

Properties and Utilization of Ash from Biomass and Coal

Bruce Dockter, Kurt Eylands, Joshua Mason, and Debra F. Pflughoeft-Hassett

University of North Dakota Energy & Environmental Research Center, 15 North 23rd Street, Grand Forks, ND 58203

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ABSTRACT

Under the Energy & Environmental Research Center's Center for Biomass Utilization, a study of bench-, pilot-, and full-scale ash samples from cocombustion of biomass and coal was performed. Initial emphasis was focused on the use of full-scale coal–biomass fly ash as a mineral admixture in concrete. Samples were subjected to standard American Society for Testing and Materials (ASTM) tests to evaluate parameters listed in ASTM C 618 as well as available alkali, sulfate resistance, and alkali–silica reactivity testing. Several samples were also subjected to characterization by computer-controlled scanning electron microscopy, particle size, and x-ray diffraction. Results of C 618 testing indicated that some coal–biomass fly ash samples met the standard specification for use in concrete; however, several samples did not meet the specification. Those not meeting C 618 specifications failed for a variety of parameters but they failed most typically on fineness, strength activity index, and water requirement. A preliminary evaluation of the results indicated that the type of biomass and the percentage of biomass used impact the characteristics of the fly ash relative to its appropriateness for use as a mineral admixture in concrete.