H.R. 2685; H.R. 3883; AND H.R. ____, "COMMUNITY RECLAMATION PARTNERSHIPS ACT"

LEGISLATIVE HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES

OF THE

COMMITTEE ON NATURAL RESOURCES
U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED EIGHTEENTH CONGRESS

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LEGISLATIVE HEARING ON H.R. 2685, TO REQUIRE THE SECRETARY OF ENERGY TO PROVIDE TECHNOLOGY GRANTS TO STRENGTHEN DOMESTIC MINING EDUCATION, AND FOR OTHER PURPOSES, "MINING SCHOOLS ACT OF 2023"; H.R. 3883, TO NULLIFY PUBLIC LAND ORDER NO. 7921, WITHDRAWING CERTAIN LAND IN THE RAILROAD VALLEY OF NYE COUNTY, NEVADA, FROM MINERAL ENTRY; AND H.R. ____, TO AMEND THE SURFACE MINING CONTROL AND RECLAMATION ACT OF 1977 TO AUTHORIZE PARTNERSHIPS BETWEEN STATES AND NONGOVERNMENTAL ENTITIES FOR THE PURPOSE OF RECLAIMING AND RESTORING LAND AND WATER RESOURCES ADVERSELY AFFECTED BY COAL MINING ACTIVITIES BEFORE AUGUST 3, 1977, AND FOR OTHER PURPOSES, "COMMUNITY RECLAMATION PARTNERSHIPS ACT"

Wednesday, June 14, 2023
U.S. House of Representatives
Subcommittee on Energy and Mineral Resources
Committee on Natural Resources
Washington, DC

The Subcommittee met, pursuant to notice, at 1:34 p.m., in Room 1334, Longworth House Office Building, Hon. Pete Stauber [Chairman of the Subcommittee] presiding.

Present: Representatives Stauber, Gosar, Rosendale; Ocasio-Cortez, Kamlager-Dove, Magaziner, and Dingell.

Also present: Representatives Amodei, LaHood, and Owens.

Mr. STAUBER. The Subcommittee on Energy and Mineral Resources will come to order.

Without objection, the Chair is authorized to declare a recess of the Subcommittee at any time.

Under Committee Rule 4(f), any oral opening statements at hearings are limited to the Chairman and the Ranking Minority Member.

I ask unanimous consent that the gentleman from Nevada, Mr. Amodei; the gentleman from Illinois, Mr. LaHood; and the

gentleman from Utah, Mr. Owens, be allowed to participate in today's hearing.

I now recognize myself for an opening statement.

STATEMENT OF THE HON. PETE STAUBER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MINNESOTA

Mr. STAUBER. Today, the Subcommittee on Energy and Mineral Resources will discuss three pieces of legislation related to different aspects of the mining sector in the United States.

First, we have the Mining Schools Act of 2023, sponsored by Representative Owens. This bipartisan bill would create a grant program for U.S. mining schools to support educational programs in mining and related fields.

There is a serious need to strengthen our mining workforce, as retirements in this country are currently outpacing the graduation rate. According to the *Wall Street Journal* article published just last week, "the mining workforce has shrunk by 39 percent since 1990." This severe labor shortage will drive up prices for dozens of mineral commodities needed for defense, consumer electronics, and virtually all other high-tech devices.

During the past academic year, there were only 600 students enrolled in accredited undergraduate and graduate mining programs in the United States. During that same time, China had over 1.4 million students enrolled. If we don't take swift action to reverse this trend, there will be no way for American-made mineral supply chains to meaningfully compete on our world stage. This bill is an important step in getting us back to where we need to be.

We will consider a discussion draft of the Community Reclamation Partnerships Act, sponsored by Representative LaHood. This common-sense bill would allow third-party organizations to help clean up coal mines that were abandoned before modern environmental regulations. The bill would grant these groups protection from liability, so they can assist in the cleanup of acid mine drainage without fear of frivolous lawsuits.

The Community Reclamation Partnerships Act has been moved through this Committee for the last three Congresses, and passed the House in the 115th. This hearing is on a discussion draft to allow ongoing conversations between both sides of the aisle. I hope to continue to work on a bipartisan basis on this important legislation.

Finally, we have Representative Amodei's H.R. 3883, which nullifies an administrative withdrawal imposed by the Biden administration in Nye County, Nevada. This decision removed nearly 23,000 acres from mineral development, affecting hundreds of existing mine claims, as well as current oil and gas production in the area.

The area in question is rich in multiple mineral commodities needed for this Administration's renewable energy goals, including lithium, magnesium, and boron. We will hear from a lithium operator today about how this withdrawal severely handicaps development in this high-potential area.

Further, this withdrawal was developed without sufficiently considering potential impacts on local communities. In fact, when

Nye County asked to be a cooperating agency in the NEPA review process, they were flat-out denied.

I know very well the frustrations and concerns of those affected by unilateral mineral withdrawals, as this same Administration took over 225,000 acres of copper, nickel, cobalt, and platinum-rich lands off the table in my home state of Minnesota. We must fully understand the impacts of these decisions, and I look forward to the discussions today.

I want to thank the witnesses for taking the time to be here, including our Member panel, in order to discuss these important pieces of mining legislation.

Because the Ranking Member is not here yet, we are going to recognize Mr. Amodei first, and then we are going to go to Mr. Rosendale.

Mr. Amodei.

STATEMENT OF THE HON. MARK E. AMODEI, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEVADA

Mr. AMODEI. Thank you, Mr. Chairman and to the folks on the minority staff for your graciousness in allowing me to present today.

H.R. 3883 is not about somebody should have said yes or anything else like that. It is about hypocrisy. It is about repudiating the NEPA process. We are here with this piece of legislation because when a Federal agency says, "We want to withdraw not a little bit, but a lot of land," then there is a process, and it is NEPA. And I know, for the people that are here it is like, oh my God, somebody who is a Republican is saying NEPA is a good thing. It is like NEPA is a good thing, because it provides due process and transparency in decisions we make about resources and land use.

This NEPA process never got a chance to work out. Why? Because when this application was put in, there were people like the local planning and zoning authorities for Nye County, where Railroad Valley is located, who said, "We would like to be a cooperating agency." Everybody here knows cooperating agency doesn't allow you to dictate the terms of whether something is approved or denied, but it allows you an official seat at the table.

Answer from NASA to Nye County: "No."

So, my office intervened and said, "Hey, NASA, come on, it is the county where it is located. They ought to be able to have a say."

"No."

So, we convened another meeting with the BLM State Director, the agency to whom NASA applied to, and the District Director where Railroad Valley is located, and said, "Hey, come on, NASA, it is OK. They can't veto your project, but this allows everybody a chance to talk about it."

"No."

So, I said, "OK, NASA, as the Member whose district it is in, and a Member of the Delegation whose state it is in, and as a member of the Appropriations Committee, which has a little say about your budget, make me a cooperating agency."

And I will tell you what, those folks with the right stuff, they are absolutely the rock of consistency. "Amodei, no."

Oh, and it wasn't just Amodei. It is not Republicans and Democrats. We had people from both sides of the aisle, Nevada Delegation, the whole Senate Delegation, all of them, write a letter and say, "Hey, please, please make Nye County a cooperating agency for NEPA purposes."

The rock of consistency comes through again. "Thank you for your input, Nevada Delegation, Republicans, Democrats, both Houses of the Congress. No."

So, we basically, and listen, if they would have said yes to Nye County's request to be a cooperating agency in the NEPA process, we would have declared victory and moved on. But now that they have told the whole State Delegation, "We don't want your input, we don't want you to be a cooperating agency, and we don't want the local planning and authority to be a cooperating agency, we just want to go ahead and have our stuff evaluated and let the Secretary of the Interior decide," then we find out, what is so special here?

So, I asked him, I say, "I want a field demonstration. How are you tracking satellites in Railroad Valley?" Fair enough. They sent somebody from DC out, and from the Jet Propulsion Lab over the hill in Pasadena, California, Palo Alto, or wherever it is. We meet out in Railroad Valley, which is a place that doesn't have a lot of people in it, and the footprint of their operation is about the size of this room. Fine.

But it is like, so how is this going to hurt you? "This valley's playa, which the Valley is much bigger, this valley's playa is so unique, reflectively, that we need that to track satellites."

Like, OK, and by the way, we had the BLM State Director and the District Director out there at the meeting, and said, "OK, these folks that want to try to," oh, by the way, here is the other part, lithium, kind of an important mineral if you are talking about no carbon, Green New Deal, all those sorts of things, "What if we can submit a plan where we extract this?"

Because as you will hear from the 3PL people when they testify, hey, we are looking for something that is 1,000 feet down in a brine, which means liquid. You don't need to build an open pit for it. You don't need to do old technology, which means flooding hundreds of acres and letting water evaporate, and then you mine the salts or whatever. It is like we want to go down 1,000 feet, we want to get that liquid to the surface, and take it, and do their extraction process.

So, minimal disturbance to the surface for NASA's purposes, i.e. bottom line, NASA, if they can prove, through a NEPA process when they submit their plan of operation that we are not going to affect the surface of that playa at all, no harm, no foul.

Oh, and by the way, if they can't prove that, then the NEPA process ought to tell them no, rightfully so.

So, have that meeting. Hey, we think that they ought to at least—make no mistake, Mr. Chairman, Madam Ranking Member, this is about access to NEPA to mine lithium, which is something that this Administration has said, hey, if this technology allows us to do less carbon and get away from other things and battery technology, so we are like, give them a chance. Give them a chance.

But by granting this land order, they don't even get to try that, unless they go through a minerals exam. I don't need to tell this Committee there is like five examiners in the country right now. Not exactly a snappy thing.

So, we are sitting here going, we have some folks who granting this landowner effectively says you can't try to go through NEPA and prove that your plan is one that does nothing to alter the surface in any way, shape, or form.

Did I mention there are 14 oil wells in the playa? Not that they are big production, Middle East-type stuff, but it is like you can do multiple use. And if these folks' proposal, if we ever got to see it, says it doesn't alter, it doesn't affect NASA's mission whatsoever, why not? Nope. Request granted. Therefore, you don't even get a try. But it is subject to valid and existing claims, so you can go through a minerals exam.

And if you win that, too—the point is, at a time when we are trying to access important rare earths and clean energy materials, if it is possible to do it in a responsible way, why wouldn't you give them a chance? And if NEPA says no, then fine.

So, the risk to NASA, by not granting this, we submit, was zero. But you know what? We will never get to know. I mean, who knows when they will be done with the minerals examination process at DOI.

So, that is why we have this bill. That is why we brought it to say this is about, hey, can they have a chance to try to go through the recognized, transparent due process of NEPA?

So, I thank you for your consideration. We are happy today or any time after that to follow up in terms of if you have questions.

And with that, Mr. Chairman, thank you for your graciousness. I will stand for questions.

[The prepared statement of Mr. Amodei follows:]

PREPARED STATEMENT OF THE HON. MARK AMODEI, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEVADA

ON H.R. 3883, TO NULLIFY PUBLIC LAND ORDER NO. 7921, WITHDRAWING CERTAIN LAND IN THE RAILROAD VALLEY OF NYE COUNTY, NEVADA, FROM MINERAL ENTRY

Background:

On April 27, 2023, the Department of the Interior approved the withdrawal of 22,684.07 acres within Railroad Valley Public Land Order No. 7921 (88 Fed. Reg. 25682), taking effect that same day. I subsequently introduced H.R. 3883—"To nullify Public Land Order No. 7921, withdrawing certain land in the Railroad Valley of Nye County, Nevada, from mineral entry" on June 7, 2023.

Initiation of Issue:

In December 2021, Rick Spees (representing Nye County) reached out regarding a proposal NASA had made to withdraw approx. 22,684 acres of BLM land in the Railroad Valley of Nye County for 20 years.

As the lead agency in the NEPA process, NASA included BLM as a cooperating agency. However, they continuously refused to include Nye County as a cooperating agency.

Rick Spees and Nye County had a follow up meeting with NASA in January 2022. Rick said that it was unproductive and NSAS still is not willing to really engage with the County. Instead of including the County as a cooperating agency, NASA gave them "early stakeholder" status.

Correspondence with NASA:

4/29/2021—NASA applied for a mineral withdrawal of approximately 22,995 acres in Railroad Valley, Nevada, located in Nye County.

7/20/2021—Nye County requested to be included as a cooperating agency in the subsequent National Environmental Policy Act (NEPA) process, which NASA subsequently denied.

1/7/2022—Representatives Mark Amodei, Steven Horsford, and Senators Cortez Masto and Rosen sent a letter to NASA reiterating Nye County's request to be a cooperating agency, which was once again denied.

The first call with NASA regarding the issue was on **1/21/2022**, where I asked Dr. Karen St. Germain (NASA Earth Science Division Director) to reconsider NASA's decision to exclude Nye County as a Cooperating Agency.

I had a follow up call with Dr. St. Germaine on **2/3/2022**, where she doubled down that Nye County would not be given Cooperating Agency status, and therefore asked that our office instead be made a cooperating agency. This request was followed up with a letter we sent on 3/17/2022, which NASA ultimately declined on **5/18/2022**.

I sent a follow up letter expressing my disappointment to NASA Administrator Bill Nelson on **5/19/2022**.

I also sent a public comment letter to NASA on **7/21/2022**, reiterating our concerns and requesting it be included in the official record for the withdrawal's EA.

4/4/2023—I sent final letter to Secretary Haaland expressing concerns with the proposed withdrawal.

4/27/2023—DOI approved the withdrawal of 22,684.07 acres within Railroad Valley Public Land Order No. 7921 (88 Fed. Reg. 25682), taking effect that same day.

3PL Involvement:

3PL Operating is an Oklahoma-based corporation, held privately, and formed in 2017. The company specifically explores and develops locatable minerals, and lithium is a primary target.

Their earth mineral scientists dominate the workforce and collectively have 200 years of prior work experience with major companies.

In 2017, 3PL filed for the largest mining claim block yet assembled in the State of Nevada, in Railroad Valley. This acquisition followed several years of research in the western USA studying basin development, stratigraphy, and lithium concentration processes.

3PL has 1,796 claims, partially within the land segregated by the BLM for withdrawal pursuant to the NASA's request.

3PL has drilled one well on its claims but there are 38 existing oil wells on 3PL claims that have public information regarding lithology and geology that have be used to help define geologic properties of the area. 3PL used this data for its inferred resource report.

Lithium and Other Mineral Potential in Railroad Valley:

According to 3PL, the best mineral description of Railroad Valley is essentially that of a "bathtub" for the Great Basin, which is why this unique super-brine was deposited with its mineral-rich complex in a concentrated area.

While there are others that are claiming to have found significant amounts of lithium and other materials in the US, and in particular Nevada, the mineralology of this project is unparalleled due to its unique geological history.

Comparable to deposits in South America and China, this is one of the world's largest reserves of lithium, and a strategic mineral critical for electric vehicle and battery storage development in the United States.

3PL's geologic team has conservatively estimated that over 25 million tons of lithium carbonate equivalent (LCE) are recoverable in the brines and salts.

This lithium resource is significantly larger than other identified projects in North America that are mostly in clays and hard rock.

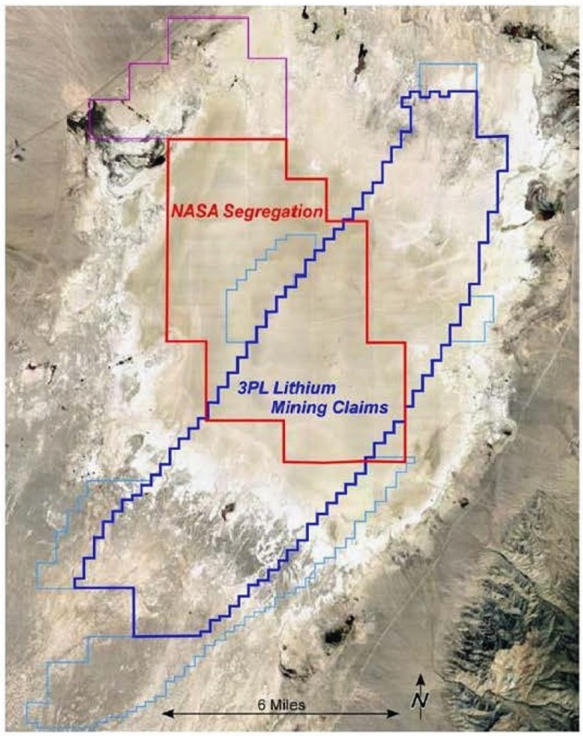
There is also a presence of Rare Earth Elements (Neodymium, Praseodymium, Gadolinium) found in concentrations that far exceed what is normally found in the earth's depositional structure:

- These minerals are all very rare and 99% imported from China and other unstable and risky sources.

China's near monopoly control over global rare earth elements (REEs) supply and reserves has created a huge vulnerability for the US.

- US reliance on REE and critical mineral imports has made it a priority for US federal agencies to take actions to secure and strengthen the domestic

supply chain—Executive Orders 13817, 13953 and 14017, as well as the recently passed Inflation Reduction Act.



Mr. STAUBER. Yes, thank you, Mr. Amodei, and it is a very similar blueprint that happened in northeastern Minnesota, the biggest copper nickel find in the world. There were 223,000 acres taken off without even an EIS. So, very similar decisions coming out of this Administration.

I now want to welcome the Ranking Member, Representative Ocasio-Cortez, who will give us her opening statement.

STATEMENT OF THE HON. ALEXANDRIA OCASIO-CORTEZ, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK

Ms. OCASIO-CORTEZ. Thank you so much, Chairman. Today, we are discussing three bills relating to mining and mine reclamation.

First, the Community Reclamation Partnerships Act would make it easier for community groups to clean up or reclaim abandoned coal mines that leach toxic pollution into the environment and threaten public health. This bill would allow Good Samaritans to use their own funds and do what they can to help clean up abandoned mines without having to take full legal responsibility for the toxic mess created by mining companies.

I do believe this is a positive step toward addressing coal mining's harmful legacy that will build on funds appropriated through the Infrastructure Investments and Jobs Act to clean up and reclaim abandoned mine lands. That said, there are some aspects to this legislation that I would like to note.

The legislation does include waivers to clean water standards that are potentially troubling. Specifically, these waivers for community reclaimers could potentially be misused by mining companies with poor practices, certain mining companies with poor practices posing as community reclaimers who are really only hoping to profit off of remining old mine waste without complying with the law.

I do hope to work with my colleagues across the aisle to make sure we potentially address any potential loopholes around reclamation. But that said, this is a positive step toward addressing coal mining's harmful legacy.

Second, H.R. 2685, the Mining Schools Act of 2023, creates a new grant program for mining schools to train students across the country with the growing focus on minerals needed for the energy transition.

I agree that the workforce must be qualified and empowered to create a safer, more sustainable industry. For this, I would like to see a greater emphasis on studying reclamation, recycling, and mitigating community and environmental impacts. As I mentioned, we must be taking a whole-of-supply-chain approach to how we manage our mineral resources in this country in order to reduce harms.

I would also like to see labor provisions such as eligibility for union-associated training programs and greater workforce protections so that we don't end up with a new black lung epidemic.

The last bill on the agenda, H.R. 3883, would nullify a mineral withdrawal in Railroad Valley, Nevada. Earlier this year, the Bureau of Land Management and NASA finalized a mineral withdrawal in Nye County to protect land essential to NASA's operations. This land is unique. It is the only location in the United States that NASA and many other satellite operators can use to calibrate their satellites. If the surface of this land were disturbed, all the satellite imaging that public and private users rely on for important science and decision-making would become essentially out of focus. It would make our satellites like a nearsighted person trying to drive with no glasses and a shattered windshield: not something we want to trust for our critical data.

NASA and BLM followed the NEPA process to conduct this mineral withdrawal by collecting public input and considering other land uses. We know there are lithium claims in and around this withdrawal area, and it is still possible for a company to develop these resources. But as with any withdrawal, valid existing rights must be honored, communities must be consulted, and a mining proposal on this land should demonstrate that it would not interfere with NASA's use.

This site is also essential to USGS, NOAA, and private companies like Planet Labs, which provides commercially available satellite data. I ask for unanimous consent to enter their public comments supporting the withdrawal into the record.

Fundamentally, I look forward to working with all of my colleagues to ensure a safer, more sustainable mining industry, with meaningful protections for our communities, the environment, and our most special places. We need meaningful tribal consultation, and a whole-of-supply-chain, whole-of-government approach to reducing consumption and boosting mineral reuse and recycling, as well. We need thorough reclamation to ensure communities aren't left with the environmental or economic burden of mine waste or pollution.

I am happy to work across the aisle to address these challenges together, where possible. I look forward to hearing from today's witnesses and continuing these crucial discussions.

And before I yield back, as I am sure my colleagues are aware, we have a very unexpected and tight timeline on our hearing today. And to that end, I ask all of my colleagues on the Committee to submit their questions to the record as necessary to ensure we collect as much information as needed to evaluate these legislative proposals.

Thank you, and I yield back.

Mr. STAUBER. Thank you very much. Now we are going to recognize Mr. Burgess Owens from the 4th District of Utah for 5 minutes.

STATEMENT OF THE HON. BURGESS OWENS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF UTAH

Mr. OWENS. Chairman Stauber and Ranking Member Ocasio-Cortez, thank you for allowing me to come to your Subcommittee hearing to briefly talk about my bipartisan bill, H.R. 2685, the Mining Schools Act of 2023.

Dr. Copan, thank you for offering to speak on behalf of this important legislation.

At a time when a strong mining workforce is needed more than ever, our mining workforce is dwindling. Many of America's miners are retiring, and there aren't enough students to make up for these losses, making finding qualified mining engineers and geologists a great challenge.

Unfortunately, in 2018 and 2019, graduation rates for university and college mining and geological programs dropped by over 21 percent, signaling a big loss of and a risk to our domestic supply chain, economic and national security, and the future of American mining.

Right now, there are roughly 600 students currently enrolled in mining programs across 11 colleges and universities, including the University of Utah School of Mining and Engineering in my home state. Compare this to China's 1.4 million students in similar programs. We can't compete on a global scale if we don't strengthen these programs. That is why I introduced the Mining Schools Act to create a grant program to recruit students and carry out important programs dedicated to production of minerals.

It would also establish a Mining Professional Development Advisory Board to evaluate the applications and recommend recipients. This is crucial to building our economy and re-establishing a domestic energy independence.

My home district is the home of Kennecott Copper Mines, the largest excavation open mine, copper mine in the world. At the end of the day, we would be working to secure America's energy security and national security. Mining is a major priority for my district and many communities nationwide, and I will continue fighting to ensure this important bill becomes law.

Thank you again for allowing me to speak on this very important topic, and I appreciate your support.

[The prepared statement of Mr. Owens follows:]

PREPARED STATEMENT OF THE HON. BURGESS OWENS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF UTAH

ON H.R. 2685, "MINING SCHOOLS ACT OF 2023"

Chairmen Stauber, Ranking Member Ocasio-Cortez, thank you for allowing me to come to your Subcommittee hearing today to briefly talk about my bipartisan bill, H.R. 2685, the Mining Schools Act of 2023.

Dr. Copan, thank you for offering to speak on behalf of this important legislation.

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My district is home to Kennecott Copper Mine, the largest excavation and open-pit copper mine in the world.

At the end of the day, we should be working to secure America's energy security and national security.

Mining is a major priority for my district and many communities nationwide, and I'll continue fighting to ensure this important bill becomes law.

Thank you, again, for allowing me to speak during this important hearing, and I appreciate your support.

Mr. STAUBER. Thank you, Mr. Owens. And the 14 mine schools that are left, I just really appreciate you with your forward-thinking on recruiting the best and the brightest to come into the field.

The Subcommittee will now move into our second panel of witnesses to speak on the legislation before us today. I will now introduce our panel.

Dr. Walter Copan is Vice President for Research and Technology Transfer at the Colorado Schools of Mines in Golden, Colorado; Mr. Christopher Wood is President and Chief Executive Officer of Trout Unlimited, based in Arlington, Virginia; Professor Emily Hammond is Vice Provost for the Faculty Affairs and the Glen Earl Weston Research Professor at the George Washington University School of

Law, right here in Washington, DC; and Mr. Kevin Moore is Chairman and Chief Financial Officer of 3 Proton Lithium, based in Carson City, Nevada.

I now recognize Dr. Walter Copan for 5 minutes.

Dr. Copan.

STATEMENT OF WALTER G. COPAN, PH.D., VICE PRESIDENT FOR RESEARCH AND TECHNOLOGY TRANSFER, COLORADO SCHOOL OF MINES, GOLDEN, COLORADO

Dr. COPAN. Thank you so much, Chairman Stauber, Ranking Member Ocasio-Cortez, members of this Committee, and distinguished participants. It is a privilege to testify on this subject crucial to the future of the U.S. mining and materials sectors, impacting the future of energy, our economic competitiveness, and national security.

I have recently served our nation as Director of the National Institute of Standards and Technology, NIST, and prior with two of the U.S. Department of Energy laboratories. It is my honor currently to lead research and technology transfer at Colorado School of Mines, affectionately known as "Mines."

Mines is ranked in the top tier of U.S. research universities by the Carnegie R1 classification, recently rated in the top three engineering programs in the nation, overall. Mines is the No. 1 rated university in the world for mineral and mining engineering, a comprehensive program with the nation's only mineral economics and space resources majors. No other university in the world has this breadth. I am proud that this university can be an authoritative resource to Congress.

Mining is critical to obtain the minerals and materials we rely upon for the products of our economy, from buildings, roads, vehicles, energy systems, and industrial infrastructure, to computers, the Internet, mobile phones, and to the new quantum devices just entering the market. Minerals underpin every sector within our economy.

As our nation and the world look to our shared energy future, for electric power, energy storage, and the environment, we are realizing the needs for mining and its products at an unprecedented scale. For example, over the next 20 to 25 years, it is estimated the world will need to mine and produce as much copper as has been done throughout all human history.

There are 50 minerals and metals on the list of critical materials published by the U.S. Geological Survey, and copper isn't even on that list. Of the 50 critical materials, 30 are primarily produced in China. The International Energy Agency estimates that by 2040 we will need 42 times the lithium produced in 2020, 25 times more graphite, 21 times as much cobalt, and the list goes on. America's shortfall is staggering.

The United States is largely dependent on other nations for supply of key minerals and metals, a situation that will persist over the coming decades if we don't act now. Supply chain partnerships are essential, and they must be trusted. Major labor shortages are already being experienced in America's mining sector, resulting in significant cost increases already. America needs a new

relationship with mining, mineral, and metal processing, extraction, and the circular economy.

Colorado School of Mines has a compelling, new vision for the mine of the future. This industry must become attractive again, with positive relationships throughout society and minimized impacts on the environment, in order to attract new students and to retrain those within the workforce. Colorado School of Mines is ranked No. 1 in the world for mineral and mining engineering, but there is only one other U.S. university in the global top 25, tied for 17th with the Chinese university.

China has invested strategically in this industry and its workforce for decades. This past academic year, across the United States, there were 600 enrollments in accredited undergraduate and graduate mining, engineering, and related programs. On the other side, it is reported that China has over 1.4 million enrollments. China currently has 38 universities devoted exclusively for extractive metallurgy, and 38 others for mineral processing. The United States has none.

Overall, today's accredited mining engineering programs in the United States produce less than 200 Bachelor of Science-level graduates per year, with a current U.S. employment demand of well over 500 annually and growing.

There are many communities across Colorado and elsewhere throughout the country, represented by this Committee, proud of their mining industries and the partnership represented with their people, demonstrating real economic benefit and positive evidence of environmental stewardship. Key to the success of this Mining Schools Act will be focus.

This is a bill that incorporates many stakeholder recommendations, and the use of $10 million per year proposed will need to be managed carefully with support from the advisory board. Most important will be establishing prestigious scholarships to attract new students into accredited mining and related undergraduate programs. Even more important than the research and grad student education, we must first refill the pipeline of students into mineral and mining engineering programs.

Industry must also more effectively communicate current and future opportunities, and market new approaches, technologies, and innovations to gain effective outcomes from the Mining Schools Act.

I am excited about the Mining Schools Act of 2023. Thanks to this Committee for your important work toward securing the workforce and the technology leadership for U.S. economic and national security. I look forward to answering questions you may have. Thank you.

[The prepared statement of Dr. Copan follows:]

PREPARED STATEMENT OF DR. WALTER G. COPAN, VICE PRESIDENT FOR RESEARCH AND TECHNOLOGY TRANSFER, COLORADO SCHOOL OF MINES

ON H.R. 2685

Chairman Stauber, Ranking Member Ocasio-Cortez, members of the Committee and distinguished participants. It is a privilege to testify on this subject that is crucial to the future of U.S. energy, economic competitiveness, and national security interests. I have recently served our Nation as Director of the National Institute of Standards and Technology (NIST), and prior, with the National Renewable Energy Laboratory and the Brookhaven National Lab of our U.S. Department of Energy. My career journey in the private sector includes corporate leadership, research and development, innovation and intellectual property responsibilities, as well as an entrepreneur.

It is my honor currently to lead research and technology transfer at Colorado School of Mines, affectionately known as "Mines." Mines is ranked in the top tier of U.S. research universities by the Carnegie R1 Classification, and it is rated in the top 3 engineering programs [1] overall in the nation. Mines is consistently ranked the number 1 university in the world for mineral and mining engineering,[2] and it offers this nation's only degree program in mineral economics. With school sports teams known as the "Orediggers" and with 150 years of history of solving the world's most pressing challenges, I believe the name "Colorado School of Mines" will proudly remain in service for a long time to come.

The key to university's leadership in these fields and across science, technology, engineering, and mathematics domains over the past century and a half is the commitment to excellence in research and its interdisciplinary culture, the strong engagement with industry, and collaboration with government partners, particularly across the federal laboratory system. The university is located in Golden, the original capital of the Colorado territory when the mining sector and the metals and materials they produced dominated the economy.

I am proud that this university is an authoritative and trusted resource to Congress and policymakers on a broad range of topics connected with Science, Technology, Engineering and Mathematics. Mines is addressing all aspects of the mining and materials life cycle—from initial community engagement, exploration, mineral economics, and mining—to minerals processing and extractive metallurgy, to metals and alloys processing and products—to closing the loop of the circular economy by product recycling. This knowledge base has also led to the first Space Resources interdisciplinary program globally.[3] No other university in the world has this technology breadth.

Role of the Mining Sector. Mining is critical to obtain the materials we rely upon for the products of our economy and for America's balance of trade—from our buildings, roads, vehicles, machines and industrial and clean energy infrastructure to our computers, the internet, mobile phones, GPS and new quantum devices just entering the market. These and many more are products from the mining industry. Virtually every product we touch, and everything that surrounds us in this building in Washington D.C. is tied to materials originating from the mining sector and sourced from the earth.

Massive New Demand for Mining and Materials. As the nation and the world look to our shared energy future, needs for electric power, and to restore the environment, the world is waking up to the needs for mining and its products, particularly from hard rock and solution mining at a scale unprecedented in human history. Over the next 20–25 years, it is estimated the world will need to mine, extract, and produce as much copper as has been done throughout all human history on this planet.[4] The scale is massive—and how will we get there from here? There are 50 minerals and metals on the list of critical materials published by the U.S. government through the U.S. Geological Survey, for which this Committee has oversight. Copper isn't even yet on that list.

The critical materials include products for semiconductors, catalysts for hydrogen production and fuel cells, ingredients for energy storage systems such as lithium, cobalt and nickel, and the rare earth elements used for making countless products including the high-performance motors we will need for electric vehicles, solar cells and for wind turbines. Renewable energies and hydrogen are critical parts of our

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[1] https://minesnewsroom.com/news/mines-ranks-third-list-best-engineering-colleges

[2] https://www.topuniversities.com/university-rankings/university-subject-rankings/2023/mineral-mining-engineering

[3] https://space.mines.edu/

[4] https://doi.org/10.1190/tle42040266.1 "Mining for Net Zero: The Impossible Task"

energy future, and we will be relying on other products from the mining industry to supply further energy sources including nuclear, as well as the materials needed to capture and transport carbon dioxide from industrial emissions and the atmosphere to stable geologic reservoirs and to be converted to other product uses. The scale of necessary changes to the mining and metals processing sector is immense. The International Energy Agency (IEA) estimates that by 2040 we will need 42 times the lithium we had produced in 2020, 25 times more graphite, 21 times as much cobalt. The list goes on—and America's shortfall is staggering.

Global Supply Chains and Risks. Of the 50 critical materials on the list, 30 primarily are produced in one country—China. The U.S. is largely dependent on other nations for supply of key minerals and metals, and it will take a substantial investment on an unprecedented scale and speed involving trillions of dollars to access products to supply the energy transition and other industries from both domestic and imported sources. This demand is coming at the same time in which we have seen the effects of depleting the domestic mining sector, as well as major gaps in the ancillary industries for extraction, metals processing and high value product manufacturing. For the mining sector in the U.S. major labor shortages are being experienced, resulting in significant increases in labor costs, leading to projections for dramatic increases in product prices. The mining industry labor shortage is being called a war for talent. Unless America's minerals and mining labor shortage is addressed, it's projected that our products will be uncompetitive in domestic and global markets.[5]

Other nations, particularly China have expanded supply chain access globally, and China has the largest base in the world for critical materials manufacturing. China's dominance has become a supply chain risk for the U.S. and our allies, and its impact is seen from the early-stage exploration and mining stages, through processing and all the way to final manufacturing. If an entity controls access to mining and minerals and processing, it may effectively control the high-end and value-add manufacturing sectors, as well.

America needs a new relationship with mining. America needs more of the products that can only come from the mining sector. We must also recognize that the volumes and time scales required to build capacity mean that our nation will not be able to do this alone. We will need to keep our trusted supply chain partners close. As we consider the proposed Mining Schools Act, we see clear evidence of many inputs that have already been received and integrated. This is a very ambitious bill. It starts with the comprehensive series of goals to begin the process of rebuilding the mining sector, and all this with a modest budget request of $10 million per year. This is a move in the right direction, a good start—but it's a small investment considering the massive challenges America faces.

The opportunity we have before us is to consider first how we engage and inspire the next generation of leaders for the mining and critical materials sectors with a purpose and passion for the future of the planet, for people and communities, and our energy future.[6] America needs a new compact regarding natural resources and where these are obtained—both within our nation and from others. Industry will accelerate its fundamental changes principally as we bring in a whole new generation to participate in re-imagining and transforming the sector.[7]

The vision Colorado School of Mines is advancing for the Mine of the Future considers the technological opportunities for efficiency in total mining to utilize every bit of value from minerals and products of the earth, and for stewardship of water and materials of production. Our vision must inspire the next generation by including the totality of working in partnership and transparency with communities toward sustainable pathways. The vision must include planning for the total life cycle of the mining operation to its closure and return to nature. Our vision includes design for product durability and ultimately for product reuse and recycling, closing the cycle of the circular economy for mining. This brings a fully interdisciplinary approach involving not only mining engineering and technology components, but all aspects of hydrology and the geosciences, the humanities and particularly social interactions and communications underpinned by trusted data. This involves economics and business in ways that engender a new foundation of mutual trust, respect and acceptance with information sharing that is both trusted and trustworthy, and with environmental social and governance (ESG) communications and reporting that is credible, trustworthy and independently validated.

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[5] https://www.wsj.com/articles/war-for-talent-at-mines-could-drive-up-cost-of-energy-transition-30b927eb

[6] https://www.wsj.com/articles/a-dirty-job-that-few-want-mining-companies-struggle-to-hire-for-the-energy-transition

[7] https://www.csis.org/analysis/united-states-needs-shift-perspective-mining

The Mining Industry's Legacy Image. The mining industry has been one of the pivotal engines of economic growth and prosperity in the United States. Together with the growth and wealth creation during the 19th century and later, we also saw concurrent destruction of ecosystems and waterways, and history has taught many lessons—including about the uneven distribution of wealth that disproportionately affected certain communities. We have since seen a decline of not only participants in the U.S. workforce trained in mining, mineral engineering and processing, but also the refining and use of metals and metallic systems throughout the manufacturing sectors. The United States has gone through an era of offshoring and globalization in many supply chains, including those related to mining and critical materials. How much capacity can we re-shore?

We will not be able to attract students into programs envisioned by the Mining Schools Act unless we have the minerals industry, industry associations, energy, materials and products companies delivering a new, optimistic and responsible message. The marketing and communications of the industry about the jobs and sector of the future must be a priority.[8] Prospective students should come to understand the importance of their talents to be deployed in these sectors—and the chance to make a real difference. Communications within universities and community colleges, supported by messages from relevant government agencies can help raise the profile of exciting job opportunities arising. The essential role that innovation and entrepreneurship plays in these industries must also be made increasingly visible to prospective students and those providing them guidance.

China has invested strategically to build manufacturing capacity, supply chain partnerships for raw materials and finished products and workforce. In many instances, China receives raw mineral ores produced in developing and developed nations from around the world and refines them into finished materials for sale on world markets. The standards for environmental performance, energy intensity, labor and human rights that are practiced in certain regions do not conform with those high standards from North America, Western Europe and elsewhere. Standards and systems for accounting and enabling supply chain transparency and mineral traceability are essential as we continue to trade with China and other nations.

Higher Education and Workforce. Colorado School of Mines is ranked number 1 in the world for mineral and mining engineering,[9] but there is only one other U.S. university in the global top 25, tied for 17th place with a Chinese university. The U.S. has 14 universities with 17 accredited degree programs that include mining and mineral engineering. China has invested strategically in the industry—and its workforce. This past academic year, across the United States, there were 600 enrollments in accredited undergraduate and graduate mining engineering and related programs. China had over 1.4 million enrollments. Overall, today's accredited mining engineering programs in the U.S. produce less than 200 Bachelor of Science level graduates per year, with a current U.S. employment demand of well over 500 annually—and demand is growing. Other nations that have been reliable trading partners with the U.S., including Canada, Australia, Europe, and Latin American countries have also been experiencing shortages of production capacity as well as labor, as we are experiencing this rapid rise in demand and related costs.

China currently has 38 universities with schools providing undergraduate and graduate levels education and research devoted exclusively to Extractive Metallurgy. There are 38 other separate schools devoted to Mineral Processing. One of the largest is Central South University, with specific BS, MS and PhD degrees in Mineral Processing Engineering and 1000 undergraduate and 500 graduate students currently enrolled. The U.S. has none—no such dedicated schools nor degree programs. Colorado School of Mines offers a comprehensive degree program with concentrations in all these areas, but not the entire degree programs as the Chinese universities have been building. 40 years ago, we had many—both at Colorado School of Mines and at other U.S. universities. Canada faces similar workforce challenges as the U.S.[10]

Chinese programs are rigorous, competitive, and increasingly delivering graduates that are highly skilled with a breadth and depth of knowledge. China has a plan. They have seen the combination of workforce, supply chain dominance and manufacturing price control as strategically essential. Currently, Chinese entities including

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[8] https://www.northernminer.com/global-mining-symposium/global-mining-symposium-mcewen-calls-for-uber-moment-in-mining-industry/1003855620/

[9] https://www.topuniversities.com/university-rankings/university-subject-rankings/2023/mineral-mining-engineering

[10] https://mihr.ca/wp-content/uploads/2023/03/Mihr-Workplace-EN-2023.pdf

their universities are filing the most patents in the world in mining mineral engineering and metals processing.[11]

Foreign Talent. The universities of the United States have educated talent not only for this country but for those from other nations who have come here to study and seek opportunity. Additionally, other nations have been expanding capacity and quality in education and have benchmarked the U.S. higher education system and research enterprise. Colorado School of Mines is currently called upon by nations with important natural resources around the world to establish mining engineering and related programs. These schools are intended to enable those nations' economies to succeed not only in natural resource production, but also to be able to enjoy the value-add of upgraded materials and finished products that can be processed in the future within their own nations. Should America close its borders to educate foreign talent? Clearly, no. Some of the foreign students will come and stay in the U.S., while others will return to their home nations as friends and colleagues of the U.S.

Why have U.S. Mining Engineering related programs declined? This appears to be a combination of important factors. The number of companies who are actively recruiting and communicating with students in these areas has not kept pace as industries have globalized, the marketing of the desirability of careers in the sector has lagged, and the image of the industry itself has needed a facelift. The bright students at our universities have many choices, and unless they understand the attractiveness of a career in the mining and resources sector, they will choose alternatives. Unless we reposition mining engineering and related fields as exciting, attractive, rewarding and impactful, with a call to duty to save our planet and economic prosperity—our students and future leaders will continue to look at other opportunities.

More about the Mine of the Future. Colorado School of Mines has a compelling new vision for the mine of the future. This is a holistic view that begins not with technology and workforce—but starts with communities and a visible respect for the planet and its resources. The mining industry of the future must become the exemplar of industries, where people want to work, contributing with patriotism to the nation, and with the knowledge of creating positive impact and a sustainable future. Without the engagement of the people and an acceptance that mining can and must deliver **a net positive impact for all stakeholders** concerned and for the effective stewardship of the planet's resources, the mining sector will struggle. Instead, the industry will need to address massive opportunities for growth and impact for the future of energy—and must deliver the materials needed for advancement of human civilization.

The future of mining is linked with applications of robotics and industrial controls, automation, global positioning drones, the Internet of Things, development and applications of artificial intelligence and machine learning, advanced communications strategies, including those for GPS-denied environments. There are exciting and challenging opportunities in mineral processing and separations, novel strategies for using membrane systems for water and resource recovery, and an amazing array of downstream applications in products touching every sector of the economy—including energy. The chance to inspire the students of the future with a vision for these possibilities and their impacts is exciting. The message behind the Mining Schools Act is a message of hope, of possibilities, and of opportunities to make a difference, for the future of America and the world, and to build partnerships with like-minded nations, our allies and friends.

What will be most impactful from the proposed legislation? I personally believe it critical that we initially establish a prestigious scholarship program at America's established and accredited programs in mining and mineral engineering and directly related disciplines. This will build a top-level cadre of students ready to go forward into industry and into advanced degree programs within the mining related sectors. Unless we overcome current perceptions of mining as a less attractive career path than others, we will continue to be challenged to meet the workforce demands of today and the years to come. Because today's mining engineering and related programs in the U.S. produce less than 200 B.S.-level graduates per year, we need to fill the pipeline of undergrads and associate-level students in these disciplines. An initial focus on graduate programs and academic research could divert precious limited resources from filling the pipeline—and may risk the program's effectiveness overall.

There are many communities across Colorado—and represented by this committee—proud of their mining industries and the partnership represented with

[11] https://www.nationaldefensemagazine.org/articles/2019/3/21/viewpoint-china-solidifies-dominance-in-rare-earth-processing

their people, demonstrating real economic benefits and positive evidence of environmental stewardship regionally and beyond. Key to the success of the Mining Schools Act will be maintaining clear **focus**. This is a bill that incorporates many stakeholder recommendations. I believe that many states across the country, including those represented on this Committee, would like to see their universities benefit and grow, and build the mining workforce through educational programs and research. $10 million, if evenly divided to just 17 accredited programs, would provide $588,000 per mining school program. Typical graduate student tuition, stipend and expenses can total between $80,000–$100,000 per student—not counting the rest of the research costs. Graduate research programs are the more expensive components of this legislative proposal.

Undergrad scholarships can make a real difference—and can open possibilities for students to pursue majors and coursework relevant to the mining sector. Undergrad research experiences result in students who are trained in the science and engineering method, and who will gain valuable insights to the needs of the industry sector. Research experiences and fieldwork offered at the undergraduate level can help students establish a practical grounding and an excitement for career possibilities.

We also need to be realistic. Building and augmenting quality programs of mining engineering, minerals processing and metallurgical refining at the universities who currently do not have accredited programs will take time. This may also involve a new level of partnership with universities having such approved curricula, as well as with industry players who are looking for specific talents and experience. It is relatively easy to establish a new research project that will train several students, but it takes longer, significantly longer to develop and approve a new course of study for inclusion in curriculum, and substantially longer yet to establish whole new degree programs and have them properly structured and ultimately accredited. Building workforce through attracting students to our currently accredited mining programs across the U.S. and building new courses and accredited degree programs at community colleges, colleges and universities committed to this industry will take time.

Industry has an essential role to play toward effective outcomes. The mining sector is a global business. Mining graduates of universities in the United States and abroad could see their career trajectories taking them to far-flung, exciting, and often remote parts of the world. People entering these fields need to first have an experience of what the mining sector and its related industries offer. Hence a strong partnership with industry offering internships, co-ops, hands-on experiences, field sessions as well as apprenticeships will be a necessary part of the equation for change. Programs of workforce retraining include certificate and online programs that allow efficient use of resource and time in bringing qualified people into the sector and preparing them for productive new careers.

Among the strongest predictors of having people enter the mining sector for a career path involves their family circumstances, where the students grew up, and the mentorship and early learning experiences they received. Students that come from a family heritage of mining, but who also resonate with the vision of the Mine of the Future as something entirely new and exciting will surely be part of the story. We, however, cannot and should not tell our next generation that they are entering into the same kind of business and for the same purposes as their grandfather may have done. We must appeal to, and create opportunities for, a broad spectrum of students, particularly those who have not considered a career in mining and are motivated to solve some of the most significant challenges of our times.

The future of mining has a new mission, and it needs to tell a new story, inspire a new purpose, and be pursued with a new ethos. Companies recruiting students to enter the sector must demonstrate a deep commitment to environmental, social and governance principles and engender trust through their sustained actions and investments. Indeed, it will be the new talent entering the sector that will help drive the changes so needed for a vibrant U.S. mining and mineral resource industry.

The United States no longer has a Bureau of Mines. Hence, the work that this Committee does with the Department of Energy, U.S. Geological Survey, and others including the Department of Defense to stimulate the necessary other interagency collaborations is essential for the strategic future of the mining and materials sectors of America.

The federal government in the United States does have examples of legislation passed and implemented with good intent—but resulting in less than satisfactory outcomes. In trying to accommodate all stakeholders, some legislation may never result in the nation achieving critical mass of workforce capacity, and hence remain unable to reach the desired goals. We need to recognize that this Mining Schools

Act of 2023 is indeed trying to accomplish much, and that the use of the limited funding of $10 million per year as proposed will need to be managed carefully with the support of the advisory board to result in impactful outcomes.

The opportunity we have before us is to look first at how we engage and inspire the next generation of leaders for the mining and critical materials sectors, with a purpose and passion for the future of the planet, for people and communities, and our energy future.

Together with many colleagues in research, education, and industry around the country, I'm excited about the Mining Schools Act of 2023. I include with this testimony the text of a letter of support for its companion bill in the Senate.

Thanks to Chairman Stauber, Ranking Member Ocasio-Cortez, and all who have worked on this bill. We are grateful for the leadership of this Committee in your work to address these critical matters toward securing the workforce and technology leadership for U.S. economic and national security. I look forward to answering questions you may have.

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Attachment

Colorado School of Mines
Golden, Colorado

November 23, 2022

Chairman Joe Manchin III
Ranking Member John Barrasso
Senate Committee on Energy and Natural Resources
304 Dirksen Senate Building
Washington, DC 20510

Re: **Support for the "Mining School Act of 2022"**

Dear Chairman Manchin, Ranking Member Barrasso, and Committee Members:

Colorado School of Mines strongly supports the bipartisan bill entitled the "Mining School Act of 2022" that you introduced to Congress in March. This bill represents an important step for the Nation, a recognition of the need to rebuild the American mining workforce, which has been in decline since 1980. Today, there are only 14 accredited mining engineering programs in the United States, which is down from 33 at its peak. Furthermore, over the past decade, those 14 programs collectively graduated only about 200 students each year, compared to an annual industry demand for over 500 mining engineers as well as mining related technical disciplines and mining economics specialists in the U.S. Given the need for critical materials for the Nation and the global energy transitions, the U.S. will have to significantly increase the production of critical metals and minerals to support increasing domestic renewable energy sources, expand electrification, increase battery storage capacity, expand the development and penetration of safe nuclear energy technologies, provide catalysts for hydrogen and alternative fuels, and develop related technologies.

Despite these declines in workforce and resource development capacity, the United States has great capabilities to lead the world in critical materials and mining engineering, and to drive the innovations required for sustainable resource development. This will require a much larger and more highly trained mining workforce, and Colorado School of Mines is ideally situated to help. Colorado School of Mines is consistently ranked the number 1 university in the world for minerals and mining engineering.[1]

Thank you for your leadership to develop and advance this important legislative proposal. We would recommend several changes to the wording of the bill to enable achievement of the goals to which the bill aspires.

The "Mining School Act of 2022" would allow eligible colleges and universities to apply for $10 million in grants for fiscal years 2023 through 2030. The grants are specifically focused to assist with recruiting, training and educating students and funding research to develop innovative technologies for the mining industry. The grant funds can be used for programs that cover the entire mine life cycle ranging

[1] https://www.minesnewsroom.com/news/colorado-school-mines-repeats-global-no-1-mining-engineering

from exploration, mine planning, mineral processing, extraction and refining to energy use, environmental and human impacts, and recycling. Colorado School of Mines has deep strengths in these disciplines as do the other 13 U.S. mining schools. Unfortunately, as the Bill is currently written, the definition of "a geology or engineering program" is too broadly stated. So, there is a very serious threat that other colleges and universities that have "a geology or engineering program" will compete successfully for the grants to be authorized by the Act, but without having the requisite curriculum or programming directly relevant to mining and the mining life cycle in place. This may inadvertently actually contribute to further declines of some existing mining school programs, which clearly would undermine the objectives of the Act.

The current use of the specific language "a geology or engineering program" means that educational programs that have nothing to do with mining could be eligible in the Mining Schools program under the draft bill. We recommend that the Committee and colleagues in the legislature reconsider this definition in advancing the legislation. This can be addressed by authorizing the awarding of funds to schools with an "accredited mining engineering program", and to schools with "a geology or engineering program who have entered a formal partnership to establish a mining engineering program, collaborating in curriculum development and educational content delivery with an institution accredited for mining engineering." Without a clarification of this sort, the bill language ultimately may not result in tangible, timely benefits to the U.S. mining sector.

Colleagues of the Colorado School of Mines and I believe that this bill is a step in the right direction. If the language is not changed, the bill certainly supports STEM, which may bring indirect benefits for mining and critical minerals, as well as for other sectors of the U.S. economy. For this bill to become a game-changer for rebuilding the U.S. mining and critical materials workforce, we recommend changes to the language defining institutional eligibility.

Again, thank you for your leadership to develop and advance this important legislative proposal. We encourage you to take appropriate action toward having this important legislation enacted.

Sincerely yours,

WALTER G. COPAN, PH.D.,
Vice President for Research and Technology Transfer

Mr. STAUBER. Thank you very much for your testimony. The Chair now recognizes Mr. Christopher Wood for 5 minutes.

STATEMENT OF CHRISTOPHER WOOD, PRESIDENT AND CHIEF EXECUTIVE OFFICER, TROUT UNLIMITED, ARLINGTON, VIRGINIA

Mr. WOOD. Thank you, Chairman Stauber, Ranking Member Ocasio-Cortez, other Subcommittee members, my name is Chris Wood, and I am the President and CEO of Trout Unlimited. Thank you for the opportunity to testify today.

Trout Unlimited's mission is to bring together diverse interests to care for and recover rivers and streams so our children can experience the joy of wild and native trout and salmon. I offer the following testimony on behalf of our 350,000 members and supporters.

My testimony will focus on the need to facilitate abandoned coal mine cleanups by community reclaimers, also known as Good Samaritans. These are entities who, literally, had nothing to do with the creation of the historic mine waste, but simply want to make the places that they live, love, and, in my members' case, fish, healthier.

I define conservation as the application of common sense to common problems for the common good. And I thank Representative

LaHood for his continuing efforts to push this common-sense proposal and turn it into law.

TU restores streams and rivers damaged by pollution from abandoned mines of the Appalachian coal fields in Pennsylvania, to hardrock mining areas of the Rocky Mountain states, to placer mines in Alaska.

Abandoned coal mines dot the Appalachian and Western landscapes. Pollution from abandoned coal mines continues to damage thousands of miles of streams and rivers. And while much has been accomplished, much remains to be done. Cleaning up the type of abandoned coal mines contemplated in this legislation is not always overly complicated. Often it involves re-routing the stream or drainage from an old mine through a series of created settling ponds and wetlands containing lime or soda ash. The metal then falls out of the water, and the water can then be re-routed into the stream.

We have seen long-dead brook trout streams in Pennsylvania, for example, come back to life through this type of restoration. And while we love our brook trout at Trout Unlimited, it is the reduced downstream water filtration costs that the local communities care most about.

Liability is a significant challenge with these projects. Consider, we might spend a few hundred thousand dollars to improve water quality by 80 percent on a stream damaged by mine waste. But to get the stream to meet Clean Water Act standards, we might have to spend another $5 million more. The status quo leaves us open to the government or others, through a citizen lawsuit, coming after us to get to 100 percent.

The fact is that these are remarkably resilient systems, and if we give them half a chance, they will recover. Consider the west branch of the Susquehanna in Pennsylvania, a river system that drains about 20 percent of the Commonwealth. Thanks to the work of TU and its partners, in the past decade nearly 26 miles of the west branch have been classified as natural trout reproduction areas, thanks to water quality improvements.

An additional 215 stream miles in the headwater tributaries, many of which were previously polluted by acid mine drainage, were found to support wild and native trout.

A Good Samaritan doctor who sees a car wreck on the road can take reasonable and prudent measures to help the injured without fear of liability. In a similar way, we want to be able to work with the EPA to take reasonable and prudent measures to help recover our streams.

If there is a stronger advocate for the Clean Water Act than Trout Unlimited, I am not aware of them. The problem is that the law treats those who want to clean up abandoned mines as if they themselves are the polluters. Non-profit organizations such as mine don't have the funding to support perpetual treatment systems, as is required by the Clean Water Act. Moreover, in many cases, the treatment systems, even if they dramatically improve water quality, do not meet all applicable Clean Water Act standards.

That is not to say that the Clean Water Act should be weakened; the opposite is true. But we should be doing all we can to incentivize organizations such as Trout Unlimited, that have broad

experience in restoration, to make our nation's waters more fishable, drinkable, and swimmable. The Community Reclamation Partnerships Act will do exactly that, and we look forward to working with the Subcommittee to ensure its passage and enactment into law.

[The prepared statement of Mr. Wood follows:]

PREPARED STATEMENT OF CHRIS WOOD, PRESIDENT AND CEO, TROUT UNLIMITED ON H.R. ____, "COMMUNITY RECLAMATION PARTNERSHIPS ACT"

Chairman Stauber, Ranking Member Ocasio-Cortez, and Subcommittee Members: My name is Chris Wood. I am the President and CEO of Trout Unlimited. Thank you for the opportunity to testify today on abandoned coal mine cleanup legislation.

I offer the following testimony on behalf of Trout Unlimited and its nearly 350,000 members and supporters nationwide. My testimony will focus on the Discussion Draft of the Community Reclamation Partnership Act (draft bill), and specifically the need to facilitate abandoned coal mine cleanups by community reclaimers (also often known as "Good Samaritans")—those individuals or entities who have no legal obligation to take on an abandoned mine cleanup, but who wish to do so in order to improve water quality and watershed health.

I have been honored to appear before this committee to speak in support of this legislation previously. This bill has been considered—and advanced—by this committee in the last three congresses. We've been pleased to support it each time. We thank Rep. LaHood for continuing to push for this common-sense proposal and we hope that this is the year we will finally see this advance into law. We deeply appreciate the Subcommittee's focus on this issue, and we urge the Subcommittee to continue to work with us, the states, and tribes, the Interior Department, the EPA, and other stakeholders on such a bill to help provide an important tool to facilitate cleanups.

TU's mission is to bring together diverse interests to care for and recover rivers and streams so our children can experience the joy of wild and native trout and salmon. Our members and supporters live, recreate, hunt and fish along the waterways impacted by abandoned mines. In pursuit of this mission, TU members and volunteers dedicate more than 700,000 hours annually in projects to restore and improve the places they live, love, and fish. This work includes efforts to restore streams and rivers damaged by pollution from abandoned mines from the Appalachian coalfields in Pennsylvania, to the hardrock mining areas of the Rocky Mountain states, to placer mines in Alaska. TU stands ready to expand our work to clean up abandoned mine pollution, but we need passage of legislation such as the Community Reclamation Partnership Act to make it happen.

Abandoned mine pollution is a widespread problem but much of it is fixable

Abandoned coal mines dot the Appalachian and western landscapes. Pollution from abandoned coal mines continues to damage thousands of miles of streams and rivers—over 10,000 miles just within Pennsylvania and West Virginia—and while much has been accomplished through the Surface Mining Control and Reclamation Act's (SMCRA) extremely valuable Abandoned Mine Lands Fund (AML Fund), a great deal more remains to be done. The cost of cleanup in Pennsylvania alone has been estimated as high as $15 billion.[1]

A reclamation fee, paid by the mining companies, is collected for each ton of coal produced to support the AML Fund. Since 1977, more than $6 billion has been put to good use making safe and cleaning up abandoned coal mines.[2]

We have developed a number of model projects that can be easily replicated. In Pennsylvania, aided by state-based Good Samaritan policy, watershed groups, including Trout Unlimited, are working with state agencies, communities, and other partners to conduct more than 250 abandoned coal mine pollution projects throughout the state. With the right policy levers and continued funding, we can do a lot more.

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[1] http://pa.water.usgs.gov/projects/energy/amd/

[2] https://www.osmre.gov/news/OSMRE-issues-final-rule-extending-AML-program-through-2034

Our best environmental law, the Clean Water Act, can be a barrier to abandoned coal mine cleanup

There are many projects where water quality could be improved by collecting run-off, or taking an existing discrete discharge, and running the polluted water through a treatment system. However, for would-be Community Reclaimers, Clean Water Act (CWA) compliance and liability issues remain a barrier to such projects. In short, the law treats those who want to clean up abandoned mines as if they themselves are polluters.

Several courts have held that discharges from systems that treat wastewater from abandoned mines are point source discharges that require a National Pollutant Discharge Elimination System (NPDES) permit under section 402 of the CWA. Although EPA and some eastern states have not considered such projects to be point sources requiring NPDES permits, the Fourth Circuit's 2010 decision in *West Virginia Highlands Conservancy, Inc. v. Huffman* creates uncertainty that has a chilling effect for would-be Good Samaritans.

Stakeholders in projects involving treatment of mine drainage have been held back because of CWA liability for two reasons. First, NGOs, including TU, are not well suited to apply for and hold discharge permits for such projects. TU does not have an adequate funding mechanism to legally bind itself to pay for the perpetual costs associated with operating a water-treatment facility and NPDES permit compliance.

Second, for many projects it may be impossible to obtain a discharge permit, because the treatment systems, even if they will improve conditions, may not be able to treat abandoned mine wastewater to a level that meets all applicable water quality standards or other applicable criteria. It should be noted that while these treatment systems are certainly capable of producing water that will support a healthy fishery, the resulting water quality might not meet CWA standards for some pollutants that are particularly difficult to remove from mine waste (for example, passive wetland systems that effectively treat highly polluted water often leave levels of manganese that do not comply with CWA standards).

This is not to say that CWA standards should be weakened; just the opposite, in fact. But there should be incentives for would-be Community Reclaimers to make water cleaner even if still short of full CWA standards. Put another way, federal law should hold polluters accountable while providing incentives for would be Good Samaritans to make our water cleaner and communities safer.

Good projects could be expanded and replicated with effective Good Samaritan policy

In Pennsylvania, as we explain below, polluted water is being successfully treated and streams and rivers are being brought back to life because the Commonwealth has provided Good Samaritans with dedicated funding. We and our partners believe that we can export the Pennsylvania model across the rest of the country if liability concerns are eased and Congress continues funding abandoned coal mine cleanups.

Our experiences in Pennsylvania are illustrative of the positive effect of Good Samaritan cleanups. Over the past 20 years, Pennsylvania has seen an increase in abandoned mine reclamation projects by watershed groups, including TU. This boom has been fueled by funding from the state's Growing Greener grant program and the Federal Abandoned Mine Land (AML) reclamation fund. Most of these projects involve treatment of abandoned mine drainage using passive treatment systems, which run the polluted mine drainage through a series of limestone basins and wetlands that increase the water's pH and cause heavy metals to precipitate out. These projects have significantly improved water quality and restored fish populations in numerous Pennsylvania streams.

The Pennsylvania Department of Environmental Protection estimates that public funding sources have paid for the construction of nearly 250 passive treatment systems in the state, the majority of which have been constructed by private watershed groups, conservation districts or other local groups.

Beginning in 1998, the work of TU and its partners in the lower Kettle Creek watershed has resulted in the reclamation of approximately 160 acres of scarred abandoned mine lands and installation of nine treatment systems that successfully improved mine water polluted with high levels of acidity and metals. The results to date have been tremendous, with water quality restored to 3 miles of previously dead streams and 6 miles of a fully reconnected and thriving native brook trout population.

TU's Chestnut Ridge Chapter and other partners have worked for more than two decades to improve water quality in the Dunbar Creek watershed in southwest Pennsylvania. On Glade Run, the chapter installed a treatment system and applied

alkaline sand to address AMD that had left the stream devoid of fish. Water quality has now improved enough that wild trout reintroduced into the lower section of Glade Run are now thriving, and the state has proposed removing 1.2 miles of this stream from the Commonwealth's list of impaired streams.

This story of recovery plays out again and again in individual streams and watersheds. Several years ago, the Babb Creek Watershed Association accomplished delisting 14 miles of Babb Creek, now a wild trout fishery, from EPA's impaired streams list. Another 14 miles in the Tangascootack Creek watershed is pending removal from the impaired streams list as a result of passive treatment systems constructed by the Clinton County Conservation District.

On a much larger scale, the West Branch Susquehanna River watershed has made tremendous strides over the past few decades. A comparison of conditions in the West Branch Susquehanna in 1972 with those in 2009 indicated that fish species increased 3,000 percent, and pH increased from 3.8 to 6.6. Preliminary results from our 2017–2018 re-evaluation of water quality and biological conditions across the historically impaired West Branch Susquehanna River basin demonstrate continued improvements in water quality and wild trout populations. Ten sites that exceeded water quality standards in the 2009 study were found to now be meeting water quality standards.

In the past decade, nearly 26 miles of the West Branch of the Susquehanna have been classified as natural trout reproduction waters thanks to water quality improvements. An additional 215 stream miles in the headwater tributaries—many of which were previously polluted by acid mine drainage—were found to support wild and native trout.

This is clear testament to the success of collaborative abandoned mine cleanup that continues across this vast landscape in Pennsylvania.

On Fall Brook in Pennsylvania, we helped Tioga County Concerned Citizens Committee and Tioga County Conservation District with a conceptual treatment plan that they then took to Southwestern Energy. Southwestern decided to fully fund the construction and the long-term operation and maintenance trust fund ($2.7 million). Southwestern Energy uses the project to fulfill their water-neutral program (for every gallon of water they use in natural gas development, they clean up the same amount of polluted water).

These improvements result in economic benefits. In Pennsylvania, almost $4 billion was spent on fishing, hunting, and wildlife viewing in 2006. Although dated, a 2008 study found that full remediation of the West Branch Susquehanna River watershed would result in "an additional $22.3 million in sport fishing revenues could be expected to be generated each year. Additional recreation spending—over and above that for fishing—would be expected after remediation is completed.

Regardless of the overall scope of the abandoned mine problem, each of these projects restored a significant water body and represents a big win for the relevant local community.

Cleaning up abandoned coal mine pollution is a long-term job, and long-term funding is needed to get the job done. We were pleased to see Congress reauthorize the Title IV AML fund as part of the 2019 Bipartisan Infrastructure Law (BIL).[3] In addition to extending the existing program, the BIL authorized and appropriated nearly $11.3 billion for deposit into the Abandoned Mine Reclamation Fund administered by the Office of Surface Mining Reclamation and Enforcement (OSMRE). This AML fund is the lifeblood of funding for abandoned coal mine work in the coalfield areas of America, especially the East. We urge Congress to continue to support this program.

Even with this additional funding, state programs only have the capacity to do so much. We need legislation like the *Community Reclamation Partnerships Act* to help unleash the untapped capacity of would be good Samaritan cleanup groups like TU, who are ready and willing to help get this work done.

Lastly, the subcommittee knows well the need to have a hardrock Good Samaritan policy enacted to provide a critical tool for western abandoned mine cleanups. We appreciate the subcommittee's work in previous Congresses to find a solution. Last year a bipartisan group of Senators and diverse stakeholders united around legislation to establish a pilot program that would have facilitated safe, effective abandoned mine cleanups. Unfortunately, this bill did not advance into law before the end of the year and abandoned mines that could otherwise be cleaned up continue to pollute our waters and communities. We are hopeful that in the 118th Congress we will be able to move forward with bicameral legislation and we look forward to further working with the subcommittee to address this issue. It is

[3] The Bipartisan Infrastructure Law (BIL) (Pub. L. No. 117-58), also known as the Infrastructure Investment and Jobs Act, was enacted on November 15, 2021.

long past due to enact Good Samaritan legislation into law so that we can get to work across the country cleaning up both coal and hardrock abandoned mines.

Conclusion

The legacy of historical mining practices—thousands of abandoned coal and hardrock mines with an estimated cleanup cost in the billions of dollars—has persisted for the better part of a century with insufficient progress toward a solution. The Community Reclamation Partnerships bill is an important step toward addressing the impact of abandoned mines in coal country. We urge the Subcommittee to mark up the bill and pass it in the coming months.

Improving water quality around the Nation is a fundamental goal of the work of this Subcommittee, and thus we are pleased that the Subcommittee is looking at one of the most vexing water problems remaining in coal country. We stand ready to work with you so that affected communities around the Nation will again have swimmable, fishable, and drinkable waters. Thank you for considering our views and thank you for working with us on these important matters.

Mr. STAUBER. Thank you very much for your testimony. The Chair will now recognize Professor Emily Hammond for 5 minutes.

Professor.

STATEMENT OF EMILY HAMMOND, VICE PROVOST FOR FACULTY AFFAIRS, GLEN EARL WESTON RESEARCH PROFESSOR, GEORGE WASHINGTON UNIVERSITY SCHOOL OF LAW, WASHINGTON, DC

Ms. HAMMOND. Thank you, Chairman Stauber, Ranking Member Ocasio-Cortez, and distinguished members of the Subcommittee for the opportunity to testify today. I will be testifying concerning two of today's discussion drafts: the Community Reclamation Partnerships Act and the Mining Schools Act of 2023.

I am a professor of law at the George Washington University, and there I specialize in administrative law, energy law, and environmental law. My work extends to the rich story of how community organizations working in Appalachia have contributed to the development of energy and environmental law, including SMCRA. So, I will begin with the Community Reclamation Partnerships Act.

As you know, title 4 of SMCRA reflects Congress' concern with the environmental hazards of abandoned mines, as well as the detrimental economic impact such hazards bring to communities. With tens of thousands of abandoned coal mines across the United States, this program is vitally important to communities and the environments they are a part of. The risks posed by abandoned mines are multi-faceted, but I will focus today on the impacts of acid mine drainage, AMD, to communities and waterways.

Simply put, AMD is water that has flowed through abandoned coal mines, becoming highly acidic and picking up toxic metals along the way. Fish can't live in it, and people can't swim in it. EPA has estimated that over 5,000 miles of streams are impacted by AMD. And Appalachian states, with their long legacies of coal mining, are especially impacted. But such streams do exist throughout the nation.

The story of the Cheat River in West Virginia provides an example. For decades it was plagued by AMD from both abandoned and active coal mines, and by the 1990s it was so utterly poisoned that American Rivers named the Cheat one of the nation's 10 most endangered rivers.

But today, the Cheat once again hosts a healthy fish population, and is very much swimmable. And it is largely that way because a lot of dedicated people and affected communities came together and formed Friends of the Cheat River. They used all the tools they could access to fund cleanup. They developed a task force linking local, state, and Federal agencies to academics, industry, and local businesses. Out of these relationships, came opportunities to research the most effective ways to restore the watershed. And ultimately, that research supported a novel watershed approach that allows direct treatment of streams in addition to more traditional treatment plants. Friends of the Cheat is an example of the kind of organization that would qualify as a community reclaimer. They are acting voluntarily, and they did not cause the pollution that they aspire to remediate.

Importantly, the bill would remove a key area of uncertainty for these organizations related to the interplay between SMCRA and the Clean Water Act.

SMCRA provides that any control or treatment for water pollution resulting from AMD shall not "in any way be less than required" under the Clean Water Act. This is a critical provision, especially where a mining company itself is responsible for cleaning up harm that it caused. But in the case of volunteer organizations who can make the water so much better, often through passive treatment, this Clean Water Act compliance requirement poses a barrier because it exposes them to potential legal liability when they improve, but don't perfect a stream's water quality.

A key feature of the discussion draft is that it protects these volunteer community organizations from that liability in such circumstances. This is an appropriately limited exception that would allow more organizations like Friends of the Cheat to undertake this crucial work.

As I noted in my written testimony, an important addition to this bill would be to require that states respond to significant comments raised following the comment period and public meeting that the bill contemplates. This is a small change, but it would have big pay-offs in reinforcing the importance of the voices of communities impacted by abandoned mines.

And that point relates to my comments on the Mining Schools Act of 2023. It appropriately includes, among grant funding purposes, education that might in the future avoid some of the harms our country faces from abandoned mines today.

But scientists and engineers need just a bit more. They need to be able to engage with communities. So, I recommend that training for community engagement and communication be among the purposes to which these grants may be put.

Thank you again for the opportunity to testify today.

[The prepared statement of Ms. Hammond follows:]

PREPARED STATEMENT OF EMILY HAMMOND, GLEN EARL WESTON RESEARCH PROFESSOR OF LAW AT THE GEORGE WASHINGTON UNIVERSITY LAW SCHOOL

ON H.R. 2685 AND H.R. ____, COMMUNITY RECLAMATION PARTNERSHIPS ACT

Thank you, Chairman Stauber, Ranking Member Ocasio-Cortez, and distinguished Members of the Subcommittee, for the opportunity to testify today. I'll be testifying concerning two of today's bills: The Community Reclamation Partnerships Act, and the Mining Schools Act of 2023.

I am a Professor of Law at The George Washington University Law School. I also serve as Vice Provost for Faculty Affairs for the University, and am a member-scholar of the not-for-profit regulatory think-tank, the Center for Progressive Reform. I am testifying today, however, on the basis of my expertise and not as a partisan or representative of any organization. I am a professor and scholar of administrative law, energy law, and environmental law. My work is published in the country's top scholarly journals as well as in many books and shorter works, and I regularly speak on topics related to my expertise. Among my areas of research is the legal history of SMCRA and the work of the community organizations that led its passage, especially in Appalachia where I grew up. Early in my career, I practiced as a civil and environmental engineer; that experience and training particularly inform my assessment of legal frameworks involving scientific or technical complexity.

I will begin with the Community Reclamation Partnerships Act, which brings to volunteer community organizations much-needed relief from legal uncertainty so that they can confidently engage in some of the most important cleanup work for our waterways. Second, the Mining Schools Act of 2023 is an important investment in higher education and should ensure robust attention to education and research in the full life cycle of mining—from protective practices for workers and the environment during mining operations to the time those operations cease. Overall, both these bills offer avenues for strengthening environmental protections in very practical, meaningful ways.

I. The Legacy of Abandoned Coal Mines

As you know, Title IV of the Surface Mining Control and Reclamation Act of 1977 established the Abandoned Mines Reclamations program for coal mines abandoned prior to August 3, 1977.[1] The program demonstrates Congress's concern with the environmental hazards of abandoned mines as well as the detrimental economic impact such hazards bring to communities. With tens of thousands of abandoned coal mines across the United States—many of which are categorized as high-priority for cleanup given the threats they pose—this program is vitally important to communities and the environments they are a part of. The risks posed by abandoned mines are multi-faceted, but I will focus today on the impacts of acid mine drainage (AMD) to communities and waterways.

The Environmental Protection Agency (EPA) has estimated that over 5,000 miles of streams are impacted by AMD.[2] Appalachian states, with their long legacies of coal mining, are especially impacted—but impacted streams exist throughout the nation. AMD is water that has flowed through abandoned coal mines, picking up toxic metals and becoming highly acidic along the way. The story of the Cheat River in West Virginia provides a concrete example. Plagued by AMD from both abandoned and active coal mines, as early as the 1970s, whitewater paddlers reported bright orange rocks and experienced nosebleeds, stinging eyes, and other health impairments after spending time on the Cheat.[3] Then in 1994, polluted water from an illegally-sealed underground coal mine burst through a hillside into Muddy Creek—a Cheat tributary. The resulting fish kills and dramatically lowered pH of the Cheat, worsened by another 1995 blowout, led American Rivers to name the Cheat one of the nation's ten most endangered rivers. Today, the Cheat once again hosts a healthy fish population, and I can tell you from personal experience that it is a delight to swim in.

What happened in between? A lot of very dedicated people in the affected communities came together and formed Friends of the Cheat River. They used all the legal tools they had to access funding for cleanup. They developed a task force linking local, state, and federal agencies to academics, industry, and local businesses. Out

[1] 30 U.S.C. §§ 1231-40a, 1242-44.

[2] J.M. Williamson et al., *Valuing Acid Mine Drainage Remediation of Impaired Waterwats in West Virginia: A Hedonic Modeling Approach*, EPA, Sept. 2006, at https://cfpub.epa.gov/si/si_public_record_Report.cfm?Lab=NRMRL&dirEntryId=159138.

[3] *See* Friends of the Cheat, *FOC History*, at https://cheat.org/foc-history/.

of these relationships came opportunities to research the most effective ways to restore the river, and ultimately, that research supported a novel instream permit from EPA that allows direct treatment of the stream in addition to traditional treatment plants for discharges into the stream.

Friends of the Cheat is an example of the kind of organization that would qualify as a Community Reclaimer under the Community Reclamation Partnerships Act—a voluntary organization that did not cause the pollution they aspire to remediate. And importantly, the bill would remove a key area of uncertainty for these community organizations. This uncertainty relates to the interplay between SMCRA and the Clean Water Act (CWA). First, it is important to recognize that SMCRA defines lands and water eligible for cleanup under the Abandoned Mines program: They must be associated specifically with coal mining (whether underground or surface); and there must be "no continuing reclamation responsibility under State or other Federal laws."[4] Second, cleaning up acid mine drainage (AMD) was clearly one of Congress's priorities for abandoned mines.[5] So the primary way of addressing AMD is through the SMCRA framework. Yet—third—SMRCA provides that any control or treatment for water pollution resulting from AMD shall not "in any way be less than that required" under the CWA.[6]

Ordinarily it is very important to require compliance with other environmental laws, especially where a mining company itself is responsible for cleanup or harm it caused.[7] But in the case of Community Reclaimers, this CWA compliance requirement has created uncertainty and even a barrier to making improvements to Appalachian waterways. The CWA bans discharges of pollutants without a permit under the National Pollutant Discharge Elimination System ("NPDES"), which incorporates water quality standards for the receiving water.[8] But what about a treatment operation that significantly restores the water quality in an impacted stream, even if the effluent can't meet all applicable water quality standards?[9]

This is a realistic scenario for streams impaired by AMD. And it is a disincentive to Community Reclaimers who stand to make a real impact in restoring these streams—but because of the nature of AMD, multiple full-blown, state-of-the-art active water treatment systems aren't financially feasible. Often, passive treatment systems make up a large part of the remedial work that is being done today and that can be further incentivized by the Community Reclamation Partnerships Act. These systems do not usually treat the full scope of water quality concerns, but they contribute substantially to improving water quality and can make non-passive systems cost less.[10]

In this respect, a key feature of the Community Reclamation Partnerships Act is that it shields Community Reclaimers from CWA liability (as well as liability under other federal laws) when they improve but do not perfect a stream's water quality.[11]

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[4] 30 U.S.C. § 1234. In other words, the exclusion means there is not a remediation responsibility under the Comprehensive Environmental response, Compensation, and Liability Act (CERCLA) or other federal or state cleanup laws.

[5] *Id.* § 1231(c)(1) (authorizing use of funds for "prevention, abatement, treatment, and control of pollution created by coal mine drainage including restoration of stream beds, and construction of water treatment plants").

[6] *Id.* § 1242(d).

[7] *See* W.V. Coal Ass'n v. Reilly, 728 F. Supp. 1276 (S.D.W.V. 1989) (upholding EPA's CWA authority to reject in-stream treatment ponds of mining wastewaters at active mining site).

[8] 33 U.S.C. § 1342.

[9] In a closely analogous setting involving the bond forfeiture provisions of SMCRA, the Fourth Circuit Court of Appeals held that the State of West Virginia was obligated to obtain a NPDES permit for AMD treatment systems at various bond-forfeiture sites, even though the state was engaging in reclamation efforts for pollution it did not cause and even though its efforts were improving water quality. W.V. Highlands Conservancy, Inc. v. Huffman, 625 F.3d 159 (4th Cir. 2010).

[10] *See, e.g.*, C. Zipper et al., *Passive Treatment of Acid-Mine Drainage*, Va. Coop. Ext. Pub. 460-133 (2018), at https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/460/460-133/CSES-216.pdf; Jeff Skousen, *Overview of Passive Systems for Treating Acid Mine Drainage*, at https://dep.wv.gov/WWE/getinvolved/sos/Documents/AMD/Overview_PassiveAMDTreatment.pdf.

[11] Discussion draft, § 4. By contrast, there is a "Good Samaritan" provision in CERCLA for hard rock mine cleanup. 42 U.S.C. 9607(d) ("no person shall be [strictly] liable . . . for rending care, assistance, or advice . . . with respect to an incident creating a danger to public health or welfare or the environment") (preserving liability for negligence). *See also* EPA, Interim Guiding Principles for Good Samaritan Projects at Orphan Mine Sites and Transmittal of CERCLA Administrative Tools for Good Samaritans, June 6, 2007, at https://www.epa.gov/sites/default/files/2015-09/documents/cercla-goodsam-principles-mem-ed2015.pdf (establishing policies to implement this provision, including flexibility for water quality associated with cleanup discharges).

This is an appropriate and limited exception that would allow more organizations like Friends of the Cheat to undertake the important work of AMD remediation.

An important point about these activities is that they strengthen communities. My own interviews with individuals engaged in these activities in Appalachia suggest that at the local level, these communities have bridged the extreme polarity we see at the national level. They have promoted discussion not just about the immediate issue, but about the longer-term values and needs of a region that is both rich in beauty, resources, and culture, and overlooked by many other measures.

For all these reasons, I support the Community Reclamation Partnerships Act and suggest one modification. The discussion draft would add a provision authorizing approved states to enter into memoranda of understanding (MOU) with state and federal agencies to remediate land and water impaired by abandoned mines. A laudable feature of this provision is that it calls for a period of public comment—including a local public meeting—prior to submitting the MOU to the Secretary and Administrator (of EPA) for approval. However, it does not include any requirement that the state respond to significant comments raised. Although it is likely that there would be some response the state, enshrining that requirement in this bill would underscore the importance of ensuring that local voices are heard, treated with respect, and impactful.[12]

II. Ensuring Remediation in Mining School Curricula

The Mining Schools Act of 2023 promotes the purpose of establishing a grant program to strengthen domestic mining education. I want to highlight some of the purposes to which these grant funds may be put, and to suggest one other. Importantly, the purposes include education that may in the future avoid some of the harms our country faces from abandoned mines and irresponsibility operated existing mines. These include reclamation at abandoned sites, methods for mitigating AMD and reclaiming abandoned mine land, and mineral extraction methods that minimize environmental harms. But today's scientists and engineers need a bit more: they need to be able to engage with communities. Just as the Community Reclamation Partnerships Act contemplates such engagement, and just as the story of the Cheat River demonstrates the value of collaboration among activists, business interests, and scientists and engineers, so too should higher education prepare students for this reality. I thus recommend that training in community engagement and communication be among the purposes to which these grants may be put.

Thank you again for the opportunity to testify today. I look forward to your questions.

Mr. STAUBER. Thank you very much for your testimony. The Chair now recognizes Mr. Kevin Moore for 5 minutes. Mr. Moore.

STATEMENT OF KEVIN MOORE, CHAIRMAN AND CHIEF FINANCIAL OFFICER, 3 PROTON LITHIUM (3PL), CARSON CITY, NEVADA

Mr. MOORE. Thank you. Good afternoon, Chairman, Ranking Member, and members of the Committee. Thank you for the opportunity to testify in support of H.R. 3883.

My new friends, I believe, have been here before. This is my first time here, so it is an honor to be here. My name is Kevin Moore. I am the Chairman of 3 Proton Lithium, a United States-owned private company engaged in the exploration and development of critical minerals in Railroad Valley, Nevada since 2017. This project is critical to ending America's over-reliance on foreign adversaries, securing a domestic supply chain for critical minerals, facilitating the country's transition to a green economy, and creating thousands of high-paying U.S. jobs.

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[12] For a discussion of procedural values like these, see Emily Hammond & David L. Markell, *Administrative Proxies for Judicial Review: Building Legitimacy from the Inside-Out*, 37 Harv. Envt. L. Rev. 313 (2013).

The segregation process, started in April 2021, has had tremendous impact on our ability to operate and develop our mining claims. It impacts about a third of our claim block, bisecting it almost directly in the middle, and captures the deepest and most mineral-rich area, and potentially locks up 60 percent of the resources.

While 3PL believes it has valid rights in the segregated area, our position has always been one of mutual cooperation. By contrast, the lack of responsiveness and transparency from NASA and other officials throughout the withdrawal process has resulted in what we feel are uninformed and incorrect conclusions about our project. This has translated into a curt dismissal of its critical importance to the economic and national security of the United States, and further hinders our nation's ability to break its dependence and over-reliance on hostile foreign nations for critical and rare earth minerals.

The deposit is one of the 10 largest in the world, and the only one of its type in North America. It is only comparable to certain strategic mineral deposits in China and South America due to its unique geological history. With over 23 billion barrels of brine and 85 billion tons of salts, this deposit is truly world class, and the find has been validated by a robust geophysical data set.

This site contains a lithium carbonate equivalent resource of 82 million tons in situ, with an estimated 25 million tons recoverable in the salts and brines, making this one of the world's largest lithium resources and, actually, 40 times larger than the only known lithium reserve currently in the United States. A recent USGS minerals report identified 98 million tons of lithium resource worldwide and 12 million tons in the United States. Railroad Valley would conservatively triple the lithium resources currently identified in the United States.

The site also contains a boron resource of over 58 million tons, conservatively, making this one of the largest and purest deposits in the world. Boron is used in advanced aerospace structures, ballistic vests, and tank armor.

3PL has also demonstrated the presence of rare earth elements which are vital to national defense. However, they are very rare, mostly imported and controlled by adversarial nations like China.

In short, the Railroad Valley deposit is not only globally significant, but also of undeniable strategic national importance to the United States.

From an environmental standpoint, 3PL is developing a safe and environmentally responsible project that will not involve evaporation ponds, open pit mining, or acid leach operations that are planned by other projects of this type. The total area used by the 3PL project compared to the vastness of the playa is a fraction of 1 percent. We can access these minerals by pumping wells, each with a minimal footprint, leaving the playa virtually untouched.

The existing permitting process is thorough, and will provide sufficient visibility into the project's impact to the playa. All actions we undertake will be scrutinized by a number of agencies at both the state and Federal levels. The project can only proceed if all requirements of all agencies are met satisfactorily. This project can and will be developed in a responsible way.

The strategic importance of proceeding with the full development of the project cannot be understated, especially as it relates to unshackling the United States from its dependence and over-reliance on foreign nations, including China and Russia, to supply certain mineral commodities that are vital to the country's economic and national security. This dependence on rare earth elements and critical minerals is a grave vulnerability, which is why this Administration has rightfully made securing domestic supply chain a priority.

The long-term economic impact of this project will provide significant benefit both locally and nationally for generations. The potential value of the minerals and salts that can be harvested over this extended period are in the trillions of dollars, resulting in billions of dollars of tax revenues and royalties. The jobs that will be created directly and indirectly from this operation and downstream impacts will be in the thousands.

This is not a matter of establishing which mission is more important to advancing the interests and objectives of the United States. They both are critically important and can be achieved in tandem. This project is a vital part of transitioning to a green economy, creating good-paying American jobs, combating climate change, ending America's over-reliance on foreign adversaries, and securing a domestic supply chain for critical and rare earth minerals. But until we can begin the process of extracting these minerals from the ground, all they represent is potential.

I thank the Committee again for their interest in this critical matter, and look forward to answering any questions.

[The prepared statement of Mr. Moore follows:]

PREPARED STATEMENT OF KEVIN MOORE, CHAIRMAN AND CHIEF FINANCIAL OFFICER, 3 PROTON LITHIUM, INC.

ON H.R. 3883

Good Afternoon Chairman Stauber, Ranking Member Ocasio-Cortez and Members of the Committee. Thank you for the opportunity to testify in support of H.R. 3883. My name is Kevin Moore and I am the Chairman and Chief Financial Officer of 3 Proton Lithium, Inc. ("3PL"), a United States owned and domiciled private company engaged in the exploration and development of critical minerals in Railroad Valley, Nevada. 3PL has assembled leases and mining claims compromising more than 58 square miles (37,350 acres), representing the largest claim block in Nevada, which it has maintained since 2017.

This project is critical to ending America's overreliance on foreign adversaries, securing a domestic supply chain for critical minerals, facilitating the country's transition to a green economy, and creating thousands of high-paying U.S. jobs.

As the largest land stakeholder in Railroad Valley, the land segregation process started in April 2021 has had tremendous impact on our ability to operate and develop our mining claims. The April 27, 2023 Public Land Order impacts about 11,000 acres—approximately 30%—of the 3PL claim block, bisecting it almost directly in the middle.

The 3PL mining claims comprise a 2000-foot-deep brine pool, consisting of globally significant concentrations of valuable, recoverable critical and rare earth minerals, such as lithium and boron. If you picture our brine pool deposit as a bathtub, the segregation captures the deepest and most mineral rich area, and potentially locks up 60% of the resources from development.

While 3PL believes it has valid existing rights in the segregated area, our position has always been one of mutual cooperation. We understand the Bureau of Land Management's ("BLM") guiding principle of productivity of the land to support their multi-use mission and that this land belongs to the citizens of the United States. Our interactions with local BLM officials in Nevada have always been conducted

with mutual respect, and we believe they have been both thorough in their investigation of our work, and supportive in our ongoing NEPA assessment.

By contrast, the lack of responsiveness and transparency from NASA and other officials in Washington throughout the withdrawal process has been problematic and has resulted in what we feel are uninformed and incorrect assumptions and conclusions about our project. This has translated into a curt dismissal of the critical importance of Railroad Valley to the economic and national security of the United States, and further hinders our nation's ability to break its dependence and over reliance on hostile foreign nations for critical and rare earth minerals.

As a starting point, I would like to explain the geological uniqueness and magnitude of the Railroad Valley deposit.

The Railroad Valley deposit is one of the ten largest in the world, and the only one of its type in North America. It is only comparable to certain strategic mineral deposits in China and South America due to its unique geological history.

As the entire Great Basin of the western United States continually filled as a lake and then evaporated more than 100 times over a period of 3 million years, the Railroad Valley mineral deposit was formed. Over time, a salt deposit settled at the deepest portion of the lakebed, leaving behind a globally significant concentration of strategic minerals in both size and diversity.

This is a salt deposit with a very distinct alkaline chemistry. The complex salts contain significant amounts of lithium, but also consequential amounts of other critically needed strategic minerals, including boron, tungsten, molybdenum, and rare earth elements.

With over 23 billion barrels of brine and 85 billion tons of salts, the Railroad Valley deposit is truly world-class. The find has been validated by a robust geophysical data set from 48 wells, over 50 miles of seismic line data, 42 miles of magnetotelluric data, and over 1,100 geochemical samples.

This site contains a Lithium Carbonate Equivalent (LCE) resource of 82 million tons, "in-situ," with an estimated 25 million tons recoverable in the salts and brines, making this one of the world's largest lithium resources, and 40 times larger than the only known lithium reserve in the United States, with more diverse strategic minerals.

A recent USGS minerals report identified 98 million tons of lithium resource worldwide and 12 million tons in the United States. Railroad Valley would conservatively triple the lithium resources currently identified in the United States.

The site also contains a Boron Trioxide resource of over 58 million tons, conservatively, making this one of the largest and purest boron deposits in the world. Boron is used in advanced aerospace structures, ballistic vests, and tank armor, in addition to many industrial uses.

Additional significant economically valuable minerals and salts are present, including sodium carbonate, molybdenum, and tungsten.

3PL has also demonstrated the presence of Rare Earth Elements, including Neodymium, Praseodymium, and Gadolinium, found in concentrations that far exceed what is normally found in the earth's depositional structure. These minerals are vital to national defense and are used in a wide range of critical weapons systems. However, they are very rare and mostly imported and controlled by adversarial nations, like China.

In short, the Railroad Valley deposit is not only globally significant, but also of undeniable strategic national importance to the United States.

From an environmental standpoint, 3PL is developing a safe and environmentally responsible project that will not involve evaporation ponds, open pit mining, or acid leach operations planned by other projects. We are confident that our operations will not degrade the playa or adversely disturb the surface in a manner that impacts other uses of the area.

The focus of our mineral exploration is the salts and brines, not in clay or hard rock. In other words, this is not an excavation project. The total area used by the 3PL project compared to the vastness of the playa is a fraction of 1%. We can access these minerals by pumping wells, each with a minimal footprint, leaving the playa virtually untouched and enabling NASA to conduct its satellite calibration mission. Pumped fluids can be piped outside the playa, where ground conditions are favorable to process facility construction. Process facilities will be limited in footprint and not require vast evaporation ponds that may interfere with NASA operations.

We strongly believe that both 3PL and NASA can co-exist in Railroad Valley, enabling both entities to deliver on missions of strategic national importance to the United States.

The existing permitting process is thorough and will provide sufficient visibility into the project's impact to the playa. All actions we undertake will be scrutinized by a number of agencies at both the State and Federal levels, including Bureau of

Mining, Water Pollution Control, Dept of Wildlife, Dept of Water Resources, Division of Minerals, Bureau of Land Management, and EPA, amongst others. Exhaustive analysis of potential risk and environmental impact including broad-scale field analysis and survey by qualified third-party experts has been and will continue to be undertaken. All significant analyses required are subject to public notice and feedback. Agency feedback can also necessitate mitigation of any perceived impacts. The project can only proceed if all requirements of all agencies are met satisfactorily.

The strategic importance of proceeding with the full development of the Railroad Valley project cannot be understated, especially as it relates to unshackling the United States from its dependence and over reliance on foreign nations, including China and Russia, to supply certain mineral commodities that are vital to the country's economic and national security.

As the world decarbonizes, demand for strategic minerals is increasing rapidly. Most analysis of these resources, shows the supply gap growing wider as demand begins to mature and surge. It is well known that demand will far exceed the supply of lithium for decades to come. The lithium market is forecasted to expand from around 300,000 metric tons in 2020 to 3,000,000 metric tons by 2030. The EV sector alone is driving an insatiable demand for lithium as the technology evolves at an exponential rate. According to a recent report by Bloomberg New Energy Finance, adding just 5% to electric vehicle range causes battery material demand to soar by 50%.

The Railroad Valley lithium resource would boost the United States supply by approximately 200% and be North America's largest deposit. Conservatively, this is a 100-year mining opportunity for American independence from foreign controlled mineral sources.

The United States' dependence on rare earth elements and critical mineral imports is a grave vulnerability, which is why this Administration has rightfully made establishing and securing a domestic supply chain a priority (Executive Orders 13817, 13953 and 14017).

The long-term economic impact of this project is immense and will provide significant benefit both locally and nationally for generations. The potential value of the minerals and salts that can be harvested over this extended period are in the trillions of dollars, resulting in billions of dollars of tax revenues and royalties. The jobs that will be created directly and indirectly from this operation and downstream impacts will be in the thousands. The financial impact to the supply chain and on America's ability to grow the domestic critical minerals industries is dramatic.

In summary, a meaningful lack of engagement from relevant federal agencies has led us to what we believe is a decision made on incomplete information. This is not a matter of establishing which mission—that of NASA or 3PL—is more important to advancing the interests and objectives of the United States. They both are critically important and can be achieved in tandem.

We are steadfast in our existing valid rights to continue our work on the playa and believe this globally significant project to be unique and of critical strategic importance to the United States of America, both economically and to our national security. The Railroad Valley project is a vital part of transitioning to a green economy, creating good-paying American jobs, combatting climate change, ending America's overreliance on foreign adversaries and securing a domestic supply chain for critical and rare earth minerals. But until we can begin the process of extracting these minerals from the ground, all they represent is potential.

Our national and economic security depends on all of us working in conjunction to make it happen.

I thank the committee again for the opportunity to provide my testimony and for their interest in this critical matter. I look forward to answering your questions.

Mr. STAUBER. Thank you very much for your testimony.

The Chair will now recognize Members for 5 minutes for questions, and I am going to recognize Mr. Rosendale first for 5 minutes.

Mr. ROSENDALE. Thank you very much, Mr. Chairman and Ranking Member Ocasio-Cortez. I would like to go on the record to officially support Representative Owens' H.R. 2685, the Mining Schools Act of 2023.

In many job fields, and especially in mining, I have heard from employers across Montana that they are having a hard time finding and retaining workers. They are worried that fewer people are pursuing mining jobs, and young people who do want to go into mining are worried they won't be able to find reliable, long-term employment. For our employers, employees, mining communities across America, and our national security, I believe it is important to educate miners and keep jobs open for them.

The Mining Schools Act of 2023 is a crucial step in the right direction toward helping the mining industry. As America moves to a greener, more electric future, we will need U.S. mining production more than ever to meet the rising demand of clean energy's rare earth minerals.

In an all-of-the-above approach to energy, America can embrace both new and conventional energy production on a timeline that works for everyone.

With the mining industry facing more retirements than graduates, and the steep decline of available mining-related education in this country, we are facing a crisis that will be difficult to fix unless we act now. I am horrified to hear that we have 600 students in mining education and that China has 1.4 million. That should concern everybody in this room.

This makes schools like Montana Tech in Butte, Montana all the more important. With Montana's abundance of minerals, we must keep funding and promoting schools like Montana Tech to preserve our state's prosperity and leave our children a state that they can be proud of, that they can stay in, that they can raise a family in.

This bill would establish a competitive grant program to increase funding to mining schools, as well as recruit students and support a wide range of programs related to the mining industry. To win the 21st century, America needs to have people with the knowledge to do so, and this Act is the first step in making sure we keep our mining workforce strong and capable.

I am happy to support Representative Owens' bill, and I encourage all of my colleagues to do the same, and help keep our mining industry thriving.

Thank you so much. Mr. Chair, I yield back.

Mr. STAUBER. Thank you very much.

Representative Kamlager-Dove, you are recognized for 5 minutes.

Ms. KAMLAGER-DOVE. Thank you, Mr. Chair and Ranking Member, and thank you all for your testimony. I have a few questions.

I would like to start with you, Professor Hammond. You mentioned that you have one proposed change to the Community Reclamation Partnerships Act to direct states to incorporate feedback from the community after public comment and public meetings. Can you tell us more about why community input is so important to consider throughout this process?

Ms. HAMMOND. Yes, thank you.

In part, it is restorative. These communities didn't have a say in the pollution that has impacted them in the first place. But more contemporarily, it is important because communities have good ideas, they have expertise, they have local knowledge.

So, being sure that not only do they have an opportunity to share that in a public hearing, or in written comments, but circling back and responding to significant comments raised is a way to promote a value in our legal system, which is that people aren't just given the opportunity to speak, but also that their views are considered.

Ms. KAMLAGER-DOVE. Thank you for that.

Dr. Copan, Colorado School of Mines says that it is inspired by the changing needs of society. And one of my priorities is addressing environmental justice issues and pollution, often from extractive industries. How is the university incorporating these concerns into its research and academies?

Dr. COPAN. Thank you so much for that very, very important question.

It is clear that the mine of tomorrow is not going to look like the mining process of today, so preparing the next generation with a holistic view, understanding impacts from the very beginning of community engagement and involvement in a potential program all the way through the technology selection process, understanding, ultimately, the broad impacts on groundwater and resource utilization overall, with a view to the downstream closure of the program, of the mine site. So, the educational process includes all those types of dimensions, as well as looking at the products that will be delivered from the mining sector, as well.

So, thinking holistically, looking at systems that involve the human beings, our communities in these types of decisions, bringing in a broad interdisciplinary process to the mine of the future, and it is much more than those technology questions. It really brings that holistic view, beginning with the human dimension.

Ms. KAMLAGER-DOVE. Great, thank you. And my last question is for Mr. Moore.

While I applaud your company's innovation in the lithium space, I respectfully oppose this legislation, as the Railroad Valley is essential to NASA's operations, as well as many other satellite operators who provide important data on a huge range of issues like Earth's water cycle, atmosphere, land, snow, ice, climate change, natural disasters, and carbon dioxide.

In your testimony, you mentioned that you believe there was a lack of meaningful engagement from Federal agencies. Is that correct?

Mr. MOORE. That is correct.

Ms. KAMLAGER-DOVE. OK. So, my understanding, after hearing from NASA, BLM, and other stakeholders is that the agencies followed the letter of the law here, including the Council on Environmental Quality Guidance, on NEPA. So, given the fact that my colleagues on the other side of the aisle have been working to weaken NEPA, I just want to know your thoughts on the importance of having comprehensive environmental reviews.

Mr. MOORE. Yes. My thought here is, when I look at the documents and read the reports, which we get after the fact, right, the decisions made, then we get access to some things, and we can read through and see assumptions that are being made about our project on things that we don't even know yet. And we don't have

enough time to go through the details of what we could go through in the reports.

But the decisions made, for example, declaring that there is going to be no economic impact based on this decision, and really covering that in one sentence, given the fact that there are trillions of dollars in the ground is, to me, just questionable, and called for a broader analysis that——

Ms. KAMLAGER-DOVE. I don't want to cut you off, but I would 100 percent agree, even though my colleagues on the other side of the aisle continue to say that we are taking up too much time, putting too many pages in these environmental reviews, and so shorten it or don't even do it.

And I know that my time has run out, but I just thank you for trying to answer my question.

Mr. MOORE. Thank you.

Ms. KAMLAGER-DOVE. With that, I yield back.

Mr. STAUBER. Thank you. I am now going to recognize myself for 5 minutes.

Mr. Moore, I want to begin by sharing that I hear your frustrations. The Biden administration has arbitrarily taken political action to stop mining for critical minerals in my district in northern Minnesota. Just last week, the Army Corps revoked a Clean Water Act permit for a copper nickel project in my district which was initially granted by career officials at the Army Corps 4 years ago. That is after their mineral lease withdrawal of 225,000 acres in the working Superior National Forest, where mining is a desired condition.

In your case, the recent withdrawal in Nye County, Nevada prevents new development on nearly 23,000 acres. But the withdrawal is not meant to include valid and existing rights. This should mean that your current claims won't be affected. However, I have seen how access to mineral rights is often impacted when the surrounding area is withdrawn, and certainly a withdrawal changes the circumstances for future production.

What are your chief concerns about how this withdrawal may affect your existing rights to develop lithium in the area?

Mr. MOORE. Chairman, thanks for the question. Part of the issue is that we don't really understand the rules. We really don't understand what the rules are for access there.

We have land north. We have land south. OK. We are proceeding to continue to work on those pieces of land, but we are still confused about what that means. We have a continuous pool. We have a brine pool, OK? It is not separated into separate sections. There is no wall that separates the segregated area from the other areas. So, the rules around what we could even do outside the segregated area are a little bit in question for us, because we just haven't been part of the process.

So, for us, it creates just the humongous inefficiency and, to be honest, renders the economic equation questionable because we can't access the deepest and richest part of the mineral pool.

And as you said, or as Congressman Amodei said, the question as to whether you have valid, existing rights is also one that is a little bit nebulous to us, right? We certainly don't want to get into a 10-year process to figure this out.

Mr. STAUBER. Well, the mine in Minnesota is on its 20th year.

Mr. MOORE. Yes, OK.

Mr. STAUBER. Anyhow, Mr. Wood, can you discuss why NGOs like Trout Unlimited would be unlikely to participate in large-scale abandoned mine clean-up without the liability protection provided in the Community Reclamation Partnerships Act?

Mr. WOOD. Yes, thank you. Just one clarification. We are talking about largely smaller-scale projects. These aren't Superfund-type cleanups. These are straightforward construction projects.

The challenge that we have is that, as I said in my testimony, we can recover a stream to perhaps 95 percent of Clean Water Act standards, make it swimmable, make it fishable, make it darn near drinkable, maybe even drinkable. And we may be able to spend a few hundred thousand dollars on that work. But to get it that extra increment of 5 percent, it might be $1 million or $2 million, and No. 1, we don't have that.

And then the Clean Water Act also would require that we perpetually treat those systems. A lot of these hardrock systems, you can walk away from. You dig a ditch, you line it, you take a bulldozer, you bulldoze the tailings, line it, put parent material on it, dig a French drain, and you can walk away. But when you are talking about a lot of these coal systems, you have to perpetually go back in and reconstruct the passive treatment systems. And forever is a long time for a non-profit.

Mr. STAUBER. So, don't let perfect be the enemy of a real good.

Mr. WOOD. In short, yes.

Mr. STAUBER. Dr. Copan, in your experience what have been the biggest deterrents over the past two or three decades keeping students away from the mining-related fields?

And how does the Mining Schools Act help break down those barriers?

Dr. COPAN. Thank you so much for that question, Mr. Chairman. There are a number of factors that are important at play.

One is the image of the industry itself. And with the advent of the Mining Schools Act, we have the opportunity to provide new scholarship programs, to provide some greater prestige to entering this industry in the first place. It will take a holistic process that includes industry and, certainly, with the support of government, to ensure that the Mining Schools Act actually achieves its goals.

There was a study recently by McKinsey that showed the challenge of the attitudes toward the mining sector that ultimately need to be overcome, as well.

Mr. STAUBER. Describe to us in the next 10 seconds the image of mining. You had mentioned that in your first comment. Tell me what the image of mining, outside mining territories like northeastern Minnesota, what is the image?

Dr. COPAN. The image is one of a dirty industry, one that has been polluting and uncaring about the environment. In many cases, this is a legacy issue that does not recognize a high technology industry that involves artificial intelligence and advanced robotics, even laparoscopic strategies that are being used for subsurface resource development. So, that legacy image persists, and we see it persisting in our public media today, as well.

Mr. STAUBER. We had a member of this Committee distribute some, what I would call anti-mining studies, and the most recent was from 1985, and it was back to the 1800s. Of course, right? Of course, the technology has grown. So, I just really appreciate that.

And I want to thank Trout Unlimited and other groups like yours that have the potential to do great work here.

And Mr. Copan, thank you. I appreciate the work that you are doing to support our mining sector and train and educate our mining workforce for the future.

My time is up, and I am going to yield to my good friend from Michigan, Representative Dingell.

Mrs. DINGELL. Thank you, Mr. Chairman. I think this hearing is a really important hearing, because I deeply care about this subject. I want to find our common ground.

One of my priorities is ensuring that we, as a country, can reach our full potential in the build-out of clean vehicles, including battery electric vehicles. And mining is clearly, very important to that.

Professor Hammond, we know that our current mining law hasn't been meaningfully updated in 150 years. Many feel that it tips the scales toward mining companies and away from communities who want to have a say in the decision-making if we are going to build a robust and enduring mining industry in the United States that will support the critical minerals we need to build the vehicles of the future.

In your testimony, and building on what our Chairman was talking about as well, you mentioned that today's miners need to know more than just science and engineering. They need to know how to engage with communities, which is something that really matters.

Professor Hammond, can you expand on this a bit more? How can miners and mining companies with more knowledge about the communities they seek to operate in improve the process of everyone involved?

Ms. HAMMOND. Thank you for that question.

Good communicators can facilitate conversations where information flows in both directions, where people are speaking respectfully with each other and, ultimately, are reaching better decisions than would be reached unilaterally by any of the parties at the table.

For so often in this sort of history, communities have been told what is happening after it has happened. They haven't been invited to partner in decision-making in the first place. So, encouraging that as an aspect of higher education with the Mining Schools bill, I think, would be a really great area to direct some of this funding.

Mrs. DINGELL. Thank you. And again, building on what my colleague said, we want to work together, in case you can't tell.

Dr. Copan, in your testimony you mentioned the need to improve the perception of mining, make it a more attractive profession with positive relationships in society and a minimized environmental impact. Can you expand on why this positive relationship is important, and how you plan to encourage improvements in this area through education?

Dr. COPAN. Thank you so much for that question. It is absolutely essential for dialogue to take place that is informed, and that opens up genuine understanding amongst the parties.

Community engagement is actually integrated within our educational process involving sociologists, anthropologists, economists, and psychologists who actually are looking at all those human dimensions that I described in my testimony. It is important to bring together the understanding of what the industry means to the economy, what it means to our future, and to our national security as part of this broader dialogue.

And I believe the other important dimension is to ensure that the technology studies are brought holistically together with an understanding of impact on environment, science and technology, and society, and the exciting new dimensions of this industry for materials development and processing, beginning with the minerals that we rely upon. It is an exciting, high-technology industry, and dealing with that image is going to be a very important part of ensuring that this Act is a success in partnership.

Mrs. DINGELL. Thank you.

Mr. Chairman, they have called votes, and I know we have another Member to ask questions, so I would like to do another question on the record about the circular economy so we can make this a win-win.

But with that, I will yield back.

Mr. STAUBER. That is very kind of you. The Chair now recognizes Representative Gosar.

Dr. GOSAR. Thank you, Chairman.

Dr. Copan, I have a direct relationship with the Colorado School of Mines. My dad graduated from there in geology, and so did my sister. So, we are very, very well aware of your school, and thank you for being excellent.

You made the comment about holistic approach. We are actually doing that right now. Are you familiar with the Resolution Copper Mine?

Dr. COPAN. Yes.

Dr. GOSAR. Can you tell me a little bit about that? Because they actually made the water cleaner than they received it. They have dialogued with local communities. They have looked at every possible aspect. So, how does that compare to the image that we are fighting from the past?

Dr. COPAN. Thank you so much for that question. I am delighted you come from such a smart family, and I really appreciate the work that you have described, the Resolution mining program.

And I do believe that taking this approach that considers all aspects of the operation, that begins with the resource, but understanding the people and the communities that are part of the dialogue, looking at all aspects of the natural landscape and topography, what is this going to look like once the project is done and during its operations?

I think the philosophy that we are talking about here is one that not only re-imagines the industry, but also helps to communicate it in that much more positive way, that is looking ultimately to the environment, to the aspects of water use and recreation, under-

standing that we have this relationship with our Earth that we need to preserve for generations to come.

So, looking at this as a new dawn for the industry also will begin with the new people that we bring into the sector. I am excited about the Mining Schools Act and the related conversations today because the next generation is going to also define what holistic utilization of our resources is going to mean for us.

Dr. GOSAR. Both you and Dr. Hammond have expressed the communication aspect, and part of that is, when you grow up with it, to be honest with you, when I was growing up I hated rocks. I will just be very frank. I love rocks now, because they set you free. They tell the story. You would both be happy to know that in my district, at the Bullhead City Public Schools, they actually teach geology, so when you touch it, see it, feel it, and are taught about it, it makes a big, big difference.

So, Chris, I would be remiss if I didn't talk to you, Mr. Woods. When we look at mitigation of joint aspects, isn't there a way that we can actually work on things like taconite recovery, other sites, and leaving coal aside, where we get the biggest bang for our buck?

And we also have to look at transparently and flexibly, in that maybe it is not dollars and cents, but there is work, people actually do the work. Do you see a remedy for mitigating these abandoned mines?

Mr. WOOD. Well, I do think that there is a great American jobs program waiting to be started by cleaning up abandoned mines. There is no shortage of them in America. Some estimates are that there are half a million abandoned mines. We have estimated that about 100,000 negatively affect trout streams, because we have a parochial interest.

But I do think that there is a future where we can make our waters cleaner, we can make them more swimmable, fishable, drinkable, and create lots of substantial jobs in the process.

Dr. GOSAR. Mr. Moore, there is something unusual about the West, right? I mean, there is a lot of Federal estate. The equal footing clause basically stated that any estate west of the Mississippi that came in should get the same kind of contract as the Eastern states.

And Arizona and Nevada are very, very similar in the fact that we took the Federal estate, in fact, it was forced on us in lieu of the multiple-use doctrine of the land. How does that withdrawal affect you? How much is Federal land?

Mr. MOORE. All of it.

Dr. GOSAR. So, the whole state is almost 60 percent Federal.

Mr. MOORE. I think it is 80, 83 or something. We have 37,000 acres under lease, the largest lease claim ever assembled in Nevada. And this withdrawal takes a third of that. It is almost perfectly in the middle, perfectly.

Dr. GOSAR. Now, there is some new technology coming out in regards to retrieval of these minerals, and making it more advantageous to get everything out of that. And I know of one that has gone through proof of concept, and now is looking at scale, where it is very green, you are getting everything out of the matrix of the ore, it is pulverized, you get a bar that you actually separate everything out of.

How is that technology? I mean, I think a number of you have expressed that this new technology, the boom that is coming with AI, robotics, all this. Tell me about that, nuances.

Mr. MOORE. There are a lot of companies out there currently chasing that market, a lot of them.

It really comes down to your type of brine will dictate what kind of company you are going to partner with. We are partnering with three or four different companies, having them look at the brine. There are a lot of companies with simpler brines than we have, which are less mineral content, like in the Smackover and those kind of places.

But our project is fairly unique, in that we have a super-brine, which is 38 percent salt. You can't use this water for anything else. So, yes, the technology has come a long way in 3 years. Is it commercially deployable right now? It is not large-scale, commercially deployable. But, again, we are 3 years from producing lithium, right? We have to go through NEPA, and go through all the stuff we have to go through. But that technology is moving quickly, and thank you for your supporting a lot of that, quite honestly.

Dr. GOSAR. I yield back. Thank you very much.

Mr. STAUBER. Thank you very much. Before we wrap it up, I would like to submit for the record a statement from the National Mining Association in support of the Mining Schools Act; a *Wall Street Journal* article titled, "'War for Talent' at Mines Could Drive Up Cost of Energy Transition," published June 8, 2023; and submitted on behalf of Mr. Amodei, a letter from Nye County in support of H.R. 3883.

[The information follows:]

Statement for the Record

National Mining Association

on H.R. 2685, "Mining Schools Act of 2023"

On behalf of the National Mining Association (NMA) and the nearly 1.3 million hard-working men and women directly and indirectly employed by the mining industry, we express our strong and continued support for the Mining Schools Act of 2023 (H.R. 2685). Modern mining depends on a 21st century workforce that drives innovation, continues to prioritize health and safety while working to reduce environmental risk, and supports the communities where we live and work.

This bipartisan and bicameral legislation supports recruitment and education opportunities for engineers and other qualified professionals in the field of mining through a competitive grant program established by the Department of Energy, in consultation with the Department of the Interior. It further strengthens programs related to exploration, extraction, processing, refining, reclamation and reprocessing technologies for hardrock minerals and coal products to reduce U.S. dependence on foreign energy and mineral supplies.

As our global energy and mineral demands continue to increase at a rate never before seen, we must recruit, educate, train and develop tomorrow's workforce today, giving them the tools they need to develop a secure domestic supply chain that will deliver economic and national security for future generations. The mining industry is a highly technical field that already employs leading technologies in autonomy, mobility, active safety, and advanced data and analytics. These capabilities require a more technical workforce yet attracting and retaining great talent is a challenge.

The Mining Schools Act of 2022 helps to bridge the generational workforce gap by ensuring the next generation of miners continue to develop their skills alongside technological advancements, driving innovation and improving best practices.

From grant funding to cutting-edge research programs, we urge you to support this bipartisan legislation and this essential workforce.

'War for Talent' at Mines Could Drive Up Cost of Energy Transition

Companies wrestle with labor shortage as Washington tries to bolster domestic metals output

Wall Street Journal, June 8, 2023 by Hardika Singh and David Uberti

https://www.wsj.com/articles/war-for-talent-at-mines-could-drive-up-cost-of-energy-transition-30b927eb

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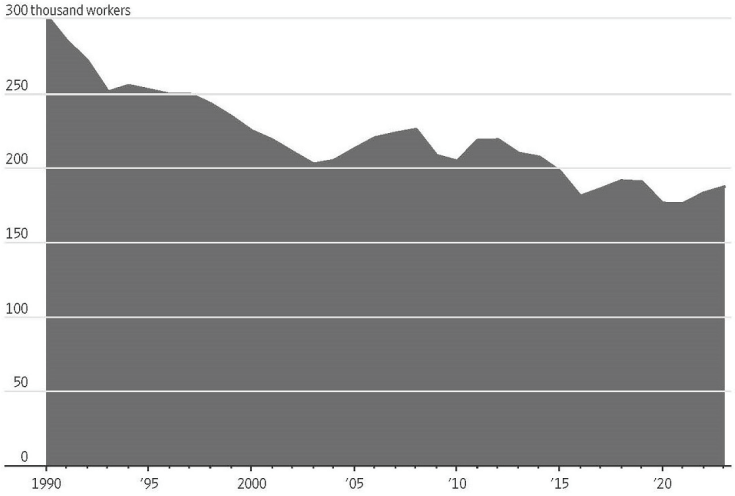
Wall Street is betting a labor shortage across the U.S. mining industry will drive up prices for the array of metals needed for the transition away from fossil fuels.

The crunch spans engineers who design job sites, miners who extract raw metals and the truck drivers who haul them away for processing. It is another headache for producers already struggling to supply the materials needed for electric vehicles, solar panels and wind farms.

"It is a war for talent," said Mel Sanderson, president of North America at American Rare Earths, which has projects in Wyoming, Arizona and Nevada.

Multinational companies and startups alike are competing for labor with more generous benefits and sustainability commitments to rehabilitate the industry's image for dirty and sometimes dangerous work. Adding to the hiring hurdles: Workers often need to relocate to remote job sites.

U.S. mining employment, seasonally adjusted



Note: All jobs across coal, metal ore and nonmetallic mineral mining
Source: U.S. Bureau of Labor Statistics

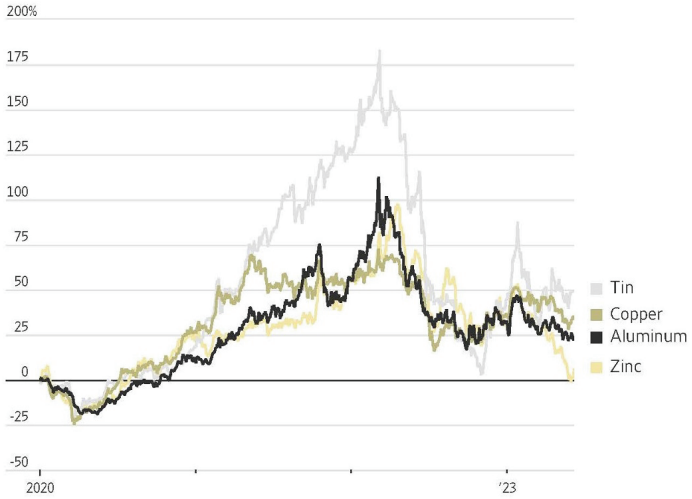
The push comes as the green-energy transition is expected to jack up demand for mined materials and the U.S. works to increase domestic production and reduce reliance on metals-rich China. Some investors say the challenge of meeting those goals will power higher prices for commodities such as copper, lithium, nickel, tin and zinc in coming years.

"Who wins here? The price of the metal," said Luke Oliver, head of climate investments at KraneShares, who is invested in metals through futures. "We don't think supply can keep up with demand."

Metal prices are down from last year's record highs, dragged lower by China's unexpectedly weak reopening after stringent Covid-19 lockdowns. The S&P 500 index's materials sector, which holds shares of mining companies, is one of the worst performers this year.

But many analysts expect a rebound. Citi expects labor shortages, permitting challenges and other issues will propel lithium prices higher by as much as 40% by year's end. It forecasts copper will jump 50% by 2025, noting that it is less vulnerable than some other metals to recent innovations for electric-vehicle batteries.

Prices for base metals trading in London, change since end-2019



Source: FactSet

Many established mines are already contending with decades of underinvestment, and companies say that labor shortages could further threaten their ability to increase output.

"It is just a significant matter in the U.S.," Freeport-McMoRan chief executive Richard Adkerson said during a recent earnings call. Shares of the company, which is based in Phoenix, are down 1.1% this year.

The warnings come after a yearslong pullback in U.S. mining. The overall industry's seasonally adjusted head count shrank by nearly 39% since 1990 as power generators turned away from coal, according to the Bureau of Labor Statistics. Colleges and universities have struggled to rebuild the depleted talent pipeline.

"The problem is that talent isn't lying around waiting to be paid more—there just isn't enough of it," said Andrea Brickey, an associate professor of mining engineering and management at the South Dakota School of Mines & Technology.

Rylan Nemesh, a 22-year-old mining engineer, received half a dozen job offers before graduating from West Virginia University. He opted for a company that produces building materials and offered him a $7,500 signing bonus and company truck.

"When people say 'mining,' it's not exactly the prettiest thing in the world," he said. "But it is insanely technologically advanced nowadays."

Lithium Americas, which is sitting on perhaps the country's largest lithium deposit, joined with a coal firm to help design and eventually staff its forthcoming Thacker Pass mine in northern Nevada.

"You don't need lithium people, per se," said Jonathan Evans, chief executive of Lithium Americas. "You need chemical-processing people and mining people."

The company has the advantage of a $650 million investment from General Motors, providing more certainty to potential employees than many other projects. Its shares, listed in Canada, are up 10% this year.

"The quicker you move and contract people, the better," Evans said.

Submission for the Record by Rep. Amodei

NYE COUNTY
Office of the County Manager

June 12, 2023

Hon. Mark Amodei
U.S. House of Representatives
104 Cannon House Office Building
Washington, DC 20515

Re: **Nye County Letter of Support for H.R. 3883 and H. Res. 478**

Dear Congressman Amodei:

On behalf of Nye County, I am writing to express our strong support for H.R. 3883 and H. Res. 478 and to thank you for your leadership in this effort. Both these measures support the termination of the Bureau of Land Management's Public Land Order No. 7921 which withdrew over 22,000 acres of land in Nye County in the Railroad Valley at the request of NASA. Our opposition is based on three facts. First, the Public Land Order was issued despite the failure of NASA to allow Nye County to participate in the proceeding as a Cooperating Agency. Second, the Public Land Order eliminates the ability for the county and the private sector to develop new mineral resources—minerals that are critical to the nation's renewable energy future. Third, the withdrawal is unnecessary. NASA has operated for decades in the Railroad Valley. There is no evidence that anything has changed that requires NASA to now withdraw the land. Together, these points make an overwhelming case to pass both H. Res. 478 and H.R. 3883 to disapprove of Public Land Order No. 7921. I will discuss each of these points in more detail below.

1. NASA refused to allow Nye County to participate in the NEPA process as a Cooperation Agency.

There is a long-time precedent for Nevada local governments to participate in federal actions that would significantly impact the lands under their jurisdiction. Nye County formally requested to become a cooperating agency in a letter dated July 20, 2021. Quite frankly we expected the request to be granted quickly, given that NASA has been operating in Railroad Valley for decades with the cooperation and support of the county. As a cooperating agency, Nye County would have had access to all the relevant information developed for the withdrawal. More importantly, the county would have helped assess the mineral potential in Railroad Valley. NASA denied the request made in the letter and again denied the county's subsequent requests made in public meetings. Even more disturbing, NASA also denied the request made by Congressmen Amodei and Horsford and Senators Rosen and Cortez Masto. There was simply no need for NASA to run roughshod over the county and its Congressional representatives. The request made by the county to be a cooperating agency was a very reasonable request, and its denial was patently unreasonable. It also severely damaged the working relationship between NASA and the county.

2. Public Land Order No. 7921 ends the opportunity for the county and the private sector to develop new mineral resources.

Public Land Order No. 7921 is subject to existing valid mining rights; however, the PLO also eliminates the ability to develop new mineral resources. A Bureau of Land Management (BLM) study released in May 2022 identified the potential existence of three highly critical minerals in the Railroad Valley. They are barite, lithium, and magnesium. The demand for these minerals is exploding as they are essential to the growth of the renewable energy sectors. Specifically, lithium is used in the production of batteries for electronic vehicles. The US does not produce nearly enough lithium to meet its needs. The country cannot afford to take a very promising source of minerals off the table.

3. Public Land Order No. 7921 is unnecessary.

Nye County was surprised when NASA applied for the withdrawal. NASA has been operating successfully in Railroad Valley for decades. Due to the topography and geology of Railroad Valley, NASA has used the land to calibrate its

satellites. To the best of our knowledge, there has never been a problem. The county always supported NASA in its operations. As part of the withdrawal process, the county asked NASA on several occasions what had changed that required a massive land withdrawal at this time. It never got an answer. However, to reassure NASA that the county wanted to support it, the county offered to enact zoning legislation to minimize any impacts on NASA of any future mineral development. The county has always been a good partner of NASA. NASA failed to make the case that it needed the withdrawal was needed.

Withdrawing 22,684 acres is not a minor action on the part of the federal government. Before it is done, it is essential that the local governments and communities be involved in the process so that they can protect the interests of their residents. NASA failed to do this, and the BLM's approval of the request was also improper. For that reason, we strongly support both H. Res. 478 and H.R. 3883.

Sincerely,

TIM SUTTON,
Nye County Manager

Mr. STAUBER. And Mr. Copan, you talked about Mr. Gosar going to a great mine school. I will just let you know Michigan Tech in Houghton, Michigan is one of our 14 mine schools, and my oldest son attends there. He has his mother's brains, though, I can tell you that.

[Laughter.]

Mr. STAUBER. With that, I appreciate it.

And then I want to let you all know that mining is—I talk about mining, the history of mining in northeastern Minnesota. I just want to share this quickly with you. Mining is our past, our present, and our future. And our future is bright not only in taconite mining, but now critical minerals mining. And I will let you all know that the cleanest water in the great state of Minnesota is in the heart of mining country.

Dr. GOSAR. Mr. Chairman?

Mr. STAUBER. Yes.

Dr. GOSAR. Can I clarify one statement?

Mr. STAUBER. Go ahead.

Dr. GOSAR. I didn't go into geology, but I went into micro-engineering and mining, and it was called dentistry.

[Laughter.]

Mr. STAUBER. OK.

I want to thank you all again.

The members of the Subcommittee may have some additional questions for the witnesses, and we will ask you to respond to these in writing. Under Committee Rule 3, members of the Committee must submit questions to the Committee Clerk by 5 p.m. on Monday, June 19. The hearing record will be held open for 10 business days for these responses.

If there is no further business, without objection, the Committee stands adjourned.

[Whereupon, at 2:44 p.m., the Subcommittee was adjourned.]

[ADDITIONAL MATERIALS SUBMITTED FOR THE RECORD]

Submissions for the Record by Rep. Ocasio-Cortez

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

November 14, 2022

The Honorable Tanya Trujillo
Assistant Secretary for Water and Science
Department of the Interior
1849 C Street, N.W.
Washington DC 20240

Dear Assistant Secretary Trujillo:

This letter is written in support of NASA's request to withdraw BLM/DOI federal land at Railroad Valley (RRV), Nevada.

The Railroad Valley desert has been developed over the last few decades as one of the best ground reference sites for vicarious calibration of satellite radiometer calibration and validation, especially for high spatial resolution radiometers. The Railroad Valley site is a NASA-funded, instrumented validation site, for the solar band radiometric validation of imaging radiometers. Imaging radiometers measure the absolute radiated power emitted by a section of the ground, and the absolute accuracy of these instruments ensures the information from the measurements accurately portrays the ground environment. The RRV site has been endorsed by the Committee on Earth Observing Satellites (CEOS)/Working Group on Calibration/Validation (WGCV) as one of the four Radiometric Calibration Network (RadCalNet) sites worldwide. Located near Ely, NV Railroad Valley has about 10 x 10 km usable area and the in-situ measurements at the site make it uniquely qualified for satellite radiometer calibration/validation.

At NOAA, the Railroad Valley site is used routinely to analyze and monitor the radiometric performance, such as stability, accuracy, and long-term trends, of the Visible Infrared Imaging Radiometer Suite (VIIRS) instrument on NOAA's Suomi NPP, NOAA-20, and NOAA-21 operational weather satellites. It is also in NOAA's interest as a principal member of CEOS to support satellite earth observations and coordinated cal/val efforts. In addition to its use for VIIRS, this site is an important asset to the constellation of high resolution sensors (30 m and better), such as Landsat and commercial satellites for which NOAA has an increasing interest.

Sincerely,

STEPHEN M. VOLZ, PH.D.,
Assistant Administrator for Satellite and Information Services

Planet Labs Inc.
San Francisco, CA

July 22, 2022

National Aeronautics and Space Administration
300 E Street SW
Washington, DC 20546

To Whom It May Concern:

Planet appreciates the opportunity to comment on the Draft Environmental Assessment for Land Withdrawal Application in Railroad Valley, Nevada (Draft EA) and Planet would like to express its support of NASA's proposed alternative to withdraw the land. Planet strongly opposes changes to this critical and unique national asset and supports continuing to protect and preserve this site. The Railroad Valley site is essential to Planet and other national and commercial Earth observing satellite systems to maintain radiometric calibration and ensure our imagery is accurate for our commercial, civil, and national security users.

Planet is one of the world's leading Earth imaging satellite companies. Based in San Francisco, we have been imaging the entire landmass of the world everyday for the past 6 years. This data is licensed to a wide variety of commercial and government customers. Seventy percent of our business is on the commercial side where we provide daily imagery to customers across many sectors including agriculture, energy and land management, emergency management, infrastructure, insurance, finance, security, scientific research and education. We also provide data to government customers including Earth scientists and researchers across the U.S. Government and the intelligence and defense community. Our imagery enables governments, agencies, communities, companies, and individuals to make better data driven decisions.

Critical to our ability to provide accurate imagery and data to our customers is our ability to calibrate our fleet of over 200 satellites. The Railroad Valley site is essential in this process and is used as both a pseudo invariant calibration site as well as leveraging the data that the RadCalNet station on the site produces. As laid out in section 1.1.1 of the Draft EA, Railroad Valley is a unique and critical site that enables Planet and other Earth imaging assets to calibrate and maintain effectiveness as a provider of remote sensing data for the world. Planet uses Landsat, Terra and Aqua data for radiometric calibration, atmospheric correction and derived data products like Planet Fusion Monitoring and Planet Basemaps.

Planet started radiometric calibration in 2016, with two of our initial test "Dove" satellites. Since then we have individually calibrated over 250 satellites. Radiometric calibration is how we can convert measurements from our satellites to a physical unit of energy. This allows the data from our satellites to be easier to use and comparable with other satellites. For the process of radiometric calibration, we are reliant on well-characterized and stable sites that do not change over the years, generally called a pseudo invariant calibration site. This stability allows us to isolate changes in our satellites over time. The fact that Railroad Valley has been studied and characterized for over thirty years means we can take into account differences between satellite instruments for the purposes of our calibration. This is key in allowing us to leverage public missions from NASA and others that have advanced on-board calibration capabilities and transfer their calibration to our satellites. Our satellites have a wide variety of instruments on them so this aspect is also important when comparing different Planet satellites (Figure 1). Railroad Valley's use from the very first calibrated Dove to the latest SuperDove allows us to provide a continuity of metrics. Any alteration of the site would degrade our ability to provide accurate radiometry and break this link from our very first calibrated satellites to our current and future satellites.

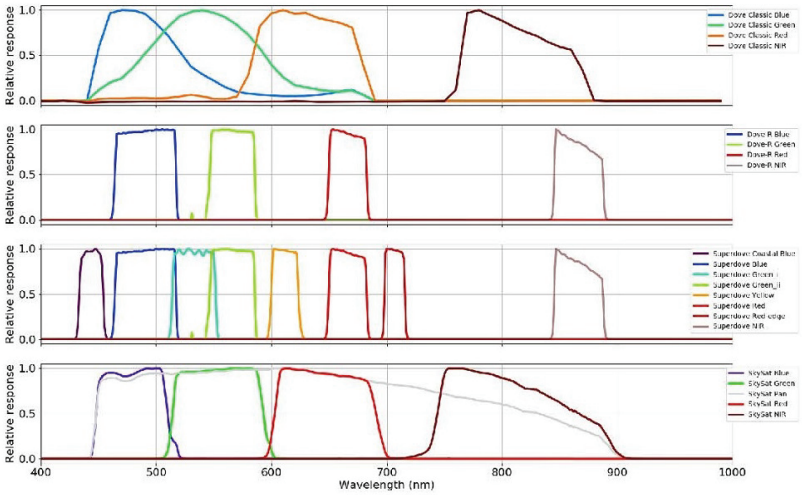


Figure 1—Showing the different spectral bands for the satellites that Planet currently operates.

With the Railroad Valley Site also being used by reference missions like Landsat 8, Landsat 9, Sentinel-2 and other programs, protection of this site is critical to allow for data fusion work in science and industry across data sources. The calibration Planet and other commercial Earth observing satellite systems do using the site ensures data from early Landsat and other missions decades ago can be used along with additional commercial data being collected today to enable new scientific understanding. This effectively multiplies the scientific impact of NASA's own missions as long as the Railroad Valley site is protected.

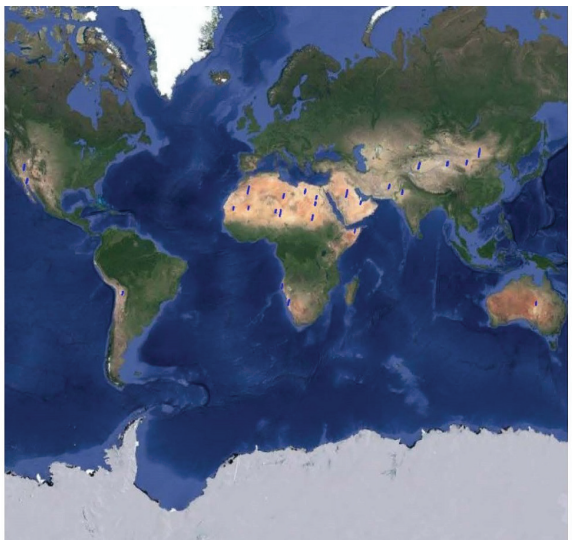


Figure 2—The calibration sites that Planet uses across the world.

Planet uses a set of 27 calibration sites across the world (Figure 2). All these sites are important to our calibration process but Railroad Valley is the only one in the USA that is easily accessible. Figure 3 shows the amount of data for each calibration site as a proportion of the total calibration data for our newest satellites (Block 3 Skysats) launched in 2020 and shows how significant the Railroad Valley site plays in the calibration of these satellites.

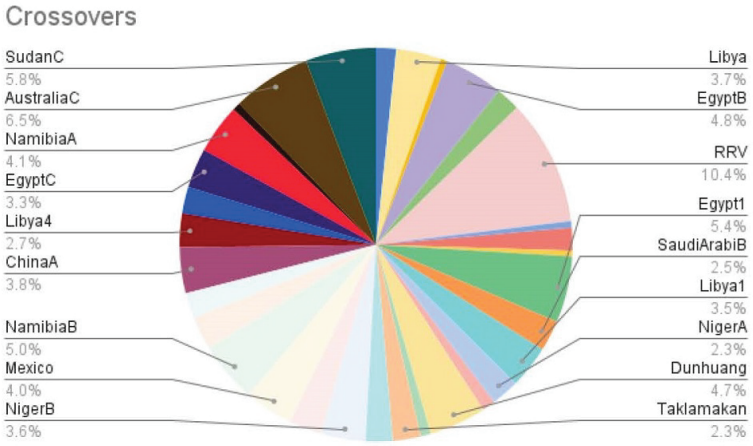


Figure 3—The calibration data for Skysat Block 3 satellites separated by calibration site between September 2021 and January 2022. RRV denotes Railroad Valley.

Railroad Valley also has a RadCalNet station on the site. This provides an automated source of ground measurements, which can act as a source of truth to validate our measurements. The fact that RadCalNet is an open and widely used data source means it is a great tool to create publicly understandable and verifiable accuracy estimates. Railroad Valley is only one of four RadCalNet sites in the entire world. Figure 4 shows the proportion of RadCalNet data from all the SkySat satellites over a one year period (September 2020 to December 2021) that comes from Railroad Valley.

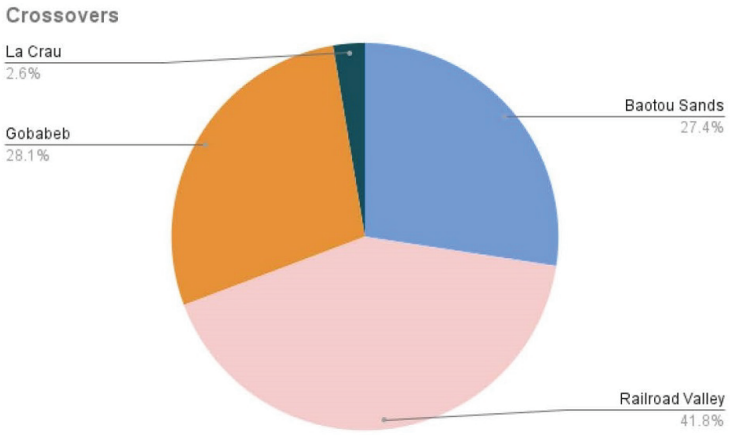


Figure 4—The amount of RadCalNet data for all SkySat satellites between September 2020 to December 2021, split by site, that is used for public validation estimates.

The Draft EA also includes discussion of alternative calibration methods in section 2.3.1.

Planet engages in several calibration methodologies, including an extensive lunar campaign continuously since 2016. Planet satellites do not have on-board calibrators due to numerous factors including size constraints. Despite having numerous approaches to calibration, the absolute radiometric calibration of the Planet satellites (Dove Classic, Dove-R, SuperDove and SkySats) all use data from well-calibrated reference satellites that rely on Railroad Valley for their own absolute calibration.

As you know, calibrated data is of utmost importance for scientific research. It allows data across disparate satellites to be used together, such as Planet's Doves and NASA/USGS Landsat data, creating a cohesive network of information. Calibration is also critical for any reliable quantitative analysis of the data, because it allows real changes on the surface of the Earth to be distinguished from variations in imaging conditions on the ground, in the atmosphere, and onboard the satellite. Accurately monitoring change on Earth cannot be accomplished without well-calibrated data.

We thank you again for your work in protecting the unique and critical role the Railroad Valley site plays for remote sensing and Earth imagery. Railroad Valley is a unique national resource and is critical to maintain accurate measurements of our world. As our nation becomes ever more impacted by an evolving and changing environment, it is critical to have reliable and accurate data and imagery of our planet to enable communities to make better data-driven decisions.

Thank you for your consideration,

ASHLEY JOHNSON,
Chief Financial Officer

United States Department of the Interior
U.S. Geological Survey

October 31, 2022

MEMORANDUM

TO: Tracy Stone-Manning—Director, Bureau of Land Management

FROM: David Applegate—Director, U.S. Geological Survey

Re: National Aeronautics and Space Administration's Railroad Valley Playa Calibration Site Withdrawal Request

The U.S. Geological Survey (USGS) would like to submit the following memorandum in response to the Notice of Application for Withdrawal Nye County, Nevada ([FR Doc. 2021-08881) submitted by the National Aeronautics and Space Administration (NASA) requesting the Secretary of the Interior to withdraw and reserve lands at the Railroad Valley Playa (RRV) Calibration Site in Nye County, Nevada, from operation of public land laws, including the mining, mineral leasing, and geothermal leasing laws to preserve the surface integrity of the playa for NASA's satellite calibration purposes. This memorandum provides information about the uses of the site for remote sensing calibration and validation and a summary of USGS knowledge of lithium and other geologic resources at the site.

The USGS National Land Imaging (NLI) Program supports remote-sensing science needs within the USGS, the DOI, and the nation. NLI builds international Earth observation partnerships; interacts with the aerospace and remote sensing industries; coordinates satellite imagery requirements and acquisitions across the Federal Government; and develops and maintains bilateral agreements with foreign countries in the development and operation of world-wide remote-sensing capabilities. NLI sets the programmatic requirements for the management and operation of Landsat 7, 8, and 9 and the development of future Landsat satellites and other systems.

The RRV Calibration Site in Nye County, Nevada, is one of only five international sites endorsed by the Committee on Earth Observation Satellites (CEOS) Radiometric Calibration Network. The RRV is the only site in the U.S. that satisfies all the requirements for a natural calibration target. It is located within the continental U.S. and therefore offers security not found at international sites. It is homogeneous (color, texture, and flatness) over a large enough area to accommodate large-footprint sensors. This heavily instrumented, well-characterized site has been used for decades by civil, commercial, and international Earth observation satellite missions. University of Arizona personnel, funded by NASA and the USGS, have continually performed field campaigns at the RRV for more than two decades, enabling a full characterization of the playa's surface and the atmosphere above it in all types of weather and seasonal change. The geomorphological characteristics and the two decades of continuous site characterization have resulted in a unique calibration site. The USGS has invested more than $4 million over this timeframe and expends several hundred thousand dollars a year to sustain it. The information collected at the site is provided to the public for free and helps all satellite operators, whether government or non-government, domestic or international, assess sensor performance against a known standard and allows satellite operators to update their image-processing systems to correct for space-based instrument degradation. Current users of the RRV include the USGS, NASA, National Oceanic and Atmospheric Administration (NOAA), and European, Japanese, Indian, Chinese, Brazilian, and commercial Earth observation satellite missions.

The site is important in the current validation and scientific traceability of the USGS Landsat Program (Landsat 8 and 9) as there is no other location in the U.S. that serves in this capacity. The site will also be useful to future NASA/USGS Sustainable Land Imaging (SLI) satellites, such as Landsat Next, the replacement to Landsat 8, now under development. Disturbance to the pristine surface of RRV could negatively impact the viability of the site as a calibration reference by introducing discontinuities in the previously homogeneous surface that would change its spectral reflectance. This would result in nullifying the historically derived spectral response of the site and require additional surveying or potentially abandonment of the site, impacting the ability to validate the scientific quality of data from Landsat and other satellite missions. The following table lists current and planned space missions using the RRV along with the spatial resolution "footprint" of each mission sensor and the corresponding area of land required at the RRV site to viably conduct calibration.

Satellite instrument	Nominal Ground Footprint (bands < 2 μm)	Vicarious Calibration area needed (3 x 3 pixel) *single pixel area	
		km^2	acres
GOSAT	13.2 km (at RRV)	175*	43,000*
GeoCarb	7.0 km x 4.5 km (at RRV)	32*	7,780*
OCO-2, OCO-3	1.3 km x 2.25 km	27	6,670
MODIS-Terra, Aqua	1 km	9	2,230
GOES	1 km	9	2,230
VIIRS	750 m	5	1,250
MISR	250 m (nadir) 1.1 km (off nadir)	0.7 10	170 2,480
Landsat	30 m	0.008	2
Commercial & Defense	<15 m	0.002	0.5

Table 1: Space Missions Using the RRV with Resolutions and Areas
(Source: NASA)

The USGS Mineral Resources Program and Energy Resources Program study mineral and energy resources across the Nation, including in the RRV and the surrounding area, in part based on use of the Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) that is also used at the RRV to provide calibration data for GOSAT. The RRV is the site of the first (1954) and most productive (more than 48 million barrels extracted to date) oil fields in Nevada. Annual production has declined from a peak of more than 3 million barrels of oil per year in the late 1980s and early 1990s, to approximately 183,000 barrels in 2020, of which approximately 1,160 barrels were produced from Sans Spring, the one active field in the withdrawal application area. It is not known how changing market conditions could alter the rate of production or what undiscovered resources may be present, but the existing fields have been depleted from years of production.

Geothermal energy resources with an average temperature of approximately 135°C have been identified on a roughly east-west trend through the withdrawal application area from observations in oil wells. Although there is significant porosity and permeability, the potential for electric power generation is limited by the relatively low reservoir temperature. USGS estimates of the RRV geothermal production potential give a mean value of approximately 18 MW-electric, which represents less than 2% of identified geothermal resource potential for the state of Nevada.

Finally, under a portion of the RRV site, exploration firms have identified both solid salt deposits and associated brines in the subsurface sediments at depths between 1000' and 3000'. High lithium concentrations have not been reported in the public domain for the brines or associated solid salt deposits. The USGS does not have a comprehensive national assessment of lithium resources at this time. Traditionally, lithium recovery from brine employs large ponds on the land surface to concentrate lithium through evapotranspiration. For example, lithium brine evaporation ponds at Clayton Valley, Nevada, the only currently active lithium brine operation in the U.S., covers approximately 4,150 acres and can hold several billion barrels of brine. Industry has been developing direct lithium extraction (DLE) technology, which removes lithium from brine without evaporation and allows reinjection of the brine without loss to evaporation, but DLE has not yet been employed on a commercial basis. Until DLE is proven commercially, new lithium brine operations will likely involve evaporation ponds and net withdrawal of brine from underground, leading to subsidence of the land surface.

The USGS is providing this additional information on the remote sensing uses of the RRV, potential impacts to DOI/USGS Satellite Operations, and current level of knowledge of geologic and lithium assessments to support BLM's analysis of the withdrawal request. The USGS is open to providing additional information or engaging in further discussion if needed.

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