PA House of Representatives
Republican Policy Committee

414, Main Capitol Building
Harrisburg, PA 17120
(717) 260-6144

Rep. Joshua D. Kail
Chairman

PA House Republican Policy Committee Hearing

"Reclaiming Our Potential: PA Rare Earth Minerals"

August 22, 2023, at 10 a.m.

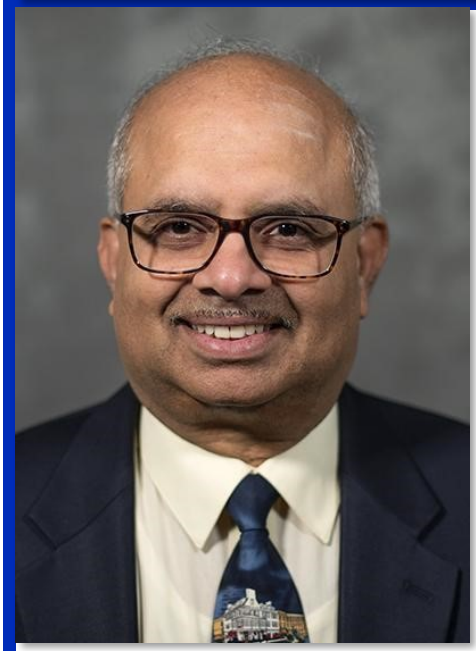
River's Landing & Event Center
139 W Market St.
Clearfield, PA 16830

10:00 a.m.	Welcome and Pledge of Allegiance
	Explaining Earth Minerals Panel
10:10 a.m.	Dr. Pete Rozelle, Ph.D. *Advisor, Pennsylvania State University College of Earth & Mineral Sciences, Retired Program Manager, U.S. Department of Energy*
10:15 a.m.	Dr. Sarma Pisupati, Ph.D. *Professor of Energy & Mineral Engineering: Professor of Chemical Engineering, Director of the Center for Critical Minerals, Pennsylvania State University*
10:20 a.m.	Questions for Explaining Earth Minerals Panel
	Exploring Earth Minerals Panel
10:50 a.m.	Anthony Marchese *Chairman, Texas Mineral Resources Corp.*
10:55 a.m.	James Swistock *President and Co-Founder, Penncara Energy, LLC*
11:00 a.m.	Questions for Exploring Earth Minerals Panel
11:30 a.m.	Closing Comments

Testifier Biographies

PA House of Representatives Policy Committee Hearing

"Reclaiming Our Potential: PA Rare Earth Minerals"



Dr. Sarma Pisupati, Ph.D.
Professor of Energy & Mineral Engineering, Professor of Chemical Engineering, Director of the Center for Critical Minerals, Pennsylvania State University

Sarma V. Pisupati is Professor of Energy and Mineral Engineering, and Director of Center for Critical Minerals at Penn State. He also codirects Coal Science and Technology Program of the EMS Energy Institute.

He earned B.S. and M.S. degrees in Chemical Engineering from Osmania University and IIT Kharagpur, respectively and a Ph.D. degree from The Pennsylvania State University. He has been studying and teaching the issues related to the energy and environment for the past 35 years. He has worked in industry for five years before joining The Pennsylvania State University.

Prof. Sarma's main areas of scientific research are chemical kinetics, mass and heat transfer in combustion of solid fuels; computational fluid dynamic modeling of combustion systems for emission reduction; extraction of geothermal energy integrated with CO2 sequestration, advanced power generation methods; oxy-fuel combustion; chemical looping combustion; slagging and fouling in gasification; coal and biomass co gasification and extraction of critical and rare earth elements from secondary sources. He was Principal Investigator (PI) or co-PI on 65 externally funded scientific research projects and was involved in 15 other projects with specific responsibilities. He coauthored over 225 research publications and has one US patent.

Sarma is very actively involved in professional societies. He is a Fellow of American Chemical Society. His service to professional societies includes: Co-organizer and/or Co-chair or Moderator of 25 Scientific and teaching related Symposia for American Chemical Society, ASME International Fluidized Bed Combustion Conferences, Annual International Pittsburgh Coal Conferences and American Society of Engineering Education, Associate Editor, ASME Journal of Energy Resources and Technology, Energy Research Journal; International Journal of Oil, Gas and Coal Technology; News Letter Editor, Secretary/Treasurer, Division Chair of the Energy Conversion and Conservation Division, American Society for Engineering Education; Conference Chair of 17th ASME International Conference on Fluidized Bed Combustion; Treasurer, Petroleum Chemistry Division of the American Chemical Society; Program Chair, Fuel Chemistry Division, American Chemical Society; Member Steering Committee of the 16th International Conference on Fluidized Bed Combustion.

Dr. Pete Rozelle, Ph.D.
Advisor, Pennsylvania State University, College of Earth & Mineral Sciences
Retired Program Manager, U.S. Department of Energy

Pete Rozelle is an Advisor to Pennsylvania State University's College of Earth and Mineral Sciences about mineral resources. He is a retired Program Manager at U.S. Department of Energy (DOE) Headquarters, where his responsibilities included management of the Turbines, Gasification and Rare Earth research programs, as well as providing in-house due-diligence support of large-scale projects. Prior to joining DOE, he worked in the mining, metallurgical and power industries.

Rozelle has Ph.D. and M.S. degrees from the Fuel Science Program within the College of Earth and Mineral Sciences.

Anthony Marchese
Chairman, Texas Mineral Resources Corp.

Anthony Marchese is currently the Chairman of Texas Mineral Resources and has served as a director since December 2009. He is currently the CEO of EV Blockchain Corp and President of Marchese Management Co.

From May 2012 until August 2017, Marchese was the managing director of capital markets at Tri Point Global Equities. Marchese had served as a Senior Vice-President with Axiom Capital Management, Inc., a New York City based FINRA member broker/dealer. He also serves as the general partner and chief investment officer of the Insiders Trend Fund, LP, an investment partnership whose mandate is to invest in those public companies whose officers and/or directors have been active acquirers of their own stock.

Marchese's prior experience includes Monarch Capital Group, LLC (President and Chief Operating Officer – 2003 to 2011), Laidlaw Equities (senior vice president - April 1997 to March 2002), Southcoast Capital (senior vice president – May 1988 to April 1997), Oppenheimer & Co (limited partner – September 1982 to May 1988), Prudential-Bache (vice president – July 1981 to August 1982) and the General Motors Corporation (analyst – June 1980 to June 1981).

Marchese served in the military with the Army Security Agency and the U.S. Army Intelligence and Security Command where he carried a Top Secret security clearance. He has been a long-time arbitrator for the Financial Industry Regulatory Authority (FINRA).

Marchese received an MBA in Finance from the University of Chicago.

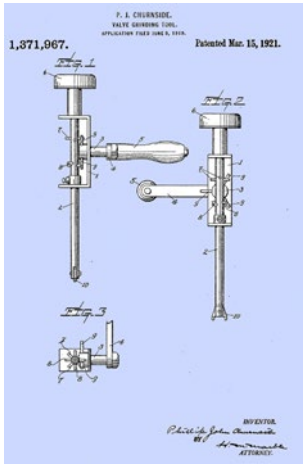
James Swistock
President and Co-Founder, Penncara Energy, LLC

In 1999, James “Jim” Swistock co-founded Penncara Energy, LLC with business partner Michael Corless to develop opportunities in the energy business. From the start, Jim stepped into the President’s role, and under his leadership, Penncara Energy, LLC has thrived, developing several large synthetic fuel projects in Pennsylvania and Ohio. One such project included assisting AIG Financial Products Corporation in the acquisition, relocation, and operation of six synthetic fuel facilities.

Over the last 46 years, Jim has invested in several other successful startups in energy, coal, and waste management. He has secured equity investments and financing for coal mining, explosives, waste management, and synthetic fuel ventures across the U.S., from Pennsylvania to Georgia, South Carolina, and even to Florida. Another company co-founded by Jim, Geo-Waste, was a NASQ traded waste management company that sold for $56 million.

Throughout his career, Jim has held a number of significant ownership and management positions, even serving as an officer and member of the Board of Directors for the Pennsylvania Coal Mining Association. Jim has also prioritized investing time and resources into his local community, having sat on the Board of Directors for Make-A-Wish Foundation of Greater Pennsylvania and Southern West Virginia and having partnered with three minor league baseball teams—the Altoona Curves, State College Spikes, and Myrtle Beach Pelicans. A graduate of Lock Haven University, Jim has served as a member of their Council of Trustees.

Supply Chains and Critical Mineral Opportunities in Pennsylvania



Pete Rozelle

22 August 2023

Recent Supply Chain Reports from the Federal Government

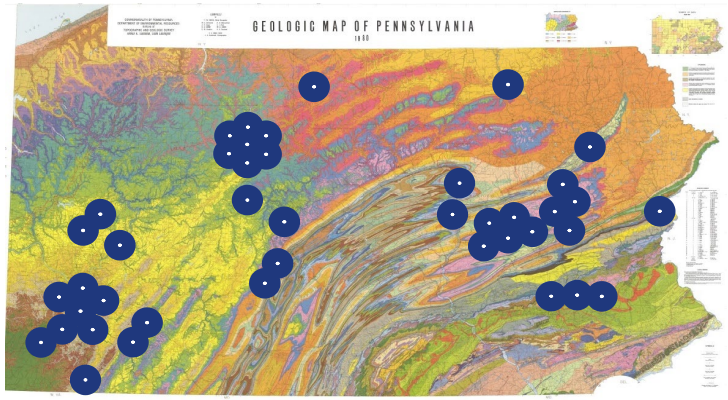
- Agri-Food Supply Chain Assessment (USDA)
- Cybersecurity and Digital Components (DOE)
- Defense-Critical Supply Chains (Department of Defense)
- Electric Grid (DOE)
- Grid Energy Storage (DOE)
- Information and Communications Technology (Commerce/Homeland Security)

Recent Supply Chain Reports from the Federal Government

- Nuclear Energy (DOE)
- Platinum Group Metal Catalysts (DOE)
- Public Health Supply Chain and Industrial Base (HHS)
- Rare Earth Magnets (DOE)
- Semiconductors (DOE)
- Transportation Industrial Base: Freight and Logistics (Department of Transportation)

Pennsylvania Production Facilities are in these Supply Chains

- **Also:**
  - ✓ Equipment Dealerships
  - ✓ Process Equipment Vendors
  - ✓ Transportation Firms
  - ✓ Engineering Firms
  - ✓ Fabrication Shops
  - ✓ Environmental Firms
  - ✓ Geology Firms
  - ✓ Law Firms
  - ✓ Maintenance Contractors
  - ✓ The Lunch Truck



Examples of Supply Chain Operations

- **Can We- Re-Shore the Raw Material Supply for these Operations?**
- **Can We do it in Pa.?**

Example Applications for Critical Mineral Commodities

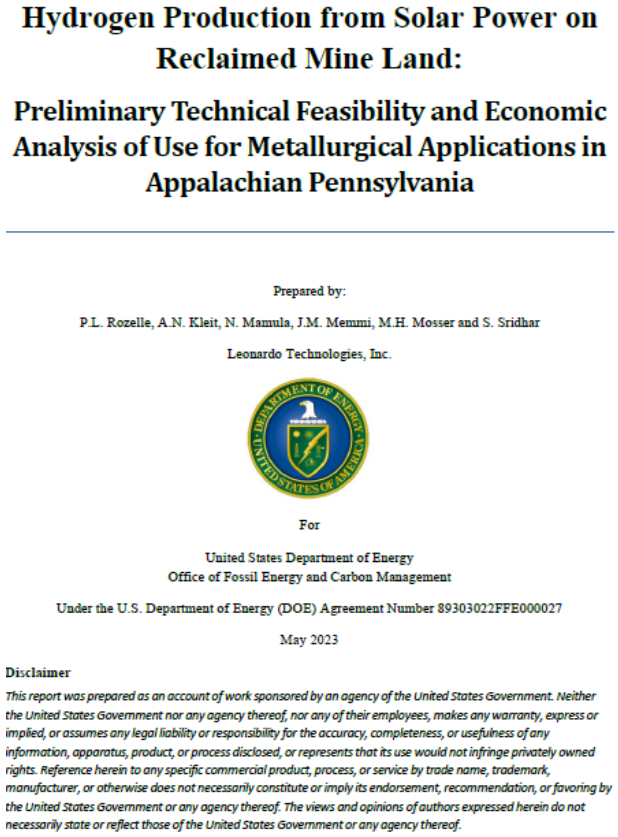
- Infrastructure and Transportation:
  - 5G systems
  - Electric vehicles (batteries and magnets)
- Energy:
  - Wind turbines
  - Solar panels
  - Conventional power systems
- Defense:
  - Magnets
  - Hot gas path parts in jet engines
  - Batteries

Critical Mineral Resource Opportunities in Pennsylvania (Work Underway)

- **The focus is linkage with reclamation of degraded land and water**
- **Cobalt, indium, lithium, manganese and zinc**: Significant amounts found on degraded mine and industrial lands requiring reclamation
- **Rare earths**: elevated concentrations have been found in rocks and acid mine drainage treatment sludges
- **Revenue from critical mineral production can help fund reclamation activities**

June 2023: The Use of Reclaimed Mine Land for Hydrogen and Metals Production (in Clearfield County)

- Hydrogen can be produced using solar power
- Using the hydrogen to produce metals has been done commercially in some cases
  - Cobalt
  - Germanium
  - Iron
  - Nickel
  - Tungsten



Hydrogen Production from Solar Power on Reclaimed Mine Land:

Preliminary Technical Feasibility and Economic Analysis of Use for Metallurgical Applications in Appalachian Pennsylvania

Prepared by:

P.L. Rozelle, A.N. Kleit, N. Mamula, J.M. Memmi, M.H. Mosser and S. Sridhar

Leonardo Technologies, Inc.

For

United States Department of Energy
Office of Fossil Energy and Carbon Management

Under the U.S. Department of Energy (DOE) Agreement Number 89303022FFE000027

May 2023

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What this can do for Pa.

- Generate production operations and production jobs in critical supply chains in the Commonwealth
- Raw material production from secondary materials (mining and metallurgical byproducts) can help anchor downstream manufacturing facilities
- Build resilience in the regional economy
- Help reclaim abandoned mine lands

What can Help this Endeavor

1. **More (Geologic) Exploration**
   - DOE has found elevated concentrations of some critical mineral commodities in Appalachian Pa.
   - More definition is required to attract private capital
   - How much can be recovered from spoil and mineral processing wastes in the Commonwealth?
   - Pennsylvania has been the leader in recovering useful materials from abandoned mine sites
   - Metallurgical wastes can also present opportunities

What can Help this Endeavor

2. **Technology Baselines**
   - What are the characteristics of critical mineral-bearing materials in Pennsylvania?
   - Can these be produced using off-the shelf technologies?
   - If so, are the costs competitive?
   - This is required to justify expenditures to develop new technologies.

What can Help this Endeavor

3. **Integration of Critical Mineral Commodity Production from Mine Reclamation Activities**
   - Pennsylvania has decades of experience here:
     - Remining/Reclamation
     - Recovery of salable commodities from coal refuse
     - Recovery of cobalt from iron mine tailings

Rare Earth and Critical Mineral Extraction Potential in PA

Sarma V. Pisupati
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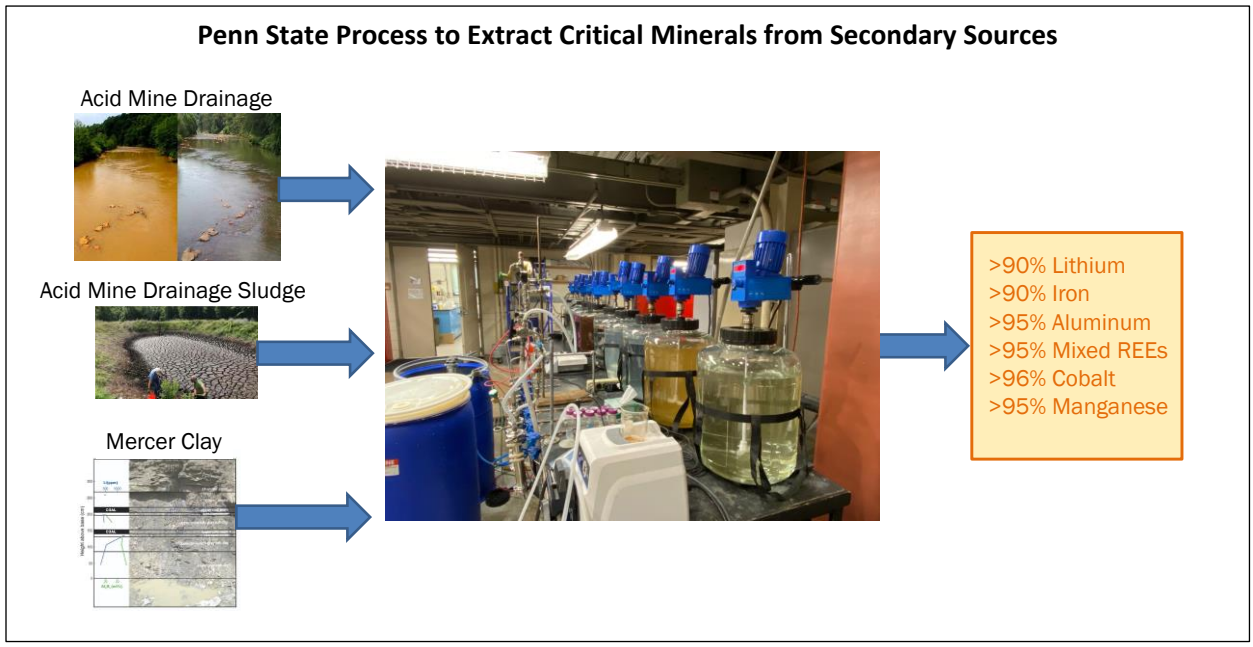


Chairman Kail and members of the House Policy Committee,

Thank you for giving me this opportunity to offer testimony and answer your questions regarding Critical Mineral and Rare Earth Elements, the nature of the extraction process, and the potential for this emerging industry in Pennsylvania.

I am a Professor of Energy and Mineral Engineering and Chemical Engineering and Director of The Center for Critical Minerals In the College of Earth and Mineral Sciences at the Pennsylvania State University.

According to a US Geological Survey report published in 2023, the United States was more than 50 percent reliant on 51 minerals, up from 47 the year prior. The U.S. is also 100 percent net import reliant for 15 of those 51 minerals. Primary sources are ores for rare earth minerals and the United States has only 1% of the world's reserves, whereas China has 37%. Therefore, byproducts of coal mining and other forms of energy-based waste products, defined as

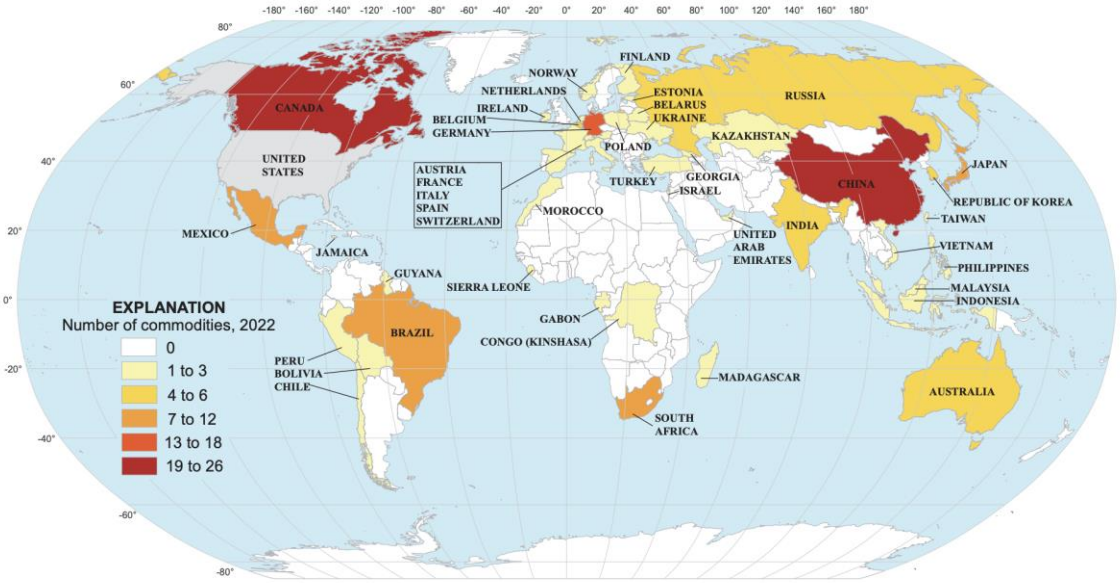
secondary sources, will be central to the development of a reliable domestic supply chain. Such byproducts, including, for example, acid mine drainage, are rich in critical minerals.

There are typically three terms people use in this area. REES, Critical Minerals, and Critical Materials. Let me distinguish these three terms. Rare earth elements are 15 lanthanide elements plus two other elements, scandium and Yettrium as defined by their chemistry. The Energy Act of 2020 defines a “critical mineral” as Any mineral, element, substance, or material designated as critical by the Secretary of the Interior, acting through the Director of the U.S. Geological Survey. Many of today’s critical minerals – such as cobalt, graphite, lithium, manganese, and rare earths. In 2022, US DOI listed 50 minerals as “Critical Minerals” which includes all the seventeen rare earth elements and 33 others. These rare earth elements are not rare but are distributed in very low concentrations everywhere. So, we need to process a lot of material to get small quantities of the products at the end. These elements are used in a wide range of applications, from commonly used in touch screen smartphones, in strengthening our national defense and ensuring sustainable modern life.

The Energy Act of 2020 defines a “critical material” as: Any non-fuel mineral, element, substance, or material that the Secretary of Energy determines: (i) has a high risk of supply chain disruption; and (ii) serves an essential function in one or more energy technologies, including technologies that produce, transmit, store, and conserve energy. According to Secretary of Energy**,** aluminum, cobalt, copper, dysprosium, electrical steel, fluorine, gallium, iridium, lithium, magnesium, natural graphite, neodymium, nickel, platinum, praseodymium, silicon, silicon carbide and terbium are included as Critical Materials in 2023.

About 28% of the country's energy is used for transportation. The transportation industry is moving away from gasoline vehicles to electric vehicles, and this is placing high demand on these elements for energy storage in batteries. For example, a hybrid automobile needs approximately 1 kilogram of rare earth elements and half a kilogram of graphite. In addition, batteries in electric vehicles require elements such as cobalt, manganese, lithium, and graphite to store the energy. A single F35 fighter aircraft needs about 1/2 of a ton of rare earth elements, and Stryker armored fighting vehicles, predator drones, and tomahawk missiles require these rare earth elements. This demand for critical minerals for strategic defense systems makes them critical for our progress. In the 1960s and 70s, the demand was less, and the United States produced most of these elements for the needs of the world. Later in the 90s, the rare earth element and other critical mineral production moved away from the United States to countries like China and the Republic of Congo, where the human rights and environmental regulations are not as stringent as in the United States. According to the United States Geological Survey, as shown in Figure 1, most of the nonfuel mineral imports are from China. China was responsible for more than 80% of rare earth imports in 2022.

Major Import Sources of Nonfuel Mineral Commodities for Which the United States was Greater Than 50% Net Import Reliant in 2022



Source: U.S. Geological Survey

Figure 1: Imports sources for non Fuel Minerals for the United states.

The main challenges faced by the United States are:

1. There are no commercial rare-earth separation plants in the United States. Even the rare earth oxides produced from the only operating mine in the United States are sent abroad for separation and reduction to metals.
2. No commercial metal making, alloy making, or rare earth permanent magnet manufacturing occurs in the United States of America.
3. There is only one facility in North America (Canada) capable of processing the concentrate into battery-grade cobalt

Since the United States' primary ore reserves are only 1% of the world's, we need to explore secondary resources, including industry byproducts such as coal mining wastes, drainage from abandoned coal mines, refuse piles, and fly ash from coal-burning power plants. Pennsylvania is rich in these resources. According to a Congressional Research report, the decline of the coal mining industry left behind 184,000 acres of abandoned mine lands, including over 9,500 acres of coal refuse piles across the western and northeastern parts of the state. This legacy includes some of the largest coal ash waste sites in the country. The total volume of coal waste in Pennsylvania is estimated between 200 million cubic yards and 8 billion cubic yards.

Locked inside those waste streams are significant quantities of rare earth elements and other critical minerals. Abandoned Mine Drainage (AMD) is one of the largest sources of stream

impairment in Pennsylvania. Billions of gallons of AMD impair over 5,500 miles of streams within the Commonwealth according to PADEP. These acid mine drainage waters must be treated before releasing it into the environment to meet the environmental regulations for discharging water. By modifying existing treatment processes, we can address multiple problems: getting the material we need for national security and remediating long-standing environmental problems at the same time. Penn State is a leader in the remediation of these sites and the extraction of valuable minerals from these sources. This is a multidisciplinary problem that involves mining, mineral processing, material science and engineering, metallurgy, chemistry, chemical engineering, and also mineral economics. Penn State is strong in all these disciplines.

To overcome the challenge of low concentration of REEs with significant amounts of impurities in the secondary sources, Penn State has recently developed a novel process, tested the process for proof of concept, and patented the process as mentioned before. Based on Penn State's results[1,2,3] a flow sheet has already been developed for multi-element recovery from AMD to recover 95% of iron, >90% of aluminum, and >90% concentrate of mixed rare-earthelement oxides and over 90% of cobalt and manganese from AMD, sludge, underclays and waste materials as shown in Figure 2.

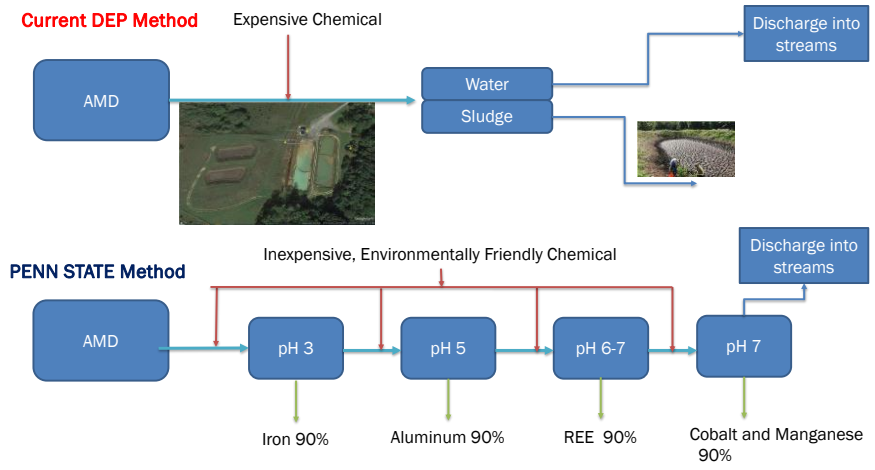


Figure 2. Simplified Penn State Approach to extract critical Minerals from ACID Mine Dtarinage.

The circuit includes a three-stage precipitation process to modify the current AMD treatment for selective recovery of REEs and other critical minerals (Co and Mn) from AMD. Acidity or alkalinity is measured using a pH Scale. Lower the pH the higher is the acidity. AMD typically is at a pH of 2.5-3.5. In this process, AMD will be first aerated to oxidize

[1] Hassas, B. V., Rezaee, M., & Pisupati, S. V. (2020). Precipitation of Rare Earth Elements from Acid Mine Drainage by CO2 Mineralization Process. Chemical Engineering Journal, 125716.

[2] Shekarian, Y., Hassas, B. V., Rezaee, M., & Pisupati, S. V. (2022). Development of a chemical-free process utilizing ozone oxidative precipitation for the recovery of cobalt and manganese from acid mine drainage. Journal of Environmental Chemical Engineering, 108533.

[3] Hassas, B. V., Shekarian, Y., Rezaee, M., & Pisupati, S. V. (2022). Selective recovery of high-grade rare earth, Al, and Co-Mn from acid mine drainage treatment sludge material. Minerals Engineering, 187, 107813.

and recover iron at pH 4, followed by a two-stage carbonate precipitation process (e.g., using Na_2CO_3) for selective recovery of Al and REEs at pH values of 5 and 7, and oxidative ozone precipitation at pH 7 for the recovery of Co-Mn and other CMs (such as Cu, Zn, and Ni), if available in AMD. The recovery efficiencies for Al, REEs, Co, and Mn were all greater than 90% at the lab scale. Penn state developed a unique chemical less-process to recover Co and Mn. These are some of the advantages of the Penn State staged carbonate precipitation process for the selective recovery of Al, and REEs over the conventional caustic treatment, which can't achieve high REE recovery unless the pH is raised to more than 9. At the Stage III of the process, *ozone* will be purged into the neutralized AMD to oxidize and precipitate transition metals (including Co, Ni, Mn) at pH 7 (i.e., without the need to use costly oxidants or raising pH to ~10, like that of conventional hydroxide treatments).

As part of the proposed solution, a pilot-scale research facility will be designed, built, and used as a demonstration facility at Penn State. The AMD from an operating treatment facility will be transported to the Center for Critical Minerals laboratories at Penn State University Park campus for further purification. The prototype will process 10,000 gallons of raw AMD per day (7 gal/min). The operational data, development of required scaleup parameters, and experience from the proposed modular pilot-scale test facility will be showcased as a small operating plant. This will infuse confidence and attract private funding into building such modular commercial projects throughout the country where these resources exist.

The developed process can also be used for lithium-rich Mercer clay to pull out over 90% of lithium from the feedstock. The proof of concept and process technical feasibility have been established. This is a perfect time to scale up some of the novel extraction technologies that have shown such promise to build a pilot-scale facility in PA to integrate all components and show potential investors that this can work to attract private venture capital funding. Penn State has developed a Power and Mineral Industrial Stakeholders group which consists of 40 industries from the entire supply chain for these critical minerals.

In another study funded by DOE, Penn State estimated that coal refuse in Pennsylvania contains approximately 52,000 metric tons of cobalt. Over a half-million metric tons of manganese are contained in these accumulations. Additionally, Recent Penn State work has found lithium contents exceeding 1,000 ppm, lying directly below the overlying Mercer coal, where the alumina content ranged from 32-34 wt%.[4].

Penn State was chosen by the Department of Energy as the lead institution for the Consortium to Assess Northern Appalachia Resource Yield (CANARY) of carbon ore, rare earth element, and critical mineral (CORE-CM) for Advanced Materials. Comprised of university, private industry, state, local, and federal government personnel, the consortium will assess and catalogue the CORE-CM production potential of the Northern Appalachian (NA) basin covering Maryland,

4 Rozelle, P. L., Shi, F., Rezaee, M., & Pisupati, S. V. (2020). "Cobalt Production in Pennsylvania: Context and Opportunities." *Published by US Department of Energy, Office of Fossil Energy.*

Ohio, Pennsylvania, and West Virginia. The $1.7 million project began in 2021 and will conclude in June 2024, providing a complete value chain basinal assessment of the Northern Appalachian region for future commercial development.

To summarize, Pennsylvania has a significant secondary critical mineral resource. Penn State is uniquely qualified to leverage our nation's considerable unconventional and secondary sources from coal and other mine wastes to help create a diverse and resilient domestic critical mineral supply that supports the creation of new jobs, furthers environmental stewardship, and advances the development of an independent energy future. It is crucial that Penn State's expertise and the Commonwealth of Pennsylvania's potential are utilized wisely to solve national security issue as it relates to critical minerals. Thank you very much again for this opportunity and your attention.

August 22, 2023
Testimony of James Swistock, President of Penncara Energy LLC before the Pennsylvania House of Republican Policy Committee Hearing – Rare Earth Minerals

My name is James Swistock and I am the President of Penncara Energy LLC. I want to thank you for inviting me to testify at this very important hearing. Penncara Energy is a privately owned company, founded in 1999, to develop projects in the waste coal federal synthetic fuel program. For the past several years Penncara has been involved in research and development of carbon conversion technologies, utilizing coal as the carbon ore. Much of the original research and technology development was done over a period of ten years at West Virginia University. The work was funded by the Department of Energy, and resulted in the development of several patented processes and technologies. Penncara Energy holds an exclusive license from West Virginia University for these technologies. When the Federal funding for this research ended in 2016, Penncara continued to advance the technologies and sponsor the research.

One of the technologies developed is the production of synthetic carbon pitch, using coal as the carbon ore. At its pilot pitch batch plant in Morganton, WV, Penncara made high-grade carbon pitch utilizing every rank of coal, including Lignite, Sub-bituminous, and Bituminous. The Penncara process produces pitch as the primary product, unlike all the other producers that make pitch as a bi product. The process is unique in many ways. It is a closed loop system in which all of the solvents are recycled back through the process. Emissions are minimal, and captured and treated by a scrubber. The carbon footprint is very low. The waste material has concentrated levels of rare earth elements, which can be easily recovered using existing technologies and processes. The pitch quality can be tailored to meet specific requirements of customer needs. Unlike all other carbon pitch, the Penncara pitch does not contain detectable levels of Benzo Pyrene, a known carcinogen.

The Penncara pitch has been successfully tested in the manufacturing of graphite electrodes for use in steel making. The pitch can be used to make composite battery anodes, needle coke, synthetic graphite, nuclear grade graphite, carbon fiber, electrical carbon products, solar panels and use in the making of silicon metals for semiconductor chips. Pitch also is used to make critical parts for the F-35 fighter jet, and other military equipment.

Foreign suppliers dominate the global production of carbon pitch.
The United States produces less than 3%, but consumes more than 30% of the global production.
Most carbon product manufactures have only one foreign supplier of pitch.

The Penncara pitch technology has been advanced to the stage of plant design and construction. No additional research is needed. The path forward to commercial production is clear. Design, permit, and construct facilities.

The following action items are necessary to accomplish this:

1. Finalize the plant design
2. Develop financial models
3. Secure pitch off take agreements
4. Obtain equity investment commitments and debt financing
5. Execute carbon ore feedstock agreements
6. Permit and construct the facility

The estimated timeline for engineering, procurement, and construction of a pitch plant is 15 to 18 months.

The question is, what can the Pennsylvania legislature do to help?

1. Involve Pennsylvania's representatives in the US House and Senate to support grants, and loans for production facilities.
2. Support the establishment of production facilities instead of funding unnecessary research.
3. There are already existing technologies and processes that can be used to build production facilities. Over the past ten years at least $250,000,000 has been spent by the Department of Energy for research to support the identification and production of rare earth elements and critical minerals and materials. To date not one production facility has resulted from their expenditures I think its time to stop funding research and fund plant construction.
4. Pennsylvania is regarded by industry as an unfriendly business state because of its environmental and tax policies. The legislature needs to address this and make Pennsylvania competitive. There is a slogan, "You've got a friend in Pennsylvania." We need to make that a true statement.
5. Another issue to address is problems with creating a feed stock supply for the production of rare earth elements and essential minerals. Significant deposits of rare earth elements have been identified in the Mercer and Lower Kittanning clay and coal measures. The sites identified are also unreclaimed surface mines and sources of major acid mine drainage discharges, which are polluting miles of streams.

The DEP has regulations and policies for remining such sites. The problem is this well intentioned program has been poorly interpreted and implemented. Any mine operator that undertakes a remining project in these areas is at risk of being responsible for a perpetual and often unquantifiable water treatment liability. These regulations need to be changed to permit and encourage the remining and reclamation of these sites.

I would also recommend the establishment of an advisory committee made up of representatives of industry and government to promote the creation of an essential mineral and materials supply chain in Pennsylvania.

The Commonwealth is rich in natural and human resources. With proper planning and execution we can help our great nation achieve critical resource independence. Thank you, and I am happy to try to answer any questions.