TRANSCRIPT OF PROCEEDINGS

In the Matter of:)
)
THE 128TH MEETING OF THE)
NATIONAL PETROLEUM COUNCIL)
)

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Astor Ballroom
The St. Regis
923 Sixteenth Street, N.W.
Washington, D.C.

Tuesday,
December 4, 2018

The parties met, pursuant to the notice, at 9:00 a.m.

APPEARANCES:

GREG L. ARMSTRONG, Chair

HONORABLE RICK PERRY, Government Cochair
Secretary, U.S. Department of Energy

DARREN W. WOODS, Committee Chair

CAROL J. LLOYD, Coordinating Subcommittee Chair
NPC Committee

HONORABLE RYAN ZINKE
Secretary, U.S. Department of the Interior

JOHN C. MINGÉ, Chair
NPC Committee on Carbon Capture, Use, and Storage

ALAN S. ARMSTRONG, Chair
NPC Committee on U.S. Oil and Natural Gas Transportation Infrastructure

HONORABLE MARK W. MENEZES
Under Secretary of Energy

APPEARANCES: (Cont'd.)

GREG A. ARNOLD, Member
NPC Finance Committee

CLARK C. SMITH, Member
NPC Nominating Committee

P R O C E E D I N G S

(9:00 a.m.)

CHAIRMAN ARMSTRONG: Good morning. I'd like to go ahead and call the 128th meeting of the National Petroleum Council to order. I promised last night we'd start promptly at 9, and I think I just barely made it, so we'll start off there.

Before we get into today's agenda, I think it's appropriate that we start this meeting with a moment of reflection and really celebration of a life well lived. This past Friday, we lost a former member of the industry, a friend of many here on the council, and a great, great American, the 41st President of the United States, George Herbert Walker Bush.

There are many ways to describe -- I was trying to think of what comments could I possibly make about this great American, and none of which really do him justice for the person and the accomplishments and contributions, but three phrases that I can distill down into 11 words I thought likely resonate with all of us. One is a fine human being, a life of service, and a remarkable life. And I would ask that you please stand and join me in a moment of silent prayer and reflection on the life and legacy of President Bush.

(Pause.)

CHAIRMAN ARMSTRONG: Thank you. President Bush will certainly be missed, but the examples that he set for all of us I think will last many lifetimes.

So, with that, again, I want to welcome everyone, members of the council, honored guests, and members of the press and public. We have what I believe is a very -- will be a productive and informative meeting this morning. We have a very full agenda, and we're honored to have both Secretary Zinke and Secretary Perry join us for various portions of today's presentations.

Because it's Washington and schedules are tight and sometimes fluid, we'll remain flexible. You've got an agenda in front of you, but we may have to kind of go out of order if things have some fluidity to them.

First, I want to also make the customary safety announcement, which with this room being on the lobby level will be quite brief. There are no scheduled drills or fire alarms today, so if an alarm sounds, we should take it as if it's real. We will evacuate as rapidly but safely as possible through the back of the room, through the lobby, and into the street. The rally point will be to the right here at

the Hotel Hilton across K Street.

Now, if there's no objection, I will dispense with the calling of the roll. For the members of the council, the check-in is inside the George Washington Room, and it serves as our official attendance record. Pam Dunning is keeping track. Any member that has not checked in, please do so, so ensure we have a complete record of this meeting.

We also have what has become familiar to many of us as an internet audience, which enables them to watch our proceedings via webcast. I hope that this audience includes both members of the council that were unable to attend today, as well as some of the many individuals that are contributing greatly to the council's steady efforts.

With that, I'd like to go ahead and introduce to you for the record -- to you and for the record -- the participants joining me at the head table today. To my right, we are pleased to have the Honorable Ryan Zinke, Secretary of the Interior. Secretary Zinke will be with us through the first portion of today's meeting as we cover the supplemental assessment on the NPC's 2015 report, "Arctic Potential."

Secretary Zinke worked with Secretary Perry

to submit a request for this supplemental assessment. Following the presentation this morning, Secretary Zinke will provide his remarks and, if we have time, take a few questions.

Next to Secretary Zinke is Larry Nichols, who is the NPC vice chair. Next is the Honorable Mark Menezes, Under Secretary of Energy and governmental co-chair for the Arctic supplemental assessment. Then we have the leaders of the Arctic supplemental assessment themselves. We have Darren Woods, and then next to him we have John Mingé, who heads up the CCUS study, and Alan Armstrong, who then heads up the infrastructure study, and then Marshall Nichols, who's the executive director of the NPC.

So you have two Armstrongs and two Nichols up here. None of us are connected, we don't think. At least they don't claim me.

(Laughter.)

CHAIRMAN ARMSTRONG: So -- and as I said, later Governor (sic.) Perry will be joining -- Governor Perry, excuse me -- Secretary Perry will be joining us later this morning. If you can't tell, I'm from Texas.

(Laughter.)

CHAIRMAN ARMSTRONG: So we'll move next to

the first order of business, is the presentation on the supplemental assessment on the NPC report, "Arctic Potential." We'll kick it off with Darren Woods, Chairman and CEO of Exxon.

And, Darren, the podium is yours.

MR. WOODS: Thank you, Greg. Good morning, everyone, Secretary Zinke, Under Secretary Menezes, fellow council members, and invited guests. As you're aware, in August, Greg received a request from Secretary Perry for the NPC to conduct a supplemental assessment of the 2015 Arctic Potential report. This request resulted from a series of briefings the NPC held with the Department of Energy and the Department of the Interior.

We were very pleased that the administration is interested in acting on the recommendations in the NPC report. And as such, we're very happy to provide an update. To respond to the request, Greg invited me to chair the supplemental assessment. I reactivated the steering committee and the coordinating subcommittee from the 2015 study.

Last week, the steering committee met and reviewed and endorsed the results of the supplemental assessment. A presentation package was distributed by email on Friday, and you will have a hard copy in the

folders in front of you.

Now, as you'll hear, the 2015 report has stood the test of time, and the findings and recommendations in the original report remain relevant today. Perhaps most importantly, since 2015, there has been substantial drilling activity that demonstrates continued advancements of well control and oil spill response technology in Arctic environments.

In light of these advancements, we will include additional recommendations for specific regulatory changes to enable the use of this technology to promote safe, environmentally responsible, and prudent exploration and development of U.S. Arctic potential.

So, on behalf of the coordinating subcommittee and the steering committee, I'm very pleased to invite Carol Lloyd from ExxonMobil, who is the chair of the coordinating subcommittee, to the podium to present the results of the potential supplemental assessment.

Carol?

MS. LLOYD: Well, thank you, Darren. Good morning, members of the Petroleum Council, invited guests, ladies and gentlemen. Today, I'm going to

cover three topics in about 45 minutes. Firstly, I'll begin with some background, including the request letter and how we approached it, and some key takeaways. Secondly, I will reconnect you with the 2015 study. And then finally we'll turn our attention to the 2018 results.

Given the time constraints, I'm going to move pretty quickly through the background material and the 2015 reconnect so that we may focus our attention on what's changed since our report was published in March of 2015.

Okay. Beginning on Slide 2, with the study request, we've summarized what was asked for in the letter, and as you can see in the block text at the top, the NPC was asked to provide input on what has changed, exploration and technology advancements, and in particular views on whether or not the regulatory environment could be improved. And key areas to be addressed are noted in the four bullets at the bottom of the slide.

In response, as Darren mentioned, we reconvened a group of alumni from the 2015 report and held a technical workshop where we had broad input of what might have changed since we published our report in 2015. I'll say more about this in just a moment.

The coordinating subcommittee and then the steering committee considered this input and developed this interim report. And as you can see, this is not yet the final product. We'll be taking the key points in this PowerPoint presentation, converting it to a formal written report, and seeking council approval around the end of February.

Our workshop was held at Rice University at the Baker Institute on October 31 and November 1. As you can see, we had broad participation, with 45 participants from industry, all levels of government, and a few nongovernment organizations. We organized the discussion into panel discussions addressing the areas of inquiry in the Secretary's letter.

Key takeaways, and Darren outlined just a couple. Since the 2015 report, there has been a lot of activity, drilling, exploration, drilling activity in Arctic conditions and technology advancements. The 2015 findings and recommendations remain relevant. And in the third and fourth bullet, whereas the 2015 study recommended further study to gain public confidence of technology for well control and safe and effective exploration and development, in this case, based on the technology demonstrations that have occurred since 2015, we're going to be making

recommendations for regulatory changes directly.

With that background then, a brief reconnect to what we said in 2015. Firstly, just a brief mention of what the original question was on this Slide No. 8 in your package. As you can see in the top of the page, the original study focused on research and technology constraints that might be inhibiting Arctic development. And working with the Secretary of Energy, we elected to focus the 2015 study on offshore technology, given that onshore development and onshore technology was obviously proven.

The other key takeaway from this slide is the broad and diverse team that worked on the 2015 study, over 200 participants from 105 organizations. Those organizations represented roughly -- were about half from industry, about one-third from all levels of government, and the remainder from academic and nongovernment organizations.

The report -- the original report represents a consensus view and our commitment and our work to date. We are committed to continue that with the 2018 supplement. The original report had seven key findings. The most important of those and the most relevant for our 2018 focus are Finding No. 4, that

the technology exists to prudently explore for and develop U.S. Arctic potential, and Finding No. 7 regarding technology capabilities to reduce the potential for and consequences of a spill.

I'm going to say a little more about these two recommendations in just a second, but before I do that, I thought I'd highlight briefly what we found in 2015. Firstly, the resource is large, globally, about 525 billion barrels, and the U.S. endowment is expected to be significant -- assessed to be significant.

Secondly, the Arctic physical, ecological, and human environment is well understood after decades of research.

Thirdly, the oil and gas industry has a long history of successful operations enabled by technology. In fact, there have been over 80 wells drilled in the U.S. Arctic offshore in the '80s.

Fourth, the technology is proven. However, we recognize that technical capability alone is not enough. We must also have an economically viable discovery, which we speak to in Finding 5, and we must also have public confidence that the activities can be progressed in a manner that's safe and respectful of the environment, which we address in Finding No. 6,

and then finally, technology for oil spill prevention in Finding 7.

So let's look a little more deeply at Finding 4 from the original report, and I'll direct your attention to the graphic, the blue table in the middle of the page. This graphic shows five different physical ice environments in each row, depicting various combinations of water depth and length of open water season, and the rows are organized from the easiest to the hardest Arctic physical environment.

The third column describes the implication of this Arctic environment on exploration and development. And you'll notice that in the first three rows, there are pictures. That's because this technology is proven around the world in global Arctic environments. In the fourth and fifth, it's not proven, not yet.

The red text in the middle illustrates where the U.S. Arctic is located in greater than two months of open water season and less than 100 meters of water depth. And as you can see from the pictures, the technology's proven.

I want to comment that this table describes the surface environment in terms of what we find on the surface. It does not describe the geologic

environment. And the U.S. Arctic geologic environment is relatively simple and straightforward. In fact, the Shell drilling operation superintendent, when he presented at our technology workshop, made the comment that once we addressed all the logistical challenges and the surface concerns with ice, these were the simplest wells that I've ever drilled.

On Finding 7, oil spill prevention and response, I'll again direct your attention to the graphic at the middle of the -- at the bottom of the page. We call this the bow tie. And in the center of the bow, it's labeled as a loss-of-containment event. On the left, prevention, and on the right, control and response.

There are many technologies available to prevent an oil spill, a loss-of-containment event from occurring in the first place. And the greatest reduction of environmental risk, as we outline in the black text, comes from focusing on prevention. Since 2018, we have added the red box in the center for subsea isolation devices. This is new. Basically, we included subsea isolation devices with capping stacks in our 2015 study.

However, a pre-installed capping stack right on the sea floor as a backup to the blowup preventer

is actually a prevention mechanism, and so we've called that out in 2018. I'll say more about that when I describe what's changed.

Let me turn now to reminding you of the most important recommendations from the 2015 study. And on this first page of two, I speak to drilling season length. Again, I'll direct your attention to the graphic in the center of the page. On the top, we describe the current construct as codified in the regulatory framework.

Drilling can start after you enter the theater, in the Chukchi Sea in this example, and you cannot enter the theater until July 1, which is a hardcoated date of when one can transport through the Bering Strait. That gets you to location on July 7. And freeze-up is also hardcoated as November 1.

In addition, because of the concern of a well-control event late in the season and the risk that one might have to leave because of ice incursion and leave the well flowing over the winter season, the last 38 days of the drilling season are reserved for a relief well. So that leaves 79 days available for productive drilling.

On the 80th day, you're precluded from drilling any further into a hydrocarbon zone. You

must stop drilling. The bottom graphic illustrates what could be possible with the application of technology that's been proven, and then proven again since our 2015 report. The first step is to accept superior technology to a same-season relief well to get back that 38 days. And then the second step is to adjust the drilling season based on actual ice conditions and the design of the equipment, not a hardcoated date, effectively doubling the drilling season and enabling single-season exploration drilling.

The second page on key recommendations speaks to lease length. And, again, I'll direct your attention to the graphic. In order to pursue an Arctic oil and gas development, there are three phases. The first is the exploration phase, drilling, assessment, appraisal. The second is the design and cost estimation and taking it to an investment decision. That's the development phase. And then the third phase is construction and execution and then startup and production.

In every other Arctic nation, the exploration phase is separated from the development phase in the primary lease term. So, as an example, in Canada, one can prosecute your exploration program,

have a discovery, hold the lease, and then get a second lease in order to do the design to advance infrastructure and make a decision to proceed.

In the U.S., all of that must occur in a primary lease term of 10 years. This is very challenging, even in the lower 48, Gulf of Mexico, where you can work 365 days of the year. And as we'll show with data, it's impossible when you're only working 80 days of the year.

Okay. So what's changed since that report? Firstly, there has been a lot of drilling activity, 47 exploration wells safely and successfully drilled to their objective in Arctic conditions all around the world, and as you see in this sub-bullet, 45 of those in international waters, 28 in Norway, 16 in eastern Canada, one in Russia in the Kara Sea, all using conventional floating drilling technology adapted for Arctic conditions. And in the U.S., two wells were drilled, one by Shell using floating drilling technology in the 2015 open-water season, the Burger prospect, and one using extended-reach drilling from a grounded ice pad in the 2018 winter season by Caelus.

In addition, Eni is currently drilling a directional drilling well into the offshore continental shelf from a gravel island at their

permanent Spy Island drill site. Pictured at the bottom is a very interesting picture of the two rigs. On the left is the *West Alpha*, which was used by ExxonMobil in the Kara Sea. And on the right is the *Polar Pioneer*, which was used by Shell to drill their Burger prospect. And both of these rigs were stored side by side in a port in Norway, and the photo's courtesy of the drilling operations superintendent that thought it was really interesting.

All of this drilling activity resulted in declared discoveries of 5 billion barrels. About 3.8 of this is assessed to be in the USA, with the remainder in Norway and Russia, and more discovery is expected to be announced.

Let's talk about the technology that enabled this substantial activity, and with a focus on the Kara Sea and the Chukchi Sea as the drilling programs that are the most challenging Arctic environments that we spoke about. Firstly, well design and execution planning. In both these programs, the well planning for the drilling began three years in advance, 2011 for the Kara Sea program and 2012 for the Chukchi program. And in both these programs, this planning culminated in an extensive practice, a drill well on paper exercise the season before it was actually

drilled, with the best weathermen and ice forecasters in the business, with a dedicated ice defense team, and with actual ice conditions as they presented the season before the drilling. For example, it's July 28. What does the ice look like, and what would we have done? Are we ready?

Secondly, rig and vessel upgrades and certifications of same for Arctic condition, including upgrades of key systems, adding enclosures, and adding safety equipment.

Thirdly, ice defense systems, all integrated with the execution plan, including new technology to monitor ice, forecast its movement, including ice drift, and identifying ahead of time what size of ice incursion could enter in an operating window around the rig and what execution steps might be done, and then finally, a common operating display to make sure that everyone on the rig knew where all the vessels were and all the potential ice incursions were at any given point in real time.

And finally, let's talk about well control equipment. Pictured on the left is a subsea shut-in device that I mentioned earlier. It was installed on the sea floor of the Kara Sea. It was designed for full well shut-in in the event of a well-control event

late in the season, just as if there was a well head on the well.

So this enables the BOP stack, which sits on top of it, to be demobilized in the event of an early freeze-up, and the well would be secure, and then, in the following summer season, the rig would return and enter through the top of the well, just as if you had a well head on the well, basically a preinstalled capping stack.

The picture is actually taken from a deployment test conducted in Norway prior to operations in 2015 -- 2014, excuse me -- witnessed by the Russian regulator in order to get the well permit. On the right is a map of all the capping stocks that have been designed, developed, tested, and staged around the world since 2015, 11 in total, including the subsea isolation device. And these capping stacks, none of them have been required for well-control events, but they've been positioned to be ready in the event of a well-control event.

In addition, BOP designs and technology have advanced as well, higher pressures and temperatures, increasing ability to share a thicker drill pipe, and a thicker-walled drill pipe, and pipe in any position, and better control systems with more redundancy. In

summary, significant technology advancements on the well design and prevention side of the bow tie.

Let's turn our attention now to spill response, where there have also been substantive advancements. The Arctic oil spill response joint industry program, which was underway in 2015, concluded in 2017, and that study found that oil spill response methods in warmer climates are as effective or better in Arctic conditions, with nine companies participating, 40 years of research, six fields of study, substantial technology advancements in monitoring and detecting oil in ice and under ice, significant field testing, including a test of chemical herders and in situ burning in a purpose-built basin observed by academics at the University of Alaska Fairbanks.

Response technologies work better in Arctic conditions than they do in southern climates for two reasons: the presence of ice slows spreading of a potential oil slick, and lower temperature keeps the higher ends in solution longer, giving you more time to respond with dispersants and in situ burning. And similar to southern climates, mechanical recovery, which is the tool of choice for very small spills, is simply ineffective for large spills, and, therefore,

regulatory reform is needed to enable the use of all tools in the toolkit.

Continuing on with oil spill technology improvements, we wanted to highlight the significant number of response exercises conducted in Norway, as outlined in the first bullet, and we call out two Arctic relevant demonstration, including actual release of an oil spill in open water. And pictured on the left is a mechanical recovery ship boom actually conducting a field exercise.

In addition to these two exercises noted, there are more than 20 other exercises which do not include live oil release, including one cooperation cross-border exercise between Norway and Russia, simulating an oil spill that crosses their international boundary.

In the second bullet, we speak to continuing technology advances, and in particular, all highlight a polymer catalyst solution that's just been developed. Basically, it will set up rapidly in the presence of significant contamination. And when we had our workshop the day before, the oil spill experts that we gathered were very excited about a successful test where they were able to set up their polymer and it withstood 10,000 pounds of back pressure in the

lab.

This JIP is forming now, and people are welcome to join to continue to advance this. This would be deployed as shown in the picture above the BOP and could be released remotely or with an ROV in the event of a BOP failure.

In the area of infrastructure and logistics, we heard about substantial technology improvements with the TAPS pipeline, focused on improving the low-flow capability with a specifically designed flow loop to test what the mechanism was for plugging in wax and water and ice deployment or deposits, and then increased throughput of TAPS. 2017 represented the first year that production increased in TAPS after three decades of decline.

Both of these improvements will substantially improve the operating envelope of TAPS and extend the life of this critical piece of infrastructure. In addition, NOAA released a significant amount of data on a bathymetric update, and the Corps of Engineers unfortunately terminated their deep-draft port study, but they did move forward with a feasability study for a shallow port at the port of Nome.

Globally, I'd highlight the significant

growth in ice breaker fleet, especially in Russia. And since 2015, Russia has added 12 new ice breakers to its fleet. Those are operating. There are an additional five being built, and another six being planned. The U.S., in contrast, has not added any, although we note that budget has been provided for an additional ice breaker and there are an additional two in the planning window.

Additionally, shipping routes in the Bering Strait have been approved, and then the first ever Arctic LNG cargo came from the Yamal LNG project via the Northern Sea Route in July of 2018.

There's also been movement on the regulatory and leasing front. Beginning in the first bullet, the two land sails that were planned in the offshore continental shelf in 2007 to 2022 were canceled. This means that the last time there was a land sail in the Beaufort Sea was in 2007, and in the Chukchi in 2008.

The Arctic rule which governs drilling in the offshore continental shelf was issued in 2015. Shell turned over their Beaufort Sea leases to the Arctic Exploration, LLC, and they recently received a suspension of operations, which is technical lingo for a lease extension of five years, which is astounding. That's never before been done. Industry's only been

granted lease extensions or termination of lease for unproductive time only in one-year increments. And I should point out this is after five years of asking for it, three at the hands of Shell and two with the Arctic Exploration company.

And then BOEM recently granted approval of Liberty, which will represent the first production facility in the Arctic offshore continental shelf waters on October 24, 2018. And then, finally, the Alaska 1002 area has been opened up for a potential lease sale as part of the Tax Act -- or the Tax and Jobs Acts. And there is an EIS underway.

Globally, the Russian regulator approved the use of a subsea shut-in device as a superior solution for a same-season relief well, and the Canadians and the Norwegians moved forward with regulatory support for the activity that I described earlier.

So, with all of that said, the team is proposing adding a couple of new findings. The first -- and we want to start with improvements that we think that could be made to improve safety and environmental performance, on page 22 in your handout. I'll direct your attention to the subpoints. Firstly, requiring specific solutions leads to compliance rather than risk management and decreases

the incentive for technology improvement. And I'll take this bullet apart in two pieces.

In the first part, compliance, compliance is important. These are complex issues, and the risks are high. And a good example of where compliance is absolutely appropriate is on the testing requirements for BOPs. Industry does, can, and should comply. But, when compliance gets in the way of risk management, then we need to enable a conversation. And one of the most compelling quotes I took away from our workshop was a seasoned drilling operations manager saying, the worst question I get in my job is what do I need to do to get my permit approved.

I don't like that question, and none of us should like that question because then we've stopped thinking about effective risk management and what is right, and we've started thinking about what do I need to do to comply.

Secondly, prescriptive regulations keep the U.S. stuck. A same-season relief well, to mitigate the risk of a blowout continuing during the winter season under ice, may have been appropriate in the '80s, but now, when subsea shut-in devices are designed, tested, and proven at temperatures and pressures that they are capable of today, it

represents a superior solution. If you're drilling a relief well, the whole time you're drilling that well you're spilling to the environment. It is not an appropriate solution for the industry, for the communities, or for the regulators.

Secondly, multiple layers of protection and requirements may actually increase overall risk. And I'll give you a couple of examples of this. In the Arctic offshore, it's a shallow water system. In the event of a well-control event, the primary focus and priority firstly needs to be safety of personnel, secondly needs to be source control. And vessels that are not needed, or at least not yet, that impede access to the well, to getting on top of it, get in the way and actually reduce -- or increase risk.

Examples of this would be containment systems or a same-season relief well. The primary focus has got to be firstly on prevention, and then, if an event happens, getting the source under control. And things that are not contributing to that are a distraction and increase overall risk at that phase of the operation.

An example of additional requirements that may increase risk are the requirement for zero discharge. I'll give you an example of snow gathering

up on the decks, having to be gathered up, put in boxes, melted, put on ships, shipped around through the Bering Strait down to Oregon, and then released into the Pacific Ocean. Substantial activity, substantial personnel, substantial miles traveled increase risk for questionable environmental benefit.

And then, finally, multiple agencies with conflicting mandates and overlapping requirements can hinder effective risk management because it restricts the ability to make the appropriate choices and to balance wildlife management with personnel safety. For an example -- I'll give a couple of examples here. The inability to be able to manage ice by breaking up ice to protect the well operation and the drilling equipment because of concerns of the sound for wildlife, and then restricting helicopter flights for crew transport because of a potential concern on wildlife. And sometimes that may be the appropriate choice, but the opportunity to have a conversation about balancing personnel safety with protection of the environment is what we're speaking of here.

Let me turn my attention now to potential improvements or a finding related to economic viability, and, again, I'll break this into a couple of parts. The first is lease terms, and I hit this in

my summary of the 2015 study. The graphic, I think, tells a very compelling story. The 10-year basically shows an actual time line for the three phases of development I noted earlier: exploration, appraisal and investment decision, and development. And remember that the U.S. lease terms require phase one and phase two to be done in the primary term.

Compare the red line to the actual duration of Arctic developments in the bottom half of the graph around the world: eastern Canada, Alaska, Russia, and then finally the Gulf of Mexico. On the top, we create a generic Alaska onshore where you can work more completely around the year compared to the offshore continental shelf, one well per season, very challenging. And then, if you have to go back for multiple seasons, as you typically currently do with the regulatory framework, impossible to progress even the exploration phase in the primary lease term.

The second area of economic viability, threatening economic viability, is regulatory burdens. And the Shell team at our workshop described 23 agencies with overlapping requirements with no mechanism to talk to each other. And multiple agencies involved is not unique to the U.S. That happens in other jurisdictions as well, appropriately

so. Some agencies have responsibility for emissions. Some agencies have responsibility for safety. What's really lacking in the U.S. is the inability of a framework for them to work together.

Okay. So what are we going to do about all of that? Before I step into the new recommendations, just a little bit of perspective on page 24, a reminder. The view of the 2015 study was that the technology and knowledge existed to prudently explore for and develop the U.S. Arctic while protecting people and the environment. And the 2015 study recommended further assessment and demonstration of that capability in order to gain acceptance by regulators and other stakeholders because we recognize that, at the time in 2015, just five years post Macondo, we did not have the public confidence just yet.

Since 2015, these technologies have been further demonstrated, and I describe that in quite some detail. And these demonstrations now form the basis for the recommendations, which include changes to the regulatory framework.

So just as I talked about in the findings, I'll hit safety first and then I'll speak to economics, and I'll speak about regulatory

effectiveness, lease length, lease terms, and season length. And then I'll finally close with infrastructure recommendations.

Beginning with safety, we recommend a coordinating body be established for federal oil and gas regulations, permitting, and environmental review, similar to the Alaska Office of Project Management and the Canadian National Energy Board, with the authority to better prioritize objectives and troubleshoot issues across agencies.

Secondly, the Arctic offshore continental shelf drilling regulations and their implementation should better emphasize prevention and the most effective technologies to reduce risk. Firstly, the use of demonstrated subsea shut-in devices should be accepted in place of a same-season relief well as a superior solution. Secondly, preapproval should be provided to facilitate rapid response using all tools in the toolkit for oil spill response, including dispersants and in situ burning, which have been tested and proven as more effective and a better solution versus mechanical recovery. And if you're dealing with an event, then sometimes, if it takes time to get approval because of the window of opportunity to act, a delayed decision can be a no

decision, and a no decision will have more environmental impact than the preapproval would.

Finally, regulations should not emphasize desired outcomes but should emphasize improved technologies. And where the authority exists -- and there are examples in the regulations -- to accept new technology, that authority should be used.

Turning my attention now to economics, in speaking first about regulatory effectiveness and certainty, the coordinating body that I mentioned needs to have a senior coordinating officer with the authority and empowered to be able to resolve disputes among agencies and improve timeliness in resolving issues. Conflicting regulatory requirements should be harmonized. Probably the best example of that is the use of drones.

Drones represent a significant technology advancement. They've got lots of uses. They are good for spill detection along pipelines. They're good for wildlife monitoring. The FAA requires that they must be flown at 1,000 feet or lower. The Fish and Wildlife requires that they must be flown above 1,000 feet. So I guess as long as you're able to fly your drone at exactly 1,000 feet, you're all right.

The second example I'd highlight is the

conflicting requirement from the point of view of air emissions and safety. With Shell's drilling program, we heard that from a safety point of view, they needed to keep their diesel engines running on all their equipment, which violated their air quality emissions limit and so they suffered fines associated with that.

The third and fourth bullet speak to timeliness of the review and the decision-making process across multiple agencies, and then the timeliness associated with requests for information and the time between receipt and response being mandated. We recognize the request for information process is an appropriate process, just as the environmental review is an appropriate process. It's done in other jurisdictions in the U.S. The time lines are significantly longer. And when we write the report, we're working on data to support that.

On the fifth bullet, the Arctic offshore continental shelf drilling regulations, the Arctic rule was written primarily from an offshore floating/drilling point of view. They assume that you're using a MODU. But recognizing the advances in drilling, directional drilling, these regulations need to be updated to contemplate this other method of drilling from a land-based rig, which represents a

very significantly different risk profile.

And then finally, regulatory authorities should participate in joint industry projects and oil spill response exercises, including those in other international jurisdictions, as an independent voice, and to promote public confidence in the industry's availability and ability to respond in the event of a spill event.

Continuing with the regulatory framework and the economics theme, we have a couple of recommendations on season length, and these are consistent with our thinking in the 2015 report. The first speaks to adoption of subsea isolation devices in place of the same-season relief well requirement to extend the drilling season and improve safety performance and improve competitiveness. And then drilling season length should be determined by actual ice conditions and the capability of the drilling rig, not a fixed date. And both of these changes are required to facilitate single season exploration drilling, which, given the geologic system in the Arctic, is -- and the current surface environment, is very possible.

Finally, on economics, let's talk about lease term competitiveness. And I illustrated the

difference between the U.S. lease terms and the other international Arctic jurisdictions. The 10-year primary lease term is insufficient and needs to be adjusted based on the Arctic working season and extended time lines and lack of infrastructure. Our first recommendation is similar to other Arctic nations: separating the production phase from the exploration and appraisal phase.

Our second recommendation is that if we want to continue to use the suspension of operations, the suspension of the time clock, then those could be automatically granted in new leases for nonworking time, including weather, litigation, permitting, wildlife management, et cetera.

We note in the Lands Act that the Secretary of the Interior has authority to describe economically productive units that are greater in size than the current lease size, which is lifted from the Gulf of Mexico. And as an example, in Mexico, in their gulf, their lease size is 450,000 acres.

The Department of Interior could consider royalty structures to improve economics and promote exploration and appraisal activity. As an example, we looked to what was done in the U.S. Deepwater in the early 2000s and the exploration activity that

followed. Unilateral changes should not be made to lease terms after issue. In Section 1 of the lease, there's a note that says the lessee bears the risk that changes can be made unilaterally to the leases after issue. Again, this stands out as distinct and different from other Arctic nations.

And then, finally, lease sales should be planned and held at regular intervals to promote certainty and effective exploration and development planning.

Turning our attention to infrastructure, we recognize infrastructure is important. It's remote. It's expensive, and there are opportunities for synergies, and there are many examples of sharing of infrastructure with Prudhoe Bay, other operators in the TOPS pipeline today. Our recommendations, just as they were in 2015, are to take a broader look forward and do some contingency planning.

The other recommendations are similar to what we had in the 2015 report with related -- related to ice breakers and FAA regulations associated with unmanned aircraft.

That concludes the presentation, the interim report. I believe I have a few minutes to address any questions from the council now. And there are

microphones and people available to come to your chair. Given the webcast, please wait until the microphone comes to your seat before asking your question.

MALE VOICE: Any questions?

(No response.)

MALE VOICE: Must be a very thorough report.

MALE VOICE: I should be so lucky.

(Laughter.)

MS. LLOYD: None? All right. Before I -- hearing no questions today, just again highlight that this represents an interim report, and so we would invite feedback from any of the council members via email to Marshall Nichols. His email is listed. And then we will take comments and convert this PowerPoint presentation to a written report. And we look forward to your comments.

Before I turn over the floor, I just wanted to take the opportunity to thank the council for your time and attention, and to thank the companies that participated in the supplemental assessment. We could not have done it without your support, and we're depending on your support as we go forward to turn this into a high-quality report which we hope will be useful to the administration and will stand the test

of time, just as the 2015 report has done. Thank you very much.

(Applause.)

CHAIRMAN ARMSTRONG: I want to thank both Darren and Carol and all the study participants for responding to the request. As Carol noted, the council's not asking for -- or we're not asking the council to vote on the interim report today. Any substantive comments that you have, you would provide to Marshall by December 14, again, with the objective of trying to move this toward a final version of the report by the end of February.

So, as I noted earlier in my comments, the request for the supplemental assessment was initiated by the Department of Interior in coordination with the Department of Energy and under the supervision of both Secretary Perry and Secretary Zinke. With that, it's now my pleasure to introduce the Honorable Ryan Zinke, Secretary of the Interior.

Ryan Zinke was sworn in as the 52nd Secretary of the Interior in March 2017. He's a fifth-generation Montanan, served in Montana's state senate and the U.S. House of Representatives, and, from my personal perspective, very importantly served 23 years as a U.S. Navy SEAL officer. Please join me

in welcoming the Honorable Ryan Zinke, Secretary of the Interior.

(Applause.)

SECRETARY ZINKE: You know, people ask me what was easier, being a SEAL Team Six commander or a secretary, and I would say actually a SEAL was easier because, as a SEAL, you know, when people shot at you, I could shoot back.

(Laughter.)

SECRETARY ZINKE: I think it's important for those that -- and I see a lot of familiar faces out there. But I think it's also important to kind of look back and review why it's important on our energy field, and I would say really three reasons. One, environmentally, I can tell you it is better to produce energy in this country under reasonable regulation than watch it get produced overseas with none. And most of you are in industry and you see it, but if there's any doubt, I'd love to take people on a tour of the Middle East and Africa and show them how not to produce energy. There is no doubt that American innovation, technology, we lead the world.

Secondly, you know, economically, you know, what's driving the economy? In many ways, it's you. When you have reliable, affordable, abundant energy,

and you look at what we've done as a country, you know, 11.6 million barrels a day. First year -- or first time in 60 years, we're exporting liquid natural gas. There's at least a dozen liquid natural gas facilities that are being either in the works where they have been permitted or soon will be permitted. That is an enormous amount of economic activity.

And lastly, morally, from the standpoint of a former Navy SEAL and also a father, because my daughter's a Navy diver -- I told her two things, by the way: don't join the Navy and don't marry a Navy SEAL. She did both. But I just don't want to see your kids, my kids ever have to deploy overseas and fight for a commodity we have here. I'd rather not your kids ever see what I've seen. And I don't like the idea of the U.S. ever being held hostage by foreign entities.

So, environmentally, economically, and morally, producing energy in this country is the right path. Now the issue is fossil fuels. And we had a climate report, which is interesting. I sat down with our leading scientist in the U.S. Geological Survey who works for me, a great scientist. And, actually, if you sit down and look at the context of the report and the content of the report -- 1700 pages -- the

report was fair. It was accurate.

What it said was there are models, and over 200 models, by the way, with 1,000 variables. And that's kind of like the military. There's peacetime, and there is global nuclear combat. The media focused on global nuclear combat. The media focused on worst-case scenarios, which statistically it may not even be able to reach. The facts of the matter is observable data, climate change is more towards the peacetime. And the U.S. has led the charge.

Our CO_2 has been down 6 percent. Our methane is down 10.2 percent. Overall, our emissions are down, in contrast to China, India, Russia, who continue to rise. So we're doing the right thing. Our technology is better, and we're leading the edge of the world. But it's a narrative that it's very difficult to get across. A lot of the millennials look at that report, and they don't look at the models. They don't look at the 1,000 variables. They don't look at, since 1960, temperatures have gone up about a half a degree Centigrade.

What they see is rising sea levels that statistically and data-wise, we don't know. I asked the USGS, give me the last 100 years of sea level rise broken down in 20-year increments. The answer? We

don't know. So, if you don't know the metrics of what to judge, it's difficult to predict. Now it is a concern. My concern from a secretary's point of view is that we need to be better at emphasizing the case for American energy. We need to be better at emphasizing why American technology is better, why producing energy in this country environmentally, morally, and economically is the right path for this country.

So Interior. What have we done? Well, the BLM hydro -- or hydraulic fracking, excuse me -- that rule is done. We've done methane. The 1002 is in process. The Arctic rule is next. Our regulatory philosophy is this, is that we have to partner with our industries because you're the leading edge of technology. We want to embrace better stewardship. We want to embrace reliability. In order to get there, we have to understand the technology. And in order to understand it, quite frankly, we have to work with you.

So I've been criticized by saying we want to work with you. I'll take the criticism because our regulatory framework should look at making sure we're partnering to understand the best technology, best science, best practices in order to increase

reliability, increase safety, and increase stewardship. And when rules don't make sense, in some cases are put in place to be an adversary rather than a partnership, then this is a conversation we have to have. And you know that some of these rules have been put in to be an adversarial role.

I don't want our government to be adversarial in anything. We should work together for a higher purpose, and certainly the higher purpose as a nation is not to be held hostage, is to do things right and show other nations this is how good governance should work.

Lastly, I want to talk a little about what I see in the next two to five years. We had a lease sale in New Mexico, a billion dollars in 48 hours for a lease. Someplace it's 72- to $80,000 an acre. That's a lot. What I see, though, is how are you going to get it out of there, because our piping system, collection system, our system to get it, especially on the Pacific Rim, is challenged.

We see a lot of activity in liquid natural gas facilities going in the Gulf, which is kind of facing the Eastern markets in Europe. But an emerging market in the West, in the Pacific, how are you going to get the gas out? And landlocked to a degree is

what we have in the North Slope. Enormous amount of gas, enormous amount of gas. The problem is, is that in Alaska you don't have a pipeline for the gas. So we're going to have to look at different strategies in order to move that commodity and supply what we think is the right path with our allies.

It does make a difference. You know, Iran produces about 3 and a half million barrels a day. If you want to use energy as an effective leverage for behavior, there's really two ways you're going to deal with Iran or an aggressive Russia. Either go military, which is not always the best solution, or you do it economically. And economically, in order to do that and leverage commodities like energy, you better have some alternatives on how to supply our allies as well, and that's production level.

I think we're going to be -- we're at 11.6 today. I think within two years, we're probably going to be marching real close to 14, if not a little higher than that. A lot of it's going to depend on FERC collection systems and the infrastructure to move our fuels.

So overall, I'm bullish. I think the price point, you know, is around 60. In this case, I'll agree with Mr. Putin, 60 probably is a pretty good

mark in that you have to have enough return on investment to invest in further infrastructure, to invest in technology. When the margins get pretty low, then the economic activity, as you know, drops. So I think at the end of the day, having the margins -- and we've gotten a lot better as an industry. You've gotten a lot better. People are making money. The Balkan -- you know, at probably 30s and that, not a lot.

But, I mean, that shows you how good we are, and efficient we are, and it kind of reset the supply chain on it. But I think, you know, around 60 is probably a good spot to keep the economic engine pretty, you know, good.

So a lot in there. I'll take questions. You have to have one.

CHAIRMAN ARMSTRONG: If you have a question, identify yourself for the record, and then ask your question, please.

(No response.)

SECRETARY ZINKE: I may have gotten off easy. Well, I want to wish everyone a Merry Christmas. And, again, I appreciate what you do. Certainly, economics make a difference. I always say, you know, on the environmental side, it's hard to be a

good steward when you're broke. And you look at some of the countries that have been visited -- you know, I visited, too, and have fought in, if their economy is not working, then their environmental stewardship and their regulatory framework and the ability to regulate is also at risk. And I think looking at the economics in the last two years, I see great hope. And, actually, I'm very, very bullish that we're going to continue to march forward. And a lot of it is as a result of your efforts.

So appreciate everyone. Have a Merry Christmas. Don't spend too much time in Washington.

(Applause.)

CHAIRMAN ARMSTRONG: Thank you, Secretary Zinke, for attending the meeting, and very importantly, for the support that he is lending to the energy business and taking a common-sense approach to the development of our resources.

As we move on next into the agenda, we will recall that in conjunction with the council's meeting last September, we received two study requests from Secretary Perry, one on carbon capture use and storage, and the other on U.S. oil and natural gas transfers, transportation, and infrastructure, many of which was just mentioned by Secretary Zinke.

The CCUS study is being headed up by John Mingé of BP, and the infrastructure study's being headed up by Alan Armstrong of the Williams Company. I believe the council's very fortunate for the leadership and the knowledge provided by these two individuals and really their teams because there's an extensive network of participants in each of these studies.

And with that, I'd like to now turn the podium over to John Mingé to provide us with a progress report on the CCUS study.

John?

MR. MINGÉ: Thank you very much. Thank you, Greg. And good morning, everyone.

So here's a quick progress report. So it'll be different than the report out that Darren and Carol gave because they were going into findings and close to recommendations, and they're closer to the finish. This is a progress report, which is kind of high-level, what is it we're doing, what are our guiding principles, what's the structure that we're using, who are the participants in leadership, what's the time line, that kind of thing.

So that's where I'll be going, and we should be able to move through this fairly quickly, and then

have time for questions if you'd like.

So this title -- you know, it says I'm the former chairman and president. That is accurate. It doesn't mean that I've left BP, though. I'm still employed, and I'm in a transition plan where I'm going to chair this study, do a few other things for the company. But, at the end of this, I'll retire from BP and move on.

So what you'll find is in the time line at the very -- my very last slide -- I'm very focused on completing this project in September because it fits my personal time line as well. Here's the letter that we -- that Greg received from Secretary Perry. Really, within this letter, it asks for a roadmap, and a roadmap for what the U.S. Government could do to drive CCUS at scale going forward. There were five key questions that he asked, so, you know, you always have to start with what's the oil and gas forecast, what's the energy demand, supply, demand, and what are the environmental benefits that you get from carbon capture use and storage.

What are the barriers? Research and development, technology, infrastructure. et cetera. What are those barriers, and what needs to be done to overcome them? How should success be defined? What

actions can be taken to establish a framework that guides policy? What regulatory, legal liability, and other issues should be addressed?

So, you know, when I first looked at that, I -- and Greg called me up and said, John, would you lead this project. I said, yeah, this looks pretty simple, no problem. And, boy, was I wrong. It's a challenging, complex study. There's lots to it. And, thankfully, we've got wonderful support from the government and from all of you. And I'll show you the diversity of our team later.

On reflection, you know, when I first started -- I'm not a carbon capture, use, and storage expert. I primarily came up through the upstream side of the business, and then went into general management, had the opportunity to work all over the world. But, as I came in and started getting up to speed on this subject, I was pretty -- and I was aware of the technology and aware of some projects, but what I was surprised by was just how deep the knowledge was and how people had spent 20-plus years of their career really focusing on carbon capture use and storage and the number of reports.

You know, one of the first reports that I read was a study that was written in 2010. It was an

interagency government report. I think there were 16 or 18 government agencies that wrote it. It was an inch thick at least. I probably didn't look at all the backup materials. But, you know, and then you start finding there's a report after report after report. And I'm not saying that those reports could fill the room, but there have been a lot of reports. There's a lot of expertise. And then you look at -- and there's been a lot of time, a lot of time.

And then you say, well, how much progress is there? How much has really been implemented? How many dollars have been invested? And it's really pretty small. There's only -- depending on how you count, there's only 16 projects that have been implemented. The only real business case there is for carbon capture use and storage is where you have high-purity CO_2 going into EOR.

Not much else has really gone. And I'm not taking away from projects like the Petra Nova demonstration plant, which is a success, and others. A lot of the CO_2 that's used -- I was surprised. A lot of the CO_2 that is used in EOR comes from CO_2 reservoirs. It's not even anthropogenic, you know. And so I looked at that and said, wow, you know, a lot of expertise, a lot of technology, a lot of effort,

more and more consensus of how important this is to the energy transition, to the dual challenge, to however you want to look at the future, but not a lot of horsepower to the rear wheels here.

And so my reflection as the chair was what's going to be different about this study. And I really felt that from Secretary Perry was in terms of the roadmap, it's I want to -- you know, I need a short-, medium- and long-term plan, something that will work because, you know, where we've been in the past really has not made the progress that we should. America has an abundance of resources. We have an abundance of industrial technologies and skill. We could be a leader in this.

So that's really the starting point for this project and how myself and the team have been looking at it. And so here's really the issue. It's, you know, define the pathways leading to CCUS deployment at scale.

Now we haven't defined what is deployment at scale. What I can tell you today is that there are 16 projects. They abate about 29 million tons per annum of CO_2. It's pretty tiny. It's pretty, pretty small. So one of the things we've got to do, and it's one of the requests, is define what does success look like

and what does scale look like.

So we will do several things in this study. We'll evaluate the entire value chains, all the way from capture through to the use and/or storage, through diverse industrial sectors and fuel types. So we'll look at, you know, our sector in EOR. We'll look at the power sector, both gas-fired and coal-fired. We'll look at different fuel sources: oil, gas, coal. We'll look at the full value chain in this study.

We will establish the business case for CCUS in the United States of America. We'll look at a broad range of factors that are consistent with the Secretary's letter. He lists them all out. There's, you know, technology, legal, regulatory, economics, a number of different things that we need to look at. We're going to focus primarily on accelerating the use of carbon capture in the United States, but we want to look at that from a standpoint of learn from abroad, make sure we're connected in with what's happening around the world, but how could the U.S. be a leader, and how could this impact jobs and technology and help us to take a leadership position here.

And then, finally, I mentioned it, but it's to deliver an actionable set of recommendations. You

know, one of the things that I've tried to do, and I've asked the team to do, is look at every one of these reports, look at their roadmaps, look at what they recommended, try to understand why those recommendations didn't go forward, and then take it to the next level in our report, really pinpoint not only what needs to be done but why it needs to be done, and get underneath.

A lot of the reports that I've read kind of had high-level, you know, there needs to be a policy, there needs to be regulatory improvements to reduce uncertainty. And I'm being a little bit facetious here, but they are kind of high-level. There needs to be a price on carbon, but then nothing else.

So what happens if there's not a price? You know, so we need to actually look at across the complete chain different options, short-, medium-, and long-term, and really try to be specific to meet the requests of the Secretary.

The guiding principles, you know, this redefine, that's a word that we chose because of my context up front, which is there's been a lot that have been done in this area, but what do we need to do in terms of redefining CCUS value in terms of energy security, economic growth, jobs, in addition to the

environmental benefits.

You know, most -- there's more and more consensus of how important CCUS will be in the long-term future, you know, from now out to 2100. There's more and more consensus about the dual challenge. There's no doubt that energy demand in this world is going to continue to grow, and it's growing because there's more people and there's more people that are going into the middle class, and there's a strong demand, and they want reliable, affordable, and secure energy.

There's more energy in this planet than will ever be produced, and they all come with different price points, and they come with different carbon footprints. At the same time, the world and different geographies are asking more and more to create more energy with lower emissions. It's a wonderful challenge, and CCUS fits right in the cross-section of that challenge, and so this is a project that's timely.

A number of the experts that I've talked to in this also say the time is now. You know, if we miss this opportunity, 10 years down the road we may have missed it. So we need to get this right.

We want to maximize the use of prior

studies. We want to engage a broad participation from industry, government, NGOs, and academia, including really collaborating and coordinating with the National Coal Council, because they've done a lot of work in this area. We want to play to the organizational strengths and get the best, brightest, you know, people that we can to help us.

I mentioned the global perspectives. And we are closely coordinating with Alan and Amy on the infrastructure study. There's two key areas. They're doing the infrastructure study. We're doing the CCUS study. You know, both of us are going to do an energy outlook. It wouldn't be very good for the one study to have one energy outlook and the other one to have a different one. So we're going to link and coordinate.

Another one is pipelines. If you're going to transport CO_2 from the sources of CO_2 to the sinks, EOR reservoirs and stuff that are short, well, there needs to be a look at pipelines, you know, so we'll be -- those are two areas where we're closely coordinating.

Here is the committee. There's a steering committee with nine participants. They're all engaged, and I appreciate them very much. And then there's a study committee, which has got 59 people

that have been requested to be part of the study committee. That's about 25 percent of the council. So far, we've gotten very positive feedback from the study plan, from the work plan, and we've got 100 percent support for the study work plan, the time line, the guiding principles, et cetera.

As Darren said and as Greg said, where the work really gets done is in the coordinating subcommittee. That's Carol from the previous one, leads the Arctic study. Well, the person doing that for us is Cindy Yeilding, sitting in the second row. So you can thank her, buy her a coffee or whatever afterwards, but a lot of heavy lifting. And her cochair is Steve Winberg, who is right sitting next to her. Well, I'm glad you guys are sitting next to you. You're still friends.

But we've got a great coordinating subcommittee with good balance, and they spend a lot of time, and I appreciate them very much.

So how did we organize? You know, we looked at previous studies. The organization is critical because we've got a lot of people involved. So, essentially, we have three task groups, you know, and they're the ones in the light yellow across the top. You've got the energy outlook. That's being led by

Jason Bordoff. You've got technology, CCUS technology, which is being led by Roxanne Walsh from Southern. And you've got the enabling factors for deployment being led by John Gunn from ExxonMobil.

Below technology and below the enabling factors are subgroubs, and they're being led. So, on the technology, we've broke it out to capture, so capture the CO_2, transport it, use it, store it, and we wanted a separate group for EOR because it's slightly different storing it in a saline reservoir versus using it for EOR. And there's different expertise and different people, so that.

And then, on the Task Group 3, on the enabling factors, you got policy, regulatory, and legal, and then stakeholder engagement, and then cross-industry integration. We've had several comments of how important it's going to be to get the stakeholder engagement right because, for whatever reason, there is some negative connotation of CCUS, and that's not going to help us as we try to advance the technology.

I would say right now where we are -- and is that there's probably -- there's enough work on energy and emissions landscape to write the report, and that team is actually writing now. Technology, you know,

there's 16 projects. I've told you there's a bunch of different reports being written, so that's pretty much ready to go, and that's being -- those reports are being written now.

The real focus area of what's going to differentiate this study for the NPC is really in the work that we do in the enabling factors, and also the integrative economics and the roadmap, the roadmap actually taking those enablers, looking at the economics, and then putting the roadmap together for Secretary Perry and his team. And so we're focused on getting as much as we can done now on the energy outlook, get the technology understood and done so that we can focus on those critical areas because that's what's going to differentiate this study.

Here's the -- I mentioned the participation list is diverse. It's kind of -- you can see it in the pie chart. I mentioned we have 192 people from 109 different organizations. So we feel good about the -- and there's, you know, a couple -- you know, there's no real high-level request. We got the team that we need. There's a couple specialists that we're looking for. But it's all in hand, I would say, and we're very satisfied with the leadership and the participation levels that we've gotten and the level

of commitment and the level of drive that we've got.

So the progress. The study's on track for a September 19 delivery. Now I will admit that in the steering committee meeting this morning at breakfast, I said, you know, it's very difficult for me because I've not chaired a study. And I'm used to kind of being in there and knowing and having early warning signals and KPIs and an operating system, a performance management system, to manage delivery.

What we've done now is we've delegated out to all these task groups and all these leaders, and there's these big groups that are, you know, working, and between now and May, they're going to be writing a bunch of reports, and then we need to integrate all that and get a report out shortly thereafter. And, you know, it's hard to see how things are going.

So, anyway, for all of you that have people that are working on one of these teams, keep the pressure on them, Betty, because we need to get the work done and in quality. We've got the diverse participation. We've got the work plan submitted and approved. We completed an initial framing exercise, and one of the -- I want to give Scott Nyquist with McKinsey some credit here. They were -- as we were -- as I was looking at my own transition from BP, we were

talking about what we were going to do next and having a chat, and I said -- I talked about this NPC study. And they're all, oh, that's very interesting, and I said, would you like to help. Well, yeah, let me talk about it. And I said, would you like to help for free. And, Scott, you said yes, and I appreciate it, and they've given up some of their consulting time to help.

And the framing exercise that we did, it was a seven-week study that we did with many of you in the room. It created a starting point for the task groups to work. It identified what the critical workstreams were and what the interdependencies were, and it helped us test and refine the work plan. And so it enabled people to have a guide and a plan going forward. And that's gone really well.

We got a report outline developed. One of the things that we noticed on every NPC study and report is the quality of the outline. They're actually quite long and very detailed. And we thought, well, that's a good way of actually managing to make sure we don't have any holes and that we got -- you know, we put accountability on each part of the report. Let's do the outline for the whole report. So at least we've got a draft of that. It's

being worked. But, to us, that's a critical factor, and the integrated time line.

So last slide. Let's see if I can do this right. I don't think I can. I was going to get it -- look, you don't -- it's complicated. What you need to look at is where we are today, which is in December. This is this meeting we're in right now. And there's going to be a draft, a draft report completed in the middle of May. And then all those kind of bullets and triangles in the middle is when draft chapters and a bunch of writing and a bunch of integration is going on.

So there's a lot of work between now and May. We do have a plan. We do have commitment from each of the task group leaders. They've delegated activities out. But, ultimately, we want to be sending to the steering committee and the study committee a final report in August of next year in order to meet the September deadline, and that's our plan.

So it's exciting. I think it's timely. And I'm very happy to have been asked, Greg, to chair and put in a lot of effort. And this report is not for any one company or industry. It's for the membership of the NPC, and it's for Secretary Perry for the

purposes of, you know, strategic guidance for our industry for the United States of America.

So, with that, I'll finish and open it up to any questions or comments that anybody might have. How am I doing on time?

CHAIRMAN ARMSTRONG: Ten minutes.

MR. MINGÉ: Okay.

CHAIRMAN ARMSTRONG: Any questions for John?

(No response.)

CHAIRMAN ARMSTRONG: This is kind of a questionless crowd today.

MR. MINGÉ: Yeah. Okay. Well, thank you, everybody. Appreciate it.

(Applause.)

CHAIRMAN ARMSTRONG: So we're doing good on time right now. We're moving right along pretty much on schedule. The final study report today is on infrastructure, and the committee chair is Alan Armstrong. And for those that are familiar -- and you kind of heard it from Secretary Zinke -- you know, we've got a huge resource base and a very positive outlook for developing that and production levels in line with, you know, roughly what he was saying, 14 million barrels-plus. One of the significant gaining items on that is do we have the infrastructure as we

hit these record production levels that have never been seen before in the United States, and that's the massive undertaking that Alan and his team are working through, and I think, a little bit like John has realized, it is, in fact, much more complex than it appears on the surface.

With that, I'll turn the podium over to Alan Armstrong to give you a report on the status.

MR. ARMSTRONG: Thank you, Greg. Good morning, everyone, and thank you all for being here. It's quite an impressive group that's assembled here for the National Petroleum Council. And I really was immediately -- you get those calls being asked to take on something like this, and you think, man, I have no idea where that's going to fit into the calendar. But on the one hand -- on the other hand, this is such a critical issue in terms of the infrastructure here in the U.S. and our ability to get it built in a more timely basis and in a way that's responsible to the concern of stakeholders in the community and, importantly, in a way that adds a lot of value to our country and to the industry.

And so, with that, rather than sitting in Tulsa and griping about things that go on outside of there, I decided to take Greg up on this. So I'm very

honored to be co-chairing this with Deputy Secretary Brouillette. And so I'm going to go through the -- very similar to what you heard from John, I'm going to go through and talk about the questions that were posed and how we're formed today to address those questions.

Before I get into that, I just wanted to say, you know, you heard this very healthy paranoia from John about not being certain about where they stood on the study and where the progress was. I'm here to tell you I do not share that paranoia. I am certain we are behind.

(Laughter.)

MR. ARMSTRONG: So we've got a very broad topic with the infrastructure, and keeping that scope narrowed is certainly going to be a challenge as we move forward, and everybody has very important issues that they want to be addressed from across the various industry and different associations, and trying to do that in a way that makes sure the most important issues and the questions are answered is certainly a challenge for us.

So, as we get into this, first of all, just the questions that were posed here, you can read on the slide here, but I'll give you the things that I

think the most important elements of these questions are. First of all is how do we ensure that we have the infrastructure we need to serve the public under a variety of supply and demand scenarios, and particularly with the advent of Shell production. So, as we've heard all morning, a lot of production to take care of, but we've got to be able to get the product to market.

And importantly, not just from a supply perspective and a supply push perspective, but as well we have important markets that need to be served with product, and I think having Russian LNG cargoes coming into Boston last winter is great evidence of the fact that we could be doing a lot better job here in the U.S. on that front.

We also need to understand where we have physical constraints to our growth and how we can overcome those constraints. We need to understand how we best address the stakeholder concerns that challenge adequate infrastructure development. And I would tell you this is at the heart of some of the most difficult things that we have to answer, is really understanding broadly where these stakeholder concerns are and not just attempting to run over the top of those concerns but really hear them and think

about how we can address them productively and how we can educate around those concerns.

We also need to work -- and I think there's a lot of room for improvement on this -- how federal and state governments work together to make the permitting process more efficient, and in taking on policies like NEPA, and how those can be improved to have a much clearer path forward on policies. And certainly I can tell you from a Williams perspective, the challenge that we have today between state and federal authority over pipeline siting in particular really has a lot of room for improvement, and we really need to focus on the real regulatory authority that's been provided and making sure that that authority is being solely for its purpose.

And I would tell you things like the Corps of Engineers 404 permit, along with the state's 401 authority is a perfect example of where we've kind of gone awry on where the real level of authority resides, and so an important opportunity to address that within the report.

And so, certainly, the policy as we go -- sorry, the process as we go forward, first of all, a lot of activity going on right now around data collection and further defining the scope, so a

tremendous effort, as you can imagine -- you'll hear a little bit more about some of the data that's been gathered here -- and then describe and define the challenges and the barriers, and then finally, then work to write up recommendations to address those challenges and barriers.

So that's the process as we have going forward, and a tremendous amount of people working on that as we speak.

Just to look at the overall organization structure here, you can see first of all the study committee, which I'm chairing, along with Dan Brouillette from the DOE, and then the study committee members. For those of you I just sent a letter out last week and thanks to you all that have already replied to that. I look forward to hearing both your review of the study -- and there's a lot of detail in there in the work plan that's already been provided to you, and look forward to hearing comments back from you.

I've gotten several really insightful comments back already, and keep those coming. Those are very helpful. And then below -- and so you can see, of course, the study committee is a much broader group. In fact, it's about 25 percent of the NPC

committee, and then, as I'll introduce in a minute, then we have a steering committee that is collected out of that group.

Below that, where the real work is getting done, is Chair Amy Shank. And Amy's right down here, and a big thanks to her for taking on the chair of the coordinating subcommittee. And for those of you all that hadn't been involved in that, that really is where a lot of the cat herding goes on. And she has a co-chair, Shawn Bennett, from the DOE. Thank you, Shawn, for your contributions there. And you can see the rest of the organization around that.

Underneath that, the task group leaders -- and there's four task groups, and I'll define this further in a moment. But Paul McNutt with ConocoPhillips is taking on the supply, demand, and resiliency task force. Telisa Toliver with Chevron is taking on the infrastructure mapping and analysis. And I want to say a big thanks to Michael Worth and to Chevron. We actually had -- Sempra was leading this. They pulled out of that effort, and Chevron agreed to step into the breach on that here last month, and so I really appreciate them taking that on, and Telisa's dug in very quickly on getting up to speed with that.

Then on the permitting license and social

license to operate -- and that is a mouthful and probably the most challenging, I would argue, of all the efforts here because there's so -- this is where so many different opinions and stakeholder opinions come together. Mark Gebbia with Williams and Marie Dunn with Phillips 66 are heading that up.

And then finally, on technology advances and deployment, which is really kind of a very interesting area because there are a lot of things that can be done when you really dig into it on the technology side, and Jay Churchill with Phillips 66 is leading that for us.

So a real quick look here at the steering committee that's been formed, and so a big thanks to these folks, and we will -- we've met once. We've got another meeting coming in February where we really start to parse out some of the competing issues that are surfacing in terms of the bandwidth that we have within the committee to do. You can see here what all has gone on with the study committee and talked about that a little bit earlier.

The coordinating subcommittee here, this is a fantastic group of folks, a lot of expertise on this list, and very thankful for the energy that's come forth from this group today, but I can tell you this

is a pretty powerful team here in terms of their knowledge and their access to resources throughout industry and the government.

Looking at the study team composition, so this is the coordinating subcommittee and the folks that are populating the effort below that. And so you can see here that we really have worked to have a variety of input from folks. And so we've got about 144 members now within the team from 69 different organizations, and that is growing. And if you want to be a part of that, we have -- Amy has plenty of places for you to plug in, so we'd love to have your support within that team.

So now on to just looking at a little more specificity around the four different task groups, and you can see the structure here and how that's broken down, and there they have three different areas, the supply, the demand, and the resiliency. And, obviously, this resiliency issue is critical. The technology group is actually taking on some of the issues relative to cyber concerns and so forth around resiliency. But I will tell you that as well, understanding the flows on the systems and the redundancy of our systems is an important area for this group to study as well.

And really, probably -- this is, you know, obviously a lot of opinions. As Daniel Yergin and folks like that could tell you, a variety of opinions to reconcile here within the supply and demand, and, certainly, we're not trying to say exactly what supply and demand looks like here. We're simply saying under a variety of conditions, including a low-carbon environment, all the way to an all-out full production limits here in the U.S. are kind of the ranges of that, and trying to understand the infrastructure challenges that would be associated with that.

On the infrastructure mapping and analysis task group, imagine this task if this was yours to try to describe all of the infrastructure starting at the processing plants and at the refineries that are in scope as well, and describing all of the infrastructure here in the U.S., so a major challenge just to describe what we have today, and then as well thinking about, along with the supply and demand effort, thinking about where the need will be for infrastructure in the future.

I can tell you without that study being completed that getting gas from the lowest-cost place in the U.S. in Susquehanna County, Pennsylvania, into New England is one of those constraints. So I've

already done my part for that team. But as well, we're also looking at LNG terminals, waterways, ports, and railroads as well. So a very broad overview of the infrastructure here in the U.S. And, again, the job here is to assess what we have today and how that will change with the changing supply and demand developments here in the U.S.

On the permitting, siting, and social license to operate, again, this is a really large challenge for folks that are in the business of trying to site LNG terminals, pipelines, refineries. This has gotten to be a very big challenge, and sometimes to the point where we're really standing in our own way in terms of reducing emissions in areas. We really are not approaching this from my vantage point, we're not approaching this from a very educated point of view as we try to site infrastructure that can even further reduce emissions. And so a lot to be done here.

I will say that as we think about climate change and we think about a low-carbon environment as well, that's something to be considered here as well. And importantly, one of the things that's come front and center has been if you think about some of the challenges on the permitting front right now, it has

been the courts and the FERC in particular questioning what should a pipeline look at in terms of both the upstream impact on emissions and the downstream impact on emissions. That's a pretty hefty challenge to think about, but this group really needs to help address how do we need to be thinking about that from an infrastructure, permitting, and siting standpoint because, whether we like it or not, those challenges are out there, and we need to be able to describe how to address that.

So I would tell you of all the things that I think will be most informative to the DOE, I think this area in terms of how we can streamline permitting and how we can actually address stakeholder concerns in a constructive manner and objective manner, this is going to be the meat I think a lot of the report coming out.

And so you can see here quite a bit more in detail on there. I'm not going to read all that to you, but, certainly, the low-carbon scenario there is one that I think is challenging for all of us to think about but nevertheless one that we need to be able to address.

On the public outreach for this team, you can see here what's gone on to date. There's been

three listening sessions with 25 participants from environmental NGOs, agriculture, and local government officials, and then as well separate discussions with Native Americans and unions, and a lot of literature search and review by industry has gone on as well.

So this team has really dug in. There's a lot of progress that's been made in this area to date. But you can see here as you start touching on some of these, this will get pretty prickly in terms of how we deal with things like the FERC process and the adequacy for climate change impacts of energy use.

So I think this is one of the most challenging, as I mentioned. If you think about trying to predict based on a pipeline being built, trying to predict what the changes in energy use and climate change might be around that, that is very daunting because it's not really the pipeline, it's not really the producer. It's really the consumer that is making the choices about how to consume energy, and yet the pipelines and sometimes the production companies are actually being held accountable for that, even though it's a consumer choice. And so I think we've got to be able to educate and define around this particular item.

This is an overview then of the technology

group and some of the things that are being addressed here. As you can see on the bottom there, the cyber security threats to the operating controls -- a lot of misunderstanding in this field within -- between regulators and concerns by regulators, as well as the operators being able to inform what the capabilities are of the pipeline systems and what the vulnerabilities may be around pipeline controls.

And so I can tell you I've been on the edge of a lot of these discussions, and this is pretty well misunderstood by folks today in terms of really what cyber security threats really look like to the pipeline grid in particular. And I think a lot of education can be done on this front that will be very helpful for the DOE and for Secretary Perry.

So I'm looking forward to the work that's being done on this. Also, a lot of work being done and improvement around facility integrity. And if you think about how this effort meshes up with the earlier topic of a social license to operate, having good technology use and knowing the integrity of our systems and the safety of our systems, and being able to educate the public about how we can use that technology to make our systems safe is really important. And so a lot of overlap here and

integration between the social license to operate and how we use technology to keep our systems safe, so a very important element of the study as well here.

And then, finally, you can see the study schedule, and you can see that come August, everything in the entire effort's going to get done in August because we've got an October end date to this, so a pretty compressed schedule that we've got going on, and a lot of hard work gearing up right now as we move out of the data collection. There's still quite a bit of data collection, but as we start to move out of that and start to define the barriers and the challenges that exist.

So a little simpler graph than John's graph was because I was struggling to figure that one out. This is more an Oklahoma style schedule, so I've got this one covered.

So, with that, I will take any questions or comments anybody has. Thank you.

CHAIRMAN ARMSTRONG: Any questions for Alan?

MR. ARMSTRONG: Yes, Daniel. Oh, sorry.

MR. SULLIVAN: Bob Sullivan, Synex. Just an observation/recommendation. We constantly hear about, as you addressed earlier, the problem between coordination between state and federal interests, as

well as the constraints placed upon the development of pipeline capacity by NEPA. In the 2013 surface transportation law, there was a categorical exemption provided for utilities built along or across a federal aid highway right-of-way. And to what extent is that potentiality being developed when you consider that some of these rights-of-way are quite massive, anywhere from 120 to over 300 feet wide? Is that something that the study is considering as a potential option?

MR. ARMSTRONG: Yeah. Amy, I'll look to see if you've got -- understand that level of detail.

MS. SHANK: Not yet.

MR. ARMSTRONG: Okay.

MS. SHANK: We haven't gotten to that level of detail yet, but we're still digging in, and I believe that we'll uncover that and consider that as well.

MR. ARMSTRONG: Thanks for the comment and the insight on that. Thank you.

AUDIENCE MEMBER: Thank you, Alan, and thank you, John, for taking on these studies. Alan, if it's not premature, you said that the cyber threat is misunderstood. Would you want to elaborate a little bit what you had in mind there?

MR. ARMSTRONG: Sure. And so, as a lot of you all probably know, a lot of concern -- and believe me, you know, within the pipeline world, a lot of effort. We see attacks against our systems every day, against our data systems, and we work to have those error gaps in between the web and our systems. But even without that, there is a lot of hardware, local hardware, control that allows these systems to continue to operate safely for a period of time, even if we were to lose some of those controls.

And so it would be uncomfortable, but I can tell you that we've had those circumstances within some of our largest pipelines already, not from cyber attacks but from other system outages. And so I think people appreciating that degree of control that already exists and the hardware that's available on the systems is probably pretty important before we conclude that an attack would be an absolute catastrophe on the systems. Thank you for the question.

Other questions?

(No response.)

MR. ARMSTRONG: Okay. Hearing none, thank you all very much. And I will just say in closing, the study committee -- a lot of you all have just

started to engage on that. Would love to hear your comments. Feel free to give me a call if there's any way that you'd like to contribute further to the study and make sure that your input is heard and engaged on that, and as well make a pitch for Amy, who is constantly looking for resources and people that are anxious to dig in and help as we get into the writing phase.

So thank you very much for your attention this morning.

(Applause.)

CHAIRMAN ARMSTRONG: I want to thank both John and Alan for agreeing to undertake the studies, as well as Darren and Carol Lloyd for jumping into the breach here quickly on the Arctic potential study.

I would also just take the opportunity to put in a little bit of plug for the NPC staff. If you can imagine, we've got, you know, the two studies we knew coming in to 2018, '19, and then adding the Arctic potential. So, as busy as each of the individuals are, then Marshall and John Guy and Jim Slutz are all basically trying to help -- I think -- what did you call it? -- cat herding throughout this whole process. So a big undertaking this year for the council going into next year, and we look forward to

trying to pull this all together toward the end of August, September, October 2019.

So the next on the agenda -- and I don't know if -- is Secretary Perry here yet? Oh, he's here? So what I'll do is turn the podium over to basically Mark Menezes, who's going to give us some comments and I think introduce Secretary Perry. So we will get a chance to hear from both of them.

So, Mark, if I can --

MR. MENEZES: Well, thank you, Greg. Before I introduce Secretary Perry, who I'm assured is in the building and on his way to the table, I too would like to thank all the members of the council and the council staff for their hard work and incredible commitment of time and expertise to produce the three studies that you've heard so much about here this morning.

The first, a follow-on assessment of the council's 2015 Arctic potential report was requested as a cooperative activity with the Department of Interior, as Secretary Zinke had noted. Now we both had requested the study because there's significant potential, as we've seen, for Arctic oil and natural gas resources to be part of this exceptional moment in America's history in global energy production and

delivery.

What's more, as mentioned by both Mr. Woods and Ms. Lloyd, there have been significant advances in Arctic innovations, technologies, and operational experience that will allow us to both grow our economy while protecting our environment. So I applaud the council for its prompt response to the Secretary's request, and we look forward to your final report, which we hope is produced in February.

Now the council's ongoing study on carbon capture, use and storage will also be of significant interest to a variety of stakeholders, certainly to government agencies and policymakers and, importantly, to industry. As explained by Mr. Mingé, the objective of this study is to define potential pathways leading to CCUS deployment at scale in the U.S. as we build on the technology and expertise developed overseas and the opportunities overseas. It's a comprehensive work plan that will result in a fresh look at this topic, with a focus on the business case for CCUS in terms of energy security, economic growth, jobs, while also protecting the environment through carbon dioxide capture.

So we appreciate your commitment to this study, and we look forward to seeing its

recommendations next fall in the integrated roadmap for CCUS deployment and the number of ways it will offer for ensuring our continued leadership in the CCUS technologies, and I too would like to point out and thank you for the roadmap to the roadmap on the last slide of your presentation.

Finally, we're also excited about your work regarding the oil and gas transportation infrastructure study, as discussed by Mr. Armstrong, even though we know that it's already behind schedule. And as noted by Secretary Zinke, our nation is now the world's leading producer of both oil and natural gas. So it is critical that we are able to build the infrastructure necessary to bring these energy resources to market. Bottlenecks in transportation can strand production, deprive consumers of competitive pricing, and undermine our ability to export oil, natural gas, natural gas liquids, and related products to global markets.

And with the foreign policy challenges we face today, maximizing our ability to supply global markets, to be reliable economic competitors with the OPEC countries and Russia, is essential to our economic and national security.

So we're confident that with the council's

final infrastructure report also due next fall, we'll have a roadmap for building the energy transportation system of the future, with practical strategies for addressing the important concerns of all of our stakeholders.

Finally, we are very appreciative of the dynamic and visionary leadership being provided by Darren Woods, John Mingé, Alan Armstrong, each providing a strong and steady hand at the helm of their respective studies. We deeply appreciate your commitment to these projects.

As evidenced in the presentation materials, they are receiving strong support from a real cross-section of the oil and gas industry, your employees, other industries, think tanks, academia, NGOs, Native American groups, other interest groups, as well as my colleagues in government.

This broad participation should produce detailed and valuable studies that reflect the views of a comprehensive set of stakeholders. And as we discussed at this morning's CCUS breakfast, it will be an enduring studies -- these will be enduring studies that will stand the test of time and serve as reference materials to all policymakers looking at these issues.

All three of these reports reflect the fact that we are truly at an extraordinary moment in American energy. It's worth remembering that in 1977, when this council was transferred to the newly established Department of Energy, America was facing long lines and high energy prices. Many considered wise at the time were convinced America's days of energy abundance and production were permanently in the rearview mirror.

Yet we didn't have an actual energy shortage. What we had was a shortage of imagination and a loss of confidence in our ability to innovate. Since then, the innovations of our national labs, universities, coupled with the energy and ingenuity of those of you in this room, in the private sector, we have made America the world's leading energy producer. By favoring innovation over regulation, we are successfully developing all of our abundant energy resources: oil, natural gas, as well as renewables, like wind and solar and hydro. That's having a profound impact on America's security and on the right of each American to pursue their dreams.

Now, without further delay, I'd like to introduce Secretary Perry. It's been a full year since he's last addressed you at last year's council

meeting, and during that time, he has met many of his counterparts all over the world, as well as the department's stakeholders, some of whom are here today.

Secretary Perry is an Eagle Scout, a veteran, the longest-serving governor of Texas, a great friend, and a genuine leader of our energy department and of America's ongoing energy renaissance. It's my pleasure to present to you the Honorable Secretary Rick Perry.

(Applause.)

SECRETARY PERRY: Good job, man. Oh, you're good, Mark. Thank you very much. I was just complimenting Darren on his very gracious move to wear a purple and flecked with gold tie today to just remind everyone of the historic Texas A&M victory over LSU.

(Laughter.)

SECRETARY PERRY: Well done, well done. That's what you call graciousness right there.

(Laughter.)

SECRETARY PERRY: Anyway, before we kind of delve into these short remarks, I want to take a moment and just reflect with the rest of the country on ourselves, each of you, and to just remember a

great American, a fellow Texan, a patriot. I don't suppose there's ever been anyone, certainly in my memory, and even being a bit of a student of history, that's been any more prepared to be the President of the United States than George H.W. Bush.

His service to our country was profound, unparalleled, as I think about his resume, and just an amazingly good and decent man. We'll miss him, but the good celebration is what a life he lived, a life of consequence, his decades of public service. Again, I think the word for me, unparalleled in his service and his work. And he was a good one.

So anyway, to each of you on the stage here with us today, thank you. It's another tremendous year that the energy sector, especially in the oil and gas business -- Mark, you made some remarks about, you know, 15 years ago, and there could have certainly been a fellow up here giving a speech on peak oil, which I heard a number of times back in the mid-2000s. But that wasn't the case, and as you mentioned, it was because of people in this room. It's because of visionaries. It's because of the private sector. You know, government had its role in that, and I think DOE and this crowd, those of you in this crowd, have found that way to work together to really make a difference,

and all the work that we've done here in the studies that you talked about on, you know, the CCUS, you know, the technologies going into the marketplace and the Arctic oil and gas development. I mean, just some amazingly powerful opportunities for development of our natural resources in this country.

So a little over a year ago, I think we were at the Hay Adams, and Zinke and I were -- I told somebody, I said, they must -- they probably had a number of really capable people that turned them down to speak because Zinke and I were the two that ended up being there. So -- but anyway, Ryan and I are great and good friends, and we -- again, sorry you couldn't get anybody better than Ryan and myself to entertain you, but here we are again.

So -- but anyway, thank you for allowing us to -- you humor us to let us come and to share with you again our observations and particularly talk about America's energy opportunities. You know, this country has chosen to become a nation that produces its energy in extraordinary abundance. And, again, it's the people in this room. It's the national labs. I've visited all 17 of our national labs now, and they're the most fascinating places with some of the most capable men and women that I've ever had the

potential to work with in my life that populate those laboratories, and they are working on this just extraordinarily wide array of energy opportunities and technologies, and we never thought, I don't think, a decade and a half ago -- no one -- well, George Mitchell did. I give George his appropriate dues.

There were a few real visionaries, but they were in the minority. But today, we're seeing energy produced more cleanly, more efficiently than anyone ever thought possible. So we're the leader in oil and gas production. I know you've heard these numbers, but they're worth repeating. For anyone who's here in the media as they share this story with what America and American energy is all about, we're on track this year to produce 10.9 million barrels a day. Next year, we're going to -- and they've upped this, Darren. I mean, we're 12.1 million barrels a day in 2019. Natural gas production, 83.2 billion cubic feet per day. Next year, we're going to be at 89.6. Both are new records.

I mean, this is some -- this is -- these are great strides that we're making. And not just in the fossil fuels side. What we're seeing in the renewables, you know, in the wind and the solar side of things, in nuclear energy, we're producing more.

We're emitting less. And that's a story that all too often doesn't get picked up by the global distributors of news. And I think it's important that we remind the world on a regular basis, between 2005 and 2017, the United States led the world in reducing emissions, cutting them, carbon emissions, by 14 percent over that time period.

And so last year is the first time since Dwight David Eisenhower was the President of the United States that we were exporting -- we were a net exporter of natural gas. Today, those exports are going to 31 countries on five different continents, and I'm telling you we're just counting. We're ticking up. I was over in the central European region, and there are going to be some countries over there that are going to be buying our products.

We discussed LNG as we hit those countries. And we were in Poland, Ukraine, Hungary, Czech Republic, and they understand, you know, cost is just one factor here. But I talked to them about the diversity of supply, the diversity of suppliers, the diversity of roots. All of that is very important as they recognize that the United States is going to be a reliable supplier, that we're going to be a competitive supplier.

The situation in Ukraine was and is exacerbated by what Russia is doing with the heating fuel supply for that region of the world. Whenever and wherever I went, that Iron Curtain may be gone, but in some places, the clarity of transparency, the rule of law, the regulatory certainty and other factors are lacking. And that's one of the messages that we time after time, you know, particularly when we were talking to the leadership of Ukraine -- I said the United States wants to come and participate in this part of the world. Our companies want to come. Our private sector companies want to come and participate. Put into place clear transparency, rule of law so that people know that when they come and they invest here that they're going to have the opportunity to succeed.

And if you want foreign investors, particularly in the energy sector, for everyone in this room, the key is to improve their business practices. I relayed to them, listen, we got the resources, we've got the technology, we've got the innovation, we've got the knowledge that it transformed our energy sector, and it can do the same in many of those countries in central Europe.

I'm not sure there's been a true

appreciation of what over 11 billion cubic feet a day of U.S. gas export capacity can do for those countries. But as Poland and other countries, they sign on, I expect that those countries will begin to appreciate what we can do for them, and there will be substantially more opportunities, particularly for our LNG as we go forward.

Already, the IEA, world energy outlook, projects that by 2025 we will contribute to half the growth in oil and gas input. Mr. Yergin, that's a stunning fact that you have that type of potential in this country. And the short memory that we have all too often of where we found ourselves 15 years ago -- we have come close, I think, to reaching our potential. We've done good work in developing the abundance of the Permian Basin, the Gulf of Mexico.

But there's -- and I say come close to reaching our potential. I'm not being critical, but I may sound like that football coach from Alabama that, you know, you're close to reaching your potential. Saban, you know, he's always pushing people to do more, to be better. And, you know, from some of our perspectives, they look pretty damn good already, you know, kind of --

(Laughter.)

SECRETARY PERRY: Anyway, not to get off subject, so when I talk about reaching our potential, I'm talking about are there places in the United States where we can do even more. And I'm drawn to the Appalachian region. I'm drawn to that Marcellus and that Utica formation that, you know, if the Appalachian region were its own country, it would be the third largest gas producer in the world.

So, I mean, the potential raw product is there. So -- and they have particularly wet NGLs that can be separated, value added to them, and a real, you know, key in developing the feedstocks. They can be turned into other products. Unfortunately, even though Appalachian natural gas and ethane are on par with being the cheapest in the world, we're missing that opportunity at this particular point in time, and in some cases, we're burning it away.

But where they have the means and the infrastructure, producers are simply shipping NGLs out to other regions, other markets, where they don't -- where they like the infrastructure to store the NGLs or the capacity to use them in other ways. They're simply burning them off. And my point is there's this great opportunity in that Appalachian region in a part of the world that truly has great need for that type

of economic growth. And I think we can do more. And at the request of Congress, we've spent a significant amount of time studying the matter, and there's -- as I said, there's an amazing opportunity here for us. There's this incredible opportunity, potential for establishing an ethane storage and distribution hub in the Appalachian region and for building this very robust petrochemical industry in Appalachia.

That's the bottom line of a report, actually, that we're releasing today, Mark, out of DOE that I hope you have the opportunity to take a look at. The report notes that Ohio, Pennsylvania, and West Virginia, their combined share of U.S. natural gas production has skyrocketed from about 2 percent in 2008 to 27 percent last year. And in 2025, the ethane production in the Appalachian Basin is expected to be 20 times greater than it was in 2013.

I mean, those are some stunning numbers of growth in potential. This is an economic opportunity for a region, as I said earlier, that sorely needs it. In fact, in March of 2018, there was a study by IHS, Marquette. That was a forecast that the region will supply almost 40 percent, almost 40 percent, of the nation's gas supply by 2040. The report also noted that the region has sufficient feedstock to support up

to five world-class ethane crackers. We know Shell is building one there now, and those investments in petrochemical production in the region are likely to have a significantly higher return than for those made in my part of the world, in the Gulf Coast.

Those investments could create economic security along with increased employment and greater infrastructure development. What's more, nearly one-third of our activity in petrochemicals already occurs within 300 miles of Pittsburgh. These are fascinating facts here: $300 billion in net revenue, 900,000 workers at 7,500 businesses. That's within 300 miles of Pittsburgh.

I mean, these are the types of numbers that are shatteringly important, I think, to our country. As our report shows, based on a market analysis by the National Energy Technology Lab, NETL, over in Morgantown and in Pittsburgh, there is sufficient global need, enough regional resources to help the U.S. gain a significant share of global petrochemical market.

An Appalachian petrochemical industry would strengthen our energy and manufacturing security by increasing our geopolitical production diversity. And what I mean by that is I talk about energy security is

national security. And it's really true. Whether you're in Ukraine or whether you're in the United States, this is a really important concept to understand.

One of my great fears as governor was a recurring thought of a Category 5 hurricane coming up the Houston ship channel and the stunning impact it would have over and above the loss of life, which could have been, without a very effective evacuation, massive loss of life. But it also had the potential of shutting down 95 percent of the petrochemical operation in the Texas-Louisiana-Gulf Coast region.

I mean, losing that type of capacity -- and, you know, knock on wood, it has not happened. But someday the potential for that to occur is real. And for us to be at this moment in time where we have the potential to be able to diversify our petrochemical footprint, I think, would be very inopportune for us as a country to miss this opportunity, to put into place -- and please don't get -- I'm not pitting one -- nobody gets confused that I don't mind helping my home boys from the State of Texas. And listen, my dad used to always tell me, he said, son, it ain't bragging if you can do it.

So I just tell people, I say, listen, I say,

one of the reasons I don't mind going and telling people, you know, move your business over here, do it over here, because I know we're going to do a good job of it. But the competition that created across the states -- now Jerry Brown still hasn't forgiven me for going into California and trying to recruit businesses back to the state. But I told him, I said, Governor, this will make your state more competitive.

I saw Gavin Newsom. I told him the same thing this Saturday. I said, Gavin, it will make you more competitive. Go put the processes into place that will make your state be more competitive. Building this petrochemical footprint in the Appalachian region of this country will make our country stronger. I will suggest to you it's not a competition for the Gulf Coast petrochemical. It's in addition to.

The market is there for us. To go to compete to get it to go put our best foot forward to go compete in the global market of this petrochemical opportunity is a great -- I mean, this is a once-in-a-lifetime chance for this country, and I'm excited about it. Like Shell, there's a number of companies that sees the region's potential and they're investing some serious resources there. Ohio is working with

PTT Global Chemicals and others to develop a second cracker over on the Ohio River. Others are considering some new investments in that region. We want to help them. We want to send the message that this is good for them, good for the country, good for the people of those regions.

So anyway, I want to wrap up with a word on our potential in November. And I visited my 17th -- that was the last of our national labs. I got out to Brookhaven in November to visit that lab. And to reach our potential, whether it's in this infrastructure side that I've just talked about, or whether it's in the innovation side in technology in this amazing and changing world we live in, you know, whether it's in the private sector, whether it's in one of your businesses, whether it's in our national labs, whether it's on a rig, we need to keep pushing forward because America -- America's great hope for the world is American innovation, American technology. And I don't think there's been a more exciting time to be a part of this, certainly not a more interesting -- I'm headed to the Middle East later here, to Qatar and then to the Kingdom, so speaking of interesting -- and these are interesting times.

But there's never been a more interesting

time from my perspective to be in the oil and gas business, and my hat is off to each of you, to this council, for the work that you do for continuing to put America in this preeminent position in the world. And our goal and our pledge to you is to continue to be as effective, as efficient as we can, and to be great partners as we go forward.

Thank you, and God bless you.

(Applause.)

CHAIRMAN ARMSTRONG: Thank you, Secretary Perry, for investing time with us. I know there's a lot of demands on your time, and really appreciate it. I also want to -- last night I made a comment. I said, we're going to need to be a little bit flexible and may have to call an audible so we -- I called the audible, and I dropped the ball. When I was introducing Under Secretary Menezes, I failed to describe a little bit his involvement with the council. And, you know, in addition to his current role, he's had much -- many years of experience in Washington. He's the principal advisor on energy policy and a large array of really existing emerging technologies. And then he's very actively involved in our study. So I apologize for not getting that off. I lost my glasses, and I couldn't see, so --

MALE VOICE: (Away from microphone.)

(Laughter.)

CHAIRMAN ARMSTRONG: Seven overtimes, LSU, I wasn't going to say anything, so --

(Laughter.)

CHAIRMAN ARMSTRONG: But we've now reached the part of the agenda -- at this point in time, we're going to go into administrative matters, and where our webcast will now conclude. So, for those in the internet audience, we thank you for watching and for listening to our proceedings, encourage you to download or read the final report on the Arctic potential, a supplemental assessment, when it is released, and which will be posted ultimately for final approval early next year.

So, at this time, I'm just going to pause for a minute to let the transmission end, and then we'll turn to our administrative matters.

First, we have two committee reports today, and we're very close to the end here, so just bear with me. Our first administrative item this morning is the report of the finance committee. Byron Dunn chairs the finance committee but was unable to be with us today, and Greg Arnold, a member of the committee, is going to present the committee's report at this

time.

So, Greg, please.

MR. ARNOLD: Thank you, Mr. Chairman. Since I'm in the way of the door, I'll try to stick straight to the script. Throughout the year, we review the periodic reports of the finance committee. We met twice throughout the year, once in September, again yesterday afternoon. The September meeting included the review of the calendar year 2017 draft audit report and IRS Form 990 with Johnson Lambert & Company, the council's outside auditors. The auditors provided the council a clean opinion letter which agrees that our financial controls are sound.

Yesterday afternoon, the committee covered a variety of topics, including projected 2018 expenditures and contribution collections, both of which indicated that we should end the year with a small surplus. This is due part in timing to expenditures associated with the infrastructure, CCUS studies, some of which are now expected to occur in 2019. The surplus is also due to your excellent response and contribution requests, which is currently 98 percent of 2018 budget target.

A number of new members were appointed to the council in June. They responded quickly and

favorably to their half-year contribution request. We greatly appreciate you for that. In addition, the committee discussed and agreed upon a proposed 2019 budget in the amount of $5,792,000. This budget supports the council's ongoing operation, provides the resources needed to complete the Arctic supplemental assessment, and the infrastructure and CCUS studies.

On balance, the proposed 2019 budget is essentially flat to the 2018 budget, with a primary exception that incorporates the previously mentioned 2018 study-related carryover expenses and the related modest costs associated with the Arctic update.

The proposed budget also continues to set aside funds for the post-retirement health liability, but at a greatly reduced amount from years prior. The finance committee recognizes the recurring economic challenges faced by our members and, despite the increase in the 2019 budget, recommends no increase to individual full-year contributions for '19.

The balance of any additional funding will be drawn from the council's contingency fund, which will benefit from the 2018 surplus. Subject to your approval of the budget and contribution recommendation, the council will send individual 2019 member contribution requests earlier next year. We

encourage you to respond expeditiously in receiving your respective funding requests.

Mr. Chairman, this concludes the finance committee report, and I move that the council adopt the current budget.

CHAIRMAN ARMSTRONG: Thanks, Greg.

So we have a motion to adopt the report. Do we have a second?

MALE VOICE: I second.

CHAIRMAN ARMSTRONG: Any discussion?

(No response.)

CHAIRMAN ARMSTRONG: If not, all those in favor, please say aye.

(Chorus of ayes.)

CHAIRMAN ARMSTRONG: Any opposed?

(No response.)

CHAIRMAN ARMSTRONG: The report is adopted. Again, Greg, thanks for your participation today.

I would make a comment. We did have very good response on the contribution request, but we can always do better. We have a few that are still outstanding. I know we've got some requests for some Form W-9s to go through. So anyway, we encourage you to ante up, and also to honor the requests when they come out. We do have a lot to do this coming year.

The next item is the nominating committee, is our administrative item. Jim Hackett chairs the nominating committee, but, again, he's unable to be here. In his absence, Clark Smith, who's a member of the committee, will now present the committee report.

Clark.

MR. SMITH: All right. Thank you, Mr. Chairman. Good morning, everyone. The nominating committee has agreed on its recommendations for NPC officers and chairs and members of the agenda and appointment committees of the council, as well as the five at-large members of the NPC co-chairs' coordinating committee.

Accordingly, on behalf of the committee, I'm pleased to offer the following nominations: for NPC chair, Greg Armstrong; NPC vice chair, Larry Nichols. For the agenda committee, we recommend the following as members: Alan Armstrong, Deb Caplan, Bob Catell, Ray Hunt, Paal Kibsgaard, John Mingé, Bill Way, Bill White, Darren Woods, and Daniel Yergin, with David Seaton serving as chair.

For the appointment committee, we recommend the following as members: Nick Akins, Lisa Davis, Larry Downes, Greg Garland, John Hess, Terry Jacobs, Mike Linn, Scott Tinker, John Walker, and Mike Wirth,

with Ryan Lance serving as chair.

In addition, we recommend the following as the at-large members of the co-chairs' coordinating committee: Kevin Book, Lee Boothby, Leo Denault, Greg Garland, and Kelcy Warren.

This completes the report of the nominating committee, and on its behalf, I move that the above slate be elected until the next organizational meeting of the council. Thank you.

CHAIRMAN ARMSTRONG: Thank you, Clark.

So I have a motion to adopt the report of the NPC nominating committee. Do I have a second?

MALE VOICE: Second.

CHAIRMAN ARMSTRONG: We have a second. Are there any discussions about the nominations?

(No response.)

CHAIRMAN ARMSTRONG: If not, for those all in favor of adopting the report, please say aye.

(Chorus of ayes.)

CHAIRMAN ARMSTRONG: Any opposed?

(No response.)

CHAIRMAN ARMSTRONG: Thank you. So we're coming in the home stretch here. Before the final item, which is the adjournment, which I hope we get unanimous approval when I propose it, we have an

opportunity for any questions or comments from members of the council.

(No response.)

CHAIRMAN ARMSTRONG: Seeing none, I would make the motion that we adjourn the meeting. Do I have a second?

MULTIPLE VOICES: Second.

CHAIRMAN ARMSTRONG: All in favor, please say aye.

(Chorus of ayes.)

CHAIRMAN ARMSTRONG: Travel safe going home. Thank you.

(Whereupon, at 11:30 a.m., the meeting in the above-entitled matter adjourned.)

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REPORTER'S CERTIFICATE

DOCKET NO.: N/A

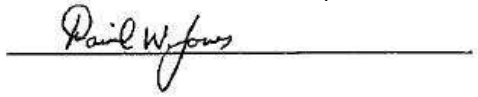
CASE TITLE: Meeting of the National Petroleum Council

HEARING DATE: December 4, 2018

LOCATION: Washington, D.C.

I hereby certify that the proceedings and evidence are contained fully and accurately on the tapes and notes reported by me at the hearing in the above case before the U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy.

Date: December 4, 2018



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