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Committee on Environment
and Public Works

Washington, D.C.

ADVANCING CARBON CAPTURE, UTILIZATION, AND SEQUESTRATION TECHNOLOGIES AND ENSURING EFFECTIVE IMPLEMENTATION OF THE USE IT ACT

Wednesday, February 5, 2025

United States Senate

Committee on Environment and Public Works

Washington, D.C.

The committee met, pursuant to notice, at 10:02 a.m. in room 406, Dirksen Senate Office Building, the Honorable Shelley Moore Capito [chairman of the committee] presiding.

Present: Senators Capito, Whitehouse, Cramer, Curtis, Ricketts, Husted, Alsobrooks.

STATEMENT OF THE HONORABLE SHELLEY MOORE CAPITO, A UNITED STATES SENATOR FROM THE STATE OF WEST VIRGINIA

Senator Capito. I would like to call this hearing to order. I thank everybody for coming. I think this morning's hearing about advancing carbon capture utilization, sequestration, or CCUS, we will be referring to it as such.

I am excited to start the year with a hearing on a bipartisan topic that Ranking Member Whitehouse and I have worked together over the years to address, and I look forward to continuing bipartisan efforts to champion meaningful legislation on this issue with Ranking Member Whitehouse and the rest of the committee. Certainly, the gentleman to my right knows a lot about this, at the same time, in the great State of North Dakota.

Innovative CCUS technologies will play a critical role in reducing emissions, particularly for facilities that face unique challenges because of their size, location, or industrial application.

In my State of West Virginia, several CCUS efforts are underway. West Virginia University is currently exploring direct air capture technologies, and the Department of Energy's National Energy Technology Laboratory, which is located in Morgantown, is supporting a suite of CCUS research.

West Virginia is also a partner in the Appalachian Regional

Clean Hydrogen Hub, known as ARCH2, that includes project partners who are working to deploy CCUS technologies. Collectively, these projects position West Virginia to continue as a national energy leader, while also reducing our air emissions. But we cannot realize the full benefits of these projects and emerging technologies like CCUS if there is not a permitting framework that will allow for the rapid and safe deployment of these projects.

That is why Ranking Member Whitehouse and I, working with Senator Barrasso and former Senator Carper, moved forward to get the Utilizing Significant Emissions with Innovative Technologies Act, or the USE IT Act, signed into law in December of 2020.

This legislation was intended to ensure that carbon capture projects at all types of facilities can be permitted in a timely and efficient manner. Despite the progress made by the USE IT Act, there have been significant problems with its implementation that have held back the deployment and the development of CCUS.

First, while the Council on Environmental Quality, or CEQ, released a report in 2021 and subsequent interagency guidance for the deployment of CCUS in 2022 as the USE IT Act required, the guidance failed to present a clear pathway to expedite permitting for these projects.

Second, the law required at least two Federal task forces

be established to help identify challenges to and solutions for permitting these projects. The Department of Energy and CEQ missed the required 18-month deadline to establish these task forces. They were not chartered until April of 2024, more than twice as long as the Congress mandated in the USE IT Act. The delay in standing up these task forces has hindered our progress in supporting CCUS, but at least they are finally working on recommendations to improve the permitting process.

After the USE IT Act, Congress and the EPW Committee worked in a bipartisan way to expedite carbon capture projects by including $25 million dollars in the IIJA for the EPA to review and approve Class VI well applications. The IIJA also included $50 million to help our States obtain primacy for permitting such Class VI wells. This funding gave the EPA needed resources to clear its backlog of individual Class VI applications and reduce the total number of applications that the EPA must review by granting States primacy.

Despite receiving additional help and funding with the process, the Biden Administration only approved two Class VI projects, and only granted primacy to two States, Louisiana, after more than three and half years, and your State already had your primacy. You are number one, you are number one. Okay, I was getting there, and my home State, just really the last day of the Biden Administration, received their permit for primacy

on Class VI wells.

I am very excited that we got our primacy over that permitting process. I hope EPA Administrator Zeldin will prioritize reducing the current backlog of pending applications and support additional States that are seeking to obtain primacy.

The North American Electric Reliability Corporation has found that over the next 10 years, due to a rise in energy consumption and the early retirement of our existing fossil fuel generation, our Country could face major electric reliability concerns.

The deployment of CCUS can be a tool to not only maintain but expand reliable electric generation capacity and ensure the reliability of our electric grid, while improving the environment and growing our economy. I believe that is a win-win situation.

I look forward to our discussion today on this important topic, so we can figure out how we can continue to work in a bipartisan manner to advance CCUS deployment.

I now recognize our Ranking Member Whitehouse for his opening statement.

[The prepared statement of Senator Capito follows:]

STATEMENT OF THE HONORABLE SHELDON WHITEHOUSE, A UNITED STATES SENATOR FROM THE STATE OF RHODE ISLAND

Senator Whitehouse. Thank you, Chairman. I want to thank you for calling today's hearing on carbon capture and utilization. I want to recognize Senator Cramer for his work on the PROVE IT Act. As I have said before, I want to get things done to solve the climate change problem.

Chair Capito and I have worked well together to encourage and expand carbon capture. There is a solid foundation of bipartisanship here.

I want to start by establishing the context for our hearing and why carbon capture is so important. We have just come off of Earth's two hottest years on record. For years, scientists warned of the perils of exceeding 1.5 degrees Celsius above the preindustrial norm. Well, it happened last year; 2024 crossed above what science tells us is the safety threshold. This does not necessarily mean that we have reached the point of no return, but it serves as yet another big red warning sign that we are dangerously close.

So, in this 11th hour, what does the path forward look like? The Potsdam Institute reviewed 1,200 forward-looking, peer-reviewed scenarios used by the IPCC to predict our future with climate change. Of these 1,200 scenarios, all the ones that led to safety depended on limiting warming to 1.5 degrees

Celsius by the end of the century. Now, only 11 of those 1,200 are still achievable. This review was done three years ago, so, likely, we have actually fewer than 11 pathways to climate safety.

Those remaining 11 scenarios that give us a pathway to climate safety have two things in common. One, they overshoot the 1.5-degrees safety limit, so carbon removal, particularly direct air capture, is necessary to claw our way back. Two, it just can't be free to pollute. There must be a cost to fossil fuel emissions. These all require a price on carbon emissions.

So, it is simple. Direct air capture, price on carbon emissions, or we fail.

Here is the IPCC, "Reaching net zero GHG emissions primarily requires deep reductions in CO2, methane, and other GHG emissions, and implies net negative CO2 emissions. Carbon dioxide removal will be necessary to achieve net negative CO2 emissions."

To reach climate safety, we must deploy carbon capture, and we are doing it, but way too slowly.

In 2015, I visited Saskatchewan with Senator Graham to see the Boundary Dam Power Station, the first electricity generating facility to successfully deploy carbon capture technology. We know this works. It was working there and then, but there are only 45 facilities operating worldwide with a total capture

capacity of only 50 million tons annually, when we need to be operating at a gigaton scale. That is, we need to be capturing 1,000 times more carbon annually to find that pathway to climate safety.

So, I have consistently led efforts to promote carbon capture. I co-led the USE IT Act, a focal point of today's hearing, with our current Chair and with then Chair Barrasso. I led repeated, successful efforts to improve 45Q, the tax credit for carbon capture with our Chair and Senators Barrasso, Cramer, and Hoeven. My Federal CDR Leadership Act is being piloted now by the Department of Energy. I have advocated for funding for offices and programs that support carbon capture deployment, including for EPA's Class VI wells program that the Chairman mentioned.

Bipartisan steps to support carbon capture included DOE's Regional Direct Air Capture Hubs and DOE's Carbon Dioxide Transportation Infrastructure Finance and Innovation Program, God, we know how to name things, both part of the Bipartisan Infrastructure Law, but we cannot dawdle. We have entered the era of climate economic consequences.

Families are paying higher prices in grocery store aisles because climate change is disrupting supply chains and diminishing crop yields. Worse, families are facing a homeowner's insurance affordability and availability crisis.

This threatens to cascade from insurance markets to mortgage markets to home property values and then, like 2008, into the general economy.

The more we overshoot 1.5 degrees, the more of this looming economic pain and dislocation. Plus, the added risk of far graver, irreversible changes: the collapse of ice sheets in Greenland or Antarctica, mass coral reef die-off, the collapse of the Amazon rainforest. It will take direct air capture as well as a price on pollution to pull us back from this danger.

The happiest estimates peg the cost of widespread, commercial CO2 removal at about 100 dollars per metric ton. This is a negligible cost compared to the costs of ignoring the problem. The Economist says a $25 trillion hit to global real estate markets. Deloitte says a $220 trillion global GDP swing between getting climate right and continuing to fail.

The Financial Stability Board has issued a warning to the global banking system of this climate risk. First Street Foundation has found that the climate-driven insurance crisis will erase $1.5 trillion in U.S. real estate value over the next 30 years, i.e. the period of a mortgage that is issued today.

So ramping up carbon capture is a step we need to take with urgency, and I am delighted to join our Chairman in this hearing.

[The prepared statement of Senator Whitehouse follows:]

Senator Capito. Thank you.

Next, I will turn to Senator Cramer for his introductory remarks.

STATEMENT OF THE HONORABLE KEVIN CRAMER, A UNITED STATES SENATOR FROM THE STATE OF NORTH DAKOTA

Senator Cramer. Thank you, Chair Capito, Ranking Member Whitehouse. It seems like such an appropriate early hearing on a topic that we really have worked closely together on, successfully, frankly, in this committee. It is really fun to be part of it, so thanks for digging in on this topic that we are so familiar with.

Thanks for the shoutout as number one. I mean, when you referred to me as a gentleman at that beginning, I was impressed, but number one was really something. I am sorry, I love the opportunity, of course, to highlight North Dakota's place in the area of carbon capture, utilization, and storage. There is a lot that goes into why North Dakota has been at the forefront.

One of the central reasons is the Energy and Environmental Research Center at the University of North Dakota, who sends us a wonderful witness today. In fact, the last EPW hearing on this topic, then-Ranking Member Capito invited John Harju from EERC, who is to be our star witness, and John is with us today, as well as the CEO, Charles Gorecki. Thank you all for being here today.

I would just say this about the EERC. If you are from a State that is looking at primacy or carbon capture, if you think

that is a potential, they are not confined to North Dakota. Their expertise is used everywhere. In fact, there is a good chance, if you are pursuing a project, that they are already working with you, so thank you, EERC.

Today, we are joined by Kevin Connors, who serves as the Assistant Director for Regulatory Compliance and Energy Policy at EERC. Kevin has been an invaluable asset to me and to my staff. In fact, we look to EERC as a bit of an extension of our staff in all matters relating to carbon capture, utilization, and storage.

From permitting to engineering to safe geological storage and the use of carbon, Kevin's expertise is invaluable to this committee's work. The successful sequestration of CO2 is a matter of national concern, as it obvious today, and I am glad Kevin can tout the good work of North Dakota in this space and how other States can benefit from our State's success in permitting Class VI wells.

Prior to his time at EERC, Kevin served on the North Dakota Industrial Commission in several capacities, including Carbon Capture and Storage Supervisor, Underground Injection Control Supervisor, and Petroleum Engineer. His expertise is not limited to the theoretical, however. He began his career as a well site geologist in the oil fields of Western North Dakota. If you are familiar with the nature of the work day in the

Bakken, it is safe to say he has earned his stripes.

In addition to his well-deserved professional accolades, his most important duties are, of course, as a husband and a father. Kevin and Julie are the proud parents of seven wonderful children. That will keep you busy.

We want to thank you and your wife and your children for sharing you with us today. Thank you, Madam Chair, for allowing me to introduce Mr. Connors to our committee. I look forward to a productive discussion.

[The prepared statement of Senator Cramer follows:]

Senator Capito. Perfect introduction, and we will lead, Mr. Connors, you are welcome to give your opening statement. Thank you.

STATEMENT OF KEVIN CONNORS, ASSISTANT DIRECTOR FOR REGULATORY COMPLIANCE AND ENERGY POLICY AT THE ENERGY AND ENVIRONMENTAL RESEARCH CENTER

Mr. Connors. Good morning, Chairman Capito, Ranking Member Whitehouse, and members of the committee. I must say, praise the Lord, it is an honor to be here. Thank you so much for the introduction, Senator Cramer.

My name is Kevin Connors. As was mentioned, I am the Assistant Director for Regulatory Compliance and Energy Policy at the e University of North Dakota's Energy and Environmental Research Center, or the EERC. Thank you for the invitation to provide testimony concerning the implementation of the USE IT Act, the Class VI well permitting, and related efforts to accelerate CCUS deployment.

For the purpose of my testimony, prior to coming to work for the EERC, I led North Dakota's efforts to become the first State in the Nation to receive Class VI primacy. In 2019, I began working at the EERC where today, I manage the Plains CO2 Reduction Partnership, or the PCOR Partnership, and work closely with EERC clients to support CCUS project development. It is important for the committee to note the EERC has been the technical lead tasked with the development of all nine Class VI projects that have been approved in North Dakota.

The history of the EERC dates back to 1951 as part of the

U.S. Bureau of Mines. Later, in 1977, the U.S. Department of Energy, and in 1983, the EERC became a business unit of the University of North Dakota. The EERC is focused on practical solutions to our world's energy and environmental challenges.

As a leading developer of technologies, the EERC has spent decades performing applied research in CCUS. The EERC leads the PCOR Partnership, one of DOE's Regional Carbon Sequestration Partnership Programs. PCOR is an industry-government partnership with more than 250 member organizations across a 10-State, four Canadian province region in the upper great plains in Northwestern-North America.

What has become apparent over the course of now over 20 years of PCOR Partnership activities is that while our region has astounding potential for geologic CO2 storage, our region's emissions are interwoven with the economy. The local, State, and regional economies and the industrial tax base that supports these communities represent the primary emission source of CO2. This is consistent nationwide.

This is where we encounter the dual challenge, the dual challenge of reducing carbon intensity of our major industrial sectors while simultaneously ensuring continued economic growth and prosperity for our local economies tied to these industries. The deployment of CCUS technologies offers a unique solution to meet this dual challenge.

Today, the 45Q tax credit and low carbon fuel markets have created a business case for CCUS. However, carbon capture technology has not been economically deployed across the full spectrum of emissions sources.

There are three main barriers preventing accelerated CCUS deployment. First, the cost of retrofitting our largest electricity generation facilities with capture technologies continues to be a major hurdle. Second, CO2 pipeline permitting and public opposition concerned with pipeline safety and eminent domain laws have created transportation challenges. Third, long lead times and delays in permitting Class VI storage projects as the Federal level persists.

The solutions to these barriers are all actively underway. The industry continues to advocate for increases to the 45Q tax credit to strengthen the incentive and offset record inflation on materials and increased labor costs. PHMSA has proposed new regulation to enhance CO2 pipeline safety, and there are policy solutions being proposed at the Federal level to improve CO2 pipeline permitting and Class VI permitting.

The solution to alleviate the significant backlog in Class VI permit applications at the EPA regional offices begins with Class VI primacy. The Class VI primacy process can take between four and seven years for States to receive this authority from the EPA. I hope we all can agree that this process is

inefficient and must be improved.

States are best positioned to regulate these activities. States have a broader framework to consider, in addition to the environmental protections offered by the Class VI rules, such as promoting the development of geologic CO2 storage, and maximizing the use of pore space of storage reservoirs.

As soon as a State has demonstrated equivalent Class VI program protections, EPA should move expeditiously to approve their Class VI application and hand that authority over to the States. The State has already demonstrated that the program meets the criteria.

An important technical challenge facing the CCUS industry has to do with the prohibition of new aquifer exemptions for Class VI. There are many examples of deep geologic formations that meet Federal definitions for an underground source of drinking water, but there are extenuating circumstances, such as depth or economics, that make these particular formations unsuitable as a drinking water source. The result of this prohibition removes billions of tons of CO2 storage potential in States like North Dakota, Montana, Wyoming, Colorado, Utah, Oregon, and Alaska, to name a few Western States.

Thank you again, Chairman Capito, Ranking Member Whitehouse, and members of the committee for your invitation to provide these remarks. I would be happy to answer any questions

you might have regarding my testimony and views on carbon management.

[The prepared statement of Mr. Connors follows:]

Senator Capito. Thank you, Mr. Connors.

Our next witness is Dan Yates, and he is the Executive Director of the Ground Water Protection Council, or GWCP. He has been with GWCP for over 20 years and has worked with his members on the challenges that have been experienced with the Class VI primacy process.

I would note, he has two children, so we are up to nine. We are getting up to a high average here. Thank you, Mr. Yates, for coming.

STATEMENT OF DAN YATES, EXECUTIVE DIRECTOR OF THE GROUND WATER PROTECTION COUNCIL, INC.

Mr. Yates. Thank you, Madam Chairman Capito, Ranking Member Whitehouse, and all the members of the committee for inviting me to speak today. It is an honor to be here to discuss the work the Ground Water Protection Council has been doing with our State members for the past 40 years.

We were created in 1983 to bring together the technical regulatory experts to address underground injection control and groundwater protection issues. Our national organization represents both energy and water agencies, including such programs as Water Quality, Underground Injection, Drinking Water Source Protection, Groundwater Protection, and Oil and Gas.

My experience spans 25 years helping aid State programs in tool development, regulatory considerations, and capacity development. We have been at the forefront of CCUS, including work on CO2 injection for enhanced oil recovery, the creation of the Class VI UIC program, and promulgation of State regulations in order to get primacy.

Class VI well regulations, like all UIC programs, are designed to protect public health and underground sources of drinking water. They cover injection site evaluation, construction specifications, operational constraints, well testing, monitoring, emergency response, and closure

requirements, among others.

As part of primacy applications, States develop their own rules and regulations that meet or exceed Federal rules. The UIC program is a novel and complex program that relies heavily on site-specific determinations. As previously mentioned, four States have primacy currently, and several of this committee's States have submitted primacy applications, while even more are in the process of completing primacy applications.

As Kevin mentioned, North Dakota waited several years for their primacy, and now States are waiting many years once they have submitted their applications to obtain primacy. State agencies have a vested interest in the communities where they live, work, and raise their families. They understand environmental protection, economic development, water use, and public health needs of their State. They have the expertise in local geology, water sources, geography, and they are the most efficient and can provide faster responses.

Some challenges remain towards obtaining primacy. State regulators have expressed to us that EPA has been helpful in providing information about the Class VI application process. They have made themselves available to meet and discuss the process, provided guidance documents, and interfaced with States, both individually and through work groups through the Ground Water Protection Council.

However, the current application process is extremely rigorous. Though EPA has done some work to improve this process, States that already have regulatory programs in place, including other components of the UIC program, are well suited to manage the Class VI program and should have a more streamlined process to obtain primacy.

Regulations for Class VI should be based primarily on geologic siting, operation, and secure project closure. States are best equipped to administer the complexities of this Class VI program, but more resources are needed for permitting and regulatory capacity, including staffing, training, and technology.

Some funding has been provided by Congress, either directly to State programs or to EPA, but not all of those funds have been released by EPA, including $1.2 million for the Fiscal Year 2024 budget for State training.

GWPC has initiated a Class VI training program, including developing a Class VI curriculum in conjunction with States for their needs, but additional funding from Congress could speed the development.

Data management focused on full well life cycle is critical for this program. States and GWPC have previously developed similar programs and have begun work on a Class VI data management program, but funding is needed to complete a robust,

State-managed system for Class VI.

How can Congress help? Federal funding enacted as part of an annual appropriations could provide essential support for geologic storage deployment by expanding capacity of States to permit geologic storage. From industry partners that have the technology to construct these projects, to States ready to develop safe and effective regulations, all the ingredients are there to implement safe and secure carbon sequestration.

GWPC stands ready with its State agency members to work with Federal partners and stakeholders to attain geologic storage on a needed scale.

Thank you again for your time on this important topic today. I am happy to answer any questions.

[The prepared statement of Mr. Yates follows:]

Senator Capito. Thank you very much, Mr. Yates.

Our final witness is Jack Cavanaugh, who is the Manager of Carbon Management for Breakthrough Energy. Mr. Cavanaugh focuses on carbon capture technologies for the organization as a member of the CCUS Federal Lands Permitting Task Force.

Thank you very much, Mr. Cavanaugh, for joining us today. We look forward to your testimony.

STATEMENT OF JACK ANDREASEN CAVANAUGH, MANAGER OF CARBON MANAGEMENT, U.S. POLICY AND ADVOCACY, BREAKTHROUGH ENERGY

Mr. Cavanaugh. Chairman Capito, Ranking Member Whitehouse, and members of this committee, thank you for the opportunity to appear before you today. I am here to discuss the USE IT Act, Class VI wells, and the challenges and opportunities this committee faces as it continues to foster carbon management, including carbon dioxide removal.

My name is Jack Cavanaugh, and I oversee carbon management at Breakthrough Energy. Breakthrough Energy was founded to accelerate energy innovation and build the industries of the future without emissions, and we deploy for-profit investment funds, nonprofit grant-making programs, and policy efforts to achieve that mission. I serve on the White House Task Force for Carbon Capture Utilization and Sequestration on the Subcommittee, Federal Lands and the Outer Continental Shelf, established through the bipartisan efforts of this committee and the USE IT Act.

I am also a Husker. It is great to see you, Senator Ricketts. I was born and raised in the great State of Nebraska. A natural gas pipeline runs through my family farm in South Hastings and was recently retrofitted to carry CO2. This was made possible by the 45Q tax credit. We are happy to have the infrastructure on our land and proud to be part of the growing

carbon management economy.

Carbon management includes carbon capture for power and industrial sectors, pipelines, geologic storage, and carbon removal. My testimony reviews important research, including the Potsdam Institute paper on the absolute need for CDR going forward, and we need gigatons. To put a gigaton in perspective, a single blue whale weighs around 146 metric tons, which means six million blue whales constitute a single gigaton, and we need multiple gigatons of both CCS and CDR from here on out.

The total summary of the research is this: the world is warming, it is warming faster, and it will continue to warm, mostly because of carbon dioxide emissions that we are putting into the air. We have no choice. We should reduce carbon emissions wherever we can, remove those that we cannot reduce, and also use carbon dioxide removal as an environmental remediation tool for legacy emissions.

Each small rise in temperature matters, and each small rise results in climate impacts getting progressively worse. The rise in temperature is having steep physical and economic impacts. Wildfires in California, hurricanes in Florida, all have resulted in hundreds of deaths and tens of billions in economic damages. Insurance has simultaneously pulled out due to this climate risk.

The U.S. is the dominant Country and driving force in

carbon removal today. Corporations and countries are paying U.S. companies for carbon removal, and investors from around the world are coming to build here. This is fundamentally due to the bipartisan policy support for CDR, the commitment to cutting edge research and development coupled with an incredibly innovative private sector.

We have the policy infrastructure, like the DAC Hubs Program from the Infrastructure Investment and Jobs Act, the USE IT Act from this committee, the 45Q tax credit, and the Class VI well program. We have the early stages and the incredible potential for the physical infrastructure of carbon capture and removal technologies, pipelines, and safe, proven geologic storage. This innovation and infrastructure combination sets the United States apart. Thousands of good paying jobs are currently being created with hundreds of thousands more upon scale-up.

Carbon management brings economic development. It brings a more competitive America and a healthier environment for American citizens. But this is only possible if we can permit and build fast enough. The committee should work with the Administration to make sure the USE IT Act, the White House task force delegated by the USE IT Act, continues to be a priority. Specifically, the task force needs to replace its two political appointees before it can conclude its recommendations and share

it with both this committee and Congress.

We need Federal permitting clarity and efficient Federal permitting regimes for CO2 pipelines and all forms of CDR, which are currently not sited Federally, sited or permitted Federally. We need authorized funds for continued research and development on driving down the costs of all use cases for carbon management technologies. We need the next phase of Federal Class VI program to reach permitting decisions on project level timelines. We need to provide lessons learned and a clear roadmap, the information EPA needs to reach decisions, on applications from States seeking Class VI primacy.

Advancements in these areas will allow the U.S. to secure domestic energy supply resource production. It will strengthen our supply chains, trade, and our national security. We have a rich history in this Country of coming together and advancing technologies to overcome the most pressing challenges, but to rise to this challenge, we need clear permitting regimes, funding, and public-private partnerships to deploy these necessary carbon management technologies.

If we do not deploy this technology, China will. China will enjoy the economic development, hundreds of thousands of jobs, and a healthier environment. America is leading the way, and the future, as always, is a policy choice. This committee has put our Country on a path to achieve American dominance in

carbon management, in energy, and in a healthier environment.

Breakthrough Energy stands ready to work with you to help our Nation's carbon management policies reach their full potential. Thank you.

[The prepared statement of Mr. Cavanaugh follows:]

Senator Capito. Thank you. Very good.

I am going to refer my time to Senator Husted. He has to leave. As we know, there are several committee meetings going on at the same time here, so there will be a lot of in-and-out, but go ahead, Senator.

Senator Husted. Thank you very much, Chairwoman Capito, for arranging the hearing and giving me chance to ask a couple of questions.

It is, my background, Ohio, the State I represent, has a large oil and gas shale play in the Utica Shale Basin. I have spent a lot of time at the State level working with our EPA on injection wells and the primacy issues that we have at the State level.

I really have been impressed at how the people who work in this area in our State really understand the unique nature of how things happen in our State, what the geology is, what the history of these regulations are. I am a big fan of primacy in general and am interested in learning more about how we do this for carbon sequestration for Class VI primacy.

Dr. Yates, just give us, give me some perspective on how States are better suited to do this. My belief is that they are better suited to handle primacy. I just want to hear your thoughts on my conclusions, and if you agree with that, or if you have advice to the contrary.

Mr. Yates. Thank you, Senator, for that question. We do quite a lot of work with Ohio. Both Ohio EPA and Ohio DNR are very involved with our organization on UIC, and you are right, very knowledgeable and conscientious staff that do really, really good work, and our leaders and our organization.

You are right. States are best suited; they are better suited. One of the reasons is just a simple numbers game. Rather than one agency trying to manage wells for multiple States, having staff in your State have management authority over the wells in your State.

Then I think another important piece is just the overwhelming amount of knowledge that State staff have about the operations in their State: previous UIC projects, access to data on those non-Class VI UIC, those other well classes, the ability to engage with their State geologic surveys and understanding the history. They have more staff that can focus, and they have better access to data information to make these management decisions to approve wells. Thank you.

Senator Husted. Thank you.

Just to follow up with that, if I could, Madam Chair, it is, the EPA, the States have, for example, in Ohio, we have primacy in everything except for these Class VI wells, and so it works, it has worked. It has worked successfully.

But tell me what lessons are there? If I were to talk with

our State regulators in this, what lessons have we learned that they should know regarding underground injection for carbon capture and as we prepare to look at this Class VI provision for States to have the primacy? What is it that you have learned that is applicable, that everybody should know?

Mr. Yates. One of the things that we have learned over time managing the UIC program, both in Ohio and nationwide, are the existing geologic plays that exist that can hold this carbon, so we have that data. We know a lot about the underlying geology because of both the Class II program, which is injecting produced water from oil and gas, and then also using CO2 for enhanced recovery.

So we have got experience, actually, injecting CO2 through the Class II program, and then we have, at the Ohio EPA and at other State agencies, additional deep geology experience and understanding from the Class I program that injects other types of wastes for, again, long-term storage. We just have a wealth of information among these State agency staffs on how UIC works, where the successes have been, where the challenges have been, and even specifically with CO2 injection that is outside the Class VI program.

Senator Husted. Thank you very much.

Senator Capito. Senator Whitehouse?

Senator Whitehouse. Thank you very much, Chairman.

Mr. Cavanaugh, the new Director of the Department of Energy's Loan Programs Office has stated that he is exploring cancelling existing already approved loans. This could affect $69 billion in issued loans and loan guarantees and $41 billion in conditional commitments, including a billion-dollar conditional commitment to Monolith for a carbon utilization project in Nebraska.

How would cancellation of these loans and the continuing freeze in related Federal grants and loans hinder the development of U.S. domestic CCUS?

Mr. Cavanaugh. Thank you for the question, Senator. We support, and I think it is important that all government spending and taxpayer dollars are spent efficiently. Freeze on funding on things like guaranteed loan and, specifically with this project in Monolith, would undoubtedly hamper the project's ability to deploy, and very likely would render the project to unable to come to a final investment decision, and end up becoming operational.

Public-private partnership, investment from private industry, especially in the carbon management sector, is not just dependent on the innovation that they are bringing forward, but also with the firm support of the Federal Government and programs like the LPO, the Direct Air Capture Hubs.

To put it succinctly, with a freeze, with a delay in these

funds, the likelihood that these projects reach full operation is incredibly dubious.

Senator Whitehouse. And there has been reliance, both by private parties and States, on these loans and commitments, correct?

Mr. Cavanaugh. That is correct.

Senator Whitehouse. The other topic I wanted to touch on with you is what I see as fossil fuel industry's split personality around carbon capture. When the industry wants to reassure everyone that it is safe to continue to pollute, they trot out carbon capture as the rhetorical vehicle for excusing continuing to pollute.

But when it actually comes to putting money into a carbon capture project on a plant or accepting an EPA power plant reg that implements that, they don't spend the money, and they claim that the thing they said is the answer is actually not feasible.

Any comments on how we works our way through that split personality problem?

Mr. Cavanaugh. Yes, thank you for the question, Senator. I think, first and foremost, when you are looking at these oil and gas companies, these are publicly traded companies, and in their investor decks, it is actually very clear to be able to see who is deploying billions of dollars on actually putting steel in the ground on projects, and who is spending --

Senator Whitehouse. The Good actors.

Mr. Cavanaugh. Sorry?

Senator Whitehouse. The good actors.

Mr. Cavanaugh. The good actors, and who is spending millions of dollars on marketing campaigns.

Second, outside of this public transparency, we also have strong regulatory regimes in the United States, on like the Class VI Well Program, like PHMSA, with CO2 pipelines, to ensure that when they do deploy these technologies, they are done in a safe manner.

Finally, I think it is important to note that the oil and gas industry does have an incredible overlap and workforce relative to the deployment of some of these technologies. In particular, direct air capture has a massive workforce development piece there, where you are not only relying on the expertise, especially on the transportation of CO2 and injection into the subsurface that you already have within these companies, but you are also then recruiting new folks into climate technology.

Senator Whitehouse. I think it is important to note the discrepancy between what significant segments of the industry say about carbon capture and what they actually do about it when it comes to either their wallets or the regulatory environment that they operate in.

Let me ask, my time is short, so if you don't mind, Mr. Connors and Mr. Yates, I will ask these questions for the record so you have time to respond in writing.

For Mr. Connors, my question is how U.S. Federal agencies can improve coordination with State and local governments, both on CCUS and CO2 transportation permitting. As the Chairman and I have both announced, we are hoping to work together on rekindling permitting reform here and with the Energy Committee. so this could be very helpful to us in that effort, if you would respond to that.

Mr. Yates, with respect to Class VI well permitting, how can the current approach be streamlined or improved to expedite project development and deployment while maintaining real safeguards for drinking water? If you can get back to us on that, I think your answers would be very helpful to our permitting reform effort. Thank you for being here today.

Thank you, Chairman. Now, I am off to the Budget Committee.

Senator Capito. I know that will be fun for you.

I mentioned in my opening statement that the USE IT Act was signed in 2020. I also alluded to the two CCUS permitting task forces that had been established, one for Federal lands and one for non-Federal lands. I am interested to know.

I am going to start with you, Mr. Connors, and then I am

going to go to you, Mr. Cavanaugh, because you are on one of the committees, I believe. Now that these task forces have been chartered and are operating, do you believe that will make an impact on identifying opportunities to improve the permitting through these task forces as the law requires? What is your opinion of the two committees now that are moving forward, and is that going to be as helpful as we would hope?

Mr. Connors. Chairman Capito, I am confident today, you mentioned it was a slow start to get these task forces established, but starting really in this summer, but in the fall, and as of recently, I have actually been given the opportunity to lead the authorizing of a section focused on permitting.

So a lot of the information that we have talked about today in terms of Class VI permitting and reforms will be within that report, so I actually have a lot of confidence that the report will be helpful to this committee and the other committees.

Senator Capito. Does that report go to these two task forces? I mean, that is required by the law, the report?

Mr. Connors. Correct. The task forces are tasked with preparing guidance for this Senate committee, Senate Energy and Commerce, House of Representatives Committees for Natural Resources and Transportation Infrastructure, and the guidance is being prepared by both task forces to identify permitting and

other challenges, and then ultimately making key recommendations to improve permitting process and promote the efficient, orderly, and responsible development of specifically CO2 Class VI permitting.

Senator Capito. Right, good.

So, Mr. Cavanaugh, what is your perspective on this, your view as a member of the Federal lands permitting task force?

Mr. Cavanaugh. Thank you, Chairman Capito.

Yes, I share similar sentiments to Mr. Connor's. The Task Force on Federal Lands is working to provide recommendations that are not only an amalgamation of the total experience in the room, which includes both industry, public policy experts, as well as folks from communities that will be receiving CCUS technologies, but also working across a number of different agencies on Federal lands and the outer continental shelf. You are not only dealing with the Department of Interior, but also BOEM, as well.

Our recommendations will take into account the total information that we have from everyone, and we will also be actionable in the near term.

The one thing that I do want to stress, and this came from the gentleman who is leading my task force on the Federal lands, is we need to replace the new political appointees before we are able to conclude the task force and give recommendations to you

and to Congress. Thank you.

Senator Capito. Okay, thank you. Mr. Connors, you mentioned that there are nine projects in North Dakota, is that correct, that have been permitted?

Mr. Connors. Yes, that is correct.

Senator Capito. Could you just kind of, really quickly, so that I can understand, because I think somebody mentioned it. I can't remember which one, that some projects are easier than others to permit. Could you tell me what those nine projects, generally, are they natural gas plants, are they ethanol plants? What are they, industrial?

Mr. Connors. Chairman Capito, there are a variety of industrial sources. The first project that was permitted was a single ethanol plant that is sitting right on top of ideal geology.

Senator Capito. Okay, so they have their well right there.

Mr. Connors. They have been operating since June of 2022.

Senator Capito. Okay.

Mr. Connors. There is also another ethanol plant, again, sitting on top of ideal geology, and that was also permitted. These were, in terms of scale, 180,000 to 200,000 metric tons of CO2 are being captured and injected on an annual basis.

There is a third project that is operating that is co-located with the Great Plains Synfuels Plant is through, CO2 is

being captured through the coal gasification process, and they are storing CO2 right there on site. They are also capturing that CO2 stream and transporting it via 205-mile pipeline to southern Saskatchewan for enhanced recovery, and they have been doing that since 2000.

There are also permits that have been issued for CO2 capture and storage for the Milton R. Young Station, and currently that is operated by Minnkota Power Cooperative, and they are currently working on determining their final investment decision for that carbon capture project.

The latest project that has been approved is the Summit Carbon Solutions Project, and that is three large storage units that have been permitted in North Dakota, there.

Senator Capito. So what is that, is that a power generator?

Mr. Connors. Summit has aggregated, I believe it is over 50 ethanol and other biofuels facilities in the corn belt in Iowa, southern Minnesota, eastern Nebraska, and eastern South Dakota, and North Dakota with intents to construct a network of pipelines to bring that CO2 to western North Dakota.

Senator Capito. Okay. Well, I would just say, I think that is very interesting, because I think part of what the Ranking Member was alluding to that certain types of projects haven't really been able to move forward with the Class VI for

whatever reason, but you did line out what those reasons are: cost of the retrofit, CO2 pipeline permitting, and then the long lead times, which has led to probably some confusions. If the political appointees can be going forward and confirmed, that might alleviate some of the long lead time issues.

Senator Cramer?

Senator Cramer. I feel like my work is done. This is really great, actually.

[Laughter.]

Senator Cramer. Along the same theme, and maybe, Mr. Connors, you could just help us. How was it that North Dakota was first? When I think of the small number of resources we had, now, we have a long history, as you have just pointed out, we have been capturing and piping and utilizing CO2 for 25 years. We were doing it way before it was cool.

Other than that, what is it that put North Dakota at the front? How did we do it so quickly, and what lessons can be learned in terms of getting that Class VI primacy authority?

Senator Capito. We thought it was you.

[Laughter.]

Senator Cramer. Yes, well, I would like to take credit, but I think it was more than that.

Mr. Connors. Chairman Capito, Senator Cramer, thank you for the question. This began in the early 2000s, and the State

of North Dakota recognized early on that our economic pillars for North Dakota, our agriculture and our energy industry, which are both intensive in terms of CO2 emissions. So we set out in the early 2000s to develop frameworks, regulatory frameworks, to provide certainty specifically to our energy industry, that if they were to be able to advance carbon capture technology, that they would have the certainty in order to store that CO2.

North Dakota took the approach of developing a resource management framework, so CO2 storage in North Dakota is regulated much like we regulate oil and gas. It is in the public interest to promote geologic storage of carbon dioxide.

We declare CO2 as a valuable commodity for its industrial use, specifically for enhanced oil recovery, and we regulate the pore space in North Dakota like a resource, under a resource management framework. That gives the State the ability to create unitization or unitize these projects in order to allow landowners to monetize their resource or monetize their pore space, looking to maximize the use of that pore space.

All nine projects that have been approved in North Dakota all have units that have been established by the State regulatory authority.

Senator Cramer. You touched on something that I have said for a long time. By the way, John Harju, I will never forget, as a utility regulator, when PCOR became an idea, and you

presented, and I thought, what in Sam Hill is this? This sounds crazy to me, and look at where you are today. Look where I am; that is even weirder, but anyway.

[Laughter.]

Senator Cramer. By the way, when it comes to primacy, and I appreciate all your testimony on this, one of Cramer's convictions is that Federal mediocrity should never be imposed on a State's excellence. I am sorry that it takes so long to do what should be obvious in terms of just, general philosophy of governance, not to mention constitutional. We will get there.

Mr. Connors, you laid in your testimony, referenced something that is intriguing to me and I think we should explore a little bit, and that is the aquifer exemption issue. Can you sort of walk through that a little bit with me? First of all, what are the dangers, and second of all, why do you need the exemption? And if we don't get the exemption, how does that affect the availability of space for storage?

Mr. Connors. Chairman Capito, Senator Cramer, thank you for the question.

This is an extremely important technical challenge that the industry is facing today. It is a little bit of a complex challenge, so I will do my best to explain it in a way that makes sense to everyone.

It really has to do with the way in the terms of our Safe

Drinking Water Act, the way we define underground source of drinking water. It is a broad definition. So, the definition of an underground source of drinking water includes a process for identifying aquifers that meet some criteria for serving public water supply, but they will not and they would never be a public water supply.

So you have deep, subsurface geologic formations that do meet some criteria for water quality, but there are certain criteria that would eliminate those formations to be used for drinking water, whether it is other constituents, or it just not economical to develop, or that formation won't produce enough water to be a drinking water source.

It is a complex challenge, but EPA created a process to allow for the exclusion of those formations, to be able to use them for underground injection. When the EPA published the Class VI rule in 2010, they excluded, aquifer exemptions are not allowed for Class VI injection. All the other well classes are allowed to have or apply for aquifer exemptions other than Class VI.

What that means to this committee is that there are formations that are ideal and suitable for CO2 storage that will never be used for drinking water, yet you cannot permit or inject into those formations because of the current regulations.

Senator Cramer. Does Congress need to address that, or

why, and what is the blockade?

Mr. Connors. Chairman Capito, Senator Cramer, the challenge with it, it is kind of a three-pronged solution.

Congress can address it and direct EPA to amend their rules and allow for aquifer exemptions for Class VI. EPA will have to amend their rules and remove that provision. And then the third piece is also challenging. EPA is the final authority when it comes to making that decision for aquifer exemptions, and that still takes a long lead time. I have previously administered North Dakota's Class II UIC Program, and it would take a year or two years to get an aquifer exemption from the EPA when they do allow it for that injection well class.

Senator Cramer. I am glad I asked. Thank you.

Senator Capito. Senator Ricketts?

Senator Ricketts. Chairman Capito, thank you very much for holding this, and also my regards to Ranking Member Whitehouse as well for this important hearing. I look forward to working on a bipartisan way to be able to get all the members of the committee on these common-sense carbon arrangements and programming, which is a win-win-win-win, right? It is great for consumers; it is great for the environment; it is great for farmers; it is great for bio-producers. It really is something that we need to continue to pursue. I congratulate the State of North Dakota on your great progress on it already.

It is also great to have Mr. Cavanaugh, to have you here. It is great to have a husker, as you mentioned before, so thanks for taking the time to be a witness, and thank you to all of our witnesses for being here.

Nebraska is actually the second-ranked ethanol State in the Country, and I know the Chairman knows this because of my service on this committee the last two years. She has heard me oftentimes talking about why I love this committee so much because we get to talk about ethanol all the time.

Ethanol is great because it saves consumers money at the pump, helps clean up our environment, and as mentioned, is great for our farmers and ranchers. Nebraskan farmers benefit from the certainty of premium markets associated with the biofuel industry. As we are talking about it, if you could lower the carbon score through ethanol, right, you can actually charge a premium for it. That is a good thing. That is the market at work. It is a fantastic thing.

Carbon pipelines help add that premium to biofuels and biofuel markets by lowering that carbon intensity even further through this carbon sequestration. Nebraska and other midwestern States tend to benefit greatly from pipeline projects like Tallgrass Pipeline, which originates in Beatrice, Nebraska and terminates in eastern Wyoming. Tallgrass has the capacity to do ten million cubic tons of CO2. That is like two million

cars being taken off the road.

The potential for growth of this carbon storage industry is just another reason why we ought to be doing E15 year-round and implement the renewable fuels standard on time. Ensuring the development of carbon storage infrastructures requires compliance with different agencies and regulatory schemes.

I would certainly agree with my colleague from Ohio when he said he agrees with the primacy of States, because again, having been a former governor, I know what a great job our Department of Environment and Energy did in that primacy.

In Tallgrass's case, the State of Wyoming was responsible for issuing the Class VI well permit through EPA's Underground Injection Control Program. The Wyoming Department of Environmental Quality successfully did that. It was a huge win for Nebraska and the Midwest and neighboring States.

So while I am relieved to hear the Tallgrass project has that Class VI permit, so many other projects have not had that same success. According to the EPA, only eight Class VI wells have been permitted. One hundred sixty-one are still awaiting that permitting, or are still pending.

Again, getting back to the Ranking Member's concerns, maybe this is one of the reason why other companies don't jump in. If you only have eight Class VI wells permitted and there are 161 waiting, why would I jump in on this? The EPA has got to get it

going. This is just unacceptable.

At the beginning of last year, Senator Fischer and I led a letter asking the EPA about Class VI well permit approval process. A biofuel stakeholder has been waiting 33 months for a permit, despite the commitment from the agency that the process would take no longer than 24 months. I have actually got copies of those letters right here, and without objection, I would like to submit these letters that we sent to the EPA and the response for the record.

Senator Capito. Without objection, so ordered.

[The referenced information follows:]

Senator Ricketts. These delays and excuses demonstrate what we already know to be true: that the Biden Administration was not serious about a holistic approach to clean energy, and favored toxic Chinese-based suppliers for batteries. Second, State governments often are better stewards of taxpayers' dollars, as we have demonstrated by what is going on in North Dakota and should play a more active role in the Federal programming for implementation.

Federal roadblocks for CO2 permitting stand in the way of leveraging every penny that could be going to helping Nebraska farmers feeding and fueling the world. Farm country is struggling and access to the biofuel market supported by the Class VI wells would pad producers' bottom lines.

I am encouraged by the bipartisan support from both Chairman Capito and Ranking Member Whitehouse and other members of this committee for the USE IT Act. This legislation includes language specifically to streamline the permitting process for CO2 pipelines. There are critical provisions in the USE IT Act, like expedited permitting to review development of cases of carbon infrastructure.

As a governor of Nebraska, I am going to Lean Six Sigma to be able to streamline our processes. For example, we are able to bring some of our permits down from 110 steps to 22 steps and cut the time to issue them from 190 days to 65 days. We ought

to be looking for those same sort of answers in our EPA.

Mr. Connors, your work in North Dakota on carbon sequestration is impressive with regard to Class VI. How has Class VI well permitting been different from what it would be in the USE IT Act's passage?

Mr. Connors. As I mentioned, when you have Class VI primacy, like you do in North Dakota, and certainly Nebraska, I believe, has decided to pursue Class VI primacy, the State regulator is able to evaluate these complex applications in a much more efficient manner.

We have a drastic comparison. On the Federal level, it takes EPA two to four years to issue a Class VI permit. The most recent ones were just the permit to construct, so that operator is going to have to turn around and actually apply for the authorization to inject, which is an unknown timeframe.

In North Dakota and Wyoming, who have both issued these project permits, North Dakota takes about eight months to issue a permit, and Wyoming takes about 12 months, on average, to issue their first three permits.

It is efficient. This is an efficient process. These are complex applications, but certainly, you would have a regulator that is able to work through that process in a more efficient manner.

Senator Ricketts. Thank you, Chairman, for being lenient

with the time here, but I just wanted to say, as a governor, I wholeheartedly agree with your assessment of it, that the States can be much more efficient in getting this done. Again, for example, when I talked about that Lean Six Sigma process, we at the State, we can't change any of the environmental regulations. Is that right, Mr. Connors?

Mr. Connors. That is correct. In order to receive Class VI primacy, your State program has to be as stringent as the Federal EPA's program in protecting underground sources of drinking water.

Senator Ricketts. Yes.

Mr. Connors. EPA recognized when they published the Class VI rule in 2010, in the preamble of that rule, that States are best positioned to regulate and implement this program, because they can enact a broader framework, and that is the framework that I was discussing, where States can regulate a project, they can create pore space unitization, and EPA is just limited to regulating the injection well.

So EPA recognizes that the States are best positioned and suited to regulate this activity and to be able to do so in a manner that is more efficient. The way we talk about it in terms of these regulatory frameworks is, the State is really positioned to regulate from cradle to grave, and that is an important piece, where the State can regulate the project. EPA

has limitations to what their regulatory authority is when they are the implementation authority.

Senator Ricketts. Thank you, Mr. Connors. I appreciate your answer there, because that is something that, again, as a former governor, I appreciate. Nobody cares more about having clean air or clean water in the State of Nebraska than Nebraskans, and that is why we do such a great job with the environment, and that is why we need primacy.

Thank you for your indulgence.

Senator Capito. Thank you.

Senator Curtis?

Senator Curtis. Thank you, Madam Chair.

I actually would like to pick up where my colleague left off. Utahns, I think, find themselves equally as concerned about leaving the Earth better than we found it, clean air, clean water, and clearly, the ability to take carbon out of the air is a very, very important part of that. I firmly believe our Nation's energy security depends on what I call affordable, reliable, and clean energy. Carbon capture can play a critical role in achieving that balance.

Companies in Utah are eager to innovate, but often faced delays in obtaining approvals from Federal agencies to implement new technologies. The USE IT Act is an important law that clarifies the role of Federal research agencies in advancing

carbon management technologies, including carbon capture through research, development, and demonstration efforts.

Additionally, the USE IT Act ensures that carbon capture, utilization, and storage projects qualify for streamlined permitting under the FAST Act, which was originally designed to expedite the review of surface transportation infrastructure projects.

Mr. Yates or Mr. Connors, or both, currently, only two carbon capture and sequestration projects are listed as FAST 41 covered projects on the permitting dashboard for Federal infrastructure projects. What actions can the Administration take to fully implement the USE IT Act, particularly ensuring a more efficient permitting process?

Mr. Yates. Thank you, Senator Curtis. That is a really great question.

One of the problems for States as they apply for primacy is, EPA uses what they call a crosswalk, which can be a very good tool, but it is a complicated tool. There is not very good transparency to States on the process of where they are within primacy. So making that a more transparent process, training that is for both States and EPA simultaneously on what the crosswalk's purpose is and how it is to be used would be very helpful in speeding primacy.

If we can get States primacy faster, we have already talked

a great deal today about how States are more efficient with their permits. So I would say an answer to your question is reviewing EPA's process, causing them to be more transparent. Often, States will get a copy of the crosswalk with things highlighted, but no description of what any of those highlights mean. So specific questions to States on what is holding up the primacy process. It is EPA's role to determine whether or not a State's rules and regulations meet or exceed Federal. It is not the State's role to do that, but we are getting confusing information back from EPA during that primacy process.

Senator Curtis. Thank you. Yes, go ahead, Mr. Connors.

Mr. Connors. As we have mentioned, there is, last I checked, 161 well permits that have been backlogged at the EPA regional offices. The number one solution is, there are States that are in the preapplication process to apply for primacy.

If EPA were to grant Texas alone primacy, 35 percent of those applications would go to the State of Texas. There are a lot of projects in Texas. If the EPA were to grant primacy to the States that are in the queue, that are pursuing primacy, it is about 40 percent, and there are several States that have announced that they are pursuing primacy. That is another 50 percent of the applications.

Those other 50 percent of the applications are in States that have not indicated that they are interested in pursuing

Class VI primacy. EPA could focus their resources on California and Illinois, where there are a lot of projects today, but granting States primacy that have applied and expediting that process is crucial to alleviating the backlog.

Second of all, EPA can incentivize more States applying for primacy and requesting that authority from EPA if they knew that EPA was going to expedite that process. I think there would be an advantage there.

Senator Curtis. That is great.

Madam Chairman, we need to talk to Mr. Zeldin and give him a few minutes to get his feet underneath him and then light a fire underneath him. I would like to agree with my colleagues about just the difficulty of Class VI permits. I don't need to go deeply into that because I know it has been discussed today, but I do want to add my voice to that.

Mr. Connors, what resources can the Federal CCUS Permitting Task Team, in coordination with the DOE, provide to States, particularly those with Class VI primacy, like Utah, to assist in the review and the permit of processes, review of permits?

Mr. Connors. The Underground Injection Control Program historically, and I think it has been around for about 40 years now, historically there are grants that the States apply for through EPA, and there is funding resources to those States that have primacy.

For the history of Class VI, which began in 2010 when EPA published the Class VI regulations, there has been no resources through those UIC grant applications. The States are applying for and administering those Class VI programs with their own State funding to do so, and so additional funding for the States, to have those resources to implement their Class VI programs, would be extremely helpful.

Senator Curtis. Thank you.

I thank the witnesses, but I also thank the Chair. This is a really important topic, and I suspect most of America doesn't really understand fully the potential here. So thanks for holding this hearing, and I look forward to additional discussions. I yield my time.

Senator Capito. Thank you.

Apparently, Senator Schiff is going to be coming. We were just called for our votes, so I am going to ask a question.

Mr. Cavanaugh, you have done a lot of work on direct air capture. I guess I am curious to know, are any of the wells that have been permitted direct air capture wells, and what kind of, Mr. Connors lined out three difficulties for getting these projects moving, retrofitting, permitting on the pipelines, and long lead times.

How does direct air capture work into this? Is the technology fully proven, and who is doing this work?

Mr. Cavanaugh. Thank you, Chairman Capito.

So, to my knowledge, there has been one conditional permit in West Texas for the Occidental Petroleum Stratos facility, a Class VI well, the Brown Pelican Project, that is specific for direct air capture project.

As a general rule, Class VI wells, you need, mostly from an economic standpoint, you need about a million tons a year down well to make it worth putting in a permit for. As of yet, there are no direct air capture projects that can remove a million tons a year, so, unlikely that many Class VI wells will uniquely be situated for a single direct air capture project.

Direct air capture shares many of the similar challenges associated with point source capture. However, instead of removing it from a relatively concentrated source, out of a power plant, industrial sites, moving directly out of the ambient air. The number one thing that we can do to drive down the cost of direct air capture is cheap, abundant power.

At the end of the day, 80 percent of the cost associated with DAC is heat, 20 percent is related to electricity. We need cheap, abundant power sources, whether that is natural gas with CCS, nuclear, hydro, geothermal. We need not just those projects to be built, but we need the large transmission lines to be able to carry that energy to these projects to drive down the cost on the capture side.

They share the same concerns on pipeline permitting and CO2 storage, although a benefit of direct air capture is because you are pulling out of the ambient air, you can site directly on top of geologic storage to minimize the amount of pipelines you need.

Senator Capito. Right. Let me ask you this: can you combine a direct air capture project with a point source capture project to make it to that scale that you have talked about? Is that permissible? I don't know.

Mr. Cavanaugh. Yes, absolutely. This is happening today with a lot of direct air capture projects, where they are deploying, for instance, the South Texas DAC Hub and also the Cyprus Project, which is a direct air capture hub facility in Louisiana, are deploying in industrial-rich areas where they can aggregate the carbon capture from these industrial sources alongside of their direct air capture to make the unit and project economics better.

Senator Capito. You know, it is interesting that you mention the need for more energy, because as you create the energy, and you mentioned, you said natural gas with CCUS, so than you are double CCUS-ing in one project, here. You are CCUS-ing to get the energy to do the direct air capture.

I don't see how the economics of that will work. Maybe into the future, hopefully. But we have a repeating theme here,

and I mentioned it in my opening statement of the reliabilities, because not only is this an intensive process, the process that we see on AI and other things are putting great pressures on our potential for providing electricity for all of this.

But the key to all of this, and it is not the only key, but it is the key to every one of these projects, is a permitting process that you can move along. You can't permit a nuclear plant, you can't permit a pipeline, you can't permit a transmission line. You are sort of, at every point of the project, all hands point to permitting. Any help that you can give us with permitting Class VI and those pipelines, I think, will cross benefit all projects.

I think what is good about it is, as Senator Whitehouse said, this is going to be a bipartisan push. It is the only way to do it effectively, to get it into legislation, because we see what happens with the regulatory environment, is the shifts of Administrations go from one to the other at the Federal level.

I would just say, I really appreciate you all being here today. I am going to go to Senator Cramer, and we will go a couple more minutes, and if Senator Schiff doesn't show, we will just ring it down.

Senator Cramer. Yes. Thank you, Madam Chair.

This is a really fascinating discussion. Quite honestly, we could take it into lunch if you want, and sit around a table

somewhere in a cafeteria.

But I run the risk of sounding silly, perhaps, in asking a couple of these questions, but we have referenced, now, on the energy, particularly the electricity issue, the challenge that we have. We have talked about all the permitting. There is a linear permitting, whether it is a transmission line or a gas pipeline to get there, the CO2 pipeline, you know, and then to do all that, you have to have a generator of some sort, right?

So we have that challenge in permitting, and then it really would help to have customers on the other side of it, because we can generate a lot of electricity and create transmission lines to nowhere, and that doesn't help anybody.

This is a very big issue. This is a very big and complex issue. As we prepare for permitting, we are going to be needing a lot of help, but we need to do it, to the Chairman's point.

You have alluded, Mr. Connors, to Class II wells and the ability to look at the similarities of all of these sources. There are a lot of Class II wells that are approved and permitted. Is there any reason why the application for a Class VI well, in space, it has already got a Class II well, does that complicate the Class II designation in any way? Do you know, or does there need to be a fixing of that?

This could apply to all of you, but we will start with you, Mr. Connors. Does that question make sense, even? Because it

is possible it doesn't.

Mr. Connors. Yes. Chairman Capito, Senator Cramer, I appreciate the question, and that is a question that I do get somewhat often.

There are different standards for well construction when it comes to a Class VI well versus a Class II well. Again, both are protective of the underground sources of drinking water. That is the cornerstone of the regulatory framework. But a Class VI well has more specific requirements for the way that that well is constructed in terms of well design and engineering that would not be compliant, typically, in, say, a Class II disposal well.

We also have Class II wells that are used for injection of CO2 for enhanced oil recovery in our oil fields, and certainly, there is phenomenal opportunity there as we look at the U in CCUS, utilizing the CO2.

Senator Cramer. Yes, I noticed we haven't talked about that a lot, and I wanted to get to that, so thank you. Keep going.

Mr. Connors. That is where I think you have an opportunity to advance and accelerate widescale carbon capture and utilization and storage to be able to have, when we are able to capture CO2 and address the economics associated with capturing CO2 from some of our largest emitters, and again, these are the

industrial sectors, the industrial operators, that are the life bread of the community in terms of economics, in terms of industrial tax base.

It is a dual challenge, but if the economics do make sense to retrofit with carbon capture technology, we can have readily available CO2 that, I believe, and I am optimistic about leads to greater innovation and greater utilization of that CO2. I think the opportunity is in front of us if we are able to knock down some of these barriers.

Senator Cramer. One of you, early on, actually referenced the difference between a commodity and a waste product, or a pollutant. That is what makes it a commodity, is the utilization piece of it.

We really haven't talked a lot about that, but Mr. Cavanaugh, I sense that you had something to say about my wonky question about wells, and you explained it well, but anything you would want to add to that?

Mr. Cavanaugh. Thank you, Senator.

No, I would just say, on something like enhanced oil recovery, enhanced oil recovery is sort of a microcosm of climate in and of itself. Climate change is a complex, societal problem, but fundamentally, a simple math one. We need to reduce emissions very quickly and remove those that we can't reduce.

Enhanced oil recovery is when you inject CO2 into an already existing field to push out more oil. In a world where you have stagnant or declining oil demand, oil produced from enhanced oil recovery is the lowest carbon intensive barrel of oil that you can get out of the ground. We have seen a demand for this globally with these barrels being sold right now. I think it is around 6 percent of current U.S. production is with enhanced oil recovery.

It is a simple math problem: however much CO2 you sequester in the ground, you subtract that from the total that would come from the combustion of the oil, and you receive more carbon intensive oil. Anyway, from your utilization question, I think it is a positive pathway.

Senator Cramer. Yes. We actually have, in Southwestern North Dakota, a project that produces net negative oil as a result. I don't know what all the great potential is for that, but it is fascinating.

My time is up. This has really been fun. I mean, I know I am nerdy, but this has actually been fun. Thank you, guys.

Senator Capito. Well, great. Listen, Senator Schiff is, I think, voting, so with no further questions, I would like to ask the witnesses and all of my colleagues, thank them for their participation today. Thank you. I know some of you have travelled quite far, so I appreciate that.

Senators who wish to submit written questions for the record have until 5:00 p.m. on Wednesday -- I believe Senator Whitehouse was going to be submitting some written questions -- February 26th to do so. The nominees' responses to those questions for the record are due back to the committee no later than 5:00 p.m. on Wednesday, March the 12th.

With that, the hearing is adjourned, and thank you all.

[Whereupon, at 11:18 a.m., the hearing was adjourned.]