Resources Policy 54 (2017) 1–8

Contents lists available at ScienceDirect

Resources Policy

journal homepage: www.elsevier.com/locate/resourpol

Disparate impacts of coal mining and reclamation concerns for West Virginia and central Appalachia

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A B S T R A C T

The international coal mining industry has experienced serious recent downturns, particularly in the electricity generating market, with steady declines projected into the future. In the United States, increased production from the natural gas sector has made coal-fired power production less competitive, and natural gas power plants are replacing aging coal-fired plants. As such, many of the larger coal companies are in or have recently been in bankruptcy, leaving all coal mining states in the United States at risk for liabilities from abandoned unreclaimed coal mines. Because of the various laws and regulations surrounding the permitting of coal mines, Kentucky, Maryland, Ohio, Pennsylvania, Virginia, and West Virginia employ some form of alternative bonding systems, and Alaska, Arkansas, Colorado, Illinois, Indiana, Kentucky, New Mexico, Texas, Virginia, West Virginia, and Wyoming employ self-bonding, which allows a coal operator to reduce its secured bond. These alternative bonding systems do not contemplate the risk of a large-scale industry downturn, leaving states at risk for hundreds of millions of dollars of liabilities to reclaim abandoned coal mines and protect the environment and its residents.

We examined the reclamation bonds for all coal mines in West Virginia and found that West Virginia faces significant gaps between counties and watershed for the amount of the secured funding for site-specific reclamation. Significant disparities exist such that some residents are much more impacted by the amount of coal mining, as well as the amount of site-specific bonding. We also found that the areas most impacted by the amount of coal mining and reduced site-specific bonding are in the areas with the worst health outcomes. This is a concern for all regions with all types of extractive industries: how to maximize industry while protecting the environment and its residents. Moving forward, states should reconfigure bonding systems to alleviate these risks and burdens on its citizens to prepare for continued declines within the coal industry.

1. Introduction

Two of the major problems that Congress intended to alleviate when it enacted the Surface Mining Control and Reclamation Act (SMCRA) in 1977 were the environmental and financial impacts from the remediation of abandoned surface coal mining sites. Existing abandoned coal mines polluted streams and rivers throughout Appalachia with a variety of pollutants, most notably acid mine drainage (AMD), and the states and the federal government lacked sufficient funding to remediate these sites and improve water quality. Previously, mine operators caused significant degradation to the land and surrounding waterbodies and then absconded with the profits without remediating the mine. In many instances, bankruptcy law protected mine operators from the costs of remediation, and others simply vanished or were unable to pay for remediation. The states and the federal government inherited the large costs of remediation to deal with the environmental impacts and unsafe conditions at abandoned mine sites. Therefore, key concepts that emerged from SMCRA were remediation performance standards and financial assurance for coal mining reclamation.

Despite the aims of SMCRA, remediation is again quickly becoming a crisis issue. Due to under-bonding and alternative bonding systems, combined with perpetual water pollution discharges associated with large-scale surface coal mining, West Virginia and central Appalachia face a risk that there will not be enough funding to reclaim all mine sites, which could result in disparate impacts on certain residents and watersheds. The fall-out from the decline of the coal mining industry has impacted and will continue to impact counties and states on a variety of financial issues, including severance taxes, property taxes, and unemployment. Previous research identified and analyzed the laws

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http://dx.doi.org/10.1016/j.resourpol.2017.08.004
Received 20 February 2017; Received in revised form 3 August 2017; Accepted 7 August 2017
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that have shaped concerns with the bonding systems (Surber, 2013, 2014). This research addresses the bonding system because of the potential human health and environmental impacts from unreclaimed coal mining sites, as well as the potential financial risks to the states. To date, such an analysis has not been conducted. According to officials at the West Virginia Department of Environmental Protection (WVDEP), pursuant to multiple Freedom of Information Act requests, West Virginia has not conducted a study on the impacts of coal mining or bonding on individual counties or watersheds.

Disparate impacts on communities will likely result because coal mining affects some areas and watersheds much more than others. Thus, environmental justice concerns exist, especially because water quality violations from coal mining have been found to occur in areas where community poverty is greater (Stretesky and Lynch, 2011). The environmental pollution impacts from unreclaimed coal mines are a potential concern for public health due to "triple jeopardy": (1) the vulnerable populations within these mining communities afflicted by poor health and low socioeconomic status, (2) potential public exposures to unreclaimed sites that may cause or contribute to further poor health, and (3) little to no funding to improve these negative conditions, perpetuating further cycles of environmental injustice (Su et al., 2009; Solomon et al., 2016; Cushing et al., 2015). In order to begin to understand these public health and environmental justice issues, this research addresses the impacts of coal mining on individual counties and watersheds.

2. Laws governing surface coal mine reclamation

SMCRA requires mine operators to restore the land and return it to its pre-mining quality. As a way to ensure that this will occur, states must receive financial assurance from the mine operator, requiring the coal operator to provide the state with money "sufficient to assure the completion of the reclamation plan" in the event that the mine operator fails to do so.[1] In theory, SMCRA ensures that states will have sufficient funds to reclaim every surface mine in the event that any coal operator refuses to or is unable to complete reclamation.

Financial assurance typically occurs through site-specific financial bonding, using cash or sureties. However, many states created alternative bonding systems to reduce the amount of financial assurance required from the individual mining operators. For example, West Virginia utilizes a Special Reclamation Trust Fund and a Special Reclamation Water Trust Fund, where it assesses fees on each ton of coal extracted to fund both land and water reclamation costs. The existence of these trust funds allows West Virginia to reduce the amount of financial assurance from each mine site to a capped amount of no more than $5000 per acre. This amount has not been adjusted since 1991, despite the increased costs of reclamation due to inflation and costly water treatment for long-term pollution discharges to comply with the Clean Water Act (CWA). Land reclamation at the existing forfeited mines costs WVDEP an average of $2700 per acre for surface operations, $12,400 per acre for underground operations, and $7300 per acre for other types of operations (for example, preparation plants and haul roads).[2] These average costs do not include water treatment. The alternative bonding system means that West Virginia does not have a full site-specific financial guarantee for every mine.

In addition to the alternative bonding system, West Virginia and other states allowed for mine operators to apply for self-bonding. In West Virginia, self-bonding allowed companies like Alpha Natural Resources and Massey Energy to give a corporate guarantee in lieu of posting a bond because of the strength of its financial resources (with the subsidiary corporations relying on the strength of the parent corporation). Based on Alpha's resources, West Virginia had approved Alpha for up to $375 million in unsecured bonds. When Alpha filed for Chapter 11 bankruptcy in 2015, it had guaranteed West Virginia approximately $186 million in unsecured self-bonds, meaning that although Alpha had bond amounts assessed at each of its mine sites, the full amount of those bonds were never posted. This left West Virginia with little to no secured bonding going into Alpha's bankruptcy. Alpha had similar self-bonds throughout the U.S. at the time of its bankruptcy, prompting Congressional inquiry into these practices.[3]

Full reclamation is vital because unreclaimed coal mines create a variety of potential environmental and safety problems. The water draining from the site may be untreated and violate water quality standards of the CWA. The unreclaimed land may not meet the requirements of SMCRA, such as a risk of flooding conditions during rainfall events, impacting the areas and waterbodies near the site. The land may be unstable, creating a risk or rock or landslides. The site may remain denuded and insufficient to maintain a wildlife community, leaving its quality similar to the pre-SMCRA strip mines that SMCRA was created to prevent.

If a mine site is not reclaimed to meet sufficient standards under SMCRA, it is the state's responsibility to reclaim the surface mine. In West Virginia, the mine's bond is forfeited to pay for reclamation costs and any reclamation costs above the amount of the bond is paid for by the Special Reclamation land and water trust funds (WVDEP is authorized to collect costs above the bond directly from the operator, assuming the operator remains solvent). The Special Reclamation trust funds are financed by a tax on each ton of coal mined in the state (currently a total of $0.279 per ton of coal extracted), bond forfeitures, and civil penalties. Because of the current and projected future declines in the amount of coal mined, there are serious risks that the tax will not be sufficient to meet the costs of reclamation.

Coal mining in West Virginia is most concentrated in the southern coalfields, one of the poorest and least healthy areas in the U.S. Epidemiological studies have associated coalfield residents, particularly in areas using the mountaintop removal mining method, with the following poor health outcomes compared to other central Appalachian residents: total mortality for all causes (Hendryx, 2011), birth defects (Ahern et al., 2011); chronic cardiovascular disease (Esch and Hendryx, 2011; Hendryx and Ahern, 2008; Hendryx and Zullig, 2009); hypertension (Hendryx and Ahern, 2008); chronic obstructive pulmonary disease (COPD) and other respiratory conditions (Hendryx and Ahern, 2008; Hendryx and Luo, 2014); hospitalizations for hypertension, COPD, and general respiratory conditions (Hendryx et al., 2007; Brink et al., 2014); self-reported cancer rates (Hendryx et al., 2012); cancer mortality (Hitt and Hendryx, 2010; Buchanich et al., 2014); lung cancer (Hendryx et al., 2008); chronic kidney disease (Hendryx and Ahern, 2008); angina or chronic heart disease (Hendryx and Zullig, 2009); heart attack (Hendryx and Zullig, 2009); mortality for chronic heart, kidney, and respiratory disease (Hendryx, 2009); self-reported respiratory, cardiovascular, skin, gastrointestinal, muscle, eye, ear, nose, and throat (Hendryx, 2013); and an overall poorer health-related quality of life (Hendryx, 2013; Zullig and Hendryx, 2011, 2010). Other research through the Appalachian Research Initiative for Environmental Science (ARIES)—funded by the coal industry—has found no elevated mortality for coalfields residents compared to other Appalachian residents (Buchanich et al., 2014; Woolley et al., 2015), birth-defects (Lamm et al., 2015), or circulatory hospitalizations (Talbott et al., 2015). Research financially supported by the National Mining Association found increased mortality rates in coalfields areas associated with "economic and cultural disadvantages" in the region (Borak et al., 2012). Physical pathways for which surface

[1] As codified in SMCRA under 30 U.S.C. § 1259 and West Virginia law under W.V. Code § 22-3-11).

[2] As reported by WVDEP to the *Report of the Special Reclamation Fund Advisory Council*, January 13, 2014.

[3] Moreover, West Virginia does not request information about the total amount of self-bonds extended in other states. At the time of Alpha's bankruptcy, it also had $411 million in self-bonds in Wyoming.

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