

Coal Ash at Coal Mines – Placement, Standards, Controls and Uses



Recent events surrounding the breach of a coal ash retention pond at a Tennessee Valley Authority power plant have renewed interest in coal ash placement and use practices. The purpose of this paper is to provide information about how coal ash is placed and used at coal mine sites.

I. Coal ash - what is it?

The combustion of coal in coal-fired power plants produces several materials, including: fly ash, bottom ash, boiler slag, and flue gas desulfurization material. Together, these materials represent what is generally referred to as coal ash, or sometimes as coal combustion byproducts (CCBs). Each material has unique characteristics that make it valuable for certain beneficial uses, including as a fill material for mine reclamation and subsidence control; for achieving mine reclamation requirements under the Surface Mining Control and Reclamation Act (SMCRA); for the elimination of dangerous highwalls; for producing concrete and Portland cement; as a low permeability capping material; to produce road base materials, structural fills and embankments; to make wallboard; as an additive to improve soil chemistry and reduce acidity; and to neutralize acid mine drainage. According to the American Coal Ash Association, 43 percent of CCBs produced in 2006 were beneficially and safely reused. To read more about these characteristics and beneficial uses visit the Environmental Protection Agency's (EPA) web site at: www.epa.gov/epawaste/conservation/rrr/imr/ccps/index.htm.

II. EPA has determined that CCBs are not hazardous wastes

Coal ash does not exhibit any characteristics of hazardous wastes.

The U.S. Environmental Protection Agency (EPA) has extensively evaluated whether large-volume wastes generated by the combustion of coal should be subject to hazardous waste regulations under Subtitle C of the Resource Conservation and Recovery Act (RCRA). EPA has repeatedly held that these materials do not exhibit any of the four characteristics of hazardous waste: corrosivity, reactivity, ignitability and toxicity. EPA submitted these findings on

the non-hazardous nature of these materials to Congress in 1988 and 1999. EPA further concluded in two regulatory determinations, published in 1993 and 2000, that these materials do not warrant regulation under RCRA's Subtitle C hazardous waste regulations.

For EPA's non-hazardous waste section: www.epa.gov/osw/nonhaz/industrial/special/fossil/index.htm.

III. Coal ash and mine reclamation

Among the many beneficial uses of CCBs is its use in reclamation activities following mining as a fill material for restoring the land to its original contours as required by federal law. The National Academy of Sciences' (NAS) March 1, 2006, comprehensive report on mine placement of coal ash concludes that placing CCBs in coal mines as part of the reclamation process is a viable management option when conducted in a manner that (a) avoids significant adverse environmental and health impacts and (b) includes public involvement in the regulatory permit process. NAS' conclusions are strongly supported by findings of the Office of Surface Mining that the agency is "unaware of any scientific data where CCB fills at any SMCRA mine site has resulted in the generation of leachate that would threaten public health or degrade the environment."

For information from the NAS report: www.nap.edu/catalog.php?record_id=11592.

It is extremely important to allow for the continued placement and beneficial use of CCBs at coal mines. In addition to the benefits listed above, prohibiting placement of this material in mines would require millions of tons of such materials be placed instead in new landfills and impoundments, causing unnecessary land disturbances.

IV. EPA cites beneficial uses of coal combustion products

EPA strongly encourages the beneficial reuse of CCBs through a cooperative effort with federal and state agencies and industry called the Coal Combustion Products Partnership (C2P2). Through C2P2, EPA promotes the beneficial reuse of CCBs to achieve a wide range of environmental and economic benefits, such as conservation of natural resources and reduction in land disposal and its attendant financial savings. EPA recognizes the follow-

ing beneficial reuses: raw feed for cement clinker, concrete, structural fill, road base/sub-base, soil-modification, mineral filler, snow and ice traction control, blasting grit and abrasives, roofing granules, mining applications, wallboard, waste stabilization/solidification, soil amendment and agriculture. EPA cautioned in its 2000 regulatory determination that beneficial reuse of these materials could be obstructed if RCRA's Subtitle C (hazardous waste) regulations are applied to CCBs.

For C2P2 program: www.epa.gov/osw/partnerships/c2p2/index.htm.

V. Recycling of coal ash should be encouraged, not avoided

The Environmental Council of the States (ECOS), an association of state environmental regulators, has concluded that a vibrant market for coal ash would lead to better waste management than a new and potentially duplicative regulatory regime. Specifically, ECOS cautioned that federal regulation of CCBs as “hazardous waste” is unwarranted, that the existing state framework is adequate for regulating coal ash, and that EPA should instead join with states to develop a national framework for promoting beneficial uses of CCBs (ECOS resolution, September 2008).

VI. The placement or use of coal ash on mine sites is regulated under both federal and state regulatory programs

Unlike the situation at the Tennessee Valley Authority facility, coal ash is not typically stored in impoundments at mine sites. In circumstances where a coal ash impoundment is located on a mine site, the design, construction and operational practices for such structures are subject to federal regulatory requirements of both the U.S. Department of Labor's Mine Safety and Health Administration (MSHA) and the U.S. Department of the Interior's Office

of Surface Mining Reclamation and Enforcement (OSM). These regulatory programs complement one another: MSHA's regulatory focus is on the design and integrity of the structure for the protection of the health and safety of miners; OSM regulates impoundment construction, design and operation to prevent failures that could adversely affect downstream water quality or the environment. MSHA and OSM regulatory programs, contained in 30 CFR Parts 77 and Chapter VII, Part 780 and 816 respectively, define engineering standards and performance criteria to achieve stable operational conditions for the protection of miners. These authorities also set standards to limit potential environmental impacts on surrounding communities. Impoundment design plans, prepared under the direction of certified and registered professional engineers and geologists, are complemented by rigorous inspection procedures followed by federal and state inspectors.

Placement or use of coal ash at coal mines in non-impoundment settings is subject to state and/or federal regulation. Leachate tests are required as part of the SMCRA permit application and groundwater monitoring is also necessary to comply with existing state and federal water quality laws. Groundwater monitoring is specifically required by OSM regulation and must be submitted to the state at least once every three months (see 30 C.F.R. § 816.41(c)). SMCRA regulations require all surface mining activity, including placement of CCBs, to be conducted so as to minimize disturbance of the hydrologic balance in the permit and adjacent area and to prevent material damage to the hydrologic balance outside the permit area (see 30 C.F.R. § 816.41(a)). The Clean Water Act provides additional protections of surface waters through federal and state water quality laws and requires mine operators to meet strict water quality standards. State water quality programs, along with the Federal Safe Drinking Water Act, offer further groundwater protection (see 30 C.F.R. 816.42; 40 C.F.R. Part 434).

January 2009