcement policies. I think Al resigned, and that is a clear indication that he recognized that his words were unfortunate and that they didn't properly represent the agency, and they do not.

I think I explained Curt Spalding and the fact that he was perhaps, the quotes that were pulled out, if you looked in larger context you might see that Curt is a dedicated individual who is actually concerned about coal shifts and recognizes the current challenges that coal faces. But EPA is not in a position, nor would we ever speak to fuel diversity issues beyond ensuring that our rule are achievable and cost effective. And the MATS rule in and of itself is already achieved by dozens of units of coal right now. And I assure you that those decisions that are being made by industry, we will work with them to ensure that they can achieve these standards within the time that is allocated under the Mercury and Air Toxics Standard, if they choose to invest in those older, smaller generation units.

Senator INHOFE. OK, my time has expired. I do have some questions for the record relative to your last statements there. Because

when you say you are for all of the above, and of course, not you, the President, the Administration, and part of that is the natural gas, and yet you do what you can to kill the process of hydraulic fracturing, I have said several times, you can't get one cubic foot of natural gas out of a tight formation without using this process that has been safe since 1949.

Thank you, Mr. Chairman.

Senator CARPER. You are welcome.

All right, Senator Cardin.

Senator CARDIN. Thank you, Mr. Chairman.

As I indicated in my opening statement, Maryland is very much interested in natural gas. We have the Marcellus Shale deposits. I think it is very interesting, as I listen to my colleagues complain about Federal action and so many cases here, it has been States that have been acting, certainly as it relates to water quality, where the Federal Government has a limited jurisdiction that the States have been the primary player.

I know that the gas and oil industries have been concerned about the inconsistent regulatory climate in the 50 States. I think it is in the interest of an energy policy that we have national predictability on fracking and on getting natural gas, that as I pointed out, the pollutants that go into the air or go into our water; the risk factors are not bound by any State border. These are national issues, and we need national policies to deal with it. On air, we have a little bit clearer direction from the point of view of the Clean Air Act than we do with the Clean Water Act.

I want to, though, first respond to Senator Inhofe's point on a debate we will have a little later this afternoon with the mercury standards. I need to point out that this is a serious issue of public health for our community. Maryland thought it was so serious that we acted. We passed mercury standards that will comply with the standards that have been proposed by EPA. We have done that in a way that actually created more jobs in our State.

Our utilities worked with us, helped pass the Healthy Start law in our State; improvements have been made in our coal burning power plants. And we are meeting those mercury standards, as I think the Chairman of the Committee is well aware. We have done that in a way that has created jobs, and we are proud of that record.

The problem is that Maryland, like Delaware, Mr. Chairman, is downwind. So we can do everything we can to stop the pollutants from entering the air as a result of energy generation in our own State. But because of surrounding States, our citizens are still suffering from the effects of the pollutants going into the air. We have our days where it is not safe for children to literally go out because of aggravated breathing problems.

The numbers that we have on the MAT standards would save thousands of premature deaths, thousands of cases of chronic bronchitis, the lost days from work for people who miss work as a result of poor air quality, estimated to be 850,000 days. The list goes on and on and on. The reason is that air pollution leads to cancer, leads to neurological development problems and reproductive problems.

So I guess my question to our witness is, has EPA evaluated the cost-benefit of these regulations from the point of view of the benefit to our community versus the additional burdens that will be placed on compliance with the proposed regulations?

Ms. MCCARTHY. We have, Senator, and you are quite right, that power plants emit hundreds of thousands of tons of toxic air pollutants, and they are related to serious health consequences, particularly for children. If you look at the bottom line for the mercury and air toxics standard, we are talking about public health benefits between \$37 billion to \$90 billion each year. And that is a return of \$3 to \$9 for every dollar that we would invest to achieve those reductions through currently existing, cost effective technologies.

Senator CARDIN. It is my understanding that those cost-benefit requirements were as a result of congressional action that you need to do those types of analyses. I think particularly those on the Republican side insist upon it. And we thought it was a good idea to be able to do that. And the numbers you are using I think are conservative numbers. There is a big range, but the minimum is three to one, which I think any economist would tell us is well worth it.

There is also a human cost here. If it is your child that is suffering from asthma, and can't go to camp because of the warnings that are being given, and then you have to stay home from work, so your child is missing camp, and you are missing a day's pay as a result of poor air quality, it really hits home.

Ms. MCCARTHY. These are very conservative numbers on the benefit side, because we have a lot of difficulty calculating with the certainty we need the benefits associated with toxics reductions. So these are conservative, but they are real, and we are talking about real lives.

Senator CARDIN. I just want to point out, Mr. Chairman, to achieve the numbers that the EPA is proposing, just take a look at the work that was done in Maryland. Take a look at the investments that were made. The technology is there. This is not technology that we don't have. We have the technology to achieve these results. It was done in a manner that was not at all disruptive to the utilities and the costs in our own State.

I think what we are trying to do is use best practices to reach achievable levels in an orderly way, consistent with the Clean Air Act, consistent with laws that have been passed historically on a bipartisan basis by the Congress in order to protect the public health and to do it in a way that that will cause little disruption to our production of energy or to the economic consequences, in fact, will help our nation grow.

Thank you, Mr. Chairman.

Senator CARPER. You are welcome, and we thank you.

Senator JOHANNIS, and Senator Merkley, you are on deck.

Senator JOHANNIS. Mr. Chairman, thank you.

Administrator, thank you for being here. Let me if I might just offer a thought to start out with. I come from a State, as you know, in the center of the country, the State of Nebraska. As our State was developing, we chose an avenue of public power. We are the only State in the United States that would be 100 percent public power. One might look at that and say, my goodness, that is quite

unusual for a State that is conservative, substantially Republican. But it is a model that worked well for us.

Over time, as we developed the resources that would generate that power, we invested in hydro. Not a lot, but some, with Kingsley Dam. We invested in nuclear power, we have a couple of power plants out there that are nuclear power, generate electricity from that. And we invested in coal. Not because of any profit motive or anything like that. Again, I ask you to keep in mind that we are a public power State.

Coal was a pretty good decision for our State. Why? Wyoming is right next door. We have railroads that run through our State that can easily transfer coal from Wyoming into the State of Nebraska, and it has worked very, very well.

Our public power utilities have always wanted to maintain a high standard. They complied with the laws that were there through the years. Those laws have changed; we understand that. We understand that they will change in the future.

But let me show you why, or point out something that makes us believe that EPA could not be more unreasonable. As you know, as the standards were being developed, currently the regulations, Nebraska was not a part of the original mix. Then all of a sudden, literally at the end, Nebraska was thrown into the mix. But what made it even more difficult for our State was that we were told that we had to start complying with those regulations within about 6, 8 months.

Now, if you think about that, you can't escape the conclusion that that is outrageously unreasonable. Darn near arbitrary and capricious, if it is not. Where is that public utility going to raise the funds necessary to do the rebuilding of that plant that it would need to do? How quickly can they go into the financial markets to accomplish that? How quickly can they do the design for the plant? How quickly can they hire the contractors?

And it just goes on and on and on. What we are ending up with is that we have a situation where it is not humanly possible to comply. So let me predict the future. I think unless we can get some relief here we just simply close down. We just simply can't operate those plants. Notwithstanding our good faith and trying to comply with what EPA wants, we have a situation where literally it won't be possible to comply. So then we have to go into the marketplace and buy the energy that people need, going to be a tight market, prices are going to go up. And it looks to me, in our State, that we will fulfill the President's promise that electricity rates will necessarily skyrocket under his plan.

So Administrator, explain to me why this would be a reasonable approach by EPA, and how could you let that happen to a State? Does it make any sense to you whatsoever?

Ms. MCCARTHY. Senator, let me explain my understanding of what you are referring to. And it is the Cross-State Air Pollution Rule, which was really replacing the Clean Air Interstate Rule that was adopted in the prior Administration and found not to be legally solid. The courts remanded it back to us, and we had to re-do that rule and do it in a more legally and scientifically robust way, which we did.

The reason why we felt that it was appropriate and in fact advisable legally and for public health reasons to aggressively look for continued reductions was because this program didn't start when the Cross-State Air Pollution Rule was put into place. It started when the Clean Air Interstate Rule was put into place. That prompted installation of equipment that we were able to take advantage of.

The actual reductions we were looking for in that short period of time were not based on need for technology installation. They were based on what we believed to be documented, readily achievable reductions that you could get by dispatching the units differently, looking at some fuel switching. There are a variety of things that you do quickly and efficiently and effectively, as well as the purchase of allowance. This is not a unit by unit compliance. It is a trading program where allowances could be generated in other areas and purchased, again cost effectively, to achieve the reductions that downwind States are looking for to protect their public health.

So I am more than happy to work with your State more directly if they feel like we haven't done that. But there is also an opportunity in this rule for States to take over the allocation of their budgets and do it in a way that they feel is more appropriate to them.

So we are doing everything we can to work with States and make sure that this isn't unreasonable, but it also provides the downwind States the relief that they Clean Air Act really entitled them to and has not yet been delivered.

Senator JOHANNES. I appreciate your offer, and there is not enough time, in fact I have run out of time already, to challenge some of your assertions. But having said that, your offer is a good one. I would be more than willing to coordinate a meeting with our public power participants to sit down with you personally. Because I think you will find out that the difficulty that this has created for a State like ours is nearly insurmountable. And it is not as easy as you have described.

Now, I don't know what your staff is advising you, but we think we have a serious problem. So I will just wrap up by saying thanks for your offer; you will hear from us.

Ms. MCCARTHY. It is a date.

Senator CARPER. We sound like matchmakers here. That is very good.

I would just say, when you and I were serving as Governors together, we found ourselves in my State in a position where we could literally have shut down the State, shut down the State in order to try to comply with Clean Air requirements and still not have been in compliance. And it was because of all the pollution that blew in from the upwind States. We felt that wasn't fair, and ultimately the court said that as well.

All right, Senator Merkley.

Senator MERKLEY. Thank you, Mr. Chair, and thank you for your testimony, Administrator McCarthy.

Just to kind of track the topic of today's discussion, that is setting standards primarily for the recovery of methane that comes from flowback, or the fluids that are pumped out of fracked wells,

as I understand it, you are really presenting a win-win. That is, that the fluids, when they are drawn back out of the well, release a lot of methane and other substances, but primarily methane. That capturing these gases has huge benefit for the air, but also is source of revenue to companies. Some companies have chosen to voluntarily implement, if you will, this recapture or green completion strategy.

I thought I would just ask you to speak to why have some companies jumped in and voluntarily done this. Is it the economics of recovery, that they are making money in doing this?

Ms. MCCARTHY. Our estimate at this point is that about half the completions now that are done are green completions. I think that a lot of the industries recognize that there is significant cost savings. And like any industry, there are leaders here. Devon is one of them, where they have gone above and beyond. We have a program called Natural Gas Star that actually has been working with the leaders to ensure that they learn from one another's experience and that we encourage to the extent we can this kind of really corporate responsibility.

But we believe that there needs to be an opportunity for that to be nationally shared, that it is appropriate to level the playing field, and it is appropriate to reduce emissions whenever it is cost effective, never mind beneficial to do so.

Senator MERKLEY. So in terms of the experience of the companies that have already gone down this track, would they come to this now from the viewpoint of, we did this for corporate responsibility, or would they also say that it has turned out that the value of the gas that is captured actually pays for the expenses?

Ms. MCCARTHY. There has been tremendous documentation by the companies themselves about how cost beneficial it is for those companies.

Senator MERKLEY. Well, then, let me turn to the fact that a couple of States have already adopted green completion strategies. I believe Wyoming and Colorado are two of them. Are they the only two that have done so?

Ms. MCCARTHY. They have. There have been a couple of other local communities in Texas, in particular, that have already adopted green completions as a requirement.

Senator MERKLEY. Cities or counties within Texas?

Ms. MCCARTHY. They are, let's see, Fort Worth, which is not small, and South Lake, Texas.

Senator MERKLEY. And there is actual gas production within the city boundaries that is affected by those?

Ms. MCCARTHY. I believe it is the county, but I could be wrong.

Senator MERKLEY. So what has their experience been? Have citizens been appreciative of the results or has the initial, if you view these kind of as pilot projects for others to observe, what lessons have been learned from that?

Ms. MCCARTHY. I think in those areas there is significant ozone challenges. I think it lowers the volatile organic compounds, which is one of the contributors to the formation of ozone. So from an air quality perspective, it has been beneficial. I think I would encourage you to ask the next panel, the State representatives, about the

resources that it provides to the State when you recover these types of natural resources.

Senator MERKLEY. So in the cases of Colorado and Wyoming, was that State statute that implemented the green recovery, or was it a kind of Department of Environmental Quality mandate?

Ms. MCCARTHY. I would ask you to ask that question of those. I don't want to presume if they were State regulations.

Senator MERKLEY. Have they been in place long enough for the States to provide feedback, though?

Ms. MCCARTHY. Oh, they have, and we worked very closely with those States to understand where it was beneficial. We also recognize that not all formations across the U.S. are the same. So in our rule we recognize that there are low pressure like coal bed methane deposits and formations where the pressure is not as high and where green completions are not going to be available.

So we did our best to understand why they are beneficial, how much they are beneficial, and then areas where their benefit may not be available and where technologically we wouldn't want to go to the extent of requiring green completions, because they are not technically available.

Senator MERKLEY. And you also have two phases here, the first phase allows flaring, which is a convenient, cheap issue. I think it is 2 and a half years before you would require green completion, so a 2 and a half year phase-in. What defined that time period; why not a longer time period or a shorter time period? What was magic about this?

Ms. MCCARTHY. It actually was data that the industry themselves submitted to us where we could understand how much equipment was available and how long it would take for equipment to be manufactured and made available so that we could move toward green completions in January 2015. I think we tried to use the data, we assessed it, we were very comfortable with it. We realized that the end goal is to recover the VOCs and to stop those from being emitted in the best way possible. Flaring helps. It destroys the VOCs, but it also can emit a small amount of NO_x, which is also an ozone precursor.

So to the extent that we can move from flaring to green completions, we are as technologically available and where it is cost effective. That is really how our rules drive our rulemaking. I think we were very faithful to that and to the data we had available to us to make these smart decisions.

Senator MERKLEY. Switching gears a little bit, in 2003 there was a voluntary agreement with a few companies related to the use of diesel, I believe, in the fracking fluids. Why was diesel used in the fracking fluids, and why was it important to get it out?

Ms. MCCARTHY. Senator, I am more than happy to go back and provide you some written follow up on that. I do not have the familiarity with that subject matter to be able to give you a direct response.

Senator MERKLEY. Great. Thank you very much.

Thank you, Mr. Chair.

Senator CARPER. Ms. McCarthy, I think that wraps it up with you. You are a good warm-up act for these other guys.

Ms. MCCARTHY. They will hold their own. Thank you, Senator.

Senator CARPER. I am sure they will. Thanks a whole lot. Thanks for being with us today. Some of our colleagues will have some follow up questions. We would just appreciate your responding promptly to those. Thank you very much, and thanks for your continued service.

Good morning, one and all. We are happy you are here. We look forward to hearing from you. Thanks for taking time to join us today and to testify and respond to our questions.

On the panel here today—we will start from my left, moving to the right. Fred Krupp, President, Environmental Defense Fund. Mr. Krupp, very nice to see you; welcome.

Next we have John Corra, and John Corra is the Director of the Wyoming Department of Environmental Quality. We have a Wyoming in Delaware. A lot of times I say to my friends here, I was in Wyoming just this weekend. We also have an Atlanta, a Lebanon and all kinds of places. For a little State, we are pretty diverse.

Next, Tisha Conoly Schuller, President and CEO of Colorado Oil and Gas Association. It is very nice to see you.

Darren Smith, and Darren Smith is the Environmental Manager of Devon Energy Corporation. How are you today?

And finally, last but not least, William Allison, the Director of the Air Pollution Control Division of the Colorado Department of Public Health and the Environment.

Welcome, one and all. You have 5 minutes to make your statement. If you go much beyond that, we will have to rein you in.

We are glad you are here, and we look forward to hearing what you have to say. Thank you for joining us.

Mr. Krupp.

STATEMENT OF FRED KRUPP, PRESIDENT, ENVIRONMENTAL DEFENSE FUND

Mr. KRUPP. Chairman Carper, Ranking Member Barrasso, and members of the Subcommittee, thank you for this opportunity to testify. My name is Fred Krupp, and I serve as President of the Environmental Defense Fund.

In 2011 the Secretary of Energy asked that I serve on the Secretary of Energy's Advisory Board Natural Gas Subcommittee. The subcommittee was tasked with recommending measures to address the safety and environmental performance of natural gas, hydraulic fracturing from shale operations. During this service, I was fortunate to meet with policymakers, gas providers, environmental organizations, and hundreds of concerned citizens through a process of intensive fact gathering.

The work was animated by two central considerations: the brisk expansion of shale gas and the imperative to address the public health and environmental impacts. The subcommittee encouraged adoption of rigorous standards for new and existing sources of methane, air toxics, ozone precursors, and other air pollutants from shale gas operations.

Oil and natural gas operations emit volatile organic compounds and nitrogen oxides that contribute to smog; benzene, which is a known human carcinogen; and methane, which is a potent climate pollutant. We can measure these emissions in tons, but in a discus-

sion that often focuses on numbers, we must not overlook their personal impacts.

Last summer, along with the subcommittee, I spent time in Washington County, Pennsylvania. There a mother told us that she had left her farm because of the severe air pollution from shale gas. The problems had become so bad that her children were living with relatives, and she was living out of her car at the time.

Our nation's clean air policies must reduce pollution, protect people, the environment, and communities. EPA's national emissions standards will cut air toxics, ozone precursors, and methane. The centerpiece of these protections is the requirement to require reduced emissions completions or green completions at hydraulically fractured wells. In a reduced emission completion, operators use separators to trap and capture natural gas that would otherwise be lost. This allows them to direct the gas to sales lines and ultimately to consumers that help offset their compliance costs.

A number of companies are using this proven, cost effective technology now, and the States of Colorado and Wyoming have similar requirements. These States with historic natural gas and oil development have recognized the ill effects that uncontrolled emissions can have. Indeed, many of EPA's standards build on time tested requirements of Wyoming and Colorado.

The natural gas industry in both States has continued to experience brisk growth while rigorous clean air standards similar to EPA's have been in place. When EPA finalized its standards, the National Journal headline read, "EPA finds rare sweet spot on fracking rules," noting that the rule "drew praise from both sides of the issue."

Indeed, EPA's new source performance standards were commended by diverse interests, such as the American Lung Association, the American Thoracic Society, the American Petroleum Institute, and Southwestern Energy. Southwestern emphasized the common sense nature, stating, "What we do today with reduced emissions completions in our wells doesn't cost us any more than just venting the gas into the atmosphere."

EPA's common sense standard to reduce pollution can conserve a valuable domestic energy resource and in some cases save producers money. The standards limit ozone precursors and air toxics and as a co-benefit, methane emissions, a potent climate pollutant. Our nation must work together to build on these clean air measures. Solutions must include the adoption of rigorous emissions standards for existing sources and must address the methane leaks and discharges across the oil and gas system.

Policy makers must provide leadership. The companies engaged in extraction activities must carry out solutions to protect our environment and our communities. Our nation's leading scientists must devote their expertise to providing answers to critical questions, and the voices of concerned citizens across our nation must be heard in forging lasting solutions.

This is critical if our nation is to fulfill the President's promise in his State of the Union to develop natural gas without putting the health and safety of our citizens at risk.

[The prepared statement of Mr. Krupp follows:]

**Before the United States Senate
Subcommittee on Clean Air and Nuclear Safety**

**'Review of Recent Environmental Protection Agency's Air Standards for Hydraulically
Fractured Gas Wells and Oil and Natural Gas Storage'**

**Testimony of Fred Krupp
President
Environmental Defense Fund
June 19, 2012**

Chairman Carper, Ranking Member Barrasso, and members of the Subcommittee, thank you for the opportunity to testify about the U.S. Environmental Protection Agency's Air Standards for Hydraulically Fractured Gas Wells and Oil and Natural Gas Storage.

My name is Fred Krupp. I serve as the President of Environmental Defense Fund, a national non-partisan, non-profit environmental organization.

OVERVIEW

In the fall of 2011, Secretary of Energy, Steven Chu, asked that I serve on the Secretary of Energy Advisory Board ("SEAB") Natural Gas Subcommittee. The Subcommittee was tasked with recommending measures to address the safety and environmental performance of natural gas hydraulic fracturing from shale formations.¹ During this service, I was fortunate to meet with state policymakers, federal government officials, industry representatives, public health and environmental advocates, and hundreds of concerned citizens through an intensive process of fact gathering, technical presentations and public meetings.

The Subcommittee's work was animated by two central considerations, the brisk expansion of shale gas in America transforming our nation's energy landscape and the imperative for our nation to work together addressing the public health and environmental impacts to ensure the safe development of this resource.

Shale gas accounted for only two percent of total U.S. natural gas production in 2001.² With the development of horizontal drilling and hydraulic fracturing, that number has grown extensively

¹ Steven Chu, CHARGE TO SECRETARY OF ENERGY ADVISORY BOARD NATURAL GAS SUBCOMMITTEE TO EXAMINE FRACKING ISSUES (May 5, 2011), *available at* http://www.shalegas.energy.gov/resources/Natural_Gas_Subcommittee_Charge_Memo_5_5_11.pdf.

² SEC'Y OF ENERGY ADVISORY Bd, SHALE GAS PRODUCTION SUBCOMMITTEE 90-DAY REPORT 6 (Aug. 18, 2011), *available at* http://www.shalegas.energy.gov/resources/081811_90_day_report_final.pdf [hereinafter 90-DAY REPORT].

to 30 percent in 2011.³ The U.S. Energy Information Administration projects shale gas will account for 47 percent of domestic natural gas production by 2035, spanning the nation from New York and Pennsylvania to Ohio, Texas, Colorado, and California.⁴

Much has been written both about the economic significance of shale gas production and the deep public concern that this development not harm human health and the environment. For natural gas to have a future, our nation must act decisively and wisely to implement measures that will address the public health and environmental impacts of shale gas development. This requires smart, well-designed policy solutions in a number of areas, including actions to protect air and water quality, to ensure disclosure of the chemicals used in fracturing fluid, and to mitigate impacts on communities, land use, wildlife and ecosystems.⁵

And our nation must work together. The policy makers responsible for protecting human health and the environment must provide leadership. The private companies engaged in these extraction activities must pioneer and carry out solutions to protect our environment and our communities. Our nation's leading scientists must devote their expertise in providing answers to critical questions. And the voices of concerned citizens across our nation must be heard in forging lasting solutions.

While this testimony focuses on the discharge of airborne contaminants, other public health and environmental impacts also warrant policy action. In addressing the urgent challenge of air emissions, the Subcommittee found that "[s]hale gas production . . . results in the emission of ozone precursors (Volatile Organic Compounds (VOCs), and nitrogen oxides), particulates from diesel exhaust, toxic air pollutants and greenhouse gases, such as methane" and that "[s]ignificant air quality impacts from oil and gas operations in Wyoming, Colorado, Utah and Texas are well documented...."⁶ As a result, we supported robust protections to address the suite of deleterious air pollutants from both new and existing sources, encouraging "adoption of rigorous standards for new and existing sources of methane, air toxics, ozone precursors and other air pollutants from shale gas operations."⁷

EPA's New Source Performance Standards (NSPS) for the oil and natural gas sector are an important first step toward reducing harmful air pollution. The standards limit harmful ozone precursors and air toxics, and as a co-benefit limit methane emissions, a potent climate forcer. They build on leadership from states like Colorado and Wyoming, utilizing cost-effective,

³ *Id.*

⁴ U.S. Energy Information Administration, Annual Energy Outlook 2011 79 (2011), available at [http://205.254.135.7/forecasts/aeo/pdf/0383\(2011\).pdf](http://205.254.135.7/forecasts/aeo/pdf/0383(2011).pdf)

⁵ See 90-DAY REPORT, *supra* note 2 at 15-26.

⁶ *Id.* at 15 (citations omitted).

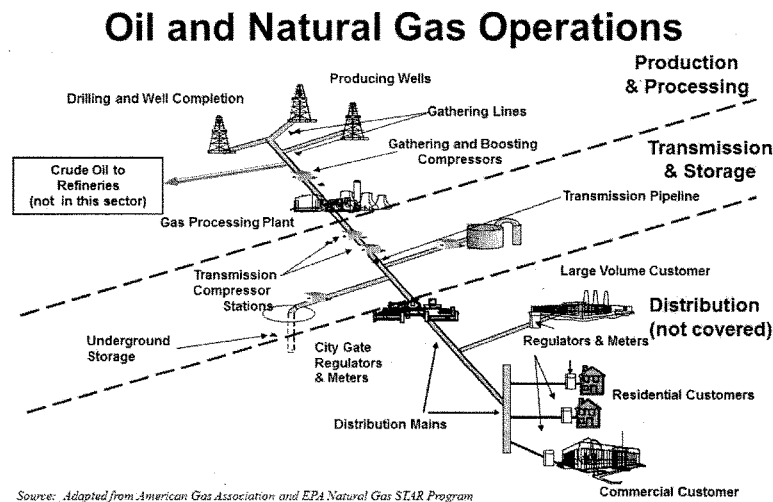
⁷ *Id.* at 2.

proven technologies that, in many cases, plug leaks throughout the system. These common sense measures are a win-win-win: they reduce pollution, conserve valuable domestic energy resources, and in some cases, actually save producers money. As a result, representatives of the public health community and business community commended EPA's action.

It is critical that we build on these clean air measures if our nation is to fulfill the President's promise in his State of the Union to develop natural gas without putting the health and safety of our citizens at risk.⁸

OIL AND NATURAL GAS SECTOR OVERVIEW

Oil and natural gas operations fall into four broad categories that encompass a range of oil and natural gas activities: 1) oil and natural gas production, 2) natural gas processing, 3) natural gas transmission and 4) natural gas distribution.



The New Source Performance Standards partially addresses elements of the production, processing and transmission segments but do not address the natural gas distribution segment.

⁸ U.S. President Barack Obama, Remarks in State of the Union Address (January 24, 2012), available at <http://www.whitehouse.gov/the-press-office/2012/01/24/remarks-president-state-union-address> (emphasis added).

OIL AND NATURAL GAS SYSTEMS EMIT AIR POLLUTION THAT IS ASSOCIATED WITH SERIOUS PUBLIC HEALTH AND ENVIRONMENTAL IMPACTS

Oil and natural gas operations emit a variety of air pollutants, including pollutants that contribute to ground-level ozone or “smog;” toxic air pollutants like benzene, a known human carcinogen; and methane, a potent climate-disrupting pollutant. We can measure these emissions in tons and characterize their damaging human health impacts. In a discussion that often focuses on numbers, however, we must not overlook the deeply personal impacts associated with air pollution from oil and natural gas development. Last summer, along with others on the SEAB Subcommittee, I spent time in Washington County, Pennsylvania. There, a mother told me and the other panel members that she has been forced to leave her family farm because of the severe air pollution from shale gas wells. The problem had become so bad that the woman and her young son were now living out of their car.

Natural Gas and Oil Operations Emit Toxic Air Pollution

Oil and natural gas operations emit hazardous air pollutants, including benzene, formaldehyde and hydrogen sulfide. Benzene is a known human carcinogen. The International Agency for Research on Cancer and the National Toxicology Program, an interagency program of the Department of Health and Human Services, have likewise classified formaldehyde as a human carcinogen.⁹ Hydrogen sulfide, a pollutant that is found in certain types of natural gas (“sour” gas), causes nausea, headaches, delirium, disturbed equilibrium, poor memory, loss of consciousness, tremors, and convulsions.¹⁰

Scientists have detected elevated concentrations of benzene near gas production sites in Texas and Colorado.¹¹ In 2010 the Texas Commission on Environmental Quality measured acute concentrations of benzene that exceeded the state’s health-based risk guidelines at two

⁹ See, e.g., NATIONAL TOXICOLOGY PROGRAM, REPORT ON CARCINOGENS, 12TH ED. 195 (2011), available at <http://ntp.niehs.nih.gov/ntp/roc/twelfth/profiles/Formaldehyde.pdf>.

¹⁰ AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, TOXICOLOGICAL PROFILE FOR HYDROGEN SULFIDE 104 (July 2006), available at <http://www.atsdr.cdc.gov/toxprofiles/tp114.pdf>.

¹¹ See, e.g., Raj Goyal, *Air Toxic Inhalation: Overview of Screening-Level Health Risk Assessment for Garfield County*, (June 2008), <http://www.garfield-county.com/public-health/documents/Air%20Toxics%20Screening%20Level%20Risk%20Assesment%20Presentation%206%2017%2008%20-%20Dr%20Raj%20Goyal.pdf> (last visited June 14, 2012); Teresa Coons & Russell Walker, *Community Health Risk Analysis of Oil and Gas Industry Impacts in Garfield County* (June 2008), [http://www.garfield-county.com/public-health/documents/1_COMMUNITY_HEALTH_RISK_ANALYSIS-\(Complete_Report_16MB\).pdf](http://www.garfield-county.com/public-health/documents/1_COMMUNITY_HEALTH_RISK_ANALYSIS-(Complete_Report_16MB).pdf) (last visited June 14, 2012); Teri Whiteley, T & Tim Doty, *Barnett Shale Formation Area Monitoring Projects* (2009), <http://www.bseec.org/sites/all/pdf/airquality/01.pdf> (last visited June 14, 2012).

exploration and production sites in the Barnett Shale.¹² In 2008, air samples obtained from oil and gas sites in Colorado's Piceance Basin led researchers to determine that emissions from well completions, dehydration units, and condensate tanks may pose an elevated cancer risk to nearby residents.¹³ Similarly, a recent study released by the National Oceanic and Atmospheric Administration based on atmospheric measurements in Colorado's D.J. Basin concluded that "oil and gas operations in the [Denver-Julesburg Basin] could be the largest source of C₆H₆ (benzene) in Weld County."¹⁴

Natural Gas and Oil Operations Contribution to Ground-Level Ozone

Ozone pollution, or "smog," is linked to serious health problems, including premature mortality, heart failure, increased hospital admissions and emergency room visits for respiratory causes among children and adults with pre-existing respiratory disease, and possible long-term damage to the lungs.¹⁵ Children, the elderly, and people with existing respiratory conditions are the most at risk from ozone pollution.¹⁶

Oil and natural gas drilling, production, processing and transport can release significant amounts of volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) which combine in the presence of sunlight to form smog. According to the state of Colorado, natural gas and oil operations were the largest source of smog-forming pollutants in the state in 2008.¹⁷

There are strong links between ozone precursor emissions from oil and gas development and serious ozone air quality impacts. Rural parts of Wyoming and Utah, where little other industrial activity occurs, have suffered ozone concentrations comparable to those recorded in some of the

¹² Railroad Commission of Texas, Notice to Oil, Gas & Pipeline Operators Regarding Air Emissions (March 2010), <http://www.rrc.state.tx.us/forms/reports/notices/airemission21010.pdf>.

¹³ Teresa Coons & Russell Walker, *supra* note 11.

¹⁴ GABRIELLE PÉTRON ET AL., HYDROCARBON EMISSIONS CHARACTERIZATION IN THE COLORADO FRONT RANGE: A COLORADO FRONT RANGE PILOT STUDY (2012). While Colorado has tightened its controls on natural gas and oil sources in the D.J. Basin since 2008, at that time, equipment in the D.J. Basin represented some of the best controlled natural gas and oil sources in the country. In fact, controls in most parts of the country remain less rigorous and comprehensive than those in place in the D.J. Basin in 2008, suggesting that benzene and other pollutant levels in many other parts of the country may also be higher than believed.

¹⁵ EPA, AIR QUALITY CRITERIA FOR OZONE AND RELATED PHOTOCHEMICAL OXIDANTS (2006); Michelle L. Bell, Roger D. Peng & Francesca Dominici, *The Exposure-Response Curve for Ozone and Risk of Mortality and the Adequacy of Current Ozone Regulations*, 114 ENVTL. HEALTH PERSPS. 532 (2006); Jonathan I. Levy et al., *Ozone Exposure and Mortality: An Empiric Bayes Metaregression Analysis*, 16 EPIDEMIOLOGY 458 (2005).

¹⁶ See EPA, Ground-Level Ozone Health Effects, <http://www.epa.gov/glo/health.html>; EPA, Nitrogen Dioxide, Health, <http://www.epa.gov/air/nitrogenoxides/health.html>.

¹⁷ COLO. CODE REGS. § 1001-9:XIX.K (2008), available at <http://www.cdphe.state.co.us/regulations/airregs/5CCR1001-9.pdf>.

most heavily polluted U.S. cities. The Bureau of Land Management (BLM) identified concentrated oil and gas development as the likely dominant source of the ozone pollution in the Utah's Uinta Basin,¹⁸ where, in the first three months of 2010, air quality exceeded national health standards for ozone nearly seventy times.¹⁹ Similarly, in addressing the designation of the Upper Green River Basin as an ozone non-attainment area, then-Wyoming Governor Dave Freudenthal noted the "need to reduce emissions from the natural gas industry."²⁰ In its submission recommending a non-attainment designation for the area, the Wyoming Department of Environmental Quality concluded "that elevated ozone [in the area] is primarily due to local emissions from oil and gas (O&G) development activities: drilling, production, storage, transport and treating."²¹

As natural gas and oil development expands into new regions, adverse air impacts are likely to follow absent protective pollution controls. Air modeling for the Haynesville Shale projects an increase in ozone concentrations near natural gas drilling and production and in adjacent regions due to ozone transport.²²

Natural Gas and Oil Operations Emit Methane

Natural gas extraction activity also discharges methane, which is the primary constituent of natural gas as well as a potent greenhouse gas. Methane has a warming potential seventy-two times that of carbon dioxide over the short term (twenty years) and twenty-five times that of

¹⁸ BLM, GASCO ENERGY INC. UINTA BASIN NATURAL GAS DEVELOPMENT DRAFT ENVIRONMENTAL IMPACT STATEMENT 3-13 (2010), available at http://www.blm.gov/ut/st/en/fo/vernal/planning/nepa/gasco_energy_eis.html.

¹⁹ Streater, Scott, *Air Quality Concerns May Dictate Uintah Basin's Natural Gas Drilling Future*, N.Y. TIMES, Oct. 1, 2010, available at <http://www.nytimes.com/gwire/2010/10/01/01greenwire-air-quality-concernsmay-dictate-uintah-basins-30342.html?pagewanted=1>.

²⁰ Letter from Wyoming Governor Dave Freudenthal to Carol Rushin, Acting Regional Administrator, USEPA Region 8, "Wyoming 8-Hour Ozone Designation Recommendations" (Mar. 12, 2009), available at <http://deq.state.wy.us/out/downloads/Rushin%20Ozone.pdf>.

²¹ WY DEPARTMENT OF ENVIRONMENTAL QUALITY, TECHNICAL SUPPORT DOCUMENT I FOR RECOMMENDED 8-HOUR OZONE DESIGNATION FOR THE UPPER GREEN RIVER BASIN, WY at vii (Mar. 26, 2009), available at http://deq.state.wy.us/out/downloads/Ozone%20TSD_final_rev%203-30-09_jl.pdf.

²² See Susan Kembell-Cook et al., *Ozone Impacts of Natural Gas Development in the Haynesville Shale*, 44 ENVTL. SCI. TECH. 9357, 9362 (2010).

carbon dioxide over a longer time-frame (one-hundred years).²³ In addition to its climate impacts, methane contributes to higher global background concentrations of ozone pollution.²⁴

According to EPA's most recent greenhouse gas inventory, natural gas and petroleum systems represent 37% of U.S. methane emissions, making them the largest domestic source of methane.²⁵ In 2011, the EPA doubled its previous estimate of methane released due to leaks and venting in the natural gas network between production wells and the local distribution network. In effect, EPA's data suggests that about 2.4% of gross U.S. natural gas production was being lost to the atmosphere before it reached the consumer. A recent paper from the National Oceanic and Atmospheric Administration, however, measured methane concentrations in the Denver-Julesburg Basin in Colorado and concluded that "the methane source from natural gas systems in Colorado [estimated using EPA's State Inventory Tool] is most likely underestimated by at least a factor of two."²⁶ These discrepancies highlight the uncertainty in our understanding of how much natural gas is lost between wells and consumers.

To reduce this uncertainty, EDF is participating with industry and academic partners on a series of scientific field studies to better quantify methane leakage rate across the natural gas supply chain. The five studies – focusing on the production of natural gas, natural gas processing, long-distance pipelines and storage, local distribution systems and natural gas vehicles – will utilize scientifically rigorous field measurements to quantify methane leakage. In addition to many leading companies in the industry, we are working with the University of Texas, Duke University, Harvard University and Boston University.

Characterizing the overall leakage rate from the natural gas and oil sector is critical to understanding the climatic implications of natural gas use relative to other fuels. A recent paper co-authored by EDF scientists underscores this point, proposing an analytical approach that reveals the inherent climatic trade-offs of different policy and investment choices involving natural gas for electricity and transportation. While this important scientific research continues, our nation too must move forward in addressing the emissions, leaks, venting and discharges associated with natural gas extraction.

²³ The values of 25 and 72 are methane's global warming potential (GWP); GWP is a commonly used concept to compare the radiative forcing of GHGs relative to that of CO₂. The Intergovernmental Panel on Climate Change (IPCC) typically uses a 100-year time horizon for the calculation of GWP; but a 20-year horizon is sometimes used.

²⁴ J. Jason West et al., *Global Health Benefits of Mitigating Ozone Pollution with Methane Emission Controls*, 103 PROC. NAT'L ACAD. SCI. 3988, 3989 (2006).

²⁵ EPA, METHANE EMISSIONS, [HTTP://WWW.EPA.GOV/CLIMATECHANGE/GHGEMISSIONS/GASES/CH4.HTML](http://www.epa.gov/climatechange/ghgemissions/gases/ch4.html).

²⁶ PETRON, *supra* note 14 at 18.

**THE EPA NEW SOURCE PERFORMANCE STANDARDS DEPLOY COMMON
SENSE, COST-EFFECTIVE CONTROL TECHNOLOGIES TO REDUCE POLLUTION**

EPA's emission standards reduce harmful air toxics, ozone precursors, and methane as a co-benefit using proven, cost-effective control technologies. When fully implemented, EPA estimates that these national emissions standards will achieve significant air pollution reductions each year: 190,000 to 290,000 tons of VOCs; 12,000 to 20,000 tons of air toxics, and 1.0 to 1.7 million short tons of methane (about 19 to 33 million tons of CO₂ equivalent).

The requirement to perform a reduced emission completion or green completion at hydraulically fractured gas wells forms the centerpiece of these EPA clean air measures. After a well is hydraulically fractured, a mixture that includes water, fracturing fluid, proppant (usually sand), and some natural gas returns to the surface. During this well completion event, natural gas that is part of the flowback mixture is emitted directly into the atmosphere or burned in a combustion device. In a reduced emission completion or "green completion," operators utilize separators and traps to capture natural gas that would otherwise be lost. This allows operators to direct the gas to a sales line and ultimately to customers, which provides an offset to the costs associated with compliance. A number of companies are already using this proven, cost-effective technology, and states like Colorado and Wyoming have similar requirements. As of 2015, EPA's clean air measures will ensure that this proven, cost-effective technology is being deployed broadly, ensuring uniform requirements and a level playing field at the approximately 11,400 new and 1,400 re-fractured gas wells across the country.

The national emission standards also include important protections for pneumatic controllers, compressors, storage vessels and equipment leaks, which, in many cases, involve plugging leaks throughout the oil and natural gas system. Capturing this valuable resource is a win-win-win: it reduces pollution, while conserving valuable domestic energy, and, in many cases, saving producers money. Collectively, producers will capture an estimated 43 billion cubic feet of natural gas and 160,000 barrels of condensate in 2015 as a result of EPA's standards,²⁷ which is enough energy to power 645,000 American homes for a year. Fixing these leaks can also pay financial dividends: the standards as a whole will save the industry \$11 million in 2015.²⁸

EPA has also included important provisions to help secure compliance with these national standards. For example, the standards require producers, in their annual compliance report, to "include a signed certification by a senior company official that attests to the truth, accuracy and

²⁷ Pre-publication Final Rule, "Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews" (April 17, 2012) at 239.

²⁸ See *Id.* at 252.

completeness of the report.”²⁹ These protections advance important accountability, helping to provide Americans with confidence that sources are complying with EPA’s clean air protections.

EPA’S EMISSION STANDARDS BUILD FROM A FOUNDATION OF STRONG STATE STANDARDS TO LIMIT POLLUTION FROM OIL AND GAS ACTIVITIES

States with historic natural gas and oil development such as Wyoming and Colorado have long recognized the deleterious effect uncontrolled natural gas and oil emissions can have on air quality and human health. Indeed, many of EPA’s standards build from time-tested clean air requirements that have been in place in Wyoming for over a decade and in Colorado since 2004.

For example, Wyoming first introduced controls for storage vessels with flash emissions in 1998 and has repeatedly strengthened these requirements until their last revision in 2010. In concentrated development areas, Wyoming currently requires 98% control of VOCs from certain storage tanks.³⁰ Similarly, in 2004, Wyoming first required “green completions” in the Upper Green River Basin,³¹ and as of 2010, Wyoming expanded this requirement to all areas of concentrated development.³² Simultaneously the state required the use of low or no-bleed pneumatic devices in all areas of concentrated development.

Similarly, Colorado first introduced requirements to control emissions from condensate tanks in the D.J. Basin in 2004,³³ tightening these controls in 2006 and expanding coverage to include condensate tanks statewide.³⁴ In 2008 the state adopted its own statewide green completion requirement, as well as a requirement that pneumatic devices be low or no-bleed.³⁵ For storage vessels located near public places in the heavily developed Piceance Basin, the state required even greater control.³⁶ These measures, like Wyoming’s, help to form the basis for EPA’s reduced emission completion, pneumatic controller and storage vessel standards.

²⁹ *Id.* at 104.

³⁰ WYOMING DEQ, AIR QUALITY DIVISION, OIL AND GAS PRODUCTION FACILITIES CHAPTER 6, SECTION 2 PERMITTING GUIDANCE at 5 (March 2010 Revision), *available at* <http://deq.state.wy.us/aqd/Oil%20and%20Gas/March%202010%20FINAL%20O&G%20GUIDANCE.pdf>

³¹ WYOMING DEQ, AIR QUALITY DIVISION, JONAH AND PINEDALE ANTICLINE GAS FIELDS, ADDITION TO OIL AND GAS PRODUCTION FACILITY EMISSION CONTROLS AND PERMITTING REQUIREMENTS (July 28, 2004) <http://deq.state.wy.us/aqd/Oil%20and%20Gas/JONAH%20INFILL%20GUIDANCE%20FINAL%207-28-04.pdf>.

³² *See* WYOMING DEQ, *supra* note 30 at 15 (describing green completion requirement in all Concentrated Development Areas).

³³ *See* 5 COLO. CODE REGS., § 1001-9(XIX.G) (2011) (describing 2004 revisions).

³⁴ *Id.* at XIX.I (describing 2006 expansion)

³⁵ COLO. CODE REGS. § 404-1:805(b)(2)(E), (b)(3)(A) (2012).

³⁶ *Id.* § 404-1:805(b)(2)(A)-(D).

Clean Air Measures and Industry Growth

EDF undertook an economic analysis of the natural gas and oil industry in Wyoming and Colorado following the adoption of both states' clean air requirements discussed above.³⁷ The results demonstrate that clean air measures, such as those finalized by EPA, and industry growth can go hand-in-hand. Between 2000 and 2009 Wyoming and Colorado had the highest annual growth rates for gross withdrawals and the highest average annual growth in producing gas wells as compared to other major gas-producing states with less protective measures.³⁸

A recent Baird analysis underscores this point: According to Baird, since the beginning of Colorado's green completion requirement in April 2009, horizontal well permit approvals have increased 126% from 2009 to 2010, and 147% in 2011.³⁹ Wyoming's green completion requirement applicable to all concentrated development areas has been in place since March of 2010, and, according to the same analysis, during that time, Wyoming's has experienced an increase in horizontal drilling approved permits from 81 in 2009, to 290 in 2010, and 746 in 2011.⁴⁰ This represents a 2-year increase of more than 900%.⁴¹

The natural gas industry in both states has continued to experience brisk growth while rigorous clean air standards similar to those finalized by EPA have been in place.

REPRESENTATIVES OF THE PUBLIC HEALTH COMMUNITY AND BUSINESS COMMUNITY COMMENDED EPA'S ACTION

On April 18, 2012, the day EPA released the final oil and natural gas standards, the *National Journal* ran a story with a headline that read, "EPA Finds Rare Sweet Spot on Fracking Rules," stating that EPA's rule "drew praise from both sides of the issue."⁴² Indeed, EPA's cost-effective, common sense national emission standards for oil and natural gas activities were well received by public health associations, environmental organizations, industry groups, and individual companies.

³⁷ Comment, *Sierra Club et al.*, Docket ID EPA-HQ-OAR-2010-0505-4240, at 161-67 (Dec. 1, 2011).

³⁸ *Id.* at 166.

³⁹ BAIRD, *Energy Policy: Upstream, Environmental Unconventional Drilling Quarterly Update* 11 (Mar. 16, 2012) available at <https://baird.bluematrix.com/docs/pdf/70b8e0c5-7762-49ca-be28-3d8b3bcc12ba.pdf?co=Baird&id=jpolson@bloomberg.net&source=mail>.

⁴⁰ *Id.*

⁴¹ *Id.*

⁴² Amy Harder, *EPA Finds Rare Sweet Spot on Fracking Rules*, NATIONAL JOURNAL (Apr. 18, 2012), <http://www.nationaljournal.com/member/energy/epa-finds-rare-sweet-spot-on-fracking-rules-20120418>.

Prominent health organizations such as the American Lung Association and the American Thoracic Society commended EPA for promulgating a rule that will have important public health benefits.

- The **American Lung Association** said, “The adoption of these safeguards against air pollution from oil and natural gas production, as required under the Clean Air Act, will help protect the public from life-threatening pollution. Limiting emissions from oil and natural gas production will yield tremendous benefits and significantly reduce adverse health effects.”⁴³
- The **American Thoracic Society**, in commenting on the final rule, stated “[w]e believe these final rules will help improve America’s air quality.”⁴⁴

Some companies have indicated they are already implementing key provisions of the standards precisely because the practices are so cost-effective. In public statements, **Southwestern Energy** emphasized the common sense nature of reduced emission completions: “What we do today with reduced emissions completions in our wells doesn’t cost us any more than just venting the gas into the atmosphere.”⁴⁵

Similarly, **Devon Energy**, which has utilized green completions as its “standard practice” in the Barnett Shale since 2004,⁴⁶ commented that, by utilizing reduced emission completions, “We are capturing value that would otherwise be lost...It does make good economic sense for us.”⁴⁷

Chesapeake Energy, too, already uses reduced emissions completions on “a high percentage of [its] wells.”⁴⁸

Even industry trade groups that had been critical of EPA’s proposed rule have issued constructive statements in response to the final standards.

⁴³ AM. LUNG ASS’N, *Natural Gas and Oil Production Standards Will Protect Health and Reduce Toxic Air Pollution* (Apr. 18, 2012), <http://www.lung.org/press-room/press-releases/natural-gas-and-oil-standards.html>.

⁴⁴ AM. THORACIC SOC’Y, *EPA Issues Final Rules on Oil and Natural Gas Extraction Emissions*, THE WASHINGTON LETTER (Apr. 27, 2012), <http://www.thoracic.org/advocacy/washington-letter/archive/2012/april-27-2012.php>.

⁴⁵ Jim Efstathiou Jr., *Drillers Say Costs Manageable From Pending Gas Emissions Rule*, BLOOMBERG (Apr. 17, 2012), <http://www.bloomberg.com/news/print/2012-04-17/drillers-say-costs-manageable-from-pending-gas-emissions-rule.html>.

⁴⁶ DEVON ENERGY, *Green Completions Now the Standard in Barnett Shale*, <http://www.dvn.com/CorpResp/initiatives/Pages/GreenCompletions.aspx>.

⁴⁷ *Id.*

⁴⁸ *Drillers Say Costs Manageable From Pending Gas Emissions Rule*, *supra* note 45.

- The **American Petroleum Institute's** (API) press release headline read, "EPA made constructive changes in hydraulic fracturing rules," and continued, "EPA has made some improvements in the rules that allow our companies to continue reducing emissions while producing the oil and natural gas our country needs."⁴⁹
- **America's Natural Gas Alliance** (ANGA) noted that "it appears as if EPA accepted some of our comments in response to the proposal."⁵⁰

The cross-cutting support reflects EPA's constructive engagement across the spectrum of interested stakeholders, resulting in a common sense rule that will reduce harmful air pollution, prevent the waste of a valuable domestic resource, and, in many cases, actually save industry money through sales of recovered natural gas.⁵¹

PREVENTING AIR EMISSIONS AND ENSURING CLEAN, HEALTHY AIR QUALITY

EPA's New Source Performance Standards provide for significant pollution reductions that will have substantial public health and environmental benefits. We must build from this important first step to minimize the pollution burdens associated with oil and gas development and in doing so, bolster these public health and environmental protections and ensure we are not wasting valuable domestic energy. This requires a collaborative effort at the federal, state, and local levels, including strengthening EPA's national emission standards, encouraging strong state leadership in providing communities with protections addressing ozone pollution, and industry leadership in ensuring American's have transparent information about the pollution to which they are exposed.

Strengthening Current Standards

In its recommendations, the SEAB Subcommittee supported "adoption of rigorous standards for new and existing sources of methane, air toxics, ozone precursors and other air pollutants from shale gas operations."⁵² As I discussed earlier, EPA's standards make important reductions with respect to air toxics and ozone-forming pollutants from new and modified sources in certain segments of the oil and gas sector. Consistent with the Subcommittee's recommendation, however, more must be done to protect public health and the environment.

⁴⁹ AM. PETROLEUM INST., *EPA Made Constructive Changes in Hydraulic Fracturing Rules, API Says* (Apr. 18, 2012), <http://www.api.org/news-and-media/news/newsitems/2012/apr-2012/epa-made-constructive-changes-in-hydraulic-fracturing-rules.aspx>.

⁵⁰ AM. NAT. GAS ALLIANCE, *ANGA Comments on EPA Air Standards for Oil and Gas Operations* (Apr. 18, 2012), <http://www.anga.us/media-room/press-releases/2012/04/anga-comments-on-epa-air-standards-for-oil-and-gas-operations>.

⁵¹ Technical Support Document, U.S. ENVTL. PROT. AGENCY, Docket ID EPA-HQ-OAR-2010-0505-0045, at 4-16 – 4-18 (Aug. 23, 2011).

⁵² 90-DAY REPORT, *supra* note 2 at 16.

The SEAB Subcommittee recommendations emphasized that emission standards should cover both new and existing sources. While the agency set new-source standards, EPA declined to issue emission guidelines covering existing sources. There are a large number of existing sources, however, and emissions from these sources can be significant. Emissions inventories, like the one compiled by the Western Regional Air Partnership, indicate that five basins in the Intermountain West would account for 259,051 tons of VOC in 2012.⁵³ Many of the standards EPA has proposed for new sources can cost-effectively be applied to reduce these emissions from existing sources. Existing storage tanks, for instance, can be retrofitted with the same technologies that new sources deploy to meet EPA's New Source Performance Standards. EPA has authority to issue emission guidelines for existing sources, and it is critical to do so to address this significant source of harmful pollution.

EPA's standards cover air toxics and ozone-forming pollutants, but the agency explicitly elected not to cover methane. Methane, however, is a potent greenhouse gas, and one of six well-mixed greenhouse gases that EPA found "may reasonably be anticipated both to endanger public health and to endanger public welfare" of current and future generations.⁵⁴ EPA has authority to strengthen its emission standards in this way, and, while the VOC controls in the rule often result in methane reductions as a co-benefit, there are important opportunities for reducing methane leakage that the current rule does not address. Consistent with EPA's science-based Endangerment Finding and SEAB Subcommittee's recommendations, the agency should strengthen the NSPS by ensuring the standards explicitly cover methane emissions.

Finally, the SEAB Subcommittee recommended that emission standards be "rigorous" and cover emission sources across the exploration, production, transportation and distribution sectors.⁵⁵ As such, it is imperative that EPA clarify that well completion protections apply to wells that co-produce oil and natural gas. Shifting market fundamentals are driving rapid development of co-producing wells in liquids-rich plays, and, contemporaneously, a de-emphasis on well development in dry-gas plays, or plays which exclusively or almost exclusively produce natural gas. Companies are pouring extensive capital resources into developing liquids-rich plays. For instance, Chesapeake Energy plans to allocate 85% of its drilling capital expenditures to liquids-rich fields and operate only 24 dry-gas rigs in 2012, a decline of 50 dry-gas rigs from its 2011

⁵³ Western Regional Air Partnership Phase III 2006 and 2012 Activity Emission Estimates for the Denver-Julesburg, Piceance, Uinta, South San Juan, North San Juan, and Wind River Basins, available at http://www.wrapair.org/forums/ogwg/PhaseIII_Inventory.html.

⁵⁴ Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66496-01 (2009) (to be codified at 40 C.F.R. ch. 1).

⁵⁵ 90-DAY REPORT, *supra* note 2 at 16.

average.⁵⁶ Long-term projections indicate that development in these liquids-rich areas will continue to expand rapidly: over the next 20 years, Bakken wells will increase from 5,000, currently, to a projected 48,000,⁵⁷ and in the Eagle Ford, wells are projected to increase from 293 in 2010 to a 4,890 new wells by 2020.⁵⁸ These wells can produce significant amounts of natural gas and associated VOC pollution, and EPA should ensure that the well completion requirements apply to these wells.

Supporting State Action on Air Quality Issues

In its recommendations, the SEAB Subcommittee noted that “[t]he challenges of protecting human health and the environment in light of the anticipated rapid expansion of shale gas production require the joint efforts of federal and state regulators.”⁵⁹ States have led the way in controlling harmful emissions of ozone precursors from the oil and gas sectors and have an opportunity to continue to collaborate with the federal government to ensure timely, impactful reductions of ozone precursors from these sources.

We must ensure that we are adequately monitoring ozone pollution in areas of oil and gas development, and, in ozone non-attainment areas, EPA should provide guidance for states containing an expansive menu of effective controls for reducing precursor emissions from the oil and gas sector. Such guidance can help states addressing ozone non-attainment problems to ensure they are deploying the suite of available emission reduction opportunities. Similarly, in attainment areas, EPA’s Ozone Advance Program provides a framework for collaboration among EPA, states, tribes, and local governments. This program promotes local actions to reduce ozone precursors, ensuring these areas continue to meet the nation’s health-based standards for ground-level ozone. Reductions from the oil and gas sector should be among the key solutions highlighted for states in the Ozone Advance Program.

Ensuring Emissions Transparency

Finally, the SEAB Subcommittee recommended that “companies should be required, as soon as practicable, to measure and disclose air pollution emissions, including greenhouse gases, air toxics, ozone precursors and other pollutants. Such disclosure should ... be reported on a

⁵⁶ CHESAPEAKE ENERGY, *Chesapeake Energy Corporation Updates Its 2012 Operating Plan in Response to Low Natural Gas Prices* (Jan. 23, 2012), <http://www.chk.com/news/articles/pages/1651252.aspx>.

⁵⁷ Clifford Krauss, *In North Dakota, Flames of Wasted Natural Gas Light the Prairie*, THE NEW YORK TIMES (Sept. 26, 2011), <http://www.nytimes.com/2011/09/27/business/energy-environment/in-north-dakota-wasted-natural-gas-flickers-against-the-sky.html?pagewanted=all>.

⁵⁸ AM. NAT. GAS ALLIANCE, *Economic Impact of the Eagle Ford Shale* 8, 21 (Feb. 2011), <http://www.anga.us/media/195472/utsa%20eagle%20ford.pdf>.

⁵⁹ 90-DAY REPORT, *supra* note 2 at 11.

publically accessible website that allows for searching and aggregating by pollutant, company, production activity and geography.”⁶⁰

As part of its greenhouse gas reporting program, EPA is collecting methane emissions data from sources in the oil and natural gas sector. Many measurement methodologies for the sector, however, rely on equations and emission factors, and, for other pollutants like ozone precursors and hazardous air pollutants, no such comprehensive reporting program exists. Measurement and public disclosure of these data is essential to provide policy makers and all Americans with the emissions data that is the foundation for lasting solutions.

CONCLUSION

EPA’s new source performance standards for the oil and gas sector are an important step forward, one that has been commended by a broad variety of interests and is an example of smart, cost-effective regulation. This modernization provides a strong foundation for the additional protections that will be necessary to ameliorate air pollution from the oil and gas sector. The standards also form an important part of what the SEAB Subcommittee considered central to rigorous policy design – a “regulatory system that sets the policy and technical foundation to provide for continuous improvement in protection of human health and the environment.”⁶¹ Thank you for the opportunity to share our views.

⁶⁰ *Id.* at 16.

⁶¹ *Id.* at 11.



Questions for the Record--Senator Inhofe:

1. The Environmental Defense Fund relied on EPA estimates (which have been criticized as wildly overestimating emissions and methodologically flawed) as the foundation for a study purporting to analyze the emissions from natural gas vehicles. As you know, Industry recently released a comprehensive study relying on data from ten times the number of wells as the previous EPA estimate for methane emissions and found that EPA's emission estimate in some instances were inflated by 200% and other studies have found overestimates closer to 1400%. If taken into consideration, how drastically do these revised estimates affect the findings of the EDF study?

A recent scientific paper co-authored by EDF scientists and published in the Proceedings of the National Academy of Sciences (PNAS) proposed an analytical approach that reveals the inherent climatic trade-offs of different policy and investment choices involving natural gas for electricity and transportation. Methane is a potent climate forcer and leaking methane undercuts the climate benefits of natural gas when compared to more carbon intensive fuels. EDF's framework provides a better understanding of how the methane leak rate associated with natural gas impacts climate over different time frames.

For natural gas vehicles to produce climate benefits on all time frames, the study determined that the well-to-wheels methane leakage rate would have to be reduced to 1.0-1.6% (well-to-wheels includes the methane emissions from the natural gas value chain plus those from vehicle refueling and use).

The EDF study did not measure methane emissions from natural gas vehicles, but utilized EPA figures and available data from the literature. The EDF study provides an analytical framework that allows for others, like the referenced industry analyses, to input their own assumptions about the methane leak rate and draw their own conclusions based on those data. These industry analyses do not, however, impact the EDF study's findings with respect to different levels of methane leakage rates and climate implications on both short and long timeframes of those different levels.

EDF is working to deepen the understanding of system-wide methane leakage by gathering extensive emissions information in a study being conducted with the University of Texas, other leading academic institutions and natural gas producers.

2. How does the more comprehensive industry methane emissions data affect cost-effectiveness assertions in the oil and gas rules?

EPA's cost-effectiveness analyses for the recently adopted oil and gas emission standards are based on the best available emissions data.



Finding the ways that work

The American Petroleum Institute (API) and America's Natural Gas Alliance (ANGA) study to which the question refers utilizes EPA's emission factor, as opposed to actual measurements, for the amount of emissions associated with a well completion. The API/ANGA study suggests that a fewer *number* of wells undergo re-fracture and re-completion annually (and therefore that there are fewer emissions from the entire sector) contrasting with EPA's estimates of the overall number of re-fracture and re-completions.

The cost-effectiveness of a green completion reflects the estimated volume of emissions during a well completion. Thus, the study does not impact EPA's cost-effectiveness determination for green completions.

3. *Emissions data was recorded from several NOAA observation towers throughout the country, including two in California, two in Colorado, and one each in Texas, Oklahoma, and Wisconsin. According to the NOAA study, the Wisconsin tower, "in the middle of the Chequamegon National Forest" recorded a higher methane level than the tower in the middle of the Denver-Julesburg Basin. Why would a tower located in a federally-protected forest and far removed from any industrial activity record higher methane emissions than measurements taken in a natural gas field?*

We have not performed an analysis of NOAA's data, but offer the following observations. According to the NOAA paper, the Chequamegon National Forest "is a mix of temperate/boreal forest and lowlands/wetlands." This wetland-rich area of northern Wisconsin has been predicted to have high natural methane emissions (Potter et al. 2006, Werner et al. 2003). Methane is produced naturally by microbes in environments such as wetlands with low oxygen and high organic matter. In comparison, the arid Denver-Julesburg Basin of Colorado is predicted to have much lower natural methane emissions. The natural production of wetland methane in northern Wisconsin likely contributes to the high methane concentration measured in the Chequamegon National Forest. Emissions from areas upwind of the Wisconsin tower may also have an effect on the observed methane concentrations at the site. We also note that Figure 2 of the NOAA paper and the related discussion indicate that the chemical signature of air samples collected at the Wisconsin tower (namely the relatively low levels of non-methane hydrocarbons) are distinct from those collected at the BAO and SGP sites in Colorado and Oklahoma, respectively. These signatures are consistent with the BAO and SGP sites being influenced by oil and gas producing sources, while suggesting that the Wisconsin site is influenced by another source type.

Petron G, Frost GJ, Miller BR and 27 others (2012) Hydrocarbon emissions characterization in the Colorado Front Range- a pilot study, Jour. Geophys. Res., doi:10.1029/2011JD016360.

Potter, C., S. Klooster, S. Hiatt, M. Fladeland, V. Genovese, and P. Gross, 2006, Methane emissions from natural wetlands in the United States: Satellite-derived estimation based on ecosystem carbon cycling, *Earth Interactions*, 10(22): 1-12.



Werner, C., K. Davis, P. Bakwin, C. Yi, D. Hursts, and L. Lock (2003), Regional-scale measurements of CH₄ exchange from a tall tower over a mixed temperate/boreal lowland and wetland forest, *Global Change Biol.*, 9, 1251–1261, doi:10.1046/j.1365-2486.2003.00670.x.

4. *Methane occurs naturally in ambient air. Atmospheric methane surveys and soil gas sampling can be used to establish baseline methane levels and then detect changes in methane concentration as shale gas development occurs. DOE's NETL lab is undertaking such a research effort to analyze natural and fugitive emissions in PA. For example, methane from both natural seeps and from pre-existing wells and pipelines is expected to be present at the Washington County site prior to development. How will these results be used to re-evaluate EDF's studies? What baseline methane levels does EDF currently assume?*

EDF will consider results of other ongoing studies, including NETL's in the course of our ongoing data gathering efforts. EDF-sponsored field studies primarily seek to directly quantify the amount of methane released from equipment and activities in the natural gas and oil industries. The amount of methane in ambient air has no effect when vented gas is directly metered; in other cases, measurement instruments we plan to use such as the High-Flow sampler self-correct for methane in ambient air. For analyses that rely on ambient air sampling, we will also take upwind samples to account for methane potentially contributed from other sources in the vicinity.

Senator CARPER. All right, thanks so much.
Mr. Corra.

**STATEMENT OF JOHN V. CORRA, DIRECTOR,
WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY**

Mr. CORRA. Good morning, Mr. Chairman and Ranking Member Senator Barrasso. Thank you very much.

My name is John Corra, and I am pleased to be here to talk to your Committee this morning. I want to thank you for the opportunity.

Natural resources in Wyoming are both the how and the why we live there. We manage those resources consistent with the philosophy that mineral extraction and strong environmental protection go together. There are almost 36,000 oil and gas wells in the State, many of which have environmental controls mandated by our Department. These wells were once referred to in the Federal Clean Air Act as minor sources, and until recently, not subject to Federal regulation. Wyoming, however, had the foresight some 15 years ago to understand the importance of managing these oil and gas resources, and the recognition for strong air quality protection has evolved since then in our State.

The industry has also shown leadership through innovation and experimentation which has led to our ability to raise the bar on emissions control technologies. The best example is the use of green completion technologies in areas of concentrated development. Over time, we learned that each producing oil and gas formation has a number of variables that bear on the level, extent, and need for emission control. Because of this, we have tailored our regulatory requirements. The technology as well, to recover oil and gas has continued to evolve, which has also resulted in the need for us to have flexibility in our State standards, which are based on location and density variables and geological conditions.

We have in Wyoming created a three-tiered regulatory approach that recognizes the different intensities of development. The tightest regulation occurs in the Jonah and Pinedale area, where we have seen ozone exceedances due to intense natural gas development. Here, all new and modified well pad equipment must be controlled upon startup to a 98 percent removal of hazardous air pollutants. In areas of less concentrated development, we have emission thresholds for single wells that allow a short time after startup to get the controls in place in order to establish the operating characteristics of the well.

Outside of these areas, we have State-wide requirements that have slightly different control thresholds. Green completions are also required where appropriate. Our State regulatory schemes can take these factors into account more readily than national rules.

Our aggressive approach faltered, however, in the Upper Green River Basin in Sublette County, Wyoming. In 2008 we first saw exceedances of the ambient air quality ozone standard. What was unique about these occurrences was the time of the year: winter. Until then, ozone problems had only been associated with summer-time conditions. We acted quickly to implement additional regulatory requirements.

Even though we did observe ozone exceedances again in the winter of 2011, and have recently been classified as marginal non-attainment, the situation could have been worse. We developed tighter regulations, such as new permitting policies to require offsets of 1.1 tons of nitrogen oxides for every ton of emissions coming from the proposed action and also 1 and a half tons for every ton of volatile organics that might be coming from the proposed action. We have also been studying ways to foster voluntary reductions of those sources in existence prior to these new policies.

Last, during the environmental impact statement development stage of that project, we also took advantage of our unique State relationship with the Bureau of Land Management, which resulted in a permitting system for drilling rigs.

Although we have not solved our ozone challenges, I do believe we are closer to a solution. While the number of wells has increased substantially in that area since 2008, and gas production has gone up by 8.3 percent, we have been able to reduce emissions of VOCs by 21 percent and nitrogen oxides by 17 percent. These notable results are a consequence of Wyoming being able to react quickly and to build upon an already established regulatory philosophy that was understood and accepted by the industry.

Having the flexibility, authority, and autonomy to readily make changes to our regulatory scheme, partner with industry on voluntary measures, and develop policies for offset trading and banking are essential to our goal of solving that problem.

The EPA regs are fairly close to ours, and we appreciate them patterning them. But we will see how they all work when we get into the implementation stage.

This is a story about the speed and effectiveness of strong environmental regulations with the legislative support that we have had in our State, close working relationships with the regulated community, and recognition of local conditions and geology.

In closing, I just would like to mention the flood of new regulations emanating from EPA. Since 2000 there have been hundreds of new rules that carry with them some level of State impact. In the air programs alone, there have been many rules just in the last several years. But funding and support for these efforts has not necessarily kept up. It has either remained flat or perhaps in some cases gone in the wrong direction.

Mr. Chairman, that concludes my remarks. Thank you.

[The prepared statement of Mr. Corra follows:]

Written Testimony of John V. Corra

Director, Wyoming Department of Environmental Quality

Before the Senate Committee on Environment and Public Works Subcommittee on Clean
Air and Nuclear Safety re Review of Recent Environmental Protection Agency's Air
Standards for Hydraulically Fractured Natural Gas Wells and Oil and Natural Gas
Storage

June 19, 2012

Good Morning Mr. Chairman. My name is John Corra. I am the Director of the Wyoming Department of Environmental Quality (DEQ). I wish to thank the Subcommittee for inviting the State of Wyoming to testify at this hearing today.

Natural resources in Wyoming are both the how and the why we live there. Our great natural beauty is an environmental resource that our citizens and those who visit our state expect to be protected. Our abundant mineral resources provide our citizens and the state with the jobs, taxes and royalty revenue necessary to prosper. We manage these resources consistent with a philosophy that mineral extraction and environmental protection can exist together in harmony. As part of this philosophy we believe in our inherent right to regulate the use and development of our natural resources. We fulfill our duties quite well and have been acknowledged by many as leaders in the effective regulation of the minerals industry, and specifically oil and gas.

Besides being the largest coal producing state, the State of Wyoming is one of the leading producers of oil and gas in the nation, playing an important role in meeting the nation's energy needs. Wyoming is number two in natural gas production and we rank 8th in oil production. In FY 2010, oil and gas production contributed nearly \$2 billion in royalties and taxes to the state and employed 18,000 people with a payroll of over \$1 billion. These results emanate from slightly under 36,000 oil and gas wells, most of which have environmental controls mandated by the state. These wells are what are referred to in the federal Clean Air Act as minor sources and until recently, not subject to federal regulation. Wyoming, however, had the foresight some 20 years ago, to understand the importance of the state taking on a leadership role in managing these oil and gas sources. This recognition of the need for strong air quality protection has evolved since then and has had the support of the industry. Our air quality program mandates that if an entity intends to emit, it must review plans with the DEQ. This high standard has lead to a strong working relationship with the oil and gas industry and results in a very effective regulatory system as well as a spirit of partnership. In fact, in many instances, the industry has shown leadership through innovation and experimentation, which has lead to our ability to "raise the bar" on emissions control technologies. The best example is the use of green completion technologies in areas of concentrated development.

The Environmental Protection Agency's (EPA) recent oil and gas regulations were patterned in large part after what Wyoming has been doing since the early 1990's. We started with some basic ideas about controlling emissions of volatile organic compounds (VOC) and hazardous air pollutants, primarily from the dehydrator and heater equipment commonly used to strip water from oil and gas product. We also consider flares as a control device. Over time, we learned that each producing oil or gas formation has a number of variables that bear on the level, extent and need for emission control. These variables include liquid to product ratio, pressure at the well head, production capability, percentage of volatile organic compounds and production decay. Because of this, our regulatory requirements were tailored to take into account thresholds of emissions that allow for controls to be either added or removed, time from well completion to steady production, and the density of wells required to effectively produce from the formation. Our current system of regulation requires the use of Best Available Control Technology as well as Best Management Practices. Examples of the former are control of emissions from dehydrators, liquid storage tanks, various pneumatic pumps and controllers, truck loading operations, and well completions. Recognizing that certain well operations will require periodic blow downs and venting due to equipment depressurization, emergency operations, and maintenance or repairs, permitting requires best management practices that include minimizing emissions to the extent safe and practicable, record keeping, estimates of emissions and reporting.

The technology to recover oil and gas continues to evolve resulting in more and more production coming from tight formations that require very close well spacing and multiple completions in individual wells. These technology innovations have resulted in the need to build flexibility into the state standards based on location and density variables of the oil and gas fields. Specifically, we have created a three-tiered regulatory approach that recognizes the different intensities of oil and gas development. The tightest regulation occurs in the Jonah-Pinedale area where we have seen ozone exceedances due to intense development of the gas reserve. At one point, these two fields were the top gas producing fields in the nation. Here, all new and modified well pad equipment must be controlled upon start-up to a 98% removal level of hazardous air pollutants and volatile organic compounds. In areas of less concentrated development, but still in need of strong controls, we have emissions thresholds for single wells and we allow a short period of time before controls are required in order to establish the characteristics of the well and the level of control necessary. Outside of these two areas, we have statewide requirements that have slightly higher control thresholds. Lastly, we recognize that infrastructure and other factors are not readily available in order for green completions to be implemented statewide and we simply require best management practices and flaring in those instances. State regulatory schemes can take these factors into account more readily than a national level rule. And, the state can more readily respond to unexpected issues that can arise from intense energy development.

In 2005, our aggressive approach to air regulation of the oil and gas industry faltered in the Upper Green River Basin of Sublette County, Wyoming, when we noted a few ozone spikes. We had been concerned about nitrogen oxide pollution and visibility impairment to the nearby Class I wilderness areas, and while these were the reasons for installing additional monitoring, we also measured other pollutants. We have since expanded our monitoring network, and today would venture a guess that this area (where the Jonah and Pinedale Anticline gas fields are located) is one of the most densely monitored areas in the country for ozone. It was in 2008 that we first saw exceedances of the ambient air quality standard for ozone in the Upper Green River Basin. What was unique about these occurrences was the time of year – winter. Until then, ozone problems had only been associated with summer time conditions. Our research found that in order for ozone to climb in winter, four factors have to all come into play: sunny days providing a source of ultraviolet energy; plenty of snow cover to create an albedo effect thus multiplying this energy; temperature inversions with low ceilings that create still air and a trap for emissions; and lastly plenty of sources of the precursor chemicals that combine to form ozone. Outside of a similar situation found in Utah some time after the discovery in the Upper Green River Basin, this phenomenon appears to be very unique requiring both unique solutions and the flexibility to make changes readily. We acted quickly to implement additional regulatory requirements in an effort to reduce precursor pollutants. Even though we did observe ozone exceedances in the winter of 2011 and have been recently classified as “marginal non-attainment” of the ozone standard, the situation could have been worse had we not been proactive and aggressive in implementing changes. We developed tighter regulations such as new permitting policies that require offsets of 1.1 tons for every ton of nitrogen oxides and 1.5 tons for every ton of volatile organic compounds that would be emitted from a proposed action. In response to our request, the industry has also developed contingency plans aimed at reducing emissions during weather conditions conducive to the formation of ozone. There are impressive examples of the implementation of these systems, and while operations cannot be completely curtailed, emissions can be reduced temporarily, and the evidence suggests that these actions have positive effects during these unique weather events. We are also studying ways to foster voluntary reductions at sources in existence prior to these new policies. Industry continues to be cooperative as we strive to solve this serious problem.

We also took advantage of our unique state relationship with the federal land manager in charge of leasing and approving drilling operations, the Bureau of Land Management, which resulted in our permitting system for drilling rigs. This regulatory element is very significant for a couple of reasons. States, other than California, do not regulate non-road mobile sources, and drill rigs fit this category. Secondly there did not exist, at the time, any drill rigs that could meet the standards we were proposing. To their credit, industry accepted these tighter requirements. Had we been subject to a national rule making, I am doubtful that we would have had the time or the freedom to accomplish the higher level of emissions controls on these rigs.

We also took advantage of the situation to require the use of flareless completion technologies, add-on controls for older sources, and industry/state funding partnerships for further research on winter-time ozone formation.

Although we have not solved our ozone challenges I do believe we are closer to a solution. The results of our efforts to date have been impressive. While the number of wells has increased substantially since 2008 and gas production has increased by 8.3% we have been able to reduce emissions of VOCs by 21% and nitrogen oxides by 17% from the winter of 2009 to the winter of 2011. These notable results are a consequence of Wyoming being able to react quickly and to build upon an already established regulatory philosophy that was understood and accepted by industry. Having the flexibility, authority and autonomy to readily make changes to our regulatory scheme, partner with industry on voluntary measures and develop policies for offset trading and banking are essential to our goal of quickly solving the problem. We could have waited until we had proper state implementation plans approved by EPA, but we didn't. We took action and yielded measurable results. I suspect that many other states would share our desire for flexibility to tailor regulatory efforts to the actual conditions on the ground. More autonomy is better than less.

While the new EPA rules comport well with ours, there are some differences. The management of change to operations, permitting details, regulatory thresholds, reporting and the application of completion controls remain to be worked out. We will also have to spend additional financial and human resources as we prepare state implementation plans.

There is a related air regulatory issue regarding the oil and gas sector that we don't want to lose sight of, and that is a potential threat of aggregation of oil and gas sources as greenhouse gas regulations evolve. EPA has considered including wells and well pads into Title V operating permits for natural gas compressor stations. We have been worried about this because of its high potential to derail the minor source regulatory program that we have in place. I am hopeful that the new oil and gas New Source Performance Standards (NSPS) will remove the threat.

This is a state story about the speed and effectiveness of strong environmental protection through legislative support, close working relationships with the regulated community and recognition of local conditions and geology. It is also an example of the flexibility states may achieve through local vs. national rules.

In closing, I want to mention the flood of new regulations emanating from EPA. Since 2000, there have been hundreds of new rules that carry with them some level of state impact. In the air programs alone, there have been many new rules in the past several years. EPA relies heavily upon the states to implement these rules. We are the "boots on the ground" that ensure that the nation's priorities in cleaning up the air and protecting human health are achieved. Funding to

support these efforts by the states has not kept up. In fact, while new rules come at us at a seemingly greater and faster pace than ever before, funding remains static, or goes in the wrong direction.

The State of Wyoming has been blessed in the recent past with good solid revenues from minerals extraction and most of this has been driven by a strong oil and gas industry. Now that gas prices have fallen drastically, with a forecast of minimal recovery, our state is no better off than others in terms of revenues. As we look to trim our budgets, our ability to continue to absorb the rush of federal rule making will be severely strained.

Thank you for allowing me to provide input to your deliberations.



Department of Environmental Quality

To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.



Matthew H. Mead, Governor

John Corra, Director

July 23, 2012

The Honorable Barbara Boxer, Chairman

The Honorable James M. Inhofe, Ranking Member

United States Senate Committee on Environment and Public Works

Attention:

Mara Stark-Alcalá
Senate Committee on Environment and Public Works
410 Dirksen Senate Office building
Washington, DC 20510

Re: Follow Up Questions on Hearing entitled "Review of Recent Environmental Protection Agency's Air Standards for Hydraulically Fractured natural Gas Wells and Oil and Gas Storage".

Dear Senators Boxer and Inhofe:

Here are answers to Senator Inhofe's follow up questions.

Question 1: In your testimony you explained a very unique phenomenon experienced in the Upper Green River basin during the winter of 2008. When the problem arose, your state had the immediate flexibility to rapidly study the localized issue, pinpoint the problem, and work with industry to quickly tailor unique solutions and contingency plans. While this represents a success story, how would the outcome have been different if the regulatory response mechanism was federal instead of local?

Response: Had we waited to take action and simply followed the prescribed process for developing non-attainment plans we would not be where we are today. We were also able to form partnerships with the industry that provided monetary and technical support that otherwise would not have been available due to budget constraints, etc. We also have more flexibility to adjust and change plans when necessary in a very short time frame.

Question 2: Do you believe EPA regulations adequately consider and give deference to local concerns and logistics challenges?

Response: EPA does try to get adequate input on new regulatory proposals. Sometimes they do a good job with providing for qualifying exemptions, such as threshold levels and population density off ramps. However, where a state has an effective program already in place, EPA should give deference and allow that state some flexibility in how it designs implementation plans.

Herschler Building • 122 West 25th Street • Cheyenne, WY 82002 • <http://deq.state.wy.us>

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Question 3: What steps should the EPA take to ensure that new oil and gas NESHAPS, NSPS, and future regulations will not interfere with programs states have in place?

Response: EPA visited the State of Wyoming in the very early stages of their development of the oil and gas rules. They interviewed my Air Quality Division staff, and spent a few days in the field observing how our rules, policies and regulations were being implemented. The final rule reflects much of what they learned from their visit to Wyoming. While there are differences between their final rule and what we do, those gaps are manageable. In the future EPA should, in their planning and preparation process, always visit those states that have experience in the area of interest well in advance of rule development. Provisions should be made to allow states with stricter or already established programs to continue.

Question 4: Can EPA replicate the speed, accuracy, and efficiency demonstrated by local regulators working in conjunction with industry to find workable solutions to unique problems?

Response: EPA actions and initiatives have nation-wide or region-wide significance and impact. As a result the number of interested parties, questions, and challenges are very large, thus resulting in the need for long lead times in getting things done. Contrast that with a state like Wyoming where we are very engaged with the citizenry and regulated community, have extensive environmental monitoring networks, and play an active management role in developing the state's natural resources. When we need to respond to an environmental problem, we can implement policies and guidelines as well as rules that quickly put in place mitigation and corrective measures.

Questions 5: You also mentioned contingency plans created by industry and describe a cooperative relationship your state has developed with industry. Has this collaborative model improved outcomes in your state? Will increased nationalization of the regulatory culture erode these relationships with industry? Will there be a negative impact on smaller or independent operators?

Response: Contingency plans are voluntary and implementation occurs during forecasted high ozone days and declared ozone action days. These efforts are hard to quantify as they relate to activities (i.e. maintenance activities, and work of service companies) that are temporarily curtailed.

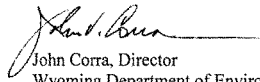
They certainly result in a reduction in ozone precursors during these critical times, just as our offset permitting policy represents a voluntary reduction achieved by policy rather than regulation. National regulations tend to limit innovation and volunteerism in the collaborative process. Regulations can provide for certainty of expectations and level the playing field with industry if they are crafted correctly taking implementation into account. Otherwise, they can be too prescriptive thus allowing for little flexibility in problem solving.

Since all operators in Wyoming large and small are analyzed equally, no increased negativity for small operators is caused. However, the cost to comply with requirements may be more of a burden to small operators.

Question 6: What concerns do you have related to funding for new EPA mandates?

Response: The funding that EPA provides is appreciated by states. However, as time has gone on, the expectations that come with this funding have steadily increased. For example, Wyoming is one of those states that receive the standard $\frac{1}{2}$ % in 105 grant money. Our grants have held steady over the past five years with the exception of 2011 when Congress approved a larger budget for EPA. Our current year grant is actually 7.5% below 2008 levels. However, increased expectations, such as more ambient monitoring, data entry and reporting into EPA databases and inspection duties continue to rise. We cannot keep pace with the staff levels needed to adequately accommodate these ever increasing demands. The pace of new rule development must be evaluated in light of the severe budget constraints facing the states.

Sincerely,



John Corra, Director
Wyoming Department of Environmental Quality

Cc: Governor Matt Mead

Senator John Barrasso

Senator Mike Enzi

Representative Cynthia Lummis

Senator CARPER. Thank you. Great of you to come, thanks, Mr. Corra.

Ms. Schuller, welcome. Please proceed.

**STATEMENT OF TISHA CONOLY SCHULLER,
PRESIDENT AND CEO, COLORADO OIL AND GAS ASSOCIATION**

Ms. SCHULLER. Mr. Chairman, members of the Subcommittee, I am Tisha Schuller. I am President and CEO of the Colorado Oil and Gas Association. Thank you for the opportunity to testify.

Colorado is uniquely positioned to provide some input on this rule. We have a 100-year history of oil and gas development across the State, over 45,000 active wells, a strong commitment to environmental protection, and a unique collaborative style that brings together environmental groups, regulators, and industry.

Colorado has some of the more protective air emissions regulations and controls in the country. There are two of particular relevance to this rule. The first is Colorado's Regulation Number 7 to reduce ozone precursors. This regulation is overseen by our State health department, the CDPHE. And it was adopted to reduce ozone precursors in the State's non-attainment area. It also includes some State-wide requirements.

The Wattenberg field is located in Weld County. In this one county in Colorado, there are over 18,000 active wells. This field is in non-attainment for ozone. As part of Regulation 7 implementation, industry has invested over \$40 million to install over 3,000 control devices. Even with increased drilling activity in this area, we know that there is a significant decrease in emissions.

The second relevant regulation, in 2008, our State oil and gas commission, the COGCC, added a rule that reduced emissions completions, or green completions, to be used when technically and economically feasible. Where not feasible, best management practices to reduce emissions are required. The purpose of this rule was to encourage the capture of natural gas and reduce potential odors associated with well completion.

We understand the EPA-based aspects of their rules on these two Colorado rules. As we have found in Colorado, there are positive aspects of the rules which promote conservation through the capture of natural gas and the resulting emissions reductions. In particular, Colorado air quality has benefited from the addition of low bleed pneumatic devices and the implementation of green completions.

The remainder of my testimony will focus on what we have learned in Colorado's rules and how the regulations might be improved for effective implementation. We have three main concerns. The first is the emissions estimates. Academics, governments, and regulatory authorities around the world rely on EPA's natural gas emissions data to make policy and regulatory decisions. Two separate studies have concluded that the emissions estimates used in developing the rule were overestimated.

This both results in an overstatement of the emissions reduction benefits of the rules and fuels controversies around the world about natural gas as a clean burning energy source. We hope that EPA will revise its emissions estimates with an analysis of the studies referenced in my written testimony.

The second is compliance requirements. The monitoring, testing, and recordkeeping requirements associated with these rules threaten to undermine the economic benefits associated with increased natural gas recovery.

One clear example is the requirement that flares be monitored by a person onsite for 3 hours every month. Several others are outlined in my written testimony. Overall, we recommend that EPA gather input from State agencies such as Colorado's and Wyoming's on how to streamline these requirements for practical implementation for both operators and State regulators. This component is critical to ensuring that the burdens of compliance don't negate the benefits of emissions reductions.

And last, economics. The EPA has estimated there will be significant cost savings for the industry associated with these rules. We recommend that more effort is invested into validating the required costs and anticipated benefits in order to ensure that some requirements, such as green completions and low pressuring wells, or some of the compliance requirements, actually balance air emissions reductions with compliance costs.

Our industry will work diligently with State regulators to continue to fully understand and address the requirements of this new rule. We hope that the published rule will allow for flexibility to encourage practical and pragmatic implementation.

Thank you.

[The prepared statement of Ms. Schuller follows:]

Statement of
Tisha Schuller
President & CEO
Colorado Oil & Gas Association
on the
Environmental Protection Agency's new Oil and Natural Gas Sector -- New Source Performance
Standards and National Emission Standards for Hazardous Air Pollutants
Before the
Committee on Environment and Public Works
Subcommittee on Clean Air and Nuclear Safety
United States Senate
Washington, D.C.
June 19th, 2012

I. Introduction

Mr. Chairman and Members of the Subcommittee, my name is Tisha Schuller, and I am the President and CEO of the Colorado Oil & Gas Association (COGA). I appreciate the opportunity to testify today regarding the Environmental Protection Agency's (EPA) new Oil and Natural Gas Sector -- New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants. Prior to joining COGA, I served as a Principal and Vice President with Tetra Tech, a national environmental consulting and engineering firm. In addition to running business operations, I spent 15 years conducting environmental permitting for oil and natural gas projects across the country. I have a B.S. in Earth Systems with an emphasis in Geology from Stanford University.

The Colorado Oil & Gas Association is an industry trade association founded in 1984; we currently have over 150 members representing all aspects of Colorado's oil and gas industry.

Colorado has a robust 100 year history of industry drilling across Colorado, in every corner of the state. Across Colorado, our industry works with community stakeholders to understand and address their concerns so that oil and gas development may be conducted in harmony with community priorities.

Colorado also has some of the most advanced and comprehensive oil and gas regulations in the country. Virtually every aspect of activity is regulated from cement and casing, hydraulic fracturing, waste management, reclamation, wildlife, water, and air emissions.

Colorado has over 45,000 active wells. One of Colorado's most productive oil and gas fields is the Wattenberg field in the DJ Basin located north of Denver. The heart of the Wattenberg field is located in Weld County; in this one county there are over 18,000 active wells.

Oil and gas is a key industry in Colorado. For context, in 2010 our industry supported over 100,000 jobs in Colorado and contributed \$1.1 billion to state and local revenues. Some

Colorado counties rely on oil and gas revenue for over 60 percent of their revenue. We are proud of the work we do in Colorado and the workers who live in these communities.

Colorado has some of the more protective air emission regulations and resulting controls in the country. The Colorado Department of Public Health and Environment (CDPHE) has adopted rules which regulate volatile organic compounds (VOC) emissions from oil and gas operations in the state. Additionally the Colorado Oil and Gas Conservation Commission (COGCC) has requirements which encourage the capture of natural gas through green completions and further regulate VOCs to control odors in certain parts of the state.

In 2004, Colorado's Air Quality Control Commission (AQCC) added Colorado's Regulation Number 7 to reduce ozone precursors. This regulation is overseen by the CDPHE Air Quality Control Division and was focused on reducing ozone precursors in the non-attainment area, but also includes some statewide requirements. Regulation Number 7 is implemented based on a system-wide control approach that requires each company to achieve a percentage-emission reduction level during the ozone season (summer) and a slightly lower percentage-emission reduction level during the non-ozone season (to enable periodic maintenance of control devices in the off-season). When first adopted, emissions reduction requirements became more stringent each year until they reached the current stringent requirements. The system-wide approach provides oil and gas operators flexibility to service and reposition their emission control devices (ECDs) as production levels in the field change.

The Wattenberg field, mentioned earlier, is in a non-attainment area for ozone; as part of Regulation 7 implementation, the oil and gas industry has invested in emissions controls that significantly reduced air emissions and ozone precursors. To date, over \$40 million has been spent by the industry to install over 3,000 control devices. Even with increased drilling activity, well permits issued in the Wattenberg Field demonstrate that the area shows a significant decrease in emissions. Each year operators submit emissions reports for Regulation 7, and as a result we know that ozone levels have shown a downward trend since the implementation of these regulations.

In 2008, the COGCC added a rule that reduced emissions completions (REC), or green completions, be used when technically and economically feasible. Where not feasible, best management practices to reduce emissions are required. The purpose of this rule was to encourage the capture of natural gas and reduce potential odors associated with well completion.

We understand that EPA based aspects of their rule on Colorado's air rules including CDPHE Regulation 7 to reduce ozone precursors and COGCC Rule 805 for green completions. As we have found in Colorado, there are positive aspects of the rules which promote conservation through the capture of natural gas and the resulting emissions reductions. In particular, Colorado air quality has benefited from the addition of low bleed pneumatic devices and the implementation of reduced emissions completions.

We appreciate EPA's willingness to phase in requirements to meet both equipment manufacturing constraints and the needs for operators to modify their processes. We would also like to acknowledge that EPA has been working diligently to clear up the many technical issues

contained in the final rule that resulted from the short, court-mandated timeframe for the rulemaking.

The new rule was the product of a complicated rulemaking, conducted in a short time frame, with many moving parts. As a result, our industry continues to thoroughly review the final rule to fully understand its impacts. We also acknowledge that EPA will be challenged to revise the rule so that the compliance requirements are clear and realistic by the effective date of the rule.

My testimony will focus on what we have learned from Colorado's rules and how the regulations might be improved for effective implementation.

II. EPA's New Source Performance Standard and Colorado Comparison

For background purposes, this section provides an overview of new EPA rules compared with the existing Colorado requirements.

1. *Reduced Emission Completions (RECs) or "green completions"*

Federal Proposal

Subpart OOOO: RECs or green completions with pit flaring for gas not suitable for entering a pipeline, required for all hydraulically fractured or re-fractured, non-exploratory or non-delineation wells, beginning in 2015.

Colorado Regulations

COGCC Section 805.b(3): RECs or green completions shall be used when technically and economically feasible. If not feasible, Best Management Practices are allowable. According to the COGCC rules, "operators must employ sand traps, surge vessels, separators and tanks as soon as possible during flowback and cleanout operations to safely maximize resource recovery and minimize releases to the environment."

Subpart OOOO addresses VOC emissions from any new or existing hydraulically fractured non-exploratory or non-delineation wells (wells that are in close proximity to a gathering line). By January 1, 2015, these wells will require RECs or green completions, in combination with pit flaring for gas unsuitable to enter a sales pipeline.

The COGCC's requirement for RECs is essentially equivalent to the EPA Subpart OOOO rule for the purpose of overall emission inventory with the noteworthy exception that RECs are required only where technically or economically feasible; where RECs are not implemented, Best Management Practices or BMP's are acceptable.

2. *Pneumatic Devices*

Federal Proposal

Subpart OOOO: Zero emission limit at gas processing plants (equivalent to non gas-driven pneumatic controllers). Six standard cubic feet per hour (SFCH) at individual locations (equivalent to low bleed gas-driven pneumatic controllers).

Colorado Regulations

CDPHE Reg. No. 7, XVIII.C.1: No or low-bleed pneumatic devices required for all new & existing applications, exceptions allowed. This rule only applies in ozone non-attainment areas.

COGCC Section 805.b(2)E - No or low-bleed pneumatic devices required for new, repaired or replaced devices where technically feasible.

The Subpart OOOO does not allow VOC emissions from devices at gas processing plants, and devices at individual sites would be limited to emissions of six SCFH or the equivalent to low bleed devices. CDPHE's Regulation Number 7 already requires no or low-bleed equipment for all new and existing applications in ozone nonattainment areas, with some exceptions allowed. Also, the COGCC contains statewide no or low-bleed pneumatic device requirements, where technically feasible. This level of mandated control in Colorado is essentially equivalent to Subpart OOOO for the purpose of overall emission inventory.

3. *Storage*

Federal Proposal

Subpart OOOO: 95 percent VOC reduction for new or modified storage vessels with emissions of six tons per year (tpy).

Subpart HH: 95 percent control of hazardous air pollutants (HAPs) at production facilities.

Colorado Regulation

CDPHE Reg. No. 7, XII.G.2: 95 percent VOC reduction at gas processing plants if emissions from condensate tanks are greater than or equal to two tpy. This rule only applies in ozone non-attainment areas.

CDPHE Reg. No. 7, XVII.C.1: 95 percent VOC reduction for condensate storage tanks if emissions are greater than or equal 20 tpy.

CDPHE Reg. No. 7, XVII.C.2: For condensate storage tanks with past uncontrolled actual emissions less than 20 tpy VOC may become subject to Section XVII.C.1 with addition of a newly drilled well or recompletion.

CDPHE Reg. No. 7, XIID: Condensate tanks in ozone non-attainment areas shall be controlled under a system wide approach.

COGCC Section 805.b(2)A: 95 percent VOC reduction for liquids condensate & crude oil tanks if emissions greater than five tpy within 1/4 mile of an affected building (applies only to Garfield, Mesa & Rio Blanco Counties)

The federal rule is equivalent to Colorado's Regulation Number 7, as applied in ozone nonattainment areas. The COGCC regulation lowers the threshold to five tpy for requiring control if the site is within 1/4 mile of an "affected building" for Garfield, Mesa & Rio Blanco Counties on the western slope of the state.

Subpart OOOO requires condensate tanks with VOC emissions of six tpy to reduce emissions by 95 percent. However Colorado's Regulation Number 7 already requires tanks with uncontrolled emissions that are greater than or equal to two tpy within ozone nonattainment areas be reduced by 95 percent and statewide if emissions are greater than or equal to 20 tpy.

Under Regulation Number 7, condensate tanks in ozone non-attainment areas shall be controlled under a system-wide approach. Furthermore, if the tanks are within 1/4 mile of an affected building, COGCC rules lowers the threshold for condensate and crude oil tanks for uncontrolled emissions greater than or equal to five tpy. In addition, Colorado has other requirements for auto-ignitors and surveillance at controlled locations based on emission level. This level of mandated control in Colorado is essentially equivalent to Subpart OOOO for the purpose of overall emission inventory.

4. *Gas Processing Facilities*

Federal Rule

Subpart OOOO: Allows advanced leak detection tools as an alternative to the Leak Detection and Repair (LDAR) protocol based on Method 21 organic vapor analyzer leak measurements.

Subpart HH: 500 parts per million threshold for valve leaks.

Colorado Regulations

Colorado has adopted NSPS Subpart KKK on LDAR under Reg. 7, XII.G.1 – this applies to all gas processing plants located in ozone non-attainment areas.

Colorado has already adopted NSPS Subpart KKK regulations for LDAR at gas plants. However, Colorado has not allowed the new leak detection monitoring options as presented under Subpart OOOO.

III. National Emissions Standard for Hazardous Air Pollutants (NESHAP) Standard for Oil and Natural Gas Production

1. *Dehydrators*

Federal Rule

Subpart HH: 95 percent reduction of Hazardous Air Pollutants in all large glycol dehydrators or one tpy benzene emissions. Small unit specific dehydrator emission limits will be based on a formula set out in the final rule.

Colorado Regulations

CDPHE Regulation 7, XII.H and XVII.D: 90 percent reduction of VOCs where VOC emissions are under 15 tpy.

COGCC Section 805.b(2)C): 90 percent reduction of VOCs required where VOC emissions are under five tpy within 1/4 mile of an affected building – this applies only to Garfield, Mesa & Rio Blanco Counties

For glycol dehydrators the federal proposal requires 95 percent control on large units or one tpy benzene compliance and a formula based emission limits on smaller dehydrators. Colorado's Regulation Number 7 requires 90 percent reduction on an emission threshold of 15 tpy, and COGCC rules for Garfield, Mesa & Rio Blanco Counties regulate that the threshold is lowered to five tpy if the site is within 1/4 mile of an "affected building." This level of mandated control in Colorado is essentially equivalent to the Federal proposal for the purpose of overall emission inventory.

IV. Suggestions for Improvement

While generally Colorado's regulations are equivalent in mandated controls to the federal regulations, COGA does have three main concerns: 1. Emissions Estimates; 2. Compliance Requirements; and 3. Economic Analysis.

1. *Emissions Estimates*

We are concerned that the emissions estimates used in developing the rules were overestimated resulting in an overstatement of the emission reduction benefits of the rules. Two separate studies, one conducted by the American Petroleum Institute and America's Natural Gas Alliance (API/ANGA) and the other by IHS-CERI came to this conclusion. Both studies found that EPA was overestimating emissions from oil and gas operations. In 2010, EPA introduced a new methodology to calculate emissions that more than doubled the estimated emissions from natural gas production. This new calculation method substantially overestimates the amount of methane emissions from hydraulic fracturing and other unconventional natural gas production activities.

The API/ANGA study found overall methane emissions to be 50 percent lower than EPA's estimates used in the regulations. The survey examined data from 91,000 wells distributed over a broad geographic area; this was 10 times more wells than EPA surveyed. In one example from this survey, API/ANGA concluded that the re-fracture rate of wells was between 0.07 and 2.3 percent rather than the estimated 10 percent used by EPA. This resulted in a decrease of EPA's emissions estimates from re-fractured wells by 72 percent.

In another example, the IHS-CERI study found that the EPA assumed that if green completions were not used, then all methane would be vented into the atmosphere. EPA also assumed that if a state did not require green completions, then it was not being done at all. These assumptions generate inflated emissions results.

We recommend that EPA revise its emissions estimates with an analysis of the referenced studies and revise the emission reduction benefits stated in the preamble of the rules.

2. *Compliance Requirements*

The monitoring, testing, and recordkeeping requirements associated with these rules threaten to undermine the economic benefits associated with increased natural gas recovery.

For example, the federal rule requires monthly Method 22 monitoring or visual inspections for smoke on combustors/flares. This requires operators to have a monthly three-hour observation of every flare to ensure that there is no smoke. With the diverse locations of wells and automation technology, this seems to make little economic or environmental sense. Instead we propose a common sense monitoring of flares as part of routine site visits.

As a second example, while there has been a tremendous improvement from the 30 day advance notice of completion operations, COGA still believes the two day pre-notification for every well prior to being hydraulically fractured or refractured is excessive. With the reality of schedule changes due to weather, supplies, and equipment logistics, we anticipate that multiple notifications are likely per site. Instead, COGA proposes that these notification requirements be eliminated and EPA relies on the annual report required in the rule for compliance determinations.

As a third example, the rules requirements for tracking and labeling pneumatic devices is overly onerous. A single piece of equipment alone may have three of these devices. We suggest instead that EPA require review of sales or purchase records to verify addition of these controls.

Additionally, the continuous monitoring, performance testing, recordkeeping and reporting provisions are almost identical to those contained in NESHAP, Subpart HH for major sources of HAPs. The Clean Air Act mandates these stringent compliance components, but requires the use of economic considerations for determining the actual requirements. EPA's economic analysis does not consider the impact of implementing major HAP source compliance assurance requirements on the remote, dispersed, unstaffed and small emission sources that are the norm in oil and gas operations.

Lastly, EPA granted only a one year delay in compliance for Best System of Emission Reduction (BSER) for tank emissions because it believes that only a few hundred tanks will be covered. EPA acknowledges that tens of thousands of tanks will be installed annually, but they assume that few of these tanks will have sufficient flow or emissions to trigger control requirements at the six tpy VOC threshold. This assumption appears to have its roots in assuming that tanks on new wells will have the same operating characteristics as tanks at existing wells which are predominately low volume wells at the end of their economic life. In practice, new wells would seldom have tank emissions below six tpy VOCs. Instead, we recommend a three year compliance period, because of the estimated 28,000 tanks per year that will require controls. Controls that meet the major

source NESHAP requirements are not currently available in the estimated required volume.

Overall, we recommend that EPA gather input from state agencies such as CDPHE's Air Quality Control Division on how to streamline the monitoring, testing, and recordkeeping requirements associated with this rule for practical implementation for both operators and state regulators. This component is critical to ensuring that the burdens of compliance don't negate the benefits of emissions reductions.

3. *Economics*

The EPA has estimated that there will be significant cost savings for the industry associated with these new rules. The EPA has also estimated the cost of control equipment required by the rules. It appears likely that the EPA has overstated these cost savings and underestimated the cost of the required control equipment. The accuracy of these calculations are important in communicating the benefit of the rule and determining the efficacy of compliance requirements.

For example, the definition of a low-pressure well could have big impacts on the cost estimate. While flow will vary by well, venting occurs for only a couple of days of production in the Wattenberg field in Colorado. This can range between 100 and 400 MCF. When operators examined the cost of the sand separator/REC production equipment a few years ago, it was about \$35,000 per well. With natural gas at roughly \$2 per MCF, it's pretty obvious that spending \$35,000 to recover \$500 or so worth of gas does not result in a cost savings.

We recommend that more effort is invested into validating the required costs and anticipated benefits in order to ensure that some requirements, such as green completions for low pressure wells, make sense when balancing the air emissions reductions with the compliance costs. In many cases, the control device needed is only one cost of the entire project. Piping, contractors, engineering services and other costs will go into making these changes. These costs should be considered in the cost-benefit analysis.

V. Conclusion

Our industry is committed to a continual process of reducing our air emissions. As seen in Colorado, capturing natural gas for sale while reducing emissions can create win-win situations for industry and the environment. Because many elements of this rule have been implemented in Colorado, we have some practical suggestions to balance emissions reductions with logistical considerations and technical feasibility. These suggestions will also help eliminate redundancy and confusion for Colorado operators due to the overlap of these rules with those in our state.

Our industry will work diligently with our state regulators to continue to fully understand and address the requirements of this new rule. We hope that the final rules will allow for flexibility to encourage practical implementation.



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Environment and Public Works Committee Hearing
June 19, 2012
Follow-Up Questions for Written Submission

Questions for: Tisha Schuller, Colorado Oil & Gas Association
Questions from: Senator James Inhofe

1. Throughout your testimony you contrasted Colorado regulations with federal regulations. What substantive differences are most impactful to producers in the field?

In general – the notification, recordkeeping, and reporting requirements of OOOO are much more rigorous than Colorado regulations.

Storage vessels- as written the control device requirements for storage vessels are extremely difficult and expensive to comply with (see below). Additionally, control devices will need to be installed upon start-up or within 60 days of first production (for wells on new locations). Finally, the rule applies the 6 tpy limit to all tanks, including water tanks and potentially frac tanks.

Gas wells - reduced emission completions are allowed under certain circumstances including instances when it is not technically or economically feasible according to COGCC rules, but NSPS OOOO requires that after 2015 flowback fluid is captured or flared when capture is infeasible, at all times. No direct emissions to atmosphere are allowed.

2. Do any of these differences fail to adequately reflect real-world operating realities? Technical or economic concerns?

Both the storage vessel control and reduced emission completions requirements raise technical and economic concerns as described below:

Storage vessels:

- The testing and monitoring requirements are very difficult and expensive to comply with. Inlet flow meters required for combustors likely cannot meet the accuracy requirements of the rule and cost \$3500-4000 per device. Additionally, the requirement to continuously monitor and record this data will be very challenging in remote locations, some of which do not have SCADA capabilities

- If frac tanks remain on-site for more than 180 days and have emissions over 6 tpy they would have to be controlled under the rule. However, it is not technically feasible to control or even cover these vessels as they are not pressure rated and containing them while loading such large volumes of fluids would be extremely dangerous and create an explosion hazard

Gas wells

- There are periods during normal operation and maintenance activities associated with well completions during which fluids contain no to minimal gas and are not able to be sent to a separator to be recovered or flared. These periods include the duration of drillout, rigging up and down, cleaning equipment, repairing equipment, bleeding off excess pressure, and during upset events such as screenouts and well control problems. Additionally, when there is not enough gas in the fluid the separator dumps cannot operate and fluids will get into the flare or recovery line, leading to operational and safety concerns. The way the rule is written today the bypass of the separator during these periods is not allowed and would be considered deviations.

3. You describe a constructive relationship between local Colorado regulators, members of the state's oil & gas industry, and other community stake holders. Do you members experience this same cooperative and collaborative atmosphere in the process of creating federal rules?

On the whole we do not. While our working relationships with the Agencies' regional offices are improving, there is still a disconnect overall between what is happening on the ground and with Washington, DC. As I will describe in question 4, we have seen how improved regional relationships can have significant impacts in improving the quality of rules by making them pragmatics.

4. What impacts does this cooperation at the local level have on the efficacy of rules? Do your members envision a similar relationship with the EPA?

Yes our members do. We envision a collaborative relationship where regulators work with industry to understand the reality of field operations, the effects of technical considerations on effective policy, and the actual potential value or impacts of rules. It is not clear whether federal agencies envision collaboration and make it a priority. However, I can definitely say that in EPA Region 8, building an ongoing collaborative dialogue has been a priority for both the EPA and industry. For example, COGA and our member companies have monthly meetings with EPA Region 8 Director Jim Martin and his staff, who will bring invited EPA Headquarters and regional staff to discuss issues which are prioritized by companies in the region. We keep the meetings focused on sharing information and identifying solutions to solving problems. We find these meetings extraordinarily valuable.

Senator CARPER. Thank you so much.
Mr. Smith, please proceed.

**STATEMENT OF DARREN SMITH, ENVIRONMENTAL MANAGER,
DEVON ENERGY CORPORATION**

Mr. SMITH. Mr. Chairman, members of the Subcommittee, thank you for the opportunity to be here today.

My name is Darren Smith. I am the Environmental Manager for Devon Energy Corporation. Devon is a leading independent oil and gas producer. Our operations are onshore U.S. and Canada. Our company's portfolio of oil and gas properties delivers stable and economically responsible production for the nation.

We work hard at Devon Energy every day to ensure that our operations are conducted in an environmentally responsible way. We aim to protect the air, water, land, and the communities that we operate in.

It is important to note that Devon does support responsible regulations for our industry. However, we stand opposed to regulations that are unreasonable and regulations that are grounded in unsound science.

My testimony today will focus on the misperception that EPA has on initial gas production from our industry. And I will describe how this misperception has resulted in a drastic overestimate of methane emissions from hydraulically fractured wells. We know that this overestimate has already been used to justify the regulations, more stringent regulations for our industry. But probably more troubling is this overestimate is finding itself into policy research that time and time again is resulting in the wrong conclusions about natural gas and its value for this nation.

It was when research from Cornell University published their Natural Gas Is Dirtier Than Coal study that Devon first became aware of the fact that EPA had revised their mission estimate from hydraulically fractured wells. EPA now asserts, and I will add that it has also reported to the United Nations Intergovernmental Panel on Climate Change, that emissions from unconventional wells are in the neighborhood of 9 million standard cubic feet per well and interestingly that those emissions have been taking place since 1990.

When we looked into the basis of this emission estimate change, we learned that EPA staff had relied on data reported to them from the Natural Gas Star program to create this new emission estimate, and this Natural Gas Star data really only came from three companies. That finding in itself probably describes the biggest flaw in EPA's method. Because very simply, the Natural Gas Star program is for operators to report gas captured, not gas emitted.

And in fact the Natural Gas Star program was never designed to report emissions from our industry. It was to report the gas that was captured from our industry. That is an important point.

Devon has worked hard over the last year or so to inform the EPA of this mistake and to provide them with the data that they could use to make the change necessary to this emission estimate. We have met with them face to face with our own data. We have provided them data from a large group of independent operators, such as Devon. We provided this data to them as part of the NSPS

rulemaking docket. We have had e-mails, we have had telephone messages, we have worked relentlessly to help the EPA reverse their course and use actual data, proper data, and proper science in this rulemaking.

We have also provided them reports from independent researchers that confirm our findings, and you will be interested to note that the Chamber of Commerce in the U.S., that represents over 3 million businesses here in the U.S., also has been involved and has asked for a request for change for this data based on the Data Quality Act.

Despite all this, EPA fails to acknowledge the mistake and more importantly, fails to make the change necessary.

I'd like to turn to the graphic that I provided to you in my testimony. I am going to have to do it very quickly, I just noticed my time. But essentially, this graphic is to describe kind of the air in an illustrated form.

Essentially, when a well is hydraulically fractured it needs to flow back so that the gas can be produced from the well. Flowback here on the left hand side starts off with very low gas volume, as water is removed from the well, gas increases until it levels off here.

EPA's perception of flowback is in the magnitude of 10 days, because that is what is reported to them under the Gas Star program. A 10-day flowback results in 9 million standard cubic feet of gas released from a well.

Now, if you contrast that with the situation where gas capture is not possible using green completion, we have provided data to EPA from operators that suggests that flowback when gas capture is not possible is only in the magnitude of 3 and a half days. So if you can compare the gas volume assumed from the Natural Gas Star program versus the gas that is released when green completions aren't possible, you will see that there is a stunning discrepancy here.

It is Devon's position that this factor needs to be changed and needs to be changed now. We have already seen that rules have been promulgated based on this bad science, and our concern again is that continued policy research is going in the wrong direction. We just recently have seen a study from our friends at EDF, Environmental Defense Fund, that suggests that gasoline vehicles are actually cleaner than compressed natural gas vehicles. And the foundation of these research findings is rooted in these bad estimates and this bad science.

With that, I will conclude my testimony. Thank you.

[The prepared statement of Mr. Smith follows:]

Testimony of Darren Smith, Environmental Manager, Devon Energy Corporation

Before the EPW Subcommittee on Clean Air and Nuclear Safety

Washington, D.C. June 19th, 2012.

Dear Mr. Chairman and members of the Subcommittee. Thank you for the opportunity to be here today.

My name is Darren Smith, and I am the Environmental Manager for Devon Energy.

Devon is a leading independent oil and natural gas company focused onshore in the United States and Canada. The company's portfolio of oil and gas properties provides stable, environmentally responsible production. We work hard to conduct operations in an environmentally responsible way, reducing impact on land, water and air. This is good for the environment and is good for business. It is important to note that Devon supports reasonable regulation of the industry; however, we oppose inappropriate regulations that are based on unsound science.

My testimony this morning will describe EPA's misperception of initial production from gas wells. I will describe how this misperception has led to a drastic overestimate of methane emissions from hydraulically fractured natural gas wells. This overestimate has allowed EPA to justify the promulgation of new air standards for the natural gas industry. More important, we continue to see new policy research being based on a foundation of this bad data - guaranteeing that the wrong conclusions are reached.

It was when researchers from Cornell University released their "natural gas is dirtier than coal study" that Devon first became aware that EPA had dramatically changed its emissions estimate for hydraulically fractured gas wells. EPA now asserts, and has reported to the United Nations Intergovernmental Panel on Climate Change, that each unconventional gas well emits over 9 million standard cubic feet of natural gas to the atmosphere and has done so since 1990.

Devon became suspicious of EPA's new estimate because if true, it would mean that Devon alone wastes over 40 million dollars of natural gas to the atmosphere annually. Clearly, a successful company like Devon could not tolerate this level of waste.

When we investigated the basis of the estimate change we learned that EPA staff had used industry data reported to it under the voluntary EPA Natural Gas Star Program to generate the new factor. The data used came from only 3 companies.

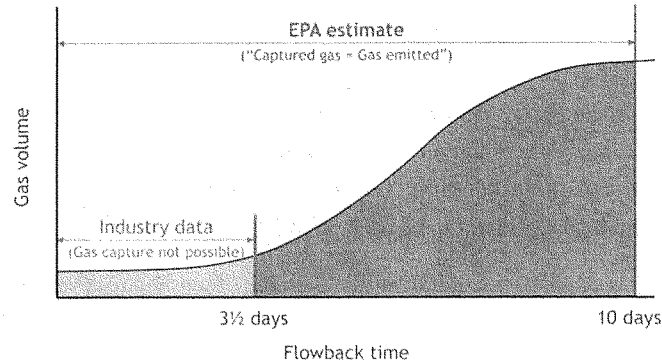
This finding represents the most significant flaw in EPA's method. Simply put, the Natural Gas Star Data represents gas captured, not gas emitted. Moreover, the data reported into the Natural Gas Star program was never intended to represent emissions.

Devon has informed EPA of this error numerous times. We have brought actual data from Devon's operation and met face to face, we have supplied comments and data from a broader set of Oil and Gas Operators to the oil and gas rule docket, we have followed up by email and telephone, and we have supplied a report from IHS CERA confirming our findings. The US Chamber of Commerce has petitioned for a correction under the Data Quality Act.

Despite all of this, EPA has failed to acknowledge its mistake much less correct it.

I would now like to turn to the graphic contained in your copy of my testimony. It will help illustrate EPA's misconception and how it has resulted in a dramatic overestimate of emissions from our industry.

Well Emissions: Actual vs. Perceived by EPA



EPA's fundamental misperception of initial gas production from natural gas wells leads to dramatic overestimates of methane emissions.

First I want to draw your attention to the curve. After a well is hydraulically fractured, it undergoes what is called flowback. In simple terms, Flowback is necessary to remove water from the well so it can produce gas.

The left side of the curve represents the beginning of flowback where water production is highest and gas production is lowest. Progressing right - as water is removed from the well, gas production increases until at the far right side, gas production reaches its maximum rate and levels off.

Now, EPA believes that the period of flowback is up to 10 days because that is what has been reported to the Natural Gas Star program. In Natural Gas Star, Operators report the volume of gas that they capture while operating specialized capture equipment. Since gas is being captured and not wasted it is not uncommon to operate this capture equipment for 10 days or more. Remember Natural Gas Star is for gas captured not gas emitted.

10 days of gas capture is on the far right side of the curve and equates to 9 million cubic feet according to how EPA averaged the Natural Gas Star data.

This contrasts significantly with the scenario where gas cannot be captured from the flowback stream - the blue shaded area.

Actual data from 8 operators has demonstrated that flowback lasts on average only 3.5 days when gas capture is not possible. An operator will flow the well back only as long as needed to remove the bulk of the water - when steady gas flow is established, the well is shut off until the pipeline is laid.

Clearly, captured gas volumes reported to Natural Gas Star, from 10 day flowback periods, are significantly higher than gas volumes released from flowback over 3 and a half days.

EPA has erred by assuming that the volume of gas captured under the Natural Gas Star program is the same volume of gas that would be emitted when gas capture is not possible.

To conclude, the error must be corrected now. We have already seen its misuse to justify air quality rules for fracking. It will continue to fuel bad public policy and research that overshadows the benefits of natural gas. Studies like the recent one from the Environmental Defense Fund that used the overestimate to suggest that Natural Gas powered vehicles are no cleaner than gasoline vehicles will continue until such time as EPA revises its published emissions data. And this will take several years.

This concludes my testimony. Thank you.



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August 6, 2012

Mara Stark-Alcala
Senate Committee on Environment and Public Works
410 Dirksen Senate Office Building
Washington DC 20510

RE: Responses to supplemental questions

Ms. Stark-Alcala:

In response to the questions you have submitted on behalf of Senator Inhofe, please find below my responses to the supplemental questions from the Committee. Thank you very much for the opportunity to present on June 19th.

1. **Your testimony predominantly focused on one of the critical flaws in the new NESHAPS and NSPS. Specifically, you explained that EPA relies on wildly overestimated emissions and flawed methodology. Do these overestimates have any bearing on the reliability of EPA cost estimates? If so, would more reliable estimates significantly affect economic analysis?**

The emission overestimate has a direct bearing on the reliability of EPA's cost estimates. EPA's cost savings per completion assumes that a particular amount of gas is being emitted from the wellhead during flowback – which, as I stated in testimony – is grossly exaggerated. Even with high emission estimates, this rule provides a very scant profit per well to the industry. If more accurate data were used by the EPA, the cost effectiveness of green completions would be greatly impacted, if cost effective at all.

2. **When or under what circumstances do completion controls cease to be economically profitable?**

Completion controls cease to be economically profitable when the value of gas recovered does not match the expense of operating temporary flowback equipment, such as green completion equipment. When considering the real volume of gas emitted, green completion equipment is possibly operated at a loss and not at a profit as EPA believes, particularly in an environment with low natural gas prices and service cost inflation for completion controls.

3. **What other considerations does EPA fail to account for? Are there practical reasons that companies have chosen to use green completions in some instances? Specifically, are there any significant differences based on: 1) wet v. dry plays; 2) tight formations; 3) wildcat and exploratory wells; 4) depth of fracturing; 5) directional drilling; and 6) size, type and complexity of operations? If so, does EPA have the technical expertise to fully appreciate these differences?**

There are a number of reasons a company might choose to use green completion technology:

- Green completion equipment allows a company to bring wells onto production more quickly than otherwise;
- A company can manage high water rates using temporary equipment rather than permanent equipment;

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- Green completions provide flexibility on facility construction schedules. Gas production from a well is not dependent on the finalization of facility construction because can be marketed while facilities are being constructed.

Further you ask about specific conditions. Those include:

Wet v. Dry plays: Dry gas is not as profitable as wet gas and this point must be considered in EPA's economics for controls. Additionally, dry gas is primarily methane, so strict controls on these wells by EPA are really an effort to control greenhouse gases rather than criteria pollutants or Hazardous air pollutants.

Tight formations: Production from tight formations relies on hydraulic fracturing: No oil and gas can be produced from today's shale reservoirs without it. The NSPS/NSHAP rule therefore impacts all new oil and gas development in the US and has a direct impact the nation's energy security.

Wildcat and exploratory wells: EPA fails to consider that new prospect exploration demands that several, perhaps dozens of "exploratory" wells be drilled to delineate the reservoir and to establish play economics. The NSPS/NESHAP rule is problematic because it requires that the second and subsequent exploratory wells be green completed.

EPA fails to recognize that these exploratory wells are often counties apart and the pipeline infrastructure does not exist to capture the gas. This requirement would stall all oil and gas development in new areas.

Depth of fracturing: EPA neglects to recognize the significant distance between the water table and most producing shale formations. Further, EPA neglects the role state regulatory agencies take in overseeing hydraulic fracturing and each state's significant understanding of its own geology.

State regulatory bodies work together and with non-governmental organizations to review and improve state oil and gas regulations. For example, state oil and gas regulatory programs are reviewed through the STRONGER efforts that provide recommendations for improving regulatory efforts. Well integrity, casing and cementing requirements are both reviewed through STRONGER and are actively enforced through each state's efforts.

Also, it essential to note that in hydraulically fractured zones, the fractures themselves are typically isolated to the producing formation only and leave no risk of fracturing across zones through impermeable layers. Much of this is understood through microseismic monitoring. Figure 1 below is an example of a survey of microseismic monitoring. The multicolored lines show the high and low point of the microseismic sensed fracture growth. The blue section at the top is representative of the deepest freshwater aquifer. Note that the shallower the fracture treatment, the smaller the fracture height. The lower pressure on the rock at shallower depths causes fractures to be aligned horizontally more than vertically.

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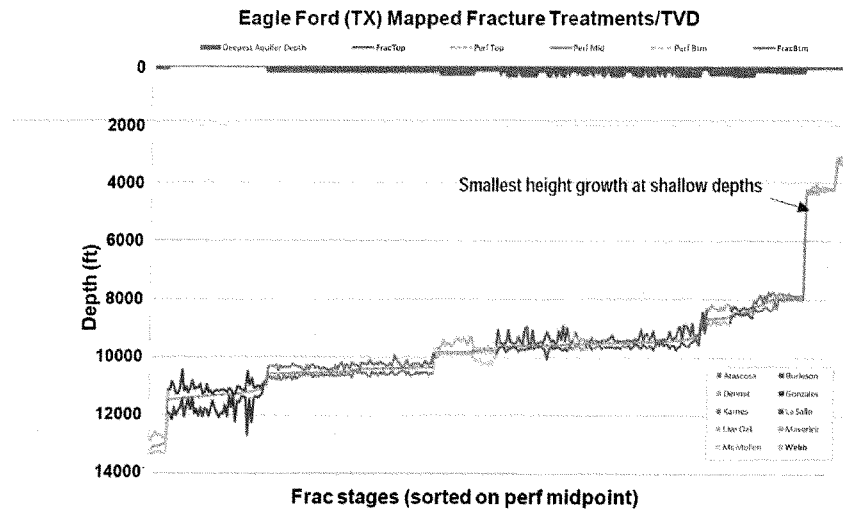


Figure 1 - Eagle Ford Shale Microseismic Mapping

Figure 2 below shows the different depths of well-known shale plays across the US:

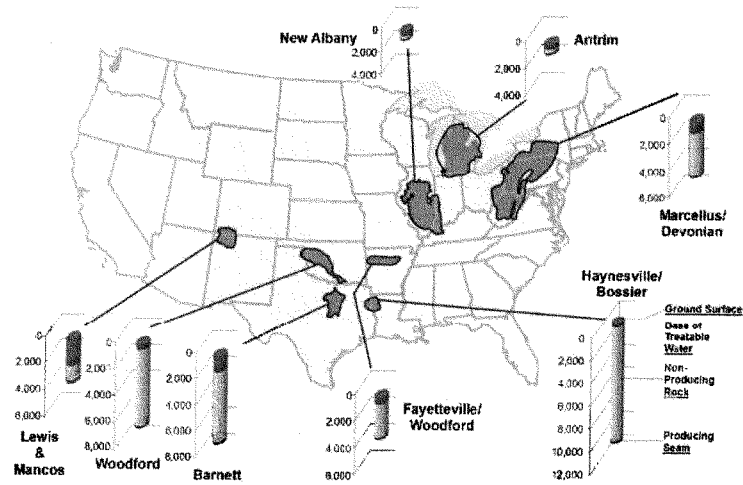


Figure 2 - Depths of Prominent US Shale Plays

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EPA continues to demonstrate that they do not understand shale development and the practices the oil and gas industry is employing to ensure its safety and environmental sustainability. Rather than reach out to industry to better understand the data in its possession, EPA made poor assumptions and based new rulemaking on bad science.

We have concerns about EPA's technical expertise. EPA is regulating an industry that they do not understand. They need to reach out to industry to understand the complexity of today's oil and gas industry.

An example of how EPA's lack of expertise leading to damaging results can be found in the EPA Hydraulic Fracturing Study. The American Petroleum Institute (API) and American's Natural Gas Alliance (ANGA) engaged the Battelle Memorial Institute (Battelle), whom conducted a review of EPA's study. Some key quotations from Battelle's review include:

The American Petroleum Institute (API) and America's Natural Gas Alliance (ANGA) last year engaged Battelle Memorial Institute (Battelle) to conduct a collaborative, side by side study with EPA on its Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources. EPA, however, declined to engage in such a collaborative effort. API and ANGA moved forward with Battelle, beginning with a critical review of EPA's study plan.

API, ANGA and others have consistently raised concerns with the EPA study, many of which are echoed in Battelle's review and the key excerpts below. We have provided the Battelle review to the Agency as part of our continued effort to collaborate with the Agency and assist in the effort to conduct a scientifically sound study.

Purpose/ Scoping: EPA's actual scope and design of the study plan ... reach beyond "studying the relationship between hydraulic fracturing and drinking water" encompassing numerous peripheral elements related to oil and gas exploration and production activities more broadly (page 2).

When the decision was made, while planning the study, to expand the study scope beyond simply hydraulic fracturing to a more expansive study of oil and gas production...all subsequent study design elections and decisions were accordingly affected, adding considerable complexity...as well as the compounding effects of uncertainty. The added complexity raises the level of difficulty of achieving the requisite scientific rigor, considering the large number of interrelated study elements and research questions (page 4).

Study Design: Given the scientific importance of the study, the effort likely meets the requirements of a "highly influential scientific assessment." However, the study was not designated as such. Such designation from the outset would have raised the level of rigor, funding, timing and transparency of all stages of the study (pages 3 and 6).

Also, the site data collected from the companies are from 2006-2010, and the final report will be in 2014. The changes occurring at these sites in the intervening years will likely render the data obsolete for the purposes of the study (page 7).

Case Studies: The limited and possibly statistically biased pool from which the sites were drawn, the small number of sites selected, and the lack of baseline information for all five retrospective sites, are likely to limit the scientific validity and usefulness of case study findings and may result in incorrect or questionable conclusions (page 6).

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Collaboration and Transparency: Specifically, given industry's extensive experience with production of oil and gas from unconventional reservoirs, its unique expertise in the process of hydraulic fracturing and associated technologies, and its wealth of relevant data and information available to inform this effort, it is a weakness of the study plan, and its implementation, that significant industry collaboration is not envisioned (page 10).

Quality: Gaps identified in the EPA study systematic planning process, the Quality Management Plan, and the Quality Assurance Project Plans can impact data quality and the scientific rigor required for this important study. The procedures used for sample collection, laboratory analysis, data synthesis and modeling, and the reporting and management are all critical to developing high-quality, accurate data. Quality cannot be built into the back end of a project through rigorous review; it must be built into each step of a scientifically rigorous process to ensure that the end product is high quality data that is defensible and achieves the study goals (page 9).

4. You painted a picture of EPA rules building on faulty assumptions and limited facts. Are there other areas of concern you did not address in your testimony?

There is another point I would like to raise. We now have further evidence that EPA relied on questionable statistical methods to justify the emission factor that it is using. The data used by the EPA comes from a small data set (four points) with a wide range (between approximately 600 and 20,000 Mcf/Completion). Basic statistics gives a 95% confidence interval that includes both the 9,175 Mcf/Completion number that the EPA uses and zero (0). This is a qualitative measure of the robustness of the EPA's data set and means that, statistically, 0 is as likely of an outcome as 9,175 Mcf/Completion. By using Bayesian Statistics coupled with two invalid and critical assumptions, the EPA was able to tighten the range of their confidence interval to exclude zero and tighten the range of possible outcomes. Given this, one could have concern that EPA has carefully crafted its methods in order to reach a predetermined outcome.

Again, it was an honor to appear before the Committee and now provide further detail on my testimony. Should you have any questions about the points I raise in my responses, please feel free to contact me to discuss them.

Respectfully,



Darren Smith
Environmental Manager

Senator CARPER. OK, thank you.
Mr. Allison, please proceed. Welcome.

STATEMENT OF WILLIAM C. ALLISON, V, DIRECTOR, AIR POLLUTION CONTROL DIVISION, COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Mr. ALLISON. Thank you.

Good morning, Mr. Chairman, members of the Committee. I am Will Allison, Director of the Colorado Air Pollution Control Division. I want to thank you for this opportunity to provide our perspective on responsible oil and gas development.

I am here today to offer comments supportive of EPA's recent rules and to discuss Colorado's own experience with oil and gas regulation. Hydraulic fracturing has been utilized in Colorado since the 1970s. It is now standard practice for virtually all oil and gas wells in Colorado and across much of the country.

Today, Colorado has well over 45,000 active oil and gas wells. And we anticipate continued growth in this industry sector.

In addition to our abundant oil and gas resources, Colorado also has a thriving recreation and tourist economy. Our clear streams, clean air, and abundant wildlife are essential to our economy and to our identity. Oil and gas are an important source of domestic energy for our State and our nation. The industry provides good paying jobs and needed tax revenues, and that is good news. Our job is to help ensure that oil and gas development does not result in bad news for public health and the environment, and to help strike a responsible balance between environmental protection and energy development.

Colorado has been at the forefront of regulating oil and gas emissions for many years. EPA's new rules, as you heard, are largely based and built upon rules that have been successfully implemented in several oil and gas States, including Colorado. The oil and gas industry continues to thrive in Colorado under our comprehensive regulatory programs.

EPA's rules will reduce emissions of such harmful pollutants as volatile organic compounds, sulfur dioxide, and air toxics such as benzene. The rules also have the co-benefit of reducing greenhouse gases, such as methane.

EPA's rules promote proven technology and best practices that are already being used by many Colorado operators. Colorado supports EPA's efforts to provide cost effective emission reductions for the nation's oil and gas industry. We believe that the Federal rules will provide a level playing field and certainty to industry nationwide. States will retain the right to be more stringent than EPA rules if they desire.

One of the central components that you have heard a lot today of EPA's rules is green or reduced emission completions. Green completions can significantly reduce emissions of air pollutants. The EPA has concluded that green completions are cost effective, and we agree. Colorado already has rules requiring green completions where technically and economically feasible. And many operators routinely utilize green completions on all of their wells within our State.

Many Colorado operators also utilize other aspects and practices set forth in EPA's rules. This includes the use of no bleed or low bleed valves, which emit less air pollution than so-called high bleed valves. Switching the valves out is as simple as changing a spark plug. And we have found that the controls in EPA's rule are cost effective and that industry can recoup its costs as companies capture and then sell natural gas that would otherwise be vented to the atmosphere.

EPA's rules are an important tool to complement the success and growth of America's oil and gas industry. Hundreds of thousands of oil and gas wells exist across the country, and EPA estimates that approximately 11,000 more wells will be hydraulically fractured each year. As thousands of additional wells are drilled, it is important to have cost effective emission controls in place to address the individual and cumulative impacts of these sources.

For example, despite the tremendous growth of oil and gas emission sources in Colorado, with our regulations, over the past decade, we have seen decreases in the levels of many pollutants associated with oil and gas operations.

As another example, many areas of this country, including the Denver metro area, are not currently meeting EPA's health based ozone standard. Oil and gas operations are a significant source of emissions that contribute to ozone formation. Sound and effective practices are thus important to our efforts to maintain and improve air quality while supporting a growing industry sector.

We are increasingly hearing concerns about the potential impacts of oil and gas development on public health and the environment, including questions about emissions and odors. Comprehensive rules such as these are an important tool for addressing community concerns regarding the potential impacts of oil and gas operations.

EPA's rules will place additional responsibilities upon State agencies already operating under tremendous resource constraints. We support continued and adequate funding to ensure that EPA and the States can effectively implement these regulations.

In conclusion, Colorado supports these rules. The rules are an important step forward in our efforts to provide clean air while promoting economic growth. We will continue to look for opportunities and take appropriate action to ensure that our regulatory programs are protective, effective, and efficient.

Thanks very much for the opportunity to speak with you today.
[The prepared statement of Mr. Allison follows:]

**Testimony before the United States Senate, Environment and Public Works
Committee, Clean Air and Nuclear Safety Subcommittee**

**William C. Allison, Director, Air Pollution Control Division, Colorado Department
of Public Health and the Environment**

June 19, 2012

Good morning. Mister Chairman, members of the Committee, my name is Will Allison. I am the Director of the Colorado Air Pollution Control Division. Thank you for this opportunity to provide our perspective on the responsible development and regulation of oil and gas resources. I am here today to offer comments supportive of EPA's recently finalized oil and gas rules, and to describe Colorado's extensive experience with oil and gas development and regulation.

Colorado has a long history of oil and gas development. Our first well was drilled in the 1860's. Development techniques have advanced greatly since then. Hydraulic fracturing of oil and gas wells in Colorado began in the 1970's, and continues to evolve and improve. Hydraulic fracturing is now standard practice for virtually all oil and gas wells in Colorado, and across much of the country. As of 2009, Colorado ranked fifth in natural gas production and tenth in oil production. Today, Colorado has over 45,000 active oil and gas wells. We foresee continued and steady growth in this industry sector. For example, thousands of more wells are planned in the Niobrara formation, which extends from El Paso County south of Denver, north to the Wyoming border.

In addition to abundant oil and gas resources, Colorado also has a thriving recreational, resort and tourist economy. Colorado's clean air and clear streams, wildlife, majestic Rocky Mountains, and the parks and wilderness areas are an essential part of our economy and our identity.

Oil and gas are an important source of domestic energy for our state and our nation. The industry provides good-paying jobs and needed tax revenues. That is good news. Our job is to help ensure oil and gas development does not result in bad news for public health and the environment, and to help strike a responsible balance between environmental protection and energy development.

Colorado has been at the forefront of regulating air emissions from oil and gas operations for many years, and has a comprehensive regulatory framework. Similar to other oil and gas producing states, Colorado provides multiple state agencies with different authorities to regulate industry operations. The Colorado Department of Public Health and Environment and the Colorado Department of Natural Resources maintain separate but complementary oversight of industry operations. Colorado's Air Quality Control Commission has regulations to address emissions from tanks, engines, compressors, and associated equipment. Colorado's Oil and Gas Conservation Commission has regulations pertaining to such issues as well completions, odors, noise, and drill rig setbacks. Many improvements to Colorado's oil and gas regulations were adopted in the 2007-2010

timeframe, and several of these regulations are reflected in EPA's new rules.

Colorado's regulatory agencies regularly confer on matters within their areas of expertise, including natural resources, air quality, water quality, and wildlife issues. Colorado regularly reviews and seeks enhancements to its oil and gas programs. Recently, this included a favorable third-party review of Colorado's oil and gas rules by a national oversight group, adoption of the country's most comprehensive fracking fluid disclosure rules, and creation of a state task force to discuss state and local jurisdictional issues in the oil and gas arena. The oil and gas industry continues to thrive in Colorado under our comprehensive regulatory programs.

EPA issued its oil and gas rules in April 2012. The rules will reduce emissions of such harmful pollutants as volatile organic compounds, sulfur dioxide, and air toxics such as benzene. The rules also have the co-benefit of reducing greenhouse gases such as methane. Because EPA's new rules are issued under the Clean Air Act, this will require some changes in our state agency responsibilities.

EPA's rules are largely based and build upon rules that have been successfully implemented in several oil and gas producing states, including Colorado. The rules promote proven technology and best practices that are already being used by many Colorado operators. Colorado supports EPA's efforts to provide cost-effective emission reductions for the nation's oil and gas industry. Colorado has consistently supported the responsible and balanced development of natural resources. The federal rules will provide a level playing field and certainty to industry nationwide. States will retain the right to be more stringent than EPA's rules, if they desire.

One of the central components of EPA's rules is "green" or "reduced emission" completions of hydraulically fractured wells. Green completions can significantly reduce emission of pollutants such as volatile organic compounds and hazardous air pollutants. When a company completes a fractured well without best operational practices, the water, chemicals, sand, and related air emissions are vented to the atmosphere. This can go on for several days. Green completions capture this material, much of which can be reused. Green completions also significantly minimize emissions to the environment.

The EPA has concluded that in most instances green completions are highly cost effective. We agree. Colorado already has rules requiring green completions where technically and economically feasible. Many operators routinely utilize green completions on all of their wells in Colorado.

Many Colorado operators also already use other practices set forth in EPA's new rules. This includes the use "low" or "no bleed" valves, which emit less pollution than "high" bleed valves. Switching the valves out is as simple as changing a spark plug. We have found that the controls in EPA's rules are cost effective, and that industry can quickly recoup its costs, as companies capture and then sell natural gas that would otherwise be vented to the atmosphere.

The tremendous growth of oil and gas industry in Colorado and other states presents tremendous opportunities and challenges. EPA's rules include the first federal air standards for natural gas wells that are hydraulically fractured, along with requirements for several other industry sources of pollution that have not been regulated at the federal level. The rules are an important tool to complement the unprecedented success and growth of America's oil and gas industry. Tens of thousands of oil and gas wells already exist in individual states, and EPA estimates that nationally, approximately 11,000 more wells will be fractured annually. As thousands of additional wells are drilled, and associated infrastructure is built to service these wells, it is important to have cost effective emission controls in place to address the individual and cumulative impacts of these sources. For example, despite the growth of oil and gas emission sources in Colorado, over the past decade we have seen decreases in the levels of many organic pollutants associated with oil and gas operations, including ethane, propane, benzene and toluene.

As another example, many areas of the nation, including the Denver metropolitan area, are not currently meeting EPA's health-based ozone standard. Oil and gas operations are a significant source of VOC emissions, which in turn contribute to ozone formation. We estimate that almost 40% of anthropogenic VOC emissions in Colorado's ozone non-attainment area are related to oil and gas operations.

It can be challenging for businesses to come into or expand their operations within non-attainment areas. That is one reason why Colorado already has more stringent rules in our ozone non-attainment area, and several oil and gas companies already use practices that go beyond our existing rules. Sound and cost-effective oil and gas practices are thus important to our efforts to maintain and improve air quality, while supporting a rapidly growing industry sector.

With the growth of the oil and gas industry, it is important for state agencies and industry to work diligently to catch up and keep up with the growth. The oil and gas industry now accounts for approximately 50% of the air permit applications received in Colorado. Oil and gas applications have almost doubled in recent years and, as previously noted, we expect further growth. We have created a separate unit within our agency devoted exclusively to oil and gas permitting and compliance issues. Colorado has devoted considerable resources to understanding and regulating this industrial sector. Our agency received approximately 3,360 permit applications from oil and gas sources alone in 2010. These permits cover equipment such as wellheads, compressor stations, natural gas processing plants, wastewater treatment and disposal facilities, and natural gas storage facilities. Through the processing of these permits, the Division has developed extensive experience with oil and gas operations.

It will be important for states to have sufficient field personnel to assist with compliance with the new rules. This is particularly true as, in addition to the volume, drilling activity often occurs in remote areas with limited advance notice. Most oil and gas companies

work very hard at environmental compliance, and some go beyond applicable standards. Regulatory agencies must continue to work with industry to ensure widespread and regular compliance. EPA's rules will place additional responsibilities upon state agencies already operating under resource constraints. We support continued and adequate Congressional funding to ensure that EPA and the states can effectively implement these important regulations.

Hydraulic fracturing has been utilized for decades, but it is new in many parts of the country. Even where it is not new, it is now deployed commonly as part of natural gas development. While hydraulic fracturing and directional drillings result in a smaller environmental footprint at the well pad, the drill rigs can be onsite much longer, and the practices raise their own environmental challenges. We are increasingly hearing concerns about the potential impacts of oil and gas development on public health and the environment, including questions about emissions and odors. Comprehensive rules such as these are an important tool for addressing community concerns regarding the potential impacts of oil and gas operations.

Colorado believes that oil and gas activities are most effectively regulated at the state level. It is important that oil and gas development occur in an environmentally responsible manner, recognizing the unique geologic, atmospheric, and aquatic resources of each state. EPA's rules build on proven and cost-effective technologies that have already been implemented by several states. The rules provide a comprehensive baseline and framework for all states, particularly those jurisdictions where oil and gas activity may be relatively new. They also provide a standardized program for oil and gas exploration on federal lands, including Indian lands within state boundaries where the federal government may have primary jurisdiction.

In conclusion, Colorado supports EPA's rules and plans to incorporate the new rules into our air quality program. The rules are an important step forward in our efforts to provide clean air while promoting economic growth. We will continue to look for opportunities and take appropriate action to ensure that our regulatory programs are protective, cost-effective and efficient.

Thank you for the opportunity to speak with you today.

Responses to additional questions of the United States Senate, Environment and Public Works Committee, Clean Air and Nuclear Safety Subcommittee

William C. Allison, Director, Air Pollution Control Division, Colorado Department of Public Health and the Environment

July 24, 2012

Questions from Senator James Inhofe:

Question 1: In your testimony you described some of the pioneering role Colorado has taken in ensuring that oil and gas development “strikes a balance between environmental protection and energy development.” What steps should the EPA take to ensure that new oil and gas NESHAPS, NSPS, and future regulations will not interfere with programs states have in place?

Answer: EPA should continue to do extensive outreach with states when scoping and developing NESHAPS, NSPS and other regulations. With respect to oil and gas regulations in particular, EPA should continue to collaborate with oil and gas producing states that have extensive experience with overseeing these operations, including states such as Colorado, Wyoming, and Texas. EPA did a good job of coordinating with Colorado on the new federal proposed NSPS, and responding to several of our questions and concerns. EPA undertook a special effort to understand Colorado’s experiences with our existing oil and gas program, and to solicit feedback on EPA’s proposed rules. Such consultation was mutually beneficial and helped EPA to develop rules that minimized potential conflicts or inconsistencies. We note that EPA’s NSPS also addressed several of the concerns raised by industry during the public stakeholder process; for example, by providing a delayed implementation date for reduced emission completions.

Question 2: Can EPA replicate the speed, accuracy, and efficiency demonstrated by Colorado’s local regulators working in conjunction with industry to find workable solutions to unique problems?

We believe that individual states are best positioned to develop and implement the specific details of environmental programs, taking into account the unique geographic, aquatic, atmospheric, economic, and other factors present within each state. States have particularized knowledge and experiences that can help them to effectively and efficiently work with local industry, environmental groups, citizens, legislatures and commissions to develop solutions that address national goals, while meeting state concerns. States can also generally respond more quickly to issues in the field. EPA is better positioned to develop broad policy and regulatory frameworks with nationwide applicability, to ensure timely and consistent action on emerging issues of national importance. The framework of cooperative federalism, whereby states and EPA work as partners towards the common goal of protecting public health and the environment, is one upon which environmental programs in the United States have been successfully implemented for several decades.

Question 3: *What concerns do you have related to state funding for new EPA mandates?*

EPA is promulgating many new rules and it is imperative that states have adequate resources to ensure the successful implementation of such rules. Similar to the federal budget, state budgets are facing increased constraints. New regulations, without sufficient resources to implement them, will likely not achieve the desired result of the regulations. States and EPA are already striving to meet existing environmental challenges with existing resources. The regional and cross-boundary nature of air pollution further highlights the need for consistent and sufficient nationwide funding. We are thus very concerned about efforts to cut funding to states.

Colorado also believes that EPA should continue efforts to streamline certain existing rules and programs. For example, the State Implementation Plan revision process can be cumbersome and time-consuming. In addition, "exceptional event" demonstrations are labor intensive and costly exercises for states, often without commensurate or demonstrable benefit to public health or the environment. Many states are working with EPA to address these issues, and Colorado looks forward to continued cooperation and substantive changes in these areas.

Thank you for the opportunity to appear before the Subcommittee and to respond to these additional questions.

Senator CARPER. Thanks so much, Mr. Allison.

Senator Inhofe has asked to go first, and we are happy to say yes.

Senator INHOFE. I appreciate that very much, Mr. Chairman.

I am delighted to have Darren Smith here witnessing today. I am very familiar with Devon, with Larry Nichols, and your whole operation, how sensitive you have always been, historically, to environmental issues.

Let me ask you just a couple of questions here. Devon's projected emissions from the EPA air rules have been overestimated by as much as 1,400 percent. In addition, a study was put together by API and ANGA, and they came out with the overestimation also of primarily methane.

Now, they didn't come exactly to the same number conclusion. Can you tell me how both of you were right, or were both of you right on this estimate?

Mr. SMITH. Sure, thank you.

There does seem to be a disagreement in the numbers. But I think it can be described this way. The API study looked at two categories of emissions, separate from the work that we have done. They recognized that when you combine overestimates in these two categories, it actually lowers the EPA emissions by a half.

Our work was specifically around completion emissions. And what we have demonstrated is that EPA's emission factor for completions was several factors too high. So you can think of these two studies as complementary. But they basically describe different categories of emissions from the industry.

Senator INHOFE. OK, that makes sense.

Now, in your testimony you estimate that Devon has lost more than \$40 million to the atmosphere under the EPA's analysis. Can you explain how you arrive at that number and how Devon and other companies can justify losing that much of their product?

Mr. SMITH. Sure. The calculation is real simple. We look at the number of wells that we drill and hydraulically fracture. Then we couple that with the volume of gas that EPA claims we are losing per well, and then we factor that with the gas price to come up with \$40 million. So that is a large number, and clearly, companies successful as Devon certainly can tolerate that level of waste.

Senator INHOFE. I see. And I wanted to ask you also about Wise County, Texas. That is the Dallas-Fort Worth area. That is in Region 6. It became a little bit famous with all the crucify comments and all that, with Armendariz. They recently have found that they are out of attainment. What I would like to ask you, could their being out of attainment be based on faulty science? And can you explain how the EPA arrived at its decision and the potential impact the decision could have in other areas?

Mr. SMITH. Sure. We do believe that EPA's decision to include Wise County as ozone non-attainment is not based on good science, and I can describe that. First of all, there is no ozone monitor in Wise County, so EPA's decision to include it as a non-attainment county comes from the concept of its contribution to non-attainment.

Senator INHOFE. You say there is no monitor in Wise County?

Mr. SMITH. There is no ozone monitor in Wise County. That is correct. So again, EPA's decision to include it as an ozone non-attainment county comes from its belief that it is a contributor to non-attainment downwind. Interestingly enough, the winds in this part of Texas don't blow in such a way that emissions in Wise County could contribute downwind to ozone problems in other counties. The wind only blows in that direction that would be needed to transport pollutants into non-attainment areas only 2 percent of the time.

So what we have seen with EPA is that they have taken a what we kind of regard as a sub-microscopic approach to try and find some evidence to link the emissions in Wise County to non-attainment elsewhere. They have employed a back-trajectory model that really has only demonstrated that winds come from Wise County to a non-attainment area only twice in 3 years, and in fact, on one of those occasions the winds never did originate in Wise County. They originated in a non-attainment county, circled through Wise County, and then landed back in a non-attainment county.

And the other thing I need to emphasize is that model that they employed, that was not employed by any other EPA region in the nation. In fact, other EPA regions have discredited it because it is not reliable. The model that they used in no way makes a connection between emissions in one area and ozone formation in another. You may know that ozone formation is a complicated photochemical process, and simply just by looking at some sort of wind direction is by no means some evidence that Wise County is contributing to ozone problems.

Senator INHOFE. That is of particular interest to me, since my State of Oklahoma is downwind from Wise County. So I appreciate that very much, and thank you for your testimony.

Senator CARPER. Senator Barrasso.

Senator BARRASSO. Thank you, Mr. Chairman.

Mr. Corra, you talk in your written testimony about philosophy, manage resources consistent with the philosophy that mineral extraction and environmental protection can exist together in harmony. Is that the philosophy you see coming out of this Administration? How do you see their approach?

Mr. CORRA. Mr. Chairman and Senator Barrasso, in the case of the oil and gas regulations, we were quite pleased to see that the Administration spent time in the State to learn how we did that and to look at that.

As we see in our State, we regulate coal mining, for example, to a very, very high standard. We also follow the Administration's rules with regard to best available control technology on all the new sources of air pollution.

A lot of rules have come through in the last year or so that we are still trying to process and see how they fit in to our regulatory scheme. We do like to say that we are regulatory partners with the EPA. We do appreciate the fact that they consulted with us on the natural gas standards.

Senator BARRASSO. You also talk about the flexibility of local versus national rules. And I wonder what the impacts to State like Wyoming, if the Federal Government steps in to regulate, where

States like Wyoming are already doing the job of regulating at home.

Mr. CORRA. Mr. Chairman, in the case of oil and gas in Wyoming, and I will talk about our non-attainment area in Sublette County, is a good example. The ability that we have to implement policies and have agreement on those policies with rules to follow later has been essential for us to act swiftly. We have already started on a planning process and implementing and making decisions well before we needed to develop any State implementation plan, for example, with the Federal Government.

The local conditions cannot be overstated, quite frankly, in our area, both from a standpoint of geology as well as from the standpoint of surface topography. These problems are very unique to all those circumstances. And we are generally in a pretty good position to determine what the appropriate regulation should be.

Senator BARRASSO. Thank you.

Mr. Smith, you stated in your written testimony that the error in the way the EPA calculates emissions from natural gas emissions isn't corrected, I think you quoted, it will continue to fuel bad public policy and research that overshadows the benefits of natural gas. If you would elaborate a little bit on that point. Will the EPA's flawed data lead to less natural gas production?

Mr. SMITH. Certainly. What we are seeing is that when different fuels are compared on a life cycle analysis basis that this over-estimate of emissions from the completion stage of natural gas wells tends to tip the balance such that there have been arguments that things like coal, for instance, on a life cycle basis, are in fact cleaner than natural gas. To us, those conclusions are absurd.

But what that essentially could mean is that the advocacy for natural gas and the recognition of natural gas to improve air quality and to be a bridge fuel is being damaged. We are also seeing some studies that suggest that even compressed natural gas vehicles are maybe no cleaner than gasoline.

And then also we have seen that this data is spread to our partners in the European area. So that is damaging the reputation of natural gas in those areas as well.

Senator BARRASSO. What is your response, then, to the Sierra Club's Beyond Natural Gas campaign?

Mr. SMITH. I would say that, I don't know exactly what is beyond natural gas, I am not sure anybody here knows what is beyond natural gas. But if there is something beyond natural gas, then I guess we really don't know what that is. We firmly believe that natural gas needs to be part of the solution, particularly as we see more and more pressure put on coal, coal plants shutting down. Really, what is the other option? What is the other fuel source? It is a real mystery to us.

Senator BARRASSO. OK, thank you.

Thank you, Mr. Chairman.

Senator CARPER. Senator Sessions.

Senator SESSIONS. Thank you, Mr. Chairman, for your courtesy.

Senator CARPER. You are welcome.

Senator SESSIONS. Mr. Allison says that you can fix this problem, Mr. Smith, we will go to you, with a small cost and can recoup that cost from the energy captured. And I believe the fact sheet from

EPA says that their regulations are highly cost effective. And how would you respond to that? Is it going to be a net cost? What do you think it would be?

Mr. SMITH. Sir, you will recognize that statements around cost effectiveness rely on the volume of gas captured. Of course, if the volume of gas captured is overestimated, then you can understand that the economics that are claimed for the benefit of this are also overestimated.

Senator SESSIONS. Is the technology such that you wouldn't flare the gas that is being now lost, presumably? You would actually capture it and put it in your pipeline?

Mr. SMITH. I would say that—

Senator SESSIONS. Is that what they are talking about doing, technologically?

Mr. SMITH. That technology is common, as has been said numerous times. It has happened voluntarily. But I would like you to think about it more as a process that helps operators improve the quality of their wells, rather than to avoid emissions, because operators do know that the emissions from cases where we cannot green complete are small and overstated by the EPA. So companies like Devon, we employ green technology or green completion technology, again, not so much as an emission avoidance opportunity.

But what this temporary equipment really allows us to do is clean up our wells, clean them up longer, and capture the gas as it is happening. So we can clean up our wells without any wasted gas.

It also allows us some operational flexibility. Because as I described quickly in my exhibit, that flowback brings a high fluid volume back initially in the well. You have one or two choices. You can construct permanent facilities—

Senator SESSIONS. So you can do this, you agree with him that it is being done, you are doing it in some cases. But what is it, what situation is it explicitly you can just simply tell us that you don't think it is smart to do that uses this process? What kind of situations do not work?

Mr. SMITH. Instances where this situation doesn't work is where there is no infrastructure available to capture the gas. And I will say that the new NSPS rule that EPA is finalizing has language in there that is problematic for operators that are developing in new areas. For instance, for Devon, we have leases in Ohio, and we are developing those. There is some suggestion in this rule that subsequent wells after exploration wells, we will not be able to operate without green completion.

I am just telling you that our operations are such that when we drill exploration wells, they are sometimes counties apart. So there are a lot of other ornaments in this rule, on the tree of this rule, if you will, that are problematic, one of which is our ability to develop new shale resources.

Senator SESSIONS. I think that developing undeveloped fields might be a basis for a legitimate concern there for you. Mr. Allison, you were saying that it would capture—this energy would pay for itself. Do you have documentation to show that? Are you using EPA estimated numbers to conclude that it would pay for itself?

Mr. ALLISON. Thank you, Senator. We have several years of rules on the books in Colorado where green completions are required, where economically and technologically feasible. While we don't have hard data, we estimate that approximately 85 percent of our operators use green completions on a regular basis and on those wells. So it is clearly cost effective for them.

Senator SESSIONS. They are doing it voluntarily or because you require it?

Mr. ALLISON. We have regulations on the books that were adopted after—

Senator SESSIONS. But do you have any scientific proof that it pays for itself?

Mr. ALLISON. Again, our industry worked with us on these rules that were adopted with widespread support. We are fortunate to have leaders in our State, in the industry, who tell us that we do this on a regular basis, it makes sense for our company, we recoup our costs. We capture not only the emissions but the sand, the liquids, the other things that come up during the flowback process. And they are able to re-use a lot of that material.

Senator SESSIONS. My time is up. Would you think that—does your regulation allow for an exploratory well in an area that does not yet have infrastructure? Do you have any exceptions for hardship type cases?

Mr. ALLISON. Thank you, Senator. There are exceptions, for example, where there is not adequate pressure or wildcat or delineation well, yes.

Senator SESSIONS. Thank you, Mr. Chairman. My time has passed.

Senator CARPER. Let me ask you a couple questions, and then we will wrap it up.

One, Mr. Smith has mentioned, I think, and some others in the industry have asserted that EPA has overestimated the emissions. I just would ask, Mr. Krupp, do you have any thoughts you would like to say with respect to the concerns Mr. Smith has raised?

Mr. KRUPP. I think the EPA used the best available data to calculate their estimates. At the same time, the EPA is well aware that right now, emissions are causing pollution and hurting people. It is urgent that we get rules in place to reduce emissions.

I would agree that all the estimates referred to are no substitute for empirical data. That is why the Environmental Defense Fund, in cooperation with the University of Texas and other industry partners, are out in the field collecting empirical data. But having said that, I am very confident that EPA's data is the best available estimates and that they have good reason to want to urgently get things done now that reduce the emissions.

Senator CARPER. Any other witnesses want to react to the concerns raised by Mr. Smith? Anybody else?

OK.

Ms. Schuller and Mr. Allison, given your experiences, do you think that EPA has given enough flexibility and time to producers to meet the new clean air standards, and what would you have maybe done differently had you been where EPA had?

Ms. SCHULLER. Senator, first I would like to acknowledge that in the final rule, EPA did make some significant changes that ac-

knowledge industry concerns. There are still quite a few considerations that still need to be taken into account. The tank emissions requirements industry estimates will require 3 years. Based on the estimates we think there will be over 28,000 tanks. The emissions control devices aren't currently being manufactured. So that is an example of one area that will require more time.

In terms of what we would do differently next time, in Colorado we spend a lot of time partnering with our regulators to understand the technical considerations and the logistical requirements of implementation. I think the emissions estimates and the estimated costs are examples of things in this rule that could be significantly improved. And they are important because they dictate where the thresholds are for implementation and how stringent and onerous compliance requirements should be. So those are things we would do differently.

Senator CARPER. OK. At the end of the day, though, do you believe that industry can meet the standards that are laid out for them by EPA?

Ms. SCHULLER. Industry can meet the majority of them. But there will be some constraints around manufacturing and implementation that are going to be quite challenging.

Senator CARPER. OK, thank you.

If I could, do you want to say anything on that, Mr. Allison?

Mr. ALLISON. Thank you, Senator Carper. I guess I would just add that I would agree there is uncertainty in any emission estimates. We welcome actual data, empirical data over estimates whenever possible. Ms. Schuller alluded to some studies that suggesting that emissions are overestimated. There are other studies out there suggesting that emissions are underestimated.

Regardless of what the right number is, we think that these controls have demonstrated effective reductions in air pollution. We welcome ongoing studies such as alluded to by Mr. Krupp that would provide more empirical data on actual emissions at the well site.

Senator CARPER. OK, thanks.

Mr. Corra, Senator Barrasso mentioned to me earlier in the hearing that you were appointed by a Democrat in your State. Who appointed you?

Mr. CORRA. Mr. Chairman, Governor Dave Friedenthal in 2003.

Senator CARPER. All right, good. A question if I could for you, sir. You come from a State that has implemented similar clean air standards, similar to what the EPA has proposed. It sounds from your testimony today that since implementing your State standards that you have seen some positive impacts on air quality. Is that true?

Mr. CORRA. Mr. Chairman, it is true. Where we are keeping detailed records in this Upper Green River Basin, where we have the non-attainment for ozone, we have seen reductions. And in fact, there have been, since 2008, when we began an aggressive program to add regulations to that industry there, the number of oil and gas wells has grown substantially. Gas production has grown, and we have seen a corresponding decrease in the precursor emissions that form ozone, namely nitrogen oxides and volatile organic compounds.

So our inventories continue to get better every year, and we continue to find other targets. We like the other States regulate a lot of the different component operations of these fields, pneumatic controllers, for example, tanks. But we are not sure we are there yet because of the unique weather conditions. But we have made good progress.

Senator CARPER. OK, good. I want to wrap it up here in the next couple of minutes. Sometimes we have a diverse panel and we have issues such as clean air issues where there is a lot of disagreement. There is less so here. And that is a good thing, I think EPA Has done a nice job reaching out to the States, trying to learn from the States. It is reflected in the work and the testimony that we have heard.

That isn't to say what they have done is perfect. One of my admonitions from a child growing was, if it isn't perfect, make it better. I still try, everything I do, I can do better. I think the same is true of all of us and of agencies like the EPA.

But if it isn't perfect, make it better, do each of you want to give like maybe one quick idea, quick idea as to something that is not perfect that EPA and we might want to make better going forward?

Mr. Krupp.

Mr. KRUPP. This rule only applies to new wells that are being constructed. There is a vast preponderance of gas that is being pumped from existing wells through infrastructure that is existing. Making it better would mean having standards applying to existing wells and existing infrastructure.

Senator CARPER. OK, thank you.

Mr. Corra.

Mr. CORRA. Mr. Chairman, I think to make things better is to just, you cannot overemphasize the importance of allowing States to have the flexibility to implement these according to the conditions in their own States. So I would hope that going forward there aren't a lot of other changes that are made. I think the implementation of the rule, how this thing evolves, other sorts of things that just seem to occur naturally, that follow new regulations, I would hope that EPA stays the course. They have said that they want to defer to the States, and that would make things a lot better, if they held to that promise.

Senator CARPER. OK, good, thanks.

Ms. Schuller.

Ms. SCHULLER. Mr. Chairman, the rules have compliance requirements similar to those for major sources. Most oil and gas operations are remote and quite dispersed. In order for the rules to live up to their promise of being effective, I think the compliance requirements need to be modified to ensure that operators can adapt to them effectively.

Senator CARPER. OK, thanks.

Mr. Smith.

Mr. SMITH. Mr. Chairman, I would suggest that there should be a critical review of the value add for new rules and to ensure that credible science is used to develop them. Many of these rules are promulgated, but we have just talked about one element of the rule here today, and we focused on green completions and those sorts of things.

But there are many other facets of this rule. I will suggest that the no value add, high cost component of this rule is the administrative piece, the recordkeeping and the reporting, those are the sorts of no value add, real cost impacts to operators like Devon. Those come out of our bottom line, those result in fewer wells drilled.

Senator CARPER. OK, thanks.

Mr. Allison.

Mr. ALLISON. Thank you, Mr. Chairman. I think these rule are an important step forward. I would note that they apply only to gas wells. And there are areas of the country where a lot of oil is being produced right now. In the process of that, a lot of gas is being burned off. That seems counterintuitive, as you heard today, when gas is such an important part of our domestic energy. So I would suggest that EPA wants to take a look at that and work hard with industry and States and other stakeholders to see what might be appropriate steps to take with respect to that.

I guess I would also say in closing that it is important, with this rule or any other EPA rules, for States to have adequate flexibility and for us to be able to take into account the unique atmospheric and aquatic and geologic resources within each State as we implement these rules.

Senator CARPER. All right. Those are helpful comments and we appreciate those. And in the spirit of if it isn't perfect, make it better, there are obviously some ways to make this better.

One of the things that my dad used to try to impress on my sister and me when we were children growing up, I was reminded of this on Father's Day, kind of reflecting, one of the things that he always reminded us of, just to use some common sense. My sister and I were kid and we must not have had very much, because he said every other day, just use some common sense. He didn't say it that nicely. He was an old chief petty officer in the Navy, tough as nails.

So believe it or not, after all those years of having it pounded it into my brain, I try to use common sense. And I encourage Federal agencies to do the same. And I am encouraged in this case that EPA has used a fair measure of that. We have these emissions that have value and that can be harnessed rather than just flared. I think EPA and the industry are trying to find a way to use the value of those gases, rather than just flare them and pollute the air, why don't we capture them and use them commercially, economically. It makes a lot of sense. My dad would say, they are using some common sense down there. And we are certainly trying to.

I thank you all. I thank our colleagues for coming today and preparing today and responding to our questions. Some of us will have some further questions to ask for the record. Our colleagues have 2 weeks to provide those questions. We would just ask that you respond to them as promptly as you can.

With that having been said, Senator Barrasso, I think it is a wrap. Thank you all. We are dismissed.

[Whereupon, at 12:18 p.m., the Committee was adjourned.]