Bottom Ash Fines as a Soil Amendment for Turfgrass and Site Closure – Laboratory and Mesocosm Studies at PPL Brunner Island and Montour Steam Electric Station

John K. Buck, CPSSc[1] and Larry L. LaBuz[2]

[1]Civil & Environmental Consultants, Inc., 333 Baldwin Road, Pittsburgh, PA 15205;
[2]PPL Generation, LLC, 2 North Ninth Street, Allentown, PA 18101

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ABSTRACT

PPL beneficially uses nearly 100 percent of the coal ash produced at its Brunner Island and Montour power plants. Until recently, fines from washing bottom ash for the aggregate market have been a waste product. Laboratory studies demonstrated that bottom ash fines ("Sand Fines") could be mixed with fine textured soils to improve the plant-available water holding capacity (PAW) and permeability of soils and reduce borrow soil requirements. Beginning in 2002, 1:1 mixtures of Brunner Island Steam Electric Station (York Haven, Pennsylvania) Sand Fines and soil were successfully used for construction of the Phoenix Links golf course.

To develop quantitative data to support expanding the Sand Fines beneficial use program, and to identify the best ratios of Sand Fines and soils in mixtures, laboratory and outdoor mesocosm (110 gallon barrels used as pots) studies began in May 2004 using Sand Fines from Brunner Island and Montour (Washingtonville, PA) SES. New studies are exploring agronomic and hydrologic performance of perennial ryegrass established in pure soil and several ratios of Sand Fines (25%, 50%, and 75%) and soil. Rainfall, other meteorological parameters, soil temperature, and soil volumetric moisture content are being continuously monitored using an array of sensors in each pot and are being used to compare water availability and rate of drainage in each of the soil treatments. Plant growth and plant tissue uptake of major and minor nutrients is also monitored. Following the mesocosm studies, several treatments will be selected for construction of full-scale soccer fields and similar monitoring regimens.

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