Coal Flyash Used for New Environmental Coating Product

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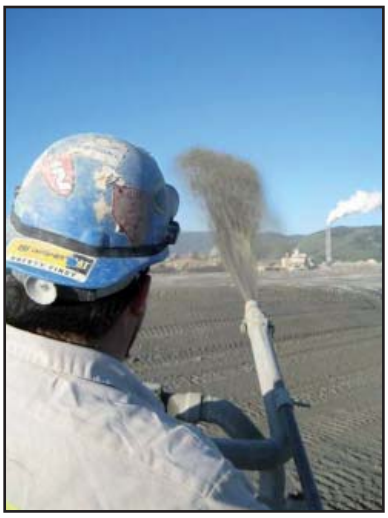
INTRODUCTION



Posi-Shell® Application

Coal utility flyash has been used for several decades in an environmental coating product known as Posi-Shell Cover. Posi-Shell Cover is a spray-applied mineral mortar coating similar to stucco, utilized for waste cover, erosion control, dust control, and contamination containment. The benefits of this type of cover are: ease of use, low cost, and excellent performance. Beginning in the 1990's, a New York State coal-fired utility (originally New York State Electric & Gas) began to utilize Posi-Shell Cover to control dust from a flyash landfill near a lake in upstate New York. NYSE&G also experimented with the use of this cover to control dust from coal piles and to reduce water infiltration into coal piles. This utility is now owned by AES Cayuga, LLC and continues to use a newer version of Posi-Shell Environmental Coatings for dust control on their flyash landfill.

Covered Flyash Landfill

Coal flyash has also been used in the past decade as a component of spray applied waste cover at municipal solid waste landfills. Typically the Posi-Shell mixture employing coal flyash also included a certain amount of Portland cement if the flyash was not self-hardening and the mixture also included specialized treated polyester fibers for strength and crack control.

Close-up of Fresh Coating

BACKGROUND

Historically there have been some cases where the flyash produced by the coal utility was cementitious enough that additional Portland cement was not required. In the 1990's, a trial was conducted at the Phelps Dodge Morenci Copper Mine in Morenci, Arizona utilizing a flyash from Tucson Electric Power which exhibited very favorable cementitious properties. In most cases, however, the

Mine Erosion Control Application

addition of Portland cement is required and typically these covers have been used in municipal solid waste (MSW) landfills for daily cover. An example of this type of use is the Berkley County Landfill in South Carolina, utilizing a Portland cement/flyash blend with the flyash provided by SanteeCooper of Moncks Corners, South Carolina. These mixtures have historically involved blends of 5-20% Portland cement with flyash in a water slurry with a total solids content of about 50-55%. Additionally about 1% of treated polyester fibers are added for tensile strength and crack control.

Polyester Fibers

NEW PRODUCT

During recent years a new Posi-Shell product has been developed by Landfill Service Corporation which does not require Portland cement as an admixture to the flyash. This product can utilize any grade of flyash, even those containing high carbon. The admixtures to the flyash-water slurry include a single bag mixture of specialized polymers and fibers which are economical and easy to mix. The resulting cover has proven to be rain resistant, even resistant to rain water erosion during application of the slurry itself, as well as resistive to later rainfall events. The cover has a desirable flexibility and is thin yet durable. The primary application is for dust control on coal ash landfills. An additional secondary application is for daily cover on municipal solid waste landfills.

MSW Landfill Test Application

A field test to verify the practicality, economics, and performance of this new product was initiated at the Washington County Landfill in St. George, Utah during late 2010 and continued into March of 2011. The product utilized flyash provided by the Reid Gardner Power Plant in Moapa, Nevada. This flyash had a high carbon content and was a dark black color. It was a relatively low value flyash for other uses, and therefore this application represented a desirable beneficial use of an otherwise generally non-usable type of fly-

Finished Daily Cover on MSW Landfill

ash. The resulting mixture was easy to use and adhered well on the solid waste. It had a high degree of opacity and successfully performed the five functions of daily cover which are: 1) litter control; 2) odor control; 3) vector control; 4) non-flammability; and 5) scavenger control.

The cover product comprising flyash, fibers and polymers proved to be economical compared with the cost of soil covers and additionally provided a very large disposal volume conservation benefit which has very high economic value to landfill operators.

The beta testing phase in Washington County, Utah indicates that this product can be successfully and economically applied for both flyash and ash landfill cover, as well as daily and intermediate cover for municipal solid waste landfills.

Based upon the positive field tests, AES of Puerto Rico is making application to the Puerto Rican Regulatory Authorities for application of this technology to MSW landfills in Puerto Rico using the coal utility flyash generated by AES.