An Integrated Approach to Processing of Coal Combustion Ash and Organic Bio-solids

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ABSTRACT

An integrated separation process technology for the treatment of coal combustion by-products and organic sludge is presented. The process provides for the economically viable and environmentally sound utilization of nearly 100% of coal combustion byproducts. The major goals were to manage and consume the huge inventories of combustion byproducts, reduce major organic waste streams and create new jobs. A flowsheet for a wet separation pilot plant was designed after bench-scale testing. The purpose of the pilot plant was to confirm the design data and parameters on a continuous basis, to provide reliable operation data for commercial plant design, establish design criteria, operation parameters, process efficiency and preliminary economic and market feasibility. In addition, the pilot plant produced bulk quantities of the multiple products for testing and market analysis. The integrated process consisted of wet separation technology to produce bottom ash, low LOI fly ash, high and intermediate carbon products and a dry process for lightweight aggregate (LWA). The results of the bench-scale testing and the pilot plant testing are presented together with preliminary economic and marketing initiatives for commercialization. The integrated process could separate coal combustion ash into bottom ash, high carbon product and low LOI fly ash and produce LWA of the desired size and shapes, strength, loose density, specific gravity and gradations. A high carbon product with nominal 72% carbon and a low LOI fly ash with 2.5% carbon were produced. Synthetic LWA with 40-50 lb/cu ft loose density were also produced from coal ash and paper mill sludge.

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