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“THE ENVIRONMENTAL AND ECONOMIC IMPACTS OF THE ANTHRACITE
INDUSTRY IN NORTHEASTERN PENNSYLVANIA AND PENNSYLVANIA’S
COAL REFUSE ENERGY AND RECLAMATION TAX CREDIT”

Testimony to the Senate Committee on Community, Economic and
Recreational Development

On behalf of the
Appalachian Region Independent Power Producers Association
(ARIPPA)

Presented by:
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On behalf of ARIPPA, I want to thank the Senate Committee on Community, Economic, and Recreational Development for inviting us to participate in this hearing to discuss the environmental and economic impacts of the anthracite industry in northeastern Pennsylvania and Pennsylvania's Coal Refuse Energy and Reclamation (CRER) Tax Credit. From the initial support of power purchase agreements (PPA) and tax-exempt Pennsylvania Economic Development and Finance Authority (PEDFA) loans to construct these facilities to inclusion of waste coal energy in Tier II of the 2004 Alternative Energy Portfolio Standards (AEPS) program and the coal refuse set aside meant to hold this industry harmless under Pennsylvania's proposed Regional Greenhouse Gas Initiative (RGGI) program, the Commonwealth has long-recognized and embraced the economic and environmental benefits of the abandoned mine land (AML) remediation and reclamation of coal refuse by this industry.

Organized in 1989, ARIPPA is a nonprofit trade association based in Camp Hill, Pennsylvania, comprised of independent electric power producers, environmental remediators, and service providers that reclaim polluting waste coal piles often located on AML sites to produce alternative energy. The association represents 10 unique, environmentally beneficial mine land reclamation facilities that utilize circulating fluidized bed (CFB) boiler technology to convert historic coal refuse into highly alkaline beneficial use ash utilized in the mine land reclamation. This process uses coal refuse as a primary fuel to generate electricity which is sold through the wholesale energy market operated by the PJM regional transmission organization (RTO) to provide private funding for mine land reclamation.

Today, there are a total of 12 CFB plants in the Appalachian region that convert historic mining waste into alternative energy in Pennsylvania, West Virginia, and Virginia with half of those (6) located in the anthracite region of Pennsylvania. Most coal refuse reclamation-to-alternative energy plants were originally constructed as Qualifying Facilities (QFs) subject to size restrictions pursuant to the Public Utility Regulatory Policy Act (PURPA). As a result, these facilities are relatively small in size, with all but one facility in the state between 33 to 112 MW net operating capacity with a combined generation capacity just under 1,200 MW.

When considering the limited state and federal dollars available for reclamation and remediation of mining-affected lands, and the magnitude of coal mining's legacy in Pennsylvania, ARIPPA facilities utilize coal refuse from historic mining activities that otherwise remain in communities throughout the Commonwealth producing acid mine water discharges to surface waters and groundwater and prevent uncontrolled air pollution caused by fugitive coal dust and coal refuse pile fires. The industry provides an option for removing coal refuse piles from the environment without shifting the full significant cost to public resources, thereby reducing the cost on Pennsylvania taxpayers. Should that option become unavailable, the entire cost for removal and remediation would fall on Pennsylvania taxpayers.

WHAT IS COAL REFUSE?

Coal refuse is a legacy of the pre-1970's coal mining industry that currently scars the land and pollutes waterways across Pennsylvania. It consists of low-quality coal mixed with rock, shale, slate, clay and other material. Also known as waste, culm, gob and boney, it was discarded as a "waste" during the original coal extraction process and randomly disposed in piles near the mine sites. These piles represent public health and safety hazards, as they can spontaneously combust or catch fire from lightning strikes, leach acid mine water and hazardous substances, and are major sources of ground, air, and water pollution.

Due to the costs associated with the removal of coal refuse and fiscal constraints governing public funding, the air and water pollution, human health and safety threats posed by these piles are mostly backburner issues for government authorities unless or until the mounds suddenly combust and become an immediate threat to nearby residents. Prior to the development of CFB technology in the 1980's, there was no productive use for coal refuse and no other technology available for the disposal or remediation of these piles. As a result, these hazardous piles have littered the local landscapes and polluted nearby land and water for decades.

According to the inventory of AML sites maintained by the Pennsylvania Department of Environmental Protection (DEP) Bureau of Abandoned Mine Reclamation (BAMR), approximately 770 coal

refuse banks covering 8,300 acres remain unreclaimed. The estimated amount of coal refuse in these banks is nearly 220 million tons of material potentially suitable for being reclaimed by coal refuse to energy facilities. Other studies have projected the amount of coal refuse placed on lands in the anthracite and bituminous coal fields of Pennsylvania approaches 1 or 2 billion tons. The coal refuse reclamation-to-energy industry is a market-based, alternative energy solution to this problem that if preserved can save the state over \$5 billion in environmental remediation costs. Frankly, if these piles are not removed during the reclamation-to-energy generation process, the likelihood is that they will remain in place indefinitely.

ENVIRONMENTAL BENEFITS OF COAL REFUSE RECLAMATION-TO-ENERGY INDUSTRY

These plants play a critical role providing environmental remediation in the coal regions where they are located by removing coal refuse piles, remediating mining-affected lands, and reducing or even eliminating surface and groundwater pollution caused by acid mine drainage (AMD) from coal refuse piles. By converting coal refuse into alternative energy, ARIPPA members are removing one of the principal sources of contamination to surface water and groundwater in coal mining regions of Pennsylvania. DEP's latest biennial report found that nearly 33 percent of Pennsylvania's rivers and streams do not meet water quality standards for water supply, aquatic life, recreation, or fish consumption. It lists 27,886 miles of Pennsylvania waters as being harmed by pollution with abandoned mine runoff representing the second largest pollutant at 5,536 miles.

In addition, they avoid ground level air pollution from coal refuse piles that absent permanent remediation represent virtually "forever emitters" of greenhouse gases, windblown fugitive particulate fines, hazardous air pollutants and Clean Air Act (CAA) regulated air pollutants, as they have been for over 100 years since being originally discarded. In fact, the most recent DEP estimates indicate about 40 coal refuse pile fires burning in the Commonwealth. The primary source of polluting air emissions from coal refuse piles is a result of weathering and spontaneous combustion eventually resulting in pyrolysis and surface emissions of products of incomplete combustion.

Unlike the carefully controlled combustion of a CFB boiler where the hydrocarbon content of coal refuse is efficiently burned out to water and CO₂, a smoldering coal refuse pile is only partially converted to CO₂ along with the far more potent greenhouse gas methane. Eventually, runaway temperatures within a smoldering pile will erupt into open flame leading not only to release of the greenhouse gases CO₂ and methane, but other uncontrolled air pollutant emissions such as mercury, fine particulate (smoke), oxides of nitrogen, carbon monoxide, sulfur compounds, and likely the extremely potent greenhouse gas nitrous oxide, at a higher rate than would otherwise be minimized in the well-controlled combustion conditions found at coal refuse reclamation-to-energy facilities. These “pop-up” air emission sources will continue every year for as long as abandoned coal refuse piles are allowed to persist. However, when a ton of coal refuse is forever neutralized via useful energy recovery, it can never again emit air pollutants or greenhouse gases, let alone contribute to acidification of soil and water resources.

ARIPPA plants work closely with state and federal environmental agency officials, various local watershed groups, and environmental groups such as Earth Conservancy, Foundation for Pennsylvania Watersheds, Western Pennsylvania Coalition for Abandoned Mine Reclamation (WPCAMR), and Eastern Pennsylvania Coalition for Abandoned Mine Reclamation (EPCAMR), to AML sites and convert polluted streams into clean and usable waterways. These facilities represent a public-private partnership with the state to eliminate the pollution in the commonwealth. In addition to state support, operators of coal refuse reclamation-to-energy facilities are currently spending private money to remediate AML sites that, if this industry is unable to continue reclamation on these and other sites, the responsibility and cost would revert to DEP to carry out this remediation work at a significant cost to Pennsylvania taxpayers.

The coal refuse reclamation-to-energy industry is the only energy source that provides a tangible, quantifiable environmental benefit to the Commonwealth in terms of air, water and land remediation. Since its inception, the coal refuse to energy industry in Pennsylvania has removed and consumed as fuel more than 230 million tons of coal refuse, improved more than 1,200 miles of streams and reclaimed more than 7,000 acres of previously polluted mining affected land. At full capacity this industry can remove over 10

million tons of coal refuse from the environment and reclaim approximately 200 acres of mining-affected land in Pennsylvania each year. The surrounding communities, lands, and streams have experienced vast environmental and economic improvements due mainly to the decades of hard work and dedication these workers and the coal refuse to energy industry have provided, in addition to the downstream environmental benefit of improved water quality provided to the Delaware, Susquehanna, and Ohio River Watersheds. Despite the efforts of the coal refuse to energy industry, the volume of remaining coal refuse across the Commonwealth is daunting.

ECONOMIC BENEFITS OF THE COAL REFUSE RECLAMATION-TO-ENERGY INDUSTRY

The coal refuse to energy industry represents a unique paradigm for mine land reclamation in which environmental and economic objectives overlap. The Commonwealth is typically forced to address the environmental impacts of coal refuse piles on a reactive, rather than proactive basis, due in part to the cost structure of remediation for the state government relative to the coal refuse reclamation-to-energy industry. The industry, on the other hand, has developed a comprehensive fuel cycle approach to the problem. By removing coal refuse piles from the environment, remediating the sites and restoring them to productive use, and using the refuse as an alternative fuel for the production of electricity, the industry's reclamation fuel cycle provides a range of environmental, economic, and societal benefits to the Commonwealth.

The coal refuse is removed from these blighted areas and transported to the facilities where it is used to produce energy – offsetting mining and transportation costs – and beneficial use ash is then returned to mining sites for remediation and restoration. The Commonwealth, by contrast, cannot generate energy and attendant revenue with coal refuse, does not have beneficial ash available for reclamation, and most crucially, must pay to safely remove, transport, and dispose of the coal refuse to a new location. As a result, the remediation activities of the industry are far more cost effective than those of the Commonwealth and result in a greater volume of environmental remediation.

Industry activity generates positive externalities, meaning that plants can deliver a net positive societal value even if their activity is not profitable in a private market context. The removal of coal refuse piles and the reclamation of mining-affected lands has demonstrated benefits including water quality, public health and safety, and land value. According to the 2019 Econsult Solutions Report, “The Coal Refuse Reclamation to Energy Industry: A Public Benefit in Jeopardy,” the environmental benefits of this activity average \$36.9 million per year, totaling more than \$738 million over a twenty-year period. Alternately, industry activity can be valued as an avoided cost to the Commonwealth. The avoided costs to the state of undertaking the same amount of remediation itself are estimated up to \$267 million per year, or \$7.4 billion to address all identified coal refuse piles across the state.

Not only has the coal refuse reclamation-to-energy industry saved the Commonwealth millions of dollars in environmental clean-up costs, but it is also an economic engine generating annual benefits to Pennsylvania of \$615 million, direct expenditures of \$363 million, and \$18 million in state taxes and fees according to the 2019 Econsult study. Additionally, thousands of people are directly or indirectly employed by the coal refuse to energy industry, and live, along with their children, families, and extended families, in communities within close proximity of these alternative energy plants. The Econsult study found the industry directly and indirectly supported 2,960 and industry employees earned an average salary of greater than \$75,000 jobs with total industry earnings of \$194 million. The IFO analysis estimated 930 total direct jobs for 2021 and total wages paid of \$80.2 million. These high value family and community sustaining jobs relate to every facet of our fuel cycle, ranging from mining, transportation, plant operations and management to environmental remediation. Not to be overlooked is the fact that these benefits are primarily concentrated in financially distressed rural communities of Pennsylvania, which are not only disproportionately burdened by the environmental legacy of past mining, but also struggle to create new economic opportunities.

CHALLENGES FACING THE COAL REFUSE RECLAMATION-TO-ENERGY INDUSTRY

These plants face unique challenges that jeopardize their financial viability as employers, taxpayers, and environmental remediators. The problem simply is that a variety of economic forces have recently conspired to undermine the fundamentals of our industry. As the industry struggles, the amount of environmental remediation that can be accomplished declines. In the past five years, four Pennsylvania coal refuse to energy plants have permanently closed, including two in the anthracite region.

Relative to most other energy producers, coal refuse plants are labor intensive and have an expensive environmental reclamation fuel cycle with several components. Both coal refuse and limestone must be transported to plants, and the resulting beneficial use ash is then transported back to the mining sites for use in environmental remediation. This series of steps and the attendant cost structure relative to decreasing energy and capacity prices in the PJM market have created major marketplace challenges for the industry.

Many coal refuse facilities are, today, a victim of their own success. Distances to retrieve fuel, and related transportation costs, have increased as piles adjacent to the plants have already been successfully removed and remediated by the industry. Thus, they must travel farther and farther afield, away from the energy facilities, to site and permit coal refuse piles for reclamation. Similarly, the rising cost to ship the beneficial ash back to remediate mining sites has increased operating costs. These costs are reflected in our fuel cycle reclamation costs which represent, on average, about 70% of the operating costs of these facilities.

Pennsylvania coal refuse plants participate in the PJM RTO that runs the wholesale electricity market for most of Pennsylvania and all or part of 12 other states and the District of Columbia. Participation in wholesale energy markets, for which these facilities were not designed, has in recent years been challenging due to the corrosive effect upon electricity pricing of suppressed natural gas costs in Pennsylvania and increasing federal and state market subsidies for other forms of generation.

The viability of the coal refuse reclamation-to-energy industry has also been adversely affected by a bevy of burdensome environmental regulations at both the federal and state level. Furthermore, the traditional fossil fuel regulatory scheme undervalues coal refuse generated electricity because it fails to

recognize its positive externalities, the inherent environmental value of remediating abandoned refuse sites, and the manifest environmental benefits attendant to this industry. Federal and state environmental regulatory requirements, reclamation bonding expenses, and the corresponding capital, operating and maintenance costs represent an escalating expense threatening the facilities' survival.

Some facilities have attempted to offset these additional costs and declining energy revenue by turning to cryptocurrency mining. The process to mine cryptocurrency requires a significant and reliable power source. In 2021, two coal refuse reclamation-to-energy generators, including one anthracite facility, were acquired by a cryptocurrency mining company that utilizes electricity generated from coal refuse to mine Bitcoin. These operations provide a predictable and stable flow of revenues that are largely independent of the real-time wholesale market price. At this juncture, the impact of Bitcoin revenues for long-term viability is unclear, but cryptocurrency mining provides an opportunity to more efficiently utilize energy from coal refuse by allowing these facilities to improve operating capacity while adding to grid reliability.

COAL REFUSE ENERGY AND RECLAMATION TAX CREDIT

The CRER Tax Credit was created by Act 84 of 2016 and is available to facilities that utilize coal refuse and beneficially use ash to restore lands degraded by legacy coal refuse piles and abandoned mines. While the credit is equal to \$4.00 per ton of coal refuse used to generate electricity by an eligible facility, due to a tax credit cap that was originally \$7.5 million but subsequently raised to \$10.0 million for FY 2017-18 and to \$20.0 million for FY 2019-20 and thereafter credit values have often been below this amount.

According to a report released in January 2022 by the Independent Fiscal Office (IFO), from 2016 to 2020, coal refuse reclamation-to-energy facilities burned 36.8 million tons of coal refuse and produced 28.0 million tons of beneficial use ash. Coal refuse burned peaked at 8.6 million tons in 2018 and declined to 5.6 million tons in 2020. For 2019, the average CRER Tax Credit issued was \$1.7 million, with an effective credit rate of \$2.70 per ton of coal refuse burned due a 22.2% per facility cap on credit awards and roughly 15%

leakage due to sales discounts and transfer fees. Prior to the 2019 increase of the CRER Tax Credit cap to \$20 million, the effective credit rate ranged from \$0.85 to \$1.17 per ton, as the lower credit amount caused all awards to be prorated. In 2021, the amount of coal refuse consumed by the industry increased to nearly 6 million tons. As the amount of coal refuse used by the industry increases, the effective tax credit rate will decrease due to the CRER Tax Credit cap and proration of tax credit awards.

The IFO study reviewed whether the tax credit has achieved its goals and purpose. For this review, the IFO analyzed the program's goals to enhance revenue stability and predictability for electric generation facilities that use fluidized bed combustion and emission control equipment to burn coal refuse, incentivize the use of coal refuse in the generation of electric power, and incentivize the use of treated ash byproduct in the reclamation of mining-affected sites. The analysis established the program purpose as reducing or eliminating the environmental impact and various negative externalities imposed on communities by coal refuse piles and AML sites. The IFO report concluded that "the CRER Tax Credit has achieved its intended goals and purpose."

One recommendation that ARIPPA supports to enhance the current CRER Tax Credit program would be to make the tax credits fully or partially refundable. The IFO data shows that "nearly all CRER Tax Credits are transferred or sold to entities other than the original recipient." Generally, sellers have received roughly 85 cents per tax credit dollar awarded with the remaining 10 cents retained by the purchaser and 5 cents retained by the third-party facilitator. These tax credit sales represent leakage of funding that does not incentivize the reclamation of coal refuse piles. This change would also simplify administration.

CONCLUSION

The coal refuse reclamation-to-energy industry is a unique private-public partnership that allows these facilities to generate electricity and at the same time restore the environment of the Commonwealth. As public funding for AML remediation continues to be insufficient, ARIPPA and our members hope to continue partnering with the Commonwealth to promote the values of AML reclamation and find ways to

secure funding that will sustain and increase the current level of AML reclamation activities. The industry is historically the most effective and prolific actor in the remediation of coal refuse piles across the Commonwealth. No one but the coal refuse reclamation-to-energy industry can remove abandoned coal refuse piles and address the attendant environmental and safety hazards in a holistic, efficient, and permanent manner.

The industry is appreciative of your continued support as our plants continue to struggle in the face of costly regulations and low energy prices. By partnering with private industry, the Commonwealth receives environmental remediation of these polluted sites at a fraction of the cost were it to be performed by a state agency or subcontractor. If the state does not continue to partner in the environmentally beneficial efforts of these facilities and ensure that they remain open, not only will family sustaining jobs be lost, but the massive environmental problem of abandoned coal refuse piles and pits will continue to scar our land and pollute our air and waterways for generations to come.

ARIPPA Plants by County

County	Plant	Net Operating Capacity (MW)	Fuel Type
Cambria	Colver Power Project	111	Bituminous
Cambria	Ebensburg Power Company	50	Bituminous
Schuylkill	Gilberton Power Company	80	Anthracite
Northumberland	Mt. Carmel Cogen	43	Anthracite
Northampton	Northampton Generating Company	112	Anthracite
Carbon	Panther Creek Power Operating	80	Anthracite
Schuylkill	Westwood Generation	33	Anthracite
Schuylkill	Schuylkill Energy Resources	80	Anthracite
Venango	Scrubgrass Generating	83	Bituminous
Indiana	Seward Generation	525	Bituminous
	Total	1197	

PA Coal Refuse Plants and Tons of Coal Refuse Removed

