Beneficial Use Case Study

R. Paul Smith Power Station Ash Beneficiation

Coal Combustion Product Type
Class F Fly Ash, Bottom Ash

Project Location
Williamsport, Maryland

Project Participants
Paul Blum Company, FirstEnergy, Maryland Environmental Restoration Group, C. William Hetzer Inc.

Project Completion Date
2020

Project Summary
In 2012, FirstEnergy closed down its R. Paul Smith Power Station, in Williamsport, Maryland, in lieu of retrofitting the plant to comply with Environmental Protection Agency regulations scheduled to take effect three years later. The coal-fueled plant, used only sparingly in its later years, had been disposing coal ash in surface impoundments and a landfill for several decades. Owing to demand from local cement manufacturers, in 2009 the plant's owners, in partnership with the Maryland Environmental Restoration Group (MERG), began excavating the ash and selling it to cement producers as kiln feedstock.

Project Description
The R. Paul Smith Power Station generated electricity from bituminous coal for 85 years, ending in 2012 when its owner closed the plant. Since 1947, fly ash and bottom ash from the plant had been conveyed by sluice to settling ponds in West Virginia, after which they were transferred to an adjacent dry landfill. Up to 50,000 tons of coal ash were generated annually prior to the plant's shutdown.

As market supplies of coal ash began to tighten following the closure of coal-fueled power plants, the plant's owners in 2008 partnered with MERG, a coal ash marketing company, and local cement producers to investigate the potential for use of its landfilled ash. The market demand came primarily from cement manufacturers in the Washington, D.C., and Frederick, Maryland, metropolitan areas.

Sampling and testing of the coal ash were carried out to assess the material's suitability in cement manufacturing—with mineralogy testing to determine, among other characteristics, its levels of silica dioxide, lime, iron oxide, aluminum trioxide, magnesium oxide, sodium oxide, potassium oxide, water, total alkalis, and loss on ignition. After tests had determined the ash's suitability for cement production, and state environmental regulators had authorized its excavation, the contractor began removal of the ash and its delivery to cement manufacturers, who combined the material with limestone and other feedstock. Landfill excavators used onsite blending to ensure the coal ash and shale levels would meet cement manufacturers' chemistry requirements.

Starting out as several truckloads per week to meet the peak needs of regional cement plants, the project soon scaled up to 450,000 tons of coal ash excavated annually. Six years into the operation, approximately 1.5 million tons of comingled Class F fly ash and bottom ash had been removed from the 30-acre landfill. It is estimated that the total amount excavated and beneficially used for cement manufacturing over the decade-plus since operations began is in the vicinity of 3.6 million tons. The project's success has piqued cement manufacturers' interest in locating additional sources of legacy coal ash for use in their operations.