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CORRELATION OF STABILITY/RHEOLOGY RELATIONSHIP WITH COAL
PROPERTIES AND CHEMICAL ADDITIVES.

Quarterly Progress Report
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OVERALL OBJECTIVE:

The overall objective of this project is to perform experiments to evaluate the necessary boundary conditions in the preparation and utilization of Coal Water Slurries (CWS) and also develop a data base for the conceptual analysis of a prescription to predict slurry quality for a given coal candidate.

PROJECT STATUS:

Examination of the characteristic coal properties on slurry quality reveals that the stability of the slurry is greatly affected by the presence of mineral matter in the coal(1). These minerals are most often metal oxides, silicates and sulfides. The presence of these minerals can confer a local polar character to the coal surface and enhance wetting. Also, the leaching of these mineral ions into the aqueous phase must have a direct impact on the electrical charge born by the particles in water. The charge may change over a period of time as leaching continues, and thus alter the interactions which are responsible for the rheological and sedimentation behavior of the slurry.

For the past three months, Atomic absorption measurements have been made in order to determine the amount of the trace elements in the coals under study. The coals that have been analyzed are Elkhorn #3, PSOC 1475 and Kentucky #9, PSOC-1494.

The procedure used is outlined below

Sample
↓
Ground to pass through 100 mesh
↓
Wet digestion of 4.0 g sample using 100 mL
conc. HNO_3 followed by 60 mL of 30 % vol H_2O_2 ,
filtered and volume made up to 1000 mL

Table 1.

Trace Element Analysis (Flame Atomic Absorption)

(Elkhorn # 3. PSOC 1475)

Trace Element	ppm/gm coal
Cr	5
Cu	8
Ca	38
Fe	54
Ni	13
V	<1

(Kentucky #9, PSOC 1494)

Ca	66
Cr	4
Fe	120
Mn	15
Ni	18
V	<1

Reference

1. Ohene, F., Third Quarterly Report. DOE/DE-FG22-88PC925 (1989).

V, Cr, Mn, Co, Ni, Cu, Zn, Ca, and Fe were analyzed using flame atomic absorption. The accuracy of the method was determined by the analysis of EPA trace metals I, II, and III obtained from Cincinnati, Ohio. Satisfactory agreement was obtained for the elements tested.

The results obtained are as shown in Table 1.

Also, during this period an article has been written for presentation at the Sixteenth International Conference on Coal Slurries and Technologies. This is enclosed in the Appendix.

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