S. HRG. 117–295

APPLEGATE, CANTOR, AND WANG NOMINATIONS

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDRED SEVENTEENTH CONGRESS

SECOND SESSION

TO

CONSIDER THE NOMINATIONS OF DAVID APPLEGATE TO BE DIRECTOR OF THE UNITED STATES GEOLOGICAL SURVEY, CARMEN G. CANTOR TO BE AN ASSISTANT SECRETARY OF THE INTERIOR (INSULAR AND INTERNATIONAL AFFAIRS), AND EVELYN WANG TO BE DIRECTOR OF THE ADVANCED RESEARCH PROJECTS AGENCY–ENERGY, DEPARTMENT OF ENERGY

APRIL 28, 2022

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CONTENTS

OPENING STATEMENTS

	Page
Manchin III, Hon. Joe, Chairman and a U.S. Senator from West Virginia	1
Barrasso, Hon. John, Ranking Member and a U.S. Senator from Wyoming	3

WITNESSES

González-Colón, Hon. Jenniffer, Resident Commissioner, Puerto Rico	5
Cantor, Carmen G., nominated to be an Assistant Secretary of the Interior (Insular and International Affairs)	7
Applegate, Dr. David, nominated to be Director of the United States Geological Survey	11
Wang, Dr. Evelyn, nominated to be Director of the Advanced Research Projects Agency–Energy, Department of Energy	15

ALPHABETICAL LISTING AND APPENDIX MATERIAL SUBMITTED

Applegate, Dr. David:	
Opening Statement	11
Written Testimony	13
Responses to Questions for the Record	40
Arthur, Jonathan D.:	
Letter for the Record	73
Barrasso, Hon. John:	
Opening Statement	3
BASF Corporation:	
Letter for the Record	74
Cantor, Carmen G.:	
Opening Statement	7
Written Testimony	9
Responses to Question for the Record	37
Castro, Hon. Joaquin and Hon. Darren Soto:	
Letter for the Record	75
González-Colón, Hon. Jenniffer:	
Introductory Statement	5
Manchin III, Hon. Joe:	
Opening Statement	1
Republican Party of Guam:	
Letter for the Record	77
Wang, Dr. Evelyn:	
Opening Statement	15
Written Testimony	17
Responses to Questions for the Record	68

APPLEGATE, CANTOR, AND WANG NOMINATIONS

THURSDAY, APRIL 28, 2022

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The Committee met, pursuant to notice, at 10:07 a.m. in Room SD–366, Dirksen Senate Office Building, Hon. Joe Manchin III, Chairman of the Committee, presiding.

OPENING STATEMENT OF HON. JOE MANCHIN III, U.S. SENATOR FROM WEST VIRGINIA

The CHAIRMAN. The meeting will come to order.

We meet today to consider three pending nominations and to vote on another.

First, as soon as we get a quorum, we will vote on the nomination of Dr. Kathryn Huff to be the Assistant Secretary of Energy for Nuclear Energy. The Committee held a hearing on Dr. Huff's nomination six weeks ago, on March 17th. I believe Dr. Huff is very well qualified for this important position. She has the academic training as a physicist and a nuclear engineer. She has extensive experience as a graduate research assistant at the Argonne and Idaho National Laboratories, as a postdoctoral fellow at Berkeley, as a professor at the University of Illinois, and as a nuclear program manager for the past year as the Principal Deputy Assistant Secretary for Nuclear Energy at the Department of Energy. She has demonstrated her ability to handle the job, both through her performance as the Acting Assistant Secretary over the past year, and at her hearing where she showed a firm grasp of the nuclear issues in answering the Committee's questions. I strongly support her nomination and I urge a favorable vote to report her nomination.

Following the vote on Dr. Huff's nomination, we will turn to today's hearing and our other three nominees. The three nominees we have are Dr. David Applegate, to be the Director of the United States Geological Survey. We have Ambassador Carmen Cantor, to be the Assistant Secretary of the Interior for Insular and International Affairs. And we have Dr. Evelyn Wang, to be Director of the Advanced Research Projects Agency. We welcome all three nominees and thank each of them for being here this morning and for their willingness to serve in these important positions. Welcome to each of your family members, if they are here, and if and when you get a chance, when you go through, you will be more than wel-

come to introduce your family members here. And I am sure they are very proud of you.

Dr. Applegate will be our first nominee. He has been nominated to head the U.S. Geological Survey. The Department of Energy often boasts of its 17 national laboratories as crown jewels. Well, the USGS is one of the Interior Department's crown jewels. It was founded a century and a half ago to assess the nation's geology and its water and mineral and other natural resources. It remains one of our oldest and most respected scientific institutions and our principal source of knowledge about our lands and waters, our mineral resources, and the natural hazards we face from volcanoes, earthquakes, landslides, and floods. Dr. Applegate is extremely well-versed in these matters. He has been with the USGS for the past 18 years—for the first seven years as Senior Science Advisor, and for the past 11 years as Associate Director for Natural Hazards, and for the past year or so, as the Acting Director. Moreover, David is no stranger to this Committee. Bennett Johnson recruited David to work for the Committee as a Science Fellow shortly after David received his doctorate in geology from MIT in 1994. So I take great pleasure in welcoming you back to the Committee this morning.

Our next nominee is Ambassador Carmen Cantor, who has been nominated to be the Assistant Secretary of the Interior for Insular and International Affairs. The Department of the Interior, like this Committee, has important stewardship responsibilities for our insular areas—Guam, American Samoa, the U.S. Virgin Islands, and the Northern Mariana Islands, in addition to overseas federal assistance under the Compacts of Free Association with the Federated States of Micronesia, the Republic of the Marshall Islands, and the Republic of Palau. As we were reminded during our oversight hearing on the Compacts last month, the Compacts with these Freely Associated States are expiring and need to be renegotiated for all our mutual benefit. So I am very pleased that the President has chosen Ambassador Cantor for this important position. She was born and educated in Puerto Rico. She is a career member of the Senior Executive Service. She is an experienced diplomat who has held senior positions at the State Department. She has spent the last two and a half years as our Ambassador to the Federated States of Micronesia, a post to which the Senate confirmed her by a voice vote, and that is not that often happening in here. I believe that Ambassador Cantor clearly has the knowledge, experience, and training that this sensitive post calls for at this critical time.

Our final nominee is Dr. Evelyn Wang, who has been nominated to head ARPA–E, the Advanced Research Projects Agency in the Department of Energy. ARPA–E had its roots in this Committee. It grew out of a request made by two of our former colleagues, Lamar Alexander and Jeff Bingaman, to the National Academy of Sciences to tell us what we needed to do to enhance science and technology so that the United States could compete and prosper in the 21st century. The America COMPETES Act and ARPA–E, which was authorized by the COMPETES Act, grew out of the Academy's recommendations. ARPA–E is charged with the task of overcoming technological barriers and developing transformative

science and technology solutions. It is the chief innovation office in a Department whose primary mission is innovation. And to head this Office, the law requires the Director to be someone specifically qualified to manage research programs and overcome technological barriers to the development of new, innovative energy technologies. As Secretary Granholm said, Dr. Wang has overseen groundbreaking research in heat transfer technology that has advanced clean energy and clean water solutions. She is the Head of the Mechanical Engineering Department at MIT, and has served as Associate Director of DOE's Solid State Solar Thermal Energy Conversion Center.

I believe all three of our nominees are well qualified for the offices to which the President has nominated them, and I want to thank all of you for being here this morning, and for your willingness to accept these important positions.

At this point, I recognize Senator Barrasso for his opening comments.

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

Senator BARRASSO. Well, thank you, Mr. Chairman.

Today, our Committee will consider Dr. Huff, who has been nominated to serve as Assistant Secretary for Nuclear Energy at the Department of Energy. Dr. Huff appears to be extremely well qualified for this position. I agree with the comments that you made, Mr. Chairman. She holds a Ph.D. in nuclear engineering and currently serves as a Special Advisor to the Energy Secretary. Before joining the Department, she was an Assistant Professor in the Department of Nuclear Plasma and Radiological Engineering at the University of Illinois Urbana-Champaign. She has also worked with our national labs. At her nomination hearing in early March, she testified, "It would be my honor to help the United States bolster and reclaim its global leadership in nuclear energy." Now, more than ever, it is critical that the Department work diligently to make America energy dominant again. Nuclear technology is essential to meeting America's energy, environmental, and national security objectives. We need to be looking for opportunities to expand our use of nuclear energy, and I believe Dr. Huff is ready to accept that responsibility.

Russia's army is funded by the sale of energy. This includes uranium. Russia accounts for one-third of the world's uranium conversion. It has half of the world's uranium enrichment capacity. Russia is our third leading supplier of uranium. Its brutal attack on Ukraine has opened the world's eyes, and we cannot be reliant on Russia for anything, and certainly not for uranium. Now is the time for the United States to stop buying Russian uranium. Now is the time for us to ramp up domestic uranium production, and I believe Dr. Huff recognizes this opportunity and is prepared to act. The Department of Energy needs to take immediate action to establish a strategic uranium reserve to ensure our existing reactors have the fuel that they need. We also cannot allow America's advanced reactor developers to be dependent on Russia. The Department of Energy needs to take immediate action to develop an American supply of high-assay low-enriched uranium. To meet

these challenges, we need experienced leadership in place at the Office of Nuclear Energy. I believe Dr. Huff is up to the task, and Mr. Chairman, I will support her nomination today.

Now, with regard to today's hearing, I would like to welcome Ambassador Carmen Cantor. I would like to welcome Dr. David Applegate and Dr. Evelyn Wang to the Committee. Congratulations to each of you on the nominations.

Ambassador Cantor has been nominated to serve as Assistant Secretary for Insular and International Affairs at the Department of the Interior. She currently serves as the U.S. Ambassador to the Federated States of Micronesia. Before that, she spent the majority of her career in various roles at the State Department. This Assistant Secretary position carries out the Department of the Interior's responsibilities for U.S.-affiliated insular areas. This includes the territories of American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and the U.S. Virgin Islands. Additionally, the Assistant Secretary administers and oversees federal assistance to the three Freely Associated States. They are the Federated States of Micronesia, the Republic of the Marshall Islands, and the Republic of Palau. I look forward to hearing Ambassador Cantor's strategy for facilitating much-needed action on stalled Compact negotiations with the Freely Associated States, for which we held a hearing just a few weeks ago. These Compacts are essential to denying China an opportunity to gain a foothold in the Freely Associated States. They help deter China's aggression and influence in the Indo-Pacific region, and we are looking forward to hearing what you have to say about that to bring us up to date from the hearing that we had a couple weeks ago.

Dr. Applegate has been nominated to serve as the Director of the United States Geological Survey at the Department of the Interior. He has served in many roles at the USGS, including that as Associate Director of Natural Hazards, currently exercising the authority of being the Director. The USGS is the nation's largest water, earth, and biological science and civilian mapping agency. It collects, monitors, and analyzes data about the geologic and other natural resources of the United States. It is critical that their director prioritize the core mission of the agency and zealously guard its scientific independence to ensure the information it publishes is not tainted by politics. I look forward to hearing from Dr. Applegate about how he intends to protect that independence.

And then, Dr. Wang, you have been nominated to serve as the Director of Advanced Research Projects Agency for Energy at the Department of Energy. You are a mechanical engineer. Your experience is very impressive. Currently, she is the Head of the Mechanical Engineering Department and Professor of Engineering at the Massachusetts Institute of Technology, has written over 200 journal articles on topics including heat transfer, thermal management, solar-thermal energy conversion, water harvesting, and water desalination. In ARPA–E's authorizing statute, it states the goals shall be among those, "to enhance the economic and energy security of the United States through the development of energy technologies that reduce imports of energy from foreign sources." Right there in the goals of the organization. So now, more than ever, energy is very critical. The Russian invasion of Ukraine has

brought this reality worldwide into very sharp relief. As we work to enhance energy security, innovation will be key. The Director of ARPA–E will continue to play a critical role, and I look forward to hearing how Dr. Wang plans to achieve this outlined goal at ARPA–E.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Barrasso.

We do have a quorum and we are going to move to the nomination of Dr. Huff.

[RECESS TO BUSINESS MEETING]

The CHAIRMAN. With that, we will now go to our hearing, and first, we are going to recognize Representative González-Colón to introduce Ambassador Cantor. Congresswoman, nice to have you with us.

INTRODUCTORY STATEMENT OF HON. JENNIFFER GONZÁLEZ-COLÓN, RESIDENT COMMISSIONER OF PUERTO RICO

Ms. GONZÁLEZ-COLÓN. Thank you, Mr. Chairman. I am happy to be here. Thank you, Ranking Member Barrasso, and the rest of the members of the Committee.

Today, I have the privilege to introduce a fellow Puerto Rican who has dedicated herself to a career in public service, Ambassador Carmen Cantor. She has been nominated by President Biden to the position of Assistant Secretary of the Interior for Insular and International Affairs. Having been nominated by President Trump in 2019, she currently serves as the U.S. Ambassador to the Federated States of Micronesia, where she remained during the worst of the COVID–19 pandemic, thousands of miles away from her husband and their three daughters. Nevertheless, Ambassador Cantor has been focused on her mission. Her unwavering commitment to service is a family tradition exemplified by her Army-Veteran father. Like myself, she is a product of Puerto Rico public schools and of the University of Puerto Rico and the Interamerican University. She brings over three decades of federal service in different roles—in the U.S. Postal Service, the Federal Maritime Commission, the Foreign Agricultural Service, and in the Department of State, where she distinguished herself in different leadership positions, including as Director of the Office of Civil Service Human Resource Management, Executive Director for the Bureau of Education and Cultural Affairs, the Bureau of International Information Programs, and the Bureau of Counter-Terrorism.

From disaster preparedness to promoting a healthy coastal environment, Ambassador Cantor has a unique perspective on the challenges that come from living on an island, having been involved with Sea Grant programs at the University of Puerto Rico. As an ambassador, she has been promoting U.S. Government grants to students interested in environmental issues. She has also been strongly involved in women's leadership programs and has made it part of her mission to empower and train women and girls in Micronesia. If confirmed to her new position, Ambassador Cantor will build up on these achievements. She will serve as an important voice for the federal policy for the U.S. territories of American Samoa, Guam, the Commonwealth of the Northern Mariana Is-

lands, and the U.S. Virgin Islands. Our native Puerto Rico has not been part of Insular Affairs since 1953, just to make that clear.

Additionally, if confirmed, Ambassador Cantor will be instrumental in preserving peace and prosperity in the Indo-Pacific region by countering Chinese aggression and supporting the United States strategic alliance in close cooperation with the Freely Associated States of the Federated States of Micronesia and the Marshall Islands and Palau. I am confident that in this position, Ambassador Cantor will continue to work in a bipartisan way to safeguard our national interests and enhance security for the U.S. and for our allies. I am convinced her personal and professional background are great assets in understanding the issues that the small island territories and the associated states face related to human development, environmental challenges, fair application of federal programs, and their limited voice in Washington, which require the responsible federal official to have a great degree of understanding and willingness to listen and to convey the needs to those communities. I encourage this Committee to support the confirmation of Ambassador Carmen Cantor in this new and important appointment, and I thank you, the Committee, for having me today.

The CHAIRMAN. Well, let me thank you, Congresswoman. And Congresswoman González-Colón is the Resident Commissioner of Puerto Rico, and I did not introduce her properly. So I want to thank you for that.

And before we get started, we have some rules which will apply to all nominees. We require you all to be sworn in. If you will stand and raise your right hand?

Do you solemnly swear that the testimony you are about to give to the Senate Committee on Energy and Natural Resources shall be the truth, the whole truth, and nothing but the truth, so help you God?

[Witnesses sworn in.]

The CHAIRMAN. You can be seated.

Before you begin your statement, I am going to ask three questions addressed to each nominee before the Committee.

Will you be available to appear before this Committee and other Congressional Committees to represent Departmental positions and respond to issues of concern to the Congress?

[All witnesses respond "yes."]

The CHAIRMAN. Yes.

Are you aware of any personal holdings, investments, or interests that could constitute a conflict of interest or create an appearance of such a conflict should you be confirmed and assume the office to which you have been nominated to by the President?

[All witnesses respond "no."]

The CHAIRMAN. No.

Are you involved or do you have any assets held in a blind trust?

[All witnesses respond "no."]

The CHAIRMAN. So, let's begin. We are going to begin with, and Congresswoman, if you have to leave, we understand that because we know everybody's schedule is quite busy, but you are more than welcome to stay too. Okay?

And we are going to have Ambassador Cantor go first, if you will.

OPENING STATEMENT OF AMBASSADOR CARMEN G. CANTOR, NOMINATED TO BE AN ASSISTANT SECRETARY OF THE INTERIOR [INSULAR AND INTERNATIONAL AFFAIRS]

Ambassador CANTOR. Thank you very much, Chairman Manchin, Ranking Member Barrasso, and distinguished members of the Committee. I am honored to appear before you today as the President's nominee to be the next Assistant Secretary for Insular and International Affairs at the Department of the Interior. I am grateful for the confidence that President Biden and Secretary of the Interior Haaland have placed in me with this nomination. If confirmed, I pledge to do my utmost to uphold this trust and to advance our nation's interests in the U.S. territories and the vital Indo-Pacific region.

I grew up and attended public schools in Puerto Rico, a U.S. territory in the Caribbean. For over three decades, I have been privileged to serve our nation in different roles and agencies, including at the U.S. Embassy in the Federated States of Micronesia, or FSM, the U.S. Postal Service, the Federal Maritime Commission, the Foreign Agricultural Service, and the U.S. Department of State. Any measure of success I achieved during these appointments would not have been possible without the support of my family, so I would like to start by expressing my deepest gratitude to them. My father, Anibal Castro Justiniano, an Army National Guard veteran, is one of 18 siblings. My mother, Zoraida Laracuente Ramirez, was one of nine siblings. Regrettably, she passed away two years ago right at the beginning of the pandemic. I have one sister, Zoraida, and many uncles, aunts, and cousins, and I will not name them all, but I do want to recognize my husband, Carlos, a retired public servant, and our daughters, who are here with me today.

Senator BARRASSO. Could we have them stand up, please? Just your husband, Carlos and then your daughters, did you say? Thank you. Welcome, welcome to the Committee, congratulations.

Thank you, Madam Ambassador.

Ambassador CANTOR. Thank you.

Amanda is a communications coordinator at the American Junior Golf Association and Adriana is in high school. Ashley, a public servant working at NASA, is in Puerto Rico watching this hearing with my dad and my sister.

Over the last two and a half years, I have had the distinct honor to serve our country as U.S. Ambassador to the FSM, a country of 607 islands. I was honored to be nominated by the previous Administration and confirmed by the Senate to my current position. In addition to being a committed career public servant, because I grew up on an island, I can connect with and understand the challenges and issues islanders face, particularly in the U.S. territories. The Office of the Assistant Secretary for Insular and International Affairs carries out the Secretary of the Interior's responsibilities for the U.S. territories; administers and oversees federal assistance under the Compact of Free Association, or COFA, to our distinct and sincere friends and partners of the Freely Associated States; and leads the Ocean, Great Lakes and Coastal Program, helping to coordinate ocean and coastal programs across the Department's bureaus.

If confirmed as Assistant Secretary, I will support our relationship with the territories—hardworking and patriotic Americans who are not always at the forefront of attention in Washington. I will work with these communities closely to ensure they can thrive. I place a high priority on the Indo-Pacific and our enduring relationship with the strongholds of freedom in the region—the Freely Associated States. These sovereign countries share our vision for an open and free region that respects sovereignty, the rule of law, and transparency. If confirmed, I will work to strengthen our relationship with the Freely Associated States by continuing to support their peace, security, prosperity, democracy, and freedoms.

I also commit to work closely with the Special Presidential Envoy on Compact Negotiations to prioritize and expedite dialogue on the expiring COFA provisions and advance our mutually beneficial partnership. Having lived in Puerto Rico and the FSM, I understand island nations face unique challenges. If confirmed, I will work with agency partners and the insular communities and their leaders to identify their priority needs, support them when it comes to climate resilience projects, and assist with their economic recovery. Given my decades of experience in an interagency environment, if confirmed, I will use my skills to continue to foster collaboration and ensure all federal agencies with a role are working effectively together in these strategically important regions.

In closing, I can imagine no greater honor than to serve as the Assistant Secretary for Insular and International Affairs at the Department of the Interior, working with our friends in the territories and in the Freely Associated States during this critical time. Chairman Manchin, Ranking Member Barrasso, if confirmed, I look forward to working with you and the honorable members of this Committee to advance U.S. interests in the insular areas, and to sustain and expand the progress we have achieved in our unique, long-term, and positive relationship with our tremendously important partners, allies, and special friends, the Freely Associated States.

Again, thank you for the opportunity to appear before you today. I will be pleased to answer any questions you may have.

[The prepared statement of Ambassador Cantor follows:]

Statement of
Carmen G. Cantor
Nominee for
Assistant Secretary for Insular and International Affairs,
United States Department of the Interior
Senate Energy and Natural Resources Committee
April 28, 2022

Thank you very much Chairman Manchin, Ranking Member Barrasso, and distinguished Members of the Committee. I am honored to appear before you today as the President's nominee to be the next Assistant Secretary for Insular and International Affairs at the Department of the Interior. I am grateful for the confidence that President Biden and Secretary of the Interior Haaland have placed in me with this nomination.

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Over the last two and a half years, I've had the distinct honor to serve our country as U.S. Ambassador to the FSM, a country of 607 islands. I was honored to be nominated by the previous administration and confirmed by the Senate to my current position. In addition to being a committed career public servant, because I grew up on an island, I can connect with and understand the challenges and issues islanders face, particularly in the U.S. territories.

The Office of the Assistant Secretary for Insular and International Affairs carries out the Secretary of the Interior's responsibilities for the U.S. territories; administers and oversees federal assistance under the Compact of Free Association (COFA) to our distinct and sincere friends and partners of the Freely Associated States; and leads the Ocean, Great Lakes and Coastal Program, helping to coordinate ocean and coastal programs across the Department's bureaus.

If confirmed as Assistant Secretary, I will support our relationship with the territories -- hardworking and patriotic Americans who are not always at the forefront of attention in Washington. I will work with these communities closely to ensure they can thrive.

I place a high priority on the Indo-Pacific region and our enduring relationship with the strongholds of freedom in the region, the Freely Associated States. These sovereign countries share our vision for an open and free region that respects sovereignty, the rule of law, and transparency. If confirmed, I will work to strengthen our relationship with the Freely Associated States by continuing to support their peace, security, prosperity, democracy, and freedoms.

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Given my decades of experience in an interagency environment, if confirmed, I will use my skills to continue to foster collaboration and ensure all federal agencies with a role are working effectively together in these strategically important regions.

In closing, I can imagine no greater honor than to serve as the Assistant Secretary for Insular and International Affairs at the Department of the Interior, working with our friends in the territories and in the Freely Associated States during this critical time.

Chairman Manchin, Ranking Member Barrasso, if confirmed, I look forward to working with you and the honorable Members of this Committee to advance U.S. interests in the Insular areas and to sustain and expand the progress we have achieved in our unique, long-term, and positive relationship with our tremendously important partners, allies and special friends, the Freely Associated States.

Again, thank you for the opportunity to appear before you today. I would be pleased to answer any questions you may have.

The CHAIRMAN. Thank you, Ambassador, and I should have asked, do you have any of your family members you would like to introduce?

Ambassador CANTOR. Yes, yes. I have my husband, Carlos.

The CHAIRMAN. I am so sorry. I missed that.

Ambassador CANTOR. My daughters.

The CHAIRMAN. Thank you all. Thank you for being here. Congratulations. Thanks.

Dr. Applegate.

OPENING STATEMENT OF DR. DAVID APPLEGATE, NOMINATED TO BE DIRECTOR OF THE UNITED STATES GEOLOGICAL SURVEY

Dr. APPLEGATE. Thank you, Chairman Manchin and Ranking Member Barrasso, for the opportunity to appear before the Committee this morning. It is a great honor to be nominated to serve as the 18th Director of the U.S. Geological Survey, and I appreciate the Committee's consideration of my nomination.

I am grateful to have my family here with me today. My wife, Heidi and my daughters, Maggie and Bea, who are getting more than they bargained for on National Take Your Kid to Work Day.

[Laughter.]

Dr. APPLEGATE. And I think this would be an appropriate time to thank my big brother, John, for encouraging me to take a geology class in college, the spark that started this journey. That class led to a major in geology and ultimately my doctorate, after which I had the transformative experience of working for this Committee as a Congressional Science Fellow. Having spent five years of field work in the Death Valley region in California, I was curious how the knowledge gained studying the inner workings of our planet—both out there and at the lab at MIT—could aid policymakers in their decision-making back here. I quickly learned how science can help examine consequences and trade-offs of decisions and the value that clearly-communicated science had for decision-makers and the American people. I believe our nation's success is directly tied to our long history of scientific excellence and innovation, and if confirmed, I would bring all my ability and experience to bear to support the future success of our nation by ensuring that continues long into the future.

For nearly two decades, I have been lucky enough to work at the USGS, an agency dedicated to delivering science to inform decisions on some of the most consequential issues facing our nation. That was the case when the USGS was established in 1879 and the order of the day was to characterize the resources of an expanding nation. It is very much the case today, when a growing population requires safe and abundant water resources, critical minerals for our energy future, healthy ecosystems that foster our quality of life and fulfill our stewardship responsibilities, and disaster-resilient communities prepared to not only survive, but thrive, despite the natural hazards we face today and what we may face in a warmer world.

The USGS is a scientific answer factory for our nation and our planet. Our science is grounded in world-class mapping, monitoring, remote sensing, and sampling of our changing earth sys-

tems. Our technical expertise to analyze, model, and interpret these data results in science products from real-time situational awareness of extreme events to long-term assessments of natural hazards and geological and biological resources. I am committed to delivering that science so that it reaches those who need it, when they need it, in a form they can use. Staying with the metaphor just a bit longer, the engine driving this answer factory is its people, and I believe it is important that we invest in their success as well as in our data, our technology, and our partnerships. The USGS workforce is very dedicated to the Bureau's role as an objective science leader for the nation. It is critical to continue to nurture that role by hiring and retaining a more diverse next generation of talent so we can pass on the accumulated knowledge of our current staff while growing our core capacity to ensure we can continue to deliver on our important mission, even as demands for our science change. It is also vitally important in all aspects of our science and service mission to uphold our commitment to scientific integrity and objective results codified in our fundamental science practices. If confirmed, this will be a key priority for me, to ensure that remains the bedrock of our culture as an organization.

Finally, as is the case throughout the Department of the Interior, partnerships are central to the success of the USGS. And if confirmed, I will work to strengthen our ties across the Department, the Federal Government, tribes, the states, academia, and the private sector. As an example, many of our offices are co-located with universities, providing ready access to new talent and also leveraging academic expertise. I would like to see us do more with tribal colleges and universities and minority-serving institutions. Working in collaboration with our partners helps us deliver science that is more relevant, meaningful, and useful than we can do alone. I love working for the USGS. It has a mandate that is neither regulatory nor policymaking, but is instead tasked with this critical mission—to provide science that can be used to underpin policy and management decisions with credibility. On matters of science, it is an honest broker and a straight shooter.

Thank you for your consideration of my nomination and the opportunity it presents to provide leadership to this remarkable organization and pursuing its exciting and important mission. I would be happy to answer any questions that the Committee might have.

[The prepared statement of Dr. Applegate follows:]

Statement of
David Applegate
Nominee for the Position of
Director of the
United States Geological Survey
at the
U.S. Department of the Interior
Before the
Energy and Natural Resources Committee
United States Senate

April 28, 2022

Thank you, Chairman Manchin and Ranking Member Barrasso, for the opportunity to appear before the Committee this morning. It is a great honor to be nominated to serve as the 18th Director of the U.S. Geological Survey, and I appreciate your consideration of my nomination.

I am grateful to have my family with me today, my wife Heidi and daughters Maggie and Bea. I would be remiss not to thank my big brother John for encouraging me to take a geology class in college, the spark that started this journey.

That class led to a major in geology, and ultimately my doctorate, after which I had the transformative experience of working for this Committee as a congressional science fellow. After five years of field work in the Death Valley region of California, I was curious how the knowledge gained studying the inner workings of the planet could aid policymakers in their decision-making.

I quickly learned the importance of using science to understand the consequences and examine the trade-offs of any decision. Thus began my role in understanding the importance that providing excellent science has for decision-makers and the American people. I believe our nation's success is directly tied to our long history of scientific excellence and innovation, and if confirmed I would bring all my ability and experience to bear to support the future success of our nation by ensuring that continues long into the future.

For nearly two decades, I have been lucky enough to pursue that role at the USGS, an agency dedicated to delivering science to inform decisions on some of the most consequential issues facing our nation. That was the case when the USGS was established in 1879 and the order of the day was to characterize the resources of an expanding nation. It is very much the case today when a growing population requires safe and abundant water resources, critical minerals for our energy future, healthy ecosystems that foster our quality of life and fulfill our stewardship responsibilities, and disaster-resilient communities prepared to not only survive but thrive despite the natural hazards we face today and what we may face in a warmer world.

The USGS is a science answer factory for our Nation and our planet. Our science is grounded in world-class mapping, monitoring, and sampling of our changing Earth systems. Our technical expertise to analyze, model and interpret these data results in science products from real-time situational awareness of extreme events to long-term assessments of natural hazards and resources. And the USGS, like me, is committed to delivering that science so that it reaches everyone who needs it, when they need it, in a

form they can use. Scientific integrity and independence is critical to the mission of USGS and it is a mission that I believe in and will foster, if I have the honor of being confirmed for this position.
The engine of this factory is its people, and I believe it is important that we invest in them as well as in our data, our technology, and our partnerships. The USGS workforce is very dedicated to the bureau's role as a science leader for the nation. It is critical to continue to nurture that role by hiring and retaining the next generation of talent, and to pass on the accumulated knowledge of our current staff and growing our core capacity to ensure we continue to deliver on our mission even as demands for our science change. It is also vitally important, in all aspects of our science and service mission, to uphold our commitment to scientific integrity and objective results codified in our fundamental science practices. If confirmed, this will be a key priority for me -- to ensure that remains the bedrock of our culture as an organization.

Finally, like much of the work carried out by the Department of the Interior, partnerships are central to the success of the USGS, and, if confirmed, I will work to strengthen our ties across the Department, the federal government, tribes, the states, academia, and the private sector. Many of our offices are co-located with universities, providing ready access to new talent and also leveraging academic expertise. Working in collaboration with our partners, we can make the science more relevant, meaningful, and useful.

I love working for the USGS. It has a mandate that is neither regulatory nor policymaking but is instead tasked with this critical mission to deliver science that can be used by decision-makers to underpin policy and management decisions with credibility. On matters of science, it is an honest broker and straight shooter, delivering data and analysis about a wide range of hazards and resources.

Thank you for your consideration of my nomination and the opportunity it presents to provide leadership to this remarkable organization in pursuing its exciting and important mission. I would be happy to answer any questions that the Committee might have.

The CHAIRMAN. Thank you, Doctor.

Now we have Dr. Evelyn Wang.

OPENING STATEMENT OF DR. EVELYN WANG, NOMINATED TO BE DIRECTOR OF THE ADVANCED RESEARCH PROJECTS AGENCY—ENERGY, DEPARTMENT OF ENERGY

Dr. WANG. Thank you.

The CHAIRMAN. I didn't know that Senator Barrasso already introduced the family, and if you want to do it again, you are more than welcome to.

Dr. WANG. My family is not with me here today, but they are watching online.

The CHAIRMAN. Well, good. Tell them we appreciate it.

Dr. WANG. Chairman Manchin, Ranking Member Barrasso, and distinguished members of this Committee, it is my honor and privilege to appear before you today as President Biden's nominee to be the Director of the Advanced Research Projects Agency–Energy, ARPA–E. I would like to thank President Biden for nominating me for this important role. I would also like to thank Secretary Granholm for her confidence in me. If confirmed, I look forward to working closely with Secretary Granholm, members of this Committee, and the dedicated and vibrant teams at the Department of Energy and our national laboratories. I would also like to thank my family, especially my parents, Kang and Edith, my husband and sons, brothers, mentors, friends, and colleagues. I am deeply honored by the opportunity to serve as Director of ARPA–E. I first received funding from ARPA–E over a decade ago, just two years after its founding, and have participated in multiple other ARPA–E projects since then. During this time, I have witnessed firsthand the impact that ARPA–E has had on creating innovative energy technologies, bringing them to market, and how these commercialized technologies help bolster our economic energy and national security.

I was born in Upstate New York and grew up in Southern California. Raised in an academic household, I was lucky to be exposed to science and engineering at an early age. I was particularly excited about product design, which led me to major in mechanical engineering at MIT. While there, I discovered the field of heat transfer and its application to energy production and management. In fact, about 90 percent of the world's energy used today involves generation and manipulation of heat. Heat transfer ultimately became the focus of my research, which included projects in a variety of industries. My graduate studies at Stanford University focused on heat dissipation of high-performance electronics. Subsequently, I became a postdoctoral researcher at Bell Labs, where I used heat to accelerate immunoassays for biodefense, which also provided me with a broader perspective on industry needs.

After my Ph.D. and postdoctoral work, I returned to MIT as a professor with my research focused on applying nanotechnology to heat transfer. For example, my team developed coding to enhance efficiency of condensers in steam power plants. In another project, we added photonic structures to solar thermophotovoltaics, thereby increasing their energy output. More recently, we built a water harvester that used the temperature differential between night and

day to extract water from air. These advances took years of research and were not mine alone. I have been privileged to work with tremendously talented students, postdoctoral researchers, and collaborators in academia, national labs, and industry. Together, we have produced many scientific publications and patents, which in turn have inspired start-up companies. These experiences have helped me develop a deep understanding of the challenges and making practical use of scientific discoveries.

For the past four years, I have also served as the Head of the Department of Mechanical Engineering, the second largest department at MIT. In this role, I have recruited the best and brightest talent, garnered resources to execute our mission, built consensus on strategy and culture, and empowered colleagues to work toward meaningful goals. If confirmed, I will bring the same passion and dedication to ARPA–E.

I also participated in the Defense Science Study Group, funded by the Defense Advanced Research Projects Agency, or DARPA, which was a pivotal experience that further motivated me to serve our country. This two-year program allowed me to see firsthand our national security operations and learn from esteemed mentors, including retired four-star generals. This experience showed me the critical role that our nation's innovation ecosystem plays in national security and the importance of research security. Our innovation ecosystem is particularly important in the context of clean, secure, and affordable energy, for which the commercial landscape could change dramatically in the coming decades. If confirmed, I will look to strengthen the ties between research and development to enable more timely, innovative breakthroughs to create jobs and provide energy security for our nation. Maintaining ARPA–E's ethos of speed, calculated risk, internal competition, and agility will be essential to achieving these goals. If confirmed, I look forward to working with the members of this Committee and leading ARPA–E to bring the most value and impact to communities across America.

Thank you very much for this opportunity to come before this Committee, and I look forward to your questions. Thank you.

[The prepared statement of Dr. Wang follows:]

Statement of Evelyn Wang
Nominee for Director of Advanced Research Projects Agency – Energy (ARPA-E).
Senate Committee on Energy and Natural Resources
April 28, 2022

Chairman Manchin, Ranking Member Barrasso, and distinguished members of the Committee: It is my honor and privilege to appear before you today as President Biden's nominee to be the Director of the Advanced Research Projects Agency – Energy (ARPA-E).

I would like to thank President Biden for nominating me for this important role. I would also like to thank Secretary Granholm for her confidence in me. If confirmed, I look forward to working closely with Secretary Granholm, members of this Committee, and the dedicated and vibrant teams at the Department of Energy and our national laboratories.

I also would like to thank my family, especially my parents, Kang and Edith, my husband and sons, brothers, mentors, friends and colleagues.

I am deeply honored by the opportunity to serve as Director of ARPA-E.

I first received funding from ARPA-E over a decade ago (just two years after its founding) and have participated in multiple other ARPA-E projects since then. During this time, I have witnessed first-hand the impact that ARPA-E has had on creating innovative energy technologies, bringing them to market, and how these commercialized technologies help bolster our economic, energy, and national security.

I was born in upstate New York and grew up in southern California. Raised in an academic household, I was lucky to be exposed to science and engineering at an early age. I was particularly excited about product design, which led me to major in Mechanical Engineering at MIT. While there, I discovered the field of heat transfer and its application to energy production and management. In fact, about 90% of the world's energy use today involves generation or manipulation of heat.

Heat transfer ultimately became the focus of my research, which included projects in a variety of industries. My graduate studies at Stanford University focused on heat dissipation of high performance electronics. Subsequently, I became a postdoctoral researcher at Bell Labs, where I used heat to accelerate immunoassays for biodefense, which also provided me with a broader perspective on industry needs.

After my PhD and postdoctoral work, I returned to MIT as a professor, with my research focused on applying nanotechnology to heat transfer. For example, my team developed coatings to enhance the efficiency of condensers in a steam power plant. In another project, we added photonic structures to solar thermophotovoltaics, thereby increasing their energy output. More recently, we built a water harvester that used the temperature differential between night and day to extract water from air.

These advances took years of research, and were not mine alone. I have been privileged to work with tremendously talented students, postdoctoral researchers, and collaborators in academia, national labs, and industry. Together, we've produced many scientific publications and patents, which in turn have inspired startup companies. These experiences have helped me develop a deep understanding of the challenges in making practical use of scientific discoveries.

For the past four years, I have also served as the Head of the Department of Mechanical Engineering, the second largest department at MIT. In this role, I have recruited the best and brightest talent, garnered resources to execute our mission, built consensus on strategy and culture, and empowered colleagues to work towards meaningful goals. If confirmed, I will bring the same dedication and passion to ARPA-E.

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Our innovation ecosystem is particularly important in the context of clean, secure, and affordable energy, for which the commercial landscape could change dramatically in the coming decades. If confirmed, I will look to strengthen the ties between research and development to enable more timely, innovative breakthroughs to create jobs and provide energy security for our nation.

Maintaining ARPA-E's ethos of speed, calculated risk, internal competition, and agility will be essential to achieving these goals. If confirmed, I look forward to working with members of this Committee and leading ARPA-E to bring the most value and impact to communities across America.

Thank you very much for this opportunity to come before this Committee. I look forward to your questions. Thank you.

The CHAIRMAN. Thanks to all of you for your wonderful statements, and I don't recall, I don't know if my other colleagues would think—I don't know if we have ever had three top-qualified and quality people to serve in these positions or be nominated for these positions. So we are very appreciative.

Senator BARRASSO. Not in this Administration.

[Laughter.]

The CHAIRMAN. Easy now, John.

Anyway, it is a delight to have you all three and willing to serve. We will start with our questions now.

In the 1879 law that created the Geological Survey—this is for you, Dr. Applegate—the Director is given the task of examining the mineral resources and products of our national domain. The job was important a century and a half ago as our nation began its development as an industrial superpower, and it is every bit as important today as we seek to maintain our national security, our economic strength, and our standard of living in a rapidly changing world. Our computers, our electrical vehicles, our windmills, our solar panels, all depend upon minerals, many of which we import from other nations which do not always have our best interests.

So you and I talked briefly yesterday. My concern is this—that we are putting a lot of our technology and a lot of the growth of our country and our economies in the hands of foreign supply chains that are not always that friendly. The war that we have going on right now—no one—I don't think anyone in this room would have ever expected to see a land war in the 21st century in Europe. None of us could expect this. And to see what is happening, Putin has weaponized energy, and I am concerned that basically Xi Jinping, the leader of the People's Republic Party in China, will do the same with critical minerals since they process about 80 percent.

My question to you would be, if you all have, or are you aggressively looking at what we can do in America or the North American continent, since we do have friendly neighbors, if you will—Canada and Mexico. So, if you could address that for me and show us what you think is the path to make us totally independent, not just in energy, but in the critical minerals we need for the new technology that we depend on.

Dr. APPLEGATE. Well, thank you very much for that question, Mr. Chairman, and for your strong interest and support on this issue. Understanding the energy and mineral resources of the nation remains a central role for the USGS. And as you pointed out, it is not enough to just understand the resources within the U.S., it is also important to understand global resources. Our National Mineral Information Center, for example, is looking at the flows of mineral resources across a global stage. Domestically, we have received an incredible shot in the arm with the Bipartisan Infrastructure Law, which is enabling us to invest heavily in what we call our Earth Mapping Resources Initiative (Earth MRI). This is collecting foundational data in areas that are prospective for a wide range of essential minerals.

The CHAIRMAN. Doctor, excuse me one second. Do you have the personnel? Have you been able to ramp up the people you need to do this?

Dr. APPLEGATE. One of the great strengths of this investment is partnerships. We are partnered very heavily with the state geological surveys. So it is both a matter of being able to strengthen our own workforce——

The CHAIRMAN. Right.

Dr. APPLEGATE [continuing]. But also, for them to ramp up, so we are in the process. Absolutely right——

The CHAIRMAN. Push hard.

Dr. APPLEGATE. Absolutely. And I will also say a very important role for the private sector, as we look at the data collection, whether it is high-resolution topography or whether it is geophysical data collection, a lot of that is done through contracts with the private sector. So we are investing in this foundational data. That is going to enable us to better understand our resources here in the U.S., including the resources that are available from secondary recovery and mine waste. So it remains an important issue, and it is one in which we have lots of strong collaborations—particularly with Canada—there is a U.S.-Canada critical minerals working group that we are a part of. We work closely with Natural Resources Canada to understand how we, as a block, are handling our mineral resources.

The CHAIRMAN. Thank you, sir.

Ambassador Cantor, you hold a unique position with Micronesia and how important it has been in the history of the United States, as far as defending ourselves in World War II and reshaping the world order, if you will. With this vantage point that you have had, what other strategic relationships did you see that we need to do, and also, what we need to defend from happening as aggression from Asia—from China—and how do we best combat that, or how do we best defend, to make sure that we are all still moving in the same direction with Micronesia?

Ambassador CANTOR. Senator, thank you so much for that question. You know, you mentioned that we have a very special and unique relationship with the three Freely Associated States—with the Republic of Palau, the Republic of the Marshall Islands, and the Federated States of Micronesia. Now, more than ever, it seems China is seeking to expand its influence in the region. So this is a very important relationship that we need to continue to have. You mentioned we have been family. We have been friends since the days of World War II. I think that one of the ways that we can do this is by expediting the negotiations on the Compacts of Free Association with the three countries. And if I am confirmed, I commit to doing that, to do the most that I can to make sure that these Compact negotiations are completed in a timely way.

The CHAIRMAN. Thank you.

I am going to take a little privilege if I can here because I will be pulled out, if I may, Senator.

Dr. Wang, we talked briefly on this and we spoke about carbon capture and sequestration and every one I talk to, from Dr. Birol, from IEA all the way down, I have been over to France and met with the different specialists over there. We have expanded our thinking to include carbon capture utilization and sequestration. At first you just heard about sequestration, but we know that we must be able to utilize this product. We have to come to see, if we are

ever going to succeed in decarbonizing our economy, but we have got to remove it—the carbon from the smokestack—but can we put it to use? Do you see movement in that direction? Will you commit to furthering research, and do you see it developing quick enough and fast enough that we can find a way not to have that so costly that everyone says well, sure, we know we can take clear stream carbon off. We know what we can liquefy, and we know we can pressurize it, but the cost is so extreme that it is not feasible as far as in the realm of how we are producing power. Do you see us coming to that technology soon?

Dr. WANG. Thank you, Chairman, for that important question. As we think about the future in terms of the net-zero emissions, carbon capture utilization and storage is going to be very critical. In fact, ARPA–E has devoted some research in this area particularly in trying to make this process more cost effective, less energy intensive. Just to give you an example of this, there has been a program focused on developing new materials that can capture more effectively a significant amount of the carbon, using materials such as what is known as these metal organic frameworks, which are a way to tailor the structure of the material in a way to be able to absorb more of the carbon—CO_2 in this case.

The question is also, of course, the release, once you capture it. And that can be relatively energy-intensive, and that is where there is opportunity to be able to tailor, again, the structure of these materials. And that is an example of what ARPA–E has been doing in the past. Now, the question is, what is the next step? There is the science and innovations——

The CHAIRMAN. Yes, what is the time frame here?

Dr. WANG. And we could do this at a grand scale, right? And so, that is the opportunity space, I think, to think about how do we scale up materials? How do we get them low-cost enough, and how do we integrate them effectively so that we can make these affordable solutions so that we can ensure energy security? And so, if confirmed, I certainly would love to work with you more, and with the members of this Committee to look at these possibilities and really innovate in these technologies moving forward so that they can be integrated to achieve net-zero emissions.

The CHAIRMAN. Great. Well, I think that is the key that unlocks the door to success as far as for the climate. And anyway, I appreciate it very much.

Sorry, I apologize for indulging, and with that we will go to Senator Barrasso.

Senator BARRASSO. Thanks so much, Mr. Chairman, and I agree with the quality of the nominees that are here today.

Dr. Applegate, let me start with you. In February of this year, a couple of days after Russia invaded Ukraine, the U.S. Geological Survey issued its critical minerals list for 2022. I know that is something you work on over the year leading up to, but this is a dramatic change. And since Russia's invasion, the United States, the European Union, and other industrialized nations have imposed a wide variety of sanctions on Russia, and there are critical minerals that we get from Russia. In addition, companies in the private sector have taken steps to reduce purchases of those products, including minerals from Russia. So, with Russia's invasion of

Ukraine, is that going to prompt USGS to reconsider and expand its critical minerals list? We have had a couple of hearings in this Committee in the last couple weeks about critical minerals and what is needed. And if so, let me know, and if not, why not?

Dr. APPLEGATE. Thank you, Senator, for that question, and I very much appreciate the Committee's attention to this important issue. As you noted, the critical minerals list—it is a snapshot in time, and something that we are continuously reviewing. And I also want to emphasize that the critical minerals list is not a list of all essential minerals, in other words, it is looking specifically at a set of criteria that includes supply chain disruptions and the impacts associated with that. So, we will be continuing to look. We revise it on a regular, standing basis, and we continue to do research on a wide range of minerals.

Senator BARRASSO. Dr. Wang, you know, under federal law, one of the goals of the Advanced Research Projects Agency is to "enhance the economic and energy security of the United States . . ." — I read this in my opening statement — ". . . through the development of energy technologies that reduce imports of energy from foreign sources." So, you add that to what we talked about earlier, you know, I note the agency has funded energy technologies which are heavily reliant on minerals—just as we just talked about with Dr. Applegate—minerals imported from foreign countries. Batteries for the electric vehicles require, as we learned at previous hearings here, lithium, cobalt, nickel, graphite, and manganese, which are mined and processed overseas.

If confirmed, how would you ensure that the Agency's efforts to reduce reliance on foreign energy doesn't increase our reliance on foreign minerals?

Dr. WANG. Thank you for that question, Senator Barrasso.

Certainly, critical minerals is a very important challenge that we face, and ARPA–E, in fact, has been investing research in trying to look at potentially other types of materials that can enable us to have the energy security, the economic security, as well as environmental well-being. I will just give you one example, in fact, of a product already that is being commercialized right now from ARPA–E's portfolio, which is the development of magnets. So, typically, they rely on these rare earth elements that are also very scarce and rely on foreign sources. And with that, in fact, there have been research developments to be able to create other alternatives, such as an iron nitride material that can be more readily abundant, lower cost, and that can be readily scaled. And so, that is just one example of the types of research that we want to continue to push at ARPA–E, to think of all these alternatives such that we can ensure our energy security. And if confirmed, I would love to discuss more with you and the members of this Committee to work toward these goals.

Senator BARRASSO. Thank you, Dr. Wang.

Ambassador Cantor, you stated in your testimony before the Senate Foreign Relations Committee regarding the nomination to be Ambassador that you were going to facilitate efficient Compact negotiations. The current Compact negotiations are stalled. There hasn't been an official negotiation going on—I think we heard at our previous hearing—since 2020. So on March 22nd, to get nego-

tiations moving, the Department of State appointed a Special Presidential Envoy for Compact Negotiations. If confirmed, how do you see your role in working with that Special Envoy, and do you think a Special Envoy is the answer to getting these negotiations back on track?

Ambassador CANTOR. Senator, thank you so much for that question. I have had the pleasure of already meeting Ambassador Yun, who is the new Special Presidential Envoy for Compact Negotiations, and I do believe that he has already had a meeting with the delegation from the Federated States of Micronesia. I know this in my current capacity as Ambassador. I see my role, if I am confirmed to this position, as someone who will support this team that has been put together to move these Compact negotiations forward. This is very important. I think we need to send a signal to the world that, you know, this region—the three Compact states—are very important to us. Like I have said, we have had great relationships with them for more than 75 years. Again, if confirmed, I will continue to work with Ambassador Yun on moving these Compact negotiations forward.

Senator BARRASSO. Thank you. Thank you, Ambassador.

Mr. Chairman.

The CHAIRMAN. Thank you, Senator.

Senator Cortez Masto.

Senator CORTEZ MASTO. Thank you, Mr. Chairman.

Congratulations, again, to all three of you and thank you for your willingness to serve.

And let me just start with a general question. First of all, I want to credit all of your written testimonies for prioritizing ways to establish and enhance partnerships with stakeholders and the general public. I think that is so important. In fact, Dr. Wang, in your written testimony you touched on your previous experiences with ARPA–E to produce key findings that inspire start-up companies and uncovered new scientific discoveries, which I believe is just fantastic.

So, if confirmed, I am going to ask all three of you, can the three of you please elaborate on how you will prioritize partnerships at your respective federal agencies, as well as the ways that you envision these initiatives contributing to the various topics that you outlined in your written testimony?

And maybe, Dr. Wang, we will start with you.

Dr. WANG. Thank you, Senator Cortez Masto, for that important question.

I see that partnerships are critical for advancing transformative energy technologies and getting them to the commercial stage. In fact, ARPA–E's mission is focused on these high-risk technologies, but that is not the endpoint, right? As we get to the end of these projects, there are still many steps to get it out to commercialization. That is where the partnerships become, really, an opportunity for us. Partnering with the DOE labs is one example. Other parts also of the DOE enterprise, such as applied offices such as EERE, and working with these various stakeholders to be able to more effectively transition and have a path toward commercialization and de-risking it such that the private sector will then come in and invest. So I think that is an opportunity that, if confirmed, I would

like to explore further and form more of these collaborations and collaborative opportunities ahead.

Senator CORTEZ MASTO. Thank you.

Ambassador.

Ambassador CANTOR. Thank you, Senator Cortez Masto.

Let me share with you my priorities, and they are all related to partnerships. You know, the first one for me is, I want to support our relationship with the territories. We have, you know, the U.S. Virgin Islands, American Samoa and Guam and CNMI. I want to be an advocate for them, and you do that through partnerships. I also want to strengthen the relationship that we have with the three Compact states, again, given, you know, the reason that I gave before regarding the influence of China in the region. And also, I want to work on the ongoing Compact negotiations and again, it is very important that we cultivate our partnerships, continue collaborating with our friends, with the territories, and the leaders of those territories, so we can move our agenda forward.

Senator CORTEZ MASTO. Thank you.

Dr. Applegate.

Dr. APPLEGATE. Thank you so much for that question, and partnerships are absolutely central to the success of the USGS. I would like to say that is actually one of our superpowers, is all of the different entities that we work with both in helping us to achieve our mission and particularly to achieve the delivery of our science, getting it to the people who need it most in a form that they need it in most. And that means that we are engaging with our partners early in the process so that we know what it is that they need, and also working with our partners to enable this. So, for example, the state geological surveys—I was just talking about the infrastructure law—this is how we achieve our goals in terms of geologic mapping. It is very much on a collaborative basis. For our ecosystems mission area, it is the state fish and wildlife agencies. We need to work closely with them to be able to understand what their needs are so we are delivering the science they need. And then in our water mission area, we have literally thousands of cooperators.

We are a very distributed organization. We have 400 offices and 68 science centers across the country. All of that is enabling partnerships at a local level, at a state level, as well as all the way up to the global level. So this is absolutely essential to the USGS.

Senator CORTEZ MASTO. Thank you.

And I so appreciate all three of you saying that partnerships are important, particularly among federal agencies. In Nevada, over 80 percent of the land is owned by the Federal Government. So we need not only that collaboration and partnership, but we need the federal agencies working together as well, which is just as important.

Workforce development—let me ask you both, maybe. Dr. Wang and Dr. Applegate, you both touched on the need for investing in workforce development. Dr. Applegate, can you talk a little bit more about that? What should we be thinking about here at a federal level to help incentivize that and support that investment?

Dr. APPLEGATE. Thank you for that question. One of our major challenges over the years is that we have seen a decrease in the size of our workforce. We very much need to be able to bring in this

new generation of talent both in terms of the ability to, you know, internally be able to deliver the work, but also to be able to better understand the communities that we want to reach. So that means that we have to be able to create a more diverse workforce, not only to bring in talent, but to retain that talent. So to be able to—when we bring folks in—to be able for them to see a whole career path within the organization. And so, that speaks to being able to ensure that there is a safe and welcoming workplace and that folks see meaning in their work. We have a wonderful mission and we need the people to be able to make that happen.

Senator CORTEZ MASTO. Thank you. And I know my time is almost up. Dr. Wang, do you have any additional comments?

Dr. WANG. Thank you for that question. I think workforce development is extremely critical for the development of innovative energy technologies. I think it starts from these projects that are being funded by ARPA–E, where students, researchers, all work on these projects and they develop really critical skill-sets that are quite specialized, and I think there is an opportunity to try to encourage more of them to stick with it because that is a really important skill-set that does not exist elsewhere. And as they develop their companies, they can bring in others that can then ultimately learn from them and further nurture that. And I think there is opportunity there. Thank you.

Senator CORTEZ MASTO. I Appreciate that.

Thank you, Mr. Chair.

The CHAIRMAN. Thank you.

Dr. Cassidy.

Senator CASSIDY. Thank you, Mr. Chairman.

Mr. Applegate, Dr. Barrasso set up this question very nicely, but in 2019 it was reported that USGS scientists believed that the deep sea may contain more cobalt, nickel, and rare earth minerals than all land-based resources combined. And as forecast, deep-sea mining could account for 15 percent of global supply by 2050. Obviously, we are vulnerable right now because of geopolitical tensions, and the Administration has announced plans to increase the use of EVs, but that, of course, requires more critical minerals, although, Dr. Wang mentioned how we are trying to mitigate that dependency.

And as you mentioned, I think, the Bipartisan Infrastructure bill has money for recycling, for battery processing, but also to further map these critical minerals. A long way to set up—how significant could a new source of deep-sea cobalt, nickel, and rare earth be to the United States, not just in general, but specifically to that which has been apportioned to us, theoretically, to take advantage of?

Dr. APPLEGATE. Well, thank you very much for that question, and this is truly a frontier area in terms of resources. We are involved. We have marine geologic expertise that we bring to bear in this arena. There is a tremendous amount of work to be done in order to be able to assess what the scale of these resources are, and of course, to understand what the associated impacts would be from their development. We have strong partnerships with both the Bureau of Ocean Energy Management with responsibilities in this area as well as with NOAA.

Senator CASSIDY. What would be a time frame to actually be able to have an assessment, because if on the one hand you are saying this could account for 15 percent of global supply, but then on the other hand, you are saying more needs to be done to assess, square that for me, please.

Dr. APPLEGATE. Sure. Well, the more we know, the more we know. So, at this point—you mentioned our investments—onshore investments with the Bipartisan Infrastructure Law are enabling us to collect foundational data, whether it is from a geospatial standpoint, from a geophysical standpoint, as well as from a geologic mapping standpoint. Those are all in the future with respect to seabed resources.

Senator CASSIDY. Now, I am a little bit confused again, because if you can say that it will be 15 percent of our resources, but it seems as if we need to do more mapping and I presume more sampling, maybe I just was gathering wool, but I don't quite figure that out.

Dr. APPLEGATE. I understand, Senator. No, and the issue is, we provide the best available information on these issues. This is a frontier area, so that is our best estimate with current level of understanding, but there is a great deal more——

Senator CASSIDY. And let me ask, because it seems like you could drop some remote-operated vehicles such as we use for outer continental shelf oil and gas. You could sample various—take a representative sample of that which we might have access to and make that assessment. Am I oversimplifying?

Dr. APPLEGATE. We have participated—again, our role here is the sort of marine geologic expertise—and we have participated in research-focused activities to better characterize resources along the lines that you are describing.

Senator CASSIDY. Now, I am told that if the U.S. ever implemented the Law of the Sea treaty, we would have access to the Clarion-Clipperton Zone. Is that the area that you are focusing your attention on?

Dr. APPLEGATE. It is——

Senator CASSIDY. Would it be the area?

Dr. APPLEGATE. Right. No, it is one very important area, particularly with respect to manganese nodules. And this is an area where we have collaborated with international partners, again, seeking to better understand, in research, this potential resource.

Senator CASSIDY. Okay. A lot of generalities in all these answers, but I will accept that. I mean, you are in a hearing like this, so, okay.

Dr. APPLEGATE. I would be happy to follow up and provide you with additional information.

Senator CASSIDY. Sounds great.

Dr. Wang, a couple years ago, ARPA–E began a program called the Seeding Critical Advances for Leading Energy Technologies with Untapped Potential, or SCALEUP, to attempt to address the innovation "valley of death." So, when I speak to people though, this valley of death is real. What would you do to support and grow this program if confirmed as Director?

Dr. WANG. Thank you, Senator Cassidy. I think this is a very important part of the success of ARPA–E—to address the valley of

death. I have my own experience, in fact, working on ARPA–E projects, where you get to the end of the project, but it is just not quite ready, because you have not considered, for example, how do you actually make materials that are manufacturable? How do you scale up these materials, for example? And so, I think there is an opportunity to be able to support further and add more to that part of this—the ARPA–E portfolio, to be able to look at the SCALEUP program, and look at maybe even riskier technologies that maybe are not funded right now.

And another is an option to work with the other DOE offices, such as applied offices, as I mentioned earlier—with EERE—where there are parts of portfolio that may be able to be transferred to the other parts of the DOE to be able to further support it and get it more to the point whereby the private sector will invest. And I think there are these various options. And if confirmed, I look forward to being able to work with you and others to be able to address this valley of death and try to really get more of these high-risk transformative energy technologies out.

Senator CASSIDY. I would follow up, but I am over time. So thank you.

Dr. WANG. Thank you.

The CHAIRMAN. Thank you, Senator.

Senator Hirono.

Senator HIRONO. Thank you.

I ask the following two initial questions of nominees for any of the Committees on which I sit. So I will just go down the line with this group. By the way, welcome to all of you and your families.

Since you became a legal adult, have you ever made unwanted requests for sexual favors or committed any verbal or physical harassment or assault of a sexual nature?

[All respond, "no."]

Senator HIRONO. Have you ever faced discipline or entered into a settlement related to this kind of conduct?

[All respond, "no."]

Senator HIRONO. A question for Dr. Applegate. As you know, USGS is currently working to rebuild the Hawaii Volcano Observatory (HVO) that was destroyed during the volcanic eruption in 2018, and I know that due to supply chain issues, inflation, et cetera, that the cost to rebuild HVO, which includes the laboratory at Hilo and the field station in Hawaii Volcano National Park, is now higher than originally planned, and I am glad that the President's budget provides an additional $29 million for the project. And I just want to thank you for continuing to give me updates every six months, and I just received your most current update.

I know that you are also having to engage in some land lease agreements. So, are these lease agreements on track—the negotiations for these agreements?

Dr. APPLEGATE. Thank you for the question, Senator Hirono, and thank you so much for your strong support of our Hawaiian Volcano Observatory and the efforts to be able to create a vibrant, long-term future in partnership with the University of Hawaii. We are very excited to be co-locating there. My understanding is that efforts are underway, and as you indicated, with the supply chain and other reasons, costs are going up. We have identified facilities

funds that we will tap into going forward to be able to augment that, but that is probably our biggest challenge because both for the main center, co-located with the university, as well as the field station that is at the National Park Service, agreements are well underway, and we are hoping to have construction starting as early as next year.

Senator HIRONO. Thank you.

Ambassador Cantor, it was a pleasure to talk with you. Was it only yesterday? I know that you have a commitment to our Compact nations—very critical to our national security and very important to allies. In the 1993 Welfare Reform bill, suddenly, the citizens—the Compact citizens—no longer are eligible for a number of programs—social service programs, including Medicaid eligibility, and we finally were able to restore Medicaid eligibility. I am hopeful that should you be confirmed, that you will be an advocate for them as we seek to restore the other social service program eligibility that were suddenly excluding them. So I would like to have that commitment from you.

Ambassador CANTOR. Yes, Senator. As you and I discussed yesterday, the people from the Compact states, they make valuable contributions to our communities here in the U.S. and yes, if confirmed, I will be an advocate.

Senator HIRONO. Thank you.

I was listening to the questions, Dr. Applegate, regarding the undersea resources. Now, what if a country like China or Russia—because they are already doing various things that—for example, what if China were to mine undersea minerals? What is to stop them from doing that? Is there some sort of an international treaty or anything that would provide some sort of guidelines for what countries can do regarding undersea mining?

Dr. APPLEGATE. Thank you for that question.

There is. This is an area that is covered under the Law of the Sea Treaty. There is an International Seabed Authority that develops the rules and guidelines associated with this. I am not familiar with all of the specific aspects of it, but absolutely, it is governed through an international process.

Senator HIRONO. Well, the thing is that our country is not part of UNCLOS (United Nations Convention on the Law of the Sea). So shouldn't we join UNCLOS at this point?

Dr. APPLEGATE. Well, that is beyond my expertise and the role of the Geological Survey, but you know, we do engage with—from a technical standpoint, on these issues.

Senator HIRONO. Well, it seems to me that it is about time that we start to really review whether or not we should be a member. And I am not suggesting that we should mine undersea resources, by the way, because there are a lot of environmental concerns attendant to that. I just wanted to make a point here, Mr. Chairman.

Thank you.

Senator BARRASSO [presiding]. Thank you. Thank you, Senator Hirono.

Senator Hickenlooper, please.

Senator HICKENLOOPER. Great. Thank you, Mr. Chair.

Needless to say, this is one of my happiest, most exciting days. To have such talent in front of us is really exhilarating and, I

think, inspiring, that you are all willing to go and give yourselves to public service in the manner that you are. And as a geologist, obviously having Dr. Applegate here is especially exciting. But I think all three of you add tremendous value.

Dr. Wang, I just came back from spending the weekend—my son is at Stanford, and so I got to walk around and just see so much of what is going on there in engineering. He is taking a lot of engineering classes. Again, to see the creative energy that our scientific community is generating gives us hope in these very difficult times.

Let me start with Dr. Applegate. Some of the Energy Information Administration's expected oil and gas usage numbers, in their outlook, seem to be larger than what the USGS calculates to be technically recoverable—you know, achievable. Clearly, something is not adding up here. Dr. DeCarolis, who is coming in to be the Director of EIA, has committed that he would work directly to compare the EIA data and the USGS data, just to make sure we begin to sort through and get the—make sure we are all on the same page. And I wanted to make sure that you would commit to that as well so we have everybody working together.

Dr. APPLEGATE. Yes, I am very happy to commit to that, Senator, and as we bring our geologic resource assessments and align with—we have many partnerships, longstanding interactions with EIA, and so I am very happy to do that.

Senator HICKENLOOPER. Yes, and when we had our discussion, we spent a period of time discussing earthquakes and other geological risks. And it was such a treat to go back into my distant past and re-experience so much of what I loved so deeply and still love to this day—the application of what we learn by observation and measuring and testing and experiments and then putting it into practical application.

In 2013, the USGS completed an initial assessment of our national and regional storage capacity for geologic carbon sequestration. I know we have talked about this a little bit, but I thought, obviously, with the BLM and project developers, we can do a better job of speeding up the assessment of pore space, of the porosity in formations that have already delivered oil and gas. So, if confirmed, are you willing to make it a priority to update the 2013 assessment, which is the most recent we have, and refine some of the methods technology that now allows us to look more accurately at geologic carbon sequestration?

Dr. APPLEGATE. Yes, thank you for the question, Senator, and it is a pleasure to get to speak to you geologist to geologist.

[Laughter.]

Senator BARRASSO. This hearing is adjourned.

[Laughter.]

Senator HICKENLOOPER. As a doctor, he is really more of an engineer—an engineer of the body.

[Laughter.]

Senator BARRASSO. Well, as an orthopedic surgeon, I was a well-paid carpenter.

[Laughter.]

Senator HICKENLOOPER. Well, there we go.

Dr. APPLEGATE. No, I very much appreciate the question, and this is, again, this speaks to the role of the USGS. It also speaks

to the ability to take the expertise that we have developed for assessing oil and gas resources, understanding the pore spaces from that standpoint, and now to look at it from the standpoint of sequestration. We actually, in the President's budget request, we have requested an increase to be able to do a new version of that. As you say, there is new technology. We would like to also incorporate, for example, understanding the opportunity for hydrogen resources as part of that for sequestration. And in the interim, we also have done a study in terms of the use of CO_2 for enhanced oil recovery. So it is an important issue.

Senator HICKENLOOPER. Absolutely. Great, thank you for that.

Now, I am going to go a little bit over time. I hope that is all right, Mr. Chair.

Dr. Wang, energy transition brings with it a host—a universe of new technologies, which are already changing how we connect into and use our transmission and our distribution grids. And when it comes to grid infrastructure and operation, can you speak a little bit to some of the challenges we see on the horizon as we begin to try and develop the technologies and techniques to address these challenges?

Dr. WANG. Thank you, Senator Hicken—looper.

Senator HICKENLOOPER. That's okay.

Dr. WANG. Sorry.

Senator HICKENLOOPER. You can't do anything to my name that hasn't been done much worse, previously.

[Laughter.]

Dr. WANG. Thanks.

I think the grid certainly is facing challenges, especially as we introduce renewables, and thinking about the electricity flows and the aging infrastructure, and there are a lot of opportunities, I believe, with advancements of technology. To give you a few examples—I will mention one that, in fact, has been commercialized by ARPA–E right now, which is in fact a device that can change the impedance of electrical wires. You place it on the electrical wires so that you can, in fact, redistribute electricity to more underutilized wires. And in this way you can improve the efficiency and you can prevent overloads.

And so, I think there are more innovations like this, and this is an opportunity for ARPA–E to really try to address some of this. Of course, there is also thinking about how, when we have renewables, the storage aspects and how that interfaces also with the grid as well, and I think that is also something that ARPA–E is putting efforts into as well, and will continue to in the future.

Senator HICKENLOOPER. They are all connected. Thank you, and thank all three of you. I yield back to the Chair.

Senator BARRASSO. Thank you. Thank you so much.

Dr. Applegate, I just have a couple quick questions. Dr. Applegate, you know, before minerals can be mined, they need to be discovered. And when we fall behind on exploration, it does seem to me to be creating a domino effect, setting the entire mineral development process back. So how can the U.S. Geologic Survey—what can you do to help accelerate mineral exploration?

Dr. APPLEGATE. Well, thank you for the question, and really the key role here is in being able to provide that foundational data that

is needed to be able to then allow for the more detailed kinds of studies that would be done, say, you know, by the mining interests. And that is one of the things that we have really been able to accelerate in partnership with our state geological survey partners in terms of geologic mapping, doing geophysical assessments, and doing the geospatial data collection. So we have really been able to accelerate that, and I think that is probably sort of the kind of foundational work that is available to all, but will enable us to have a better sense of what are those resources that are out there domestically as an insurance policy for all of the issues that you raised earlier.

Senator BARRASSO. Ambassador Cantor, we had a good discussion here in the Committee previously about action that China has been taking in the area that you are most familiar. So I just ask that you give some of your experiences as Ambassador to Micronesia, and briefly give us some specific examples of actions that China took to gain influence and how, as Ambassador, you attempted to address the action?

Ambassador CANTOR. Senator, thank you so much for that question. You know, I agree that China is an increasing threat in the region. You are very familiar with what just happened with the Solomon Islands and the security agreement that they signed with the PRC. The President of the Federated States of Micronesia, as a matter of fact, sent a letter to the Prime Minister of the Solomon Islands expressing concerns about that agreement. And I have seen, you know, how they have moved in the region.

Let me tell you that in preparation for this hearing I spoke with the Governors of the territories, and the Governor of American Samoa, Governor Lemanu. When we discussed China and their influence in the region, he was describing to me how they are very active in the western part of Independent Samoa. And Independent Samoa is only a 30-minute flight to American Samoa. He said it is 30 minutes by plane, six hours by boat. So we are talking about our backyard, practically. So I think that we need to do more. We need to be more visible and we need to signal to the world and to China that this region is very important. You know, we are focusing on the Indo-Pacific, as you know, and if I am confirmed, I commit to you and the members of this Committee that I will do everything that I can to make sure that China doesn't continue to be a threat in the region.

Senator BARRASSO. Thank you. That is very helpful.

Before turning to Senator Hoeven, Senator Hickenlooper, any additional question that you had?

Senator HICKENLOOPER. The only thing I was going to just ask the Ambassador was that the Compacts of Free Association are about to expire in, I guess 2024, or the Marshall Islands were next year and then Palau, 2024. As you were just discussing, China has increased encroachment there. How will climate change factor into the Compact negotiations as they go forward?

Ambassador CANTOR. Yes, Senator, thank you. Climate change has impacted not only the Freely Associated States, but the insular areas, and it is a major concern for them. I do expect this issue to be a major topic that will factor into the Compact negotiations. I have seen it myself, having been in Micronesia for the last two and

a half years, the impact of climate change. Just this past December there was a series of king tide events that flooded taro patches in two of the states in Micronesia. They had to declare an emergency. So we are not only talking about rising sea levels, we are also talking about food security, water security. So definitely, this is something that is going to be discussed during the Compact negotiations.

My understanding is that Ambassador Yun, the new Presidential Envoy for Compact Negotiations, he has been empowered to discuss any topics that are brought up by any of the three nations.

Senator BARRASSO. Thank you, Senator Hickenlooper.

Senator Hoeven.

Senator HOEVEN. Thank you, Ranking Member Barrasso.

Dr. Applegate, talk to me a little bit about CO_2 storage and enhanced oil recovery. That is something that we actually do in North Dakota. Dakota Gasification Company—we have a plant that takes lignite coal, converts it to synthetic natural gas, puts that in the pipeline, captures it, separates the CO_2 in the process, and sends that to what are called the Weyburn oil fields and puts it down a hole for tertiary oil recovery. It seems to me that is the way for us to produce more energy in this country, while at the same time, capturing CO_2. Obviously, we have the technology to do it. The challenge is getting it to a commercially viable basis. So, whether we are talking about coal, coal-fired electricity, or in this case, converting coal to natural gas, or we are talking about natural gas or oil—any of the fossil fuels—it seems to me this is a way to both address carbon and also make these technologies commercially viable. And not only important for our country—and of course, the Ranking Member's state is a leader in this area as well as our state—but also then, those technologies get adopted around the world, right? And so, it is actually something that is a solution not only for America, in terms of energy and good stewardship, but also globally.

How do you play an important role? What can you do to advance this technology and make this happen? I hope it is something you have thought about and something that you can help address.

Dr. APPLEGATE. Yes, thank you very much for the question, Senator. And yes, there is an important role here for the U.S. Geological Survey. We recently issued a report specifically looking at where the potential is for using CO_2 for enhanced oil recovery. And so, that is really our part of this, is understanding where, you know, where are the prospective areas, and as you noted, I think, the Williston Basin was one of the most significant areas in the nation for that. So, again, it is using the same kinds of expertise that we develop to understand where the oil and gas resources are for the nation, and understanding where the sequestration potential is as well. So that is an area of ongoing work.

Senator HOEVEN. And that is something that you would help with in your role, if confirmed, correct?

Dr. APPLEGATE. Absolutely.

Senator HOEVEN. Very good.

Okay, Dr. Wang, I am going to go the same direction with you at ARPA–E there. Whether it is coal, whether it is natural gas, whether it is oil, you know, we are facing inflation right now. Obvi-

ously, every product has an energy component in its cost structure. So not only for our country, but also for our allies, with what is going on in Ukraine, and Western Europe's need for energy as well as other places around the globe, and we don't want to have to depend on our adversaries for energy, we want to produce it here at home. Talk to me about how you can help address what I just described to Dr. Applegate, and are you committed to helping us make that happen? And how do you propose to do it?

Dr. WANG. Thank you for that question, Senator Hoeven. It is extremely important as we think about our energy independence. ARPA–E has a mission to develop transformative technologies in a range of diverse ways. And I think that is where there is an opportunity. In fact, I was just thinking that I think we could collaborate more. I could collaborate more with Dr. Applegate to work toward transformative technologies that can address the CO_2 challenge, and I think there are other opportunities as well beyond that, and that ARPA–E can support and further invest in, which includes looking at next generation, say, nuclear power and how do we actually interface that, in particular thinking about the waste management and the safety of those. And there are other opportunities with other clean energy sources and renewables. And we have to look at all this range of energy sources, including this carbon capture utilization and storage as well. And these are advances that ARPA–E has already demonstrated at some level.

I mentioned earlier that ARPA–E has had a program in developing advanced materials for carbon capture utilization and storage. And the challenge is still that how do we scale it up, and there are opportunities there, but can we accelerate the pace of these technologies and get them cost-effective and efficient so we can really deploy them and incorporate them and collaborate with others within the DOE and others to be able to get those to the point by which we can commercialize and make the impacts we need so that we can be energy independent. And so, if confirmed, I certainly will work toward looking at this diversity of portfolio of energy sources and generation. Storage, as well, is really important to the utilization of our energy and to be able to work toward these goals.

Senator HOEVEN. For both storage—geologic storage and tertiary energy recovery—would you agree though that you are committed to helping us do that on fossil fuels? You mentioned renewables, but also on fossil fuels, one, and two, recognize that when we crack the code on doing that here, other countries around the globe will adopt that technology as well, at places like China, where they are building coal plants.

Dr. WANG. Right.

Senator HOEVEN. We want to develop these technologies and make them commercially viable. That not only maintains our industry and more energy here at home, but it also sets the standard for technology around the world so that other places have better environmental stewardship as well. Do you agree with that, and specifically, as regards fossil fuels?

Dr. WANG. Absolutely. I think that certainly we will also rely on fossil fuels in the future, and this is where the carbon capture, I

think, is very important because you want to minimize emissions, right? So that is a really important part of this as well.

Senator HOEVEN. Thank you.

Thank you, Mr. Chair. Are you Chair or Ranking Member now?

Senator BARRASSO. Yes.

Senator HOEVEN. Okay, good. Thank you.

Senator BARRASSO. Thank you, Senator.

I have one last question, Dr. Applegate, and it is something we talked about earlier—the critical minerals list. In light of your answer of how we try to take a close look at that, and it modifies over time as things change, and it brings me to the issue of helium. So I raise the issue because the U.S. Geologic Survey removed helium from its critical minerals list in February. You know, we now are experiencing a shortage of helium, and the shortage of helium is a result of Russia's invasion of Ukraine. Algeria is the world's fourth largest helium supplier. And so, it is producing less helium. Helium is a byproduct that occurs in the process of liquefying natural gas. So with Algeria producing less helium because it is producing less liquefied natural gas—still producing natural gas, which is shipped by pipeline now to Europe as an alternative to Russian gas, but as a result we are having less helium being produced as a byproduct of the chemical process here.

So I would just recommend and ask you to consider, in light of these developments, which USGS needs to be constantly on top of, if you would reconsider putting helium back on the critical minerals list.

Dr. APPLEGATE. Thank you for the question, Senator. And I have to admit, I am having a bit of a sense of deju vu, because when I was a Congressional Fellow here 27 years ago, helium was one of the issues—the National Helium Reserve—that I worked on. So there is nothing new under the sun, as it were.

Helium is, as I indicated—we continue to look at the different factors that go into that criticality determination, particularly with respect to supply lines. Obviously, the United States has huge helium resources as well as being an overall net exporter, so those are some of the drivers in terms of whether it made that list or not. But no question about it being an essential, central resource, and one that we will continue to look at in terms of its criticality.

Senator BARRASSO. Well, I think you have effectively pointed out the issues related to this critical minerals list and how it can change from time to time in terms of use of those minerals as well as the impact of global activities and availability for use in the United States, and that is why it is critical to us.

Well, I want to thank all of you, all of our nominees today. Congratulate all of you as well. We appreciate all of you being here with your families, your responsiveness to our questions and concerns, your willingness to take on these very important jobs.

Members have been in and out, some may have additional questions. They have until 6:00 p.m. tomorrow night to submit additional questions for the record. I hope you would get back to us with answers as quickly as possible.

Thank you for bringing your daughter to work today, Dr. Applegate.

And with that, the Committee stands adjourned.

[Whereupon, at 11:35 a.m., the Committee was adjourned.]

APPENDIX MATERIAL SUBMITTED

Senate Committee on Energy and Natural Resources
Ambassador Carmen Cantor Nomination Hearing
April 28, 2022

Questions from Ranking Member Barrasso

Question 1: Wyoming is the main producer and exporter of American soda ash, a primary component in making glass. The United States main competitor is China, which produces a synthetic soda ash that is less environmentally friendly. A new security pact between China and the Solomon Islands may pose a threat to trade in American soda ash.

In March, the *New York Times* explained that the security pact would give –"*China a base of operations between the United States and Australia that could be used to block shipping traffic across the South Pacific."*

a. **If confirmed, what would you do in your new role to help ensure the free flow of U.S. exports like American soda ash to the South Pacific, especially as it relates to the waters of the U.S. territories, Freely Associated States, and their neighbors?**

Response: As stated at the hearing, my priorities are all related to partnerships and in my current position I am very aware of the evolving security concerns in this region as it relates to China. If confirmed, I will work to strengthen our historic and economic partnerships, in both the U.S. territories and the Freely Associated States, which are now more important than ever, to counterbalance the overt and covert actions by China in the Indo-Pacific Region. In public and private communications, we must make clear that the United States will continue to preserve and promote free and fair trade in the region, including for U.S.-produced commodities. Taken together, the islands, airspace, and waters of these American partners in the Pacific give the U.S. a strategic presence that compliments American political, social, and economic membership in the Pacific islands region and Oceania that make it clear to China and the world that the U.S. is here to stay and promote American values and interests. Risks involving interference with shipping and other aspects of U.S. freedoms and relationships in the region is reduced by the strength of these partnerships spanning a vast region of the Pacific.

Accordingly, if I am confirmed, I will seek to promote continued trade in the region, free of interference, by working closely with Special Presidential Envoy for Compact Negotiations Joseph Yun and the federal team that has been put together to move the Compact of Free Association (COFA) negotiations forward, including the Department of the Interior, State, Defense and other lead agencies. We need to send a signal to the world that this region, including the Freely Associated States, remains very important, and the U.S. is increasing, not diminishing, our commitment to bilateral relationships with our partner governments in the Freely Associated States.

Question 2: During your nomination testimony before the Senate Foreign Relations Committee you stated that – *"We have an opportunity to act as a positive alternative to China's growing presence in the FSM and the region."*

a. **If confirmed, how will you use your new position to help facilitate the US being a positive alternative to China's presence in the region and counter their aggressive actions in both the Freely Associated States and the U.S. territories?**

Response: As I said at my hearing, I agree that China is an increasing threat in the region. That threat is evidenced by the security agreement that the Solomon Islands recently signed with the People's Republic of China. In my current position as Ambassador, I have been actively engaged in promoting the United States as a

positive alternative in the region and I believe that there is significant support for that view. The President of the Federated States of Micronesia sent a letter to the Prime Minister of the Solomon Islands expressing concerns about that agreement. Since my nomination for this position, I spoke with the governors of the U.S. territories to hear more from their perspectives and discussed China's influence in the region and the need to counter that influence.

While we have been active on this front, I believe that the U.S. needs to do more, be more visible, and signal to the world and to China that this region is not only very important to the U.S., but vital. Our role with the Freely Associated States and U.S. territories is based not only on a historical relationship with the people of these islands, but the values and commitments to freedom and peace that we have come to share. That relationship began with liberation of the islands in which 100,000 Americans and many islanders died and continues today in order to preserve the liberty of the islands. That is not just a U.S. legacy, it is a shared legacy of our peoples. If confirmed, I commit to using my position to support actions and policies to ensure China does not threaten the freedom of our friends or our interests in the region.

One of the ways the U.S. can be a positive alternative to China is by prioritizing and expediting the COFA Negotiations. If confirmed, I commit to do all I can to make sure that COFA Negotiations are completed in a timely way and strengthen those strategic bilateral partnerships.

Overall, I want to support our relationship with the U.S. Virgin Islands, American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands. Historically and in a changing world, these islands are also of immense and increasing strategic importance. I want to be an advocate for our territories, and the hard-working Americans who call those territories home. I want to cultivate partnerships with the U.S. territories and their leaders so we can move the U.S.'s agenda forward. I appreciate the strong interest in these matters by Members of Congress and look forward to continuing engagement, if confirmed.

Question 3: Based on your experience as Ambassador of Micronesia, where do you see the most need in terms of U.S. domestic assistance in the Freely Associated States?

Response: The U.S. has a very special and unique relationship with the three Freely Associated States. We have been friends with the region since the days of World War II and have had a great relationship with them for more than 75 years. Given their geographic isolation as island nations, any government faces challenges to ensure a strong economy and public services, and key issues in my experience include infrastructure, health care, education, and public security. The COVID-19 pandemic has been a major challenge to nearly all governments and poses unique issues in the FAS, many of which closed their borders to protect their populations. While there is undoubtedly need for U.S. domestic assistance in the Freely Associated States, those sovereign island nations are best positioned to characterize and prioritize those needs, and to incorporate those needs into Compact renewal discussions. So, if confirmed, I will continue to work with Ambassador Yun on moving COFA Negotiations forward expeditiously.

Senate Committee on Energy and Natural Resources
Ambassador Carmen Cantor Nomination Hearing
April 28, 2022

Question from Senator Lankford

Question: The last few years have rightly shined a light on the importance of the Pacific region to our national security. **Ambassador Cantor, how do you intend to partner with the Department of Defense to ensure the territories in INDOPACOM are being equipped and fortified to combat China's growing influence and aggression in the region?**

Response: If confirmed, I expect to work closely with all our partner agencies, including the Department of Defense (DOD), when it comes to ensuring security for U.S. interests in the region, including our territories and Freely Associated States (FAS) allies. In my current capacity as Ambassador to the Federated States of Micronesia, I have worked very closely with the Commander of the Joint Region Marianas in Guam and INDOPACOM leaders in Honolulu. If confirmed, I plan to build on the relationships I already have with these key partners to ensure the territories and the Freely Associated States, segments of DOD's "Pacific Homeland" plan, can fight the People's Republic of China's growing influence in the region.

The office for which I am nominated is charged to carry out the Secretary of the Interior's responsibilities for the U.S. territories and administer and oversee federal assistance under COFA. Those responsibilities require the Department of the Interior to partner with other federal departments and agencies operating in the U.S. territories as our historical partners in the region, more recently with the former U.N. Trust Territory that today partners with the U.S. through strong and close bilateral relations with the Freely Associated States under COFA.

Security matters are an important part of the ongoing COFA negotiations and if confirmed I will work closely with Ambassador Yun to support those negotiations. I believe my experience as Ambassador to the Federated States of Micronesia gives me a unique experience and understanding of the domestic and security concerns of the FAS and since my nomination, I have done outreach to the governors of the U.S. territories to hear directly from them, including their security concerns regarding China. I believe the role for which I have been nominated is to serve as an advocate for the U.S. territories that are not always a focus of those in Washington. I appreciate the strong interest in these matters by Members of Congress and look forward to continuing engagement, if confirmed.

The Departments of State and Defense are lead agencies that we work with most closely, among several other agencies that play a vital role in these U.S. and U.S. affiliated islands. DOD works with each of the U.S. territories and the Freely Associated States on addressing the most pressing and defense and security needs. If confirmed, I will do everything that I can to support and work with DOD as they operate in the region.

Senate Committee on Energy and Natural Resources
Dr. David Applegate Nomination Hearing
April 28, 2022

Questions from Ranking Member Barrasso

Question 1: USGS has the important role of publishing a list of critical minerals at least once every three years. In February, it updated the critical minerals list. A fact sheet accompanying the updated list says – *"the 2022 list of critical minerals is based on data through the year 2018."* **How can USGS accurately evaluate minerals if it is relying on data that is four years old?**

Response: I recognize the importance of using the most up-to-date data possible. The data that are used in the development of the critical minerals list come from a variety of sources, not just USGS data, some of which are prepared on different time cycles. The analysis published in 2022 reflects the most recent complete set of data available at the time the analysis was conducted. For example, the United States Census Bureau's 2018 Annual Survey of Manufacturers (ASM) was released on June 25, 2020, and the results from the 2019 ASM weren't released until February 18, 2021, at which time our analysis was complete and the draft methodology for the list of critical minerals was already being submitted for peer review. That said, the critical minerals list is not primarily meant to identify short-term issues (which may change before either federal policy or private sector action would take effect) but to highlight critical mineral trends, which may prompt a long-term response. If confirmed it will be a priority for me not only to implement the critical minerals list objectively according to the law but also to support the USGS efforts to supply policy makers with as much timely, nonpartisan, and sound scientific information as possible on important mineral resources matters.

Question 2: The President's fiscal year 2023 budget requests $147 million for Energy and Mineral Resources programs. It requests increases for wind, solar, and geologic energy, critical minerals, and research into greenhouse gas emissions and sinks on federal land.

a. **What increases has the President requested to support conventional oil, gas, and coal – and what work will the USGS do to facilitate the continued use of these energy resources in the future?**

Response: Oil and gas research and assessments will continue to be important components of the Energy Resources Program portfolio and are foundational to much of our other work. Fossil energy sources are a significant part of our current energy mix and are expected to continue to be so for many years. I believe that the USGS's work to assess these resources both domestically and around the world is important, and if confirmed would work to ensure that USGS continues to produce strong, technically sound information on all resources, including fossil energy resources. In addition, as discussed at my hearing, our research on CO_2-enhanced oil recovery relies on our oil and gas work. And the Scenario Analysis Tools for Greenhouse Gas Reduction on Federal Lands increase proposed in the FY 2023 President's Budget Request is directly tied to energy resources and would support sustainable uses of federal lands by providing decision-makers and land managers with the tools to analyze tradeoffs among energy development scenarios including oil, gas, coal, and renewable energy generation and storage. Finally, our petroleum and coal expertise are providing essential support to implementation of the Bipartisan Infrastructure Law remediation funding.

Our committee held two important hearings on the need for domestic mineral production earlier this month.

Senate Committee on Energy and Natural Resources
Dr. David Applegate Nomination Hearing
April 28, 2022

b. What work will USGS conduct on critical mineral supply chains?

Response: The USGS will continue to collect, analyze, and publish the information required to evaluate mineral criticality to identify risks of supply disruption and work across the federal government to prioritize and advise on options for mitigation of strategic vulnerabilities. The USGS will also continue to provide technical assistance to federal agencies that invest in critical mineral supply chains, for example by participating on investment review panels for the Department of Defense, the Department of Energy, and the Export-Import Bank.

We are also working to implement recent Congressional directions. The Energy Act of 2020 directed the USGS to increase its emphasis on quantifying the Nation's domestic critical mineral resource base and on analyzing and forecasting mineral supply chains essential to the Nation's economy and national defense. The FY 2023 President's Budget includes increases for forecasting related to critical minerals, which would allow the USGS to leverage its experience providing interagency technical assistance to launch an automated analytical capability for critical minerals supply risk and economic impact forecasting. One specific focus of those increases is on supply chains for energy technologies, which would help the USGS build on recently published analyses of the mineral dependencies of current and emerging energy generation and storage technologies to increase the provision of data and technical assistance to other federal agencies, including the interagency Federal Consortium on Advanced Batteries.

If confirmed, I would endeavor to lead the USGS to pursuing these missions efficiently and effectively, developing strong science and working in continued partnership with Congress.

Question 3: USGS, rather than the United States Fish and Wildlife Service (USFWS), has emerged as the authoritative source for sage grouse science and policy. **Please explain how this came about.**

Response: The USGS provides science support to various Department of the Interior bureaus and other agencies based on their requests and articulated needs. The USGS is a world leader in sage-grouse-related science but does not develop or advocate for or against specific policy. USGS scientists coordinate with our partners to ensure that the products they develop support and inform partner needs for making policy and management-related decisions.

USGS has provided science support regarding the sage-grouse going back to before 2015, including information that was utilized in the development of the Bureau of Land Management (BLM) and USDA Forest Service Land Use Plan Amendments and the U.S. Department of the Interior Integrated Rangeland Fire Management Strategy. The USGS is continuing to build on that foundation to inform science-based decisions to help support local economies and the continued conservation, management, and restoration of the sagebrush ecosystem.

USGS science support has focused not only on sage grouse population but landscape-scale ecosystem and habitat issues across a very large area, including the impacts of wildlife. If confirmed, I would work to ensure that the USGS continues to produce independent quality science for sage brush ecosystems to benefit federal agencies, states, Tribes and the public.

Senate Committee on Energy and Natural Resources
Dr. David Applegate Nomination Hearing
April 28, 2022

Question 4: USGS prides itself on creation of peer reviewed science.

a. **Please explain the peer review process. Who selects the reviewers?**

Response: The USGS has an extensive peer review process as part of its internal Fundamental Science Practices (FSP), which are defined in policy in the organization's Survey Manual (Chapters 502.1-502.10). Peer reviewers are asked to evaluate the clarity of hypotheses, the validity of the research design, the quality of data collection procedures, the robustness of the methods employed, the appropriateness of the methods for the hypotheses being tested, the extent to which the conclusions follow from the analysis, and the strengths and limitations of the overall product. Most USGS science publications appear in peer-reviewed journals for which the editors typically select these reviewers. Under FSP, the USGS requires one or more additional peer reviews with the reviewers selected by the author's supervisor who will seek qualified and independent experts.

b. **Does the review panel include individuals who are known to disagree with the analytical approach adopted by USGS?**

Response: Peer review of USGS manuscripts is intended to ensure the accuracy of data, the scientific validity of interpretations, and the consideration of alternative interpretations. As I noted in the previous response, most USGS science publications appear in peer-reviewed journals with editors selecting the reviewers. USGS science publications are required to have at least one additional peer review. Also, independent scientists in the USGS Office of Science Quality and Integrity ensure that USGS standards for scientific quality and peer review are followed by reading publications, associated peer reviews, and written reconciliation of peer-review comments before approving interpretive science products for release. If confirmed, I will endeavor to lead the USGS as it engages in the peer-review process in a manner that continues its scientific independence and credibility.

Question 5: USGS's 2022 Minerals Commodity Summary for helium states that the United States imported 7 percent of its helium from "Portugal." It is my understanding that Portugal does not produce any meaningful quantities of helium. **What exactly is the 7 percent figure referring to?**

Response: The reported number for imports from Portugal does benefit from additional context. Importantly, the United States is a net exporter of helium, and United States total imports of helium are very small relative to domestic production, consumption, and exports. The data reported in the Mineral Commodity Summaries are averages over the period from 2017-2020. One of those years (2017) reported imports from Portugal (7% of imports, or less than 0.5% of United States annual consumption), but our USGS mineral commodity experts think it is most likely that "imported" helium was originally domestic helium that was exported abroad and then "re-exported" back to the United States via Portugal. Going forward, reported volumes from Portugal have virtually ceased since 2017 and thus USGS expects that this source will likely drop out of the statistics in the next cycle. USGS's survey reports imports and exports as they are recorded and appreciates the opportunity to clarify or provide additional context in situations like this. If confirmed, I would work to continue USGS practice of open and transparent communication with Congress on such matters.

Question 6: On February 8, 2022, Gasworld published an article titled "Helium markets now experiencing 'Helium Shortage 4.0.'" The article discusses Russia's Amur helium plant. Specifically, it says that "the natural gas processing plants that produce feed gas for the first of three helium plants experienced a fire on 8th October and a second explosion/fire on 5th January that will delay Amur's helium production until at least Q3 of 2022."

It goes on to say: "How long it will take to restart helium production from Amur remains to be seen, with speculation ranging from the most optimistic late Q3 to more pessimistic predictions that Amur will produce little, if any, helium before 2023." The article concludes with: "The helium market in 2022 is going to look very different than most knowledgeable observers…would have predicted little over one month ago."

On March 16, 2022, Chemical and Engineering News published an article titled, "War in Ukraine makes helium shortage more dire." It explains that the Arzew plant in Algeria - which is among the world's largest helium producers - has shutdown helium production. Specifically:

> *"The helium shutdown in Arzew is a result of high natural gas demand in Europe, due in large part to Russia's invasion of Ukraine. Helium is found alongside natural gas in conventional wells. Algeria normally compresses natural gas into liquid form at Arzew for global transport by ship. During that process, it's economical to extract helium because it liquefies at much higher pressures and lower temperatures than natural gas…But now, much of Algeria's natural gas is being sent to Spain via pipeline, making separation impractical. The industrial and rare-gas advisory firm Edelgas Group estimates that liquefied natural gas production in key regions is down 30% from January, leading to a 10% drop in global helium supply."*

On March 29, 2022, the National Weather Service announced that it "is reducing the frequency of weather balloon launches at several upper air locations in the United States due to a global supply chain disruption of helium." On April 4, 2022, Physics Today published an article that explained that scientists at the Department of Energy's Pacific Northwest National Laboratory (PNNL) "had deactivated two NMRs [nuclear magnetic resonance spectrometers] and scheduled another to be mothballed in May." It states that "The shutdowns have been forced by successive cuts to PNNL's helium allocation from Messer, its supplier, from a preshortage average of 2400 liters per month to 940 liters in March." The article goes on to say that "Of the five major helium suppliers—Air Products and Chemicals, Air Liquide, Linde, Matheson, and Messer—all but Air Products have declared force majeure and are now rationing their customers to 45–60% of their contracted amounts." It says, "Noncontractual users who buy helium through purchase orders are having the hardest time acquiring it; spot prices have doubled in the last several months."

a. **Does USGS recognize that helium is a global market? Does it recognize that U.S. end users, including end users with long-term contracts for helium, may not be able to acquire sufficient supplies of helium if helium production is reduced or shutdown elsewhere in the world?**

Response: As a practical matter, I appreciate that helium, like many commodities, is traded in a global market and it is experienced that way by end users. I also acknowledge that recent global events appear to be having significant impacts on this market. Helium was not included in the most recent critical minerals list reflecting that the United States is a net exporter of helium, possesses some of the largest recoverable volumes of helium reserves in the world, and is the world's largest producer of natural gas, from which helium is derived as a byproduct. It is my understanding that currently the United States continues to export larger quantities of helium than it consumes domestically on an annual basis, but I recognize that the situation with this commodity is dynamic for important reasons, including those raised in your question.

That said, the critical minerals list is not primarily meant to identify short-term issues (which may change before either federal policy or private sector action would take effect) but to highlight critical mineral trends,

which may prompt a long-term response. While helium was not listed on the most recent critical minerals list, I recognize that it is a very important commodity for many reasons and uses and that current events are dynamic. If confirmed, I am committed to ensuring that the USGS plays its appropriate role in the response to new events regarding this or any other commodity.

b. How can USGS maintain that "Helium's trade exposure score [is] 0 and, in turn, its supply risk score [is] 0" when the National Weather Service, another federal agency, states it is unable to obtain sufficient quantities of helium "due to a global supply chain disruption of helium" and the Department of Energy's PNNL has had its allocation of helium cut by over 60 percent?

Response: Again, as a practical matter, I appreciate that helium, like many commodities, is traded in a global market and it is experienced that way by end users, including federal agencies, and that recent global events appear to be having significant impacts on this market. For purposes of constructing the most recent critical minerals list, key factors considered for helium included the fact that the United States is a net exporter of helium, that the United States possesses some of the largest recoverable volumes of helium reserves in the world, and that the United States is the world's largest producer of natural gas, from which helium is derived as a byproduct.

It is my understanding that currently the United States continues to export larger quantities of helium than it consumes domestically on an annual basis, and that the scores referenced in this question related to the situation at the time of the production of the list, but I recognize that the situation with this commodity is dynamic for important reasons, including those raised in your question.

That said, the critical minerals list is not primarily meant to identify short-term issues (which may change before either federal policy or private sector action would take effect) but to highlight critical mineral trends, which may prompt a long-term response. While helium was not listed on the most recent critical minerals list, I recognize that it is a very important commodity for many reasons and uses and that current events are dynamic and, if confirmed, I am committed to ensuring that the USGS plays its appropriate role in the response to new events regarding this or any other commodity.

c. In light of these developments, will you issue a notice in the Federal Register giving the public an opportunity to comment on whether USGS should return helium to its list of critical minerals? If so, when will you issue that notice? If not, why will you not issue the notice?

Response: The critical minerals list is not primarily meant to identify short-term issues (which may change before either federal policy or private sector action would take effect) but to highlight critical mineral trends, which may prompt a long-term response. While helium was not listed on the most recent critical minerals list, I recognize that it is a very important commodity for many reasons and uses and that current events are dynamic and, if confirmed, I am committed to ensuring that the USGS plays its appropriate role in the response to recent events regarding this or any other commodity. When it comes to implementing the critical minerals list, I am fully committed to following the law and ensuring that USGS makes independent, scientifically sound decisions based on the best available information for policymakers and the public.

Question 7: USGS aims to provide unbiased scientific information to describe and understand the geological processes of the Earth; minimize loss of life and property from natural disasters; and support the management of

water, biological, energy, and mineral resources. The USGS is a scientific agency housed within DOI. In contrast to other DOI bureaus, it has no regulatory authority and does not manage any major federal lands. USGS also collects scientific information for long-term data sets. These data sets range from satellite imagery of land and ecosystem features to streamflow and groundwater data. Since 1879, Congress has expanded the USGS's statutory authorities to include activities related to ecosystems and natural hazards.

a. How do you see USGS's role as the primary scientific agency in DOI?

Response: The USGS has a unique role as a non-management, non-regulatory bureau within the Department of the Interior. I believe that the science USGS delivers does not determine the outcome of those management and regulatory decisions but supports and informs our federal and state partners' needs for making policy and management-related decisions, helps clarify the impacts and trade-offs of policy choices, and assists our partners with prioritizing their investments of taxpayer dollars by providing information on likely outcomes. USGS's broad scientific mission includes carrying out activities to better understand the Earth and its resources and to minimize the loss of life and property to natural disasters, like earthquakes, floods, and volcanic eruptions. If I am confirmed as Director, I will work to ensure that the USGS continues to carry out its mission in a non-partisan fashion to address the nation's scientific needs.

b. How might that role evolve under your leadership?

Response: Technology and the Earth and biological sciences continue to evolve, and the USGS must evolve along with it to meet the Nation's scientific needs. If confirmed, I will continue to meet these expectations with a focus on the highest scientific integrity. I will work to strengthen our core capabilities so that we have the expertise and data necessary to provide real-time and long-term information products. And I will seek to strengthen our partnerships with states, Tribes, academia, and with the private sector, to help improve the delivery of our science so that it reaches those who can benefit from it the most.

c. In 2021, USGS published a strategy for science to guide the agency through 2030. What aspects of the Strategy do you plan to address, and what aspects, if any, do you believe should be changed?

Response: The 21st Century Science Strategy provides the USGS with a long-term vision for how our science can be most useful to those who need it for decision-making. To make progress in addressing each of the elements of the science strategy, I believe it is important to use it as the framework for our annual science planning process. This includes a scientific focus that builds on our mission-specific capabilities and drives greater interdisciplinary integration; a focus on information technology (IT) and other technical innovations; a partnership focus to develop and strengthen relationships with a wide variety of partners; and an organizational focus to optimize interactions across the USGS, develop our workforce, and improve our facilities.

I believe that achieving the USGS mission requires a sustained commitment and attention to all of these aspects of our enterprise that reflect not only what we do, but how we do it. In addition to these four focus areas, the Science Strategy calls for development of an integrative, predictive science capability. The USGS has initiated several pilot studies for such a capability and has undertaken a cross-program, cross-mission collaborative planning process for initiatives proposed this fiscal year with an emphasis on principles such as participatory research engaging partners, a focus on scientific capacity needs, data and model interoperability, and delivery of actionable information to stakeholders. If confirmed, I will work to implement this strategy effectively, while

also paying close attention to how the strategy is working and what, if any, improvements or course corrections should be made as we move forward.

Question 8: Some stakeholders have referred to various USGS monitoring and datasets as a "gold standard" for their length of record, availability of data, widespread coverage, and calibration standards. Stakeholder confidence in USGS monitoring and data is predicated on the scientific integrity of USGS staff and the data they provide.

a. How does USGS monitoring and data compare to the growing expertise of the private sector and capabilities of state, local, and tribal governments?

Response: The USGS has had a long-standing role to provide monitoring capabilities and data sets that are long-term, national, and based upon consistent protocols, ensuring that data collected at different times and in different parts of the country are readily comparable. I take very seriously the trust and reliance that states, Tribes, local governments and the private sector place in our data and scientific integrity, and if confirmed it will be a high priority to maintain and build on that trust. The USGS follows Fundamental Science Practices and rigorous quality assurance protocols to ensure the highest quality in the monitoring, data collection, data interpretation, and reporting of results. The bureau's longstanding role as a non-regulatory, non-advocacy science provider also ensures that the data collected are recognized by all parties as impartial. This complements the role of the private sector, academia, and other state, regional, and Tribal governments, which typically produce, or contract for the production of, monitoring and datasets that address specific issues or needs. I believe in ongoing communication and collaboration with these entities so that we can benefit from ongoing feedback and mutual support.

b. How do you see the USGS interacting with these entities to meet the scientific needs of the nation?

Response: I am proud that the USGS engages in many beneficial partnerships with a wide range of external entities, allowing it to best meet the scientific needs of the Nation, and if confirmed, I would seek to foster and expand these interactions going forward. These valuable efforts include partnerships in which the USGS receives funding, partnerships in which the USGS sends funds to external partners or contractors, and agreements in which both the USGS and external partners contribute in-kind services. Other useful partnership models include: reimbursable projects from other government agencies that provide them with access to USGS's science and expertise that they are lacking, or where the USGS provides needed impartial science on contested topics; external contracts with the private sector for analytical or other services that the USGS does not have the capacity or expertise to carry out; external cooperative agreements or grants that the USGS uses to fund academic partners, such as through the Cooperative Research Units; and Cooperative Research and Development Agreements with the private sector where we work together on innovative technology development or mutually beneficial data collection. An excellent current example is the Earth Mapping Resources Initiative (Earth MRI), where the USGS is working with and sending funds to many states for basic geologic data collection, contracting with the private sector for collection of large geophysical data sets, and partnering with the private sector to access their geophysical data sets—all with the goal of understanding better where critical minerals are likely to occur geologically across the United States. These partnerships are important to the work of the USGS and, if confirmed, I will ensure that this remains a priority for the bureau.

c. How would DOI support scientific integrity of USGS work and data under your leadership?

Response: I am committed to maintaining the long-standing USGS emphasis on and respected reputation for adhering to the highest standards of Scientific Integrity and Fundamental Science Practices. The USGS is committed to work with and is supported by DOI in its adherence to Scientific Integrity and Fundamental Science Practices. I commit to taking any issues involving scientific integrity with the utmost seriousness and ensuring that other USGS leadership does the same.

The USGS Office of Science Quality and Integrity monitors and enhances the integrity, quality, and health of USGS science through executive oversight and development of strong practices, policy, and supporting programs. The USGS Science Integrity Officer provides the USGS with advice and oversight on scientific integrity matters and leads independent evaluations of any allegations of scientific misconduct or loss of scientific integrity against the USGS. The USGS Fundamental Science Practices Advisory Council is tasked to provide advice and recommendations to USGS leadership and others regarding fundamental science practices, including evaluation of current practices in need of updating or establishment of additional new practices.

If confirmed as Director, I will work to ensure that these positions and roles are carried out effectively and pay close attention to any issues or feedback so that USGS science continues to earn the nation's trust.

Question 9: USGS, through its Natural Hazards Mission Area, provides scientific information and knowledge necessary to address and mitigate the effects of natural hazards such as volcanic eruptions, earthquakes, storm surges, and landslides. Congress recently enacted hazards-related legislation such as the National Earthquake Hazards Reduction Program Reauthorization Act of 2018 (P.L. 115-307), the National Landslide Preparedness Act (P.L. 116-323), and Section 5001 of P.L. 116-9, authorizing a National Volcano Early Warning and Monitoring System. Congress has also provided funding to the USGS through emergency supplemental appropriations in FY 2018, FY 2019, and FY 2022.

a. How would you work with other federal agencies and local partners to advance hazards science and monitoring in order to save lives and property?

Response: Having spent much of my career in this area, I firmly believe that partnerships are essential to ensuring that USGS science reaches those who can use it to enable resilience in our communities. I believe in the importance of partnerships. Every program in our Natural Hazards Mission Area collaborates with other federal agencies, whether through statutory interagency bodies like those you cited or through individual agreements, as well as with state, local, and Tribal authorities. In leading the USGS, I believe it is important to assist with such coordination because our centers and programs regularly engage stakeholders. This leads to better responses to hazards, but also to better preparation, which together result in reduced risk. If confirmed, I will keep such collaboration a high priority for the USGS, looking to build off of successful models and apply them in additional circumstances where appropriate.

b. What is the USGS's role in the social science regarding natural hazards, such as understanding and improving the government and public preparation and response to hazards, if any?

Response: I have a great appreciation for the value of communicating science to the public in ways that are useful. Recognizing that social science provides critical expertise to this arena, the USGS employs a number of

social scientists across its centers and programs and partners with academic experts. Social science has made possible a number of products by the USGS and our partners, including the annual ShakeOut earthquake drill, which prepares people to respond to earthquakes, large-scale scenarios that illustrate the impacts of catastrophic natural hazard events, and the ongoing implementation of the ShakeAlert earthquake early warning system, which relies on user responses to alerts. The use of social science to inform the development and delivery of hazard information has recently been highlighted in several publications. Some examples include the Puerto Rico Landslides Guide, the State of our Nation's Coast project, the Next Generation Volcano Hazard Assessment project, and the Wildland Fire Strategic Plan. If confirmed, I will be committed to ensuring USGS hazard science reaches those who need it most in the forms that can be readily understood and acted upon.

c. How do the various hazards authorities recently enacted by Congress integrate into the current activities of the USGS?

Response: I appreciate the hazards authorities recently enacted by Congress that strengthen the programs that make up the USGS Natural Hazards Mission Area. These authorities include the National Earthquake Hazards Reduction Program Act, the National Volcano Early Warning and Monitoring Act, the National Landslides Preparedness Act, and the PROSWIFT Act, which authorizes the role of our geomagnetic observatories in characterizing the potential impacts of space weather events. Besides authorizing our programs' missions to deliver hazard science, each authority also enables robust interagency and stakeholder collaboration. The USGS cannot undertake its science alone, and these authorities reflect that. If confirmed, I look forward to working with Congress to ensure that these statutory authorities continue to serve as a framework for nationwide hazards science and resiliency.

d. Are there additional resources needed to carry out activities authorized in recently enacted legislation related to hazards science and monitoring?

Response: If I have the honor of being confirmed for this position, I look forward to working with Congress to identify opportunities to ensure that these programs operate efficiently, provide information that is timely and instructive for its intended uses, and that resources needed to carry out authorized activities are available.

Question 10: Please explain how USGS collaborates with local governments, specifically on emergency management? How will USGS continue to grow this area under your leadership?

Response: As I noted in my opening remarks, the USGS is committed to delivering unbiased science so that it reaches everyone who needs it, when they need it, in a form they can use. Partnerships are a great strength of the USGS, and emergencies are the critical moment when that information delivery must be correct so that emergency managers can make informed decisions that can truly save lives. That is why we deploy experts to local, state, or FEMA operations centers to help interpret scientific information during geologic and hydrologic hazard events. Recently, I approved expanding our emergency management function in order to better train our scientists for disaster response and improve how our products address emergency management at the local level, for example tools such as the National Water Dashboard that improve the public's ability to subscribe to flood alerts.

Senate Committee on Energy and Natural Resources
Dr. David Applegate Nomination Hearing
April 28, 2022

USGS data and products can save lives and protect property only if we respond to the needs and capacities of local decision-makers. If confirmed, it is my commitment that the USGS will continue to work hard to earn the trust of local communities and agencies on the front lines of emergency management.

Question 11: Please explain the research USGS is currently working on related to chronic wasting disease? Do you plan to prioritize research on chronic wasting disease if confirmed?

Response: I understand that this matter is of great concern to federal, state and Tribal wildlife managers, conservationists and sportsmen and women in many states. Since the early 2000s, the USGS has been working with partners to understand the biology of chronic wasting disease (CWD), assess the spread and persistence of CWD in wildlife and the environment, and develop strategies for early detection and control. Collaboration is a key element in the work that we carry out in this field, and we have worked for years with other federal agencies, with states, and with Tribes to better understand the dynamics of the disease and to develop tools to assist with monitoring the spread of CWD in order to help wildlife managers make informed management decisions. There is currently hope that a test to detect the harmful prions that appear in the brain will soon be available for use in live animals, as opposed to on post-mortem tissues. In FY 2022, the USGS has continued research on CWD early detection, ecology, decision science, human dimensions, and management; continued participating in the Department of the Interior CWD Task Force; and contributed funding for the first phase of the National Academies CWD transmission study, as called for under America's Conservation Enhancement Act. If I am confirmed as Director, the USGS will continue to prioritize engaging with other DOI bureaus, the U.S. Department of Agriculture, as well as state and Tribal partners on applied science to support a coordinated and effective response to inform the actions of land and wildlife managers.

Senate Committee on Energy and Natural Resources
Dr. David Applegate Nomination Hearing
April 28, 2022

Question from Senator Risch

Question: Though the responsibilities of the U.S. Geological Survey have since expanded, the USGS was first created by Congress in order to explore and identify the land potential of the West.

a. **What role, if any, do you expect USGS to play in compiling or creating the American Conservation and Stewardship Atlas, including providing expertise on critical mineral deposits?**

Response: The USGS is providing its technical, scientific expertise to this process. USGS has been named a co-chair, with the U.S. Department of Agriculture and the National Oceanic and Atmospheric Administration, of a committee to assemble publicly available data and information that is intended to provide an accessible and comprehensive picture of existing conservation and restoration work in America.

Our role in this process is technical in nature; policy decisions about what would qualify will be made by Administration leadership and policymakers, not by the USGS. Our scientists are working to integrate data from key stakeholders and to develop mapping and other analytical capabilities within the American Conservation and Stewardship Atlas. I understand that the intention is to have broad policy engagement with the public and am aware that a public comment period on development of the Atlas closed on March 7, 2022, and that comments are being reviewed. The goal is to release a "beta" version of that Atlas by the end of the year. If confirmed, I would be happy to keep your office updated on our progress and ensure that USGS work in this area is consistent with our mission of providing the best available, objective scientific information to inform policymakers and the public.

The Atlas is intended to integrate data from key stakeholders including key contributions from the USGS Protected Areas Database and provide map and analytical capabilities. Although the Atlas will not serve critical mineral data directly, the Atlas will support connections to critical minerals information and science to inform multiple-use lands.

Senate Committee on Energy and Natural Resources
Dr. David Applegate Nomination Hearing
April 28, 2022

Questions from Senator Cantwell

Question 1: Last winter, Washington state experienced severe storm and flooding events that caused significant flooding and damage in Northwest Washington and the Olympic Peninsula. An area that was hit hard was Whatcom County. This flooding event was the most expensive natural disaster since the area became Whatcom County.

USGS plays an important role here, conducting the science before, during and after flood events to inform decision makers on where floods are likely to happen. They also conduct monitoring and alert on potential floods, and importantly, they inform communities of how to bolster existing infrastructure and plan new infrastructure to be flood resilient.

When the flooding in Whatcom County occurred, critical stream gauges got washed away and without those gauges, there was no other way to monitor the flooding that was occurring.

a. **Can you commit to working with myself and the regions impacted by flooding in Washington state to ensure there are ample stream gauges in the system, so if one fails, communities can still get accurate flood information?**

Response: Yes, if confirmed, I am committed to working with you and others on this important issue. I understand that a short-term network has been established at strategic locations along the Washington coast where sensors can be deployed to monitor storm surge and flooding from atmospheric rivers and tsunamis. Additionally, the USGS has begun expanding our short-term network capabilities, consisting of Rapid Deployment Gages (RDGs) that are fully functional streamgages designed to be deployed quickly and temporarily to measure and transmit real-time stream water-level data in emergency situations. The speed with which RDGs can be installed allows the USGS to augment gage networks during coastal or riverine flooding by adding additional temporary locations to the network; provide situational awareness and support to emergency managers; and maintain data flow when streamgaging equipment is damaged. Our goal is to work with local emergency managers to pre-determine locations where RDGs can be deployed during floods.

b. **What does USGS need to effectively work with local community partners and Tribes along areas like the Nooksack River to address flood monitoring needs?**

Response: Partnership and coordination between USGS and local communities is critical to ensure the effectiveness of this program, which provides data to assist with flood management, with water scarcity, and with important natural resource management activities. The Federal Priority Streamgage network and Cooperative Matching Funds in the Groundwater and Streamflow Information Program are important priorities for the USGS and allow us to address flood monitoring needs with local communities, like those that were impacted in Washington State last year. If I am confirmed, I would make partnerships such as these, which are so important to manage for hazards that may impact life and property, a priority.

c. **Do you think USGS has enough resources dedicated to studying and monitoring flooding?**

Response: A priority for the USGS is to maintain the continuity of our National Streamgage Network, particularly the Federal Priority Streamgages where possible. Streamgages are funded by USGS appropriations,

Tribes, federal, state, and local agencies, and in many cases, jointly funded by both the USGS and partners. The USGS leverages these funding sources together to support as many streamgages as possible. I am committed to ensuring that the critical data and information provided by this program continues to be a priority for the bureau.

d. Can you commit to work with me to find ways to strengthen USGS' critical flood work?

Response: Yes, I commit to working with you and your colleagues to strengthen this critical work that USGS carries out.

Question 2: Washingtonians grapple with the threat of a number of natural disasters. Washington is home to five active volcanos that are considered a high or very high threat of eruption. Washington is also located on the Cascadia Subduction Zone, threatening "the Really Big One" that has the potential to devastate the Pacific Northwest.

I have worked to secure funding and pass bills to help Washingtonians prepare for natural disasters. It's critical that the USGS implement these bills and we need to educate and secure more resources to keep communities safe.

a. What is the status on fully implementing H.R. 8810, the National Landslide Preparedness Act?

Response: The USGS and the Department are organizing an Interagency Coordination Committee as called for in the statute. The USGS is also organizing a Federal Advisory Committee comprised of representatives from states, Tribes, higher education, industry standards organizations, and emergency management. In early 2021, the USGS organized a federal interagency working group to provide input to a National Strategy for Landslide Loss Reduction. The strategy is currently under review and will be delivered as a USGS report describing four main landslide risk reduction goals aligned with the intent of the National Landslide Preparedness Act: (1) Assess, (2) Coordinate, (3) Plan, and (4) Respond to landslide hazards. Each goal is supported by several strategic actions.

b. Can you commit to fully implementing this bill?

Response: The President's FY 2023 Budget proposes an additional $2.25 million that will help us to develop the capacity to provide federal landslide experts and equipment to assist in response to landslide emergencies which is an important objective of the statute. If confirmed, I look forward to working with Congress to identify the additional resources needed to complete its implementation.

Question 3: Senator Murkowski and I worked to pass into law S. 346, the National Volcano Early Warning and Monitoring System Act which would modernize USGS' volcano early warning system.

a. What steps have been taken to implement this legislation?

Response: Last year, the USGS published the 5-year management plan for the implementation of NVEWS called for by the statute (USGS Open-File Report 2021-1092). This plan describes the milestones and standards that will be needed to implement the system as envisioned. In particular, the statute calls for a 24/7 watch office

capability and a National Volcano Data Center, which the President's FY 2023 Budget proposes to undertake. The USGS is also meeting requirements of the Act to stand up the interagency committee that will bring together stakeholders from across the federal government to provide guidance on its implementation. This group is expected to meet later this year. Other improvements to our volcano monitoring system are moving the USGS toward implementation of the statute, including the establishment of an upgraded lahar detection system on Mt. Rainier, new seismic and geodetic equipment on Glacier Peak, and the re-establishment of the Hawaiian Volcano Observatory's monitoring capabilities that were damaged in the 2018 eruption of Kilauea. I look forward to fully implementing important systems such as this, if I am confirmed.

b. Is there more that Congress should do?

Response: If I am confirmed, I would look forward to working with Congress to continue support of the core research, assessment, and monitoring capabilities for volcanic hazards that are so important for the implementation of the system envisioned by the Act.

Question 4: I believe we need to talk more about seismic resiliency. We working to bolster infrastructure in the Northwest to prepare for earthquakes, but there is more work to do.

c. Can you commit to working with me to provide more resources towards becoming seismic resilient? What does USGS need to do this?

Response: Yes, if confirmed, I commit to work with you to ensure the USGS continues efforts to advance this important need. Seismic resilience is the overall objective of the entire National Earthquakes Hazards Reduction Program and requires contributions by all four NEHRP agencies.

The President's FY 2023 Budget is an important place to start, as it strengthens USGS's efforts to deliver the science that communities need to become more resilient to the most devastating natural hazard events. Subduction zones, where one of the Earth's tectonic plates is thrust over another, generate the world's largest earthquakes, volcanic eruptions, landslides, and tsunamis. Subduction zones generate hazards onshore and offshore in the Pacific Northwest (Cascadia subduction zone), southern Alaska (Alaska-Aleutians subduction zone), the Caribbean, and Pacific Island Territories, and tsunami hazards extend to Hawai'i, California, and East Coast states. Subduction zones remain poorly understood because the processes that drive the hazard lie beneath the ocean floor. The FY 2023 budget also includes a request for increased funding for the Induced Seismicity Project to assess increased seismic hazard associated with energy development, including geothermal energy and carbon sequestration, and increases funding for the modernization and hardening of IT infrastructure to ensure robust delivery of enhanced multi-hazards products improving situational awareness following a major disaster.

Question 5: Federal Advisory Committees, like the Advisory Committee on Water Information, have done important and highly valued work to leverage public and private sector resources that improve federal water information programs to meet our nation's water information needs. These committees have also served as an important resource to many state and local water scientists and professionals, including cross-sector sharing of information, best practices, and other interactions. This includes critical work by the ACWI subcommittee on Ground Water and the National Ground Monitoring Network, among others.

Senate Committee on Energy and Natural Resources
Dr. David Applegate Nomination Hearing
April 28, 2022

a. What value do you see in volunteer advisory committees of this type? Do you think advisory committees like the Advisory Committee on Water Information should play a role in USGS programs, and do you believe they should be reinstated?

Response: The USGS values information and feedback from all stakeholders and users of USGS information. Federal advisory committees, such as the Advisory Committee on Water Information, are established to foster communication between the federal and non-federal sectors and create more effective working relationships with state and local agencies, Tribes, and the private sector. The USGS is committed to working with federal, state, and county agencies, Tribes, academia, private industry, water utility associations, environmental professional and technical societies to improve federal water information programs whether through formal processes such as federal advisory committees or through informal town-hall style meetings or listening sessions as needed for idea exchange and solution development.

Senate Committee on Energy and Natural Resources
Dr. David Applegate Nomination Hearing
April 28, 2022

Questions from Senator Daines

Question 1: Dr. Applegate, critical minerals and materials play a major role in our economy, energy production, national defense, healthcare, and more. **What can USGS do to better partner with private companies to help locate and develop critical mineral deposits?**

Response: First, if I am confirmed as Director, I commit to ensuring that the USGS will continue to collect, analyze, and publish the information required to evaluate mineral criticality to identify risks of supply disruption and work across the federal government to prioritize and advise on options for mitigation of strategic vulnerabilities. The USGS will also continue to provide technical assistance to federal agencies that invest in critical mineral supply chains, for example by participating on investment review panels for the Department of Defense, the Department of Energy, and the Export-Import Bank. As we go about that work, partnerships with the private sector are of the utmost importance as are partnerships with states, Tribes, and other stakeholders. USGS has a variety of partnership approaches that we can use to support that work, and I am encouraged that the private sector is increasingly interested in working with USGS in ways that improve the amount of information and data available to benefit government, industry, academia and the public.

Second, the private sector has significant interest in our work to implement recent Congressional direction, such as those contained in the Energy Act of 2020, which directs the USGS to increase its emphasis on quantifying the Nation's domestic critical mineral resource base and on analyzing and forecasting mineral supply chains essential to the Nation's economy and national defense. The USGS's FY 2023 budget request includes increases for forecasting related to critical minerals, which would allow the USGS to leverage its experience providing interagency technical assistance to launch an automated analytical capability for critical minerals supply risk and economic impact forecasting. One specific focus of those increases is on supply chains for energy technologies, which would help the USGS build on recently published analyses of the mineral dependencies of current and emerging energy generation and storage technologies to increase the provision of data and technical assistance to other federal agencies, including the interagency Federal Consortium on Advanced Batteries.

If confirmed, I would endeavor to lead the USGS to pursuing these missions efficiently and effectively, developing strong science and working in continued partnership with Congress.

Question 2: Dr. Applegate, how can USGS better partner with state geological societies and institutions to share and highlight research and information on critical minerals?

Response: I believe that partnerships with institutions such as the state geological surveys are critical to USGS's work and will continue to be a priority if I am confirmed for this position. The USGS engages in active outreach through regular attendance at meetings, including those hosted by the state geological surveys, by professional societies, and academic institutions. With the recovery of domestic travel and the support of funding through the Bipartisan Infrastructure Law, the USGS will be ramping up its outreach and communications activities, working to connect local communities and geoscience interests with the increasing critical mineral data collection, mapping, and assessment work. The USGS will also continue to augment these in-person meetings with webinars, online data delivery, and geospatial tools for exploring new datasets and associated interpretations. Throughout my career I have been active in engaging with state geological entities and, if confirmed, that would continue to be a priority for me.

Senate Committee on Energy and Natural Resources
Dr. David Applegate Nomination Hearing
April 28, 2022

Question 3: Dr. Applegate, the United States is heavily import dependent on China for dozens of minerals, many of which can be produced here in the United States. **What do you believe are the major impediments to reducing dependence on China for minerals and materials?**

Response: I understand that critical minerals are important for our economy for a variety of important purposes including the defense industrial base, clean energy technologies, and manufacturing. As I said at my confirmation hearing, it is important not only to understand the resources that we have domestically but to understand the stock of global resources, as well. The USGS role is to ensure that the decisionmakers within government, who would address such matters, have the best available scientific information, on an objective and nonpartisan basis, that they need to set our nation's policy course on this and other important topics. The USGS Mineral Resources Program is our nation's premier provider of scientific information and research on critical mineral resources. The Earth Mapping Resources Initiative, expanded through enactment of the Bipartisan Infrastructure Law, is a critical component. If I am confirmed, I will ensure that these efforts to support and enhance our ability to forecast risks to supply chains, to better understand the resources that we have at home and abroad, and to provide quality data for decisionmakers remain a priority.

Question 4: Dr. Applegate, do you believe our dependence on China for minerals is an economic or national security risk?

Response: As I stated in the previous response, I understand that critical minerals are important for our economy and for the clean energy technology that is so important to our clean energy future. The analysis of whether China, or any other country, is a security risk to the United States is an issue that falls outside the USGS's role of providing technical and scientific expertise for policymakers to consider as they make decisions. If I am confirmed, I will ensure that USGS pursues its mission efficiently and effectively and in partnership with its stakeholders and Congress.

Question 5: Dr. Applegate, outside of traditional mining projects or recycling, where or how else can the U.S. increase domestic production of critical minerals?

Response: The Bipartisan Infrastructure Law directs the USGS to conduct above-ground mine waste research and assessment activities as a means to evaluate the resource potential of this product, and through the Earth Mapping Resources Initiative, the USGS is working with state geological surveys on sampling and characterization work, while also initiating development of a national mine waste inventory. If confirmed, I would look forward to carrying out evaluations of re-mining and pre-processing activities to determine the promise that they might hold for the future.

Senate Committee on Energy and Natural Resources
Dr. David Applegate Nomination Hearing
April 28, 2022

Question 6: Dr. Applegate, Stream gauges provide essential data on streams and rivers for landowners, agriculture, angler, conservation stakeholders, and watershed groups. However, limited resources often force USGS to stop the monitoring, use, or maintenance of gages often with little notification to affected parties. As a result, stakeholders are left scrambling to identify alternative funding. **If confirmed, how would you prioritize which gages are funded? Further, if confirmed, would you commit to establishing a consistent and transparent process for USGS to provide stakeholders with ample notice when funding is expected to be cut?**

Response: A priority for the USGS is to maintain the continuity of our National Streamgage Network, particularly the Federal Priority Streamgages, where possible. Streamgages are funded by USGS appropriations, Tribes, federal, state, and local agencies, and in many cases, jointly funded by both the USGS and partners. The USGS leverages these funding sources to collectively support as many streamgages as possible. I am committed to ensuring that the critical data and information provided by this program, important to protect life and property, continues to be a priority for the bureau. If confirmed, I would work hard to ensure that partnerships such as these, and the contributions that our partners make, are a key focus. In order to ensure transparency for stakeholders and cooperators of the at-risk nature of streamgages, the USGS Endangered Streamgages website is inclusive of all at-risk streamgages in the USGS National Streamgage Network. Streamgages are added to this site as soon as we are aware that a site is at risk of losing funding. Once an at-risk streamgage is either rescued or discontinued, it is displayed as such on the website for 6-months to increase exposure and provide more opportunities to find a new funding partner for sites that are discontinued. I am committed to taking actions like this that help ensure that informed decisions on important issues can be made rapidly and efficiently.

Question 7: Dr. Applegate, if confirmed, how will your balance and prioritize funding between both the Federal Priorities Stream gauges and the Cooperative Matching Funds for Streamgage Network?

Response: If confirmed, I will ensure that the USGS continues to execute the intent of Congress for both of these efforts. The Federal Priority Streamgages network is, as the name suggests, intended to serve as the "backbone" of the bureau's streamgage network to provide federal information needs that are funded by federal dollars and thus not vulnerable to shifting local priorities and resource pressures. Streamgages funded through the Cooperative Matching Funds for Streamgage Network are part of an important partnership that USGS has with other federal, state, Tribal, and local agencies. I am committed to working with and listening to our stakeholders and partners and will work hard to prioritize our partners' needs for better data, information, and tools that will assist with flood response and water management.

Senate Committee on Energy and Natural Resources
Dr. David Applegate Nomination Hearing
April 28, 2022

Question 8: Dr. Applegate, last year the U.S. Geological Survey published a report predicting a 50% chance that the majority of sage grouse leks will be productive in 60 years. However, the report failed to acknowledge the fact that within the past fifteen years, states and partners have invested an unprecedented amount of resources and time to reverse this trend. According to wildlife biologists, the benefits of sage grouse habitat projects typically take around 30 years to fully realize. As the listing of the sage grouse has become increasingly politicized, I worry about USGS's motivations in leaving out western states' data, analysis, and pro-active measures within this report that would have provided a more optimistic outlook. **Why did USGS decide to leave out this information and how can USGS better collaborate with state agencies on these wildlife issues?**

Response: I agree that the USGS should work on strong collaboration with state partners on matter such as this. USGS has worked to answer questions about this report for the committee staff and we will continue to do so further if requested. My understanding is that the report referenced is the result of close collaboration and coproduction with 11 western state resource agencies, the Western Association of Fish and Wildlife Agencies, the USGS, and other federal resource management agencies. I believe that it was intended to ensure that the best available data provided by state wildlife agencies were used to estimate sage-grouse population trends and identify where and when local population trends differ from regional trends. Because the effects on sage-grouse population trends vary substantially among conservation efforts, geographies, and climate patterns, the estimated trends reported implicitly incorporated benefits of some conservation actions implemented over several decades.

As noted in the report, the rate of habitat loss was found to be increasing and outpacing the rate at which the important conservation efforts referenced by your question are improving or restoring degraded or lost habitats. I agree that the USGS should continue collaborating closely with partners including the states to evaluate the influence of the conservation and restoration actions they are taking, as well as the influence of threats that are driving habitat loss and population trends. This is part of the next phase of this collaborative, which is underway using data entered into the Conservation Efforts Database by the partners referenced above. If confirmed, I am committed to directing the USGS to conduct its work in an objective way to provide the best available scientific information for policymakers, being transparent with our work including with Congress, and prioritizing production collaborations with states, Tribes and stakeholders.

Senate Committee on Energy and Natural Resources
Dr. David Applegate Nomination Hearing
April 28, 2022

Questions from Senator Lankford

Question 1: Many of the deadlines for meeting emissions reductions targets are right around the corner – for instance, this administration set a goal of procuring only zero-emissions vehicles by 2035, and aims to do this by 2027 for light-duty vehicles. There are countless others that will drive up demand for wind turbines and solar panels. That is a lot of minerals we need to secure in the next few years. We need to know where these resources are quickly if we are going to use domestic resources to support the manufacture of EVs and other renewable technologies on such a short timeframe. **Dr. Applegate, are you confident that the current pace of progress on Earth MRI enables greater use of domestic minerals in these technologies on that near-term timeline?**

Response: I believe that USGS can make great progress on Earth MRI in order to provide policy makers with timely, nonpartisan, and sound scientific information on mineral resources to inform these decisions. The Bipartisan Infrastructure Law accelerates the acquisition of geophysical, geological, and geochemical data across the U.S., and specifically for the Earth MRI program provided funding to significantly increase the size and number of mapping projects and associated analyses. The infrastructure law set initial goals for the program, and with continued funding we expect to have mapped the majority of areas believed to have subsurface critical mineral potential in a timely way, and to have developed a first-generation national mine waste inventory. These are important efforts as underscored by your question and are a critical part of the USGS mission that I will make a priority, if I am confirmed.

Question 2: Just as important as knowing where these minerals are is knowing the likelihood of getting a permit to develop the resources. In some instances, it is obvious from looking at a map that permitting in an area would be challenging, but others are less clear. Knowing in advance whether there are extenuating environmental concerns in a region could lead to a lot more certainty for project developers. **Dr. Applegate, is there any effort to work collaboratively with permitting agencies to not only identify areas that are potentially mineral-rich, but also areas that are more likely to get through the permitting process in a timely fashion? If not, is this something you would support doing?**

Response: While USGS does not have a role in decision-making related to permitting or management decisions on the public lands, I fully support close working relationships with land management agencies on studies of both mineral resource potential and the environmental impacts of past and potential future mining activities. As outlined in your question, it may make sense to prioritize the USGS work in some areas. If I am confirmed for this position, I would ensure that the USGS implementation of Earth MRI is both meeting its mission requirements and being responsive to the needs of our partner agencies and stakeholders, while ensuring that the information we are providing is objective and based on the best available strong scientific information.

Question 3: USGS' spend plan for Infrastructure Investment and Jobs Act funding made a passing reference to collaboration with private sector mining companies. Near the end of the document it stated, "Earth MRI works with mineral exploration companies to gain access to existing geophysical survey data and to help offset costs for large geophysical surveys."

Senate Committee on Energy and Natural Resources
Dr. David Applegate Nomination Hearing
April 28, 2022

a. **Dr. Applegate, as the individual exercising the delegated authority of the USGS director, can you expand on what this collaboration with mineral exploration companies entails?**

Response: Transparency and public data delivery are key parts of the USGS's Earth MRI effort to collaborate with federal, state, Tribal, and local stakeholders on advancing the Nation's understanding of its geology and natural resources. An increasing number of mineral exploration companies are recognizing the value of sharing data of all types (geophysical surveys, geologic observations, subsurface and surface rock samples, and geochemical measurements) with the USGS so it can be released into the public domain. The release of these data saves taxpayer dollars by avoiding duplication of data acquisition when a private company has already collected data in an area and also maximizes the information available from USGS data acquisition in areas not already covered by the private sector with modern surveys. The increasing availability of data in the public domain enriches research in the mineral resources community and provides local communities and other stakeholders with a consistent understanding of mineral resource potential, as well as the opportunity to use these datasets for other important purposes, such as water resource investigations.

b. **Are there opportunities for greater collaboration with mineral exploration companies so that we can actually put all of the information you are collecting to use?**

Response: Yes, based on experience with the Earth MRI program, the success of the initial collaborations with industry, state geological surveys, Tribes, and nongovernment organizations, is growing with time as the actual and potential impact of Earth MRI is recognized. If I am confirmed, I will work hard to ensure that the USGS is focused on the efficiencies of collaboration, including with the private sector, and is delivering this data to the public in more efficient and effective ways.

Senate Committee on Energy and Natural Resources
Dr. David Applegate Nomination Hearing
April 28, 2022

Questions from Senator Cassidy

Question 1: Dr. Applegate, during your nomination hearing we spoke about the potential for mining deep sea nodules from the Clarion Clipperton Zone (CCZ).

a. **Please detail what work USGS has performed with international partners to better understand this offshore region given 2019 USGS reporting on the potential for the CCZ to hold more than cobalt, nickel and rare earth minerals than all land-based resources combined.**

Response: The USGS has spent substantial effort studying marine minerals throughout the Pacific. The CCZ is one region among many in the Pacific that host or may host marine minerals, including manganese nodules.

The most substantial United States and USGS effort in the CCZ was the Deep Ocean Mining Environmental Study (DOMES) project in the 1970s. The purpose of this work was to evaluate potential environmental effects of manganese nodule mining. This work was funded by NOAA and led to USGS research on processes of manganese nodule formation and the associated open ocean environment.

Following the DOMES project, there were a series of research cruises in the late 1980s and early 1990s that were a collaboration between the Korea Ocean Research and Development Institute and the USGS. In addition to the CCZ, this work was also carried out in the Exclusive Economic Zone (EEZ) of the Marshall Islands and the Federated States of Micronesia.

Following 1991, the USGS's work on manganese nodules was opportunistic and included research throughout the Pacific Ocean, including around the Cook Islands. A summary of the state of the knowledge of marine minerals in the United States EEZ was completed in 2005. The USGS continues to work with partners on environmental questions related to the potential for manganese nodule extraction in the CCZ and elsewhere, as well as the marine processes that result in critical element enrichment, in order to help refine regions of interest.

Global estimates referenced in your question of contained metals are the broadest initial quantification of mineral resource potential. These estimates are scientifically credible, but because of limited mapping, sampling and analyses, they fall short of the assessments of technically or economically recoverable resources the USGS has provided elsewhere. I would be happy to discuss this issue further with you and ensure that the appropriate USGS experts update your office.

b. **What impediments exist in order for U.S. companies to conduct deep sea exploration in this region?**

Response: As I noted in response to a similar question at the hearing, undersea mining outside the Exclusive Economic Zone of the U.S. and other nations is an area that I understand involves the International Seabed Authority and would be covered by the Law of the Sea Treaty, through which I understand rules and guidelines associated with such activities have been developed. As a general matter, I appreciate that international cooperation is necessary outside the EEZ, but I am not familiar with the particulars of this question, and it is outside my area of expertise and the role of the USGS. If confirmed I am committed to ensuring that our scientific work informs policy makers to the best of our ability.

Senate Committee on Energy and Natural Resources
Dr. David Applegate Nomination Hearing
April 28, 2022

c. How can companies source raw materials in a way that does not cause vast disturbance to the seabed floor?

Response: I am generally aware that proposed technologies, which are associated with seafloor disturbance and sediment plumes, are in various stages of construction and testing. New technologies, such as neutrally buoyant collectors, could reduce impacts but I understand have not yet been developed to scale. If confirmed, I would work to support USGS work as it relates to this question to help support policymakers.

Senate Committee on Energy and Natural Resources
Dr. Applegate Responses to Ranking Member Barrasso
Letter dated June 1, 2022

1. In your response to my written question 6(a), you state, in part, that:

"Helium was not included in the most recent critical minerals list reflecting that the United States is a net exporter of helium, possesses some of the largest recoverable volumes of helium reserves in the world, and is the world's largest producer of natural gas, from which helium is derived as a byproduct."

Likewise, in your response to my written question 6(b), you state, in part, that:

"For purposes of constructing the most recent critical minerals list, key factors considered for helium included the fact that the United States is a net exporter of helium, that the United States possesses some of the largest recoverable volumes of helium reserves in the world, and that the United States is the world's largest producer of natural gas, from which helium is derived as a byproduct."

a. When evaluating whether to include helium on its 2022 critical minerals list, did USGS account for the facts that: (i) the contractual obligations of suppliers of U.S.-produced helium do not give priority to U.S. customers of helium over foreign customers of helium; and (ii) loss of helium production in other parts of the world may reduce the amount of U.S.-produced helium that U.S. customers, including U.S. customers with long-term contracts, are able to obtain? If so, how exactly did USGS account for these facts in its evaluation? b. When evaluating whether to include helium on its 2022 critical minerals list, did USGS take into account the facts that: (i) about 80 percent of U.S. natural gas production over the last year came from shale formations or tight oil plays (commonly referred to as "shale gas"); and (ii) that shale gas contains virtually no helium? If so, how exactly did USGS account for these facts in its evaluation?

Response: Thank you for the opportunity to provide additional information and context in response to your questions about the critical minerals list in general and the USGS evaluation of helium, in particular. First, I would like to stress that the lack of inclusion of a mineral on the list does not mean that said mineral, including helium, is not important to the economy.

As explained in the published Methodology and Technical Input for the 2021 Review and Revision of the U.S. Critical Minerals List, helium did not meet the criteria for inclusion on the final 2022 list of critical minerals because, in part, the U.S. is a net exporter of helium, and it thus did not meet the quantitative threshold identified in the criteria, nor did it have a single point of failure of domestic production. Helium is noted in discussion of this methodology at several points, including page 15, which is available here: https://pubs.usgs.gov/of/2021/1045/ofr20211045.pdf.

Senate Committee on Energy and Natural Resources
Dr. Applegate Responses to Ranking Member Barrasso
Letter dated June 1, 2022

In response to question (a)(i), I understand that these kinds of commercial factors are very important to participants in the helium marketplace, but they are not a significant part of the critical minerals list evaluation process because the USGS does not have a great deal of access to information about private commercial contracts between producers and consumers of any mineral commodity. As a practical matter, it is not possible for the USGS to rely on proprietary commercial information in the evaluation of mineral criticality and attempting to do so could raise disclosure issues involving proprietary information.

In response to question (a)(ii), the reduction in the supply of a mineral (such as helium in this case) from other producing countries is considered in the USGS peer-reviewed and published critical minerals list methodology. However, the strong domestic production history drove the determination that helium is not currently critical under the USGS methodology. The United States is the world's largest producer of helium, is a net exporter of helium, and exports more helium than it consumes on an annual basis.

In response to questions (b)(i) and (ii), I appreciate your highlighting the important difference in helium yields from different types of natural gas production. In 2021, the USGS estimated that 306 billion cubic feet of recoverable helium is presently within the known geologic natural gas reservoirs of the United States (https://pubs.usgs.gov/sir/2021/5085/sir20215085.pdf), in comparison to estimated domestic apparent consumption of Grade-A helium that year of 1.4 billion cubic feet.

If the overall production of helium in the United States reduces over time due to changes in natural gas production, that shift could be taken into account in the evaluation of whether to include helium on the list of critical minerals in the future. However, as I have noted, for the purposes of the 2022 list, the current, specific sources of helium produced domestically indicate that the U.S. is the world's largest producer of helium and is a net exporter.

2. In your response to my written questions 1, 6(a), (b), and (c), you state, in part, that:

"the critical minerals list is not primarily meant to identify short-term issues (which may change before either federal policy or private sector action would take effect) but to highlight critical mineral trends, which may prompt a long-term response."

In your response to my written question 6(c), you go on to state that you are:

"fully committed to following the law and ensuring that USGS makes independent, scientifically sound decisions based on the best available information for policymakers and the public."

Senate Committee on Energy and Natural Resources
Dr. Applegate Responses to Ranking Member Barrasso
Letter dated June 1, 2022

On what legal basis did you conclude that the critical minerals list is "not primarily meant to identify short-term issues"? Please cite a specific provision within a federal statute.

Response: The relevant statute, 30 U.S. Code § 1606, requires the critical minerals list and methodology to be updated every three years, or sooner if directed by the Secretary of the Interior. As a practical implementation matter, the list is developed over a period of years. The statute also directs the USGS to publish draft and final methodology for developing the list which is developed over several years with leadership by the USGS and interagency input coordinated by the White House Office of Science and Technology Policy's (OSTP) National Science and Technology Council (NSTC) Critical Minerals Subcommittee.

The methodology evaluates trends in mineral supply chains in annual cycles over extended periods of time. For example, it has taken decades for the United States to reach the state of critical mineral supply vulnerabilities that we experience today and the methodology clearly identifies these types of decadal trends.

I fully appreciate that events like the Russian invasion of Ukraine may cause significant impacts to mineral supply chains, including for a mineral like helium. The 2022 USGS critical minerals list was published on February 22, 2022, and the Russian invasion began on or around February 24, 2022. Please be assured that the USGS is closely monitoring the impacts of this event on supply chain issues in coordination with other agencies and the national security community.

Continuing to do this work on an ongoing basis is a key mission for the USGS and I will ensure that the relevant parts of USGS continue to evaluate the impacts of this invasion and associated events on supply chain security both for minerals on the list and other important minerals such as helium. To that end, I am recommending that the USGS, along with the other co-chairs of the NSTC interagency Critical Minerals Subcommittee, host a meeting for private sector minerals industry representatives to provide their updated perspectives on supply chains to the Critical Minerals Subcommittee member agencies.

3. Since 2006, there have been four significant global helium shortages, including the shortage we have been experiencing since January of this year. If USGS believes "the critical minerals list is not primarily meant to identify short-term issues…but to highlight critical mineral trends," did USGS account for the three prior global helium shortages (i.e., 2006-2007, 2011-2013, and 2018-2020) when evaluating whether to include helium on its 2022 critical minerals list? If so, how exactly did USGS account for the three prior global helium shortages in its evaluation? If not, why did USGS ignore the three prior global helium shortages since 2006?

Senate Committee on Energy and Natural Resources
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Response: The USGS monitors the production, sales, exports, and consumption of helium on an ongoing basis in connection with its analysis of critical minerals.

For 2006-2007, I have been informed by the USGS experts that although helium extraction from natural gas was lower than prior years, withdrawals occurred from storage and overall sales were average. The United States remained the world's largest producer and a net exporter of helium during 2006-2007.

Regarding 2011 – 2013, my understanding from our analysts is that U.S. production, sales, exports, and consumption of helium changed by only modest amounts. The United States remained the world's largest producer of helium and exported amounts of helium that exceeded domestic consumption by no less than 70% for all three of those years.

My understanding is that helium sales did decline in the period from 2018 – 2020 but domestic consumption was relatively flat. Export volumes were down but still exceeded domestic consumption by a sizeable margin. The U.S. remained a net exporter and the world's largest producer throughout the period.

4. USGS issued its 2022 critical minerals list several days after Russia's invasion of Ukraine or what President Biden had warned could "be the largest invasion since World War II" and "would change the world." If USGS believes "the critical minerals list is not primarily meant to identify short-term issues…but to highlight critical mineral trends," how can USGS highlight such trends if it does not take into account war involving one of the world's largest mineral producers? At what point will Russia's invasion of Ukraine and the sanctions imposed on various sectors of Russia's economy prompt USGS to revisit its 2022 critical minerals list? Please be specific.

Response: It is a priority for me that the USGS be as responsive as possible to policymakers following this highly significant event that impacts global mineral supply chains. The current version of the critical minerals list is based on analysis that was conducted in 2020; the methodology was reviewed, approved, and published in 2021, and finalized and published earlier this year after public comment.

As your question highlights, the USGS critical mineral list was published the same week as the Russian invasion of Ukraine. As noted by Dr. Fortier in his testimony before the Senate ENR Committee on March 31, 2022, the USGS has provided, and continues to provide, technical expertise and data on mineral resources to the Administration, other executive branch agencies, and Congress to inform decision making on sanctions and potential supply chain impacts. The USGS briefed Committee staff on these issues on April 27, 2022, and we stand ready to continue to provide information to Congress.

The law directs the USGS to update the critical minerals list at least every 3 years and earlier if directed by the Secretary of the Interior. I certainly expect the next update of the list, when it occurs, to take into account this significant geopolitical event, among others. In the meantime, the USGS is actively engaged in providing information to other agencies and the national security community and welcomes opportunities for further engagement and discussion with Congress on this issue. As noted above, I will ensure that the relevant parts of USGS continue to evaluate the impacts of this invasion and associated events on supply chain security both for minerals on the list and other important minerals such as helium.

5. In your response to my written question 6(c), you did not indicate whether, in light of the helium shortage we have experienced since January of this year, you would issue a notice in the Federal Register giving the public an opportunity to comment on whether USGS should return helium to its 2022 list of critical minerals. How severe – in terms of lost helium production worldwide, reduction in allocations to U.S. customers, price increases, and duration – must a global helium shortage become before USGS would give the public an opportunity to comment on whether USGS should return helium to its list of critical minerals? Please be specific.

Response: As I noted previously, I appreciate the fact that conditions can change for minerals, including helium, and I am committed to ensuring that the USGS pays close attention to the helium supply chain now and in the coming months and years. If we believe that any mineral's conditions are changing to such a degree that the assessment under the USGS methodology would change significantly in a persistent way, we will consider these kinds of steps as appropriate. In addition, if you, committee staff, or helium stakeholders have information to provide or would like to further discuss the USGS methodology, I am committed to such a constructive engagement.

Again, I want to stress that just because a mineral did not meet the criticality standard for the 2022 list does not mean that the market conditions or other factors do not merit a policy response. In all cases, the USGS role is to produce objective information for policymakers and defer to the appropriate policymakers in other bureaus, agencies, and Congress as to whether and how to address public policy challenges, including conditions in the helium market.

I am familiar with the history of U.S. helium policy and the recent congressional direction to transfer stewardship of the U.S. helium reserve out of the Bureau of Land Management. As part of that transition, the USGS will be taking on a more direct role in helium data gathering. The USGS Mineral Resources Program has recently assigned a helium commodity specialist, who is beginning outreach to helium stakeholders. I am committed to ensuring that the USGS undergoes proactive engagement during this transition period and pays close attention to the helium supply going forward to ensure that policymakers and the public have the best information.

U.S. Senate Committee on Energy and Natural Resources
April 28, 2022 Hearing: The Applegate, Cantor, and Wang Nominations
Questions for the Record Submitted to Dr. Evelyn Wang

Question from Ranking Member John Barrasso

Question: ARPA-E recently awarded $36 million to 11 companies "seeking to increase the deployment, and use of, nuclear power as a reliable source of clean energy and limit the amount of waste produced from Advanced Nuclear Reactors." The Office of Nuclear Energy has authority to fund such technologies. Please share the ways in which you will coordinate with program offices to avoid duplicative funding.

Answer: If confirmed, I will work to ensure that ARPA-E is supporting technological transfer and not duplicating efforts within the applied offices or across the Department of Energy complex. I understand that ARPA-E has practices in place to help manage overlap and duplication during its program development cycle, as noted in Government Accountability Office (GAO) review in February, 2022 (**GAO-22-104775**). If confirmed, I will work to continue the below practices, and strengthen them as appropriate.

- **Pre-program consultation:** ARPA-E often coordinates with DOE's applied offices and the Office of Science on the development of its workshops, programs, and the selection of its research projects and creation of its programs. Technical staff from such offices are often invited to events such as workshops, kickoff meetings, and annual meetings where appropriate.

- **Reviewers:** Technical staff from the applied offices and the Office of Science routinely act as reviewers of ARPA-E's proposed projects with the goal of developing and de-risking advanced energy technologies. ARPA-E technical staff also act as reviewers for the applied offices, and where appropriate have attended merit reviews and other events.

- **Applicant:** Once a FOA is issued, applicants are required to disclose in their applications whether they submitted the same or similar concepts to other Federal agencies, or private investors.

- **Recipients:** ARPA-E recipients are also required to disclose in their quarterly performance reports any new funding received from public or private sources. This ensures transparency and enables ARPA-E to make appropriate funding determinations.

Question from Senator James E. Risch

Question: ARPA-E has had great success creating cutting edge technology for a broad set of energy applications. How do you see ARPA-E engaging with the new Office of Clean Energy Demonstrations to ensure the technology gets to the end users?

Answer: The Department of Energy (DOE) facilitates coordination between DOE Research & Development (R&D) programs, including ARPA-E, through a variety of Departmental activities at the Program Office levels, including joint participation in research workshops, strategic planning activities, solicitation development, and program review meetings, including the set-up of the new Office of Clean Energy Demonstrations (OCED).

U.S. Senate Committee on Energy and Natural Resources
April 28, 2022 Hearing: The Applegate, Cantor, and Wang Nominations
Questions for the Record Submitted to Dr. Evelyn Wang

These activities will in the future facilitate cooperation and coordination between the Office of Clean Energy Demonstrations (OCED), and ARPA-E, with the goal to explore potential hand-offs of technology and knowledge transfer between the two offices. While I do not believe this mechanism has been formalized, I anticipate that upon successful completion of an ARPA-E project, further scaling and demonstration would be needed to further advance the technology towards commercialization, particularly in large capital energy applications such as turbines or reactors. Those technology projects could be potential candidates for at-scale demonstrations that OCED will be responsible for managing.

Questions from Senator Steve Daines

Question 1: Dr. Wang, CCUS technology is an important tool for the reduction of carbon emissions. This committee has passed and signed into law numerous CCUS related bills that have direct instructions to DOE. One of those bills created a large-scale pilot project at an existing coal or natural gas plant. I believe Montana is uniquely qualified to host one of these DOE projects. Will you commit to working with me on finding ways for DOE to be more involved with CCUS development in Montana?

I agree that Carbon Capture Utilization and Sequestration (CCUS) is an important technology area and tool to address carbon emissions. If confirmed, I would look to see how ARPA-E can better support the innovation and commercialization of these technologies in places like Montana and across the country.

Question 2: Dr. Wang, pumped hydro-storage can be used to help make intermittent energy act more like baseload and help stabilize the grid. How can DOE promote storage technologies like pumped hydro to better secure the grid?

I agree that energy storage is essential for a modernized, resilient, and reliable grid. I understand that ARPA-E has been working to develop solutions that can provide 10 to 100 hours of storage at a levelized cost of storage of 5 cents/kWh or less under the Duration Addition to electricitY Storage (DAYS) program. If confirmed as Director of ARPA-E, I would work closely with the applied offices to understand the additional research and needs for storage technologies, including the Water Power Technologies Office's investment and research into pumped hydro-storage.

Question 3: Dr. Wang, hydropower and nuclear energy have provided the vast majority of carbon-free electricity for the United States for decades. Both also provide consistent baseload power. Unfortunately, for many, when they discuss 'green-energy' they mean only 'wind and solar', forgetting the role that nuclear and hydro already play in carbon-free electricity generation. Further, we have already seen certain areas move to close nuclear plants or propose to breach hydro-dams. What role do you think nuclear power and hydropower should play in the future of energy production?

I believe that nuclear and hydropower can and should play a significant role in the future of energy production. They provide important dispatchable and firm energy. I also believe that there is potential for ARPA-E to

advance additional technological innovations to help enhance power production, minimize environmental disruption, and improve the economic viability of new technologies.

Question 4: Dr. Wang, do you believe we should increase hydropower production?

Yes, and I believe there are technological advancements that would increase our ability to harness hydroelectric power in a way that is environmentally sustainable and that lowers the levelized cost of energy.

Question 5: Dr. Wang, do you believe we should increase nuclear energy production?

Yes. I believe that nuclear energy will play a key role in any zero-emission grid. I also believe there will need to be additional innovation and technology to help ensure new nuclear facilities are cost effective and safe. For instance, ARPA-E is currently supporting nuclear innovation through the Optimizing Nuclear Waste and Advanced Reactor Disposal Systems (ONWARDS) program to help support next generation advanced nuclear reactors with a 10X reduction in waste volume.

Question 6: Dr. Wang, do you believe we should invest in new coal, oil, and natural gas power plants that are paired with CCUS technology?

I believe that abating carbon emissions from new fossil facilities will be critical, and that Carbon Capture Utilization and Sequestration (CCUS) is an important technology where there is still a need for innovation and technologies to make the facilities economically viable. This is a prime area of research for ARPA-E, including on materials development and carbon utilization.

Question 7: Dr. Wang, in-stream hydrokinetic power allows for small scale, low impact hydropower generation. How can DOE work to increase the use of in-stream hydrokinetic power?

I understand this has been an area of exploration through ARPA-E's Submarine Hydrokinetic And Riverine Kilo-megawatt Systems (SHARKS) program, which aims to accelerate the market adoption of hydrokinetic turbine designs for tidal and riverine currents. If confirmed, I would work closely with the applied offices, including the Water Power Technologies Office to understand the current efforts and challenges around in-stream hydrokinetic power and how programs like SHARKS can help address technology gaps.

Question 8: Dr. Wang, there have been recent calls to 'electrify everything'. In many parts of the country, including the Pacific Northwest, we are already facing a near term shortage of electricity to meet peak demand. Do you believe that a dramatic move to electrify numerous industries without the similar investment in baseload energy will have a negative impact on grid reliability?

It is critical to maintain and enhance grid reliability and ensure adequate flexible and dispatchable power. I believe that a modernized and resilient grid also requires enhancements to the grid in terms of incorporating new resources, bidirectional flows, and enhancements in grid software and management. If confirmed, I would seek to work closely with the Office of Electricity to understand current efforts to improve grid resiliency, including through deployment provided under the Bipartisan Infrastructure Law, and how existing and future ARPA-E research can enhance those efforts. For instance, I understand that ARPA-E recently launched its third

U.S. Senate Committee on Energy and Natural Resources
April 28, 2022 Hearing: The Applegate, Cantor, and Wang Nominations
Questions for the Record Submitted to Dr. Evelyn Wang

challenge under the Grid Optimization (GO) Competition, which will examine new models for emerging technologies such as storage, consumer participation (bid-in demand), and distributed energy resources (DERs). I would look forward to partnering with my colleagues across the Department on the implementation of new models and operations to improve grid resilience.

Question 9: Dr. Wang, nuclear energy, including advancements in small modular nuclear reactors, can help increase baseload energy with smaller and smaller physical and environmental footprints. Will you commit to work with me and affected stakeholders to bring new technologies to Montana?

I agree that small modular reactors can help provide firm dispatchable power to the grid. If confirmed, I would look to see how ARPA-E can better support the innovation and commercialization of these technologies in places like Montana and across the country.

Questions from Senator James Lankford

Question 1: The federal government spends hundreds of billions of dollars annually on R&D efforts that are fragmented across agencies, and the results are not always available to entities wanting to build on those results. This fragmentation and lack of consistent public access to the results of those research investments could slow down the advancements we are looking to spur. A 2019 GAO report looked into the issue of public access to determine if agencies were taking appropriate steps to coordinate across agencies and enable researchers to benefit from previous work. That report included a whopping 37 recommendations to 16 agencies, demonstrating that there is a lot of work to make results accessible to those who might be able to use them to reach the next big breakthrough. Dr. Wang, getting results into the hands of those who can take it the next step, or commercialize it, is critically important. What do you believe we can do differently to ensure we don't leave promising research stranded?

Answer: Recognizing these issues, in 2019 ARPA-E released a Funding Opportunity Announcement (FOA) titled "Seeding Critical Advances for Leading Energy technologies with Untapped Potential (SCALEUP), which provides a vital mechanism for the support of innovative energy R&D that complements ARPA-E's primary R&D focus on early-stage transformational energy technologies that still require proof-of-concept. The goal of the program is to help ARPA-E-funded technologies, past and present, transition from proof-of-concept prototypes to commercially scalable and deployable versions of the technology and be well-positioned for investment from the private sector. ARPA-E's authorizing statute directs the Agency to develop linkages between its sponsored applied research and the marketplace. These linkages are central to realizing the public's return on technology investments.

An enduring challenge to ARPA-E's mission is that even technologies that achieve substantial technical advancement under ARPA-E support are at risk of being stranded in their development path once ARPA-E funding ends. The SCALEUP FOA builds upon ARPA-E-funded technologies to demonstrate technical performance at market relevant scales. Stranding promising ARPA-E-funded technologies in their development pathways leaves substantial intellectual property developed with American taxpayer dollars vulnerable to adoption by foreign competitors, who can and do capture it for continued development – and economic benefit – overseas. This harms national competitiveness, as U.S. industries often lose the lead on the development, scaling, and manufacturing of technologies necessary to compete in rapidly evolving global energy markets.

U.S. Senate Committee on Energy and Natural Resources
April 28, 2022 Hearing: The Applegate, Cantor, and Wang Nominations
Questions for the Record Submitted to Dr. Evelyn Wang

These scaling energy technology projects will meet ARPA-E's statutory direction to achieve the above goals by "accelerating transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty." If confirmed, I would look to see how ARPA-E can use SCALEUP and collaborate with DOE's applied offices to transition even more promising research to commercially scalable and deployable versions of the technology.

Question 2: There is often a lot of talk about how much funding for any given purpose – from R&D to education and healthcare – is "enough" to reach an objective. I believe this overlooks that it matters not just *how much* we spend, but *what* we spend it on.

- Dr. Wang, what do you believe we can do to spend our existing resources for ARPA-E smarter?
- How can we better evaluate and prioritize which areas of research will yield the most impactful technological advances and breakthroughs?

Answer: Based on my experience as an ARPA-E awardee, the agency is constantly looking at solving problems in new and different ways and re-evaluating the state of the art in energy technologies. At the core of this model is the team, particularly the Agency's term-limited program directors. These individuals are leaders in their respective fields and come to ARPA-E for limited three-to-five-year terms. These limited terms instill a sense of urgency to succeed and regularly provide a fresh re-evaluated perspective on technologies and current market conditions. This term-limited approach also helps enable a collaborative and competition-free culture, which is of extreme importance to maintaining an environment where all perspectives and opinions are welcomed and value. ARPA-E program directors drive the agency, determining answers to "what problem should be solved, and why," and "what should that solution look like to achieve impact." These answers lead, via much pressure testing and outreach, to metric-driven focused programs that create carefully researched funding solicitations.

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April 26, 2022

The Honorable Senator John Barrasso
Ranking Member, Senate Committee on Energy and Natural Resources
United States Senate
304 Dirksen Senate Building
Washington, D.C. 20510

Dear Ranking Member Barrasso,

I am writing in support of Secretary Deb Haaland's nomination of Dr. David Applegate as the Director of the US Geological Survey (USGS). I am the executive director of the American Geosciences Institute (AGI), which was formed by directive of the National Academy of Sciences in 1948. AGI is a not-for-profit institute that serves a federation of societies comprised of over 200,000 geoscientists in the United States.

Thank you for acting on this nomination as I cannot underscore the importance of having a non-interim director lead the USGS. The appointment will convey the support and commitment that a government science agency needs to thrive. The timing is also important as our nation considers its energy future, which relies in part on the advancement of geoscience.

An effective leader of the USGS will serve the geoscience needs of the nation in partnership with and complementing the work of state geological surveys across the country. This leader should have a non-partisan record demonstrating impartiality and should be an accomplished and credible geoscientist. To hit the ground running, first-hand knowledge of the agency (i.e., a USGS "insider") is needed, and the candidate must be able to communicate how geoscience can most effectively inform policy. The USGS director should also have robust experience working effectively on Capitol Hill. Dr. David Applegate holds all these attributes and is a demonstrated strong, innovative, and effective leader. On a more personal level he is well respected by his peers, and he is approachable, unassuming, and highly intuitive.

Geosciences affect nearly every aspect of our lives. Through integrated scientific knowledge of the earth, geoscientists find the mineral resources to power our future and advance technology, we find the raw materials needed for critical infrastructure, we mitigate hazards such as floods, earthquakes, and ground collapses, our knowledge of soils and water resources aids in their conservation, our understanding of seasonal and climate patterns helps society plan accordingly, and we help solve environmental problems.

I deeply appreciate the important work you are doing to confirm the leader of the US Geological Survey, and without hesitation I support Dr. David Applegate in that pivotal role.

Sincerely,

Jonathan D. Arthur, Ph.D.
Executive Director
American Geosciences Institute

BASF
We create chemistry

April 28, 2022

Honorable Joe Manchin, Chairman
Senate Energy & Natural Resources Committee
304 Dirksen Sente Office Building
Washington, DC 20510

Honorable John Barrasso, Ranking Member
Senate Energy & Natural Resources Committee
304 Dirksen Senate Office Building
Washington, DC 20510

Dear Chairman Manchin and Ranking Member Barrasso,

Please accept this letter of support for Dr. Evelyn Wang's nomination to be the next Director of Advanced Research Projects Agency-Energy (ARPA-E) at the U.S. Department of Energy (DOE). The work of ARPA-E is critically important to energy innovation in the U.S. As such, we encourage you and the Members of the Committee to quickly advance Dr. Wang's nomination to the full Senate for approval.

As you know, ARPA-E manages critical high-risk research that supports transformational energy innovation but is at too early a stage for private-sector investment. Since its creation in 2009 – followed by its formal authorization in 2019 – ARPA-E has helped form 129 new companies with 285 licenses for ARPA-E technology. Additionally, 268 ARPA-E project teams have partnered with government agencies on projects, and 185 teams have together raised more than $9.87 billion in private-sector follow-on funding to continue advancing important energy technologies. In short, ARPA-E is delivering results, exactly how Congress envisioned, and we urgently need that work to continue.

To that end, ARPA-E needs a Senate-confirmed Director in place in order to continue delivering on its mission. Like any other agency, diligent management of resources for quick and efficient project initiation is important, and an ARPA-E Director is crucial to hiring the necessary program managers, allocating resources effectively, and providing direction and oversight. Dr. Wang's impressive background and scientific work on ground-breaking energy technologies will serve as an asset in the Director role and justifies the expeditious approval of her nomination.

BASF has long supported ARPA-E and will again be a platinum-level sponsor of the ARPA-E Energy Innovation Summit next month in Aurora, Colorado. We recognize the critical importance of energy innovation and respectfully request that the Committee quickly approve Dr. Wang's nomination so that the full Senate can also act without delay.

Sincerely,

Catherine A. Trinkle

Catherine A. Trinkle
Deputy General Counsel, Regulatory &
Environmental Law and Head of Government Affairs

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Congress of the United States
Washington, DC 20515

April 27, 2022

The Honorable Joe Manchin
Chair
Senate Committee on Energy and
Natural Resources
304 Dirksen Senate Building
Washington, D.C. 20510

The Honorable John Barrasso
Ranking Member
Senate Committee on Energy and
Natural Resources
304 Dirksen Senate Building
Washington, D.C. 20510

Dear Chairman Manchin and Ranking Member Barrasso:

We write in support of the nomination of Ambassador Carmen G. Cantor to be the next Assistant Secretary of the Interior for Insular and International Affairs and urge you and the members of the Senate Committee on Natural Resources to support her during the confirmation process.

Ambassador Cantor is a highly qualified foreign policy professional with a long and distinguished career in public service, under both Democratic and Republican administrations, that has prepared her for this moment. Her experience managing complex issues, advancing the United States' foreign policy priorities, and leading within the Department of State makes her well qualified to both manage the relationship between the Department of the Interior and the island territories of the United States and support U.S. programs in the freely associated states in the Pacific.

The person who holds this position will have important responsibilities within our nation's government, charged with managing the Department of the Interior's relationships with the island territories of American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and the United States Virgin Islands. These territories are an essential part of our nation with a unique and complex history within the United States. Ambassador Cantor was born and raised in Puerto Rico and she understands these dynamics intimately. She is a diplomat with a record of building understanding between different communities. We believe she would approach the Department of the Interior's work in these territories with excellent judgement and understanding.

The Biden administration's 'Indo-Pacific Strategy' has prioritized engagement with this dynamic region, which stretches from the Pacific Islands to the Indian Ocean, building on bipartisan work done during the previous two administrations. Within this region, our relationships with the Pacific Island countries of the Federated States of Micronesia, the Republic of the Marshall Islands, and the Republic of Palau are of critical importance.The success of United States' efforts to advance our interests in the Indo-Pacific will require proper stewardship of these partnerships with the Pacific Islands, especially in the face of an increasingly assertive People's Republic of

China that has prioritized engagement with the same countries to advance its security interests. The Assistant Secretary of the Interior for Insular and International Affairs plays an important role in preserving the United States' security and economic interests in the Pacific Islands. Ambassador Cantor's extensive service at the Department of State as a diplomat, including most recently as the President's Ambassador to the Federated States of Micronesia, makes her particularly well equipped to take on this task.

We have no doubt that, if confirmed, Ambassador Cantor will bring the same enthusiasm and zeal to the Department of the Interior that she has demonstrated at the Department of State, where she has been a leader and a mentor to many of our nation's diplomats.

Thank you for convening this week's hearing to consider her nomination, where you will have an opportunity to hear from her directly about her record and qualifications. I hope you will strongly consider our recommendation and support her confirmation without delay.

Sincerely,

Joaquin Castro
Member of Congress

Darren Soto
Member of Congress

APRIL 25, 2022

SENATOR JOHN BARRASSO
RANKING MEMBER

SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
304 Dirksen Senate Building
Washington, DC 20510

RE: NOMINATION OF CARMEN G. CANTOR TO BE ASSISTANT SECRETARY FOR INSULAR AND INTERNATIONAL AFFAIRS

Dear Senator Barrasso;

The Republican Party of Guam would like to extend our most gracious support for Ambassador Carmen G. Cantor to be the next Assistant Secretary for Insular and International Affairs at the Department of Interior. Ambassador Cantor has spent some time on Guam and this region and is very familiar of the challenges we face, from all aspects, inclusive of the economic and cultural factors. As proud Americans in the United States territory of Guam, we have distinctive needs when it comes to the support of the federal government and having someone who was born and educated in a territory herself, is certainly a welcoming addition.

One of the key discussions which the Office of Insular Affairs will be engaging in is the Compact of Free Association (COFA) negotiations, which addresses the free movement of migrants from the Federated States of Micronesia (FSM), into the United States and its territories. The impact of this agreement greatly affects Guam and other jurisdictions financially, and thus it is vital to have participation on the table which understands these realities.

Ambassador Cantor was first appointed as the Ambassador Extraordinary and Plenipotentiary to the FSM by President Trump. She understands the cusps of the COFA, as well as the reality that while Guam has no issues welcoming these migrants seeking the “American Dream”, the

agreement must have some parity when it comes to assuring that our depleting public resources are fairly compensated.

For the reasons stated above, the Republican Party of Guam would like to restate their unconditional support for her nomination to be Assistant Secretary for Insular Affairs at the Department of Interior.

Sincerely,

Juan Carlos Benitez

Chairman

Republican Party of Guam