

Executive Summary

“All of the Department’s monitoring at the numerous ash reclamation sites **demonstrates no harmful components leaching into the groundwater due to ash.**”

“An investigation of [ash placement sites in Western Pennsylvania where groundwater contamination was alleged] revealed that water contamination is resulting from acid mine drainage that existed prior to the re-mining and reclamation of the sites, and that this degraded water has not been further impacted by the use of coal ash.”

Pennsylvania Department of Environmental Protection, Fact Sheet, “*Coal Ash and Dredge Sediment in Mine Reclamation*,” August 2003. (Emphasis added.)

For over 20 years, the Pennsylvania Department of Environmental Protection (PADEP) has been promoting the placement of large volumes of coal combustion waste (CCW) in active and abandoned coal mines as a method of addressing acid mine drainage, increasing soil fertility and filling mine pits and voids. There is growing concern, however, that placement of CCW in mines may be contaminating groundwater and surface waters with harmful levels of toxic chemicals, including aluminum, chloride, iron, manganese, pH, sulfate, total dissolved solids and toxic levels of trace elements such as arsenic, nickel, selenium, lead, mercury, molybdenum, cadmium, copper, chromium, antimony, boron and zinc. Congressional concern about potential adverse impacts of coal ash in mines lead to the recent study of this issue by the National Academies of Science. Many have raised concerns that CCW contamination could result in water quality that is more deteriorated than the adverse conditions created by acid mine drainage.

The purpose of this report is to test PADEP’s oft-repeated claim that the use of CCW in coal mine reclamation, as permitted by the PADEP under their beneficial use program, does not result in the pollution of groundwater or surface water. The report tests this claim by examining monitoring data from 15 minefill sites to determine if any degradation of groundwater or surface water has occurred. The hypothesis being tested is whether the data allow one to state definitively, as does PADEP, that the use of CCW has not caused or contributed to contamination. Even if the data are merely inconclusive, this hypothesis must be rejected and the practice of CCW minefilling, as permitted in Pennsylvania, may not be declared a proven success from the standpoint of water quality protection.

It is fair to state the hypothesis this way and to assign the “burden of proof” in this manner for two reasons. First and most fundamentally is the “precautionary principle,” a rule of decision under which doubts are resolved against an activity that might cause harm to people or the environment and which places the burden of proof on the

proponent of the activity to demonstrate that it is safe. Second, the hypothesis fairly states the claim being made by PADEP, which has become a focal point of the national debate over the impacts and regulation of CCW minefilling.

The thorough and detailed analyses in this report, nevertheless, allow the authors to go further than merely rejecting the above hypothesis. Our report states affirmatively that the monitoring data indicates permitted CCW minefilling in Pennsylvania has resulted in groundwater and/or surface water contamination. The data reveal such water quality degradation at two-thirds of the mine sites analyzed in this report.

This report examines 15 coal mining permits issued by PADEP allowing the placement of CCW. To arrive at the 15 mine sites, 110 coal mining permits allowing CCW placement in the bituminous and anthracite coalfields were inspected for monitoring data. Twenty-one permits were reviewed for closer analysis on the basis of coal ash tonnage, number of monitoring points and duration of monitoring. Nineteen of these had adequate levels of information to facilitate an examination of possible impacts of CCW on groundwater quality and, in some instances, on surface water quality. Fifteen permits were chosen to review for this report because of time and resource constraints.

Detailed analysis of the 15 minefills revealed: (1) characterization of sites insufficient to establish monitoring systems that will detect pollution from ash; (2) inadequate numbers of groundwater and surface water monitoring points; (3) not enough baseline data; (4) insufficient frequency of data collection; (5) significant lapses in data collection; (6) analysis of monitoring samples at detection limits too high to monitor the creation of toxic conditions; (7) failure to monitor indicator parameters that would readily differentiate ash contamination from mine pollution; (8) inadequate records describing dates, quantities, and locations of ash placement; and (9) the absence of monitoring after the completion of ash placement. Despite these deficiencies, which occurred in varying degrees in all permits, substantive evidence exists of degradation of groundwater and/or surface water from CCW *in two-thirds of the permits*, based on rising trends in concentrations of CCW contaminants at relevant ash monitoring points. Specifically, the authors found that in 10 of the 15 minefills studied, coal ash contributed to degraded water quality. In three other cases, degradation was occurring but the data were insufficient to differentiate the causes of the degradation. For one minefill, water quality improvement occurred in some parameters as a result of gob removal and ash placement while coal ash appeared to cause degradation in other parameters, and at one mine site, water quality improvement occurred as a result of re-mining and ash placement. Even in these last two cases however, the authors found that post-project monitoring was far too brief to assert that water quality improvements were more than temporary.

The import of this finding goes far beyond the implications for the health of Pennsylvania waters. There is currently a national debate over the need for federal regulation of placement and disposal of CCW in mines. Central to that debate are the two key issues explored in this report. The first is the adequacy of state programs to prevent adverse environmental impacts from CCW placement. The second is the degree to which coal ash placement poses a threat to the environment.

This debate is not a new one. The United States Environmental Protection Agency (US EPA) expressed serious concern over CCW minefilling in its 2000 Regulatory Determination on Wastes from the Combustion of Fossil Fuels.¹ US EPA specifically noted that more information was needed on minefilling practices, impacts and “the ability of government oversight to ensure that human health and the environment are being adequately protected.” The Agency stated:

“We are aware of situations where coal combustion wastes are being placed in direct contact with ground water in both underground and surface mines. This could lead to increased releases of hazardous metal constituents as a result of minefilling. Thus if the complexities related to site-specific geology, hydrology, and waste chemistry are not taken into account when minefilling coal combustion wastes, we believe that certain minefilling practices have the potential to degrade, rather than improve, existing groundwater quality and can pose a threat to human health and the environment.”²

Recognizing the importance of this debate, Congress in 2004 directed the National Academies of Science (NAS) and its National Research Council to study the issue of coal placement in mines. The NAS Report, published in 2006, concluded that “that the presence of high contaminant levels in many CCR [coal combustion residue] leachates may create human health and ecological concerns at or near some mine sites over the long term.”³ The National Research Council further concluded that placement of CCW in coal mines may be a viable option *only if*:

“(1) CCR placement is properly planned and is carried out in a manner that avoids significant adverse environmental and health impacts and (2) the regulatory process for issuing permits includes clear provision for public involvement.”⁴

Lastly, the NRC concurred with USEPA that enforceable federal regulations were necessary to guarantee that state programs minimized such threats to health and the environment by implementing safeguards, such as sufficient monitoring, site and waste characterization, isolation measures, corrective action standards and public participation.

The authors of this report recognize that Pennsylvania, as well as other states in the Appalachian Region, face serious environmental and public safety concerns as a result of coal mining. This legacy includes acid mine drainage, dangerous headwalls, and blighted landscapes. Yet it is also the authors’ opinion that the solution to these problems should not create additional, serious environmental problems that threaten future

¹ U.S. Environmental Protection Agency, Regulatory Determination on Wastes from the Combustion of Fossil Fuels, 65 Federal Register 32214, May 24, 2000.

² *Id.* at 32228.

³ Committee on Mine Placement of Coal Combustion Wastes, National Research Council. , Managing Coal Ash Residues in Mines. National Academies of Science, March 1, 2006 at page 1.

⁴ *Id.*

generations. It is with this concern that this detailed analysis of Pennsylvania's minefilling program was undertaken.

PADEP Secretary Kathleen McGinty has commented, "DEP has more than 20 years in mine reclamation expertise. Our policies and procedures are the best in the nation, literally the model for federal rules."⁵ This report examines this model very closely and finds it lacking in several critical respects, including the failure to recognize degradation from the use of CCW, the failure to implement a program where such impacts are easily detected and the failure to prevent such degradation. It is important that the nation learn from the 20 years of CCW minefilling in Pennsylvania. Further examination of the degradation of groundwater and surface water occurring from CCW placement in Pennsylvania coal mines and of the deficiencies of the PADEP beneficial use program will inform the national debate, lead to improvements, and afford greater environmental protection in Pennsylvania, and by example, the nation.

Based on the findings of this report, the authors make the following specific recommendations for the Pennsylvania Coal Ash Beneficial Use Program:

- 1. PADEP should require that accurate and thorough waste characterization is completed prior to permitting the use of coal ash in mines.**
- 2. PADEP should require that accurate and thorough site characterization is completed prior to permitting the use of coal ash in mines. PADEP should require the integration and updating of waste and site characterizations as new information becomes available so that placement of wastes with clearly dangerous leaching potentials in specific sites is avoided, site hydrologies are understood and monitoring is adjusted to account for changes in water movement.**
- 3. PADEP should require comprehensive and long-term water quality monitoring at all coal ash mine placement sites.**
- 4. PADEP should include enforceable corrective action standards for coal ash parameters at monitoring points in all coal ash mine placement permits and address degradation that occurs from coal ash at mine placement sites.**
- 5. PADEP should issue NPDES permits for mine ash placement sites that monitor and control ash contaminants in surface discharges from these sites.**
- 6. PADEP should require financial assurance sufficient to address potential long-term water quality problems at coal ash mine placement sites.**
- 7. PADEP should require isolation of coal ash from groundwater at all coal ash mine placement sites.**
- 8. PADEP should update its permit system with a modern database that is better organized and more publicly accessible.**

⁵ Statement of Kathleen A. McGinty, Secretary, Pennsylvania Department of Environmental Protection, before the House Environmental Resources and Energy Committee, April 1, 2004.

- 9. PADEP should require that all coal ash placement permits in mines actually achieve a measurable beneficial result.**
- 10. PADEP should require ecological monitoring at all coal ash mine placement sites as a condition of the permit.**
- 11. PADEP should establish enforceable requirements for coal ash placement permits in state regulations to replace the current system of unenforceable guidance documents.**
- 12. PADEP should conduct a statewide programmatic review of its coal ash beneficial use program to determine whether any coal ash minefills permitted by the state are posing a threat to health or the environment and reevaluate the purpose and justification for this program.**
- 13. PADEP should establish a program to promote the safe reuse of coal ash, *prior to issuing or renewing permits for coal ash minefills*, and only if such safe and beneficial recycling is unavailable, permit the placement of coal ash in Pennsylvania mines with these aforementioned safeguards.**

This is a very critical time in this important debate. The Office of Surface Mining recently published in March 2007 an advanced notice of proposed rulemaking concerning placement of coal ash in mines.⁶ The Office of Surface Mining's proposed rulemaking is purportedly a response to the National Academies of Science's 2006 Report, yet its proposal, which recommends only minimal changes to the federal Surface Mining Control and Reclamation Act, stands in direct contravention of the National Academies' directives. We hope that the conclusions of this report, in terms of the substantial degradation found at mine sites from coal ash placement, the serious deficiencies found in Pennsylvania's program and the specific recommendations articulated above, will inform this federal rulemaking so that stronger federal requirements are indeed forthcoming before additional damage occurs throughout the United States.

⁶ Advance Notice of Proposed Rulemaking on Placement of Coal Combustion Byproducts in Active and Abandoned Coal Mines, 72 Fed. Reg. 12026, March 14, 2007.



CAPTION - Winter in the massive Springdale Pit portion of the Lehigh Coal and Navigation (LCN) surface mine. This pit has a capacity of 80 million cubic yards (one cubic yard of ash is roughly equivalent to one ton) which the operator has advocated filling with contaminated freshwater, brackish, and marine dredge materials, cement kiln dust, lime kiln dust and coal ash, and received a statewide General Permit from PADEP for such purposes in 2004. A permit issued in 2005 to expand ash disposal operations in this pit from 300,000 tons of ash to 1 million cubic yards of ash and dredge material annually was appealed by a local environmental group and has been returned by LCN to PADEP. This site was not studied in the report. Photo from PADEP provided by Army For a Clean Environment, Tamaqua, PA.