

**H.R. 5066, “DATA PRESERVATION ACT OF
2014”; AND H.R. 5176, TO AUTHORIZE THE
SECRETARY OF THE INTERIOR TO RE-
TIRE COAL PREFERENCE RIGHT LEASE
APPLICATIONS FOR WHICH THE SEC-
RETARY HAS MADE AN AFFIRMATIVE
COMMERCIAL QUANTITIES DETERMINA-
TION, AND FOR OTHER PURPOSES**

LEGISLATIVE HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY AND
MINERAL RESOURCES

OF THE

COMMITTEE ON NATURAL RESOURCES
U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED THIRTEENTH CONGRESS

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**LEGISLATIVE HEARING ON H.R. 5066, “DATA
PRESERVATION ACT OF 2014”; AND
H.R. 5176, TO AUTHORIZE THE SECRETARY
OF THE INTERIOR TO RETIRE COAL PREF-
ERENCE RIGHT LEASE APPLICATIONS FOR
WHICH THE SECRETARY HAS MADE AN AF-
FIRMATIVE COMMERCIAL QUANTITIES DE-
TERMINATION, AND FOR OTHER PURPOSES**

**Wednesday, September 17, 2014
U.S. House of Representatives
Subcommittee on Energy and Mineral Resources
Committee on Natural Resources
Washington, DC**

The subcommittee met, pursuant to call, at 2:08 p.m., in room 1334, Longworth House Office Building, Hon. Doug Lamborn [Chairman of the Subcommittee] presiding.

Present: Representatives Lamborn, Lummis, Benishek, Holt and Garcia.

**STATEMENT OF THE HON. DOUG LAMBORN, A REPRESENTA-
TIVE IN CONGRESS FROM THE STATE OF COLORADO**

Mr. LAMBORN. The committee will come to order.

The Chairman notes the presence of a quorum, which, under Committee Rule 3(e), is two members.

The Subcommittee on Energy and Mineral Resources is meeting today to hear testimony on a legislative hearing on two bills: H.R. 5066, introduced by our colleague, Congressman Benishek, the Data Preservation Act of 2014; and H.R. 5176, introduced by our colleagues, Congressman Ben Ray Lujan and Cynthia Lummis, To authorize the Secretary of the Interior to retire coal preference right lease applications for which the Secretary has made an affirmative commercial quantities determination.

Under Committee Rule 4(f), opening statements are limited to the Chairman and Ranking Member of the subcommittee. However, I ask unanimous consent to include any other Members’ opening statements in the hearing record if submitted to the clerk by close of business today.

Hearing no objection, so ordered.

I now recognize myself for 5 minutes.

I would like to welcome everyone here today and those listening via our webcast to the Subcommittee on Energy and Mineral Resources legislative hearing on H.R. 5066, the Data Preservation Act of 2014, introduced by the gentleman from Michigan, Dr. Benishek; and H.R. 5176, that authorizes the Secretary of the Interior to retire coal preference right lease applications for which

the Secretary has made an affirmative commercial quantities determination, introduced by our former committee colleague from New Mexico, Mr. Luján, and cosponsored by the Representative from Wyoming, Mrs. Lummis.

Back in the 1990s, building on the success of the National Cooperative Geologic Mapping Program, several professional geologic organizations began to push for a national geological and geophysical data preservation program to facilitate the acquisition, archiving, and storage of mineral and core data.

Each year tens of millions of private and public dollars are spent in the United States acquiring geologic and geophysical data by various industries and state and Federal agencies.

If saved, archived, and stored, it can be retrieved, reviewed, reanalyzed, and reinterpreted and can help identify and solve environmental problems, locate public safety hazards, saving lives, or direct exploration, allowing geologists to find possible new discoveries of energy and mineral resources.

As stated in testimony, “In 2008, reinspection of a small manila pouch full of rock chips from a dry oil test well in southern Texas led to the discovery of the Eagle Ford Shale play: a \$25 billion economic impact in a 20-county area, supporting more than 47,000 jobs.” What a discovery that was.

H.R. 5176 solves a long-standing Department of the Interior obligation to the Navajo Nation to transfer lands selected by the Navajo Nation in trust for the Navajo by allowing the Interior Secretary to address prior mineral rights on the selected parcels.

The Navajo Nation was granted the right to select certain Federal lands to be placed in trust for the Navajo as part of the 1974 Navajo-Hopi Settlement Act that settled a long-running boundary dispute between the Navajo and Hopi.

The Navajo relinquished land and relocated its citizens as part of the agreement. Forty years is a long time for the Navajo Nation to wait for the transfer of these lands.

[The prepared statement of Mr. Lamborn follows:]

PREPARED STATEMENT OF THE HON. DOUG LAMBORN, CHAIRMAN, SUBCOMMITTEE ON
ENERGY AND MINERAL RESOURCES

I would like to welcome everyone here in the room today and listening via our webcast to the Subcommittee on Energy and Mineral Resources legislative hearing on H.R. 5066, the “Data Preservation Act of 2014” introduced by Dr. Benishek, and H.R. 5176, that authorizes the Secretary of the Interior to retire coal preference right lease applications for which the Secretary has made an affirmative commercial quantities determination, and for other purposes introduced by Mr. Luján and cosponsored by Mrs. Lummis.

Back in the 1990s, building on the success of the National Cooperative Geologic Mapping Program, several professional geologic organizations began to push for a National Geological and Geophysical Data Preservation Program to facilitate the acquisition, archiving and storage of data.

As it is each year, millions of dollars are spent in the U.S. acquiring geologic and geophysical data by various industries and state and Federal agencies.

If saved, archived and stored it can be reviewed, reanalyzed and reinterpreted and can help identify and solve environmental problems, locate public safety hazards saving lives, or direct exploration geologists to possible new discoveries of energy and mineral resources.

As stated in Dr. Arthur’s testimony, “In 2008, reinspection of a small manila pouch full of rock chips from a dry oil test well in southern Texas led to the discovery of the Eagle Ford Shale play: a \$25 billion economic impact in a 20-county area supporting more than 47,000 jobs.”

Not an insignificant discovery!

H.R. 5176, solves a long-standing Department of the Interior obligation to the Navajo Nation to transfer lands selected by the Navajo Nation in Trust for the Navajo by allowing the Interior Secretary to address prior mineral rights on the selected parcels.

The Navajo Nation was granted the right to select certain Federal lands to be placed in trust for the Navajo as part of the 1974 Navajo-Hopi Settlement Act that settled a long-running boundary dispute between the Navajo and Hopi.

The Navajo relinquished land and relocated its citizens as part of the agreement. Forty years is a long time for the Navajo Nation to wait for the transfer of these lands.

Now I would like to yield 2 minutes of my time to Dr. Benishek to introduce his legislation and his witness from Michigan Potash.

I look forward to hearing from our witnesses today.

Mr. LAMBORN. I am going to now yield 2 minutes of my time to Dr. Benishek to introduce his legislation and a witness who is here today from Michigan Potash.

STATEMENT OF THE HON. DAN BENISHEK, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Dr. BENISHEK. Thank you, Mr. Chairman. I really appreciate the time to introduce this bill. And thank you for holding the hearing.

This bill, the Data Preservation Act of 2014, is to reauthorize the National Geological and Geophysical Data Preservation Program Act of 2005 through 2019. As the National Research Council reported in 1995, data are the lifeblood of science and the key to understanding this and other worlds. As such, they are a critical natural resource and must be protected, preserved, and made accessible to all people for all time.

In my state, Michigan Geological Repository for Research and Education has been collecting and storing geological samples and data for over 30 years. The repository is the resource center for the Michigan Geological Survey and for industry.

Dr. John Yellich, a Michigan State geologist, reports that the repository houses more than 500,000 feet of core, additional samples, and geophysical data for more than 25,000 wells.

Tens of thousands of well reports, logs and sample analyses have been entered into databases. Over the past 6 years, the repository has submitted large data sets and received grants under the National Geological and Geophysical Data Preservation Program.

The availability of this data has benefited the people of Michigan significantly. In partnership with Core Energy, researchers at the Survey relying on archived data in the repository began to use liquefied carbon dioxide for enhanced oil recovery in old, inactive oil fields. One field alone has already produced an additional 1.6 million barrels of oil.

Core Energy, which is based in Traverse City, Michigan, is the only company east of the Mississippi using this innovative technique. Another company, Michigan Potash, reexamined a significant donation of core that led to the discovery of a deposit valued at \$65 billion.

I would like to introduce and welcome one of the principals of that company, Ted Pagano, who will be testifying here today.

Finally, I ask unanimous consent to enter testimony and other documents for the record from Dr. John Yellich.

Thank you. I yield back my time.
[The documents of Dr. John Yellich follow:]

PREPARED STATEMENT OF JOHN A. YELICH, CERTIFIED PROFESSIONAL GEOLOGIST,
DIRECTOR, MICHIGAN GEOLOGICAL SURVEY, MICHIGAN GEOLOGICAL REPOSITORY
FOR RESEARCH AND EDUCATION, A MICHIGAN GEOLOGICAL SURVEY—RESOURCE
CENTER ON H.R. 5066

Data preservation has been the focus of the Michigan Geological Repository for Research and Education (MGRRE) for more than 30 years. MGRRE has received financial support and has submitted very large datasets to the National Geological and Geophysical Data Preservation Program (NGGDPP) during the past 6 years. As the National Research Council (NRC) reported in 1995: "Data are the lifeblood of science and the key to understanding this and other worlds. As such, they are a critical natural resource and must be protected, preserved, and made accessible to all people for all time." In Michigan, we have seen how these data are also essential in finding solutions to environmental problems and to supporting economic growth through sustainable natural resource management. Because no one can predict which environmental and resource issues will arise, for which the solutions will depend on these data, we must make every effort to protect and preserve them.

In Michigan, geological samples and data are preserved and used in education and research by MGRRE, a resource center to the Michigan Geological Survey (MGS) at Western Michigan University (WMU). Through MGRRE, industry members and our researchers have furthered development of domestic energy, greenhouse gas sequestration, discovery of non-metallic natural resources, and worked to define water resources. MGRRE has data from oil, gas, environmental and geotechnical research in over 500,000 feet of core (>95 miles), samples and geophysical data from over 25,000 wells, tens of thousands of well reports, logs and sample analysis which is all in databases and scanned digitally and housed in an area having >27,000 sq. ft., over half an acre.

Funding by the NGGDPP for MGRRE and many other data repositories has created a data source for the country and preserved data that previously were at risk of damage and/or destruction. We share these examples from our work at MGRRE, much of which has been sustained by support from the NGGDPP.

Using cores and data donated to or rescued from disposal by MGRRE, largely from the oil and gas industry, our researchers have conducted research about hydrocarbon reservoirs and presented those results at workshops for more than 20 years (attached picture of Manuals). Attendees represented industry, government and higher education. By conducting our research in partnership with independent and national oil and gas companies, our faculty and students have provided applied solutions. And our students have gained hands-on experience in becoming geoscience professionals receiving high paid challenging professional positions.

The following examples represent some of MGRRE's major environmental, industry and economic milestones over the last 20 years.

- A. In 1995 WMU and Michigan Technological University (MTU) entered into a partnership to study preserved oil field core samples and data at MGRRE.
 - a. With grant support from the Department of Energy (DOE), MTU-WMU demonstrated effective use of horizontal drilling technology to produce additional oil reserves in Michigan, laying a significant foundation for conventional horizontal drilling used today.
- B. Since 1997, MGRRE has been the Michigan Center for the Petroleum Technology Transfer (PTTC), initially funded by the DOE, a program where industry and academia share in oil industry geological, geophysical and current operational technology.
 - a. MGRRE has presented one to two workshops each year, utilizing archived core and data.
 - b. This program is now entirely self-funded by MGRRE through workshop fees and industry sponsorship.
 - c. Many of the environmental and industry accomplishments in the last 20 years were the result of data, well-field experience, and research shared at these open industry events.

- C. In 2005, the DOE established a national environmental program to evaluate the potential of capturing and safely storing Carbon Dioxide (CO₂), in subsurface geologic reservoirs. MGRRE, and other states, submitted proposals that would utilize preserved core and geophysical data to explore this concept.
 - a. MGRRE was funded to evaluate Michigan's reservoirs through the Midwest Regional Carbon Sequestration Partnership (MRCSP) and conducted a successful test of CO₂ sequestration in a collaborative partnership of DOE, MGRRE and industry partner, Core Energy, LLC.
 - b. This basic program and subsequent successful testing and evaluations have continued for more than 9 years and demonstrated the potential underground storage capacity of tens of billions of tons of CO₂.
- D. The CO₂ sequestration program further evolved in Michigan when CO₂ injections into old oil fields resulted in the added benefit of more energy production through the recovery of previously stranded oil. Typically these fields would yield about 25 percent of their reserves initially through primary recovery. The remaining oil was "stranded" in isolated small pore spaces.
 - a. Injecting the captured CO₂ in these oil-bearing formations produced an additional 20 percent to 25 percent of the oil, an economic benefit to Michigan, new wealth.
 - b. This technology has recovered more than 1.6M barrels of oil, which had an estimated revenue of \$112,000,000 at \$70/BBL price, netting Michigan an estimated tax revenue of \$7.3 million.
- E. Legislation in Michigan was passed in April 2014 to entice the oil industry to invest in this capital-intensive process of CO₂ capture and injection by providing them a tax benefit for the additional cost.
 - a. Millions of barrels of additional oil will now be recovered through this technology, resulting in tens of millions of dollars of both unrealized income for Michigan residents and millions of dollars of otherwise unrealized tax revenue to the state of Michigan.
- F. In 2003, MGRRE researchers, MTU and members of the oil and gas industry presented their research and experience at a PTTC workshop focusing on the potential of undiscovered hydrocarbon reserves, particularly those in the Trenton Black River Formations.
 - a. Subsequently, in 2006, USGS began a Michigan basin assessment of unrecovered oil resources and WMU geoscientists compiled data for Michigan using archived core samples and geophysical data.
 - b. This compilation and research was presented at a subsequent MGRRE/PTTC workshop, and this resulted in industry coming to MGRRE to study and sample cores for developing exploration targets.
 - c. New Trenton/ Black River Formation oil-bearing zones were discovered in 2006.
 - d. The Trenton/ Black River continues to be successfully explored and developed, resulting in additional millions of dollars in economic benefits for our citizens and new tax revenues for the state today.
 - i. An estimated 5 million Barrels of previously undiscovered oil from five newly discovered fields has been produced to date, an additional revenue and tax benefit.
- G. In 2009 and 2010, MGRRE hosted conferences about potential unconventional oil and gas resources in the Collingwood, Utica and A-1 Carbonate formations.
 - a. Industry professionals visited MGRRE, studied the samples and data and developed a geological and exploration model.
 - b. In 2010, \$178 million was paid by the oil industry to lease thousands of acres of state land, the largest single lease sale to date in Michigan, providing a major source of revenue to the Natural Resources Trust Fund of Michigan.
 - c. In 2010 and 2011, industry began exploration on these leases, which has already resulted in several discoveries of commercial quantities of oil and gas and provides the potential for additional millions in economic benefits and tax revenue to Michigan.

- H. In 2013 the industrial mineral industry recognized that MGRRE had the only collection of geological cores and geophysical data for an extensive deposit of potash: a critical ingredient in fertilizer, essential to U.S. agriculture.
 - a. Industry professionals and MGRRE researchers conducted tests and completed an evaluation of this material and determined that this represented a significant potash resource to Michigan and to the United States.
 - b. The area of study has an estimated in-place value of more than \$65 billion, with additional geologic data indicating an even larger resource area.
- I. Michigan has a coastline contact with four of the five Great Lakes and is perceived as having an abundance of and understanding of water resources, including groundwater. Scientific data collection and mapping of subsurface geologic materials and water resources has been limited for more than 30 years. The Michigan Geological Survey, assigned to WMU in October 2011, is now mandated to function through WMU will utilize the MGRRE samples and data collections with a scientific geosciences emphasis to develop a greater understanding of the groundwater resources of Michigan.
 - a. The MGRRE facility has water well drill samples from over 2000 public water supply wells and combined with more than 20,000 oil well sample sets. These samples will be used in conjunction with other geologic and geophysical information to support the program for effective and rational management of our water resources.
- J. Since 2005, MGRRE and WMU has been a major educational foundation for numerous students who have utilized the resources of MGRRE and faculty to develop the next generation of geosciences professionals. In the last 10 years, there have been over 45 Masters graduates from WMU that have benefited from the MGRRE and faculty experiences, some whom have gone on for Ph.D.'s. These graduates are now experienced contributing professionals in the environmental, industrial and academic world.

Through NGGDPP funding, MGRRE has continued to rescue cores that were literally destined for landfills, recovered cores that had been damaged by poor storage conditions, brought cores and samples back to Michigan from out-of-state, scanned thousands paper records (mudlogs) so they are now available in digital form, inventoried thousands of well records, hand-entered porosity and permeability numbers from old records into individual spreadsheets, uploaded all this data to the National Data Repository, thereby increasing the amount of data available and making these data publicly accessible.

Without NGGDPP funding, this recent work would still be in progress. Funding for data preservation is very limited and so critically needed. We urge your consideration to continue this funding so that more data can be saved and preserved for today and tomorrow.

Attached are the examples of the workshop manuals, press announcements and supporting documentation of data preservation and the benefits.



Damaged core in boxes is repackaged and catalogued at MGRRE using NGGDPP funds.



The MGRRE core facility storage, examination & technical workshop areas. (>27,000 sq ft.)



Core workshops with student poster sessions showcase Thesis project work



MGRRE—Petroleum Technology Transfer Council (PTTC) Manuals prepared and used in conferences conducted since 1997 to 2014.

Mr. LAMBORN. OK. Thank you.

And now we are about to hear from the Ranking Member for his 5-minute opening statement.

But, first, I want to thank Representative Rush Holt of New Jersey. He will be retiring at the end of this Congress. I have enjoyed working with him these last 4 years. Many times we have

agreed on issues. Many times we have not agreed on issues. But that is how our system works. I have always enjoyed his company and the input that he provides.

You will be missed, Representative Holt.

STATEMENT OF THE HON. RUSH HOLT, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW JERSEY

Mr. HOLT. Well, thank you, Mr. Chairman. That is very kind of you. I am still on the job and am delighted to be here once again in your committee, or your subcommittee.

Mr. LAMBORN. And I just say that because this might be the last hearing of our subcommittee this year.

Mr. HOLT. This year.

Mr. LAMBORN. Yes.

Mr. HOLT. I see. OK.

Mr. LAMBORN. We will be coming back after November for a lame duck session, but if it is not the case, if we have another hearing, I will say my farewell then, also.

Mr. HOLT. As many times as you like, then. Thank you.

And thanks to the witnesses for being here today.

And I appreciate the Chair holding this hearing.

The first bill, H.R. 5066, would reauthorize the National Geological and Geophysical Data Preservation Program, and the bill is long overdue. This country's collection of geologic and geophysical data is invaluable. It represents millions upon millions of wells and cores and fossils and maps and other things that have been collected over more than a century.

They are not static museum pieces. These collections are used, will be used, should be used, day by day by government scientists and the private sector and teachers and students and others.

And not only are most of these data irreplaceable, but much of it needs special handling and storage, so digitizing it is not the answer. It is hard to imagine what future researchers would say if we allowed this to disintegrate or disappear.

Recently, the Geological Survey used a tool on some old mine samples, applying modern analytical techniques to see if there are potentially valuable minerals, such as rare earth elements, left behind in the mine waste.

The results in this case are promising, might provide a new strategy for decreasing dependence on China and other nations for these minerals. But that is only one example of the kinds of things that can be done with these data, with these samples.

The authorization for the program expired 4 years ago and while the U.S. Geological Survey has a general authority, it really needs a special, specific reauthorization with a clear statement of support as well.

So I think this will help. I hope it helps with the funding levels because they are insufficient as it stands. The authorized \$30 million a year has not come close in the appropriations, and it is something on the order of \$1 million, I guess, in recent years, or it may be as much as \$2 million now—\$2 million spread over the state geological surveys is not nearly enough to really safeguard the collections.

So I am glad to see it is moving forward. Thank you, Mr. Chairman, for doing that.

The second bill, H.R. 5176, will finally retire some antiquated coal lease applications that date back decades. These preference right lease applications are a vestige of a bygone method of coal leasing, and it is time that we do away with them.

Since the mid-1970s, the Department of the Interior has gradually been working through these applications. The ones that were grandfathered were down to fewer than 30,000 acres in New Mexico. This bill would help the Department take care of probably all or almost all of those remaining acres and put this system to rest, as it deserves.

The most concerning thing about the coal preference right lease applications in New Mexico is that they are in a terrible area for coal mining. Right next door to the Chaco Cultural National Historic Park, they lie within a Wilderness Study Area and the Fossil Forest Research Natural Area. Some are on the same land selected by the Navajo Nation as part of the Land Settlement Act.

It is my understanding that all the parties involved: the coal company, the Navajo Nation, the Administration, are in support of retiring these lease applications in exchange for coal-bidding credits to be used elsewhere. And this legislation will move that along.

So I look forward to hearing about these two bills and yield back the remaining seconds of my time.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Holt follows:]

PREPARED STATEMENT OF THE HON. RUSH HOLT, RANKING MEMBER, SUBCOMMITTEE
ON ENERGY AND MINERAL RESOURCES

Thank you Mr. Chairman for holding this hearing to discuss these two bills.

The first bill, H.R. 5066, which would reauthorize the National Geological and Geophysical Data Preservation Program, is long overdue.

This country's collection of geologic and geophysical data is invaluable, representing literally millions upon millions of wells, cores, fossils, maps, and more that have been collected at incredible expense for roughly a century and a half.

These aren't simply museum pieces. These collections are used every day by the private sector, government scientists, teachers, and more. Not only is most of this data irreplaceable, or only replaceable at tremendous expense, but much of it needs special handling and storage. It can't just be digitized and kept in a database.

If you have a core sample, and want to come back later to take a sample for some new analysis, you need to have that core sample stored safely in a proper facility. And it's far cheaper to construct and maintain the storage facility than it is to go out and drill new cores.

We can barely imagine how future researchers will use our existing library of geologic data. Recently, the U.S. Geological Survey used a new tool on some old mine samples, applying modern analytical techniques to see if there are potentially valuable minerals, such as rare earth elements, that had been left behind in mine waste.

The results have been extremely promising, and might provide us with a new strategy for decreasing our dependence on China for some of these minerals. But that work is only possible because those samples were available for testing.

The authorization for this valuable program expired in 2010, and while the U.S. Geological Survey has the general authority it needs to keep the program operating, congressional reauthorization would be a clear statement of support, and hopefully help boost funding levels. Although authorized at \$30 million a year, the program barely received \$1 million for many years, although recently Congress has boosted that to \$2 million.

But that's \$2 million spread out over all the state geological surveys, which is helpful, but not nearly enough to truly safeguard these critical collections. I'm glad

to see us move forward with a reauthorization of this program, and hope that we can keep increasing the funding available for it.

The second bill, H.R. 5176, is a bill to finally retire some antiquated coal lease applications that date back decades. These preference right lease applications are a vestige of a bygone method of coal leasing that Congress did away with in the mid-70s.

Since that time, the Department of the Interior has been gradually working through those applications that were grandfathered in, and we are down to less than 30,000 acres in New Mexico. This bill will help the Department take care of most, if not all, of these remaining acres, and finally put this system to rest once and for all.

The most concerning thing about the coal preference right lease applications in New Mexico is that they're in a terrible area for coal mining. They're right next door to an important cultural site, the Chaco Culture National Historic Park, lie within a Wilderness Study Area and the Fossil Forest Research Natural Area, and are also on some of the same lands selected by the Navajo Nation as part of the Navajo-Hopi Land Settlement Act.

It is my understanding that all the parties involved—the coal company, the Navajo Nation, and the Administration—are in support of retiring these lease applications in exchange for coal bidding credits to be used elsewhere, and that this legislation is necessary to make that happen.

I look forward to hearing more about these bills, and I thank the witnesses for being here today.

I yield back the balance of my time.

Mr. LAMBORN. All right.

Mr. HOLT. Oh. Mr. Chairman—

Mr. LAMBORN. Yes.

Mr. HOLT. May I ask unanimous consent to include in the record a statement of Representative Ben Ray Luján on the subject of H.R. 5176?

Mr. LAMBORN. If there is no objection, so ordered.

Mr. HOLT. Thank you.

[The prepared statement of Representative Ben Ray Luján on H.R. 5176 follows:]

PREPARED STATEMENT OF THE HON. BEN RAY LUJÁN, A REPRESENTATIVE IN
CONGRESS FROM THE STATE OF NEW MEXICO

Mr. Chairman, I appreciate the subcommittee's willingness to hold this important legislative hearing on H.R. 5176, a bill I have sponsored with Representative Cynthia Lummis to authorize the Secretary of the Interior to retire coal preference right lease applications for which the Secretary has made an affirmative commercial quantities determination, and for other purposes. I want to welcome the witnesses Walter Phelps, Chairman of the Navajo-Hopi Land Commission, and Mike Nedd, Assistant Director from the BLM Minerals & Realty Management, who are appearing before the subcommittee today on this bill.

While it may not be evident from the bill's title, the authorization provided to the Secretary by this legislation will not only resolve certain preference right lease applications, but will also help resolve a tribal trust obligation to the Navajo Nation that has been unresolved for four decades. In 1974, when the Congress enacted the Navajo-Hopi Settlement Act, a process was established for the final settlement of the reservation boundaries between the Navajo and Hopi tribes. This led to the resettlement of Navajo tribal members and the loss of acreage from the Navajo Reservation in order to make the Hopi Reservation whole. In return, the Navajo were permitted to select a comparable amount of acreage on Federal lands managed by the BLM, to be taken into trust for the Navajo Reservation. In the 1974 Act, Congress committed to providing the Navajo these lands, unencumbered by mineral rights.

In the early 1980s, the Navajo Nation selected its parcels of Federal land. The Secretary of the Interior has since taken most of those parcels into trust for the Navajo Nation. Unfortunately, a number of the parcels selected by the Navajo were encumbered by prior mineral rights held by private entities. These parcels are un-

able to be taken into trust for the Navajo until the private mineral rights are removed, and the status of these parcels remains unresolved after decades.

Several of these parcels are also within 2 miles of the Chaco Canyon National Historical Park. It is the BLM's goal, shared by me and many of my constituents, to protect areas closely surrounding the Park that contain important historical and archeological assets.

There have been numerous attempts to resolve this situation administratively, and I applaud the efforts of all the parties involved for working in good faith to find a solution. A key element to resolving this issue is the exchange of existing preference right lease applications for competitive coal leasing bidding rights that can be used to meet future obligations under the Federal coal leasing program. Unfortunately, the Interior Department's Solicitor has determined that Interior lacks the authority to pay the resultant state share of royalties or bonus bids once the new bidding rights are exercised. This would significantly disadvantage states in the application of any bidding credits.

Our bill provides the Secretary of the Interior with important authorities that will ensure that all affected parties—private entities, the Navajo Nation, and the states—will be treated equitably going forward. Further, the Interior Department and private entities holding the mineral rights have already stipulated that there are 267 million tons of commercially recoverable coal on these parcels. Absent Congress providing statutory authority to the Secretary to resolve issues like this, a far more expensive takings claim may occur. Accordingly, our actions here in Congress will save taxpayers significant dollars.

Again, I appreciate the subcommittee's attention to this important issue, and I am committed to working with the subcommittee and committee leadership to move this bill forward in an expeditious manner.

Mr. LAMBORN. We will now hear from our witnesses.

I want to welcome Jonathan D. Arthur, Ph.D. and P.G., President of the Association of American State Geologists and Director and State Geologist of Florida; Patrick J. Gooding of the Kentucky Geological Survey and the University of Kentucky, Well Sample and Core Library; Theodore A. Pagano, P.G. and P.E., General Manager of the Michigan Potash Company, LLC; and Walter Phelps, Council Delegate of the Navajo Nation; and, finally, Michael Nedd, Assistant Director of Energy, Minerals and Realty Management of the Bureau of Land Management with the U.S. Department of the Interior, who is accompanied by Kevin Gallagher, Associate Director of Core Science Systems of the U.S. Geological Survey, also with the U.S. Department of the Interior.

Like all of our witnesses, your written testimony will appear in full in the hearing record, so I ask that you keep your oral statements to 5 minutes.

Our microphones are not automatic. So you need to turn them on when you are ready to begin.

I also want to explain how our timing lights work. When you begin to speak, our clerk will start the timer and a green light will appear. After 4 minutes, a yellow light will appear and, at that time, you should begin to conclude your statement. At 5 minutes, the red light will come on and I ask that you conclude at that time.

I will also be giving the gavel here very soon to Dr. Benishek to finish this hearing. This is a very busy day with committees. I have two others going on at the same time.

So, Dr. Benishek, if you can come here, we will do that.

But, Mr. Arthur, you may begin. Thank you for being here.

STATEMENT OF JONATHAN D. ARTHUR, PH.D., P.G., PRESIDENT, ASSOCIATION OF AMERICAN STATE GEOLOGISTS; STATE GEOLOGIST OF FLORIDA

Mr. ARTHUR. Thank you, Chairman Lamborn, Ranking Member Holt, members of the subcommittee and bill sponsor, Congressman Benishek. I appreciate this opportunity to provide testimony in support of H.R. 5066, Reauthorization of the National Geological and Geophysical Data Preservation Program Act. I serve as the State Geologist of Florida and as president of the Association of American State Geologists, AASG.

Today I am testifying on behalf of AASG. Our association commends your efforts to strengthen our Nation's capacity to address the challenges related to energy and critical mineral resources.

AASG strongly supports restoration, preservation, and accessibility of geological and geophysical data. We acknowledge and support the role of U.S. Geological Survey in administering this program. We are grateful that the Act supports important state and Federal partnerships through 100 percent matching to achieve mutually beneficial goals.

We acknowledge that local, state and tribal agencies and our Federal partners, such as the Departments of the Interior, Energy, Homeland Security and EPA, as well as the private sector, rely on this data for purposes of water, mineral and energy discoveries and assessments, natural hazard mitigation, and protection of human health and the environment. Bottom line: This data is important.

Examples of the data at risk include rock and sediment samples, fossils, paper logs, aerial photos and maps, which are often in poor states of preservation and access and in danger of permanent loss.

In 2002, the National Academy of Sciences Report titled "Geoscience Data Collections—National Resources in Peril" made the case for the premise of this Act. Many of this Nation's geological data repositories, most of which are maintained by state geological surveys, are now at or near their storage capacity. Expansion of these facilities requires significant capital costs.

Per the Act, annual authorization is \$30 million. However, appropriation has been on the order of 3 percent. Over the last 5 years, average annual funding of roughly \$27,000 per state has been awarded to an average of 25 states.

While capital improvements are not possible with this modest appropriation level, small data rescue projects have been accomplished by State Geological Surveys, enhancing accessibility, discoverability, and usability of the data.

For example, funds from the Act supported digital archiving of historic mine maps in California, which are used to mitigate public safety hazards posed by abandoned mines.

Florida digitally converted more than 7,000 paper geophysical logs, thereby protecting the data and providing digital access to information about the state's deepest wells for use in groundwater and energy assessments.

The economic and societal importance of geological and geophysical data cannot be overstated. Kansas used 50-year-old drill cores in its repository to help determine the cause of fatal gas explosions and recommend solutions.

Michigan received a mining company donation of 4,000 core boxes and, fortunately, had the sufficient staff and space to archive the materials for future use. Reinspection of the samples led to discovery of potash deposit valued at \$65 billion.

New Jersey, Maryland, and Delaware used data from their respective collections to cooperate on a study of the Potomac aquifer, which serves these states as a principal source of drinking water.

You heard from Chairman Lamborn about the Eagle Ford Shale play in Texas. This successful use of geologic and geophysical data is seen in other states. For example, similar stories exist in Oklahoma and Pennsylvania, where frequent use of geophysical logs and samples has led to rapid and efficient development of significant oil and gas plays.

Data underpins everything we do as geoscientists. We must protect it, and we must make it accessible. The AASG urges this subcommittee to consider extending the reauthorization to 2025.

Thank you again for this opportunity.

Dr. BENISHEK [presiding]. Thank you very much.

[The prepared statement of Mr. Arthur follows:]

PREPARED STATEMENT OF JONATHAN D. ARTHUR, PH.D., P.G., PRESIDENT, ASSOCIATION OF AMERICAN STATE GEOLOGISTS; STATE GEOLOGIST OF FLORIDA ON H.R. 5066

Thank you for the opportunity to submit written testimony for the record on H.R. 5066, Reauthorization of the National Geological and Geophysical Data Preservation Program Act of 2005 through 2019 (NGGDPP). This testimony is presented on behalf of the Association of American State Geologists (AASG). Our organization, founded in 1908, represents the State Geologists of the 50 United States and Puerto Rico. AASG seeks to advance the science and practical application of geology and related earth sciences across our lands. AASG strives to optimize the role that State Geological Survey agencies play in delivering benefits to the people of the United States in relation to developing economic prosperity, understanding and mitigating natural hazards, protecting property and lives, and preserving our natural environmental heritage.

AASG recognizes the work of Chairman Lamborn, Ranking Member Holt, sponsor Benishek and the members of this committee. We commend your efforts to strengthen our Nation's capacity to address the challenges associated with energy, as well as critical and strategic mineral resources. I share with you today the vital role of geological and geophysical data in this regard, the vulnerability of these resources, and I will emphasize the role that State Geological Surveys can play in addressing associated concerns.

THE AASG POSITION

AASG strongly supports preservation and access of geological and geophysical data, which is facilitated through this Act. We support long-term authorization and full appropriation of the Act. We acknowledge and support the role of the U.S. Geological Survey (USGS) in administering this program, which includes the development and compilation of state and Federal data inventories, an implementation plan, data standards, strategic planning, and collaboration regarding preservation techniques. We acknowledge the significance of the National Data Catalog at ScienceBase.gov. We acknowledge that local and state agencies and our Federal partners, such as the Department of Interior, Department of Energy, Department of Homeland Security and the Environmental Protection Agency, rely on this data for purposes of water, energy and mineral resource assessments and sustainability, hazard mitigation, and protection of human health and the environment. AASG understands that despite the continuous evolution of geological, geophysical, engineering concepts, and analytical techniques, there is a constant need to revisit, re-examine, and re-analyze rock samples over time. These "second looks" at archived and heritage data can yield energy and mineral discoveries worth billions of dollars and generate tens of thousands of jobs. The NGGDPP supports important Federal-State partnerships that achieve mutually beneficial goals related to the rescue and accessibility of invaluable geoscience data.

A CRITICAL ISSUE FOR THE NATION

Geoscience-related issues are critical and of immediate concern to the Nation's security and economy. Examples include the following:

- Location, abundance, sustainability and quality of water supplies
- Domestic energy sources, such as oil, gas, coal, geothermal, and renewables; reduction of carbon emissions
- Domestic sources of metals and critical minerals
- Identification, mapping, and prediction of geologic hazards such as earthquakes, volcanic eruptions, sinkholes and landslides
- New technological breakthroughs require re-examination of samples and data; data historically deemed insignificant may become paramount to new discoveries
- Training the next generation of geoscientists, especially geologic mappers

All of these issues rely on the analysis of geological and geophysical samples, collections, and data that already exist. Regrettably, these vital materials are often in poor states of preservation and access, and in danger of permanent loss. Many of this Nation's geological data repositories, most of which are maintained by State Geological Surveys, are now at or near their storage capacity. Some have exceeded their capacity and are relying on temporary, non-climate-controlled portable storage. Expansion of these facilities requires significant capital costs. While industry and government have made substantial investments to acquire geoscience data and collections for over 150 years, volumes of expensive and arduously obtained subsurface information are currently at risk of disposal or ruin. Once these data are lost, they probably will never be replaced.

The value of our Nation's geological and geophysical data (e.g., rock and ice cores, fossils, geophysical tapes and paper logs, rock, mineral and fossil samples, aerial photos, field notes) have long been recognized. The fact that significant portions of these materials are irreplaceable due to destruction of outcrops (e.g., construction, quarrying, flooding, landslides), urbanization, restricted access, and prohibitive replacement expenses only increases their importance. If preserved, these materials and data will be invaluable for the next generation of scientific research and education. The ability to preserve and maintain geoscience data and collections has not kept pace with the growing need for information and technological advancements, many of which require real-world calibration: samples from the Earth.

Not only is rescue of this data critical, a full understanding and access of the types and sources of data is equally important to future geoscientists. To this end, developing inventories, and recording *metadata*—or structured information about data—allows for future discovery and use through a georeferenced platform such as an Internet-based map. Meticulous effort is involved in the research of metadata; it is much like detective or forensic work and is time-consuming.

In 2002, the National Academy of Sciences reported on “Geoscience Data and Collections—National Resources in Peril,” making the case for preserving these irreplaceable data and physical samples. The report notes that “housing of and access to geoscience data and collections have become critical issues for industry, Federal and state agencies, museums, and universities. Many resources are in imminent danger of being lost through mismanagement, neglect, or disposal. A striking 46 percent of the state geological surveys polled by the [National Research Council] committee reported that there is no space available or they have refused to accept new material.”

THE RESPONSE

Congress established the National Geological and Geophysical Data Preservation Program (NGGDPP) through the National Energy Policy Act of 2005 [P.L. 109–58, Sec. 351] to address these issues. Specifically, the NGGDPP was established to:

- Create a national network of cooperating geoscience materials centers and data archives, representing a partnership between U.S. Department of the Interior Bureaus and the State Geological Surveys;
- Archive geologic, geophysical, and engineering-geologic data, maps, well logs, and samples in accordance with National and international formats and standards;
- Permit ready access to the holdings of all collections through a common, distributed Internet-based National Digital Catalog of archived materials;

- Provide Federal assistance, matched by state and private funds, to support physical and digital infrastructure efforts, outreach, public awareness, and workshops;
- Ensure that this Nation's next generation of geoscientists has the necessary reference material with which to train;
- Designate the USGS as the program administrator to coordinate geologic material centers and data archives with other Department of Interior Bureaus, the State Geological Surveys and the AASG; and
- Encourage private industry and universities to partner with State Geological Surveys and the USGS to leverage resources.

BUDGET HISTORY—A STATE PERSPECTIVE

Since implementation of the NGGDPP, the annual authorization has been \$30 million, however, total appropriated funds since 2007 equals \$8 million. This comprises *three percent of the total \$240 million authorization* during that period. Cooperative funding of state projects began in 2007, totaling \$4.58 million to date in awards to the states. Over the last 5 years, on average, *25 states per year have received funding averaging \$27,033 per state*. This annually comprises an average of 63 percent of the appropriated funds over this 5-year period.

DATA PRESERVATION ACCOMPLISHMENTS AND APPLICATIONS

With the modest appropriation levels, intended capital improvements have not been possible; however, the USGS-administered NGGDPP has successfully implemented the National Data Catalog and funded small data rescue activities and improvements in data collections and management across the country. The following describes selected accomplishments of State Geological Surveys. In addition, examples of successful applications of previously archived geological and geophysical data are shared to illustrate the importance of these geoscience data resources, which can generate billions of dollars for the Nation's economy, create jobs, and save lives:

- **Alabama** has digitally cataloged approximately 170,000 fossil specimens within its paleontology collection, providing ready access of fossil information to energy companies who are constructing or moving pipelines. The companies incorporate this information into the Paleontological Resources section of the required Environmental Impact Statement within their applications to the Federal Energy Regulatory Commission. Archived vibracores can be used to evaluate damage to the Alabama coast due to the Deepwater Horizon oil spill and may be the basis for recovering significant funds for coastal restoration.
- **Alaska** completed a major curation project supported partly by NGGDPP involving a valuable core sample collection at risk of severe material and data loss: 818 boxes of moldy coal-bed methane core from five oil and gas wells were cleaned, re-boxed, restored and made available to geoscientists studying potential energy resources. Other archived cores once examined and analyzed for gold, silver, and tin, are now being analyzed for their promising REE potential.
- **Arizona** digitized and georeferenced more than 4,900 maps, 5,500 reports, 5,100 images to date; over 30,000 additional files and maps have also been scanned—information used extensively by state and Federal agencies in environmental and abandoned mine/mine safety programs, and by mineral resource exploration companies.
- **California** notes the importance of its Historic Mine Maps Collection, which is used to remediate public safety hazards posed by abandoned mines throughout the state. Almost every year there are reports of California residents entering or falling into abandoned mines and becoming trapped sometimes with deadly results. Maps in the collection provide information on mine locations that would otherwise go undetected.
- **Florida** converted more than 7,000 geophysical logs to digital format, providing information about state's deepest wells, making the data more accessible and useful toward exploration of oil, natural gas and deep-aquifer drinking water. Evaluation of core samples and geophysical logs continue to lead to a refined understanding of the Floridan aquifer system. Moreover, examination of core samples led to discovery of natural sources of arsenic, which fostered development of techniques that mitigate the release of this element underground sources of drinking water.

- **Kansas** used drill cores in its repository that were collected in the 1960s to help determine the cause of a gas explosion and recommend solutions. In 2001, natural gas bursts in Hutchinson, Kansas, resulted in downtown explosions and fires, as well as fountains of natural gas and brines 3 miles east of the fires and an explosion under a mobile home that killed two people. Using the drill cores and new seismic data, scientists determined that gas leakage from a salt cavern used to store natural gas had resulted in two anomalous zones of potential high gas pressure. Vent wells were drilled to release the pressure, which prevent further explosions. Originally acquired in the 1960s while the Atomic Energy Commission was trying to determine potential nuclear storage facilities, *the core was used in 2001 to prevent further explosions and deaths from underground natural gas accumulations.*
- **Michigan** received a mining company donation of 4,000 core boxes and fortunately had sufficient staff process the samples and sufficient space to archive the materials for future access. *Reinspection of the samples led to discover of a potash deposit valued at \$65 billion.*
- **Missouri** received funding from NGGDPP and applied it to convert 400 hard-bound, paper field notebooks to a digital format via scanning for preservation and archival purposes, increasing public awareness of and accessibility to the information. The collection comprises more than 1,500 geology field notebooks that date back to 1855. The collection is one-of-a-kind and would be impossible to replace should be lost or destroyed. The notebooks contain historic geologic data on outcrop locations, rock-unit layers, mining, karst, hydrology, structure and other topics. They also contain historic data on physiography, vegetation, socio-economic and cultural information and a myriad of other subjects. The notebooks have proven to be essential for site location and characterization work on mine-related Brownfields work. The information has not only reduced costs and time by providing mine location data, but has also been the sole source of information for more than 1,700 historic mines, many of which have significant soil or groundwater lead contamination and are now proximal to residential development.
- **Montana** applied NGGDPP funds to collect and preserve mines and mineral data throughout the state, specifically, preserving drill hole logs, mineral evaluations, and many other data related to the New World Mining District. Preservation of mineralogic and geochemical data was also accomplished to evaluate hundreds of abandoned-inactive mine sites for reprocessing waste rock.
- **New Jersey, Maryland and Delaware** used geologic and geophysical logs from their respective collections to cooperate on a transboundary study to understand the Potomac Aquifer, which is a principal supplier of drinking water in each state. The project was supported by the USGS National Cooperative Geological Mapping Program (STATEMAP). The geologic information, made available in part from the NGGDPP program, assisted the team with identifying the dimensions of the aquifer, and for locating optimal drilling locations for additional test wells. Drilling test wells is costly, and the use of existing geologic and geophysical information allowed the team of researchers to make optimal use of their research funds.
- **New York** applied NGGDPP resources to support the scanning of over 1,700 maps, therefore preserving the documents and making them more accessible. State agencies, such as the Departments of Transportation and Environmental Protection, have used the scans of our bedrock maps for projects such as landslide mitigation, resource planning, and habitat protection. They have also been used by the engineering community in planning and construction of a new water supply tunnel for New York City. *Engineers on the project stated that the existence of archival bedrock data in the NYSGS open file saved the City “millions of dollars in drilling costs.”*
- **Oklahoma** has a core facility and data center, the Oklahoma Petroleum Information Center, that is the size of four football fields and holds over 100 miles of core. It also holds thousands of well logs, thousands of boxes of drilling cuttings, very popular old aerial photographs that we have scanned with NGGDPP funding, and equally popular old data such as mud logs which we have also scanned with NGGDPP funding. These data are being used daily in oil and gas exploration and production efforts across Oklahoma, and we are regularly told how invaluable these data are. Some of the recent plays that are in the news are the Mississippi Lime, Granite Wash, Woodford shale, and SCOOP (South Central Oklahoma Oil Province). The utility of the data we

preserve can be easily tracked by the requests for core viewing, examination of cuttings, and paper records as these and other plays develop.

- **Pennsylvania** gas archived core that was drilled and archived over the last 40+ years and has been utilized over the last 5 years for studies of the Marcellus shale. This horizon has recently fueled a significant increase in available gas resources to support the U.S. economy. Were it not for the cores preserved and maintained by the PA Survey, and the work over the last 30 years to map, sample and evaluate the Marcellus—long before the advent of current drilling technology and the now recognized importance of organic shales—the rapid and efficient development of this resource would have been significantly delayed.
- **Texas** maintains three core research centers. In 2008, reinspection of a small manila pouch full of rock chips from a dry oil test well in southern Texas led to *discovery of the Eagle Ford Shale play: a \$25 billion economic impact in a 20-county area supporting more than 47,000 jobs*. The pouch resides in a box among half a million boxes in a Texas Bureau of Economic Geology core research facility. The sample had likely not been inspected since the 1950s.
- **Utah** has record of over 24,000 air photos that were downloaded last fiscal year for use by geotechnical and environmental engineering consultants in support of investigations for new development to identify and locate potential geologic hazards, and in environmental assessments, and by local governments and others to document land-use changes. The Survey's Aerial Imagery Collection is being used on almost all internal geologic hazard projects and emergency responses, and is critical for mapping landslide occurrences (such as the over 500 square mile Wasatch Plateau landslide inventory mapping project, Seeley Fire emergency response, etc.), and other hazards.

IN CLOSING

The AASG endorses the NGGDPP as it is designed to readily address a vast and enduring concern for the Nation. Not only are geological and geophysical data at risk, but scientific clues revealing undiscovered water, mineral and energy resources may be lost, and more importantly, data that can save lives may be lost. This cooperative Federal-State program affords the Nation the opportunity to more fully understand the reserves of water resources and mineral and energy reserves in our lands. In addition, the data is also used for prediction and preparation of geological hazards, as well as to avoid unnecessary costs of embarking in geologic exploration in areas already represented in historic collections.

Given past appropriation levels and the immense importance of this successful program, the AASG strongly recommends that the authorization be extended to a 10-year duration, “. . . 2015 through 2025.” We also encourage full appropriation levels to meet national demands for capital improvement projects to store, protect and make these valuable geoscience resources more readily available.

Thank you, again, for this opportunity. I hope you find this information helpful as you consider this important matter.

For more information about geoscience data repositories and success stories:

American Geological Institute, 1997, National Geoscience Data Repository System Phase II: Final Report, Alexandria, Virginia, 127 p.

American Geological Institute, 2003, National Geoscience Data Repository System Phase II: Implementation and Operation of the Repository Final Report, Alexandria, Virginia, 42 p.

American Geological Institute, 2006, Directory of Geoscience Data Repositories, Alexandria, Virginia, <http://www.agiWeb.org/ngdrs/datadirectory.html>.

Collette, Mark, December 30, 2012, “The Wildcatter: Corpus Christi’s Gregg Robertson, key member of Eagle Ford discovery, named 2012 Newsmaker of the Year,” Corpus Christi Caller Times, Retrieved from <http://www.caller.com/business/eagle-ford-shale/the-wildcatter-corpus-christis-gregg-robertson>.

National Research Council, 2002, Geoscience Data and Collections—National Resources in Peril, National Academies Press, Washington, DC, 107 p.

Office of Management and Budget, 2002, Coordination of Geographic Information and Related Spatial Data Activities. Circular No. A-16 Revised.

Roland, Cheryl, September 10, 2013, “Western Michigan University research facility assists in rediscovery of rare mineral deposit,” Western Michigan University News, Retrieved from <http://wmich.edu/news/2013/09/9197>.

SUPPORTING IMAGES

Geological sample rescue: before and after



Cores in need of rescue



Rescued geological field notebook



Core analysis



Photo by David M. Stephens,
Bureau of Economic Geology, The University of Texas at Austin.

Dr. BENISHEK. Mr. Gooding.

**STATEMENT OF PATRICK J. GOODING, RESEARCH GEOLOGIST/
MANAGER, KENTUCKY GEOLOGICAL SURVEY, UNIVERSITY
OF KENTUCKY, WELL SAMPLE AND CORE LIBRARY**

Mr. GOODING. I am also honored to be here representing the Kentucky Geological Survey at the University of Kentucky.

Geoscience data is the extensive collection of data obtained during research and exploration and includes the following: Fossils—

Dr. BENISHEK. Sir, is your microphone on?

Mr. GOODING [continuing]. And includes fossils, geochemistry data, minerals, well cuttings, coals, to name a few.

Are important geoscience data being destroyed? Yes. Each year millions of feet of coal and well cuttings along with water data, geologic logs, maps, seismic data, mineral, and fossil collections are being discarded all over the country.

Why is examination of geoscience data important? It leads to cleaner, better, and improved environment, discovery of energy sources and minerals, and a better understanding of the geological history.

Field work, data acquisition, and research is costly. It is time-consuming and it is dangerous. Preserving geoscience data at a repository is the solution. State Geological Surveys throughout the country maintain facilities similar to this one with supporting funds from Congress. Geoscience data are examined daily for research and exploration.

Where do our donations come from? From coal companies, mining, quarry, research, state and Federal agencies, to name a few. Samples and cores add great value to industry and research, in education, and in training in all levels.

Geoscience data provides opportunities for research, exploration and development. It is used by graduate students with their thesis and dissertations, on class projects, and lab exercises.

What can be learned from studying this material? A detailed and accurate understanding of the subsurface is possible through the examination and study of geoscience data.

And how does geoscience data impact the economy? It provides solutions to scientific, economic, environment issues and potentially natural disasters. It also facilitates new discoveries, redevelopment of old areas, and allows intelligent planning decisions and a better management of our natural resources.

So what is the benefit and purpose of keeping geoscience data? There is a constant need to go back and reexamine samples and cores as new geological and engineering concepts evolve, as new analytical instruments and techniques are developed, as new progress in technology and computer modeling advances, and as new methods of examination and interpretations evolve.

An established record results in greater success and predictability, less development, and exploration time, readily available data, and geoscience data preservation facilities throughout the country are filled to capacity.

Tremendous geoscience data preservation progress has been accomplished nationwide with support from the National Geological and Geophysical Data Preservation Program Act of 2005, and reauthorization is warranted and justified.

I thank you.

[The prepared statement of Mr. Gooding follows:]

PREPARED STATEMENT OF PATRICK J. GOODING, RESEARCH GEOLOGIST/MANAGER,
KENTUCKY GEOLOGICAL SURVEY, WELL SAMPLE AND CORE LIBRARY ON H.R. 5066

What is geoscience data?

It is the extensive collection of data obtained during research and exploration. It includes fossils, geochemistry data, models, geologic reports, field samples, well cuttings, cores, mineral collections, hydrocarbon samples, tar sands, coals, thin sections, engineering reports, maps and geologic cross sections.

How are geoscience materials used and by whom?

Although many tools are available for exploration, the examination of geoscience data available at state and Federal repositories are used by scientists from the U.S. Government, geological surveys, educators from academia, exploration, development and industry geologists, consultants, operators, students and the general public. The data preserved at these facilities are the best source of materials for research, training, and education and provides solutions to scientific, economic, and environmental issues.

Are important geoscience data being discarded and destroyed?

Yes. Each year, millions of feet of cores and well cuttings along with the water data, geologic records, maps, seismic data, and mineral and fossil collections, are discarded and destroyed all over the United States. The loss of this resource, which costs millions of dollars to obtain, is a tragedy for our Nation.

Why are geoscience data important?

Detailed examination of geoscience data is important in research, development, discoveries, exploration of new hydrocarbon reservoirs and mineral deposits critical to U.S. energy security and independence. Examination of these data provides opportunities leading to new discoveries in energy, environmental issues, and a better understanding of the earth's history and development. An established record results in greater scientific success and predictability. It reduces development and exploration time, and contributes to lower exploration costs, increased efficiency and greater safety. Some data are irreplaceable and would be cost prohibitive to reacquire in the future.

What are the advantages of a repository?

Repositories preserve geoscience data, make the data accessible, and promote the utilization of their collections in education, scientific research, exploration, and development of resources both on and beneath the earth's surface.

Historical data, literature, previously analyzed sample data, geophysical logs, core data, geochemical analysis and samples are generally available at repositories for examination. Many records have been scanned and are accessible in digital format on repositories' Web sites. Utilization of data becomes more efficient when geoscience data pertaining to that state is preserved at a repository located in that state.

How are repositories important for research and development?

Geoscience data are of great value in industry, research, education and training. Cores and well samples are the most important source of information for hydrocarbon and mineral exploration and for stratigraphic and structural investigations. Cores and well samples also are the best source of detailed geologic information about the nature, occurrence, and extent of rocks in the subsurface. Geologists engaged in the exploration for and development of mineral resources must have detailed knowledge about the strata in which the deposits occur, as well as information about associated deposits. Cores and well samples also provide essential information for a better understanding of our groundwater resources and related environmental problems. Knowledge about the rock beneath the earth's surface can only be gained through detailed examination of well cuttings and cores.

How are geoscience data used in education?

Geoscience data provides opportunities for research, exploration, development and scientific reports. Graduate and undergraduate students from universities throughout the country use the materials available at the repositories to generate theses, dissertations, class projects, term papers, lab exercises, reports, research papers, publications and professional presentations. Examination of cores and well samples allows students to expand their knowledge of rocks and geologic processes while conducting research on a wide range of geologic material, thereby providing a greater understanding of the subsurface and the evolution of the earth.

In what disciplines are the data used?

Geoscience data are used for a wide range of interests including: exploration for hydrocarbons, and coal, and in environmental, engineering, mining, construction, and land-use studies. In addition, they are used in stratigraphy, sedimentology, paleontology, geochemistry, structure, earthquake investigations, subsurface mapping, seismic studies, and geologic reconstruction.

How are geoscience data acquired?

Geoscience data are generally donated to Federal and state geological surveys by coal, oil and gas, mining, highway construction, and environmental investigations; construction projects; quarry operators; university research; and Federal and state projects.

What can examination of geoscience data reveal?

A detailed and accurate understanding of the rock beneath the earth's surface can only be gained through exploratory drilling and examination of geoscience data generated during exploration. Detailed examination of well samples and cores is important in understanding petroleum reservoirs, and mineral deposits which lead to more discoveries of hydrocarbons and minerals critical to the Nation's energy security and independence.

Conclusions reached using geoscience data provide information to government and industry that allows intelligent planning decisions concerning assessment and management of valuable natural and strategic resources. Without these data, more time and effort will be consumed in duplicated exploration and development and there would be a greater chance of failure because of increased cost overruns and decreased production. Intelligent planning decisions are made based on reliable data.

How does geoscience preservation affect the economy?

Geoscience preservation leads to new discoveries, redevelopment of mature oil and gas fields and mineral deposits, and infrastructure, resulting in sustained economic growth and more investment in the community and increased tax revenues. It also lowers exploration costs, and increases efficiency and safety. Availability of geoscience data allows more detailed preparation and development, better management of natural resources, and provides solutions to scientific, economic, and environmental problems and potential natural disasters.

Without good and efficient management of our current and future resources and firm knowledge of where future supplies of these resources can be found, economic development cannot be sustained. This fact also begs the question: If our supply of strategic minerals from foreign sources was interrupted for any reason, where would we find a local source of that mineral? Geoscience data and the professional papers generated from research using the subsurface data would be a good place to begin the search.

How much does it cost to initially acquire geoscience data?

The process of field work, data acquisition and research, time consuming and dangerous to attain. It costs millions of dollars to acquire.

How would preservation of geoscience data affect future generations?

Preserving geoscience data would provide readily available data to future generations, giving them opportunities for investigation, development and evaluation which in turn could lead to new innovations and discoveries. Using these preserved data may result in greater success and predictability. Some data are irreplaceable and lack of availability of the necessary tools, equipment and labor to reacquire geoscience data may be cost prohibitive in the future. Preservation of geoscience data will facilitate the training and education of the next generation of geoscientists, and help with appraising water resources, dealing with conservation, and mitigating hazards such as earthquakes and landslides.

What are the advantages of maintaining a database and inventory of geoscience data?

Samples and cores are of great value to industry and research. There is a constant need to re-examine geoscience data available at both Federal and state repositories. These data are an invaluable resource as new geologic and engineering concepts evolve, as new analytical instruments and techniques are developed, as new methods of examination and interpretation emerge, and as advances are made in technology and computer modeling. Our greatest gift is preserving our data and passing our knowledge to the next generations.

How is having geoscience data readily available important to geoscientist?

Readily available geoscience data will lower the costs and increases the efficiency of reworking old reservoirs, reevaluating environmental concerns and predicting natural hazards and using new technology and new extraction enhancement techniques. In addition, they can be used in the quest for a pristine and greener environment, by facilitating clean and efficient energy. It is imperative that the next generation be trained and educated, because knowledge is the key to success. Using

this wealth of data can contribute to continued economic prosperity and energy independence, resulting in greater national security.

Should the National Geological and Geophysical Data Preservation Program Act of 2005 be extended to 2014?

For the most part, both Federal and state repositories are filled to capacity, and have inadequate working space. In addition, many repositories are overwhelmed by the extent of available collections. Most repositories that have received funding from the National Geological and Geophysical Data Preservation Program Act of 2005 are making tremendous progress rescuing collections, and preserving, identifying, inventorying, scanning and photographing their collections while making the data available for inspection at the repository or on their Web sites, and for this to continue, reauthorization of this Act is justified and necessary.

Dr. BENISHEK. Thank you, Mr. Gooding.
Mr. Pagano, you may begin.

**STATEMENT OF THEODORE A. PAGANO, P.G., P.E., GENERAL
MANAGER, MICHIGAN POTASH COMPANY, LLC**

Mr. PAGANO. Again, thank you. My name is Ted Pagano. I am the founder and general manager of Michigan Potash Company. Thank you, Dr. Benishek, for the recommendation to come before Congress to speak on behalf of House Bill 5066.

Dr. Benishek thought about Michigan Potash Company when House Bill 5066 came up because our story is a unique and compelling one that really epitomizes the purpose of H.R. 5066.

So it is a unique one in which we utilized, or Michigan Potash Company utilized, rescued and old geological data to identify a critical strategic resource that actually strengthens the U.S. balance of trade, helps our U.S. farmers and potentially impacts food security.

Food security in geology doesn't tend to usually come to a frame of reference or mind, but potash, potash is actually the world's tightest-controlled commodity and it is responsible for our food growth.

It is produced by only 13 producers in the entire world and it comes from only 13 countries. Amongst all other commodities, it is the tightest controlled.

Go ahead and turn it to the next slide.

This is a graphical example of where U.S. potash production has come since its peak plateau in 1962. So the blue line shows U.S. potash production, and the red line shows U.S. consumption. The green line on the back side shows where U.S. prices have come of recent times.

So since 1962 and at peak rates, potash production has declined by 65 percent. Demand has increased by 195 percent, in large part due to emerging competitive nations, and U.S. potash import reliance has increased by 85 percent.

This is a picture also generated by the U.S. Geological Survey and old historical data, of potash consumption by county. The United States only has three places from where potash comes.

Next to each of those red dots you can actually see when commercial production was established. Most of our potash production comes from New Mexico, from what is called the designated potash reserve.

In 1939, it was identified as a strategic resource important enough to protect. So it is protected yet today by the Department of the Interior.

But it has become significantly depleted over the past 80 years. In fact, one of the potash producers in the designated potash area will cease potash production there at the end of this year. That leaves us with one potash producer domestically.

Now, there is a little red dot there in Michigan in the middle of the Corn Belt that reached commercial production in 1989.

We know very little about this. We knew very little about this until about 3 years ago. This is the Hersey potash facility in Michigan, one of the United States' only sources of potash.

In 2008, this gentleman, Bill Harrison, the founder and director of the Michigan Geological Repository for Research and Education, drove up to Hersey, Michigan, to take back core in his pickup truck, and he came across boxes and boxes, over 12,000 foot of core, which would cost today over \$200 million to replicate. It is one of the finest evaporative collections that we have in the United States.

So he took it under his wing, brought it back to preserve. And I think Dr. Benishek mentioned he is a beneficiary of the prior 2005 Data Preservation Act. Without that, he couldn't operate.

So a few years later we inquired as to the solid core cuttings that he had. And, as it turns out, the youngest commercial deposit of potash reaching production in 1989 is also the world's highest-quality ore, globally speaking, and it resides in the U.S. Corn Belt.

A beneficiary of the Data Preservation Act of 2005 enabled the rediscovery of this critical mineral reserve enough in place in Michigan to double the U.S. output for over a century and a half.

So the control of a product in the hands of very few creates price control around a resource needed by the United States to sustain our farmers and the work that they do to feed our families. The MPC story is one that pays H.R. 5066 forward in a real and impactful way.

Thank you.

[The prepared statement of Mr. Pagano follows:]

PREPARED STATEMENT OF THEODORE A. PAGANO, P.G., P.E., GENERAL MANAGER,
MICHIGAN POTASH COMPANY, LLC ON H.R. 5066

Michigan Potash Company, LLC ("MPC") has been invited to give testimony on H.R. 5066, the "Data Preservation Act of 2014", as a result of its immediate experience with preserved geological data and the Michigan Geological Repository for Research and Education ("MGRRE").

MGRRE was a beneficiary of the National Geological and Geophysical Data Preservation Program Act of 2005, and requires these funds to operate.

MGRRE was founded by William B. Harrison III, in 1982 to preserve and research geological samples and data, for the specific purpose of identifying value, both commercial and educational in Michigan's natural resources. The Repository now archives the largest collection of subsurface geological samples and data in the state. The collection includes Michigan geological publications, geologic and subsurface maps, driller's reports, well scout data, oil and gas well production data, well test data, various types of wireline logs, drill cuttings samples, drill core samples and other miscellaneous well and geological information.

IN 2011, MPC became a direct beneficiary of MGRRE's preservation of geological data that resulted in a critical and substantive geological re-discovery that has the ability to strengthen U.S. agriculture, farmers, food security, and balance of trade.

About Potash:

Potassium is one of the three primary nutrients essential to support carbohydrate production and plant life. Potassium is supplied in natural fertilizers to improve productivity, efficiency, and yields of agribusiness. The major source of potassium is potash (potassium chloride), extracted from sylvinites, a naturally occurring mineral containing both potassium chloride (potash) and sodium chloride (table salt). Since 1965, world consumption of potash grew from 12 million tons, to an approximate 58 million tons today. In 50 years, potash consumption has almost quadrupled. In the last two decades, potash consumption has doubled.

The American farmer, the most efficient in the world, consumes about 6 million tons of potash annually and globally, pays more than any other farmer. Over 83 percent of U.S. potash consumption is imported. Domestic potash supply comes principally from the Designated Potash Area in New Mexico; established in 1939 as a strategic resource, it has been and remains protected by the Secretary of the Interior. Over the past 80 years, the Designated Potash Area has become critically depleted.

In December of 2014, one of the two potash producers based in the United States will cease potash production from the Designated Potash Area, citing depletion and low ore grade.

Potash is the world's tightest controlled commodity. It is utilized throughout the globe, but commercial production occurs in only 13 countries and from 13 companies.

About the Core Recovery:

A small manufacturing plant in the western rural setting of Hersey, Michigan, for extracting and refining potash was opened in the late 1980s by Pittsburg Plate and Glass. Harrison, the founder of MGRRE, said the company extracted subterranean rock cores all over Michigan back in the 1980s and he was aware of their test drilling at the time, but the company never revealed its findings to the public.

IMC Global purchased Pittsburg Plate and Glass' potash producing segment, resulting in the largest potash producer in the world, and at the time most critical to the Hersey's capital growth period, they did not invest the capital Hersey needed to expand, thus it remained "under the radar."

The Hersey plant contacted MGRRE in 2008 stating it no longer wanted to store the Michigan geological core samples it had amassed, and offered to donate them to Western Michigan University.

Harrison accepted on behalf of Western Michigan University, and drove up to Hersey in his pickup truck—only to discover there were 4,000 80-pound core samples—approximating 12,000 feet of drilling. The drilling and replacement cost of this core, would be over \$200 million today. A moving van had to be hired to bring the boxed cores to the Michigan Geological Repository for Research and Education, where they were cataloged and stored.

About the Re-Discovery:

A few years later, following inquiries from MPC, MGRRE and MPC worked collectively to have all of the cores tested by an independent lab in Saskatchewan, provided the province's foremost expertise in potash analysis. The drilling cores from Michigan "turned out to be the highest grade of potash anywhere in the world. It was just remarkable," said Harrison. It is the purest and highest-grade potash being produced globally—600 percent higher than that being produced in New Mexico's vast Permian Basin and twice the grade of deposits found in Canada and Russia. "What blew our minds was that there were layers in there that were essentially 100 percent of this potassium chloride," said Harrison.

The Hersey Potash discovery in 1980, makes it the world's youngest commercial discovery, and a very tightly kept secret.

As it turns out, and later discovered by MPC, Pittsburg Plate and Glass had intended to double U.S. potash output from Hersey, Michigan, effectively migrating the U.S.' domestic reliance from New Mexico to Michigan. They coined it the 'U.S. Potash Project.'

There is enough proven, commercial, potash sitting under Hersey, Michigan to double U.S. output for over 150 years, and that's without drilling any new test wells. MPC has worked quietly over the past 3 years to confirm the reserve could be technically, economically and logistically put into production as it was originally intended by Pittsburg Plate and Glass.

"One of the things that makes this so valuable is that it is an incredibly rich deposit that is in easy reach of the enormous demand from Midwest corn and soybean farmers who operate within a 500-mile radius of this deposit," Harrison says. "This

is an opportunity for new wealth to come from the use of natural resources never tapped before.”

Some financial endeavors transfer wealth from one hand to another by the trading of goods and services. The discovery of a new natural resource, however, and its production, creates brand new Gross Domestic Product, or GDP. At current prices, a simple in the ground value exceeds \$65 billion.

Linda Harrison, William’s spouse and an administrator with MGRRE, said the Michigan potash was obviously known about, as it was “booked as proven and probable” in SEC documents filed by IMC Global when the company stock traded on the New York stock exchange. However, the promising discovery in Michigan was apparently forgotten within IMC Global during its financial trials.

MPC and MGRRE were the first ones to cut open these vacuum-sealed cores from the time they were originally packed.

MGRRE are not hired consultants nor investors, and have no financial involvement with Michigan Potash.

References:

Daly, Pete (2013, September 13). Potash a Gold Mine for Michigan. *The Grand Rapids Business Journal*.

Zipp, Yvonne (2013, September 10). Rediscovery of rare mineral deposit by WMU geologists and private company could boost Michigan economy. *The Kalamazoo Gazette, Mlive*.

Related Materials:



Potash is a natural potassium fertilizer, and the tightest controlled commodity in the world.

- ✎ Potash is an essential plant nutrient and nutritional requirement for animals and humans. It has no known substitutes.
- ✎ Although potash is used worldwide, only 13 countries and only 13 companies produce it.
- ✎ Amongst comparative world commodities, potash is the most tightly controlled.
- ✎ Our farmer's rely on potash to grow our food and they pay more for potash than anybody else in the world.



Potassium, Nitrogen, and Phosphorus, the three major elements required for plant growth.



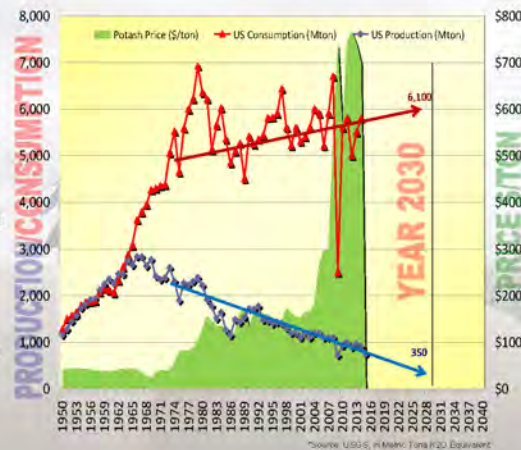
Soybeans with and without the application of Potash.

Source: Graham and Phosphate Institute, 2002.

Slide 2

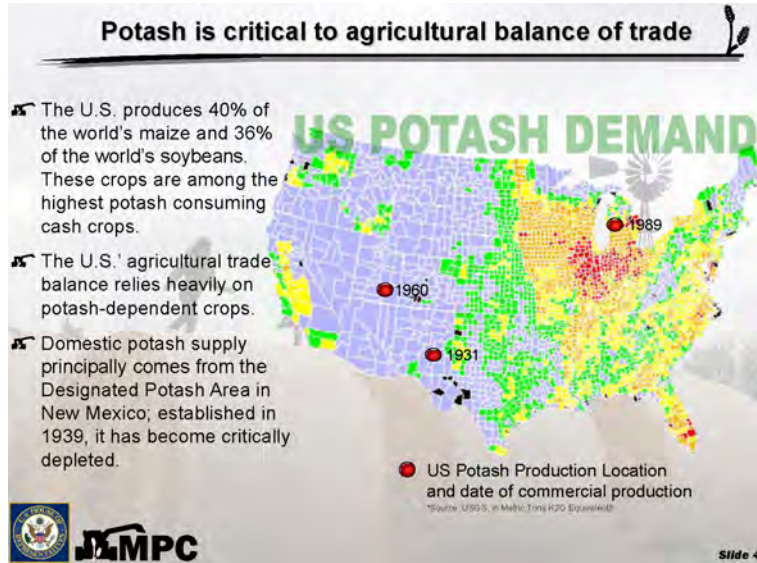
U.S. Potash import reliance increases year over year.

- ✎ U.S. potash production has declined by 65% since 1962.
- ✎ U.S. potash demand has increased by 195% since 1962.
- ✎ U.S. potash price has increased 1000% since 1962.
- ✎ U.S. potash import reliance is 85% annually, and may be as high as 95% by 2030.



*Source: USGS, Mineral Tons P2O Equivalent

Slide 3



In 2008 MGRRE rescued over \$200 Million dollars in core

H.R. 5066 (Representative Benishek)

Potash: Michigan's next billion-dollar industry?

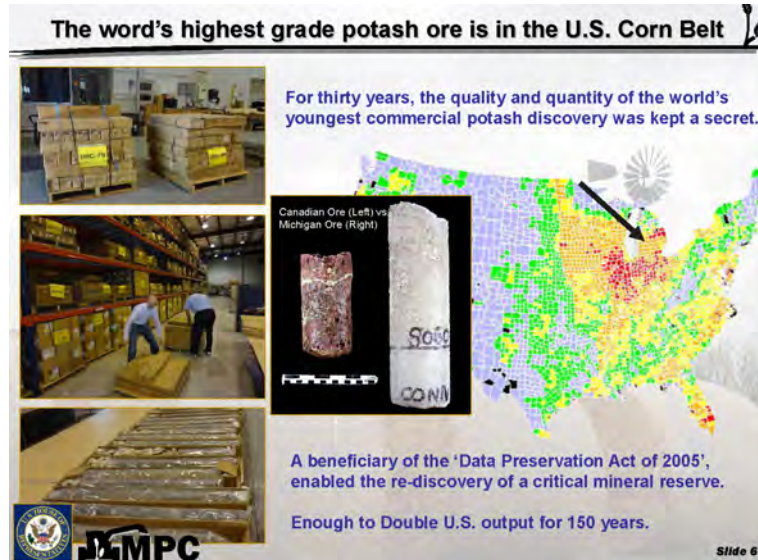
Dr. William B. Harrison III, Professor Emeritus
 Founder and Director
 Michigan Geological Repository for Research and Education
 Western Michigan University Magazine, Summer 2014

A WMU research facility has assisted in the rediscovery of a rich and rare deposit of potash. As a result of rediscovery comes the introduction of a new industry in Michigan worth as much as \$65 billion, geologists say.

With the rediscovery of a very important mineral in central and west Michigan counties, Michigan has been able to find a new, rich source of potash. This is a critical agricultural tool in current times.

A valuable resource
 The discovery was made by using the power of geologic data that is housed at Western Michigan University's Geological Repository for Research and Education.

September 17th 2014



Dr. BENISHEK. Thank you, Mr. Pagano.
Mr. Phelps.

**STATEMENT OF WALTER PHELPS, COUNCIL DELEGATE,
NAVAJO NATION**

Mr. PHELPS. Thank you.

Good afternoon, Congressman Benishek, Chairman Lamborn, Ranking Member Holt, members of the Subcommittee on Energy and Mineral Resources. My name is Walter Phelps, and I am a Nation Council Delegate and Chairman of the Navajo-Hopi Land Commission of the Navajo Nation Council.

It is an honor to come before you to discuss the Navajo Nation's support for House Resolution 5176. This legislation would help to resolve a 4-decade-old Federal obligation to the Navajo Nation that was authorized in the Navajo-Hopi Land Settlement Act of 1974.

The Act settled the disputed boundaries between the Navajo Nation and the Hopi tribe and resulted in the forced relocation of over 10,000 Navajo citizens from what is now Hopi land. In return for the lost acreage, the Navajo Nation was permitted to select unencumbered Federal lands for the conveyance and to trust for the Navajo Nation.

In the early 1980s, Navajo Nation selected parcels of land known as Paragon Ranch in northern New Mexico. The Secretary of the Interior has conveyed some of these parcels. Unfortunately, a number of the parcels selected within the Paragon Ranch are encumbered by the preference right lease applications held by private entities. These parcels cannot be taken into trust for the Navajo until the PRLAs are resolved.

A further complication evolved after the selection of these parcels when the Federal Government initiated the Fossil Forest and the

Wilderness Study Area, effectively blocking the development of these selected lands.

The BLM initiative is designed to protect these areas and surrounding lands with historical and archeological assets. There is therefore no legal process for deselection and reselection of lands that would solve these problems.

Given the limited availability of BLM lands within the mandated 18-mile boundary area, there is little opportunity to easily fix this issue.

This legislation should establish that the naturally existing boundary of the reservation includes the Navajo trust lands that incorporate the satellite communities. The Navajo Nation supports this legislation with the ability to deselect and reselect land of equal value at the Nation's discretion.

Representative Ben Ray Luján and Representative Cynthia Lummis introduced House Resolution 5176 to provide the statutory authorization to resolve these issues by providing a mechanism to retire these remaining PRLAs. We appreciate their efforts and hope that this committee will act on the legislation before the end of this Congress.

Passage of this legislation would resolve one aspect of the harsh effects experienced by the Navajo people due to the 1974 Navajo-Hopi Settlement Act. Further, it fulfills a promise made by the Federal Government to the Navajo people 40 years ago.

Thank you.

Dr. BENISHEK. Thank you, Mr. Phelps.

[The prepared statement of Mr. Phelps follows:]

PREPARED STATEMENT OF WALTER PHELPS, NAVAJO NATION COUNCIL DELEGATE ON
H.R. 5176

Good afternoon Chairman Lamborn, Ranking Member Holt and members of the Subcommittee on Energy and Mineral Resources. I am Walter Phelps, Navajo Nation Council Delegate, and Chairman of the Navajo-Hopi Land Commission. I am here to discuss the Navajo Nation's support for H.R. 5176. This important legislation brings to a close a four decade-old Federal statutory obligation to the Navajo Nation that was authorized in the Navajo Hopi Settlement Act of 1974.

I would like to thank Congressman Ben Ray Luján and Congresswoman Cynthia Lummis and their staff for introducing this legislation. I would also like to take this opportunity to thank some of the members of the subcommittee who have been strong supporters of the Navajo Nation: Congressmen Bishop, Gosar (our former Representative), Mullin, Grijalva, and Hanabusa. The Navajo Nation recognizes and appreciates your tireless efforts working on behalf of the Navajo Nation and all Native Nations.

The Navajo-Hopi Settlement Act settled the disputed boundaries between the Navajo Nation and Hopi Tribe. The settlement led to the relocation of Navajo citizens from what is now Hopi land, and the loss of acreage from the Navajo Reservation. In return for the lost acreage, the Navajo Nation was permitted to select comparable acreage on Federal lands to be taken into trust for the Navajo Nation. In the 1974 Act, Congress committed to provide the Navajo unencumbered lands that the Nation would select from Federal lands managed by the BLM.

In the early 1980s, the Navajo Nation selected the parcels of Federal land. The secretary of the Interior has since taken most of those parcels into trust for the Navajo Nation. Unfortunately, a number of the parcels selected by the Navajo Nation were encumbered by prior mineral rights (PRLAs) held by private entities. These parcels are unable to be taken into trust for the Navajo until the private mineral rights are removed. The status of these parcels of land with valid private mineral rights, and stipulated commercial quantities of coal, remains unresolved.

Further complicating a resolution to this matter is that subsequent to the Settlement Act, the Federal Government also provided two major areas with protections against development: the Fossil Forest and the Ah-Shi-Sle-Pah Wilderness

Study Area on which these PRLAs existed and on which the Navajo had selected parcels to be taken into trust. It is the BLM's goal to protect areas closely surrounding the Park that are replete with historical and archeological assets. Unfortunately, the current law does not provide a mechanism for deselecting any of the parcels and reselecting others. Further, given the limited availability of BLM lands within the mandated 18-mile boundary limitation there is little opportunity to easily fix this issue. Allowing for deselection and reselection, and establishing that the boundary of the reservation lies within the naturally existing boundaries of Navajo trust land would alleviate these issues and allow the Navajo Nation to address the BLM's concerns.

An important mechanism to un-encumber lands is the exchange of existing PRLAs for competitive coal leasing bidding rights, essentially "trading in" the old PRLAs for credits that can be used to meet future obligations under the Federal coal leasing program. However, as potential administrative PRLA exchange discussions moved forward, the Interior Department's solicitor discovered that Interior did not have the authority to pay the resultant state share of credits. This would significantly disadvantage states in the application of any bidding credits.

Representatives Ben Ray Lujan and Cynthia Lummis introduced H.R. 5176 to provide that statutory authorization to resolve of all of these issues, most importantly the Federal obligation to the Navajo Nation, by providing a mechanism to retire these remaining PRLAs. The legislation:

1. Authorizes the Secretary to negotiate a value for these minerals currently held by private interests;
2. Authorizes the exchange of the mineral rights for a credit in the amount of the negotiated value to the private interest, to be applied in other Federal leasing activities, and;
3. Authorizes the Secretary to make "state share" payments to any relevant state in which the bidding credits are applied.

It is important to note that while the selection of the lands in question result from the terms of the Navajo-Hopi Land Settlement Act, this is solely a Navajo/Arch/New Mexico issue. The lands selected by the Hopi Tribe for conveyance were solely within the state of Arizona, and the rights therein have already been transferred; it is only the Navajo Nation that has yet to finalize its land selection and transfer. Completion of this exchange does not require that the Hopi agree to the terms contained within the legislation.

Passage of this legislation would bring to a close one element of the long painful experiences that the Navajo people have experienced due to the 1974 Navajo Hopi Land Settlement Act. Further it fulfills a promise made by the Federal Government to the Navajo Nation 40 years ago.

Thank you.

Dr. BENISHEK. And, finally, Mr. Nedd.

**STATEMENT OF THE HON. MICHAEL NEDD, ASSISTANT
DIRECTOR, ENERGY, MINERALS & REALTY MANAGEMENT,
BUREAU OF LAND MANAGEMENT, U.S. DEPARTMENT OF THE
INTERIOR**

Mr. NEDD. Mr. Chairman, Ranking Member, and members of the subcommittee, thank you for the opportunity to present the views of the Department of the Interior on these two bills. I will briefly summarize our views and ask that the entire statement be included in the record.

I am accompanied today by Mr. Kevin Gallagher, Associate Director for the U.S. Geological Survey of Core Science Systems. Mr. Gallagher is here to answer questions relating to H.R. 5066.

H.R. 5066, the Data Preservation Act of 2014, reauthorizes the National Geological and Geophysical Data Preservation Program through 2019. Through this partnership with the State Geological Survey, the Department plays a leading role in the Federal collec-

tion, management and preservation of geological and geophysical data.

Since 2007, the program, which is administered by the U.S. Geological Survey, has provided 44 states with almost \$4.6 million, which, when matched by the states, amount to over \$9 million invested in the rescue and preservation of geoscience collection.

The Department supports H.R. 5066, the Data Preservation Act of 2014, in order to provide continued funding for the states and Federal partnership, ensuring the rescue and continued preservation of geological and geophysical samples and data.

H.R. 5176 would authorize the Secretary of the Interior to retire certain coal leases in exchange for coal bidding rights elsewhere on Federal lands.

The Department appreciates the work of the cosponsors and supports the goal of seeking resolution to long-standing, unresolved mineral development issues. We would like to continue discussions with the sponsors and the subcommittee on how best to achieve the intent of this bill while minimizing the cost to taxpayers and ensuring continued protection of important environmental and cultural resources.

Prior to 1976, the Secretary was authorized by the Mineral Leasing Act to issue permits to prospect for coal on public land in areas where no known coal deposit existed. And if commercial quantities of coal were demonstrated, permittees could file a preference right lease application, or a PRLA, to develop the coal.

In 1976, this authority was repealed and the BLM began working to process existing valid PRLAs. Currently, only 11 PRLAs remain, and they are in northern New Mexico just outside Chaco Cultural Natural Historical Park. This area has significant environmental, cultural, and other important resources, including Wilderness Study Area and areas of critical environmental concern.

The BLM has worked with the holder of the PRLAs on a settlement agreement which would exchange 11 PRLAs for an equal value in Federal bidding credits elsewhere.

H.R. 5176 provides the authority to ensure that all aspects of the exchange could be completed. The Department notes that the land currently encumbered by the PRLAs have been selected by the Navajo Nation under the Navajo-Hopi Land Settlement Act. The Navajo Nation has sought to deselect these lands and select others, but is unable to complete the action without further legislation.

In order to ensure that the environmental, cultural, and other important resources in this area are fully protected, the Department encourages Congress to include the authority for the Navajo Nation to deselect lands in this legislation. Should that occur, the BLM would welcome the opportunity to manage these lands to protect the significant and important values.

We look forward to continuing to work with the sponsors to achieve the goals of H.R. 5176. Thank you for the opportunity to present our testimony. I am happy to answer any questions you may have.

Dr. BENISHEK. Thank you, Mr. Nedd.

[The prepared statement of Mr. Nedd follows:]

PREPARED STATEMENT OF MICHAEL NEDD, ASSISTANT DIRECTOR FOR ENERGY,
MINERALS & REALTY MANAGEMENT, BUREAU OF LAND MANAGEMENT, DEPARTMENT
OF THE INTERIOR ON H.R. 5176

Thank you for the opportunity to present the views of the Department of the Interior (Department) on H.R. 5176, which would authorize the Secretary of the Interior (Secretary) to retire a certain type of Federal coal lease rights—"preference right lease applications" or PRLAs—in exchange for coal bidding rights elsewhere on Federal lands. The Department appreciates the work of the co-sponsors and supports the goal of seeking resolution to long-standing unresolved mineral development issues. We would like to continue discussions with the sponsors and the subcommittee on how best to achieve the intent of this bill while minimizing the cost to taxpayers and ensuring continued protection of environmental and cultural resources.

BACKGROUND

Prior to 1976, the Secretary was authorized by the Mineral Leasing Act (MLA) to issue permits to prospect for coal on public lands in areas where no known coal deposits existed. If coal was discovered, the prospector could file a preference right lease application (PRLA). If commercial quantities of coal were demonstrated, the prospector was entitled to a "preference right lease,"—a noncompetitive, exclusive right to mine coal on these public lands for an initial 20-year term. The Federal Coal Leasing Amendments Act of 1976 repealed the Secretary's authority to issue prospecting permits and terminated the preference right leasing program, subject to valid existing rights. However, prospecting permittees who have filed a PRLA prior to 1976 continue to be recognized as having valid existing rights that require adjudication by the BLM. In 1987, the BLM promulgated regulations exclusively for processing these pre-1976 PRLAs.

To date, all PRLAs have been processed, except for 11 held by the Ark Land Company (Ark Land), covering approximately 21,000 acres in northern New Mexico. These PRLAs are within 3 miles of Chaco Culture National Historic Park and in the Ah-Shi-Sle-Pah Wilderness Study Area (WSA), Fossil Forest Research Natural Area, and North Road and Ah-Shi-Sle-Pah Road Areas of Critical Environmental Concern (ACECs). These areas have cultural archaeological, paleontological, primitive recreational, and environmental significance, and are not an ideal site for commercial development of the coal. In the interest of protecting the important cultural and environmental resources in the area, in 2012, after extensive investigation, litigation and negotiation, the BLM New Mexico State Office and Ark Land signed a settlement agreement that would seek to exchange the 11 PRLAs for an equal value in Federal bidding credits for Federal coal within the borders of the state of Wyoming. While this exchange can currently be completed through existing regulations (43 CFR Subpart 3435), further authority is necessary to meet a condition of the settlement agreement that requires taxpayers pay the share of sums that would have otherwise been paid from bonus bid receipts to the state of Wyoming or any other party under the bid-sharing formula.

In addition, as part of the Navajo-Hopi Land Settlement Act (P.L. 93-531), the Navajo Nation selected approximately 12,000 acres of lands which overlap the PRLAs and are currently included in protected areas such as the Ah-Shi-Sle-Pah WSA and the North Road and the Ah-Shi-Sle-Pah Road ACECs. These selections have not yet been completed due to the encumbrance of the PRLAs. The Navajo Nation has sought to "deselect" these lands and select others, but is unable to complete the action without further legislation. In the absence of new legislative authority, the sensitive lands currently under discussion would continue to be available for development.

H.R. 5176

H.R. 5176 would authorize the Secretary of the Interior to retire coal PRLAs by issuing bidding rights in exchange for relinquishment of the PRLAs. The bill would define a "bidding right" as an appropriate legal instrument that may be used in lieu of a monetary payment for a bonus bid in a coal sale under the MLA, or as monetary credit against a rental or royalty payment due under a Federal coal lease. Thus, a bidding right could be used in lieu of cash for part or all of a winning bonus bid in a subsequent coal lease sale, or for rental or royalty owed under a Federal coal lease. H.R. 5176 further provides for payment of 50 percent of the amount of the bidding right used to the state in which the newly issued coal lease—or in which the lease under which a royalty payment is made—is located. The payments to the state would be made from revenues received under the MLA that otherwise would

be deposited to miscellaneous receipts. Under H.R. 5176, bidding rights would be fully transferable to any other person and the bidding rights holder would have to notify the Secretary of the transfer. The bidding rights would terminate after 5 years, unless the rights could not be exercised within the 5-year period under certain conditions outlined in the bill.

The Department supports the goal of H.R. 5176 to provide legislative authority for a solution to the long-standing coal PRLA issue in northern New Mexico. However, the Administration is concerned about the likely costs of this legislation as drafted. Based on the terms of the legislation, and in the context of the Ark Land settlement agreement, it appears these costs would likely fall between \$53 million and \$240 million, which provides challenges for identifying suitable offsets. If enacted, the BLM, consistent with 43 CFR Subpart 3435, using standard appraisal practices and in coordination with the Department's Office of Valuation Services, will determine on the fair market value of the resources.

In addition, the Department notes that if the bill is enacted as currently written and the PRLAs are relinquished, the Navajo Nation would hold the 12,000 selected acres in fee, and would have the authority to develop the resources—including coal—as the tribe sees fit. The Navajo Nation has indicated that it is interested in deselecting these lands and selecting other lands to fulfill its entitlement. If legislation is to be enacted to resolve the status of PRLAs in this area, the Department would like to ensure that the resolution also provides for permanent protection of these resources from future impacts.

In order to ensure that the cultural and environmental resources in this area are fully protected, the Department encourages the Congress to work with the Navajo Nation to effectuate the deselection of these lands as part of this legislation. Should this deselection occur, the land would revert to the BLM. If that occurs, the BLM would welcome the opportunity to manage these valuable lands to protect their resource values in a manner consistent with the Ah-Shi-Sle-Pah WSA, and the North Road and the Ah-Shi-Sle-Pah Road ACECs.

CONCLUSION

Thank you for this opportunity to present testimony on H.R. 5176. The Department thanks the sponsors for their dedication to this issue. We look forward to continuing to work with the sponsors to achieve these goals.

Dr. BENISHEK. Thank you all for your statements.

We will begin the questioning now. Members are limited to 5 minutes for their questions, but we may have an additional round as needed.

I recognize myself for 5 minutes for my questions. And members of the committee may have additional questions for the record, and I will ask you to respond to those in writing.

Mr. Pagano, thanks for taking time out of your schedule to be here today to tell us a little bit more about your company. I am interested in how this Michigan Potash Company came into being. So I have a couple questions.

How did you find these cores? I mean, can you kind of lead me to the path of how did you form Michigan Potash and then find the core? Tell me about how this all started.

Mr. PAGANO. When we began this project, the core wasn't fully cataloged yet at MGRRE, and we had gone down the road to very quietly secure an asset that once was secured by Pittsburg Plate and Glass, a potash producer at the time, in 1980.

Following resecuring that asset, then it came to our attention that the core was fully cataloged now at MGRRE and quickly shortcut our path toward realizing the impact of the potash deposits in Michigan. So we are a relatively young company.

Dr. BENISHEK. Where did you find the cores? Where were they at when you came into the picture?

Mr. PAGANO. Well, the cores were underneath Bill's house. So they were already at MGRRE. So the geological work that we had done began prior to us becoming aware of the availability of the core.

Dr. BENISHEK. So it must have been kind of exciting to realize that you had discovered \$65 billion worth of potash there.

How did you feel when that happened? Did you check your numbers?

Mr. PAGANO. You know, potash is an industrial mineral. When it does occur, it occurs en masse. And so initially, I had been speaking to the prior geologist that was familiar with this core when it was extracted. And he had told me that, when you see it, you will be astounded, and I didn't really believe him.

When we stepped into MGRRE, I quite frankly didn't believe it when we did pull it out. I was astounded.

And Bill Harrison, he picked up a core and he says, "Ted, I can look at this and it looks like it is about 60 percent potash."

And I said, "Bill, it is not. That doesn't exist."

And he said, "It looks to me like it is 60 percent KCL, maybe 70 percent."

I said, "No. I doubt it."

We sent it off to the Saskatchewan Research Council, verified that it was, in fact, some of the highest grade, cleanest potash that exists in the world.

Dr. BENISHEK. I have a question for some of the other folks there.

How could this program be improved? I mean, it seems to me this is pretty valuable data. It is really expensive to collect, and I think it provides valuable information that would benefit our society for centuries.

So maybe each of you could just give me what you think is the most important thing that we should try to improve with the program.

Mr. Arthur.

Mr. ARTHUR. Thank you, Congressman. Can you hear me all right?

Dr. BENISHEK. Yes.

Mr. ARTHUR. OK. Well, the program, which has been going on since 2007 with regard to funding, all of the infrastructure is set up.

The U.S. Geological Survey has done a great job administering the program, building the national geological data catalog into which all of this information will flow, facilitated inventory of all of the geoscience data collections in the states that participated. It would be good to see all states in the country participate.

But, furthermore, all of the groundwork is laid. The two gaps are the fact that there are a lot of facilities that are hitting a wall, literally, with regard to their collections and they need to expand.

Florida, for example, is addressing this and we are buying maybe another 10 or 15 years of core storage, but that doesn't address the paper records and the digitizing and georeferencing of all of this other information.

So the bottom line is to just simply continue the work and increase the funding. And that, to me, would be the primary take-home message is the appropriation.

Dr. BENISHEK. Mr. Gooding, do you have an opinion other than the funding?

Mr. GOODING. Yes, I have been in charge of the facility in Kentucky for the last 37 years, and during that time, I have traveled to 35 facilities, both private, Federal and state, from Canada all the way to Texas, looking at their facilities. And if there is one thing each repository in the country has in common, it is that they are out of space. They are completely out of space.

In Kentucky, we are stacking pallets three, four, six high in rows. So when someone needs to see the collection in a particular row, maybe 20 pallets have to be pulled out just to access one well.

So with the funding that the states have been getting from the Geological Survey and from this program over the last few years, it went to do rescue collections or repair or to identify collections. But the states now need more funding to do expansion, you know, whether it is Alaska or Florida—

Dr. BENISHEK. Right.

Mr. GOODING [continuing]. All over the country. I was in Austin at the Survey there, and they are pretty much out of room, too.

Dr. BENISHEK. All right. Thank you.

And I am over my time.

But I would like to recognize my colleague from Wyoming, Mrs. Lummis.

Mrs. LUMMIS. And I would like to compliment the Chairman on your absolutely beautiful voice, especially when you hook it up to a microphone. You should be in radio, not in Congress.

You know, Mr. Nedd, I have to tell you, I have been here long enough to know that, when the Administration comes in with a statement that says we would like to continue to work with the sponsors, that that is code, and that is code for, "We don't like this bill, but we don't want to say it in public."

It is a little bit like me being a parent and, when my daughter would ask me for something, I would say, "We will see." And it didn't take her long to figure out that "We will see" meant I am just trying to put this off, I don't want to talk about it right now, but I am probably not too keen on this idea.

What is the hang-up here?

Mr. NEDD. Congresswoman, certainly, as I said in my statement, we want to work with the committee to ensure we understand how the funding will be made for this. And the BLM worked for this settlement and, as you know, the BLM was involved—or the Department was involved in the drafting service.

So again, we believe the bill is heading in the right step and we want to achieve the goal, but we just feel there are a few things that need to be discussed with the sponsors and the committee.

Mrs. LUMMIS. OK. So that means—well, I will tell you how the funding works, because I am trying to be a good guy here.

This bill doesn't have anything to do with Wyoming. This has to do with trying to help out the Navajo and trying to get Ark Land Company's property rights monetized.

It will also help prevent a claim for a property rights taking. And that could be very expensive for the Department because, if Ark Land Company chooses to sue on a takings claim, the amount that they can quantify might even exceed the negotiated value of the bidding credits under the settlement.

Now, you will recall, that is where I come in. These bidding credits are coming out of my state. So when you say the money is coming from Federal land elsewhere, it is coming from—I am the “elsewhere.” It is from Wyoming.

So my role here is just to try to be a good guy and help the Navajo and the Ark Land Company settle this matter and get on with this agreement.

Now, let me ask you, Mr. Phelps, do you think this settlement agreement is an equitable solution for the Federal Government, Ark Land, the Navajo, and the states impacted?

Mr. PHELPS. Thank you for your question.

The position of the Navajo Nation basically goes back to the Settlement Act of 1974, where the Federal Government committed to provide unencumbered lands and lands that were taken. So—

Mrs. LUMMIS. I appreciate that, and I get that, and I am sorry to interrupt you. I was kind of hoping that you could just say “yes” or “no.”

Can you say “yes” or “no”? Do you think this is an equitable deal?

Mr. PHELPS. Well, the value question, basically, is of equal value.

Mrs. LUMMIS. Thank you. Perfect.

Mr. PHELPS. This must be of equal value.

Mrs. LUMMIS. Like that. OK.

Mr. Nedd, do you disagree with that?

Mr. NEDD. Congresswoman, again, we entered into a settlement, and under the settlement term we worked with Arch Coal to put forward some framework on how we can value the coal.

So, again, we believe the goals are right of this bill. And, again, the Administration just wants to make certain it works with the sponsor to minimize the impact on taxpayers.

Mrs. LUMMIS. OK. I am one of the sponsors. The other sponsor is not here.

Mr. NEDD. So we—

Mrs. LUMMIS. So let’s talk. Here we are.

Mr. NEDD. We would love to work with you, Congresswoman, and we certainly can do it here or we can come back and visit with you. But we would love to discuss with the sponsors how to do that and the committee.

Mrs. LUMMIS. Well, you know what? Time is kind of a’wasting. You know, we are down to the wire here. So my time is expired. But, man, I would just like to get this done.

Dr. BENISHEK. I would like to maybe try to finish it off. I agree with Mrs. Lummis.

What is it you want?

I can give you more time, Mrs. Lummis.

Mr. NEDD. As we said, the Administration would certainly like to work with the committee to figure out how to minimize—

Dr. BENISHEK. Well, she’s asking what exactly, what are you asking for?

Mr. NEDD. Well, Congressman, there is a range that has come up between \$53 million and \$240 million. And so the Administration would like to work through the committee to figure out how to minimize the cost to the taxpayer—\$53 million to \$240 million is a wide variety—and then to figure out how to minimize the taxpayers' impact. And I think that is the accent here.

The second accent is to really ensure Congress work with the Navajo Nation so they can have a way to deselect the lands. Those are the two major accents of the bill, or the Administration is asking.

Mrs. LUMMIS. How does delaying this bill moving forward advance that conclusion? Would you like to have the bill written so it uses a specific number?

Mr. NEDD. Again, Congresswoman, I believe it is going to take some discussion. But certainly \$53 million always sound better than \$240 million.

Second thing. Would like to ensure there is some way the bill takes into account how to allow the Navajo to deselect the land so, therefore, the Interior would be able to manage these lands for its important environmental and cultural resources.

So, again, I believe those are the major parts.

Mrs. LUMMIS. Fair enough, Mr. Nedd. You answered my question. And I am happy to work with you. And I appreciate getting down to the specifics here. So thanks.

Mr. Chairman, I yield back. And thank you for giving me the opportunity to explore it right here.

Dr. BENISHEK. Might as well try to finish it off a little bit. Yes.

Mrs. LUMMIS. OK. Thank you very much.

Dr. BENISHEK. Well, one final order of business.

I ask unanimous consent to enter into the record a submission in support of H.R. 5066 from the Michigan Geological Survey, the Michigan Geological Repository for Research and Education.

And hearing no objection, so ordered.

If there is no other business, without objection, the committee is adjourned.

[Whereupon, at 2:59 p.m., the subcommittee was adjourned.]

[ADDITIONAL MATERIALS SUBMITTED FOR THE RECORD]

PREPARED STATEMENT OF KEVIN GALLAGHER, U.S. GEOLOGICAL SURVEY,
U.S. DEPARTMENT OF THE INTERIOR ON H.R. 5066

Thank you, Mr. Chairman, for inviting the Department of the Interior to provide its views on H.R. 5066, the Data Preservation Act of 2014, to reauthorize the National Geological and Geophysical Data Preservation Program through 2019.

The Energy Policy Act of 2005 established the National Geological and Geophysical Data Preservation Program (NGGDPP) and outlined the following goals:

- Archive geological, geophysical, and engineering data, maps, well logs, and samples;
- Provide a national catalog of archived materials; and
- Provide technical and financial assistance to state geological surveys and relevant Department of the Interior bureaus for archived materials.

Through this partnership with the state geological surveys, the Department of the Interior plays a leading role in the Federal collection, management and preservation of geological and geophysical data.

Since 2007 the NGGDPP, administered by the U.S. Geological Survey, has provided 44 states with almost \$4.6M which, when matched by the states, amounts to over \$9M invested in the rescue and preservation of geoscience collections. These preserved data have been used in discoveries that have brought significant benefit to local and state economies. In addition, over 2.6M geoscience data records have been entered into the National Digital Catalog, an Internet-accessible library describing the geologic collections located in Federal and state repositories.

There are numerous examples of Federal and state partnerships that we have funded via this program, and we would like to highlight three of those.

- In 2009, the Michigan Geological Survey received Program funds to prepare accurate inventories of rescued core from western Michigan. A search of this inventory by a potash company scientist revealed a large deposit of high grade potassium chloride, a critical ingredient in fertilizer. In September 2013, this deposit was estimated to be worth \$65M, and if mined, would create an estimated 300 jobs.
- Most of the characterization work for tar sand deposits in western Kentucky took place in the early 1900s, with a second brief round of interest after the 1974 Arab oil embargo. Using funds from this program, the Kentucky Geological Survey was able to preserve these historical tar sand cores that had been slated for disposal. Inspection of samples in these cores by exploration geologists led to the initiation of a \$5M exploration program that culminated in a proven deposit in Kentucky.
- Last, preservation of geological and geophysical data and samples has proven invaluable in the continued research on the Bakken shale from the Williston Basin in North Dakota and Montana. The USGS Core Research Center in Denver houses core samples from this region. Over the last 10 years, these well-preserved cores have been accessed providing many private, academic and Federal research scientists with information key in the discovery and advancement of the existing and potential energy resources in the Williston Basin.

The Department of the Interior supports H.R. 5066, the Data Preservation Act of 2014, in order to provide continued funding for state and Federal partnerships ensuring the rescue and continued preservation of geological and geophysical samples and data. We thank Representative Benishek for introducing this legislation.

Preserving endangered geoscience collections is significantly more cost effective than recollecting these samples and data. Properly housing, inventorying and curating these collections, as we have identified for you today, provides an invaluable resource that underpins a wide variety of research, which can lead to important discoveries, new jobs and a stronger economy.

Mr. Chairman, again, we thank you for this opportunity. We will be pleased to respond to any questions you may have.

**SUBMISSION FOR THE RECORD IN SUPPORT OF H.R. 5066 FROM THE MICHIGAN
GEOLOGICAL SURVEY, THE MICHIGAN GEOLOGICAL REPOSITORY FOR RESEARCH AND
EDUCATION**

OUR FOCUS	CONTACT US	MICHIGAN GEOLOGICAL REPOSITORY FOR RESEARCH AND EDUCATION
<p>The Michigan Geological Repository for Research and Education (MGRRE) focuses on:</p> <ul style="list-style-type: none"> • Acquiring and preserving the rock samples and data that hold the keys to Michigan's geologic history and natural resources • Using these vast collections to inspire and educate the next generation of geoscientists and to conduct fundamental and applied geological research • Conducting outreach programs for K-12 teachers and students, as well as for industry and government professionals <p>Our work with Michigan resources results in cost-effective technologies; many of which are transferable nationally and internationally.</p> <p>Founded by Dr. William B. Harrison in 1982, the Repository is now the primary resource for subsurface geological samples and data for the State of Michigan.</p>  	<p>Dr. William B. Harrison III MGRRE Curator and Director of Michigan Basin Core Research Laboratory at MGRRE (269) 387-8691</p> <p>Dr. David A. Barnes Professor (269) 387-8617</p> <p>Dr. Peter J. Voise Instructor and K-12 Outreach Director (269) 387-8696</p> <p>Jennifer L. Tison Geologist (269) 387-8633</p> <p>Linda K. Harrison Administrator (269) 387-8642</p> <p>MGRRE 5222 W. Michigan Avenue Kalamazoo, MI 49006</p> <p>Mailing address: Department of Geosciences 1184 Rood Hall Western Michigan University Kalamazoo, MI 49008-5241 FAX: (269) 387-8513 Phone: (269) 387-8633 http://mgs.geology.wmich.edu/MGRRE</p>  <p>http://mgs.geology.wmich.edu/</p>	 <p>MGRRE A Resource Center for the MICHIGAN GEOLOGICAL SURVEY Department of Geosciences Western Michigan University</p>

OUR GEOLOGICAL RESOURCES	CURRENT APPLIED RESEARCH	EDUCATIONAL ACTIVITIES
<p>MGRRE now archives the most comprehensive collection of geological samples and data in Michigan, including more than 500,000 linear feet of rock cores, cuttings samples from about 25,000 wells, and associated well records showing the properties of subsurface rocks. These samples and records were acquired from companies exploring for minerals, oil and gas, and water resources. They were also obtained from our research projects.</p> <p>We are acquiring even more geological samples, expanding our on-line digital datasets and applying state-of-the-art information technologies to them. By combining GIS and interrelational database technologies, we are providing cost-effective solutions for data integration, dissemination, resource mapping, visualization, and modeling.</p> 	<ul style="list-style-type: none"> • Developing and demonstrating technologies that result in safe underground storage of CO₂ produced by industry, to lessen the adverse impact of this greenhouse gas on global climate • Creating new approaches to maximize the recovery of domestic hydrocarbon reserves that will reduce our dependency on foreign oil • Documenting and evaluating Michigan's subsurface geothermal energy potential to provide alternative usable power solutions • Identifying and quantifying characteristics of Michigan's groundwater reservoirs in our primary glacial and bedrock aquifers to protect and manage these irreplaceable resources 	<ul style="list-style-type: none"> • Training a professional workforce for technical careers in energy and environmental industries • Targeting cutting-edge technologies that increase students' retention and prospects for career success • Providing displays and materials about Michigan's geology, environmental concerns, subsurface natural energy and groundwater resources • Developing an awareness of the connections between environmental protection and sustainable economic growth and development among students, industry professionals and the general public 

Michigan Geological Survey - Michigan Geological Repository for Research and Education (MGRRE) – September 17, 2014 Testimony documentation. H.R. 5066
Relevant press announcements supporting the NGGDPP, the data preservation program.

March 15, 2014 at 6:00 AM, updated March 18, 2014 at 10:15 PM

WMU partners with energy company to inject carbon dioxide underground, flush out leftover oil

Chuck Miller | MLive.com

By Yvonne Zipp | yzipp@mlive.com on March 15, 2014 at 6:00 AM, updated March 18, 2014 at 10:15 PM

KALAMAZOO, MI — It sounds like a science project designed by Al Gore: Take excess carbon dioxide, liquidize it and inject it into abandoned oil fields, filling the porous rocks beneath with the CO₂ and — not so incidentally — flushing out the oil that remains.

A Michigan company has used the technique to retrieve 1.6 million barrels of oil that, its owner says, would not otherwise have been produced.

Core Energy, based in Traverse City, says it is the only company east of the Mississippi River doing this kind of Enhanced Oil Recovery (EOR) — with the help of Western Michigan University's Michigan Geological Repository for Research and Education. Around the U.S., about 80 projects reportedly produce 230,000 barrels of oil per day using this technique.

"The potential in Michigan is tens of millions of barrels," said Bob Mannes, president and CEO of Core Energy LLC, and a third-generation Michigan oilman.

"It's a win-win. It's absolutely the right thing to do," Mannes said. "It's the ultimate recycling project because we utilize existing well bores wherever possible."

That said, the company does often drill additional wells, he said. The carbon dioxide Core Energy uses comes from natural gas production from the Antrim Shale in northern Michigan.

A study done by Clean Wisconsin found that crude oil produced from CO₂ EOR creates 40 percent less carbon dioxide than conventional crude oil.

There are potentially 800 Michigan oil fields where the technique could be used, William Harrison, professor emeritus of geosciences and director of MGRRE, said. So far, Core Energy has used EOR on seven.

"We think the potential is phenomenal," Harrison said on a recent tour of the repository, which is essentially a library or archives for rocks. It houses 500,000 feet of core samples, as well as an additional 20,000 samples. The facility is also home to the former University of Michigan collections and the Michigan Geological Survey, which was transferred to WMU in 2011, making the MGRRE the primary geological resource in the state.

"That's additional oil that never would have been recovered otherwise," Harrison said.

WMU's research suggests that 180 to 200 million barrels of "stranded" oil in old fields in the state could be recovered through this technology, Harrison said.

MGRRE originally teamed up in 2005 with Core Energy and Battelle Memorial Institute, an Ohio-based company, in a public-private partnership to study geologic carbon sequestration. The effort, known as the Midwest Regional Carbon Sequestration Partnership, collects data and samples of Michigan's geological formations relevant to CO₂ storage, containment and potential for enhanced oil recovery.

The regional partnership is one of seven established by the U.S. Department of Energy's National Energy Technology Laboratory to study carbon sequestration as an option for mitigating climate change.

In 2009, they received more than \$600,000 in federal funding secured with the assistance of U.S. Rep. Fred Upton, R-St. Joseph.

Suggesting that energy companies should pay to store carbon dioxide underground hasn't proved terribly popular with the industry, Harrison said.

The big question: Why should we spend hundreds of millions of dollars to get rid of carbon dioxide?

"The cost was phenomenal," said Harrison. "We needed to find some way for it to pay for itself."

Enter the enhanced oil recovery effort.

In a process known as "piggy-backing," after a company such as Core Energy made a profit from the oil, another organization — such as the state or federal government or a nonprofit — potentially could then use the drill and other infrastructure already installed as a carbon dioxide dispersal well, Harrison explained.

"To me, this is an enormously logical and ecologically driven approach," Harrison said.

Mannes said that no federal money has gone toward Core Energy's exploratory efforts. The company also uses 3-D seismic technology in its exploration, which it says allows it to be more accurate when drilling, leading to fewer negative environmental effects.

The partnership with MGRRE has been a tremendous help, he said, calling Harrison's more than three decades of work collecting samples from all over the state "invaluable."

"They're a valuable resource. Their contributions to the state of Michigan go beyond the regional partnership," Mannes said. "Michigan is very fortunate to have that facility in the state."

"We're always looking for ways of further understanding of Michigan geology and MGRRE is the tool to do that in the state of Michigan," he said. "The usefulness of that organization goes far beyond the oil and gas industry."

Yvonne Zipp is a staff writer at the Kalamazoo Gazette. Email her at yzipp@mlive.com or follow her on Twitter.

Lt. Gov. Brian Calley signs law offering incentives for enhanced oil recovery at Western Michigan University

By [Yvonne Zipp](#) | yzipp@mlive.com on April 01, 2014 at 2:48 PM, updated April 01, 2014 at 4:12 PM

KALAMAZOO, MI — With half a million linear feet of core samples as a backdrop, Michigan Lt. Gov. Brian Calley signed a package of bills into law Tuesday that provides incentives for an oil recovery method that retrieves more oil and natural gas from existing wells while sequestering carbon dioxide deep underground.

Western Michigan University's Michigan Geological Repository for Research and Education, where Public Act 82 was signed, **is part of a regional partnership set up by the federal government** to study carbon capture and sequestration. Since 2011, it also has been home to the Michigan Geological Survey.

"I must say, you have a really cool rock collection going," Calley told WMU President Jolin Dunn before the signing.

"It's an honor to be back on campus," Calley said. The signing "recognizes the strength of the partnership state has with WMU. This is an outstanding place for us to take a step forward help both entrepreneurs and the government to make intelligent, scientific, fact-based policy decisions."

Saying that MGRRE had "played a critical role in the legislation being signed today," Dunn called the repository "an amazing resource for Michigan's citizens."

Under a bill sponsored by state Rep. Aric Nesbitt, R-Lawton, enhanced oil recovery projects will be taxed at a 4 percent severance rate, rather than 6.6 percent for oil and 5 percent for natural gas. The oil and gas severance tax generates about \$60 million for the general fund each year.

The process is more expensive than traditional methods, but is considered the most cost-efficient method of carbon capture and sequestration, Calley said.

With enhanced oil recovery, liquidized carbon dioxide is injected more than 2,000 feet underground, often in existing oil and natural gas well-bores, allowing companies to retrieve about 20 percent more of the

"stranded" oil left behind by conventional drilling. The carbon dioxide remains behind, sequestered underground.

"In the case of CO₂, there is the added benefit that CO₂ that would otherwise be emitted into the atmosphere is being sequestered in geologic formations that have proved capable of storing it for 300 million years," said John Wilson, one of the founders of Core Energy, of Traverse City, at Tuesday's signing.

In an interview with the Kalamazoo Gazette last month, Core Energy said that, since 1997, it has used the process on seven old oil fields in Michigan to retrieve 1.6 million barrels of oil that otherwise would not have been retrieved. Wilson estimated that an additional 200 million barrels in the state potentially could be captured using the process – about 30 times Michigan's annual output. At today's prices, he said, the potential value of the oil is \$20 billion.

"Michigan is committed to the wise use of its natural resources," Calley said. "Providing incentives to fully develop old, traditional oil fields benefits consumers and our economy. Protecting our environment while fueling our economy is a win for everyone."

On Tuesday, Calley also signed three additional bills that promote the use of enhanced oil recovery. HB 5254, sponsored by state Rep. Rick Outman, R-Six Lakes; HB 5255, sponsored by state Rep. Thomas Stallworth III, D-Detroit; and HB 5274, sponsored by state Rep. Peter Pettalia, provide for the exercise of eminent domain when laying pipelines to transport carbon dioxide.

After the signing, Nesbitt pointed to the fact that his bill passed the state House 85 to 25 as an example of its bipartisan support and thanked Stallworth for his work on the issue. Nesbitt said he believed the incentives were necessary, since the process is more expensive than conventional drilling.

"I believe this is a valuable first step," he said, calling it a "win-win-win" for jobs, domestic energy output and the environment. "This will help put Michigan on the map."

The law does not apply to the controversial practice of hydraulic fracturing, commonly known as fracking.

However, after the laws' passage, environmentalists and Democrats questioned the need to offer more incentives to oil companies. They said any environmental benefits from carbon sequestration should be weighed against new pipeline construction, well conversions, additional air pollution and costs and environmental impacts of increased transport of oil.

"Giving more tax breaks to big oil companies just shows that this administration is out of touch, and has the wrong priorities for Michigan," said Mark Schauer, the Democratic candidate for governor, in a statement. "At a time when dozens of Michigan school districts are in deficit because of Snyder's education cuts, the last thing we should be doing is giving more handouts to big oil companies. Instead, we should be investing in clean, renewable energy sources to reduce our dependence on foreign oil and create good Michigan jobs."

The Sierra Club's Michigan Chapter and Clean Water Action also expressed dismay about the law's signing.

"Our elected officials should not be reducing state revenue and giving tax breaks to companies who put our Great Lakes, rivers, and streams at risk," said Nic Clack, Michigan director of Clean Water Action. "We should be moving Michigan away from our dependence on corporate oil to clean energy, not pandering to oil and gas companies."

And the Sierra Club specifically took issue with the extension of eminent domain.

"This law poses an alarming new threat for all Michigan residents who are facing aggressive oil, gas and related pipeline construction in their communities. The Sierra Club strongly opposes the expansion of eminent domain authority to private oil and gas companies at the expense of the rights of private property owners and the public," said Anne Woiwode, director of the Sierra Club Michigan Chapter, in a statement. "Giving oil and gas companies more ability to take lands for the transportation of fossil fuels and carbon dioxide pipeline development is the wrong decision for Michigan, for clean water, and for property owners."

For his part, Nesbitt pointed to a 2008 National Resources Defense Council paper that found that "to date, no significant documented environmental impacts from CO₂ injections, such as groundwater sources, have been reported."

The report went on to note that, "as with any other oil-extraction process, responsible operations are essential and sound regulations can help minimize any surface or subsurface risks."

Geologists' mission in Kalamazoo and Northern Michigan is still a bit below the surface

By Yvonne Zipp | yzip@mlive.com

Published: Friday, October 01, 2010, 6:51 PM | Updated: Friday, October 01, 2010, 6:59 PM

Courtesy Photo William B. Harrison III, at right, talks Wednesday to geologists from industry and government who attended a shale workshop presented at the Eastern Section of the American Association of Petroleum Geologists. In the wooden framing are shale samples.

KALAMAZOO — Rocks, gas and geology are not necessarily exciting stuff. But the importance of work being done with them in Michigan appears to be rising to the surface.

Attention has been focused on Michigan and its potential for greater natural gas and oil production since a major discovery of shale was announced last spring in the northern Lower Peninsula. It led to unprecedented participation by exploration companies in the state's spring 2010 auction of oil and gas leases on state-owned lands.

The May 4 auction for the rights to explore on state-owned land in 22 northern Michigan counties netted the state \$178 million, explains William B. Harrison III, emeritus professor of geosciences at Western Michigan University. That rivals some \$190 million the state has raised cumulatively in such auctions over the last 80 years, he said.

Money from the auction goes into a trust (the Natural Resources Trust Fund) that is used for recreational areas, she said.

"It means that companies that have never come to Michigan looking to explore for natural resources are going to look to Michigan," said Harrison, who co-chaired the annual meeting of the Eastern Section of the American Association of Petroleum Geologists, held this past Saturday through Wednesday at the Radisson Plaza Hotel & Suites in downtown Kalamazoo.

The meeting attracted 510 petroleum geologists, researchers, educators and business people, with the geologists, from 22 states and three Canadian provinces, attended any of 72 technical talks, three workshops and three field trips to learn about Michigan rocks, new technology and how to do their work in environmentally sensitive and respectful ways, said Linda K. Harrison, manager of the Michigan Geological Repository for Research and Education at Western Michigan University.

"They hoped to find out how to explore in Michigan and other basins (and) how to produce gas from shale formations and hydrocarbon-bearing (oil and gas rich) limestones," said Linda Harrison, who is also William Harrison's wife. Her organization, the MGRRE, is a repository of the greatest amount of subsurface rocks and data in the state. A part of WMU's Department of Geosciences, it is at 5272 W. Michigan Ave. in the university's College of Arts and Sciences.

"We do applied research in a number of fields," Linda Harrison said. That includes CO₂ sequestration.

Carbon-dioxide is among the primary gases blamed for causing global warming, via the greenhouse effect.

The result of explorations that are to be done in northern Michigan on what is being called the Collingwood Shale, could mean lots of new jobs, involving the explorations, the drilling and related endeavors, the Harrisons said.

"It could be a huge economic boost for the state," she said.

The Collingwood Shale is a rock formation that is 3,000 to 10,000 feet below the surface of the northern third of Michigan's Lower Peninsula, William Harrison said. Shale has tiny pockets that may be filled with gas.

"This could be one of the few bright spots in the Michigan economy," Linda Harrison said.

The American Association of Petroleum Geologists meeting here was hosted by the Michigan Basin Society of Geologists, WMU's Department of Geosciences, and the MGRRE.

Discussion among geologists at the meeting included the theory that Michigan may have huge, untapped reservoirs of natural gas.

Co-chairing the meeting with William Harrison was Robb Gillespie, WMU assistant professor of geosciences.

The theme of the gathering, "Perseverance — the Pipeline to Prosperity," called attention to challenges petroleum geologists face in "exploring for, developing and responsibly utilizing energy resources in the mature basins of the eastern United States and eastern Canada," according to information provided by the MGRRE.

Petroleum geologists are the people involved in the science of finding and unearthing useful oil and gas products, an industry that has been in great focus since the disaster in the Gulf of Mexico and the Enbridge oil spill into the Kalamazoo River.

WMU partners with energy company to inject carbon dioxide underground, flush out leftover oil



Director of Michigan Geological Repository Bill Harrison points out different well locations on a map throughout Michigan inside the warehouse at the repository Friday. Harrison and WMU are the lead researchers in a project to capture carbon dioxide and store it underground.

Lt. Gov. Brian Calley signs law offering incentives for enhanced oil recovery at Western Michigan University



Geologists' mission in Kalamazoo and Northern Michigan is still a bit below the surface

