ARTICLES

Addressing Virginia's Legacy GOB Piles

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This report is a collaboration between the Appalachian School of Law (ASL) and Econsult Solutions, Inc (ESI). Legal and policy research and analysis are provided by ASL, while economic and data analysis is provided by ESI.

Appalachian School of Law (ASL)

ASL is an American Bar Association-approved private law school located in Grundy, Virginia. ASL exists to provide opportunities for people from Appalachia to practice law and better their communities. ASL is an exciting, student-centered environment that emphasizes community service and strives to provide a resource for people, the bar, courts, and other regional institutions. ASL's Natural Resources Law Center (NRLC) supports ASL's commitment to community service while emphasizing natural resources and energy law. Given that our location is in southwestern Virginia, the heart of the Appalachian oil, gas, and coal-producing region, the topic of natural resource law is a natural, evident fit. The NRLC's mission is to train attorneys to navigate the increasingly complex world of natural resources law in terms of energy production, conservation, and improving sustainability. At the center of this mission is ASL's commitment to offering a place for rational discussion, intelligent debate, and collaboration to foster cutting-edge programs and innovative scholarship; the ultimate goal is to make students more effective and scientifically grounded policymakers and advocates.

ASL contributors to this report include NRLC Director Mark (Buzz) Belleville, NRLC Law Fellow Courtney Zyeda Cole, Gabrielle Englander (ASL Class of 2022), and Jay Callahan (ASL Class of 2023).

Econsult Solutions, Inc. (ESI)

ESI is a private consultancy specializing in the intersection of economic and public policy issues. Based in Philadelphia, ESI serves clients nationwide.

Our scope is broad, and our expertise is specific. ESI assists clients in evaluating economic and fiscal outcomes of programs and developments; offers planning insight and advice; provides GIS analytic services; yields financial projections; and advises investors and governments on projects, developments, and policy outcomes. Our team has the economic skills and expertise to process, analyze, and manage large and complex datasets.

Our staff and senior advisors include nationally recognized experts in urban development, real estate, government, and public policy, planning, transportation and infrastructure, non-profit management, business strategy, and administration, as well as litigation and commercial damages.

Executive Summary and Key Recommendations

Southwest Virginia's coal mining legacy has created a range of environmental issues that persist to this day. One manifestation of this legacy is Garbage of Bituminous (GOB) piles containing mining waste and coal discarded by mining companies over decades. Virginia Energy (formerly the Department of Mines, Minerals, and Energy) has identified 245 legacy GOB piles in Virginia concentrated in the southwest region.

Quantification Of Environmental And Public Use Benefits Over 20-Year Time Span ($M)

Category	Benefit Type	Year 1	Year 10	Year 20	Total	20 Year Avg
Water Quality	Cumulative	$0.18	$1.79	$3.58	$37.55	$1.88
Public Safety	Cumulative	$0.03	$0.35	$0.69	$7.29	$0.36
Land Reclamation	One-Time	$0.76	$0.76	$0.76	$15.11	$0.76
Nearby Property Value	One-Time	$0.62	$0.62	$0.62	$12.35	$0.62
Total		**$1.59**	**$3.51**	**$5.64**	**$72.30**	**$3.61**

Source: ESI Calculation

These legacy piles create a range of environmental and safety hazards and discourage economic activity in the southwest region. GOB piles degrade Virginia's waterways through Acid Mine Drainage (AMD) and the leaching of other pollutants. The piles are also often unstable, creating a public safety hazard, and are at risk of catching fire, leading to dangerous and uncontrolled burning. These challenges complicate economic revitalization efforts in an area that trails the state's economic and demographic trends.

Assuming remediation occurs at the current rate of about 400,000 tons of GOB per year, ESI quantifies the benefits from rectifying GOB piles at nearly $1.6 million in year one, accelerating to $5.64 million in year 20. Over 20 years, benefits total more than $72 million in nominal terms, averaging $3.61 million per year.

Whether considered from an environmental, public health, or economic development perspective, all efforts should be made to remediate legacy GOB piles in southwest Virginia.

Recommendation 1 >> A programmatic effort should be undertaken to remediate the GOB piles in southwest Virginia.

Remediation can take different forms. The most appropriate form of remediation for one GOB pile may not be suitable for another; some GOB piles could be remediated "in place." Water treatments, stabilization, and revegetation are all processes that can be used to limit the impacts of GOB piles.

GOB piles can also be removed. The piles can be disposed of in lined landfills or at active mine sites. Some piles could also be re-mined, separating the waste coal and putting it to some beneficial use, such as combustion for electricity generation. Dominion's Virginia City Hybrid Energy Center (VCHEC) in Wise County, located near many of the legacy GOB piles, has the capability to burn waste coal. This approach has been the predominant way that GOB piles have been removed in Virginia in recent years. Choosing to combust GOB for electricity creates market incentives for remediation, but also runs counter to Virginia's commitment to transition to clean energy.

Choosing the best method for remediation depends on the characteristics of a particular site. The location of the site in relation to waterways and underground drinking water is a crucial consideration. When determining

whether a site is optimal for remediation, the site should prioritize the harm caused by a particular pile. A pile's proximity to transportation channels, local communities, and existing or soon-constructed landfills could significantly impact the most suitable method of remediation. The particular characteristics of a pile, its composition, percentage of waste coal likely to be reclaimed, stability of the pile, and extent of pollutants present, affect prioritization and remediation choices. Property ownership and potential liability issues can also differ among the various piles, as well as permits required to engage in remediation activity.

Recommendation 2 >> Virginia should conduct a site-by-site analysis of the state's inventory of GOB piles to include information that will allow the state to prioritize remediation efforts and determine the most appropriate method of remediation for each site.

A site-by-site analysis of the GOB piles should be undertaken to prioritize the most in need of remediation and inform the most appropriate method of remediation. This should include groundwater testing and possible monitoring at each site. Such an undertaking calls for the State's involvement.

As this report explains, there is a significant market available for GOB pile remediation through various sources. The most applicable source is the federal Abandoned Mine Land (AML) Fund under Surface Mining Control and Reclamation Act (SMCRA). The AML Fund is particularly appropriate because it recently received 11.3 billion dollars over 15 years with the recently enacted Infrastructure Bill.

Virginia Energy should apply for AML funding to support the inventory efforts and site-by-site analyses. Virginia Energy should also develop standards for prioritizing which GOB piles should be remediated first; then, remediation efforts can begin as soon as individual analyses are completed.

Recommendation 3 >> Virginia should launch a GOB pile remediation initiative that employs coal industry workers and reclassifies GOB pile remediation as a top priority for its AML funds.

GOB piles have long been relegated to Priority 3 status under SMCRA, which has limited Virginia's ability to target GOB remediation directly. However, the 2021 Infrastructure Bill affords Virginia new authority when expending AML funds appropriated under the Bill. It assigns any level of priority to AML reclamation projects so long as they provide employment for current and former coal industry employees. This authority to determine project priority is additional to the traditional three priority levels prescribed by SMCRA. Virginia should launch an aggressive GOB remediation initiative that employs coal industry workers and explicitly reclassifies GOB piles as a higher priority.

The high prioritization of remediating southwest Virginia GOB piles would be consistent with Virginia's recent laws, and policies in support of environmental justice communities. The economics and demographics of southwest Virginia, combined with the disparate public health impact the region has felt from extensive coal mining activity, assure that many localities qualify as environmental justice communities. By law, Virginia must consider the impacts to those communities in making decisions on energy policy.

Recommendation 4 >> In its 2022 AML grant application (and in future years), Virginia Energy should request sufficient funds to cover GOB pile remediation efforts.

Under the 2021 Infrastructure Bill, state applications for AML grants may aggregate bids into larger statewide or regional contracts. Virginia should solicit bids for a large-scale effort to remediate GOB in southwest Virginia and aggregate those bids in the 2022 AML grant application.

Recommendation 5 >> Virginia should create an atmosphere conducive to the remediation of GOB piles, funding for such remediation efforts, and providing necessary tools that are accessible to private entities, localities, and non-profits.

Whether pursued through the General Assembly, the Governor's Office, or various state agencies, there are several non-mutually exclusive options Virginia could pursue to maximize the opportunities for funding to remediate southwest Virginia GOB piles:

- Many of the funding opportunities discussed in this report can only be pursued by the State or with the State as a partner; the State should commit to pursuing such opportunities and partnerships.
- Investor-owned public electric utilities could be encouraged or required to pursue remediation funding, to partner with localities and academic institutions as required for funding, and support remediation efforts.
- Many funding opportunities are only available to nonprofits, private entities, localities, and academic institutions, or collaborations among such entities. Virginia Energy should establish a database of funding opportunities so these entities can coordinate and initiate efforts to seek remediation funding.
- Virginia should commit to increasing the State's capacity (personnel, equipment, expertise, etc.) to permit remediation activities, assist with GOB pile assessments and groundwater monitoring, and undertake mass remediation projects.
- Virginia should create a program or provide incentives for the creation of such a program, to employ and/or retrain displaced miners to work on remediation projects. In addition to such

programs, other funding opportunities are available involving the employment and/or retraining of current and displaced coal miners if the State prioritizes AML funds.

- In seeking federal and other funding, Virginia should emphasize that southwest Virginia is home to many environmental justice communities; Virginia should prioritize environmental justice communities in determining how to utilize limited infrastructure resources.

- In the event site assessments support coal re-mining from GOB piles for power generation, Virginia could create a tax credit or other incentives for burning waste coal or making other productive use of it.

1. Report Overview

This study aims to identify options, obstacles, and opportunities for the potential remediation of legacy waste coal piles, known as "GOB piles" or "coal refuse piles," in southwest Virginia. The Appalachian School of Law (ASL) has collaborated with Econsult Solutions, Inc. (ESI), a consultancy specializing in economic and public policy issues, to undertake this analysis. This work is funded in part by a grant from Dominion Energy.

This study is not intended to endorse a particular policy approach to this complex challenge. Instead, this study intends to identify relevant economic, legal, and environmental considerations for state and local policymakers who wish to address the ongoing challenges presented by legacy GOB piles.

After this Overview, section 2 of the report begins by explaining southwest Virginia's coal mining history and the legacy Garbage of Bituminous (GOB) piles it left behind. Various environmental and public health impacts of these GOB piles and attempts to quantify the economic benefits of remediating them will be discussed in section 3.

Section 4 explores the remediation of the GOB piles in more detail. First, it examines potential remediation approaches. These include approaches that lessen GOB piles' adverse impacts; removal and safe storage of the GOB; and re-mining the piles for waste coal that could be used for electricity generation. Section 4 also considers the legal and regulatory framework pursuant to which remediation would take place. Relevant federal laws include the Surface Mining Control and Reclamation Act (SMCRA), the National Environmental Policy Act (NEPA), the Clean Water Act, and other regulations designed to address the handling of coal ash and the combustion of waste coal. Finally, section 4 examines Virginia's transition to a clean energy economy, and how it may impact the preferred remediation approach.

The operating trends and regional economic impact of Dominion's Virginia City Hybrid Energy Center (VCHEC) will be discussed in section 5. As the VCHEC is the only facility in Virginia where combustion currently occurs, the re-using the GOB as a fuel source should be examined.

Section 6 discusses potential funding sources for remediation projects. Many communities in southwest Virginia may qualify as "environmental justice" communities due to their relative poverty and the disparate public health impacts attendant to the region's coal mining history. Qualifying as an environmental justice community opens up additional funding sources. The most clearly applicable funding source is the Abandoned Mine Land (AML) Reclamation Fund; the recently enacted Infrastructure Bill appropriated $11.3 billion over 15 years for the AML Fund. Other funding sources are also explored, including EPA environmental justice programs, Brownfields programs, and American Rescue Plan programs.

Finally, the Conclusion in section 7 extracts key recommendations from our analysis for policymakers to consider.

2. Virginia's Coal Mining History and Legacy GOB Piles

The rise and decline of southwest Virginia's coal industry, and the origins and status of the legacy GOB piles in the region are extremely apparent.

Virginia's coal mining history is long and has significantly shaped the state's southwest area. Coal was discovered in southwest Virginia in 1701 and first produced in 1748. The southwest area of Virginia is part of the Appalachian Plateau, and is a predominantly bituminous region (see Figure 2.1).

Originally, iron was the most valuable natural resource in Virginia. However, more efficient iron furnaces in Pennsylvania overtook the Virginia furnaces. After the Civil War, a heavy investment in railroad expansion occurred in the Virginia coalfields, especially in Buchanan, Dickenson, and Wise counties.

As deep mining was replaced with surface mines, and automation dramatically reduced the number of miners needed for every ton of coal produced, the number of miners in southwest Virginia dropped.[1]

Since the peak in 1990, coal production in Virginia has continuously declined. In 2020, Virginia produced 9.7 million short tons of coal; only 20% of the 1990 annual production level.[2] While production levels have declined steadily, the value of coal as a Virginia export has only, recently, declined. Global demand bolstered the value of Virginia's coal through the 2000s. However, following the "Great Recession," and the subsequent spike in coal value, the value has

1 Data from the Bureau of Labor Statistics reviewed in Section 6 of this report shows that mining employment in Virginia has fallen from 17,000 in 1990 to 7,000 in 2020.

2 Data on coal production from Virginia Energy and from the US Energy Information Administration.

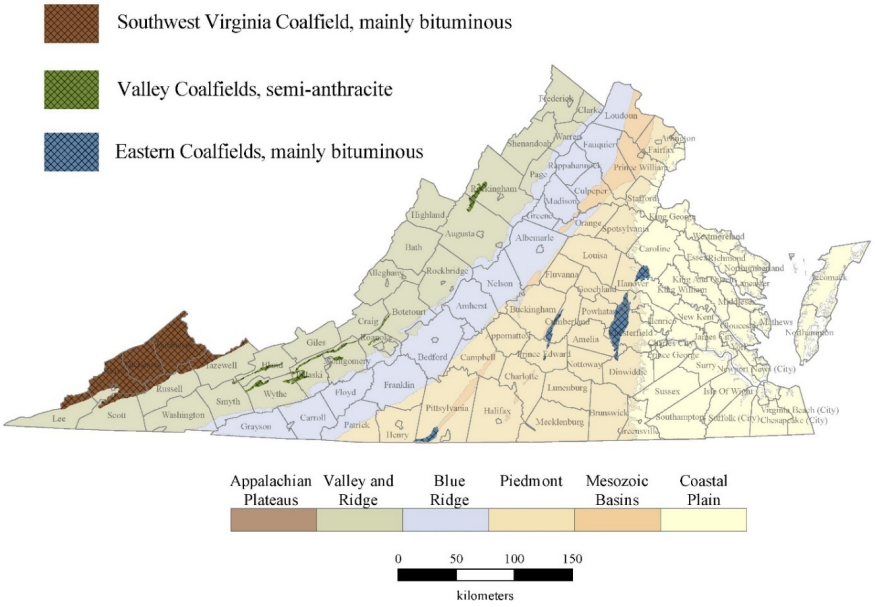


Figure 2.1. Distribution of Virginia Geological Regions and Coal Fields

Source: Virginia Energy

fallen sharply. Similarly, many mines have closed throughout Virginia: in 2001, there were 190 actively operating mines in Virginia, and by 2020 the number was down to 62.[3] The negative shift in the industry, both recent and historic, has created a myriad of issues with which Virginia – and particularly southwest Virginia – must now contend. Recent declines in the mining industry have created a need for economic development to revitalize and strengthen the area.

As mining activity curtailed and eventually, left Virginia, a significant number of abandoned mines and piles of coal were left behind. Virginia was host to over two centuries of coal production before significant legislation was introduced to mitigate and control the impact of mining activity. Coal mining operations left behind extensive waste and remains for the extensive period of early coal production in Virginia. These remnants pose a serious, continuing problem to the people of Virginia.

Coal refuse piles are mounds of "waste coal," and other mining refuse that were discarded during the mining and coal cleaning processes. These piles in southwest Virginia are commonly referred to as "GOB" piles, and can often weigh tens of thousands of tons. With limited environmental regulations in place, pollutants leach from the coal refuse and erode local streams and soil. These GOB piles pose serious threats to health and safety, and actively damage environmental conditions as well as economic conditions.

3 *Coal Data Browser*, U.S. Energy Info. Admin., https://www.eia.gov/coal/data/browser.

Hurricane Fork GOB pile, 2003 (before remediation)

It was not until 1977 that the federal Surface Mining Control and Reclamation Act (SMCRA) was enacted, which triggered the Virginia Coal Surface Mining Control and Reclamation Act of 1979 (Va. SMCRA). The state regulation of mining activity was strengthened through the establishment of the Department of Mines, Minerals, and Energy (DMME) in 1985.

Virginia Energy (formerly DMME) has done significant work to assemble an inventory of GOB piles and their locations. While the inventory is acknowledged to be incomplete, Virginia Energy documents at least 245 GOB piles in the Commonwealth.[4] These piles' size, weight, and composition have not been fully surveyed (see Figure 2.2).

The landscape of GOB piles and mining remnants follow the geography of coal deposits in the Commonwealth. As a result, these piles – and the accompanying hazards and environmental damages – are heavily clustered in southwest Virginia.

A Geographic Information System (GIS) analysis was taken by ESI of nearly 200 identified GOB piles classified as "unremediated" in the Virginia Energy dataset. More than 80 of such piles are located in Buchanan County alone, and the other 114 piles are located in Dickenson, Wise, Russell, Tazewell,

4 There are 198 piles currently recognized as requiring remediation, and an additional 47 piles that have been classified as "capped and graded." This method of remediation does not involve the removal of waste coal and can generally only be considered a temporary remediation effort. While those 47 piles are not included in the figure below, they are considered further in this report.

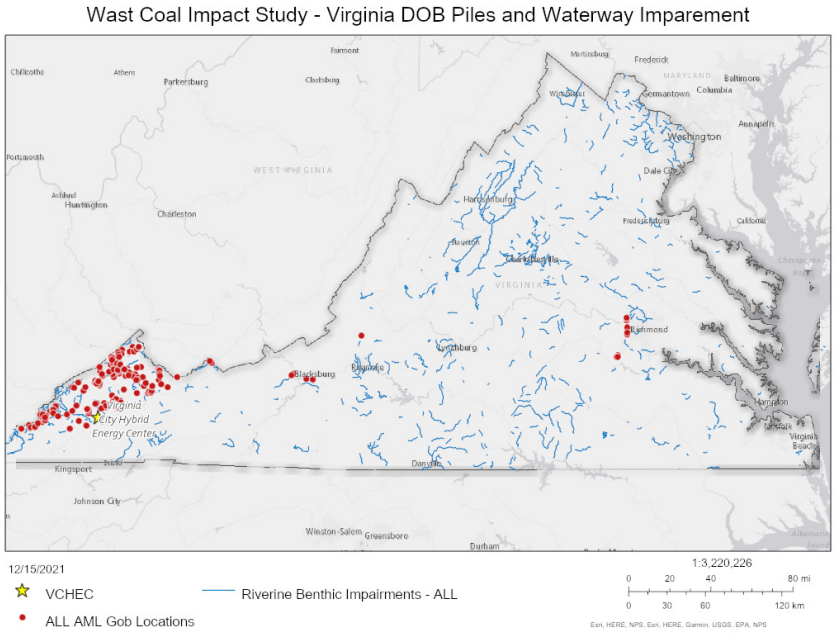


Figure 2.2. Identified Waste Coal Piles in Virginia

Source: Virginia Energy

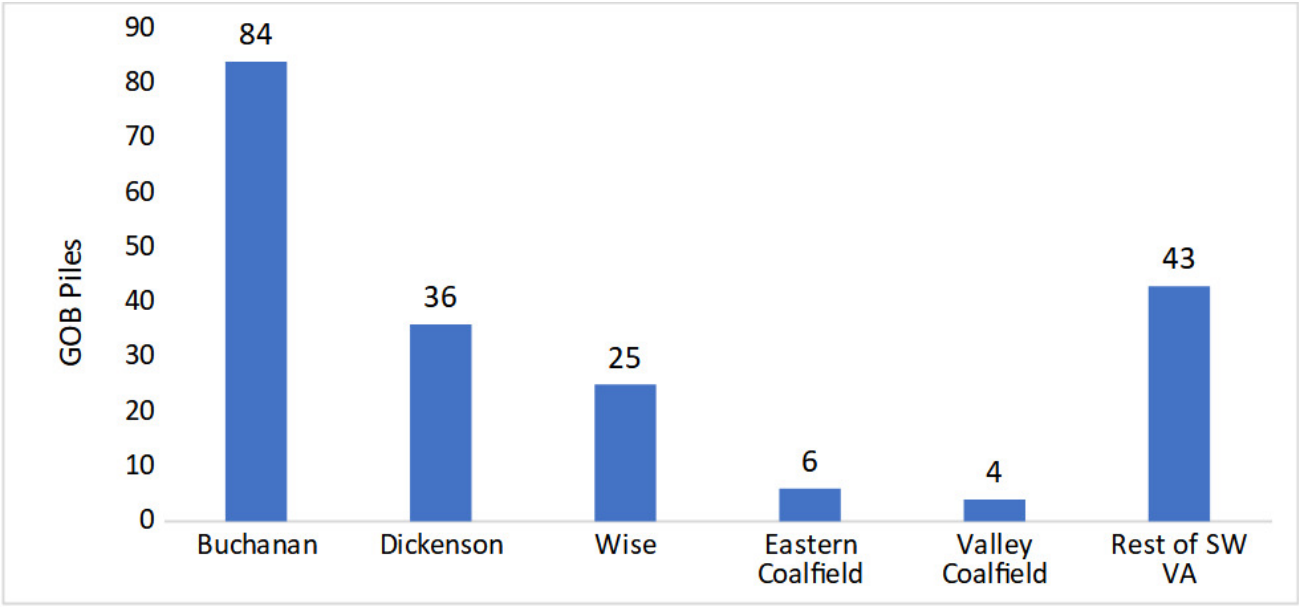


Figure 2.3. Distribution of Unremediated GOB Piles by Location

Source: GIS Analysis of Virginia Energy Data

and Lee Counties. The remainder of the piles are gathered around the Valley and Eastern coalfields in the middle and the east of the Commonwealth, respectively (see Figure 2.3).

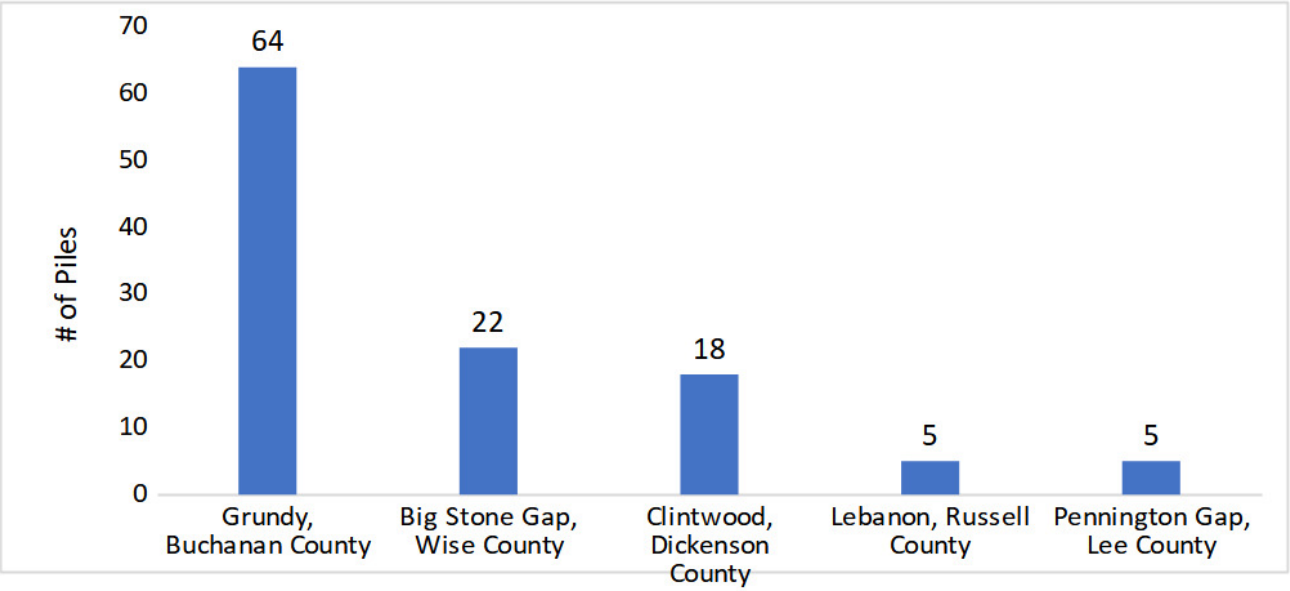


Figure 2.4. Unremediated GOB Piles within a 10-Mile Radius of Select Communities

Source: GIS Analysis of Virginia Energy Data

Many of these piles are located near populated areas, posing not only a health hazard but also a blight too, both, quality of life and real estate values. One-hundred-fifteen GOB piles are located within 10 miles of some of the densest population centers in affected counties (see Figure 2.4).

3. Environmental Impacts/Liabilities of the GOB Piles and Efforts to Remediate Them

This section reviews research and develops an economic framework to monetize the costs of environmental degradation from legacy GOB piles and the potential benefits of remediation.

- Section 3.1 reviews impacts on water quality and defines avoided costs for water treatment achievable through the remediation of GOB piles.
- Section 3.2 reviews impacts on public health and safety, and defines avoided costs and social value generated by avoided injuries from the remediation of GOB piles.
- Section 3.3 discusses the reclamation of land enabled by the remediation of GOB piles, and the potential economic value generated through direct reclamation and impact on adjacent properties.
- Section 3.4 aggregates each category's benefits into a valuation framework for GOB pile remediation.

The environmental and public health benefits of remediation result in different forms to different beneficiaries, including the public at large, private landholders, and state and local government entities. ESI employs a mix of analytical methods to quantify these benefits in economic terms.

In addition, some of the benefits from the remediation of environmental hazards are cumulative over an extended period because the benefits continue for several subsequent years. Total benefits are expressed in this analysis as the net difference between societal benefits accumulated (a positive number) and costs avoided (a negative number) and are modeled over a 20-year timeframe to account for the cumulative effects.

As discussed in Section 2, no comprehensive inventory exists that indicates the number of tons of coal refuse represented by Virginia's legacy GOB piles. Absent this benchmark; it is not possible to define the economic benefits of remediating all GOB piles across Virginia. Remediation of all piles is also not likely to be achievable within a realistic window for analysis.

In order to provide a relevant benchmark for analysis, revenue generated from remediation is based on the annual level of coal refuse removed for energy generation at the VCHEC. Based on operational data from the VCHEC from 2012 to August 2021, the annual remediation level is estimated at 400,000 tons per year.[5]

The use of this benchmark does not indicate that these benefits are unique to activity undertaken by the VCHEC since these benefits could be achieved through other approaches that remove coal refuse and remediate the sites. The framework does seek to compare the benefits of this annual activity level to the costs the state and private actors ultimately accrue if the state's legacy coal refuse piles remain unaddressed.

3.1. Water Quality Impacts

ACID MINE DRAINAGE (AMD)

Acid Mine Drainage (AMD) is a phenomenon exclusive to the mining industry that generates billions of dollars worth of negative externalities. AMD occurs when surface and groundwater percolate through refuse coal piles leading to a reaction between pyrite, oxygen, and water (surface or ground). The reaction creates acidic runoff containing sulfuric acid and dissolved iron compounds, which have their own unique effects on the environment. The former gives the water an acidic property serving as a catalyst for further corrosion of minerals, which adds to the pollution of soil and waterways over time, dissolving other metals such as copper, lead, and mercury.[6] The latter is responsible for the

5 Based on data provided by Dominion Energy.

6 U.S. Environmental Protection Agency, "What is Acid Mine Drainage?".

accumulation of silt content, causing a rustic tint in affected waterways. However, both serve to devalue, disrupt, and deteriorate ecosystems and inhibit their ability to sustain marine and plant life.

Virginia's Stone Creek is an example of the negative effects that AMD can impose on waterways and their habitability. A buildup of sedimentation and the continuation of dissolved solids from abandoned mine lands resulted in the degradation of the 5,251-acre watershed. The analysis of the affected waterway by the Virginia Department of Environmental Quality (DEQ) found it to be lacking the ability to sustain aquatic life and categorized it as a "severely impaired" to a "moderately impaired" body of water.[7]

To remediate the impaired watershed, the DEQ and Virginia Energy developed a benthic total maximum daily load (TMDL) and implementation plan. The plan assesses the maximum daily load of pollutants a body of water can sustain and still meet water quality standards. To meet the TMDL and initiate the reclamation of Stone Creek, the DEQ reclaimed the disturbed mine lands and those adjacent to it, and imposed sedimentation control practices for the watershed. As a result, the water quality of Stone Creek has improved tremendously, resulting in readings above the minimum required threshold in the fall of 2009 and 2010.[8]

IMPACTED WATERWAYS

Virginia has more than 100,000 miles of rivers and streams, 248 publicly owned lakes, more than one million acres of coastal and freshwater wetlands, and over 120 miles of Atlantic Ocean coastline.[9] Statistical data provided by the EPA shows that, as of 2018, 47.2% (19,588 miles) of the rivers and streams being monitored in Virginia were in suboptimal conditions to support aquatic life. Further, the primary sources causing strain on the habitability of those waterways were due to the presence of sedimentation/siltation and high levels of phosphorus.[10] Of the 47.2% of impaired rivers and streams, 38.1% experience high levels of sedimentation/siltation, while 24.1% display high levels of phosphorus.

A key indicator used to determine the habitability of waterways is the abundance of benthic organisms present. Benthic organisms are aquatic species that live in or on the bottom of a body of water. According to Virginia's water quality standards, waters that display a degraded benthic community are considered impaired. GOB piles directly affect Virginia's streams and waterways by producing acidic runoff containing sulfuric acid and dissolved

7 U.S. Env't Prot. Agency, Reclaiming Acid Mine Drainage Areas and Implementing Control Measures Improve the Biological Health of Stone Creek (2018), https://www.deq.virginia.gov/home/showpublisheddocument/5155/637490875744330000.

8 *Id.*

9 Virginia Department of Environmental Quality.

10 U.S Department of Environmental Protection, "How's My Waterway?", Virginia.

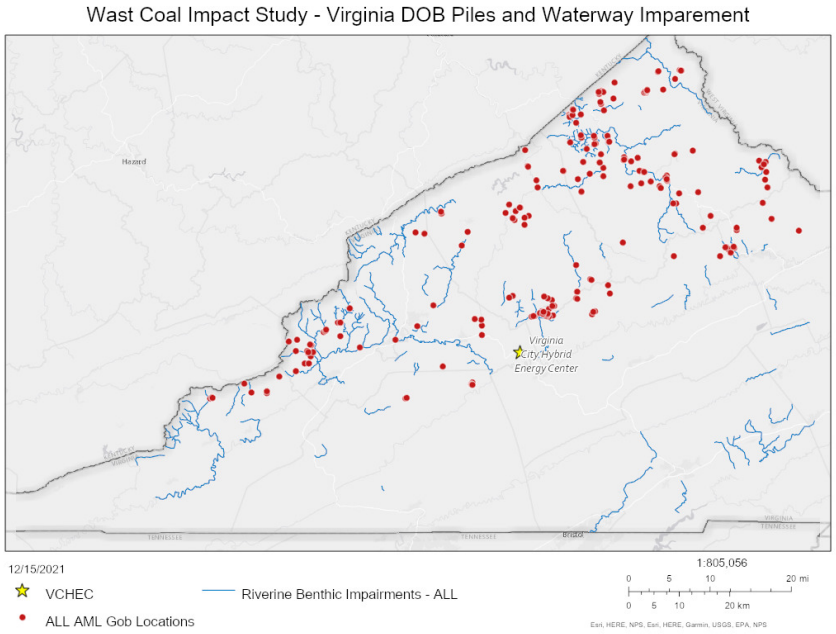


Figure 3.1. GOB Piles and Impacted Waterways in Southwest Virginia

iron compounds that leak into waterways and inhibit habitability. One of the most detrimental pollutants to benthic life is the accumulation of dissolved iron compounds that increase levels of siltation and sedimentation in impacted waterways.

Figure 3.1 shows the clustering of GOB around southwest Virginia's waterways, increasing the likelihood of impairment and loss of aquatic life. It is also important to note that 27 piles are within a 10-mile radius of the Powell River, and four piles are within a 10-mile radius of Virginia's Clinch River watershed. These represent two of Virginia's most prominent watersheds, connecting to hundreds of other waterways and tributaries. The negative and pollutant effect of each GOB pile compounds as affected waters flow through the watersheds.

IMPLICATIONS FOR REVEGETATION

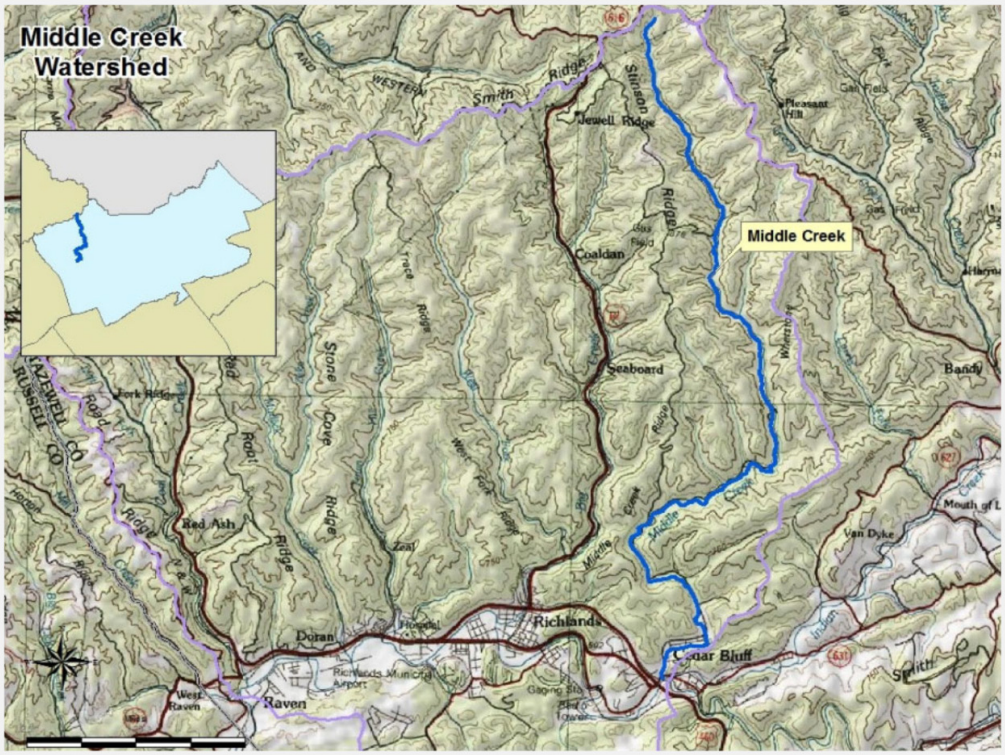
Revegetation is a common, yet difficult process for waste coal remediation and reclamation. Under SMCRA and state regulations, refuse piles must be able to sustain vegetation for a period of five years before the reclamation is considered successful.[11] Additionally, water, leachate, and runoff must meet water quality standards and show no signs of relapse in the future. Another new feature is

11 Powell River Project Reclamation Guidelines for Surface Mined Land: Reclamation of Coal Refuse Disposal Areas.

CASE STUDY

Middle Creek Watershed

Middle Creek watershed: Success story. Pollution from decades of coal mining resulted in reduced benthic populations in Virginia's Middle Creek. As a result, the Virginia Department of Environmental Quality (DEQ) added an 11-mile segment of Middle Creek to the Clean Water Act section 303(d) list of impaired waters in 1998. Between 2000 and 2005, DMME's Division of Mined Land Reclamation (DMLR) implemented mined-land best management practices (BMPs).



The 11-mile stretch of Middle Creek listed in violation of the general water quality standard. (Image Source: Virginia Department of Environmental Quality)

In the period from 2000 to 2005 the abandoned mining properties impacting Middle Creek were reclaimed and restored to forestlands. Post-BMP water quality monitoring indicated significant water quality improvements, prompting DEQ to remove Middle Creek from the list of impaired waters in 2006. Prior to SMCRA, mining companies disposed refuse (coal mining waste) along Middle Creek. Runoff from storm events washed suspended and dissolved solids from the mine sites into the creek.

the storage and structure of modern refuse piles. The regulations require piles to be placed on an incline to reduce the overall acreage of piles and minimize the amount of disturbed land.[12]

Sloped surface piles present several impediments to revegetation: (1) difficulties in placing soil amendments atop a sloped surface; (2) difficulties for soil to absorb and retain water due to increased runoff – further exacerbated by the compaction of refuse piles; (3) and the climate of sloped surfaces being subject

12 *Id.*

These photos depict the before, and after of a hillside reclaimed at the Gilbert Site within the Stone Creek watershed.

Source: Environmental Protection Agency

to the direction in which they face.[13] Another problematic aspect of the revegetation process is the unpredictability of the geological components of each pile. Southwest Virginia coal seams tend to be lower in sulfur than other coal seams found along the Appalachian Mountains, indicating a higher level of acidity.[14] In fact, "the average fresh refuse material in Virginia requires 10 tons of calcium carbonate per 1,000 tons of raw refuse to neutralize the acidity."[15] Moreover, the fertility of soil tends to be lacking in terms of nitrogen and phosphorus for plants.

ECONOMIC VALUE OF IMPROVED WATER QUALITY

An analysis by Dr. Paul Ziemkiewicz, Director of the West Virginia Water Research Institute, established the potential acidity reduction from removing coal refuse for use at the coal refuse plant in Grant Town, West Virginia, and replacing it with coal ash. Scaling these benefit levels to the activity of Dominion Energy's VCHEC indicates that the annual removal of 400,000 tons of coal refuse produces a reduction of more than 150 metric tons of acid loadings annually.[16] Further, the deployment of 978,000 tons of coal ash annually produces a reduction of nearly 403 metric tons of acid loadings each year.

To combine these values, an "overlap adjustment" of 50% is conservatively applied to account for situations where coal ash is returned to the original site where coal refuse was re-mined; thus, combining to lessen the impacts on the same waterway. The unique annualized savings in acid loadings from coal

13 *Id.*

14 *Id.*

15 *Id.*

16 These numbers are calculated based on a 100-year drainage lifespan.

refuse removal and coal ash total approximately 360 metric tons in year one. Importantly, this amount accumulates in future years, because remediation that takes place in year one continuously delivers benefits in subsequent years.

Earlier work by Ziemkiewicz, Skousen, and Simmons found that the industry standard treatment cost for a metric ton of acid loadings with caustic soda (NaOH) was $500/ton/year. Applying this figure to the annualized volume of acid loading reduction from industry activity yields an avoided cost of about $180,000 in year one. This figure accelerates over time, since avoided cost benefits from prior years remain in place.

Notably, this figure monetizes only the benefits from a reduction in acid loadings and the associated treatment savings. The removal of coal refuse also reduces loadings of iron, aluminum, manganese, and sulfate. Conversely, this figure does not attempt to monetize any costs associated with using coal ash in this manner.

3.2. Public Health and Safety

In addition to water quality impacts discussed above, GOB piles pose several threats to public health and safety, including air quality impacts, the potential for destructive collapses, and injuries from unsafe recreational use. Coal dust from piles is emersed in the wind and spread in nearby communities, creating adverse effects.[17] Coal refuse piles can also ignite spontaneously or through human intervention, such as garbage burning.[18] Once ignited, fires may continue to burn for decades due to the coal refuse's continuous fuel source. Further, "methods to extinguish or control AML fires . . . are generally expensive and have a low probability of success," according to a report from the U.S. Bureau of Mines, which describes the fires as "a serious health, safety[,] and environmental hazard."[19] As a result, piles that have caught fire typically are upgraded to "Priority 1" AML features due to the extreme danger associated with public health, property, and safety.

While there is a significant amount of research studying the impacts of GOB piles, there have not been very many legal cases recently brought before the United States government. Below, we consider the impacts on air quality resulting from adverse impacts of GOB piles, such as spontaneous combustion, and incidents from the instability of GOB piles in other countries. Unsurprisingly, the few cases addressing the liability associated with the health

17 Stephen F. Mueller, et al., *Variability of Natural Dust Erosion from a Coal Pile*, 54 J. of Applied Meteorology & Climatology (2015).

18 Memorandum from Lewis M. McNay, U.S. Dep't of Interior (Apr. 8, 2020), https://www.arcc.osmre.gov/resources/impoundments/BoM-IC-8515-CoalRefuseFires,AnEnvironmentalHazard-McNay1971.pdf. (This analysis explains that the flow of air through untreated piles oxidizes combustible coal refuse materials. The oxidation process generates heat which ultimately ignites the combustible components of piles).

19 A. Kim & F. Chaiken, Fires in Abandoned Coal Mines and Waste Banks (U.S. Dep't of Interior Identifying No. IC-9352, 1993), https://www.arcc.osmre.gov/resources/impoundments/BoM-IC-9352-FiresinAbandonedCoalMinesandWasteBanks-KimandChaiken1993.pdf.

CASE STUDY

Cleanup of the Clinch River

In 2014 the Office of Surface Mining approved DMME to proceed with the reclamation of the 12-acre Hurricane Creek GOB pile site as an effort to increase the overall health of the Clinch River Watershed. According to DMME Director, John Warren, "This abandoned mine land was the largest pollution contributor to the Clinch River." The Hurricane Creek GOB pile was located near Carbo, VA on Dumps Creek which is a tributary of the Clinch River. In total, approximately 1 million tons of GOB was removed as part of this clean-up project, with around 500,000 tons being transported to the Virginia City Hybrid Energy Center (VCHEC) to be converted into usable energy for Virginians.

A slope of the Hurricane Creek GOB Pile during extraction and cleanup, and the remediated site after reclamation. Source: Dominion Energy

Before remediation, it is estimated that an annual rate of 200 tons of waste coal percolated into the Clinch River for as long as the GOB pile was standing. The remediated site was covered with topsoil to reduce surface erosion, given slopes for drainage, and planted special grass and native hardwood to facilitate natural succession and wildlife repopulation. Virginia Energy, Dominion, and Savage Industries have remained in programming partnership. An Arbor Day event at the reclaimed Hurricane Creek site attracted about 350 sixth-grade students to plant trees in the 12-acre site.

"The reclamation of the Hurricane Creek GOB pile is an important step toward improving water quality in the nationally important Clinch River watershed"

Brad Kreps, Director of the Clinch Valley Program for the Nature Conservancy

and safety impacts of GOB piles within the United States have come from the Appalachian coal states of Pennsylvania and West Virginia, and, recently, the Illinois Coal Basin.

IMPACTS FOR AIR POLLUTION (U.S. LITIGATION)

Legal claims stemming from the impact of GOB piles on public health can be traced back to the mid-1930s in *Versailles Borough v. McKeesport Coal & Coke Company*.[20] The Pennsylvania private nuisance case was brought by the

20 *Versailles Borough v. McKeesport Coal & Coke Co.*, 83 Pittsb. Leg. J. 379, 379 (1935).

city and borough against a coal company for health impacts residents suffered due to nearby burning of GOB piles.[21] The city and borough introduced 51 witnesses who spoke of conditions such as hay fever, asthma, irritated throats, coughs, and other similar symptoms resulting from exposure to the fumes.[22] Later, the defense produced 71 witnesses who claimed they suffered no ill effects from the nearby GOB piles.[23] The court ultimately found there was no evidence provided that "warrant[ed] the assumption that the health of anyone [was] being imperiled" by the fumes from the GOB piles.[24] Instead, the court indicated the injuries resulted from annoyances posed by dust, smoke, and the odor.[25] While the court did not hold the burning GOB piles posed a significant risk, by July 1964, the Pennsylvania Department of Health had determined that burning GOB piles constitutes a serious air pollution risk.[26] Studies conducted in Pennsylvania found that burning GOB piles emit oxides of sulfur, which can interfere with visibility throughout the area. The study shows that the emitted oxides of sulfur adversely affect the health of residents and impact the property of nearby communities.[27]

In 1940, the West Virginia Supreme Court concluded that the fumes from a burning GOB pile could constitute a public nuisance resulting in civil liability.[28] In this case, residents alleged that the fumes adversely impacted the health of the community and amounted to a public nuisance.[29] There was testimony at trial that the atmosphere was "pungent with the odor of burning sulphur," impacting both the residents' health and their ability to enjoy their own property and land.[30] More specifically, residents claimed that the gases resulted in burning sensations in the nose, throat, eyes, and respiratory tract, causing headaches, coughing, loss of appetite, and sleeplessness.[31] As for their ability to enjoy their land, many residents stated that they had to keep their homes sealed to prevent the fumes from entering the house.[32] After air tests were presented to the court and testimony given from several doctors and current and previous residents, the court held that the fumes from this

21 *Id*.

22 *Id*.

23 *Id*.

24 *Id*.

25 *Id*.

26 Victor H. Sussman & John J. Mulhern, *Air Pollution* from *Coal Refuse Disposal* Areas, 14 J. of the Air Pollution Control Ass'n 279, 279-284 (1964).

27 *Id*.

28 Bd. of Comm'rs v. Elm Grove Mining Co., 9 S.E.2d 813 (W. Va. 1940).

29 *Id*. at 445.

30 *Id*.

31 *Id*.

32 *Id*.

particular burning GOB piles constituted a nuisance.[33] While the Supreme Court upheld the ruling, it explicitly stated that the decision does not mean *every* burning GOB pile constitutes a nuisance.[34]

Over a decade later, in 1956, the Supreme Court of Appeals of West Virginia heard another case, *Koch v. E. Gas & Fuel Assocs.* Here, the court held that owners of parcels containing GOB piles cannot utilize their land and allow GOB piles to burn if the fumes are injurious to neighbors.[35] This case centered on the negligent use and operation of the GOB pile by failing to prevent and subsequently maintain burning fires, resulting in the release of poisonous gases, such as sulphur dioxide.[36] The decision relies on *Rinehart v. Stanley Coal Co.* as precedent in making its determination.[37] In *Rinehart*, the coal company noticed the spontaneous combustion, and unsuccessfully attempted to extinguish the fire with water and 'bug dust.'[38] The Court held that the company, "knowing the highly inflammable and combustible quality of the `bug dust,' was clearly negligent in depositing it with the other mining refuse in a huge dump covering several acres, as the machine cuttings, not sold as coal, could have been, and part of it was, deposited elsewhere."[39] Similarly, the *Koch* court held that a plea of assumption of risk cannot be used to "bar damages to the plaintiffs which have accrued since the plaintiffs moved into and on their property, and after the trust association had been notified or by the exercise of reasonable care should have known, of the injurious effects of its gob pile or gob piles."[40] Ultimately, the Court reiterated that "[a] person in possession of land is required [ ] to use it as not to injure the property of another person."[41]

Another Pennsylvania case involving the violation of a municipal ordinance shows that liability may be found against a possessor of property where a burning GOB pile is located, even if the possessor did not create the GOB pile or cause the resulting fire.[42] In 1959, the Superior Court of Pennsylvania decided a case where a gentleman was fined $100 for violating the Smoke Control Ordinance of Allegheny County for a fire burning from a GOB pile emanating smoke and obnoxious fumes.[43] The smoke and fumes resulted in health issues of, both, people and animals, as well as property damage.[44] The

33 *Id*. at 816.

34 *Id*. at 818.

35 Koch v. E. Gas & Fuel Assocs., 95 S.E.2d 822 (W. Va. 1956).

36 *Id*. at 825.

37 *Id*. at 828.

38 *Id*.

39 Rinehart v. Stanley Coal Co., 163 S.E. 766, 766 (W. Va. 1932).

40 *Id*.

41 *Koch*, 142 W. Va. at 828.

42 Commonwealth e*x rel*. Allegheny v. Toth, 152 A.2d 284, 284 (Pa. Super. Ct. 1959).

43 *Id*.

44 *Id*. at 286.

ordinance stated that any open fires resulting from coal refuse had to be extinguished by January 1, 1956, or show that due diligence was being exercised to extinguish the fire.[45] The court found that the gentleman's failure to extinguish the fire or show that he had diligently attempted to extinguish the fire after January 1, 1956, was a violation of the ordinance.[46] Additionally, the court held the following facts were immaterial in determining whether the gentleman had violated the ordinance: (1) he did not own the land in fee simple, (2) he did not create the GOB pile, and (3) he did not cause the fire.[47]

More recently, in 2005, the United States Court of Appeals for the Seventh Circuit refused to hear a case regarding adverse effects resulting from a nearby GOB pile.[48] In *Korte v. ExxonMobil Coal USA, Inc.*, Korte brought suit claiming that airborne dust from a nearby GOB pile resulted in "a mild obstructive lung problem including a small bronchospasm component."[49] However, the court in this case never reached the merits of the claim because the doctor offered by the plaintiffs failed to qualify as an expert witness under the federal rules of evidence, and without the doctor's testimony, the essential element of causation could not be proven.[50]

IMPACTS FROM UNSTABLE GOB PILES (INTERNATIONAL INCIDENTS)

GOB piles vary widely in composition, size, and construction throughout the world and the United States.[51] Coal refuse can be "deposited by dump trucks, dropped from aerial trams, dumped from mine cars (where the tracks are laid on the pile) and deposited by conveyor belts" creating GOB piles.[52] These methods can affect the stability of piles and the rate of combustion within a pile.[53]

Although incidents involving GOB pile collapses are not as frequent as the claims of water and air pollution discussed throughout this report, the harm from such a collapse can be substantial. Consideration of the potential health and safety impacts of GOB piles must include a discussion of the 1966 "Aberfan disaster."

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45 *Id*. at 287.

46 *Id*. at 286.

47 *Id*. at 285.

48 Korte v. ExxonMobil Coal USA, Inc., 164 F.App'x 553, 555 (7th Cir. 2006).

49 *Id*.

50 *Id*. at 557-58.

51 Sussman *supra* note 26, at 279-284.

52 *Id*.

53 *Id*.

The Aberfan disaster occurred in Aberfan, Wales, in 1966, and is likely the most significant incident resulting from faulty stability of GOB piles.[54] At this time, several GOB piles, known as tips, were built on the mountainside along streams situated above the village of Aberfan.[55] Tip 7 laid on "highly-porous sandstone riven with streams and underwater streams."[56] In 1963, the tip slipped, trapping the mountain spring water within the tip.[57] Despite warnings from engineers and other concerned residents of Aberfan, nothing was done.[58] On October 21, 1966, after relentless rain for about a week, the tip slipped once again.[59] As a result of this small slip, 144,000 cubic yards of black slurry and coal refuse avalanched down the mountainside destroying farmhouses, a school, and cottages.[60] One-hundred forty-four lives were lost, 116 of which were children attending school.[61]

During this time, the United Kingdom and Aberfan had no laws or regulations governing mining and/or the creation and storage of GOB piles.[62] Well aware of the magnitude of the disaster, the government ordered an immediate inquiry, and, after 76 days, investigators deemed the National Coal Board (NCB), a statutorily created agency that took control over the country's mines and operations, was responsible for the disaster.[63] However, the lack of rules and regulations allowed NCB to continue business without a significant punishment.[64] Since then, the United Kingdom has adopted the Mines and Quarries (Tips) Act of 1969, giving details on the proper construction and inspection of GOB piles.[65] However, landslides have not stopped or been prevented. More recently, on February 12, 2013, a GOB pile landslide near Hatfield and Stainforth rail station in South Yorkshire resulted in a section of the railway being destroyed. While no one died in this accident, the railway was forced to shut down for some time.[66] No pending litigation could be found regarding this recent landslide.[67]

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54 Huw Edwards, *Aberfan disaster – lessons learned*, Inst. of Civ. Eng'rs, https://www.ice.org.uk/what-is-civil-engineering/what-do-civil-engineers-do/aberfan-disaster-lessons-learnt (last visited Dec. 27, 2021).

55 *Id.*

56 Ceri Jackson, *Aberfan: The mistake that cost a village its children*, BBC, https://www.bbc.co.uk/news/resources/idt-150d11df-c541-44a9-9332-560a19828c47 (last visited Dec. 27, 2021).

57 *Id.*

58 *Id.*

59 *Id.*

60 *Id.*

61 *Id.* (The Aberfan disaster invokes U.S. coal ash slurry disasters such as that in Kingston, TN in 2008).

62 *Id.*

63 Richie Venton, *Aberfan Disaster 1966: power and corruption in the Valley of Death*, Public Reading Rooms, https://prruk.org/aberfan-disaster-1966-power-and-corruption-in-the-valley-of-death (last visited Dec. 27, 2021).

64 *Id.*

65 *Id.*

66 *Hatfield Colliery, South Yorkshire*, British Geological Surv., https://www.bgs.ac.uk/case-studies/hatfield-colliery-south-yorkshire-landslide-case-study (last visited Dec. 27, 2021).

67 *Id.*

Source: Petley, American Geophysical Union

Dave Petley, New aerial photos of the Hatfield Stainforth colliery landslide, AGU, https://blogs.agu.org/landslideblog/2013/02/15/new-aerial-photos-of-the-hatfield-stainforth-colliery-landslide (last visited Jan. 3, 2022).

ECONOMIC VALUE OF IMPROVED PUBLIC SAFETY

The removal of coal refuse piles eliminates any possibility that they will catch fire in the future at that site, producing a quantifiable avoided fire response cost for the Commonwealth of Virginia. Depending on the size of the fire and other factors – location, access issues, etc. – the cost of extinguishing burning coal fires and securing the site can be significant. To date, at least $1.75 million in AML funding has been committed to extinguish and control surface coal fires in Virginia.[68] Recently reported projects in Pennsylvania regarding extinguishing coal pile fires suggest an average cleanup cost of approximately $120,000 per acre.[69]

Based on this benchmark and data on waste coal fire remediation efforts in Pennsylvania, an effective fire reduction rate is calculated utilizing the annual removal and remediation of waste coal. The removal of 400,000 tons of coal refuse annually reduces the expected fire response costs by $2,400 in year one. These benefits accumulate over time, because the fire risk is permanently removed when a site is remediated.

68 Comments from Virginia Energy (formerly the Department of Mines, Minerals, and Energy).

69 Remediation cost estimates for coal pile fires were derived from the remediation of the Simpson Northeast coal pile and the Staback Park coal pile, both in Lackawanna County, Pennsylvania. The remediation of both fires was carried out through commission by Pennsylvania's Bureau of Abandoned Mine Reclamation (BAMR). Cost proposals submitted to BAMR for each coal pile fire was the basis for the average cost estimate of $120,000 per acre.

In addition to fire risks, piles are structurally unstable and can collapse, leading to landslides and mudslides that have affected public and private lands, including highways, homes, crops, and forests. Public safety issues are compounded by the number of coal refuse piles located in populated areas. Unfortunately, unsupervised piles are frequently used for recreational purposes, particularly all-terrain vehicle (ATV) and bike riding, activities that are not uncommon in southwest Virginia. Due to the instability of the piles and dangerous debris on the sites, this activity can lead to serious injury and even loss of life.

Benefits from avoided fatalities and injuries can be quantified based on government guidance on the statistical value of a life and varying degrees of injury commonly used in cost-benefit analyses. Based on the historic rate of annual fatalities and the established relationship between ATV deaths and injuries, the removal of 400,000 tons of coal refuse annually yields an avoided fatality and injury value of more than $32,000 in year one.[70] This amount grows over time as sites are remediated in future years.

NET EMISSIONS

Legacy GOB piles generate emissions due to their contents. These emissions increase if the GOB is burned, either in an uncontrolled manner as piles catch on fire, or in a controlled setting using GOB as a fuel source for energy generation.

Burning piles create a range of uncontrolled negative atmospheric impacts, including smoke, minute dust particles, and the release of poisonous and noxious gases, including carbon monoxide, carbon dioxide, hydrogen sulfide, sulfur dioxide, ammonia, sulfur trioxide, sulfuric acid, and oxides of nitrogen.[71] These pollutants can be fatal to vegetative life and negatively impact human health. [72]

When GOB is used as a fuel source, emissions take place in a controlled and regulated setting. According to Dominion Energy, the Virginia City Hybrid Energy Center (VCHEC) employs two fuel-flexible circulating fluidized bed boilers (CFB) [73] which are uniquely designed to burn coal, waste coal, and up to 20% biosolids[74] and serve as the plant's engine, with an energy generating

70 John Topping, U.S. Consumer Prod. Safety Comm'n, 2018 Annual Report of ATV-Related Deaths and Injuries (2020). (This report identifies 658 ATV related deaths in 2017 (the most recent year for which complete data is available) and estimates 93,800 ATV-related, emergency-department-treated injuries annually, a ratio of 143 injuries to each fatality. This ratio is applied to extrapolate from fatalities to injuries, with injury severity assigned based on the distribution calculated by the U.S. Department of Transportation for traffic accidents and provided in DOT cost-benefit guidance.)

71 Trent Garrison, The Environmental Effects of Coal Fires (2015) (Ph.D dissertation, University of Kentucky) (on file with UKnowledge).

72 *Id.*

73 *Virginia City Hybrid Energy Center*, MCDERMOTT, https://www.mcdermott.com/What-We-Do/Project-Profiles/Virginia-City-Hybrid-Energy-Center.

74 POWER, TOP PLANT: Virginia City Hybrid Entergy Center, Virginia City, Virginia, Oct. 1, 2012.

capacity of 585-MW.[75] In addition, the steam produced by the boilers powers a 668-MW steam turbine. The dual system incorporates advanced air quality control equipment comprised of a dry scrubber, baghouse particulate filter, selective noncatalytic reduction system, and an activated carbon injection system to reduce environmentally unfriendly materials such as mercury from entering the atmosphere.

The VCHEC also utilizes several water-saving design features, such as reusing the leachate derived from their solid waste storage facility for ash wetting and the system's dry scrubber. Dominion reports that water usage at the VCHEC is roughly 90% less than the amount of what's used at an ordinary facility. The facility also recycles heat from the CFB boiler system to preheat the feedwater, ultimately improving the overall plant heat rate.[76]

Even with the controls and environmental protections in place, the use of GOB as a fuel source still generates material carbon emissions. The VCHEC uses a blend of waste coal, coal, and other biosolids, meaning that its emissions profile is not representative solely of GOB-generated activity. Data from Dominion Energy indicates that GOB represents 27% of fuel utilized at the VCHEC from the opening of the plant in 2012 through August 2021. During this time, emissions from energy generation at the VCHEC totaled 25.5 million tons.[77]

The net emissions effect of using GOB as an energy source is difficult to quantify and depends heavily on how the "counterfactual," in which GOB is not removed for this use, is defined.

For instance, it is not clear whether the marginal energy that is generated through waste coal would be replaced by a zero-emissions fuel source in the near term. Notably, the Virginia Clean Economy Act (VCEA) recognizes natural gas as a fuel source with an extended role in the transition of Virginia's energy portfolio.[78] It may be that the alternative to burning waste coal for VCHEC's energy generation is energy generated from a natural gas facility.

Data from the US Energy Administration shows that energy generation from natural gas has a smaller emissions footprint per kWh of energy generated than coal plants, and an emissions footprint less than half that of the VCHEC when running at capacity (see Figure 3.2.[79] The emissions profile for alternative energy generation is material in considering the net effects of emissions from GOB as a fuel source.

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75 *Virginia City Hybrid Energy Center*, *supra* note 74.

76 POWER, *supra* note 75.

77 Data provided by Dominion Energy.

78 Cale Jaffe et al., *Legal Report on Executive Order 43*, Energy Transition Initiative Univ. of Va., 1-1 (2020).

79 *How much carbon dioxide is produced per kilowatt hour of U.S. electricity generation*?, U.S. Energy Info. Admin., https://www.eia.gov/tools/faqs/faq.php?id=74&t=11.

Figure 3.2. Carbon Emissions by Fuel Type

Fuel Type	CO_2 pounds per kWh
Coal	2.23
Natural Gas	0.91
Petroleum	2.13
VCHEC (Base Capacity Operation)[a]	2.08

Source: Dominion Energy, U.S. EIA (2020)

[a] Emissions factor shown here reflects the efficiency level at VCHEC's highest capacity factor of 69% in 2013).

Additionally, the counterfactual must consider the effects of GOB pile emissions over time if they are left unremedied rather than used for energy generation. Passively, GOB coal piles release coal dust and particulate matter as it is loosened and swept up by the wind.[80] More seriously, piles can catch fire, leading to uncontrolled burning without any measures to capture or mitigate the release of traditional air pollutants. Burning coal in a GOB pile represents a more severe emissions scenario than the burning of waste coal in a controlled and equipped facility.[81]

While emissions from the use of GOB for energy generation are knowable, the level of averted emissions from alternative energy sources and from the remediation of piles and potential fires is not clearly defined. Net emissions are not considered directly within the economic framework in this study. Ultimately, decisions as to combusting waste coal are left to policy makers to determine whether the increased GHG emissions are worth the incentive of creating a market for GOB.

3.3. Reclamation of Land

The remediation of coal refuse piles also returns substantial areas to productive land use. Reclaimed land has become recreational parks and soccer fields, pastures, industrial parks, shopping centers, and housing developments, adding considerable value to private landholders and to the general public. On the other hand, coal refuse piles are frequently located in populated areas where they represent a drawback/disadvantage for nearby homes, reducing the quality of life and property values for residents.

As of January 2022, the home page of Virginia Energy's website touts the innovative repurposing of the mined land in southwest Virginia. The site even links to a video of such efforts, explaining that "Virginia Energy has long been involved in economic development with a special focus on coal-impacted

80 Akshaya Jha, *Even When It's Sitting In Storage, Coal Threatens Human Health*, THE CONVERSATION (Sept. 13, 2017, 9:13 PM), https://theconversation.com/even-when-its-sitting-in-storage-coal-threatens-human-health-80865.

81 Trent Garrison, *supra* note 72.

communities in southwest Virginia."[82] The video explains how previously mined land is being repurposed to create new opportunities for jobs and the community.

LOCAL EXAMPLES OF PUTTING RECLAIMED LAND TO PRODUCTIVE USE

Reclamation of AML sites is about remediating the environment, as well as creating value for an economic asset for the local community. Several outdoor recreation sites – Norton Riverwalk, Tipple Hill Park, Spearhead Trails, and Project Claim – all started with improving environmental quality and then repurposing or enhancing the site for its economic opportunities.

The Norton Riverwalk and Tipple Hill Park project successfully reclaimed the 11.1-acre site of a pre-1977 surface mining location. Remediation involved the mitigation of Acid Mine Drainage and the preparation of an environmental assessment. The project then conducted a full construction and design to improve the aesthetic assets for the local community, which was thought to have incentivized walk-up businesses to locate nearby.[83]

Spearhead Trails is an organization and a multi-trail network that crosses numerous AML sites in Tazewell County. Partnering with Pocahontas Land Corporation, it has successfully remediated and opened the Original Pocahontas (OP), generating approximately $1.5 million in new investment since the opening in 2014.[84] Located on a subsidence-prone, environmentally impaired area and next to two GOB piles, the land reclamation effort involved removal, hauling, and disposal of waste material to an off-site location, sealing portals, and designing for trail improvement and expansion. This effort was followed by the Pocahontas Exhibition Mine and Museum project, which benefited from AML Pilot Funding and further integrated the trail system into the local tourism economy.[85]

Project Reclaim[86] turned a 32-acre GOB pile and its adjacent lands into a regional industrial site in Russell County. After backfilling and grading the GOB pile, the project also identified and repurposed several infrastructures and utilities to support the industrial site, including existing rail siding, an electric distribution line, gravel roads, access points to bridges, water supply, natural gas, etc. Three industrial projects expressed interest in the site upon projected completion.

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82 Va. Energy, https://energy.virginia.gov (last visited Jan. 6, 2022).

83 Evan Fedorko et al., *Healing Our Land, Growing Our Future*, https://appvoices.org/resources/AMLstudy/AppVoices_Healing_Our_Land_AMLstudy_Nov2016_lowres.pdf.

84 According to Charlotte Mullins, Acting Executive Director and Chari of the Spearhead Trails Board of Directors.

85 OSMRE Programs. 2016-2019 Annual Report AML Economic Development Pilot Program. Access through: https://www.osmre.gov/programs/AML/2016_2019_Annual_Report_AML_Economic_Development_Pilot_Program.pdf.

86 *Id.*

Both the reclamation of previously unusable land and the value impacts to nearby residents represent quantifiable economic benefits resulting from the industry's remediation of coal refuse piles. These benefits accrue largely to private residents and local governments (which benefit from increased land value and the potential for commercial uses), rather than directly to the Commonwealth. Land value benefits resulting from the remediation of a site are one-time rather than cumulative benefits.[87]

ECONOMIC VALUE OF RECLAIMED LAND

According to information provided by Dominion Energy, activity by the VCHEC has reclaimed roughly 1,700 acres of land since 2012, restoring it to productive use. Applying the historic relationship between beneficial ash utilization and reclamation to the recent annualized volume of ash reclamation, it is estimated that 189 acres are restored annually.

Using an assumed land value of $4,000 (based on pasture-land values in Virginia published by the U.S. Department of Agriculture), the annual benefit of this rehabilitation activity is estimated at more than $755,000.[88] This approach may be conservative, since land values for non-agricultural uses like those described above may be higher.

Remediation of GOB piles can also have positive effects for nearby properties. Incremental benefits to properties within one-quarter mile are estimated at 5 percent, the lower end of the range of statistical results for similar blighting influences, such as landfills.[89]

Several coal refuse piles are in proximity to developed areas and population centers. As detailed in Section 2 of this report, at least 115 piles are located within 10 miles of some of the densest population centers in southwest Virginia. This means that the blighting effect of these coal refuse piles apply in many instances to residential and commercial properties. This analysis conservatively continues to use an estimated land value of $4,000 per acre based on agricultural land values, consistent with the approach used for remediation and restoration of the piles themselves.[90]

Spatial analysis based on refuse pile sizes indicates that for each acre of coal refuse, there are approximately 16 acres of nearby property. Based on an assumed 5% blighted effect, the estimated increase in nearby property values

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87 Notably, reclaimed land and land with improved value continues to deliver benefits to land holders and users in future years. However, from an economic standpoint, this future use value is captured in the initial value increment that is produced. For example, a parcel that is purchased for $100,000 is understood in economic terms to be delivering $100,000 of value to the land holder over time, rather than $100,000 in additive value each year.

88 U.S. Dep't. of Agriculture, ISSN 1949-1867, Land Values 2020 Summary (2020).

89 *See also* Richard C. Ready, *Do Landfills Always Depress Nearby Property Values?*, 27 J. of Real Est. Rsch. 1, 321-39 (2010). (This analysis of three Pennsylvania landfills found that their presence decreased adjacent property values by an average of 2.7 to 13.7%).

90 U.S. Dep't. of Agriculture, *supra* note 90.

from the remediation of 189 acres per year is estimated at $617,000 per year. These benefits would be shared among private and public landholders with property in proximity to existing GOB piles.

3.4. Summation of Environmental Impacts

To summarize the monetized value of the remediation and reclamation of GOB-affected areas over time, the categories of benefits described above are calculated annually over a 20-year period. Benefits from water quality and public safety accumulate over time, since remediated areas continue to deliver avoided costs in subsequent years, while benefits from land reclamation and nearby property value are treated as a one-time social benefit in the year in which they occur.[91]

As noted above, the full extent of GOB piles in Virginia in need of remediation is unknown. As a basis for the calculation, this study uses the annual level of remediation undertaken by the VCHEC, which is approximately 400,000 tons of GOB and 189 acres of land restoration annually.

Importantly, the quantification of benefits in this analysis is entirely forward-looking, in that future activity is designated as "year one," and activity undertaken to date is excluded from the calculation. The accelerating benefits over time outlined below illustrate that recent remediation activities have delivered and will continue to deliver considerable value for Virginia.

Year 1 benefits from this level of GOB removal and remediation are estimated to total more than $1.6 million, with the majority derived from land reclamation and property value effects. Over time, water quality and public safety benefits, which compound annually as more coal refuse piles are remediated, begin to supply the majority of the benefits. Water quality benefits represent the largest category of savings over time, generating an average of $1.9 million in nominal benefits over the twenty-year horizon.

Total benefits accelerate from an estimated $1.6 million in year 1 to $5.6 million in year 20. Over the 20-year period, benefits total more than $77.6 million in nominal terms, averaging $3.9 million per year (see Figure 3.3).

This framework assumes the removal of 400,000 tons of GOB per year over a 20-year period, which is equivalent to the removal of 8 million tons. As discussed throughout this report, the total volume of legacy coal refuse piles in Virginia is unknown, but may be significantly larger than this figure. Optimistically, this means that Virginia could achieve proportionally larger benefits if a greater volume of GOB than this benchmark is remediated in the coming years. More pessimistically, the inverse is also true: failure to act and

91 Total benefits are expressed as the net difference between societal benefits accumulated (a positive number) and costs avoided (a negative number).

Figure 3.3. Quantification of Environmental and Public Use Benefits Over 20 Year Time Span ($M)

Category	Benefit Type	Year 1	Year 10	Year 20	Total	20 Year Avg
Water Quality	Cumulative	$0.18	$1.79	$3.58	$37.55	$1.88
Public Safety[a]	Cumulative	$0.03	$0.35	$0.69	$7.29	$0.36
Land Reclamation	One-Time	$0.76	$0.76	$0.76	$15.11	$0.76
Nearby Property Value	One-Time	$0.62	$0.62	$0.62	$12.35	$0.62
Total		**$1.59**	**$3.51**	**$5.64**	**$72.30**	**$3.61**

Source: ESI Calculation

[a] Public Safety impacts include impacts to air quality, impacts from pile fires, and impacts from direct injury and loss of life. Each of these factors is discussed above.

continue remediation efforts turn these benefits into liabilities. The damages that would be avoided through remediation are instead realized, and if the volume of legacy coal is indeed greater than the baseline put forward here, those damages will be commensurately larger than the impacts calculated here.

4. Remediating Virginia's Legacy GOB Piles

This section considers potential options for remediating legacy GOB piles.

- Section 4.1 discusses various remediation approaches, including leaving the piles in place. When leaving the piles in place, mitigation is needed through removing and better storing the waste coal or removing the waste coal and making economic use of it, such as generating energy.
- Section 4.2 reviews the legal framework that governs GOB site remediation and related environmental issues, most notably the Surface Mine Control and Reclamation Act (SMCRA) and the Clean Water Act.
- Section 4.3 considers Virginia's regulatory environment, including its transition to a cleaner energy environment.

4.1 Potential Remediation Approaches

Legacy GOB piles produce several hazards to the environment and landscape, which are described in detail in Section 3 of this report. "Remediation" of these piles encompasses several potential strategies to mitigate their harmful impacts. Remediation is, thus, not a uniform activity and can be approached in different ways depending on the location, nature of the pile, available funding sources, intended land uses, and other specific factors.

This section seeks to outline the potential approaches that have been implemented in Virginia and elsewhere for the remediation of coal refuse piles. Broadly, there are two major approaches to GOB pile remediation:

1. remediation in place; and
2. removal and remediation.

Remediation in place efforts involve actions that mitigate the environmental harms from a GOB pile without the direct removal of the coal refuse. Techniques include grading and revegetating piles, and mitigation efforts for nearby waterways. These interventions are generally more cost-effective than removal approaches, but are typically partial solutions to the ultimate underlying environmental issues.

Remediation involving the removal of GOB requires coordination with multiple entities to transport the waste coal and provide a terminal location or use for that waste coal. Remediation and the subsequent removal are notably more expensive than remediation involving leaving the piles in place. These methods, however, necessarily remove the source of environmental damage, providing social and environmental benefits and the opportunity to recoup a portion of their costs. Generally, removal and remediation require the transfer of waste coal to a lined landfill site or used in one of a limited number of functions. As discussed, gaps in funding for lower-level abandoned mine sites, like GOB piles, create an economic advantage that generates enough revenue to facilitate thorough and complete remediation efforts.

The VCHEC's energy generation provides one market approach that can help facilitate comprehensive removal and remediation efforts. As a generation plant capable of burning waste coal, the VCHEC can create a market for the extraction, transport, and use of GOB. This dynamic can be beneficial to remediation efforts, as the financial viability of using GOB as a fuel source leverages private funds, thereby making grant funding and public programs better utilized in remediation efforts. Through the energy generation process, the VCHEC generates coal ash; a byproduct of the burning process that can be used to aid in remediating GOB pile sites. Further, the avoided costs of lining and loading landfills, as well as the coal supplanted using waste coal, can both be considered tertiary benefits of burning waste coal for fuel.

On the other hand, there would also be environmental and social costs associated with combusting GOB at the VCHEC. The greenhouse gas emissions from the combustion of GOB would run contrary to current emission-reduction goals in Virginia and nationally. Such emissions would be exacerbated because as GOB is generally of lower quality, requiring more supplemental coal to achieve the same amount of thermal energy is necessary. This would also exacerbate the traditional air pollution associated with coal combustion. While coal ash may have some beneficial uses, it is a waste product that contains harmful contaminants that can pollute nearby waterways. Finally, while using GOB as a fuel source may extend the viability of the VCHEC, and, correspondingly slow the transition to a cleaner electricity portfolio.

REMEDIATION IN PLACE

GOB can be addressed on-site or off-site. When reclamation happens on-site, the approach involves stabilizing and covering the GOB with vegetative supporting material or species such as soil and beach grass. In addition, technicians manage existing water and soil pollution, implement hydrologic controls, and creates an ecosystem design for rehabilitation.[92] However, the treatment for pollution and land stability is hardly a one-time effort, and a healthy ecosystem takes years to be truly re-established.

The legacy (pre-SMCRA) and post-SMCRA GOB piles scattered throughout southwest Virginia demand different levels of remediation efforts due to their creation and storage. Due to the lack of regulations present before the passing of SMCRA in 1977, coal mining companies typically piled refuse materials extremely high and abandoned them. This misguided approach makes the refuse materials prone to sliding. As a result, legacy piles often need to be reconfigured and stabilized before reclamation, causing them to be more expensive to remediate.[93]

A 2018 study by researchers at the Virginia Cooperative Extension at Virginia Tech University concluded that the "slope and aspect effects" of legacy piles in Virginia typically made them more challenging for revegetation and other typical mitigation measures.[94] The "uncompacted" nature of legacy piles also allows for more weatherization and oxidization, leading to higher rates of combustion and increased production of Acid Mine Drainage. [95]

REVEGETATION

The revegetation of GOB piles is a relatively straightforward, yet difficult process of waste coal remediation and reclamation. Several important factors must be considered to determine the best method of reinstating vegetation atop a GOB pile: soil pH, soil fertility, soil/refuse compaction, and soil gradient placement (based on the slope of the GOB pile).

Starting with soil pH, this measure provides active soil acidity and is typically the most used indicator of soil quality.[96] Depending on the mineral content of soil, the pH is subject to volatile fluctuations. For example, if the soil contains a majority of rock or similar materials, it is more likely to become acidic due to weatherization and oxidization. According to the International Journal of Soil, Sediment, and Water, "vegetation achieves optimal growth in the soil at a

92 Louis R. Iverson & Mohan K. Wali, *GRASSLAND REHABILITATION AFTER COAL AND MINERAL EXTRACTION IN THE WESTERN UNITED STATES AND CANADA*, 2 Ecosystem Rehabilitation 85, 108 (1992); U.S. Dep't. of Agriculture, Gen. Tech. Rep. NRS-169, The Forestry Reclamation Approach: Guide to Successful Reforestation of Mined Lands (2017).

93 Powell River Project, *supra* note 11.

94 Powell River Project, *supra* note 11.

95 *Id.*

96 V. Sheoran et al., *Soil Reclamation of Abandoned Mine Land by Revegetation: A Review*, 3 Int'l. J. of Soil, Sediment and Water 1, 3 (2010).

A successfully revegetated waste coal site in southwest Virginia. Revegetation was possible using mulch, lime, and biosolids to balance soil contents.

Source: Virginia Cooperative Extension

neutral pH." [97] When soil pH drops below 5.5, it negatively affects the growth of legume and forage. As a result, low pH affects the ability of vegetation to establish roots within the soil. Conversely, soil with a pH of 6.0-7.5 is ideal for establishing vegetative growth.[98]

Mine soils usually require fertilizer to establish a vegetative ecosystem. Since coal refuse is comprised of weathered rock and coal fragments, there is generally a lack of nitrogen (N) and phosphorus (P) available for plants.[99] However, due to the weatherable mineral content present in refuse piles, the piles typically provide sufficient levels of calcium, magnesium, and potassium for vegetative cover.[100] Therefore, it is imperative that fertilizer be added to account for the lack of nitrogen and phosphorus. Common forms of fertilizer used on refuse piles are biosolids or composts that help supply needed amounts of nitrogen and phosphorus.

Lastly, the compaction of soil, refuse, and the gradient of each are directly correlated. Starting with the former, dense soil poses a problem for several reasons. For example, it reduces the ability of plants to establish roots within the soil, leading to increased runoff and erosion; decreased water retention; and a lack of vegetative cover, which would ultimately increase the amount of AMD generated by the pile. Regulations requiring refuse material to be placed

97 *Id.*

98 *Id.*

99 Powell River Project, *supra* note 11.

100 *Id.*

CASE STUDY

Straight Hollow GOB Pile – Early Attempts at Partial Reclamation

1980s – Before Remediation 1980s Cap and Grade Reclamation Attempt

The Straight Hollow GOB pile site, located in Russell County, is a compelling and insightful study in the varied impacts of various remediation methods. Shortly following the implementation of SMCRA, the GOB pile was capped, graded, and revegetated. This early remediation attempt involved no removal of the waste coal itself. As a result, the danger of contamination, combustion, and other hazards was only marginal abated but not removed.

2008 – Combustion of Pile 2012 – Removal of Pile

Despite the earlier remediation effort, testing in 2008 revealed that the pile had combusted. Utilizing AML funding, Virginia Energy initiated a full removal of the pile. Full removal of the pile will eliminate the danger and environmental hazard posed by the burning waste coal, and introduce a provide a permanent solution to the environmental damage to air and water introduced by the Straight Hollow pile.

"Our experience has proven that the best reclamation method is complete removal of the gob pile"

Richard Davis, Former AML Project Coordinator DMME

on a slope present a problem for the establishment of soil amendments on steep slopes without severe compaction. Further, the slope further exacerbates the issues associated with soil compaction.

WATER TREATMENT (TREATMENT PLANT, OPEN LIMESTONE CHANNELS)

The two most common approaches to water quality issues caused by Acid Mine Drainage (AMD) from mine-affected sites fall under passive or active treatment. Typically, passive treatment is a less expensive approach to

remediation as it only requires occasional maintenance, whereas active treatment requires more labor input and usually involves continuous reagent/chemical treatment over time.[101]

Importantly, while water treatment addresses the "symptoms" caused by GOB piles, it does not address the underlying cause. Water treatment can be strategically located to address runoff and other drainage generated by GOB piles. Economically, these efforts will be most feasible when used to aid in the remediation of several point sources or affected areas. Water treatment approaches are most effective in conjunction with efforts to deal with the GOB piles themselves.

A common but expensive approach to water reclamation is a water treatment plant. The award-winning computer-controlled Levels Road treatment plant, located in Powell, West Virginia, uses two two-channel ultrasonic flow meters, along with two 22-inch electric valves and two 12-inch electric valves to blend highly acidic refuse water with highly alkaline and calcium rich mine water. This process significantly reduces the cost of chemical inputs since the two water sources offset one another.[102] Alum, caustic soda, and flocculent are still added to the water as needed.

The computer system constantly monitors the flow from each pump and the electric valves open or close to adjust the blend ratio selected by the plant operator. The autonomous plant has been transforming the mine water (pH 6.4-6.7) and refuse water (pH 2.0-3.0) to a pH of 7.5-8.0 since its resurrection in 1999, winning the West Virginia Coal Association Reclamation award in 2000 and the West Virginia Business Environmental Leadership Award in 2002.[103]

Another less expensive form of water remediation involves open limestone channels (OLC). Open limestone channels are used to reduce the acidity of runoff as it descends from its originating location. In theory, the calcium carbonate ($CaCO_3$) contained in the limestone dissolves the acidity in AMD-affected waters and increases its pH as it encounters the stones.[104]

The structure of OLCs is relatively simple, consisting of two common construction methods. The first is the construction of a drainage ditch that collects and drains water contaminated by AMD. The second requires placing limestone fragments directly in a contaminated stream.[105] The placement of

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101 Jeff Taylor, Sophie Pape, and Nigel Murphy. "A Summary of Passive and Active Treatment Technologies for Acid and Metalliferous Drainage (AMD)." Australian Centre for Minerals Extension and Research (ACMER) (Fremantle, Western Australia: Earth Systems, 2005).

102 Gary Timms, Engineer-Eastern Associated Coal Corp. "Martinka's State-of-the-Art AMD Treatment Plant"; the plant's water intake often approached 10,000 GPM.

103 *Id.*

104 Mine Closure, "Open limestone channel."

105 Lehigh University, ENVIRO SCI Inquiry, "Open Limestone Channels."

limestone fragments is likely to represent a lower-cost option, since the primary costs are limestone and labor. The cost of implementing an OLC is relatively low compared to other methods. Costs generally associated with the construction of a drainage ditch consist of excavation, labor, and the acquisition of limestone. Dr. Paul Ziemkiewicz, director of West Virginia Water Research Institute at West Virginia University, puts the average cost of an OLC at $27,500.[106]

However, open limestone channels typically lose effectiveness over time since there is no protection against oxidization which causes metals to precipitate and, in turn, causes the limestones to become armored.[107] Armoring can be explained as the accumulation of precipitate on reactive surfaces acting as a chemical barrier reducing reactivity at the point of contact. To increase the effectiveness of OLCs, it is important to consider the slope of the channel and the rate at which water is passing since the slower AMD water passes through OCLs, the faster armoring occurs, and the water's acidity (the same relationship discussed above can be said regarding the water's acidity). On the other hand, the water must not travel too fast through the channel since it needs enough contact time for the reaction with $CaCO_3$ to occur, and channels should be long enough to neutralize the acidity of the water by the time the channel ends. That said, titration studies comparing the effectiveness of armored limestone and unarmored limestone found that the former will still treat AMD, albeit less effectively than the latter.[108]

REMOVAL AND REMEDIATION

An alternative approach to addressing GOB-affected areas involves the removal of waste coal and subsequent remediation of the site. GOB removed from a site can be permanently and safely stored at another location in a limited number of ways, primarily through specially lined landfills or repurposed mine lands. GOB can also be repurposed for uses, including as a fuel source for energy generation. The repurposing of GOB for economically productive uses can facilitate its removal and subsequent remediation.

Regardless of the destination or terminal use, removing the waste coal directly removes the underlying source of environmental damage. Thus, removal and remediation are the most complete option for addressing the environmental damages and hazards posed by GOB piles, relative to remediation-in-place efforts, which generally only mitigate environmental impacts partially or temporarily.

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106 Mine Closure, "Open limestone channel."

107 *Id.*

108 *Id.*

Example of how open limestone channels can be used to mitigate and remediate AMD from seepage areas. This photo was taken at the Luikanlahti copper mine in eastern Finland. Source: Mine Closure

Removal and remediation approaches are notably more expensive than remediation in place efforts. The costs associated with transportation, preparing landfills or other destinations, and the costs and difficulty of coordinating with multiple entities, all create financial barriers to removing GOB from pile sites. The viability of each approach relies heavily on being able to coordinate among multiple entities to achieve the intended end use. If there is no viable use for the waste coal, the only removal option available is the permanent disposal of the coal, which carries significant costs for proper storage and maintenance. Disposal of waste coal has no direct economic product, meaning it does not generate any form of revenue to offset the associated costs.

If an appropriate end user for the waste coal can be identified, and relevant legal, regulatory, and financial issues are considered, waste coal removal and re-use are far more economical. By creating an end-use and revenue stream, transportation, coordination, and land reclamation costs can potentially be fully or partially offset.

DISPOSAL OPTIONS (LINED LANDFILLS, ACTIVE MINE SITES)

Safe disposal of removed GOB that does not have an end use requires a location that is appropriately prepared to mitigate environmental damage. This typically entails either a lined landfill, or coordination with an active surface mining site that is taking measures to safely store newly generated coal refuse.

Landfilling is a common practice used to deal with hazardous waste materials. In the context of coal mining, landfills are commonly used to store combustible coal residuals (CCR), a byproduct of coal that has been burned to be converted into energy. There are several types of CCR, including fly ash, bottom ash, boiler slag, and flue gas desulfurization material, which can be collected and stored in a landfill. Similarly, waste coal can be stored similarly to CCR. The Environmental Protection Agency published its Final Rule on the storage of CCR on April 17, 2015, which provides rules and regulations for the storage of such materials. Based on the EPA's Final Rule, there are five regulations that owners and operators must follow including location restrictions, liner design, structural requirements, operating criteria, and groundwater monitoring and corrective action:[109]

- *Location Restrictions*: CCR landfills cannot be placed above uppermost aquifers, wetlands, within fault areas, unstable areas, or seismic zones.

- *Liner Design*: criteria have been put in place to reduce the rate of leachate from waste which tends to affect surface and ground waters. Landfill liners must be composite liners made of a two-foot layer of soil and a geomembrane in direct contact with one another. New piles require additional protections in the form of collection/removal systems to deal with leachate generated and collected within the landfill, while existing piles (piles that formed before the EPA's Final Rule) are only required to monitor the leachate and groundwater.

- *Structural Requirements*: requirements apply to new and existing sites and require owners and operators to continuously assess landfills for slope stability continuously.

- *Operating Criteria*: criteria are set by the EPA and consist of air criteria, run-on and run-off controls, hydrologic and hydraulic capacity requirements, and periodic inspection requirements to ensure the safety of owners and operators and to reduce the environmental impact of sites.

- *Groundwater Monitoring and Corrective Action*: EPA regulations mandate the use of detection monitoring, assessment monitoring, and corrective action systems/procedures related to groundwater monitoring and corrective action.

109 There are other requirements such as recordkeeping, notification, and internet posting requirements. However, the five listed above are used and discussed due to their direct relation to the storage and maintenance of landfills holding CCR materials.

Taking all factors into account, constructing and maintaining a landfill is a costly form of remediation. In addition, transportation costs often make the landfills economically unfeasible.

In some cases, it may be possible to coordinate safe disposal with an available nearby site. For example, in 2016, the Pennsylvania Department of Environmental Protection (DEP) awarded a contract to Rosebud Mining Company for the removal, disposal, and rehabilitation of a 62-acre coal refuse pile in Ehrenfeld, Pennsylvania. The project used federal AML pilot funds at a bid of $13.5 million for removal and rehabilitation.[110] Including an additional $12.7 million for disposal of the material totaling $26.2 million for the project.

Importantly, Rosebud controlled disposal costs for this project by relocating the refuse (mixed with an alkali) to nearby strip-mining pits that it owned, limiting transportation and storage costs.[111] In announcing the award, DEP noted that previous bids – originally solicited in July 2013 – were cost-prohibitive until the identification of the nearby disposal location "resulted in a cost reduction to allow the contract to proceed."[112] Rosebud's bid reflected a cost of around $11 per ton – split roughly even between removal and disposal – as well as a rehabilitation cost of around $20,000 per acre. Pricing from three bidders in 2016 for removal and rehabilitation were 15 to 20 percent higher than Rosebud, at about $7.50 per ton for removal and $23,000 per acre for rehabilitation.

Cost differentials for disposal are far higher, with two competitive bids for disposal costs in 2013 averaging more than $25 per ton, more than four times the cost to Rosebud. This cost is likely more reflective of the typical cost profile that the state would incur for disposal, absent the unique circumstances of the Rosebud bid.

BENEFICIAL USES FOR REMOVED GOB (INCLUDING ELECTRICITY GENERATION)

Alternatively, if an end-use can be found for GOB, storage costs can be eliminated, and revenue can be generated to support removal and remediation. GOB is most commonly utilized as a construction material or ~~as a~~ fuel source for energy generation.

110 *Ehrenfeld Abandoned Mine Reclamation Project In Cambria County Wins National Recognition; Renewal of Federal Reclamation Fee Needed Now,* PA Environmental Digest Blog (Aug. 31, 2020), http://paenvironmentdaily.blogspot.com/2020/08/ehrenfeld-abandoned-mine-reclamation.html.

111 Bids for removal, disposal, and rehabilitation of the site were submitted publicly to PA DEP in August 2013 under contract number OSM 11(3041)101.1.

112 Pennsylvania Dep't of Envtl. Prot., *Pennsylvania DEP Awards Contract to Reclaim Long-Abandoned Ehrenfeld Mine Site in Cambia County,* Cision PR Newswire (Mar. 8, 2016) https://www.prnewswire.com/news-releases/pennsylvania-dep-awards-contract-to-reclaim-long-abandoned-ehrenfeld-mine-site-in-cambria-county-300232586.html (quoting former DEP Secretary John Quigley).

GOB can be used as a construction material for area fill and structural support, similar to coal ash usage as a structural fill.[113] The Federal Highway Administration has pointed to burnt coarse coal refuse being suitable for embankment or fill material.[114] In addition, a study has shown waste coal can serve as a source for ceramic raw materials used in brick manufacturing.[115] Coal has also been studied as a potential component for plastic composite, potentially useful in applications such as plastic decking and similar construction.[116]

GOB was not considered a popular fuel source historically. Its low British Thermal Unit (BTU) brings a low unit value for power plants. However, in recent years, clean coal technology – such as the Circulating Fluidized Bed Combustion (CFBC) technology – has improved the technical feasibility of using GOB for energy generation. The VCHEC is a CFBC plant that turns both GOB and biomass from the regional reclamation activities into power for southwest Virginia.

The use of GOB as a fuel source for energy generation is part of a broader "fuel cycle" that can produce both revenue and byproducts to support the remediation of affected areas. A byproduct of the energy generation process is fly ash, which can be used as part of the remediation process to help neutralize acidic elements at the re-mining site (or elsewhere). The fuel cycle approach used by the VCHEC changes the economic structure of coal refuse pile reclamation by generating revenue to offset removal and transportation costs, generating a byproduct for use in remediation, and alleviating the need for disposal of unused coal refuse removed from the original site.

This model also introduces private sector resources to complement public sector investment. Total remediation of GOB coal in Virginia may not be completed through public funding and initiatives alone. To effectively address the issue, private investment may be necessary. This is precisely the nature of the VCHEC's operations. Multiple projects have leveraged AML funding, and the removal and remediation efforts are carried out in coordination with Virginia Energy, which funds aspects of the remediation efforts.[117] The removal and remediation efforts that both the VCHEC and Savage conduct are a

113 *User Guidelines for Waste and Byproduct Materials in Pavement Construction*, Fed. Highway Admin. Res. and Tech., (last updated Mar. 8, 2016) (*see* "Coal Bottom Ash/Boiler Slag" and "Coal Fly Ash" sections) (FHWA-RD-97-148), https://www.fhwa.dot.gov/publications/research/infrastructure/structures/97148/mwst4.cfm.

114 *Id.* at Mineral Processing Waste.

115 A. Yu. Stolboushkin et al, *Use of Coal-Mining and Processing Wastes in Production of Bricks and Fuel for Their Burning*. 150 Procedia Engineering 1496 (2016), https://www.sciencedirect.com/science/article/pii/S1877705816313984.

116 Leon Kaye, *Could Coal Find a New Life as a Green Building Material*, Triple Pundit (June 20, 2017), https://www.triplepundit.com/story/2017/could-coal-find-new-life-green-building-material/16731.

117 Information and commentary from Dominion Energy and Virginia Energy.

combination of public and private investment that Dominion claims follows regulatory guidance to appropriately use waste coal while remediating impacted Virginia land.

Further, there are additional uses for ash from burning GOB coal. In West Virginia, the Grant Town Power Plant reclaims substantial amounts of waste coal, consuming and removing more than 12 million tons since its first operation in 1993.[118] The ash generated from the Grant Town Power Plant was approved as a substitute for cement in concrete by the West Virginia Department of Highways.[119] This example demonstrates a potential downstream product chain of coal refuse economics beyond the common use of ash as a remediation material.

Importantly, this approach is unlikely to be a realistic option for all GOB piles in southwest Virginia due to logistical considerations. First, there are significant fixed costs associated with the re-mining process. Piles below a certain size likely do not provide a sufficient potential return from energy generation to justify these costs. Second, transportation of GOB once it has been removed represents a major component of the overall cost equation. This transportation cost is partly a function of distance to the VCHEC, which is in a fixed location. Those piles that are located further from the facility are progressively less cost-feasible to use for energy generation at the VCHEC. Transportation of waste coal will also trigger environmental concerns relating to coal dust.

Figure 4.1 shows the distribution of known GOB piles by distance from the VCHEC. While the feasibility of any pile as a fuel source for the VCHEC depends on multiple factors, piles further than 45 miles from the facility have prohibitively high transportation costs. These piles are generally considered infeasible as fuel sources for the VCHEC.[120] Closer, smaller piles are also likely infeasible as fuel sources for the VCHEC due to the fixed costs associated with removal and remediation efforts.

Challenges such as these highlight the importance of individual site analyses in determining the most appropriate remediation strategy.

4.2. Legal Considerations for Remediation

Virginia and Congress maintain a strong legal framework for conducting responsible GOB pile remediation. This section outlines the legal landscape within which a systematic effort to reclaim GOB piles in southwest Virginia would operate. GOB pile remediation would have to comply with certain federal laws, including the Surface Mining Control and Reclamation Act of

118 Kaitlyn Neff, *Grant Town Power Plant to Receive Reclamation Award*, Times W. Va. (Jan. 10, 2018), https://www.timeswv.com/news/grant-town-power-plant-to-receive-reclamation-award/article_a4867092-f5e3-11e7-b52c-b70536656d2f.html.

119 Sonal Patel, *The Remarkable Responsibility of Coal Refuse Power*, Power Mag. (Aug. 2, 2021), https://www.powermag.com/the-remarkable-responsibility-of-coal-refuse-power/.

120 Based on interviews with industry professionals.

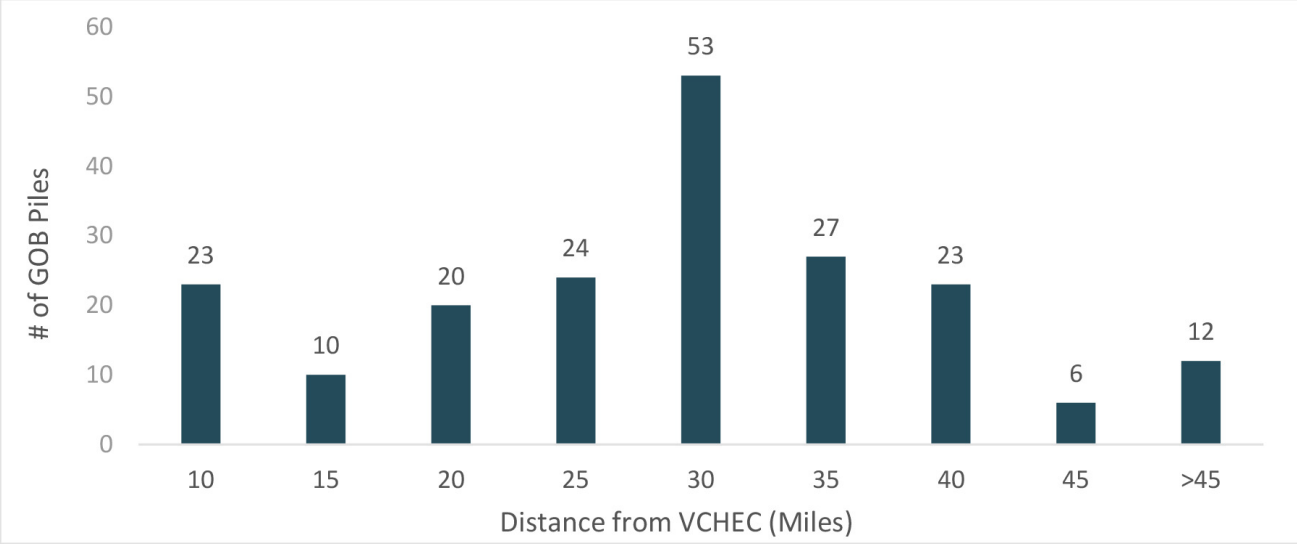

Figure 4.1. Proximity of Legacy GOB Piles to VCHEC

Source: GIS Analysis of Virginia Energy Data

1977 (SMCRA), the National Environmental Policy Act (NEPA), and the Clean Water Act. This section describes each of these federal programs, how Virginia operates as a regulator, and how these broad programs may affect GOB pile reclamation efforts.

SURFACE MINING CONTROL AND RECLAMATION ACT OF 1977 (SMCRA)

The Surface Mining Control and Reclamation Act of 1977 (SMCRA) provided a comprehensive federal framework of environmental regulations that govern coal mining on the surface of lands within the United States.[121] In 1977, Congress determined that surface coal mining caused severe erosion; contributed to flooding; polluted waterways; and generally degraded land in ways that harmed habitat, commerce, agriculture, and communities.[122] However, Congress also identified the expanding national need for coal as an energy source requiring an urgent need to establish standards addressing the effects of surface coal mining on public health.[123] Thus, Congress established SMCRA, a regulatory process to prevent, account for, and remediate damage to land caused by surface coal mines.[124] Additionally, Congress sought to remediate the historic accumulation of mining waste and lands rendered unusable by surface mining.[125] The purposes of SMCRA are diverse and enumerated in 30 U.S.C. § 1202.[126]

121 30 U.S.C. § 1231 (1977).

122 *Id.*

123 *Id.*

124 *Id.*

125 30 U.S.C. § 1202 (1977).

126 30 U.S.C. § 1201 (1977).

Congress observed that coal mining before 1977 left behind a substantial amount of unreclaimed land that imposed social and economic costs onto communities near those sites.[127] Within SMCRA, Congress addressed the environmental risks of surface coal mining through Title IV and Title V. Title IV of SMCRA established the Abandoned Mine Land Reclamation Fund (AML Fund) and authorized reclamation of historic, pre-1977, coal mining.[128] Under Title V of SMCRA, Congress established a complex set of requirements that apply to post-1977 mining and protect, manage, and restore lands impacted during and after coal mining.[129]

To implement SMCRA, Congress created the Office of Surface Mining Reclamation and Enforcement (OSMRE) within the Department of the Interior.[130] OSMRE regulations cover everything from administrative requirements for agencies and states to mine health and safety requirements, educational programs for miners, procedures for mine rescues, and health and pension plans for miners.[131]

To create a cooperative federal-state/tribal framework, and to implement both Title IV and Title V, SMCRA allows any qualifying State or Tribe to submit details of a program demonstrating the State's capacity to implement SMCRA within the State or Tribal territory.[132] The Secretary of the Interior, who administers the AML Fund, distributes grants to States and Tribes with qualifying programs to conduct abandoned mine land reclamation.[133] States or Tribes responsible for implementing SMCRA must also certify – for every AML grant – that the State or Tribe's remediation actions comply with the Clean Water Act, the Clean Air Act, the National Historic Preservation Act, and the Endangered Species Act.[134] While States and Tribes can apply stricter standards than SMCRA, no State or Tribe may apply standards less stringent than those detailed in SMCRA.[135]

On December 15, 1981, Virginia was approved as the primary enforcer of SMCRA requiring state approval for every AML action within Virginia.[136] To meet its obligations, Virginia passed the Virginia Coal Surface Mining Control

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127 *Id.*

128 *Id.*

129 30 U.S.C. § 1211(1977).

130 *Laws& Regulations*,, Office of Surface Mining Reclamation and Enforcement (last visited Nov. 9, 2022), https://www.osmre.gov/lrg.shtm.

131 30 U.S.C. § 1232 (1977).

132 *Id.*

133 *Id.*

134 Abandoned Mine Land (AML) Reclamation program; Enhancing AML Reclamation, 64 Fed. Reg. 7470, 7470 (Feb. 12, 1999) (to be codified at 30 C.F.R. parts 707 and 874), https://www.govinfo.gov/content/pkg/FR-1999-02-12/pdf/99-3556.pdf.

135 30 U.S.C. § 1202.

136 Telephone Interview with Lesa C. Baker, AML-AMLER Project Coordinator, Va. Dep't of Energy, (Oct. 27, 2021); *see also* Virginia Regulatory Program, 61 Fed. Reg. 104, 26836-26839 (May 29, 1996), https://www.govinfo.gov/content/pkg/FR-1996-05-29/html/96-13268.htm.

and Reclamation Act of 1979, created an executive agency – recognized today as the Virginia Department of Energy –, and submitted a proposal of Virginia's Reclamation Plan to the Secretary of the Interior.[137] Once a state assumes primacy, the state takes over permitting, inspection, and enforcement activities previously completed by the Federal government.[138] However, OSMRE oversees and evaluates the states' programs.[139] An incentive for states to receive primacy entitles states to both regulatory grants and to grants for reclaiming abandoned mine lands.[140]

ABANDONED MINE LAND RECLAMATION FUND (AML FUND)

Congress established the AML Fund to provide for the remediation of mined surface lands for which no person or agency has any reclamation responsibility.[141] Revenues in the AML Fund are primarily derived from "reclamation fees" or taxes on each ton of coal mined.[142] Generally, the AML Fund is used to reclaim and restore both water and land adversely affected by past coal mining operations.[143] For example, the AML Fund provides for remediation of mined land, coal processing areas, and abandoned coal refuse sites.[144] It also provides for sealing mine access points, replanting trees and other plants to prevent erosion, and restoring waterways polluted by surface mining drainage.[145]

Today, land and water eligible for AML funding are those (1) that were mined or affected by coal mining or processing; (2) that were mined or impacted before August 3, 1977; and (3) for which there is no active legal obligation to reclaim.[146] Surface mining operations under Title V for which the operator forfeited the reclamation bonds are also eligible to receive AML funding.[147] Finally, non-federal lands and waters are eligible for AML funding if they were mined or affected:

(1) after August 3, 1977, but before the state where the land is located was approved to implement SMCRA; or

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137 *Id.*

138 *Id.*

139 *Id.*

140 *Id.*

141 30 U.S.C. § 1231.

142 30 U.S.C. § 1232. ("All operators of coal mining operations subject to the provisions of this chapter shall pay to . . . a reclamation fee of 28 cents per ton of coal produced by surface coal mining and 12 cents per ton of coal produced by underground mining or 10 per centum of the value of the coal at the mine, as determined by the Secretary, whichever is less.").

143 *Id.*

144 *Id.*

145 *Id.*

146 Federal Assistance Manuel, Off. of Surface Mining Reclamation and EnforcementatG-2-G3, (last updated Aug. 15, 2019), https://www.osmre.gov/sites/default/files/pdfs/FAM.pdf.

147 *Id.*

(2) between August 4, 1977, and November 5, 1990, and were backed by a surety that has since become insolvent.[148]

As of 2019, $5.5 billion in AML Fund grants have been distributed to State and Tribal AML agencies resulting in the elimination of more than 29,000 acres of waste coal piles.[149] By one estimate, every mile of stream reclaimed delivers $80,000 of benefit per year, and every dollar spent on AML reclamation returns $1.59 to the local economy.[150]

Virginia oversees both Title IV and Title V of SMCRA within the state. The Abandoned Mine Land Program (AML Program) implements Title IV, which addresses lands mined after Virginia achieved primacy in 1981.[151] Virginia's AML Program is funded by grants from the AML Fund[152] and, in some instances, from the U.S. Treasury.[153] Virginia is also one of several Appalachian states to receive additional appropriations in recent years under OSMRE's Abandoned Mine Land Economic Revitalization Program (AMLER).[154] On the other hand, the Mined Land Repurposing division – formerly the Division of Mined Land Reclamation – within the Virginia Department of Energy implements Title V.[155] Thus, Virginia has significant funding for AML reclamation, but AML funding is prioritized for certain hazards under SMCRA.

SMCRA prescribes three priority levels that guide AML reclamation.[156] Priority 1 projects are those that target features of mining activities that present extreme danger to public health, property, and safety.[157] Priority 2 projects seek to protect public health, property, and safety from the adverse effects of coal mining.[158] Priority 3 projects are those that neither present an extreme danger nor immediate risk to property, public health, or public safety, but instead present an environmental risk and target the restoration of lands and waters

148 *Id.*

149 Eric Cavazza, *Basics of SMCRA Title IV*, Pa. Abandoned Mine Land Campaign (June 2019), https://www.congress.gov/116/meeting/house/110202/witnesses/HHRG-116-II06-Wstate-HughesR-20191114-SD015.pdf.

150 *Id.*

151 Lesa Baker, *Abandoned Mine Land*, Va. Energy, https://energy.virginia.gov/coal/mined-land-repurposing/abandoned-mine-land.shtml (last visited November 7, 2021).

152 Abandoned Mine Land (AML) Reclamation program; Enhancing AML Reclamation, 64 Fed. Reg. 7470 (Feb. 12, 1999) (to be codified at 30 C.F.R. parts 707 and 874), https://www.govinfo.gov/content/pkg/FR-1999-02-12/pdf/99-3556.pdf.

153 Federal Insurance Manuel, Off. of Surface Mining Reclamation and Enforcement, at G-1 (last updated Aug. 15, 2019), https://www.osmre.gov/sites/default/files/pdfs/FAM.pdf.

154 Baker, *supra* note 154.

155 Marshall R. Moore, *Mined Land Repurposing,* Va. Energy, https://energy.virginia.gov/coal/mined-land-repurposing/mined-land-repurposing.shtml (last visited November 7, 2021).

156 30 U.S.C. § 1233 (1977).

157 *Id.*

158 *Id.*

degraded by coal mining before 1977.[159] Priority 3 projects seek to conserve "soil, water . . ., woodland, fish and wildlife, recreational resources, and agricultural productivity."[160]

Notably, Priority 1 and Priority 2 projects can include "the restoration of land and water resources and the environment that (i) have been degraded by the adverse effects of coal mining practices . . . and (ii) are adjacent to a site that has been or will be remediated."[161] This means that any Priority 3 AML feature, such as a GOB pile, adjacent to a Priority 1 or Priority 2 project that has been or will be remediated can be prioritized alongside that site.

SMCRA's priority scheme has contributed to the failure to remediate GOB piles. GOB piles in Virginia are usually considered a Priority 3 mining feature leaving many GOB piles unaddressed as Priority 1 and Priority 2 sites receive AML funding first.[162] Further, private interests have been largely uninterested in re-mining GOB piles because they contain only marginal coal deposits and present long-term liability risks for Acid Mine Drainage and other environmental problems resulting in GOB piles remaining in place and lacking any reclamation obligations.[163]

OSMRE has periodically amended its regulations to allow for more private involvement in the reclamation of AML features and adjusted the AML funding framework to allow for more flexible use of AML funds in the reclamation of GOB piles. In 1980, and later amended in 1996, OSMRE issued guidelines that permitted contractors performing reclamation to sell coal incidentally recovered from an approved AML reclamation project.[164] Incidental coal is any coal that must be removed to complete the reclamation project.[165] This change provided an incentive for contractors to bid on AML reclamation projects and recover some of the costs of reclamation.[166]

Later, in 1999, OSMRE amended 30 C.F.R. §§ 707 and 874, relaxing certain requirements to reduce the cost of reclamation projects to AML agencies, expanding the scope of AML reclamation, and permitting contractors to make a profit on reclamation projects.[167] This set of changes became known as the

159 *Id.*

160 *Id.*

161 *Id.*

162 *Status of the Abandoned Mine Land Reclamation Fund*, Off. of Surface Mining reclamation and Enforcement (Sept. 30, 2020), https://www.osmre.gov/sites/default/files/pdfs/Status_of_AML_Fund_09_30_2020.pdf.; *see also* Telephone Interview with Lesa C. Baker, AML-AMLER Project Coordinator, Va. Dep't of Energy, (October 27, 2021).

163 Abandoned Mine Land (AML) Reclamation Program; Enhancing AML Reclamation, 64 Fed. Reg. 7470, 7471 (Mar. 15, 1999), https://www.govinfo.gov/content/pkg/FR-1999-02-12/pdf/99-3556.pdf.

164 *Id.*

165 *Id.*

166 *Id.* at 7471.

167 *Id.*

"Enhancement Amendments."[168] The Enhancement Amendments no longer required AML authorities to cover at least 50% of the cost of any reclamation project since this discouraged AML reclamation of GOB piles containing enough coal to recover more than 50% of the project's cost.[169] In response to this disincentive, OSMRE amended regulations to allow AML funding for projects that would yield enough coal to cover more than half of the overall cost of reclamation.[170]

Today, Virginia's AML Program utilizes the Enhancement Amendments to facilitate reclamation actions, oversee projects according to Title IV standards, and fund projects to cover the difference between the recoverable value of the coal and total project costs. Virginia also oversees procedural SMCRA requirements, such as verifying right of entry,[171] overseeing land acquisition,[172] enforcing liens,[173] and ensuring compliance with the National Environmental Policy Act (NEPA).[174]

THE NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) AND GOB PILE REMEDIATION

NEPA is a federal environmental law that demands an environmental review process for any major federal action that significantly affects the human environment.[175] NEPA protects the environment by informing the public and officials about significant environmental risks presented by any major federal action.[176] Since OSMRE is a federal office and distributes AML grants, NEPA requires that OSMRE document the environmental effects of actions receiving AML grants.[177]

NEPA requires agencies to conduct a tiered appraisal of the risks of significant environmental effects associated with a major federal action, usually beginning with an initial Environmental Assessment (EA).[178] The ultimate result of this appraisal is one of two actions: (1) an Environmental Impact Statement (EIS); or (2) a finding of no significant Impact (FONSI).[179] Certain actions, however, are deemed 'Categorical Exclusion(s)' meaning they always have no significant effect on the environment, while other actions are excluded from NEPA review

168 *Id.* at 7470.

169 *Id.* at 7471.

170 *Id.*

171 30 U.S.C. § 1267 (1977).

172 *Id.*

173 30 U.S.C. § 1238 (1977).

174 Virginia AML Program Draft AML Enhancement/No Cost Agreement Checklist.

175 42 U.S.C. § 4332(C) (1970).

176 Glenda Owens, *Handbook on Procedures for Implementing the National Environmental Policy Act*, Off. of Surface Mining reclamation and Enforcement at 1-2 (July 2019), https://www.osmre.gov/LRG/docs/directive995_NEPAHandbook.pdf.

177 *Id.* at 3-5.

178 40 C.F.R. § 1501.3 (1970).

179 *Id.*

by statute.[180] Importantly, a categorical exclusion does not exempt an action from NEPA review.[181] Rather, a categorical exclusion is a form of NEPA compliance that does not require the same degree of scrutiny as an EA or EIS.[182] OSMRE evaluates each project receiving AML funding to determine whether an action will require an EA and EIS, or is categorically excluded.[183]

Any reclamation action using AML funding must comply with NEPA, including remediation of GOB piles. However, in the 1980s, OSMRE conducted two Programmatic Environmental Impact Statements to help establish generic categories of, effects of, and standards for approving AML projects.[184] Based on these broad reviews, OSMRE determined that some surface coal mining actions are generally categorically excluded.[185] Specifically, AML reclamation projects that meet the following conditions are categorically excluded from in-depth environmental review:

> AML reclamation projects involving: No more than 100 acres; no hazardous wastes; no explosives; no hazardous or explosive gases; no dangerous impoundments; no mine fires and refuse fires; no undisturbed, noncommercial borrow or disposal sites, no dangerous slides where abatement has the potential for damaging inhabited property; no subsidences involving the placement of material into underground mine voids through drilled holes to address more than one structure, and no unresolved issues with agencies, persons, or groups or adverse effects requiring specialized mitigation.[186]

Suppose one of the conditions mentioned above is present, such as the presence of a refuse fire. In that case, that remediation project must undergo an environmental review under NEPA.[187] When deciding to categorically exclude a reclamation action, AML agencies must submit documents to OSMRE that explain the decision and clearly demonstrate that a categorical exclusion applies to the project.[188] As this report recommends, every GOB pile reclamation action will require a site-by-site analysis to determine whether a given AML action is categorically excluded from NEPA review.

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180 Owens, *supra* note 179 at 2-2, 2-3.

181 *Id.* at 6-1.

182 *Id.*

183 *Id.* at 2-1.

184 *Id.* at 3-2.

185 *Id.*

186 *Federal Assistance Manual*, Office of Surface Mining Reclamation and Enforcement Federal Assistance Manual at Appendix 6.2, Part 516, § 13.5(B)(33), 3https://www.osmre.gov/sites/default/files/pdfs/FAM.pdf (last updated Aug. 15, 2019).

187 *Id.*

188 Owens, *supra* note 179 at 3-8.

Further, several other Categorical Exclusions might apply in a given circumstance, such as the Fire Rehabilitation Categorical Exclusion,[189] the Applied Science Cooperative Agreement Categorical Exclusion,[190] or an Emergency Categorical Exclusion.[191] Also, an agency may conduct an EA or EIS if a project is one of significant public interest to seek the input of other federal and state agencies or the public.[192] Ultimately, because NEPA is broad, exemption from NEPA review is rare, and it should be expected that AML reclamation of GOB piles comply with NEPA standards.

CLEAN WATER ACT

The main federal legislation addressing water quality is the Clean Water Act. The objective of the Clean Water Act is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[193] The discharge of "pollutants" into waters of the United States is regulated under § 402 of the Clean Water Act, while earth-moving activities that add "fill" material such as dirt to waterways are regulated under § 404.[194] The permitting scheme under §402, administered by U.S. EPA, is more protective of the environment and more stringent than the permitting process administered by the U.S. Army Corps of Engineers under § 404.[195]

The Clean Water Act is considered here for two reasons. First, some existing GOB piles may be either surface-transmitting pollutants or leaching pollutants that ultimately make it to local waterways, which would be a violation of § 402. Secondly, remediation efforts are likely to require permits under either or both sections.

Section 402 vs. Section 404. Section 402 of the Clean Water Act establishes the National Pollutant Discharge Elimination System (NPDES) Permit program required for the discharge of pollutants into waterways.[196] It is unlawful to discharge a pollutant into the waters of the United States from a point source without a permit.[197]

189 43 C.F.R. § 46.210 (2008).

190 Owens, *supra* note 179 at 3-6.

191 30 C.F.R. § 700.5 (2017).

192 Owens, *supra* note 179 at 6-1.

193 33 U.S.C. § 1251 (1948).

194 *Id.*

195 *Id.*

196 *Id.*

197 Black Warrior River-Keeper, Inc. v. Drummond Co., Inc., 387 F. Supp. 3d 1271, 1278 (N.D. Ala. 2019).

The Clean Water Act defines a discharge of a pollutant as "any addition of any pollutant to navigable waters."[198] Pollutants specifically include chemical wastes, biological materials, and industrial and municipal waste.[199] The major pollutants associated with GOB piles (and their remediation) are Acid Mine Drainage, mercury, and lead.

As mentioned earlier, GOB piles consist of pyritic material that has been removed from coal seams and exposed to the oxidizing environment.[200] Exposure to oxidation chemically forms highly acidic solutions.[201] This reaction creates what is known as Acid Mine Drainage, which is known to turn waters orange.[202]

Numerous courts throughout the country have found that Acid Mine Drainage is a pollutant, including the Ninth Circuit Court of Appeals (1993), the federal district courts for the District of Montana (1995), and the Southern District of West Virginia (2009).[203] The Montana court explained that Acid Mine Drainage is a pollutant because it is composed of both copper and zinc, both of which are pollutants subject to effluent limitations established by U.S. EPA for active mines.[204] In 2009, the West Virginia district court found "[Acid Mine Drainage] is obviously a pollutant under the definition of 'pollution' in 33 U.S.C. § 1362(19)."[205]

Relatedly, the Clean Water Act identifies specific toxic pollutants for U.S. EPA to prioritize when setting effluent guidelines and permitting standards, including mercury and lead.[206] This is important for GOB pile restoration projects because studies have shown that waste coal found in GOB piles has higher concentrations of mercury than freshly mined coal.[207] When mercury is discharged into waterways, its affects and toxicity depend highly on environmental factors and the route of exposure.[208] The major concern for discharge of mercury into waterways is that mercury is a "potent neurological poison in fish, wildlife, and humans."[209]

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198 33 U.S.C. § 1311 (1948).

199 33 U.S.C. § 1362 (1948).

200 Jerry Coalgate, GOB Pile Stabilization Reclamation and Utilization 16 (1973).

201 *Id.* at 18.

202 *Id.* at 19.

203 Beartooth All. v. Crown Butte Mines, 904 F. Supp. 1168, 1172 (D. Mont. 1995) (citing 40 CFR § 440.100).

204 *Id.*

205 W. Va. Highlands Conservancy, Inc. v. Huffman, 651 F. Supp. 2d 512, 518 (S.D. W. Va. 2009).

206 *Priority Pollutant List*, U.S. EPA (Dec. 2014), https://www.epa.gov/sites/default/files/2015-09/documents/priority-pollutant-list-epa.pdf.

207 Mike Ewall, *Fact Sheet: Waste Coal* (Nov. 2007), https://www.energyjustice.net/files/coal/wastecoal/factsheet.pdf.

208 *Id.*

209 Water Science School, *Mercury Contamination of Aquatic Environments* (Nov. 13, 2018), https://www.usgs.gov/special-topics/water-science-school/science/mercury-contamination-aquatic-environments#overview.

While § 402 covers the discharge of "pollutants," § 404 of the Clean Water Act requires dischargers of "dredged or fill material into navigable waters at specified disposal sites" to obtain a permit issued by the U.S. Army Corps of Engineers.[210] A violation of section 404 would occur if any GOB pile remediation work results in the discharge of dredged or fill material, such as dirt or sand, that alters that bottom elevation of a waterway.

Whether remediated in place or removed and/or re-mined, work on at least some of the piles will likely result in leftover dirt and sediment making their way to local waterways. Such "discharges" may implicate either § 402 or § 404 of the Clean Water Act.

In 1999, the Eleventh Circuit Court of Appeals held that the definition of pollutant within the Clean Water Act is broad and includes, among other things, "rock, sand, cellar dirt and industrial, municipal, and agricultural waste."[211] Sediment consists primarily of sand and silt, which are included in the broad definition of pollutant.[212] Additionally, the land surrounding the ponds had been disturbed and altered by human activities resulting in the release of these materials into the waters, a discharge of a pollutant.[213] In 2019, a federal district court ruled that sediment, consisting of rock and sand, from mining GOB is a pollutant under the Clean Water Act.[214] Based on other decisions, the court concluded that, found sand and silt from timber harvesting and land development were pollutants[215]; excavated dirt was a pollutant[216]; and sediment was a pollutant under the Clean Water Act.[217]

On the other hand, the U.S. Army Corps of Engineers' regulations define fill material as any material that has the effect of "(1) [r]eplacing any portion of a water of the United States with dry land; or (2) [c]hanging the bottom elevation of any portion of a water of the United States."[218] The United States Supreme Court in *Gwaltney of Smithfield v. Chesapeake Bay Found. Inc.* found that basin-creating sediment discharges into rivers constituted fill material under § 404.[219]

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210 Black Warrior River-Keeper, Inc. v. Drummond Co., Inc., 387 F. Supp. 3d 1271, 1280 (N.D. Ala. 2019).

211 Driscoll v. Adams, 181 F.3d 1285, 1291 (11th Cir. 1999).

212 *Id.*

213 *Id.*

214 Black Warrior River-Keeper, Inc. v. Drummond Co., Inc., 387 F. Supp. 3d 1271, 1283 (N.D. Ala. 2019).

215 *Id*. at 1284.

216 Rybachek v. U.S.E.P.A., 904 F.2d 1276, 1285-86 (11th Cir. 1990).

217 N.C. Shellfish Growers Ass'n v. Holly Ridge Assocs, LLC., 278 F. Supp. 2d 654, 677 (E.D.N.C. 2003).

218 33 C.F.R. § 323.2(e)(1) (1986).

219 Gwaltney of Smithfield v. Chesapeake Bay Found. Inc., 484 U.S. 49 (1987).

More significantly, in 2009, the Supreme Court found that valley fill from mountaintop mining is not governed under § 402.[220] The Court explained that because the discharge of waste rock and mining tailings raises the elevation of the lake floor, it was fill material regulated under § 404 despite the additional discharge of pollutants.[221]

If any part of a GOB pile is disposed of in a way that situates it nearby waterways, then such activity could require adherence to § 404 of the Clean Water Act.

Waters of the United States. The Clean Water Act only prohibits unpermitted discharges into "waters of the United States." Whether intrastate streams, including intermittent streams and tributaries that lead to larger navigable waters, are covered by the Clean Water Act depended, in recent years, on the occupant of the White House.

On November 18, 2021, U.S. EPA and the U.S. Army Corps of Engineers proposed a rule revising the definition of "waters of the United States" (WOTUS).[222] This proposal would reinstate the pre-2015 regulatory definition of WOTUS,[223] which includes the following:

1. All waters which are currently used, historically used or may be used in interstate or foreign commerce, including waters "subject to the ebb and flow of tide."[224]

2. All interstate waters and interstate wetlands.[225]

3. All waters, including "intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce . . . ."[226] Examples laid out in the definition include waters used by interstate or foreign travelers, waters from which fish or shellfish are taken and sold in either interstate or foreign commerce, and waters that could be used for industrial purposes by those in interstate commerce.[227]

4. All tributaries of waters and impoundments of water.[228]

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220 Coeur Alaska, Inc. v. Se. Alaska Conservation Council, 557 U.S. 261, 274-75 (2009).

221 *Id.* at 267-68.

222 *Current Implementation of Waters of the United States*, U.S. EPA (last updated Dec. 20, 2021), https://www.epa.gov/wotus/current-implementation-waters-united-states.

223 *Id.*

224 *Id.*

225 *Id.*

226 *Id.*

227 *Id.*

5. The territorial sea.[229]

6. Wetlands adjacent to waters.[230]

Much of the confusion and changing interpretations regarding the jurisdictional reach of the Clean Water Act can be traced to the Supreme Court's 2006 decision in *Rapanos v. United States*.[231] In that case, John Rapanos backfilled approximately 54 acres of wetlands without a permit.[232] Justice Scalia, writing for a four-justice plurality of the Supreme Court, determined that the wetlands on Rapanos's property were not jurisdictional waters under the Clean Water Act.[233] Scalia explained that wetlands were navigable waters, and thus governed by the Clean Water Act, if two factors were met. The first factor required the wetland to be "adjacent to a 'relatively permanent standing or continuously flowing [body] of water.'"[234] The second factor requires a continuous surface connection to the water source.[235] Republican administrations propose WOTUS rules that tend to follow Justice Scalia's 'relatively-permanent' and 'continuous-surface-connection' tests.

In Justice Kennedy's concurring opinion, he suggested a test that would subject waters to the Clean Water Act if they have a 'significant nexus' to waters that could be, have been, or might reasonably be navigable waters.[236] Some courts, including the Eleventh Circuit Court of Appeals, have held that Kennedy's concurring opinion controls when determining whether the Clean Water Act covers a particular body of water.[237] The current proposed WOTUS rule tracks more closely with Justice Kennedy's 'significant-nexus' test.

Point source. Section 402 is only implicated if the discharge of a pollutant comes from a "point source." The Clean Water Act defines a point source as "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged."[238] The Supreme Court has stated that a point source "need not be the original source of the pollutant; it

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228 *Id.*

229 *Id.*

230 *Id.*

231 *Current Implementation of Waters of the United States*, *supra* note 225.

232 Rapanos v. United States, 547 U.S. 715, 720 (2006).

233 *Id.* at 738.

234 *Id.* at 742.

235 *Id.*

236 *Id.* at 759.

237 *See* Black Warrior River-Keeper, Inc. v. Drummond Co., Inc., 387 F. Supp. 3d 1271, 1287 (N.D. Ala. 2019). *See also* Wis. Res. Prot. Council, Ctr. for Biological Diversity v. Flambeau Min. Co., 903 F. Supp. 2d 690, 715 (W.D. Wis. 2012); United States v. HVI Cat Canyon, Inc., 314 F. Supp. 3d 1049, 1060-61 (C.D. Cal. 2018).

238 S. Appalachian Mt. Stewards v. Va. Operating Co., *LLC,* No. 2:12CV00020, 2013 U.S. Dist. 457 (W.D. Va. Jan. 3, 2013).

need only convey the pollutant to navigable waters.[239] Courts have determined that both ditches and basins qualify as point sources as a matter of law, since both 'ditches' and 'channels' are specifically named within the definition of a point source under the Clean Water Act.[240]

In 2019, a district court in Alabama specifically considered whether GOB piles themselves are point sources.[241] The court found no dispositive decisions within the Eleventh Circuit, but relied on a prior holding that piles of industrial debris comprised of metal objects and junked cars constitute point sources because they collect rainwater, which later flows into streams by way of 'erosion gullies.'[242] The court noted that the GOB pile in question likewise collected rainwater and ultimately released the water into navigable waters via man-made channels and naturally-formed gullies.[243] Thus, this GOB pile was a point source under the Clean Water Act.[244]

Lastly, and importantly, the Supreme Court recently decided *Hawai'i Wildlife Fund v. Cty. of Maui*, *Hawai'i*.[245] The issue was whether a permit was required when pollutants originating from a point source are conveyed by non-point sources, namely ground water to navigable waters.[246] The Supreme Court ruled that the discharge of pollutants from wells into ground water connected to navigable waters constitutes a point source under the Clean Water Act.[247] In other words, a § 402 permit is required for either "a direct discharge or the functional equivalent of a direct discharge of a pollutant from a point source."[248]

The Hawaii case could have significant impacts for GOB piles in southwest Virginia, as it means that pollutants that leach into groundwater and ultimately make their way to WOTUS will amount to a § 402 discharge.

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239 S. Fla. Water Mgmt. Dist. v. Miccosukee Tribe of Indians, 541 U.S. 95, 98 (2004).

240 *See* Sierra Club v. Abston Constr. Co., Inc., 620 F.2d 41 (5th Cir. 1980) (court's ruling clearly indicates that, when miners disrupted gravity flow by attempting to collect or channel water resulting in a discharge of a pollutant, this mining activity constituted point source pollution. Further, the court stated that, even if the miners did nothing besides collect and pile the rocks and other materials, designing GOB piles so that ditches, gullies, and similar conveyances carry pieces of the GOB pile lost during erosion constitutes point source pollution.); see also Black Warrior River-Keeper, Inc. v. Drummond Co., Inc., 387 F. Supp. 3d 1271, 1282 (N.D. Ala. 2019) (Eleventh Circuit found that any ditches, channels, gullies, basins, and dams that create a drainage system resulting in the discharge of acid mine drainage from GOB piles into nearby streams are point sources.); *see also* N.C. Shellfish Growers Ass'n v. Holly Ridge Assocs., LLC (court held that manmade ditches fit the definition of point sources because they are "designed to serve as conveyances and do in fact convey [pollutants] from the site to waters of the United States.").

241 Black Warrior River-Keeper, Inc. v. Drummond Co., Inc., 387 F. Supp. 3d 1271, 1292 (N.D. Ala. 2019).

242 *Id.*

243 *Id.*

244 *Id.* at 1292-93.

245 Wildlife Fund v. Cty. Of Maui, Hawai'i, 140 S. Ct. 1462, 1468 (2020).

246 *Id.*

247 *Id.*

248 Elizabeth Wydra, et al., *County of Maui v. Hawai'i Wildlife Fund*, Const. Accountability ctr., https://www.theusconstitution.org/litigation/county-of-maui-v-hawaii-wildlife-fund (last visited Dec. 8, 2021).

REGULATIONS FOR BURNING COAL REFUSE FOR ELECTRICITY AND DISPOSING OF COAL ASH

If remediation includes the combustion of GOB for electricity generation, there are federal rules that set standards for such operations. There are also federal and Virginia regulations for disposing of coal ash, or coal combustion residuals (CCR).

2020 EPA Pollution Standards for Electric Utility Units that Fire Coal Refuse. In April 2020, U.S. EPA announced a new subcategory of electric utility steam generating units (EGUs) that fire eastern bituminous coal refuse (EBCR).[249] Much of the coal mined in southwest Virginia is low- to medium-volatile bituminous coal.[250] U.S. EPA recognized the unique qualities of acid gas hazardous air pollutants (HAPs) from burning EBCR, distinct from HAPs resultant from burning anthracite coal refuse.[251] Specifically, the regulation established a subcategory "of certain existing ECBR-fired EGUs for emissions of hydrochloric acid and sulfur dioxide," which are considered acid gas HAPS under the Mercury and Air Toxic Standards (MATS).[252] This creation of a subcategory is significant because, under § 112(d)(1) of the Clean Air Act, the U.S. EPA is compelled to establish minimum controls – a "maximum achievable control technologies (MACT) floor" – for that unique subcategory.[253] In this case, EPA found that emissions limitations that are more stringent than the MACT floor level are appropriate for these certain EGUs that fire EBCR.[254] With the creation of this subcategory, the U.S. EPA established exact standards for these certain EBCR-fired EGUs.

Specifically, the U.S. EPA indicated that the rule change will affect six EGUs that fire ECBR, which are all small units in Pennsylvania and West Virginia.[255] However, any GOB-remediation strategy that involves the burning of GOB sourced in southwest Virginia may involve one of these facilities, and the strategy should take these heightened standards into account. It is also possible that the pollution controls at the VCHEC may be required to conform to the U.S. EPA MATS emissions standards, and any strategy that includes burning GOB at the VCHEC should consider the effect of potentially heightened pollution controls.

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249 40 C.F.R. § 63.2 (2020).

250 *Coal*, Va. Dep't of Energy, https://energy.virginia.gov/geology/coal.shtml (last visited January 9, 2022).

251 40 C.F.R. § 63.2 (2020)..

252 *Id.*

253 *Id.*

254 *Id.*

255 *Final Subcategory of Certain existing Electric Utility Steam Generating Units that Fire Coal Refuse*, U.S. EPA (last updated May 12, 2021), https://www.epa.gov/mats/final-subcategory-certain-existing-electric-utility-steam-generating-units-fire-coal-refuse.

EPA CCR Rules and Industrial Landfills in Virginia. Remediation strategies that involve burning GOB in any capacity must include consideration of the federal and state regulations controlling the storage of coal ash, also known as Coal Combustion Residuals (CCRs).[256] In 2014, U.S. EPA issued a comprehensive set of regulations (the Final Rule), governing the safe disposal of CCRs from coal-fired power plants.[257] The Final Rule established parameters for CCR landfills and impoundments, prescribing, for example, technical requirements for building, siting, and monitoring new CCR waste facilities.[258]

Although the Final Rule did not classify CCR as a "hazardous waste" under the Resource Conservation and Recovery Act (RCRA), it did create baseline federal requirements for CCR disposal with which operators must comply.[259] States are encouraged, but not required, to adopt the federal minimum requirements imposed by the Final Rule; state laws may impose stricter CCR-handling rules.[260]

In 2016, in response to the Final Rule, Virginia updated its solid waste management regulations and reclassified CCR disposal facilities, previously exempt from such regulations, as industrial landfills.[261] In Virginia, all CCR disposal facilities must obtain a state permit.[262] Permit applications must address a host of regulatory considerations, including site design plans; operational plans; hydrologic capacity requirements; closure considerations; groundwater monitoring; and the publication of site activities.[263]

The Virginia Waste Management Board administers the Virginia Waste Management Act.[264] Solid waste management regulations control siting, design, operation, leachate management, and groundwater monitoring for all solid waste disposal sites.[265] Any GOB pile reclamation strategy that involves the burning of GOB should consider these guidelines and restrictions.

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256 *Disposal of Coal Combustion Residuals from Electric Utilities Rulemakings*, U.S. ENVT'L. PROTECTION AGENCY (last updated July 30, 2021), https://www.epa.gov/coalash/coal-ash-rule.

257 *Id.*

258 *Id.*

259 *Id.*

260 *Id.*

261 *Solid Waste Facility Requirements and* Guidance, Va. Dep't of Env'l Quality, https://www.deq.virginia.gov/land-waste/solid-hazardous-waste/solid-waste/solid-waste-facility-requirements-and-guidance (last visited January 9, 2022).

262 *Id.*

263 Memorandum from Justin Williams to Regional Land Protection and Revitalization Program Managers (Dec. 5, 2016), https://townhall.virginia.gov/L/GetFile.cfm?File=C:\440_DEQ_6089_v1.pdf.

264 Va. Code Ann. § 10.1-1402.

265 *Solid Waste Facility Requirements and Guidance*, Va. Dep't. of Envtl. Quality, https://www.deq.virginia.gov/land-waste/solid-hazardous-waste/solid-waste/solid-waste-facility-requirements-and-guidance (last visited January 9, 2022).

As of January 2022, eight facilities in Virginia are permitted to handle CCR.[266] The nearest CCR facility to the VCHEC is the Curley Hollow Landfill, located adjacent to the plant.[267]

4.3. Virginia's Regulatory Environment (transition to clean energy)

Virginia has taken several steps to transition to cleaner energy sources in recent years. These steps may impact the ability and/or feasibility of combusting more waste coal at the VCHEC. Most significantly, Virginia has enacted the Virginia Clean Economy Act (VCEA), which imposes stringent requirements on electric utilities in Virginia. These added regulatory pressures will, directly and indirectly, increase the cost of operations for the VCHEC going forward.

The VCEA has numerous provisions – largely designed to accelerate Virginia's transition to clean energy – that will affect operations of the VCHEC.[268] Specifically, the VCEA requires the VCHEC to be phased out of operation by 2045, and to meet interim emission reduction targets before then. [269] In addition, consistent with Governor Northam's Executive Order 43 issued in September 2019, the VCEA establishes: (1) binding renewable portfolio standards for Dominion Energy and Appalachian Power; (2) "energy-efficiency savings targets that must be achieved before new carbon-emitting sources can be permit[ed];" and (3) a cap-and-trade program that builds on efforts to link Virginia to RGGI.[270]

The VCEA adds a section to the Virginia Code entitled "Generation of electricity from renewable and zero-carbon sources."[271] Within this section is a schedule for the retirement of certain generation facilities that emit greenhouse gases.[272] Under this schedule, most coal and oil plants are phased out or set to be closed by 2024; all biomass generating units, excluding the VCHEC, are set to close by 2028; and all carbon-emitting generating units, including the VCHEC, are to be phased out by 2045.[273] Until that time, the section sets forth a mandatory renewable portfolio standard.[274]

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266 *Coal Ash, Dominion Energy,* https://www.dominionenergy.com/projects-and-facilities/electric-projects/coal-ash (last visited January 9, 2022).

267 Stacy Bowers,, *Curley hollow Landfill*, Va. Dep't. of Envtl. Quality, https://www.deq.virginia.gov/permits-regulations/permits/waste/coal/curley-hollow-landfill (last visited January 9, 2022). The two other facilities relatively close to the VCHEC are the Clinch River Power Station and the Glen Lyn Plant, in Russell and Giles County, respectively, but both were statutorily required to close by January 1, 2019. Va. Code Ann. § 10.1-1402.04.

268 Alena Yarmosky, *Governor Northam Signs Clean Energy Legislation* (April 12, 2020), https://www.governor.virginia.gov/newsroom/all-releases/2020/april/headline-856056-en.html.

269 Cale Jaffe et al., Legal Report on Executive Order 43, Univ. of Va. 2-2 (Ma2020).

270 *Id.* at 1-2.

271 *Id.* at 2-2.

272 *Id.*

273 *Id.*

274 *Id.*

The renewable portfolio standard relies upon the "renewable energy" definition in Va. Code § 56-576, which includes sources that emit greenhouse gases, such as landfill gas and waste-to-energy.[275] But it most assuredly does not include energy generated by the combustion of GOB. A report by the U.S. Department of Energy indicates that environmental cleanup, including GOB piles, is a major concern among the communities in Wise County, Virginia. [276] The ability to address these concerns is impacted by the passing of the VCEA and the new definition of "renewable energy," as energy generated from the burning of waste coal would certainly not qualify.[277]

The VCEA builds on efforts to link Virginia to the Regional Greenhouse Gas Initiative (RGGI). RGGI is a multi-state, cap-and-trade program that has been operating to reduce greenhouse gas emissions in New England states for years. Virginia joined RGGI in July 2020 and has been taking the necessary steps to prepare for participation.[278] Through RGGI, an overall cap is established on CO_2 emissions from power plants within member states, and fossil-fueled power plants must purchase emission allowances.[279] The allowances are allocated to the states, which are free to distribute them to covered entities; however, allowances are primarily distributed through regional auctions.[280]

The operator of any power plant in Virginia – such as the VCHEC – that seeks to burn waste coal would have to purchase allowances to account for the associated GHG emissions.[281] At the state level, Virginia has authorized a consignment auction, which requires holders of conditional allowances to allocate them to quarterly consignment auctions or the Virginia Department of Environmental Quality may elect to participate in a direct auction.[282] Based on conversations with industry professionals, Virginia's inclusion in RGGI is estimated to increase VCHEC's production costs by $10 to $12 per ton of coal.[283]

Of course, participation in RGGI will also incentivize Virginia utilities to decrease their GHG emissions and transition to cleaner sources of energy. In addition, participating states can use 25% of the proceeds from RGGI auctions for strategic energy initiatives and/or consumer benefit purposes, and the

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275 *Id.*

276 Initial Report to the President on Empowering Workers Through Revitalizing Energy Communities, Interagency Working Group on Coal and Power Plant Communities and Economic Revitalization (2021), https://netl.doe.gov/sites/default/files/2021-04/Initial Report on Energy Communities_Apr2021.pdf.

277 Cale Jaffe et al., Legal Report on Executive Order 43, Univ. of Va. 2-2 (2020).

278 *Elements of RGGI*, The Reg'l Greenhouse Gas Initiative, https://www.rggi.org/program-overview-and-design/elements (last visited Dec. 9, 2021).

279 *Id.*

280 *Id.*

281 *Id*.

282 Cale Jaffe et al., Legal Report on Executive Order 43, Univ. of Va. 2-11 (2020).

283 Based on ESI conversations with industry professionals.

remaining 75% can be used at the state's discretion.[284] Given its recent commitment to environmental justice, Virginia could certainly allocate auction proceeds for GOB pile remediation.[285]

5. The VCHEC (reusing GOB for electricity generation)

This section describes the VCHEC and considers its potential role in remediating southwest Virginia's legacy GOB piles. As described in prior chapters, using GOB for electricity generation is a potential method for removal of existing piles and remediation of impacted sites. The information in this section explores the economic benefits of such re-use by analyzing economic impacts in nearby communities and across the Virginia economy from the operations and capital investments activity of the VCHEC. It is for policymakers to weigh those benefits against the environmental consequences of such re-use, including increased emissions of greenhouse gases and traditional air pollution.

- Section 5.1 provides an overview for considering the possible re-use of GOB by burning it at the VCHEC to generate electricity.
- Section 5.2 considers the operating trends and capacity usage of the VCHEC.
- Section 5.3 models the annual economic and fiscal impacts of operating and capital activity within Virginia at the VCHEC, and the implications for direct and spillover employment.

5.1. Framework for Considering the Combustion of Re-mined GOB

One of the possible remediation approaches discussed above includes re-mining the GOB piles and using any recoverable waste coal to generate electricity, most likely at the VCHEC. While funding sources for remediation efforts are discussed in Section 6 below, revenue-generating uses for GOB can serve as a "funding source" to facilitate the clean-up of piles and remediation of affected sites. It is for policymakers to balance the benefits of re-using recovered waste coal against the associated environmental impacts.

Coal refuse is typically a lower energy fuel source, and the energy generation process requires additional additives.[286] As a result, per unit energy generation costs as well as the environmental impacts from such generation are typically higher for coal refuse than for other fuel sources. These costs will vary based on

284 *See* Reg'l Greenhouse Gas Initiative Memorandum of Understanding, sec. G (Dec. 20, 2005), https://www.rggi.org/sites/default/files/Uploads/Design-Archive/MOU/MOU_12_20_05.pdf.

285 *Id.*

286 L. P. Boesch et al., Low-Btu coal gasification in the United States: Company topical. [Brick producers] 67 (1983), https://www.osti.gov/servlets/purl/5133865/.

factors such as the distance from the fuel source and associated transportation costs, the quality of the fuel, and costs associated with the environmental remediation of the re-mined site.[287]

Broader energy market conditions are also an important factor in the economic equation. As the price of energy dropped in recent years and new technologies became more efficient, the least cost-effective modes of production become less desirable.[288] Market conditions can at times make it more cost-effective for a plant to stop constant production and instead, produce only at times when energy demand is higher. If economic conditions make it infeasible for VCHEC to operate on a regular basis, the consumption of coal refuse and the associated remediation will be reduced accordingly.

Naturally, emissions of GHGs and traditional air pollutants – as well as the other environmental impacts associated with combusting coal and its waste – would also correspondingly decline. Any benefit associated with the market incentive of burning recovered GOB must counterbalance the environmental consequences. As explained in section 3.2 above, greenhouse gas emissions associated with coal combustion are more than double the emissions from burning natural gas, while emissions from renewable sources are zero. Additionally, there are traditional air pollutants associated with burning coal. Both climate pollution and traditional air pollution is exacerbated by the lower quality of coal waste as a fuel source and the need to include additives. Traditional air pollution from the VCHEC will be disproportionately felt in southwest Virginia, contrary to the environmental justice concerns that support remediating the GOB piles in the first place. Generating electricity from burning waste coal also conflicts with the clean energy goals of the VCEA, discussed in section 4.3 above.

5.2. VCHEC Operating Trends

Established in 2012 by Virginia Electric & Power Co. d/b/a Dominion Energy in Wise County, Virginia, the VCHEC burns waste coal and biomass up to 610 MW. The VCHEC has two CFBC boilers that allow for up to 20% biomass in the hybrid feed.[289]

The VCHEC utilizes coal refuse from GOB piles and idling mining sites. According to Dominion Energy, it has reclaimed over 4 million tons of GOB coal since 2012.[290] Reclamation and material transportation operations are typically carried out by Savage Services and Mountain Fuels, which specialize

287 Based on ESI conversations with industry professionals.

288 *The Coal Refuse Reclamation to Energy Industry: A Public Benefit in Jeopardy*, ARRIPA 15 (June 20, 2019), https://arippa.org/wp-content/uploads/2019/07/ARIPPA-Report-FINAL-June-2019.pdf.

289 Virginia City Hybrid Energy Center, DOMINION ENERGY, https://www.dominionenergy.com/projects-and-facilities/coal-and-oil-facilities/vchec (last visited Nov. 9, 2022).

290 *Id.*

in coal blending and transportation.[291] Through recent acquisitions of related enterprises,[292] Savage Services has become more involved in the remediation process and sponsored rehabilitation events in the community.[293]

The capacity factor of a power plant represents the percent of total potential electricity generation that the plant produces each year. Power plant operations fluctuate as a function of market conditions and a plant's ability to operate profitably in those conditions. A plant's capacity factor represents its output relative to the maximum possible output and, therefore, reflects the decisions made throughout the year to operate the plant in accordance with the market conditions impacting it.[294]

Figure 5.1 shows the annual capacity factor for the VCHEC from its opening in 2012 through August 2021. From 2012 to 2018, the plant operated at a capacity factor between 55% and 70%. These capacity factors are typical of historical "base load" levels for a coal plant producing power at a constant rate over the course of a year.[295] Since 2019, capacity factors at the VCHEC have dropped to approximately 20%, about one-third of the prior levels.[296]

From the standpoint of the producer – in this case Dominion Energy – the desirability of energy production is a function of revenues relative to costs. Where the returns from production at a facility do not justify the costs relative to alternatives, the economically *rational* choice is to idle the plant rather than continue production. Accordingly, it is not uncommon for power plants to cease operations at times of lower demand. This approach can lead to the reduced capacity factors evident in the data from the VCHEC.

The variable costs associated with electricity generation are generally higher for plants processing waste coal than other comparable coal plants. Like all facilities, the VCHEC has essential plant costs, such as:

- employee wages and salaries;
- general maintenance costs;
- administrative costs; and
- acquisition costs of conventional coal and other fuels.[297]

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291 These operations were previously conducted by Gobco LLC. *Savage Purchases Environmental Reclamation and Fuel Supply Businesses in Virginia*, Savage Services (Apr. 18, 2017), https://www.savageservices.com/press-release/savage-removal-of-waste-coal-piles/.

292 *Id.* Savage Services purchased Gobco, LLC, and Power Fuels LLC in 2017 to enhance its business in COG removal, land restoration and coal blending before it enters VCHEC.

293 *Id.* One example is that Savage Services sponsored an Arbor Day event organized by the Virginia Coal and Energy Alliance, Virginia Oil and Gas Association and DMME, where about 350 sixth-grade students will participate in planting trees on the reclaimed Hurricane Creek site.

294 Carl Bozzuto, ALSTOM, Power Plant Economics (2006).

295 U.S. Energy Info. Admin., Electric Power Monthly with Data for December 2019, 131 (February 2020), https://www.eia.gov/electricity/monthly/archive/february2020.pdf.

296 Note that 2012 is a partial year of operation, while 2021 value was as of 09/01/2021.

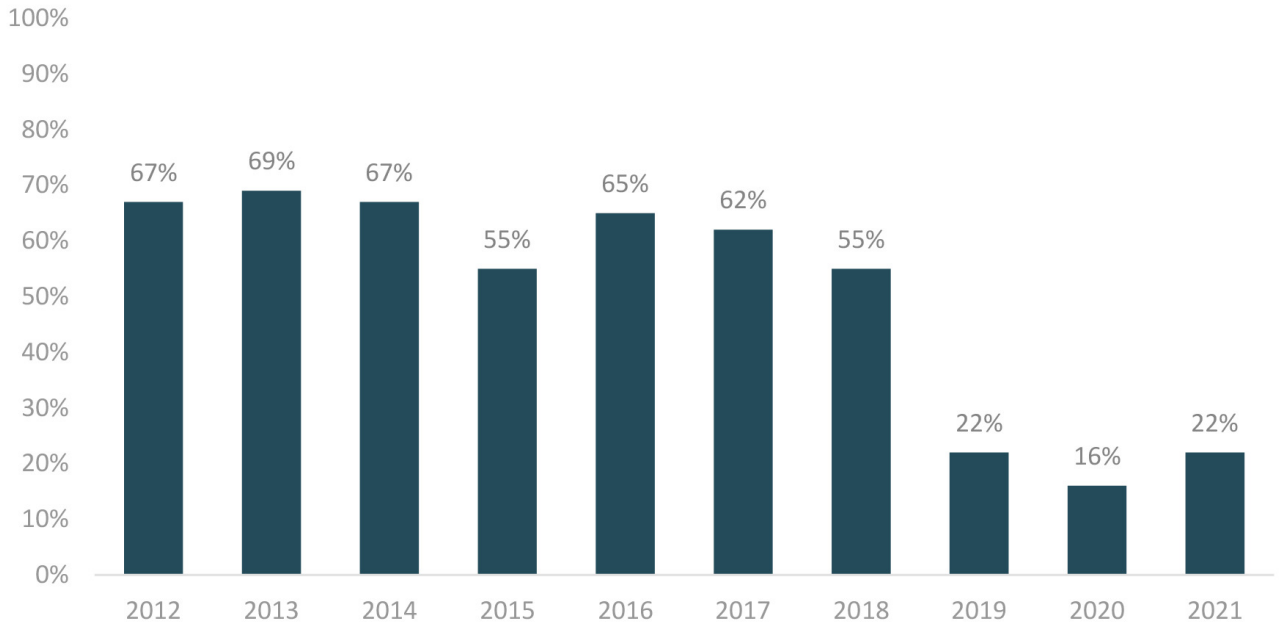

Figure 5.1. VCHEC Capacity Factor, 2012-2021

Source: Dominion Energy

The VCHEC also has costs unique to its operations as a waste coal facility.[298] Namely, these costs include:

- re-mining costs for the extraction and collection of waste coal from pile sites;
- transportation costs associated with both the transportation of waste coal to the VCHEC, as well as, the transportation of beneficial use ash, which is used in the remediation of waste coal pile sites; and
- reclamation costs associated with the restoration and treatment of the coal pile sites where the waste coal was located.

The nature of waste coal and waste coal facilities may increase some of these costs over time. As more preferable piles are sourced and remediated, the VCHEC must source waste coal from piles that are further away, of lower fuel grade, or smaller than is economically feasible to transport to the VCHEC.

Lower capacity factors at the VCHEC generally correspond to lower levels of GOB consumption at the plant. For example, comparing the first full operating year (2013) with the most recent full operating year (2020) for the VCHEC, annual waste coal consumption has fallen by approximately 400,000 tons (see Figure 5.2).

297 Based on ESI conversations with industry professionals.

298 Based on data provided by Dominion Energy.

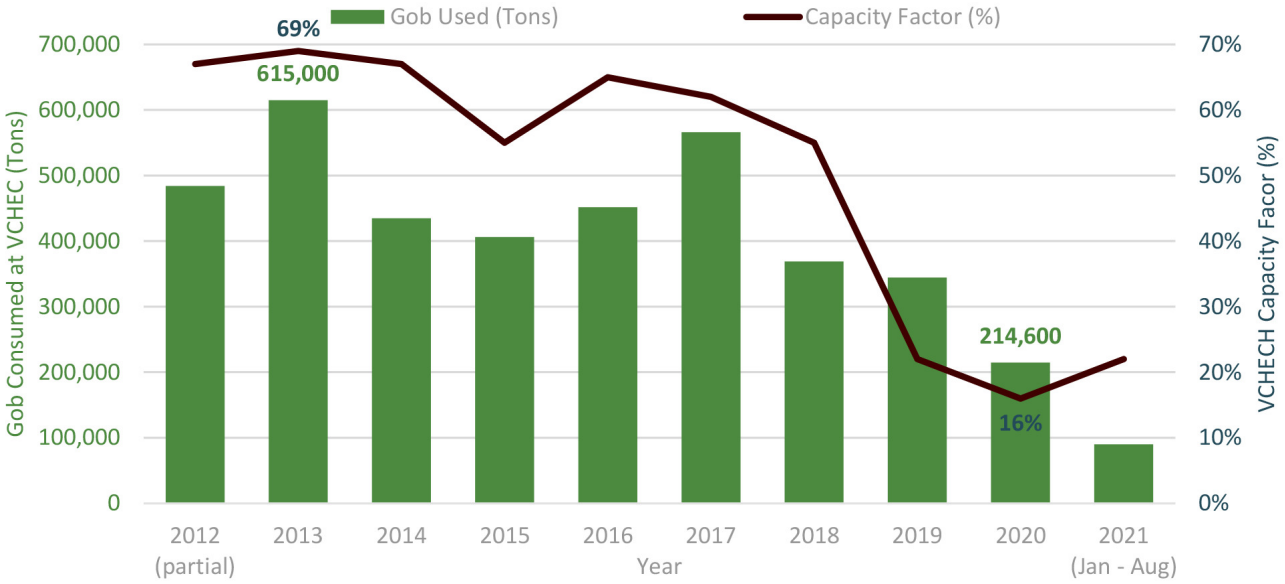

Figure 5.2. Annual Consumption of GOB and Capacity Factor at VCHEC

Source: Dominion Energy

Figure 5.3. Annual Consumption of GOB and Production of Ash at VCHEC

Year	Capacity Factor	GOB Share of Total Fuel (%)	GOB Used (Tons)	Ash Produced from GOB (tons)
2012	67%	42%	484,000	217,800
2013	69%	27%	615,000	276,800
2014	67%	21%	434,800	195,600
2015	55%	23%	406,300	182,900
2016	65%	23%	451,800	203,300
2017	62%	30%	566,200	254,800
2018	55%	21%	368,900	166,000
2019	22%	48%	344,500	155,000
2020	16%	38%	214,600	96,600
2021 (Aug)	22%	28%	90,000	40,500
Total		**27%**	**3,976,200**	**1,789,300**

Source: Dominion Energy

At the same time the production of coal ash, which can in some instances be used to aid the remediation of coal pile sites, has also decreased substantially (see Figure 5.3). This dynamic shows that GOB coal consumption is as sensitive to market factors as overall operations and fuel consumption at the VCHEC. In other words, with present conditions, the removal of GOB coal for use as a fuel source at VCHEC is sensitive to market forces and regulatory conditions.

The availability of waste coal from GOB piles is not the primary constraint to the production of energy at the VCHEC. The decreased capacity factor in recent years reflects broader industry factors, including the significant decrease in the demand for coal-generated electricity throughout the state and nation.

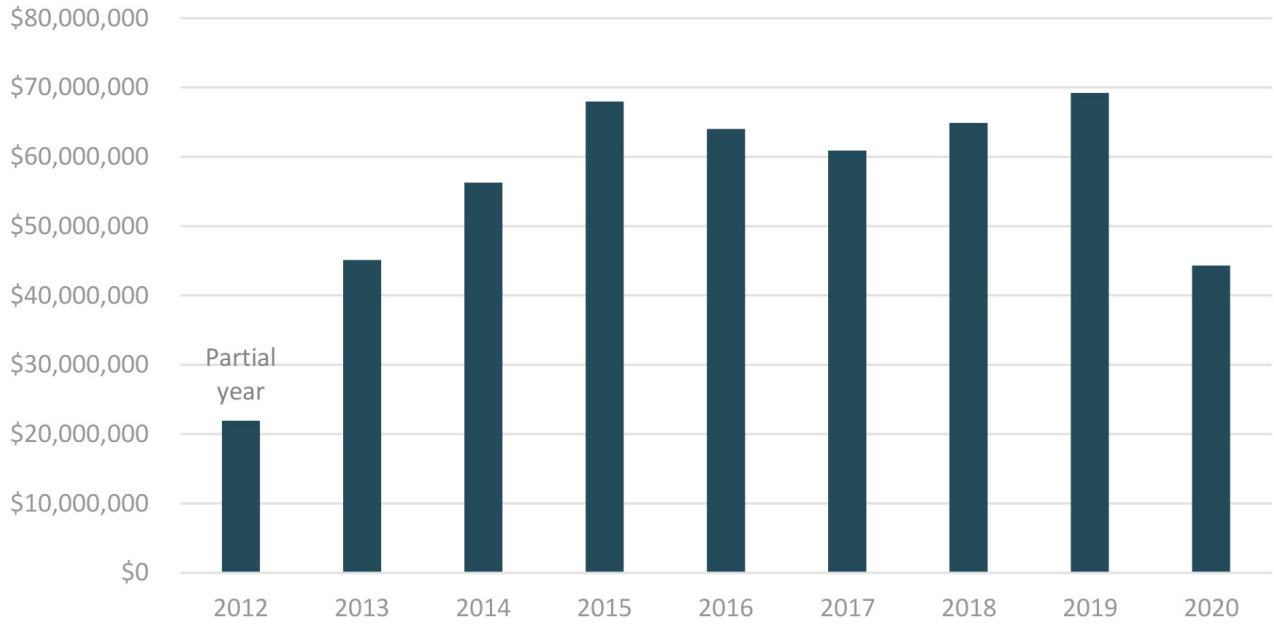

Figure 5.4. VCHEC Annual Operating Expenses, 2012 to 2020

Source: Dominion Energy

However, if the VCHEC is not in regular operation going forward, or is taken offline entirely, the state's option to utilize energy generation as an approach to facilitate removal of GOB would be reduced or eliminated accordingly.

5.3 Economic and Fiscal Impact of VCHEC Operating and Capital Activity

ECONOMIC IMPACTS

The operations and capital activities of the VCHEC contribute to Virginia's economy and to the surrounding communities.

ECONOMIC IMPACT FROM OPERATIONS

Since its construction in 2012, the VCHEC has been a powerful economic contributor to southwest Virginia's economy.

- Overall development and construction costs totaled $1.8 billion, which was a significant one-time injection of construction activity.
- Since that time, the VCHEC has spent over $212.5 million on material replacement and over $679 million on fuel procurement. From the first full year of operations in 2013 to 2020, the VCHEC has had between $44 million and $69 million in direct operating expenses per year (see Figure 5.4).

Direct economic activity generated by the VCHEC translates into additional economic activity within Virginia in multiple ways:

Figure 5.5. Annual Economic Impact of VCHEC Operations in Virginia

	2013 – 2020 Average
Direct Output ($M)	$59.1
Indirect & Induced Output ($M)	$25.6
Total Output ($M)	**$84.7**
Total Employment	**260**
Total Earnings ($M)	**$15.8**

Source: ESI (2021), IMPLAN (2021)

- First, some proportion of the direct expenditures that goes to the purchase of goods and services gets circulated back into an economy when those goods and services are purchased from local vendors. This represents what is called the "*indirect effect*," and reflects the local purchases of goods and services that support local vendors, who in turn require additional purchasing with their own set of vendors.
- Second, the VCHEC and the associated businesses pay annual salaries to their employees. That labor income gets circulated back into an economy when those employees spend some of their earnings on various goods and services. This represents what is called the "*induced effect*," and reflects the fact that some of those goods and services will be purchased from local vendors, further stimulating a local economy.

The total economic impact is the sum of its direct economic footprint plus the indirect and induced effects of that direct footprint. As described below, the "coal refuse industry" is not limited to operations conducted directly by the plant, but also includes services related to the coal refuse fuel cycle (including re-mining, transportation, and environmental remediation) that may, in some cases, be contracted to other firms, but would not take place if the industry did not exist.

Direct inputs are modeled by ESI using IMPLAN, an input/output modeling software used to assess the economic and job creation impacts of economic development projects, the creation of new businesses, and public policy changes. IMPLAN modeling translates an initial amount of direct economic activity into the total amount of economic activity that it supports. This includes multiple waves of spillover impacts generated by spending on goods and services and by the spending of labor income by employees.

Figure 5.5 below shows the estimated annual economic impacts of the VCHEC's operating activity within the Virginia economy, inclusive of direct and spillover effects. The analysis is based on averaged annual expenditures from 2013-2020.

- On average, the VCHEC's operating activities supported $85 million in total output and 260 direct and spillover jobs within Virginia, representing $16 million in annual earnings.

Figure 5.6. Annual Economic Impact of Ongoing Capital Activity at the VCHEC

	Annual Average
Direct Output ($M)	$23.6
Indirect & Induced Output ($M)	$13.2
Total Output ($M)	**$36.8**
Total Employment	**200**
Total Earnings ($M)	**$8.2**

Source: ESI (2021), IMPLAN (2021)

Figure 5.7. Annual Economic Impact of Ongoing Operating and Capital Activity at the VCHEC

	Annual Average		
	Operations	Capital	Combined
Direct Output ($M)	$59.1	$23.6	$82.7
Indirect & Induced Output ($M)	$25.6	$13.2	$38.8
Total Output ($M)	**$84.7**	**$36.8**	**$121.5**
Total Employment	**260**	**200**	**460**
Total Earnings ($M)	**$15.8**	**$8.2**	**$24.0**

Source: ESI (2021), IMPLAN (2021)

Economic Impact from Ongoing Capital Expenditures. Dominion also invests significant capital dollars in the upkeep and improvement of the VCHEC. Beyond regular maintenance and related costs included in the operating activity discussed above, capital costs following completed development have totaled $212 million through July 2021, or approximately $24 million annually.[299]

Like operating activity, this regular flow of investments supports additional indirect and induced activity within Virginia through the supply chain and through the recirculation of the labor income that these direct expenditures support.

- Ongoing capital activity is estimated to support $37 million in total output and around 200 jobs annually in Virginia, representing more than $8 million in earnings (see Figure 5.6).

Combined Annual Economic Impact. Annual operating and capital activity can be combined to represent the average annual economic footprint of the VCHEC within the Virginia economy since it opened.

- Ongoing operating and capital activity is estimated to support $121.5 million in total output and around 460 jobs annually in Virginia, representing $24 million in earnings (see Figure 5.7).

299 Based on data provided by Dominion Energy.

FISCAL IMPACTS

The economic output and employment associated with the VCHEC's operations also yield significant increases in state and local tax bases. These effects are augmented by direct fee and tax payments made by the VCHEC, which are a crucial revenue source for its host jurisdictions: Wise County and the Town of St. Paul.[300]

State Revenues. Fiscal impacts result from both the direct taxes and fees paid by the plant and from increases in tax revenue – notably income and sales taxes – associated with the additional income generated by industry operations. These revenues result not only from the direct operations and employment of the industry but from the impacts of the indirect and induced impacts estimated above various state and local tax bases.

State fiscal impacts for income, sales, and business taxes are estimated using effective tax rates. Using data from the Commonwealth of Virginia's Comprehensive Annual Financial Report on tax collections as well as data from the Federal Reserve Bank of St. Louis on state-level economic measures, an effective collection rate is calculated for the overall economic activity level in Virginia for sales tax, income tax, and business tax.[301] Those effective rates are then applied to the economic impacts calculated in Section 5.1.

Figure 5.8 quantifies fiscal impacts to the Commonwealth of Virginia from the direct, indirect, and induced impact of annual operations within the industry in four categories. These numbers are based on average annual activity levels from 2013-2020.

- Income tax revenue from the increased labor income associated with the VCHEC's operations and ongoing construction is estimated to average $720,000 per year.
- Sales tax revenue from the increased output in the Commonwealth economy associated with the VCHEC's operations and ongoing construction is estimated to average $450,000 per year.
- Business tax revenue associated with profits accruing both to the VCHEC and in other industries benefiting from the related economic activity is estimated to average $110,000 per year.

300 Dominion Virginia Power, *Dominion Virginia Power Begins Commercial Operations At Virginia City Hybrid Energy Center,* Cision PR Newswire (July 11, 2012), https://www.prnewswire.com/news-releases/dominion-virginia-power-begins-commercial-operations-at-virginia-city-hybrid-energy-center-162053145.html. Also from ESI conversation with Industry expert (Geofery).

301 Va. Dep't of Accounts, Va. Comprehensive Ann. Fin. Rep. (2019) https://www.doa.virginia.gov/reports/ACFReport/2019/S_Statistical.pdf; *Gross Domestic Product: All Industry Total in Virginia*, FRED Economic Data | St. Louis Fed, https://fred.stlouisfed.org/series/VANGSP (last updated Sept. 30, 2022).

Figure 5.8. Fiscal Impact of the Coal Refuse Industry to the Commonwealth of Virginia ($M)

Tax Type	Average Annual
Income	$0.72
Sales	$0.45
Business	$0.11
Environmental Taxes and Fees	$0.11
Total	**$1.39**

Source: IMPLAN (2021), Virginia CAFR (2019), Federal Reserve Bank of St. Louis (2020)

Figure 5.9. Direct Local Tax Payments by VCHEC, 2020

Annual Fee Item	Amount ($000)
Wise County	
Taxes	$4,454
Property Taxes	$4,607
Public Service Authority	$247
Wise County Total	**$9.31 million**
Town of St. Paul	
Taxes	$2,317
Property Taxes	$9
PSA	$575
St. Paul Total	**$2.90 million**

Source: Dominion Energy (2021)

- Environmental taxes and fees paid directly by the VCHEC to the Commonwealth, including landfill fees, emissions fees, and other environmental fees, which totaled $107,000 in 2020.

Together, these impacts are estimated to generate an average of $1.4 million in annual revenue for the Commonwealth of Virginia (see Figure 5.5).

Local Revenues. The VCHEC is also a significant contributor to the tax base of Wise County and the town of St. Paul through taxes and fees.[302] Figure 5.9 shows the local tax payments made by the VCHEC in 2020.

- Tax and fee payments to Wise County totaled $9.3 million in 2020.
- Tax and fee payments to the Town of St. Paul totaled $2.9 million in 2020.

These tax revenue contributions are indicative of the economic importance of the VCHEC to the local community. The tax and fee payments by the VCHEC accounts for nearly 14% of the annual budget of Wise County and 50% of St. Paul's annual budget, playing a critical role in supporting local

302 Dominion Virginia Power, *Dominion Virginia Power Begins Commercial Operations At Virginia City Hybrid Energy Center*, CISION PR Newswire, https://www.prnewswire.com/news-releases/dominion-virginia-power-begins-commercial-operations-at-virginia-city-hybrid-energy-center-162053145.html (last visited October 28, 2021). Also based on ESI conversations with industry professionals.

public services, such as schools. More broadly, economic activity from the plant represents a source of employment and economic opportunity in southwest Virginia.

6. Potential Funding for Remediation Efforts

Cost may pose the greatest challenge to remediation efforts. This section discusses potential opportunities and challenges for Virginia and the southwest region as it seeks to identify public and private funding sources to support the clean-up of GOB piles.

- Section 6.1 provides context on economic and demographic trends in southwest Virginia, and the implications of the region's economic development needs for clean-up efforts.
- Section 6.2 reviews federal policies around Environmental Justice and discusses their implications for the region and its potential to access federal funding opportunities.
- Section 6.3 discusses the 2021 federal Infrastructure Investment and Jobs Act, and potential funding opportunities to address these issues.
- Section 6.4 reviews recent economic and regulatory challenges for the Virginia City Hybrid Energy Center, which have contributed to a significant decrease in energy generation and in coal refuse remediation associated with the plant.

6.1 Economic and Demographic Trends in Southwest Virginia

Southwest Virginia's coal mining legacy bears on its economic trajectory. As the economic footprint of this activity has decreased, economic opportunities for residents of this region have been reduced. As a result, trends in population and employment in the southwest region have diverged from broader trends statewide.

Figure 6.1 shows population and unemployment trends for southwest Virginia – defined as Buchanan, Dickenson, Lee, Russell, Scott, Smyth, Tazewell, Washington, and Wise counties, and the cities of Norton and Bristol – relative to the whole state from 2010 to 2019 (prior to the impacts of the COVID-19 pandemic). While Virginia's population grew by 8% over this period, the population of the southwest region declined by more than 5%. The unemployment rate in the southwest region improved as overall economic conditions improved, but lagged the statewide trends in terms of both the pace of improvement and the level of unemployment, which were more than 40% higher in the southwest region than in the state in 2019.

The population decline is consistent with the decline in employment opportunities in core industries within the region. Figure 6.2 shows the trends in Virginia employment in the mining and logging sector – in total and as a share of statewide employment – from 1990 – 2020. Mining employment

Figure 6.1. Economic and Demographic Trends, southwest Virginia and Statewide, 2010-2019

Category	Southwest Virginia	Statewide
Population		
2010	312,400	7,841,800
2019	295,300	8,454,400
% Chg 2010-2019	-5.5%	+7.8%
Unemployment Rate		
2010	7.5%	5.9%
2019	6.6%	4.6%
% Chg 2010-2019	-12.0%	-22.0%

Source: US Census Bureau (2020), Bureau of Labor Statistics (2021)

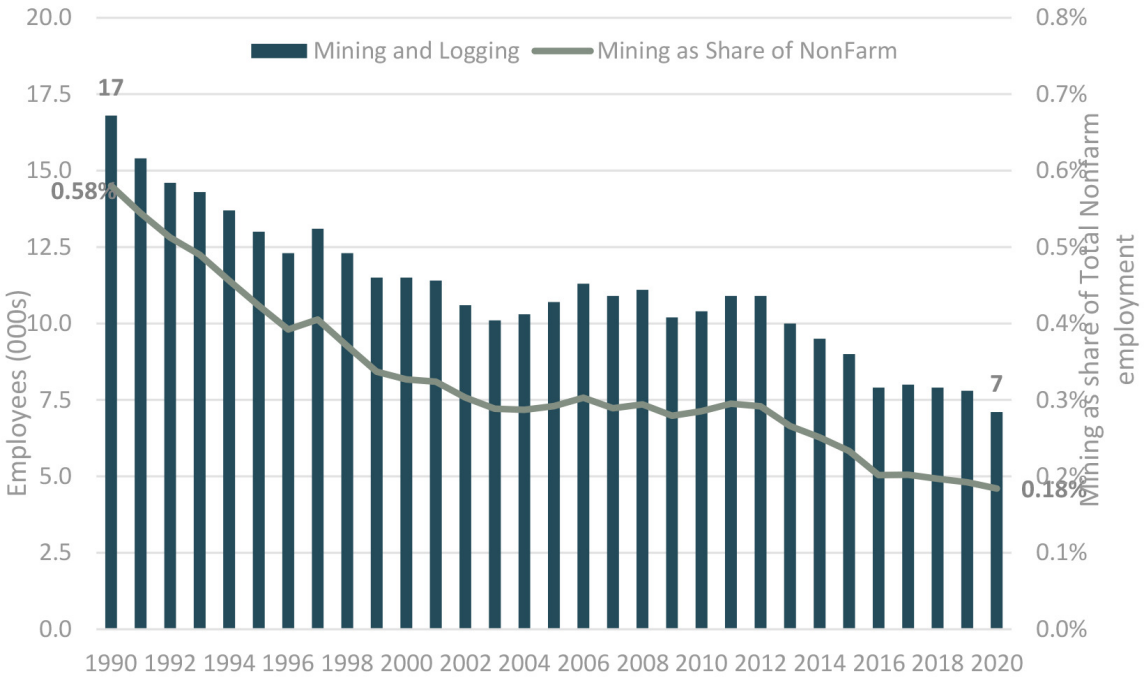

Figure 6.2. Virginia Mining Employment, 1990 – 2020

Source: Bureau of Labor Statistics (2021)

follows a steady downward trend and has declined from 17,000 jobs in 1990 to only 7,000 in 2020, representing a diminishing share of the state's workforce. Shifting employment opportunities have contributed to population migration out of the southwest region and to elevated rates of unemployment and poverty among those that remain in the region.

Recognizing some of the challenges faced by southwest Virginia, efforts are underway at the local, state, regional, and federal levels to help improve the economic trajectory of the region.

The Virginia Economic Development Partnership (VEDP) has been overseeing and coordinating economic development organizations since 1995. The Virginia General Assembly established the Virginia Coalfield Economic

Development Authority (VCEDA) in 1988.[303] The VCEDA's major initiative is centered in southwest Virginia's e-Region and focuses on electronic information technology, energy, education, and entrepreneurship development, leveraging industry relationships while providing incentives and financing programs.

In 2019, southwest Virginia launched InvestSWVA,[304] which aims to attract business, cultivate talents, and build strategic partnerships for economic development. The group has developed a roadmap for the region built around its strengths, including quality of life, a dedicated workforce, affordable real estate, and the availability of grant dollars to pair with private investment.[305] Leveraging these strengths, the group seeks to build a sustainable strategy for the region by attracting activity like data centers, energy innovation, and advanced manufacturing that is well-suited to the region's physical assets and workforce.

Southwest Virginia has also seen economic development efforts directed toward building an "outdoor economy."[306] For instance, a recent grant awarded to Russell County, Virginia, will go toward "Building an Outdoor Recreation Economy in southwest Virginia," including the construction of the Three Rivers Destination Center (TRDC) in the middle of Virginia's coalfield region to grow tourism in southwest Virginia.[307] Home to the Appalachian Trail, the Blue Ridge Parkway, the Virginia Creeper Trail, the New River Valley Trail, and others, southwest Virginia has seen a concerted effort to replace mining and manufacturing jobs with a trail economy.[308]

The remediation of mine-affected sites has been an important component of economic development efforts and a potential source of capital for projects with both economic and environmental benefits through the federal Abandoned Mine Land Reclamation Program (AML). Through 2016, 14 economic development projects in southwest Virginia shared over $16 million in cleanup activities (e.g., removal of GOB piles, cleaning up Acid Mine

303 *Southwest Virginia's e-Region*, Va. Coalfield Econ. Dev. Auth. (last visited Jan. 10, 2022), https://www.vceda.us.

304 *Reinventing the Economy of Virginia's Southwest*, Invest SWVA (last visited Jan. 10, 2022), https://www.investswva.org/roadmap.

305 *Reinventing the Economy of Virginia's Southwest, supra* note 307.

306 *Warner & Kaine Applaud Nearly $3 Million for Southwest Virginia Workforce Development and Outdoor Economy*, Tim Kaine (Dec. 9, 2021), https://www.kaine.senate.gov/press-releases/warner-and-kaine-applaud-nearly-3-million-for-southwest-virginia-workforce-development-and-outdoor-economy.

307 *Id.*

308 Jacob Stump, *In Southwest Virginia, Trails Connect Region to Economic Growth,* Time News (July 5, 2018), https://www.timesnews.net/living/arts-entertainment/in-southwest-virginia-trails-connect-region-to-economic-growth/article_bb15a956-428c-5aea-8cdb-155aa2056087.html; *See* Wally Smith, *Natural Assets: How the Outdoor Economy is Transforming Appalachia,* Blue Ridge Outdoors (Jan. 9, 2018), https://www.blueridgeoutdoors.com/go-outside/natural-assets.

Discharge, mitigating a dangerous high-wall mining site, etc.) and $52.7 million in construction investments (e.g., parking lot, new trails, reconfiguration of energy distribution lines, etc.).[309]

To better understand the types of projects that have secured AML funding in recent years, the Office of Surface Mining Reclamation and Enforcement (OSMRE) provided a breakdown of how AML funds were distributed during the Fiscal Year 2020:

> $3.494 billion was spent on construction costs for coal AML Priority 1, 2, and 3 projects[,] . . . $59 million was spent on construction costs for non-coal AML Priority 1, 2, and 3 projects[,] . . . $106 million as reported in e-AMLIS was spent on construction costs for both coal and noncoal problems . . . included Priority 4 and Priority 5 problems, non-mining related activities, and water supply restoration[,] . . . $286 million is the estimated amount reported in e-AMLIS spent on construction costs for non-coal AML Priority 1, 2 and 3 projects[,] . . . [and] $410 million is estimated to have been placed in acid mine drainage and future set-aside funds by states. . . .[310]

Priority 1, 2, and 3 projects are defined by federal law and are discussed in more detail elsewhere in this report. OSMRE also released the following numbers on the distribution of funds for Virginia during the fiscal year 2021: $3,600,000 in regulatory grant distribution; $765,925 in state and tribal share distribution; $2,442,108 in historic coal fund distribution; $3,208,033 in total mandatory grant distribution; and $3,025,175 in AML mandatory distribution (after reductions).[311]

In recent years, OMSRE has funded projects under the AML Economic Revitalization (AMLER) Program to "states with the highest amount of unfunded Priority 1 and Priority 2 Abandoned Mine Land (AML) sites based on OSMRE AML inventory data as of September 30, 2020. . . ."[312] Under the Pilot program, Virginia was to receive $10 million to "implement strategies to return legacy coal sites to productive uses."[313] Eligible projects would combat current and previous abandoned mine land – unclaimed priority 1, 2, or 3 sites – land adjacent to unclaimed or reclaimed AML sites, polluted water

309 Adam Wells et al, *Healing Our Land, Growing Our Future*, Appalachian Voices (Nov. 2016), https://appvoices.org/resources/AMLstudy/AppVoices_Healing_Our_Land_AMLstudy_Nov2016_lowres.pdf.

310 *Status of the Abandoned Mine Land Reclamation Fund (AML Fund)*, Off. Of Surface Mining Reclamation And Enf't (last visited Nov. 29, 2021), https://www.osmre.gov/programs/AML/Status_of_AML_Fund_09_30_2020.pdf.

311 *FY Grant 21*, Off. Of Surface Mining Reclamation And Enf't, (last visited Nov. 29, 2021), https://www.osmre.gov/resources/grants/docs/FYGrantDist21.pdf.

312 *Grants Resources*, Off. Of Surface Mining Reclamation And Enf't (last visited Nov. 29, 2021)https://www.osmre.gov/resources/grants.shtm.

313 *Id.*

reclamation, and economic development of communities historically impacted by coal production.[314] Title V mines sites are not eligible to receive Pilot program funding.[315]

The Pilot program provides funding for two types of projects: (1) reclamation projects with development and (2) reclamation projects with potential development. The reclamation project with development has economic and community development considerations as part of the project, while reclamation projects with potential development will likely create economic and community development. Projects will not obtain funding if they are not on or near a reclaimed or unclaimed AML site, do not show economic or community development, or do not have local government support.[316]

In 2021, the Federal Revitalizing the Economy of Coal Communities by Leveraging Local Activities and Investing More Act (RECLAIM Act) earmarked $6 million over five years for Virginia on its AML clean-up activities and economic planning for neighborhoods near mining sites.[317] Economic development efforts in the region may also benefit from broader efforts or funding sources addressing Environmental Justice communities. This issue is discussed in detail below.

6.2. Environmental Justice Communities

Southwest Virginia is more likely to obtain funding for GOB pile remediation if funds are used to address the detrimental environmental impacts experienced by coal mining communities and workers, referred to legally as environmental justice communities. Environmental justice requires "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[318]

This section considers the development of environmental justice policies at both the federal and state levels, and how those policies may affect funding opportunities.

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314 *Guidance for Project Eligibility Under the Abandoned Mine Land Economic Revitalization Program for Fiscal Year 2021*, Off. Of Surface Mining Reclamation And Enf't (last visited Nov. 29, 2021), https://www.osmre.gov/programs/AML/FY21_pilotProgramGuidance.pdf.

315 *Id.*

316 Abandoned Mine Lands Economic Revitalization (AMLER Program, W. Va. Dep't of Envtl. Prot., https://dep.wv.gov/dlr/aml/Pages/AML-Pilot-Program.aspx.

317 U.S. Congress S1455: RECLAIM Act of 2021, https://trackbill.com/bill/us-congress-senate-bill-1455-reclaim-act-of-2021/2106593.

318 *Environmental Justice*, U.S. Envtl. Prot. Agency (Oct. 29, 2021), https://www.epa.gov/environmentaljustice.

EXECUTIVE ORDER 12898

The environmental justice movement was started by individuals – primarily people of color – who sought to address the inequity of environmental protection in their communities.[319] The movement began in 1994 when President Clinton signed Executive Order 12898, which directs federal agencies to:

- "identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations, to the greatest extent practicable and permitted by law";
- "develop a strategy for implementing environmental justice" and incorporate policies into their decision-making;
- "promote nondiscrimination in federal programs that affect human health and the environment"; and
- "provide minority and low-income communities access to public information and public participation."[320]

EXECUTIVE ORDER 14008: THE CLIMATE CRISIS ORDER

The current administration centered on environmental justice concerns in its energy policies. On January 27, 2021, President Biden signed an Executive Order on Tackling the Climate Crisis at Home and Abroad.[321] In addition to laying out a strategy for combatting climate change, this Executive Order identified the need to improve air and water quality in rural communities and tackle the environmental harms on former mine land.[322] The Order calls for a focus on economic revitalization and job creation for current and former mining and power plant communities and workers.[323] Projects should focus on reducing "emissions of toxic substances and greenhouse gases from existing and abandoned infrastructure and [] prevent[ing] environmental damage that harms communities and poses a risk to public health and safety."[324]

Section 218 established the Interagency Working Group on Revitalizing Coal and Power Plant Communities and Economic Revitalization.[325] The Interagency Working Group consists of 13 federal agencies tasked to identify and deliver resources to revitalize coal, oil, gas, and power plant communities,

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319 *Id.*

320 *Summary of Executive Order 12898*, U.S. Envtl. Prot. (last updated Sept. 28, 2021), https://www.epa.gov/laws-regulations/summary-executive-order-12898-federal-actions-address-environmental-justice.

321 Exec. Order No. 14008, 86 C.F.R. 7627 (2021).

322 *Id.*

323 *Id.* at 7627-28.

324 *Id.* at 7628.

325 *Id.*

and help ensure benefits to coal and power plant workers.[326] The Interagency Working Group will consider the views of the state, local officials, environmental justice organizations, and community groups.[327]

In an April 2021 report to President Biden, the Interagency Working Group on Coal and Power Plant Communities and Economic Revitalization ranked southwest Virginia 4th out of 25 coal-dependent communities in need of immediate assistance.[328] The ratio of the number of direct coal-related jobs to the percentage of the total number of jobs in the area determined the top 25 coal-dependent areas.[329] The agency recognized that these coal-dependent communities and communities located near energy or industrial facilities are also disproportionately impacted by pollution and environmental impacts.[330] The agency recommended that initial federal investments focus on areas with high levels of coal-dependent jobs and prioritize these projects for investment and economic engagement.[331]

Section 221 of the Executive Order established the White House Environmental Justice Advisory Council, tasked with obtaining public comments and providing recommendations to the White House on the best ways to address and help environmental justice communities.[332] The Council is currently in discussion to develop recommendations on how funds should be dispersed and monitored.[333]

Section 223 established the Justice40 Initiative to ensure that 40 percent of federal investments in climate and clean energy are used to benefit disadvantaged communities affected by environmental injustices.[334] Investments focus on areas such as clean energy and energy efficiency programs, training and workforce development, mitigation and reduction of legacy pollution, and the development of clean water infrastructure.[335]

On July 20, 2021, the White House identified 21 priority programs that will serve as a blueprint for other agencies to utilize when implementing the Justice40 Initiative.[336] One of the priority projects is the EPA Drinking Water

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326 *Id.*

327 *Id.* at 7629.

328 *Initial Report to the President on Empowering Workers Through Revitalizing Energy Communities*, Interagency Working Group on Coal & Power Plan Communities and Econ. Revitalization (Apr.2021) https://netl.doe.gov/sites/default/files/2021-04/Initial Report on Energy Communities_Apr2021.pdf.

329 *Id.*

330 *Id. a*t 10-11.

331 *Id.* at 8.

332 86 C.F.R. § 7630.

333 *WHECJAC Public Meeting*, Zoom Lecture (Nov. 17, 2021).

334 86 C.F.R. § 7630 at 7631-32.

335 *Id.* at 7632.

336 Shalanda Young et al., *The Path to Achieving Justice40*, The White House (July 20, 2021), https://www.whitehouse.gov/ceq/news-updates/2021/07/20/the-path-to-achieving-justice40.

State Revolving Fund, which "provides funds to improve drinking water quality, prevent water contamination, and support water systems."[337] Financial assistance is granted to States to improve water systems for projects such as improving drinking water treatment, replacing finished water storage tanks, or fixing leaky and/or old pipes.[338] In 2021, the State of Virginia was allocated $17.9 million to fund these types of projects.[339] Within Virginia, Virginia's Department of Health manages the eligibility of projects, and Virginia Resources Authority administers the financial aspects of projects.[340] Funding for projects ended on April 30, 2021.[341]

On Dec 2, 2021, the White House requested agencies submit recommendations on methods for tracking the progress of the Justice40 initiative and calculating how funds are improving EJ communities.[342] The White House stated that they "are developing a Scorecard to make this information available to the public, and that will be released early next year."[343]

VIRGINIA ENVIRONMENTAL JUSTICE

Many of the funding opportunities available for remediating GOB piles will flow through the state of Virginia. Environmental justice concerns should be prioritized in urging the state to aggressively pursue such funding.

Virginia's codified Commonwealth Energy Policy specifically "recognizes the need to promote environmental justice and ensure that it is carried out throughout the Commonwealth," and "the need to address and prevent energy inequities in historically economically disadvantaged communities."[344] The Commonwealth Energy Policy also calls for creating "training opportunities and green career pathways for local workers and workers in historically economically disadvantaged communities."[345] Importantly, all state agencies and political subdivisions taking discretionary actions are required to recognize and act consistently with the Commonwealth Energy Policy.[346]

In January 2020, in a watershed federal court ruling, *Friends of Buckingham v. State Air Pollution Control Board*, the Fourth Circuit Court of Appeals held that the Virginia agency was required to consider the disproportionate impacts of a proposed natural gas compressor station on minority and low-

337 *Id.*

338 *Id.*

339 *2017 - 2021 Allotment of Federal Funds for States, Tribes, and Territories,* U.S. Envtl. Prot. Agency (Apr. 9, 2021), https://www.epa.gov/dwsrf/2017-2021-allotment-federal-funds-states-tribes-and-territories.

340 *Id.*

341 *Id.*

342 *Id.*

343 *Id.*

344 Va. Code § 45.2-1706 (1950).

345 *Id.*

346 *Id.*

income communities.[347] The agency was faulted for failing to make any findings as to the existence, and resolution, of environmental justice issues, which, left unresolved, would impact the suitability of the proposed site.[348] Indeed, the court explained that, under Virginia law, the Board was *required* "to consider the potential for disproportionate impacts to minority and low-income communities."[349]

The *Friends of Buckingham* case prompted Virginia DEQ to begin a rulemaking process for determining site suitability for all projects seeking environmental permits.[350] The case has also been used to mount opposition to another compressor station, based on environmental justice concerns.[351]

In April 2020, the General Assembly enacted the Virginia Environmental Justice Act.[352] This act declares that "[i]t is the policy of the Commonwealth to promote environmental justice and ensure that it is carried out throughout the Commonwealth, with a focus on environmental justice communities and fenceline communities."[353] An environmental justice community is defined to include a "low-income community," which in turn means a census block group in which 30 percent or more of the population includes people with low income.[354] A fenceline community includes all or part of a low-income community that faces increased health risks due to its proximity to a major pollution source.[355]

Building on the Fourth Circuit's decision, on December 3, 2021, Virginia Attorney General Mark Herring issued an advisory opinion concluding that DEQ must consider the state's codified environmental justice policy to site a potential landfill.[356] Two other entities exist in Virginia to facilitate the resolution of environmental justice issues. With Executive Order 29, Virginia Governor Northam established the Council on Environmental Justice to make recommendations to the Governor and executive agencies.[357] And through the budget process, legislators created the Interagency Environmental Justice

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347 Friends of Buckingham v. State Air Pollution Control Board, 947 F.3d 68 (4th Cir. 2020).

348 *Id.* at 88.

349 *Id.* at 87.

350 *See* Nina H. Farah, *Landmark EJ parks Legislative Reckoning in Va.,* (Oct. 4, 2021), https://www.eenews.net/articles/landmark-ej-ruling-sparks-legislative-reckoning-in-va/; Andrea Wortzel & Melissa Horne, *Virginia Initiates Regulatory Process to Consider Environmental Justice in Air Permitting Actions* (July 29, 2021), https://www.environmentallawandpolicy.com/2021/07/virginia-initiates-regulatory-process-to-consider-environmental-justice-in-air-permitting-actions/.

351 *Id.*

352 Va. Code § 2.2-235 (1950).

353 *Id.*

354 Va. Code § 2.2-234 (1950).

355 *Id.*

356 Letter from Mark R. Herring to Honorable Ghazala F. Hashmi (Dec. 3, 2021), https://www.oag.state.va.us/files/Opinions/2021/20-064-Hashmi-issued.pdf.

357 *Virginia Council on Environmental Justice*, Secretary of Natural and Historic Resources (last visited Dec. 14, 2021), https://www.naturalresources.virginia.gov/initiatives/environmental-justice.

Working Group, which directs state agencies to provide the General Assembly with plans for creating and implementing environmental justice policies.[358] The Working Group's 2020 report highlighted that, through the Abandoned Mine Land program discussed in Section 3.3, Virginia Energy has awarded over $47.8 million in public water projects throughout far southwest Virginia, "a historically disadvantaged community."[359] The report noted that this had created over 1,400 jobs.[360]

As the state agency that distributes funds from the AML Fund, Virginia Energy – one of the more likely funding sources for GOB pile remediation – stresses policies and regulations that benefit low-income communities. As the Working Group's 2020 report explained:

> Virginia is dedicated to ensuring that there are not disproportionate impacts on economically disadvantaged or minority communities during the siting of energy resources. It is the policy of DMME that in the development of energy programs, job training programs, and placement of renewable energy facilities, the agency consider whether and how those facilities and programs benefit local workers, historically economically disadvantaged communities, veterans, and individuals in the Virginia coalfield region that are located near previously and presently permitted fossil fuel facilities or coal mines.[361]

6.3. Infrastructure Investment and Jobs Act

In 2021, Congress passed and President Biden signed, the Infrastructure Investment and Jobs Act (Infrastructure Bill). The Infrastructure Bill became law on November 15, 2021.[362] As the Commonwealth considers ways to address legacy GOB piles, the Infrastructure Bill provides numerous avenues of potential funding for remediation and environmental clean-up.[363] Most relevant, the Infrastructure Bill includes **$11.3 billion for abandoned mine land and water reclamation projects.**[364] The Department of Interior explains that these funds "support vitally needed jobs for coal communities

358 Farah, *supra* note 351.

359 *2020 Environmental Justice Interagency Working Group Report*, (last visited Dec. 14, 2021), https://www.governor.virginia.gov/media/governorvirginiagov/secretary-of-natural-resources/pdf/2020-Environmental-Justice-Interagency-Report_Final.pdf.

360 *Id.*

361 *2020 Environmental Justice Interagency Working Group Report*, *supra* note 360.

362 Infrastructure Investment and Jobs Act, H.R. 3684, 117th Cong., § 90007(d) (2021).

363 *Id.*

364 *Id.*

by funding projects that close dangerous mine shafts, reclaim unstable slopes, improve water quality by treating Acid Mine Drainage, and restore water supplies damaged by mining."[365]

This section considers the funding options that may be available under the Infrastructure Bill for remediation of GOB piles in southwest Virginia. First, this section addresses funding for Abandoned Mine Land ("AML") programs under Section 40701 of the Infrastructure Bill. Second, it discusses clean energy programs under Section 40342 of the Infrastructure Bill. The third section addresses funding for projects involving displaced coal mine workers and disadvantaged communities and the opportunities available within the Infrastructure Bill. The following sections consider GOB pile remediation funds available for water restoration (Sections 40907, 40801, 40804, and 40807) and wildfires and natural combustion (Sections 40803 and 40807). Next, this section briefly addresses funding opportunities for partnerships with academic institutions under Sections 40204 and 40210. Finally, this section considers funding opportunities related to the capabilities of the VCHEC and carbon sequestration under Sections 40103, 40205, 40209, 40302, 40305, and 40804 of the Infrastructure Bill.

Each potential source for financial assistance under the Infrastructure Bill has an entity requirement, some of which a private entity, like Dominion Energy, would not be eligible for independently. However, through a partnership with the state of Virginia, a local government, or an institution of higher education, Dominion may have access to more sources of funding. Likewise, if the VCHEC is classified as a power generator, transmission facility, or generating plant, the available sources for funding will vary.[366]

ABANDONED AND/OR FORMER MINE LAN

Historically, States and Tribes receive AML funding based on a formula authorized by the Surface Mining Control and Reclamation Act.[367] The Office of Surface Mining Reclamation and Enforcement (OSMRE) explains that the formula includes "AML fee collections, historic coal production, the various shares within the AML Fund (i.e. State/Tribal Share, Federal Expense Share,

365 Press Release, U.S. Dep't of the Interior, Bipartisan Infrastructure Deal will Clean Up Legacy Pollution, Protect Public Health (Nov. 9, 2021) (on file), https://www.doi.gov/pressreleases/bipartisan-infrastructure-deal-will-clean-legacy-pollution-protect-public-health.

366 Many of the applications and deadlines for state and federal grants can be found on Grants.gov. Instructions for online application are found on the organization's applicant registration page. Applications must be submitted by an authorized organization representative who previously registered with grants.gov. Significant forms include: (1) SF-424, the general application; (2) SF-424A, the budget form for non-construction programs; (3) SF-424B, the assurances for non-construction programs; (4) SF-424C, the budget form for construction programs; and (5) SF-424D, the assurances for construction programs. *Grants Training*, U.S. ENVT'L. PROT. AGENCY, https://www3.epa.gov/grants-training/epa_grants_management _training_for_applicants_and_recipients_mod_3 (lasted visited Nov. 29, 2021).

367 *Reclaiming Abandoned Mine Lands*, Off. Of Surface Mining Reclamation And Enf't last updated May 5, 2021), https://www.osmre.gov/programs/aml.shtm.

Historic Coal Share), the minimum program supplemental adjustments, the AML inventory, and any other special Appropriations Act provisions (e.g. sequestration)."[368]

In July 2020, the Appalachian Citizen's Law Center applied this formula to then-candidate Biden's recently unveiled infrastructure proposal, which called for allocating $11.3 billion to the AML Reclamation Fund.[369] The Center estimated that Virginia may be allocated $23,579,905 based on historic coal tonnage and $353,698,580 over a span of 15 years.[370]

Section 40701 of the Infrastructure Bill authorized appropriations in the amount of $11.3 billion into the Abandoned Mine Reclamation Fund (30 U.S.C. 1231(a)).[371] This section supports projects such as state reclamation programs; projects that combat negative impacts on public health, safety, and welfare; and projects that mitigate environmental hazards on abandoned and/or former mine land.[372] An eligible entity is a state-approved for a state reclamation program (30 U.S.C. 1235) or a state certified as showing an emergency to the public health, safety, and welfare (30 U.S.C 1240a(a)).[373] Since these funds are distributed to states for abandoned mine land and water reclamation projects, Dominion would need to work with the State of Virginia to access these funds. A state may receive a $20 million grant so long as the project is no less than $20 million.[374] Priority for funds is given to projects that incorporate employment for current and former coal industry employees.[375]

AML funds have been used to remediate coal refuse piles in several instances. For example, in Pennsylvania, AML funds were used to remove 27 acres of coal refuse piles along the Path of the Flood Trail due to highly acidic levels in the local streams near South Fork Borough.[376] Subsequently, the project created a safer walking trail for recreational activities.[377] A second water reclamation project that received AML funding was the 2018 Snow Hill AML Site 882 Project in Indiana.[378] The Reclamation Division obtained funding for "installing drainage structures, establishing a wetland, and regarding the coal refuse embankments" after two piles of coal refuse clogged the North Coal

368 *Id.*

369 *Estimated Distribution of Funds from Infrastructure Investment and Jobs Act for Abandoned Mine Lands*, Appalachian Voices (July 2020), https://appvoices.org/resources/AML_Funding_Projections_11.3billion_simple.pdf.

370 *Id.*

371 § 40701, 135 Stat. 1091.

372 Infrastructure Investment and Jobs Act, H.R. 3684, 117th Cong., § 90007(d) (2021).

373 § 40701, 135 Stat. 1091.

374 *Id.*

375 *Id.*

376 Jamar Thrasher, *DEP Blog: Cambria County Coal Waste Reclamation Project Wins National Award*, Pa. Env't Dig. (Sep. 15, 2021), http://www.paenvironmentdigest.com/newsletter/default.asp?NewsletterArticleID=53658&SubjectID=224.

377 *Id.*

378 *Id.*

Creak due to Acid Mine Drainage and erosion.[379] Finally, a project in Pennsylvania "removed the refuse piles, eliminated the surface burning conditions[,] and improved the Little Conemaugh watershed" after environmental threats such as erosion, highly acidic waters, poor air quality, and damage to local streams were associated with 70 acres of nearby coal refuse.[380] The project also developed new opportunities for recreation, tourism, community parks, and safer walking trails along the Spearhead trails.[381]

Section 40701 may be particularly useful for a coal waste and water reclamation project that focuses on the removal of GOB piles from polluted waterways to improve the public health, safety, and welfare of local communities. Projects aimed at the removal of GOB piles can get priority if they provide opportunities and jobs to current and past coal mine workers. However, a site-by-site analysis is needed to determine which GOB piles throughout Virginia result in water pollution. Virginia Energy's virtual map depicts numerous polluted waterways and their proximity to a nearby GOB pile.[382]

Another possible project that can foster economic development and partnerships with local businesses can result from the reclamation of GOB piles near the Appalachian Trail, the Virginia Creeper Trail, the New River Valley Trail, and other trails throughout southwest Virginia. However, a site-by-site analysis is needed to determine the proximity to these trails and possible reclamation actions that can improve recreational activities on the land.

CLEAN ENERGY DEMONSTRATION PROGRAMS

Funding may also be available under section 40342 of the Infrastructure Bill, which supports clean energy demonstration programs on current and/or former mine land.[383] Under this section, funding is provided for clean energy projects which demonstrate "technology on current or former mine land site with [a] reasonable expectation of commercial viability."[384] A clean energy project should demonstrate relevant technology such as direct air capture, fossil-fueled electricity generation with carbon capture, utilization and sequestration, or energy storage.[385] Priority is given to "clean energy projects, in a location which will create the most domestic jobs, the greatest impact on avoiding emissions, the greatest economic development by the project, that

379 Moira Russell, *AML Reclamation Awards Winners*, Off. Of Surface Mining Reclamation And Enf't (last updated Sept. 22, 2020), https://www.osmre.gov/programs/awards/AMLwinners.shtm (last visited Nov. 29, 2021).

380 *Id.*

381 *Id.*

382 *Map Viewer*, Va. Dep't of Energy, https://vadmme.maps.arcgis.com/apps/mapviewer/index.html?webmap=aa50410e6daa444d9cd0b9256657b21c (lasted visited Nov. 29, 2021). Interactive virtual map showing GOB pile locations and contaminated water sources.

383 § 40342, 135 Stat. 1031.

384 *Id.*

385 *Id.*

is located in an economically distressed area[] and with respect to dislocated workers who were previously employed in manufacturing, coal power plants, or coal mining."[386]

A possible project to clean up GOB piles and use abandoned mine land is the conversion of sites to solar generating stations. As one analyst explained, "[c]oal waste sites serve no purpose, require maintenance, and have been the source of toxic leaks that damaged the local ecology. Repurposed into solar generating stations, such sites offer utilities cost-effective resource mix diversity and a new way to meet customer demand as well as emission reduction and renewable goals."[387] The Orlando Utilities Commission, for example, effectively capped ash at its coal waste landfill and then placed a solar array on top of it.[388] This type of project can also be beneficial in helping Dominion Energy reach its obligations under the Virginia Clean Economy Act.[389]

DISPLACED COAL MINE WORKERS AND DISADVANTAGED COMMUNITIES

Southwest Virginia is made up of predominately low-income coal mining communities. These communities have faced not only economic disparities but also environmental injustices. With the transition from coal mining, many communities face job loss and environmental pollution issues.

In 2010, nearly 5,000 individuals were employed in the coal mining business, but by 2020 this number dropped to 2,094.[390] As the switch to clean energy is pursued by Virginia, the demand for jobs in coal mines will decrease, likely causing an increase in unemployment rates throughout southwest Virginia.[391] Additionally, the United Way of Southwest Virginia found that this area has a poverty rate of 19%, and 51% of households in the region cannot afford the basic cost of living.[392] The Infrastructure Bill provides avenues for potential funding to help tackle GOB piles in southwest Virginia and improve local communities through job creation, economic development, and environmental restoration.

Several sections throughout the Infrastructure Bill can assist disadvantaged communities, such as southwest Virginia. Section 40701 – AML projects – gives priority to projects that benefit former and current displaced coal mine workers, while Section 40103 – electric grid reliability and resilience research,

386 *Id.*

387 Herman K. Trabish, *Are Utilities Missing out on the Opportunity to Use Old Coal Sites for Solar?*, Utility Dive (March 8, 2018), https://www.utilitydive.com/news/are-utilities-missing-out-on-the-opportunity-to-use-old-coal-sites-for-sola/518319/.

388 *Id.*

389 For more details on Dominion's obligation, please refer to Virginia Clean Economy Act section of this report.

390 M. Garside, *Coal-mining Employment in Virginia from 2010 to 2020*, Statista (May 16,, 2022), https://www.statista.com/statistics/215779/coal-mining-employment-in-virginia.

391 *Id.*

392 *About The United Way ALICE Report,* https://unitedwayswva.org/alice/ (last visited Nov. 29, 2021).

development, and demonstration programs – gives funding priority to low-income communities, rural communities, and economically distressed areas through job creation with energy projects and wildfire protection. Lastly, Sections 40209 – energy manufacturing and recycling – and 40342 – clean energy demonstration programs – give priority to disadvantaged communities and low-income communities. [393]

WATER RESTORATION

Funding for GOB pile remediation may also be possible under the water restoration provisions of the Infrastructure Bill. Sections 40907, 40801, 40804, and 40807 provide funding opportunities for projects or programs that focus on improving drinking water or public drinking water source areas, restoring waterways, reducing negative impacts on streams and waterways with the hope of ecosystem restoration, restoring water sources on National Forest land through the removal of hazardous materials, and improving watershed health in a river basin.[394]

Section 40907 is the Multi-benefit Projects to Improve Watershed Health program.[395] Under this section, the Secretary may award grants for the "design, implementation, and monitoring of conservation outcomes of habitat restoration projects that improve watershed health in a river basin that is adversely impacted by a Bureau of Reclamation water project by accomplishing . . . ecosystem benefits[,] . . . restoration of aspects of the natural eco-system[,] [and] [e]nhancement of river-based recreation."[396] Eligible applicants are States, local government, regional authorities, or any power or water delivery organizations.[397] Priority is given to habitat restoration projects that achieve one or more of the goals listed above.[398] Dominion may obtain funding under this section if it shows that removing GOB piles near waterways will naturally improve watershed health, ecosystems, habitats, and mitigate climate change to wildlife habitats.

Section 40801 is the Forest Service Legacy Road and Trail Remediation program.[399] Under this section, amendments to subsection 8 include projects that "restore passages for fish and other aquatic species."[400] Priority is given to projects that "protect or improve water quality in public drinking water source areas [and] restore the habitat of a threatened, endangered, or sensitive fish or

393 § 40103, 40209, 40342, 40701 135 Stat. 928, 75, 1031, 91.

394 § 40801, 04, 07, 08, 905, 07, 135 Stat. 1094, 1105, 12, 14, 22, 25.

395 § 40907, 135 Stat. 1125.

396 *Id.*

397 *Id.*

398 *Id.*

399 § 40801, 135 Stat. 1094.

400 *Id.*

wildlife species. . . ."[401] Dominion may potentially obtain funding to combat GOB piles near water sources harming wildlife species. A site-by-site analysis would be required to determine which GOB piles are contaminating water sources.

Section 40804 is the Ecosystem Restoration program.[402] Under this section, $2.1 billion is authorized to be appropriated to the Secretary of the Interior and Secretary of Agriculture through 2026.[403] Of the $2.1 billion, $400 million is available for "voluntary ecosystem restoration projects on private or public land,"[404] and $200 million is available for projects that "restore native veget[ation] and mitigate environmental hazards on mined land on Federal and non-Federal land. . . ."[405] Also, this section includes the collaborative-based, aquatic-focused, landscape-scale restoration program, which selects development proposals for five-year projects seeking to restore water quality.[406] Priority is given to projects that will restore the most miles of streams.[407]

In 2012, the Chesapeake Bay Program found that 13,140 miles of streams and 2,130 square miles of estuaries in Virginia were listed as impaired.[408] Impaired means that the waters "do not support aquatic life, fish and shellfish consumption, swimming, wildlife and/or public water supplies."[409] Funding for GOB pile remediation is more likely when the project also involves waterway restoration. Virginia Energy's virtual map attached below shows numerous polluted waterways and their proximity to certain GOB piles.[410] The multicolored lines represent contaminated waterways.

Section 40807 is the Emergency Actions program and allows the Secretary to authorize actions in emergency situations against "hazards threatening human health and safety or . . . natural resources on or adjacent to National Forest System land. . . ."[411] Relevant actions include the "restoration of water sources or infrastructure. . . ."[412] Dominion may potentially obtain funding to remove the GOB piles for the restoration of water sources. This would require a site-by-site analysis to determine whether any GOB piles are hazardous to National Forest land, natural resources, and/or human health and safety.

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401 § 40801, 135 Stat. 1096.

402 § 40804, 135 Stat. 1105.

403 *Id.*

404 *Id.*

405 *Id.*

406 *Id.* at 1107.

407 *Id.*

408 Alicia Pimental, *Water Quality Report Shows Majority of Va.'s Streams Unhealthy*, Chesapeake Bay Program (Mar. 27, 2012), https://www.chesapeakebay.net/news/blog/water_quality_report_shows_majority_of_virginias_streams_and_rivers_unhealt.

409 *Id.*

410 *Id.*

411 § 40807, 135 Stat. 1112-13.

412 *Id.* at 1113.

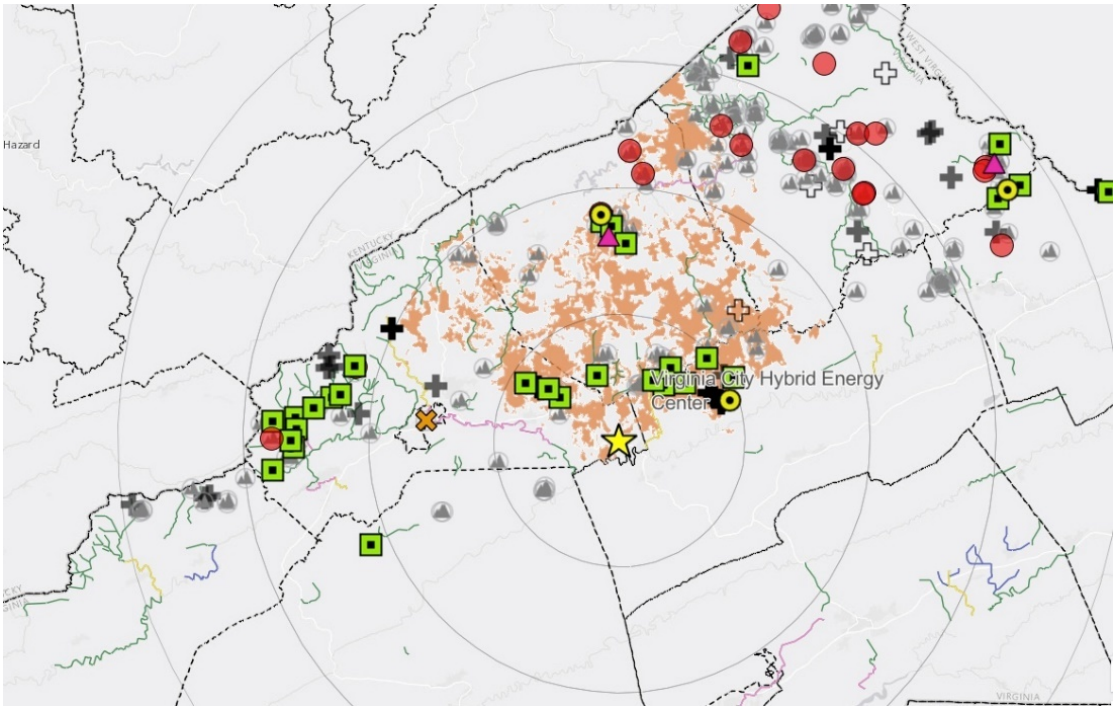

Figure 6.3. Contaminated Waterways in Virginia

Source: Virginia Energy

Alicia Pimental, Water Quality Report Shows Majority of Va.'s Streams Unhealthy, CHESAPEAKE BAY PROGRAM (Mar. 27, 2012), https://www.chesapeakebay.net/news/blog/water_quality_report_shows_majority_of_virginias_streams_and_rivers_unhealt.

WILDFIRES AND NATURAL COMBUSTION

The natural combustion of GOB piles can potentially start wildfires and negatively impact the communities in southwest Virginia.[413]C The Virginia Department of Forestry (DOF) has recognized that once a GOB pile is ignited, the fire becomes a problem for years.[414] In a statement from the Department of Environmental Protection, Spokesman Jack Glance referring to fires emanating from a GOB pile he stated, "you can't just throw water on it or think the rain will put it out . . . It ignites and then sucks air in from every possible place. It continues in this cycle and gets hotter, and hotter, and hotter until it reaches the surface."[415] The fires can affect local air quality, endangering the health and safety of the public and environment.[416] For example, in 1998, Buchanan County, Virginia, experienced a forest fire after the Richmond Hollow refuses pile ignited.[417] That year DMME – now Virginia Energy – also reported a forest fire in Tazewell County, Virginia, due to a subsequently reclaimed GOB pile.[418]

413 Richard Davis, *Experiences with Abandoned Coal Mine Land GOB Piles,* Virginia Dep't of Mines, Minerals, and Energy 2 (Apr. 18, 2008).

414 *Id.* at 3.

415 Chris Lawrence, *Massive gob fire in Boone County Finally Out*, MetroNews (Feb. 14, 2016, 1:00 PM https://wvmetronews.com/2016/02/14/massive-gob-fire-in-boone-county-finally-out.

416 *Id.*

417 *Id.*

418 *Id.*

Sections 40803 and 40807 provide financial assistance for the prevention of disruptive events such as wildfires.[419] These sections focus on projects that combat issues relating to areas at risk of wildfires, projects that reduce the risk of wildfires, and actions that mitigate harm to life, property, or natural resources.[420]

Section 40803 is the Wildfire Risk Reduction program and Community Wildfire Defense Grant.[421] Under this section, the Secretary of the Interior and Secretary of Agriculture are authorized to appropriate over $3.3 billion through 2026.[422] Funding goes towards federal land, Indian forest land, or rangeland that has a very high potential for wildfires.[423] Priority is given to projects that have a likelihood of reducing effects from potential wildfires.[424] Additionally, the Community Wildfire Defense Grant program provides grants to at-risk communities to develop or revise a community wildfire protection plan.[425] Priority is given to an at-risk community that is also "a low-income" community or a community impacted by a severe disaster.[426] The Secretary of Agriculture will not award a grant to an at-risk community unless the county or community has "adopted an ordinance or regulation that requires the construction of new roofs on buildings to adhere to standards . . . by National Fire Protection Association...or . . model building code established by the International Code Council." [427]

The map depicted below identifies the different types of land in Virginia. Although there is not much rangeland in Virginia; there is pastureland, grazed forest land, and Federal land.[428] This section may provide potential funding for the transportation and cleanup of GOB piles that have the potential to cause wildfires. A site-by-site analysis is needed to determine which GOB piles will likely combust and start a wildfire.

Section 40807 is the Emergency Actions program and can be utilized for emergency situations, such as controlling wildfires.[429] Dominion may potentially obtain funding to remove the GOB piles from National Forest

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419 § 40101, 803, 07, 08, 135 Stat. 923, 1097, 1112, 14.

420 *Id.*

421 § 40803, 135 Stat. 1097.

422 *Id.*

423 *Id.*

424 *Id.* at 1103.

425 *Id.*

426 *Id.*

427 § 40803, 135 Stat. 1103.

428 Loretta J. Metz, *Grazing Lands National Assessment,* U.S. Dep't of Agric. https://www.nrcs.usda.gov/wps/portal/nrcs/detail/va/home/?cid=nrcs143_014159 (last visited Nov. 30, 2021).

429 § 40807, 135 Stat. 1112-13.

Figure 6.4. Federal Lands and Indian Reservations in Virginia

Source: Virginia Places

land to help mitigate threats to natural resources and human health and safety. Here, a site-by-site analysis would be required to determine which GOB piles are causing negative environmental impacts on National Forest land.

ACADEMIC PARTNERSHIPS

As previously mentioned, a commonality of obtaining funding is the need for an eligible entity to receive funding or grants. In many cases, Dominion Energy, independently, will not be considered an eligible entity for funding purposes. A possible way to obtain funding is through an educational/research partnership. Sections 40204 and 40210 of the Infrastructure Bill provide avenues of funding through partnerships with institutions of higher education or academia.[430] Among the projects for which academic collaboration funding may be available are projects designing energy and mineral research facilities (Section 40204) and projects conducting research to advance critical mineral mining, recycling, and reclamation strategies (Section 40210).[431] For any of these projects, relevant eligible entities include institutions of higher education or a listed eligible entity in collaboration with a private industry, such as Dominion Energy.[432] Depending on the type of project, a partnership with the Appalachian School of Law, Virginia Tech, or other colleges and universities may provide an avenue to obtain federal funding to combat GOB piles in southwest Virginia.

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430 § 40204, 210, 135 Stat. 960, 978.

431 *Id.*

432 *Id.*

FUNDING OPPORTUNITIES USING THE VCHEC

Depending on which avenue Dominion chooses to take, the Infrastructure Bill may offer funding for many types of projects that could be utilized at the VCHEC. These sections are 40103, 40205, 40209, 40302, 40305, and 40804. Funding could be used to modernize the equipment, add new equipment, or improve the infrastructure of the building(s). This funding could also advance carbon capture infrastructure, carbon sequestration, electricity generation, extraction, and separation, or byproduct production.[433]

Section 40103 provides funding opportunities for the modernization of electric generation facilities.[434] Projects should demonstrate an innovative approach to enhance regional grid resilience and reliability.[435] Dominion may also potentially obtain funding from the State of Virginia by demonstrating new innovative approaches to enhance the regional grid, improve energy in rural communities, and provide economic viability to low-income and distressed areas.

Section 40209 is the Advanced Energy Manufacturing and Recycling Grant program.[436]

A qualified advanced energy project is a project that helps create an industrial, manufacturing, or recycling facility that produces or recycles advanced energy property and is also designed to reduce greenhouse gas emissions through the installation of low or zero-carbon process heat systems, carbon capture, transport, utilization, and storage systems, and technology relating to energy efficiency and reduction in waste from industrial processes.[437] Higher priority is given to projects that will significantly avoid emissions and result in the creation of numerous jobs for current and previously dislocated coal mine workers and low-income communities.[438] Eligible entities are manufacturing firms with gross annual sales of less than $100,000,000, fewer than 500 employees at the plant site, or annual energy bills totaling more than $100,000, but less than $2,500,000.[439] The Institute for Energy Economics and Financial Analysis created a report in December 2020 which lists the VCHEC as having local tax revenues of $6-$8.5 million, 153 employees, and $25-$40 million in generated local economic activity.[440] Dominion may qualify as an eligible entity under this section if they undertake such projects.

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433 § 40103, 205, 209, 302, 552, 804, 906, 135 Stat. 928, 60, 75, 87, 1001, 76, 1105, 22.

434 *Id.*

435 *Id.* at 928.

436 § 40209, 135 Stat. 975.

437 *Id.* at 976-77.

438 *Id.* at 977.

439 *Id.*

440 Karl Cates, et al. *Virginia Coal Plant's Future Isn't Bright: Preparation for Transition Should Commence Now*, Inst. For Energy Econ. And Fin. Analysis (Dec. 1, 2020), https://ieefa.org/wp-content/uploads/2020/12/VCHECs-Future-Is-Not-Bright_Transition-Preparation-Should-Commence-Now_December-2020.pdf.

Depending on the funding availability and lifespan of the VCHEC, several other sections in the Infrastructure Bill may be beneficial. Section 40205 is the Rare Earth Elements Demonstration Facility program, which funds the design, construction, and build-out of a facility that can demonstrate the commercial feasibility of a rare earth element extraction and separation facility and refinery.[441]

Section 40302 is the Carbon Utilization program, which funds products created from anthropogenic carbon oxides and demonstrates a reduction in greenhouse gas emissions.[442] Section 40305 is the Carbon Storage Validation and Testing program, which provides funding for the development of new or expanded commercial large-scale carbon sequestration projects and associated carbon dioxide transport infrastructure.[443] Section 40804 is the Ecosystem Restoration program, which recycles byproducts for use in road construction, concrete/cement products, land reclamation, wallboards (drywall or sheetrock), and agriculture (soil conditioners and to neutralize acidic soils).[444] More details can be found in the Infrastructure Bill for these programs to address the feasibility of the VCHEC when remediating GOB piles in southwest Virginia.

6.4. Other Potential Funding Sources

This section identifies several potential GOB pile remediation funding sources beyond the AML Fund. To begin, U.S. EPA awards more than $4 billion annually in grants and program assistance, including managing several "brownfields" programs for which GOB piles may qualify and offering various funding channels for environmental justice communities.[445] Additionally, the recently passed American Rescue Plan specifically addresses funding and employment opportunities for coal communities. Though the Senate has not passed the Build Back Better Act, it would also provide funding opportunities for environmental justice communities related to jobs, healthcare, and education. The Appalachian Regional Commission has been supporting local communities and especially those negatively impacted by the declining coal industry. Absent public funding, tax credits, or other state incentives could be offered to encourage the productive use of waste coal (as has been done in Pennsylvania). Alternatively, utilities could pass the additional costs of acquiring and using waste coal on to ratepayers.

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441 § 40204, 135 Stat. 960.

442 *Id.*

443 *Id.*

444 Stephen K. Ritter, *A New Life for Coal Ash*, Chemical & Engineering News (Feb. 15, 2016), https://cen.acs.org/articles/94/i7/New-Life-Coal-Ash.html.

445 *EPA Grants*, (Oct. 19, 2021), https://www.epa.gov/grants.

BROWNFIELDS PROGRAMS

States and communities use the Brownfield Grant programs to assess, job train, clean up, and reuse brownfield sites.[446] A brownfield site is defined under Section 101 of the Comprehensive Environmental Response, Compensation, and Liability Act as "a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant."[447] Mine site cleanup for brownfields redevelopment includes: roasting, shaft, slag, smelting, spoil, subsidence, tailings, watersheds, and wetlands.[448] Further, spoil is defined as debris or waste rock from mining, or more specifically GOB (coal mining).[449]

Grants include assessment grants, revolving loan fund grants, cleanup grants, multipurpose grants, job training grants, and state and tribal response program grants.[450] The state and tribal response program annually award $50 million for projects that "create new or [] enhance existing environmental response programs."[451] Programs must focus on collaborative economic development to "prevent, assess, safely clean up, and sustainably reuse brownfields."[452] Once annual deadlines for new applications are established, the dates are posted on Grants.gov or similar federal agency websites.

The brownfield assessment grants are community-wide assessment grants that can provide up to $500,000 for an unidentified entity "to assess sites contaminated by hazardous substances, pollutants, contaminants (including hazardous substances co-mingled with petroleum), and/or petroleum."[453] Site-specific or identified site assessments are given $350,000.[454] States are given $2 million for assessments of brownfield sites in its exclusive jurisdiction.[455] However, application requests closed on December 1, 2021.[456]

Under the brownfield cleanup grants, $500,000 is awarded to owners of brownfield sites "to address one brownfield site[ ] or multiple brownfield sites, contaminated by hazardous substances, pollutants, contaminants (including

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446 *Overview of EPA's Brownfields Program*, U.S. ENVTL. PROT. AGENCY (last updated July 26, 2021), https://www.epa.gov/brownfields/overview-epas-brownfields-program.

447 *Id.*

448 U.S. Envtl Protection Agency (EPA), *Mine Site Cleanup For Brownfields Redevelopment: A Three-Part Primer* 89 (Nov. 2005).

449 *Id.*

450 *Types of EPA Brownfield Grant Funding*, U.S. ENVTL. PROT. AGENCY (July 20, 2021), https://www.epa.gov/brownfields/types-epa-brownfield-grant-funding.

451 *State and Tribal Response Program Grants*, U.S. ENVTL. PROT. (Nov. 5, 2021), https://www.epa.gov/brownfields/state-and-tribal-response-program-grants.

452 *Id.*

453 *Brownfields Assessment Grants*, U.S. ENVTL. PROT. AGENCY (Dec. 2, 2021), https://www.epa.gov/brownfields/brownfields-assessment-grants.

454 *Id.*

455 *Id.*

456 *Office of Land and Emergency Management Grants and Funding*, U.S. ENVTL. PROT. AGENCY (Sept. 30, 2021), https://www.epa.gov/grants/office-land-and-emergency-management-grants-and-funding.

hazardous substances co-mingled with petroleum), and/or petroleum."[457] Cleanup grants have a 20 percent cost-share; however, the State can have it waived based on hardship.[458] However, application requests closed on December 1, 2021.

Under the brownfield multipurpose grants, $800,000 is awarded to brownfield owners to assess, clean up, and revitalize similar geographic areas.[459] Eligible activities include onsite inventory development; prioritization of sites; environmental assessment of sites; cleanup, reuse, and revitalization plans; and community involvement activities.[460] Grants require a $40,000 cost-share, which cannot be waived.[461] However, application requests closed on June 1, 2021.[462]

Under the brownfield's job training grants, organizations and local governments may receive awards "to recruit, train, and place unemployed and under-employed residents of areas affected by the presence of brownfield sites."[463] The program focuses on training for the "assessment, cleanup, and preparation of brownfield sites for reuse."[464] The Environmental Workforce Development and Job Training Grants program – now called the Brownfields Job Training Program – awards $200,000 to organizations for job recruitment, job training, and job placement in "predominantly low-income and minority, unemployed and under-employed people living in areas affected by solid and hazardous waste."[465] The purpose of this program is to reduce environmental pollution while simultaneously providing sustainable jobs and futures in underprivileged communities.[466] However, application requests closed in October 2021.[467]

EPA has awarded several brownfield grants for the remediation of coal waste in Pennsylvania. In 2010, for example, EPA provided Earth Conservancy a $600,000 grant to clean up three brownfield sites in Hanover Township,

457 *Brownfields Cleanup Grants*, U.S. ENVTL. PROT. AGENCY (Dec. 2, 2021), https://www.epa.gov/brownfields/brownfields-cleanup-grants.

458 *Id.*

459 *Brownfields Multipurpose Grants*, U.S. ENVTL. PROT. AGENCY (Nov. 30, 2021), https://www.epa.gov/brownfields/brownfields-multipurpose-grants.

460 *Id.*

461 *Brownfields Cleanup Grants*, *supra* note 461.

462 *EJ Collaborative Problem-Solving Cooperative Agreement Program FY 2021 Request for Applications*, U.S. ENVTL. PROT. AGENCY (Apr.19, 2021), https://www.epa.gov/environmentaljustice/ej-collaborative-problem-solving-cooperative-agreement-program-fy-2021-request.

463 *Brownfields Job Training (JT) Grants*, U.S. ENVTL. PROT. AGENCY (Oct. 6, 2021), https://www.epa.gov/brownfields/brownfields-job-training-jt-grants.

464 *Id.*

465 *Environmental Justice Grants, Funding and Technical Assistance*, U.S. ENVTL. PROT. AGENCY (Nov. 25, 2021), https://www.epa.gov/environmentaljustice/environmental-justice-grants-funding-and-technical-assistance.

466 *Id.*

467 *Office of Land and Emergency Management Grants and Funding*, U.S. ENVTL. PROT. AGENCY (Sept. 30, 2021), https://www.epa.gov/grants/office-land-and-emergency-management-grants-and-funding.

Pennsylvania.[468] The majority of the property was used for coal waste storage, causing Acid Mine Drainage into the Susquehanna River and Nanticoke Creek.[469] Like much of southwest Virginia, Hanover Township is an environmental justice community negatively impacted by the declining industry and abandoned mines, and a majority of the community is low-income and living in poverty.[470] The cleanup project was expected to provide "job opportunities, space for additional economic development, and increased tax revenues."[471] Similar brownfield grants were awarded to clean up coal waste sites in Newport Township, Pennsylvania, in 2013 and in Hanover Township and Nanticoke, Pennsylvania, in 2017 due to the presence of Acid Mine Drainage in nearby waterways.[472]

EPA ENVIRONMENTAL JUSTICE PROGRAMS

EPA has offered several other environmental justice grant programs in recent years, but the four that appear to be most relevant for GOB pile reclamation are not currently accepting applications. However, due to the current administration's commitment to environmental justice, these or similar programs will likely be accepting applications again.

The four potentially applicable recent programs are as follows:

- The Environmental Justice Collaborative Problem-Solving Cooperative Agreement program awarded up to $200,000 to states and local community-based organizations to address public health and environmental issues in underprivileged communities by collaborating with local businesses, governments, and industries.[473]
- The Environmental Justice Small Grants program awarded up to $75,000 to States for one-year community-based projects that help communities address exposure to environmental hazards and risks.
- The State Environmental Justice Cooperative Agreement Program awarded five grants of $200,000 for two-year projects that improve environmental and public health conditions of environmental justice communities focusing on clean air and safe water.[474]

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468 *Brownfields 2010 Cleanup Grant Fact Sheet,* U.S. ENVTL. PROT. AGENCY (April. 2010), https://cfpub.epa.gov/bf_factsheets/gfs/index.cfm?event=factsheet.display&display_type=PDF&xpg_id=7237.

469 *Id.*

470 *Id.*

471 *Id.*

472 *Id.*

473 *The Environmental Justice Collaborative Problem-Solving Cooperative Agreement Program*, U.S. ENVTL. PROT. AGENCY (June 2, 2021), https://www.epa.gov/environmental-justice/environmental-justice-collaborative-problem-solving-cooperative-agreement-0.

474 *The State Environmental Justice Cooperative Agreement Program*, U.S. ENVTL. PROT. AGENCY (Aug. 17, 2021), https://www.epa.gov/environmentaljustice/state-environmental-justice-cooperative-agreement-program.

- The Source Reduction Assistance program awarded grants for activities or technical assistance in research, investigation, experiments, education or training, and the demonstration of an innovative technique to help prevent pollution.[475] In 2020, the EPA gave eleven grants in the amount of $1.16 million with a five percent match requirement.[476] Applicants can receive $20,000-$200,000 over two years.[477]

Once annual deadlines for new applications are established, the dates are posted on, EPA.gov, Grants.gov, or similar federal agency websites.

AMERICAN RESCUE PLAN ACT (ARP)

On March 11, 2021, the $1.9 trillion American Rescue Plan Act of 2021 was enacted into law.[478] The U.S. Economic Development Administration (EDA) used $300 million to create the Coal Communities Commitment.[479] The funds will be used to ensure job creation in coal communities through the creation or expansion of local businesses and opportunities.[480] Of the $300 million, $100 million will go towards the Build Back Better Regional Challenge grants, and $200 million will go towards the Economic Adjustment Assistance grants.[481] These two programs are discussed in more detail below.

Further, the Assistance to Coal Communities (ACC) initiative funds projects that provide economic diversity, job creation and development, re-employment, and investments to areas with declining coal use.[482] Relevant eligible applicants may include an organization from an EDA-designated Economic Development district, state, county, city, or institution of higher education.[483] Funding has been provided to entities negatively impacted by the coal economy within the past fifteen years.[484] "'Coal economy' refers to coal mining and coal-fired power plants, along with related transportation, logistics, and supply chain manufacturing."83 However, only certain portions of Virginia are within an EDA-designated area and eligible for this funding without the assistance of an institution of higher education.[485] ACC was provided $10 million in 2015, $15 million in 2016, $30 million in 2017

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475 *Grant Programs for Pollution Prevention*, U.S. ENVTL. PROT. (July 12, 2021) https://www.epa.gov/p2/grant-programs-pollution-prevention.

476 *Id.*

477 *Id.*

478 *American Rescue Plan Act Funding Breakdown*, Nat'l Ass'n of Counties (Apr.12, 2021), https://www.naco.org/resources/featured/american-rescue-plan-act-funding-breakdown.

479 *Coal Communities Commitment*, U.S. Econ. Dev. Admin, https://eda.gov/arpa/coal-communities (last visited Nov. 30, 2021).

480 *Id.*

481 *Id.*

482 *Id.*

483 Coal Communities Commitment, *supra* note 481.

484 *Id.*

485 *Id.*

through 2020, and $33.5 million in 2021.[486] In 2018, Kentucky received $8,361,955 under the ACC initiative; Pennsylvania received $5,506,758; Tennessee received $1.5 million; West Virginia received $5,784,200; and Virginia received no funds.[487]

ACC-funded economic development projects have taken many forms:

- Pennsylvania received funds for the installation of fiber optic cable to industrial parks, laying sewer and water lines, and building new access roads for the surrounding area suffering from high unemployment and low wages.[488]
- Tennessee received funding to support economic development and continuing education in Franklin County, severely suffering from the closure of the largest coal-powered plants that employed 500 employees.[489]
- West Virginia received funding to support Brook County, which suffered "economic losses from the closure of coal, steel, industrial, and manufacturing facilities," including the loss of over 300 jobs when the Ball Corporation closed.[490]
- The Harrison County Commission in Clarksburg, West Virginia, received $2.6 million to develop a clean energy products manufacturing facility. [491]
- The Pea Ridge Public Service District of Barboursville, West Virginia, received $2.5 million to expand public sanitary sewer services.[492]
- EDA Program Rep. Ellen Heinz investigated a project in the Vinton County Parks District that would use $1.65 million from AML Economic Revitalization funds to create recreational trails and bridges, expanding across six Appalachian states, three Native American tribes, and running along the Zaleski State Forest.[493] The

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486 Julie M. Lawhorn, Cong. Res. Serv., IN11648, *The Economic Development Administration's Assistance to Coal and Nuclear Closure Communities Initiatives for Economic Transitions* 2 (Apr. 5, 2021).

487 *2018 Grants*, U.S. Envt'l. Prot. Agency, https://eda.gov/files/annual-reports/fy2018/EDA-FY2018-Annual-Report-full.pdf (last visited Dec. 22, 2021).

488 *Id.*

489 *Id.*

490 *Id.*

491 Press Release, U.S. Senate Committee on Environment and Public Works; Capito, Manchin Announce $2.6 Million EDA Grant for Clean Energy Products Manufacturing in Clarksburg (Oct. 1, 2021) https://www.epw.senate.gov/public/index.cfm/press-releases-republican?ID=0E3D3650-25D6-4990-88C7-9D20818C0AD6.

492 *Fact Sheet: Biden Administration Outlines Key Resources to Invest in Coal and Power Plant Community Economic Revitalization*, The White House (Apr. 23, 2021), https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/23/fact-sheet-biden-administration-outlines-key-resources-to-invest-in-coal-and-power-plant-community-economic-revitalization/.

493 Gina Collinsworth, *EDA Program Rep Ellen Heinz Visits Projects in the OVRDC Region*, (Oct. 18, 2021), https://www.ovrdc.org/2021/10/18/economic-development-administration-eda-rep-ellen-heinz-visits-the-region.

> hope of the project was to turn abandoned mine land into an opportunity to boost tourism and improve "job loss and economic decline related to reduced coal production."[494]

U.S. EPA's Economic Adjustment Assistance (EAA) program has $500 million to help communities plan, build, and innovate construction and non-construction projects to help the needs of local communities, with a focus on regions suffering adverse economic changes.[495]

The program has rolling application deadlines for relevant eligible entities, including states, counties, cities, an institution of higher education, or a consortium of the above; however, funds are not available to private organizations.[496]

Eligible activities include investments in infrastructure and workforce development, entrepreneurship, technical assistance and planning, and public works projects.[497] Criteria used to determine which projects will receive funds include: (1) the likelihood of the project achieving its results; (2) how quickly the project can start; (3) how quickly jobs can be created; (4) the likelihood of economic diversity and prosperity; (5) economic distress of the area; and (6) the applicants' performance receiving previous federal funds.[498]

EDA annual reports show the last time Virginia received EAA funds was in 2015 when Abingdon, Virginia, received $257,000 for outdoor recreation and tourism projects.[499] The goal of the project was to "grow and diversify" communities negatively impacted by the coal industry and to promote entrepreneurs across the Appalachian region.[500] In 2019, Kentucky received $11,491,186 EDA funds; Pennsylvania received $9,514,055; Tennessee received $3,606,335; West Virginia received $6,992,719; and Virginia did not receive any EDA funds.[501] Projects in other states fund communities negatively impacted by the declining coal industry through the improvement and development of infrastructure, water, and sewer systems; educational opportunities; and economic development to help create jobs.[502]

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494 *Id.*

495 *Economic Adjustment Assistance*, U.S. Econ. Dev. Admin., https://eda.gov/arpa/economic-adjustment-assistance/index.htm (last visited Nov. 30, 2021).

496 *Id.*

497 Economic Adjustment Assistance, *supra* note 497.

498 *Economic Adjustment Assistance Program*, U.S. Econ. Dev. Admin., https://eda.gov/pdf/about/Economic-Adjustment-Assistance-Program-1-Pager.pdf (last visited Dec. 16, 2021).

499 *2015 Grants*, U.S. Envtl. Prot. Agency, https://www.eda.gov/grants/2015/ (last visited Dec. 22, 2021).

500 *Id.*

501 *2021 Latest EDA Grants*, U.S. Econ. Dev. Admin. https://eda.gov/grants/ (last visited Dec. 27, 2021).

502 *Id.*

To apply for funding, applicants must coordinate with their District's Economic Development Representative (EDR).[503] Virginia's EDR is Lauren Stuhldreher with U.S. EPA's Philadelphia Regional Office.[504] Ms. Stuhldrehrer suggested that possible projects include expanding transportation channels for removing GOB piles.[505] There may also be funding opportunities for infrastructure projects at the VCHEC, and for job training past or current coal miners in the clean-up of GOB piles.[506]

BUILD BACK BETTER REGIONAL CHALLENGE

The goal of the Build Back Better Regional Challenge within the American Rescue Plan is economic recovery by revitalizing local communities.[507] Eligible activities include "planning, infrastructure, innovation and entrepreneurship, workforce development, access to capital, and more."[508] More specific examples of eligible activities include water system improvements, industrial parks, business incubators, multi-tenant manufacturing facilities, transportation enhancements, development facilities, economic recovery strategy development, and demand-driven workforce training.[509] Relevant eligible entities include states, counties, cities, institutions of higher education, or a consortium of the above.[510] Phase 1 applications ended on October 19, 2021, accepting 60 finalists from 529 applications.[124] Each finalist received $500,000 towards their proposed project.[511] Phase 2 applications will close on March 15, 2022, and will provide up to $100 million for approximately 20-30 projects.[512] Recently, Virginia Tech received $500,000 under phase I of the application process for economic development to accelerate the transition to electric and automated vehicles in southwest Virginia.[513]

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503 *EDA Coal Communities Webinar*, Zoom Lecture (Aug. 17, 2021).

504 Telephone Interview with Lauren Stuhldreher, Econ. Dev. Rep. of VA, (. 9, 2021).

505 *Id.*

506 *Id.*

507 *$1B Build Back Better Regional Challenge*, U.S. Econ. Dev. Admin., https://eda.gov/arpa/build-back-better/index.htm (last visited Nov. 30, 2021).

508 *Id.*

509 *American Rescue Plan Act Build Back Better Regional Challenge Notice of Funding Opportunity*, U.S. Econ. Dev. Agency, (Aug. 2021) https://reichardandassociates.com/wp-content/uploads/2021/08/ARPA-BBBRC-NOFO.pdf.

510 *Id.*

511 Michelle M. Havich, *Finalists announced for $1 billion Build Back Better Regional Challenge*, Am. City & County (Dec. 14, 2021), https://www.americancityandcounty.com/2021/12/14/finalists-announced-for-1-billion-build-back-better-regional-challenge; *American Rescue Plan Act Build Back Better Regional Challenge Notice of Funding Opportunity*, *supra* note 511.

512 *American Rescue Plan Act Build Back Better Regional Challenge Notice of Funding Opportunity*, *supra* note 511.

513 *2021 Latest EDA Grants*, *supra* note 503. Virginia Tech partnered with other institutions of higher education, community and industry representatives, and small business development centers to create plans for manufacturing, testing, and evaluation for a "technology-based economic development." The project involves over 50 public and private organizations and over 21 counties in Southwest Virginia. Virginia Biotechnology Research Partnership Authority was also a finalist of Phase 1 for an advanced pharmaceutical manufacturing project in Richmond/Petersburg area. The project is related to construction of manufacturing facilities and lab expansion. The project plans to focus on "infrastructure, workforce development, and education."

U.S. EPA UNDER THE RESCUE PLAN

Under the American Rescue Plan Act, $100 million was appropriated to U.S. EPA to address pollution-related health disparities.[514] Of the $100 million, $50 million went towards activities that identify and address environmental injustices under the Safe Drinking Water Act, CERCLA, and the Energy Policy Act of 2005.[515] This grant focuses on improving communities' access to dependable and safe drinking water and improving methods to prevent underground water contamination.[516] The remaining $50 million went towards activities to enhance air quality authorized under the Clean Air Act.[517] U.S. EPA also provided a $20 million grant for proposals from state and local air agencies – individually or in partnerships – to monitor pollutants that greatly impact community health disparities.[518]

U.S. EPA can also award $16.6 million for environmental justice grants under the Clean Air Act § 103 and the Safe Water Drinking Act § 1442, as well as technical assistance to communities.[519] Additionally, $5 million is allocated towards the assessment, clean-up, and preparation for redevelopment of brownfield sites, and $4.7 million is allocated toward compliance monitoring for drinking water in rural communities. [520] The community technical assistance program provides $2.2 million to build community capacity to combat air and drinking water issues in underprivileged communities.[521] Lastly, $500,000 will be used to support analysis and outreach in the oil and gas sector that relate to air and drinking water issues in environmental justice communities.[522]

BUILD BACK BETTER ACT

On November 19, 2021, the House passed a $2 trillion Build Back Better Act.[523] The purpose of the bill is to "build back" the middle class by encouraging spending on climate change, health care, job creation, and education.[524] Of the $2 trillion, $555 billion is proposed to be allocated for investment in clean energy, climate resilience, clean energy tax credits and

514 *American Rescue Plan (ARP),* U.S. Envtl. Prot. Agency (Nov. 2, 2021), https://www.epa.gov/arp.

515 *Id.*

516 42 U.S.C. § 300j-1 (1944).

517 *Id.*

518 *Id.*

519 *Environmental Justice Funding under the ARP,* U.S. ENVTL. PROT. AGENCY (Oct. 14, 2021), https://www.epa.gov/arp/environmental-justice-funding-under-arp.

520 Press Release, (June 25, 2021), https://www.epa.gov/newsreleases/epa-announces-50-million-fund-environmental-justice-initiatives-under-american-rescue.

521 *Id.*

522 *Id.*

523 Emily Cochrane, *House Narrowly Passes Biden's Social Safety Net and Climate Bill*, N.Y. Times (updated Nov. 21, 2021), https://www.nytimes.com/2021/11/19/us/politics/house-passes-reconciliation-bill.html.

524 *The Build Back Better Framework*, The White House, https://www.whitehouse.gov/build-back-better (last visited Dec. 8, 2021).

benefits, and infrastructure.[525] To advance environmental justice, the bill encourages a clean energy economy that focuses on transitioning "buildings, transportation, industry, electricity, and agriculture to climate smart practices."[526] Additionally, to align with President Biden's Justice40 Initiative, 40 percent of investments will go towards disadvantaged communities.[527] The Build Back Better framework would also create a Civilian Climate Corps consisting of 300,000 good-paying jobs for Americans that "will conserve our public lands, bolster community resilience, and address the changing climate. . . ."[528] However, the bill has yet to pass the Senate.

APPALACHIAN REGIONAL COMMISSION

The Appalachian Regional Commission (ARC) is an economic development agency within the federal government focusing on 13 states and hundreds of counties across the Appalachian region.[529] ARC created a program called the Partnerships for Opportunity and Workforce and Economic Revitalization (POWER).[530] POWER helps to ensure ~~that~~ federal resources are provided to communities "affected by job losses in coal mining, coal power plant operations, and coal-related supply chain industries."[531] Projects range from community development, entrepreneurial opportunities, building fiber-lit cell towers, and a research project to determine whether it is economically feasible to track and report miles of specialty grains grown in southwest Virginia.[532] Under the POWER Initiative, ARC has funded over 369 projects and impacted over 354 coal communities across the Appalachian region.[533] In 2021, ARC invested over $46 million into coal-impacted communities; supported 57 projects that retained over 9,100 jobs; attracted over $519 million in private investments; and had $59 million matched by public and private funds.[534]

To obtain funding for projects, ARC recommends contacting state program managers.[535] Virginia's state program manager is Tamarah Holmes with the Virginia Department of Housing and Community Development.[536]

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525 *What's in the House's Build Back Better Act?*, Committee for a Responsible Federal Budget (Nov. 8, 2021) https://www.crfb.org/blogs/whats-houses-build-back-better-act.

526 *President Biden Announces the Build Back Better Framework,* Earth Justice (Oct. 28, 2021), https://earthjustice.org/sites/default/files/files/build_back_better_fact_sheet_10.28_vfinal.pdf (last visited Nov. 30, 2021).

527 *Id.*

528 *Id.*

529 *ARC Announces Nearly $46.4 Million to Continue Economic Transformation in Region's Coal-Impacted Communities*, Appalachian Regional Comm'n (Sept. 16, 2021), https://www.arc.gov/news/appalachian-regional-commission-announces-nearly-46-4-million-to-continue-economic-transformation-in-regions-coal-impacted-communities.

530 *Id.*

531 *Id.*

532 *Id.*

533 *Id.*

534 *Id.*

535 *Grant Resources,* Appalachian Regional Comm'n, https://www.arc.gov/grant-resources/?fwp_grant_resources_funding_stages=pre-award (last visited Nov. 30, 2021).

536 *Tamarah Holmes*, Appalachian Regional Comm'n, https://www.arc.gov/staff/tamarah-holmes/ (last visited INSERT DATE HERE).

INCENTIVES FOR REUSING GOB AND WASTE COAL

The unique cost profile involved in the cycle of GOB re-mining, use for energy, and site remediation creates a challenging business model for waste coal processing power plants. This issue is not unique to the VCHEC and has impacted similar facilities in other states.

Pennsylvania – another legacy coal mining state with an even larger stock of legacy waste coal piles – has encountered similar issues with waste coal facilities operating in that state.[537] From a peak of 14 facilities, Pennsylvania now has ten active waste coal plants due to operating challenges amidst rising fuel and regulatory costs and declining electricity prices.[538] This raises concerns about the viability of the industry and its ability to continue the remediation of Pennsylvania's waste coal piles.[539] In response, Pennsylvania enacted the Coal Refuse Energy and Reclamation Tax Credit in 2016;[540] the tax credit enabled eligible waste coal facilities to receive $4 per ton of coal refuse used to generate electricity reflecting Pennsylvania's acknowledgement that waste coal facilities are important to Pennsylvania's goals for environmental remediation.[541]

At the federal level, the "Coal Refuse Reclamation Act" was introduced in the 115th Congress in February 2018, proposing a federal credit of $12 per ton of coal refuse for qualifying facilities.[542] This legislation is not under current consideration, and is unlikely to be implemented federally in the near term.

RECOUPING CAPITAL COSTS THROUGH RATEMAKING

Finally, in the absence of public funding for remediation, electric utilities could only recover the cost of using waste coal through the rate they charge their customers. In Virginia, the State Corporation Commission (SCC) would have to approve any such rate.[543]

In Virginia, electric utilities are regulated monopolies, and the SCC must approve the rates they charge their customers.[544] Generally, electricity rates must be just and reasonable, and allow utilities an opportunity to recover

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537 *Coal Refuse to Energy Industry,* Anthracite Region Indep.. Power Producers Ass'n, https://arippa.org/coal-refuse-to-energy-industry.

538 Barry Cassell, *Senators want Waste-coal-fired Power Plants in Pa. Exempted from EPA Rules,* Transmission Hub (Jan. 16, 2015), https://www.transmissionhub.com/articles/2015/01/senators-want-waste-coal-fired-power-plants-in-pa-exempted-from-epa-rules.html.

539 *Id.*

540 *Comments to the Joint Legislative Air and Water Pollution Control and Conservation Committee on the Coal Refuse to Energy Industry*, Appalachian Region Indep. Power Producers Ass'n (last visited Nov. 20, 2021), https://arippa.org/wp-content/uploads/2018/12/J.Gibbons-Testimony-10-4-18.pdf.

541 *Id.*

542 H.R. 4977, 115th Cong. (2018).

543 State ex rel. Utils. Comm'n v. Stein, 851 S.E.2d 237, 242 (N.C. App. 2020). In a loosely analogous issue, neighboring states have allowed utilities associated with the remediation of coal ash spills.

544 *Electric Rate in Virginia*, Va. State Corp. Commission (last visited Nov. 30, 2021),https://scc.virginia.gov/getattachment/4be693ef-eb12-4ad6-8c3d-3cc12866d869/howerates.pdf.

a fair rate of return on operating expenses.[545] Utilities can recover their fuel costs annually so long as the utility made reasonable efforts to minimize costs and the price is not unjustified.[546] Utilities can increase rates to recover on transmission costs, environmental and reliability costs, generation facilities, and conservation and renewable energy programs.[547]

7. CONCLUSION AND KEY RECOMMENDATIONS

At least 245 legacy coal waste piles in southwest Virginia present clear public health and environmental harm to communities that are already economically disadvantaged. There are significant and discernible economic and social benefits to remediating these GOB piles in order to improve water quality and public safety, and to reclaim damaged lands.

There are a few remediation options that may be appropriate for particular GOB piles. They all stem from two basic approaches – remediation in place, and removal and remediation. Remediation in place could include stabilization, water treatment, and revegetation designed to reduce the harmful impacts. Removal of the GOB piles may include disposing of the material in lined landfills or active mine sites and/or making beneficial use of the recoverable GOB, such as using it for electricity generation, followed by remediation of the site.

Choosing the best method for remediation depends on the characteristics of a particular site. The exact location of the site vis-à-vis waterways and underground drinking water is a crucial consideration both in prioritizing the harm caused by a particular pile, and in choosing the best remediation. A pile's proximity to transportation channels, to the VCHEC, to local communities, and to existing or to-be-constructed landfills could significantly impact the most suitable method of remediation. The particular characteristics of a pile – its composition, the amount of waste coal likely to be reclaimed, the stability of the pile, and the extent of pollutants present – all affect prioritization and remediation choices. Additionally, property ownership and potential liability issues will differ among the various piles.

Regardless of the chosen method, the challenge will be paying for any such remediation efforts. Legacy GOB piles pre-date the Surface Mining Control and Reclamation Act (SMCRA) of 1977, which requires active mining companies to reclaim their mining sites. SMCRA liabilities and remediation obligations were not made applicable to coal mining activities prior to 1977. As the liability for these pre-SMCRA environmental damages was not assigned,

545 Va. Code § 56-235.2 (2007).

546 Va. Code § 56-249.6 (2020).

547 *Electric Rate in Virginia*, *supra* note 546; *See* Va. Code § 55-585.1 (2021).

the related social and economic costs are ultimately borne by the Commonwealth of Virginia, and there is no clear responsibility for remediation.

One option is passing along the costs to Virginia taxpayers, utilities, and/or electricity ratepayers. Providing a market for the economically beneficial use of waste coal mined from GOB piles could defray some remediation costs. The VCHEC is capable of burning waste coal for electricity generation, which could provide a market incentive for GOB pile remediation. On the other hand, the combustion of waste coal results in significant greenhouse gas emissions and traditional air pollution – more than burning newly-mined coal – and may run counter to Virginia's efforts to transition to cleaner energy sources.

There is also significant potential funding available through federal programs, most notably, the Abandoned Mine Land Reclamation Fund, which got an infusion of long-term appropriations from the recently enacted Infrastructure Bill. In addition to the AML Reclamation Fund, the fact that the majority of southwest Virginia consists of environmental justice communities or economically disadvantaged communities disproportionately affected by pollution, opens up considerable other funding opportunities through federal and regional programs.

This report leads to the following recommendations:

Recommendation 1 >> A programmatic effort should be undertaken to remediate the GOB piles in southwest Virginia.

Recommendation 2 >> Virginia should conduct a site-by-site analysis to include additional information for the state's inventory of GOB piles in order to prioritize remediation efforts and determine the most appropriate method of remediation for each site.

Recommendation 3 >> Virginia should launch a GOB pile remediation initiative that employs coal industry workers and reclassifies GOB pile remediation as a top priority for its AML funds.

Recommendation 4 >> In its 2022 AML grant application (and in future years), Virginia Energy should request sufficient funds to cover GOB pile remediation efforts.

Recommendation 5 >> Virginia should create an atmosphere conducive to the remediation of GOB piles, to obtaining funding for such remediation efforts, and to providing the tools so that funding could be accessible for private entities, localities, and non-profits.

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