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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:

During the past quarter, zeta potential and static stability measurements of the coal slurries, PSOC-1487, 1475 and 1493 have been made using poly naphthalene ammonium sulphonate, A-23, A-23S MCG-32A-LS and Igepal 990 as dispersants and at a pH of 10.

A preliminary study of the static stability measurements were made in a column having two outlet ports separated by a distance of 1 ft. Samples were withdrawn periodically from these ports and the solid content profile was determined for an initial period of one week.

Based on the results obtained from this preliminary study, larger samples were prepared and the stability measurements made in a 6 ft column having three outlet ports with a water jacket surrounding it.

Zeta Potential measurements were made prior to the stability studies.

RESULTS:

Data obtained from the electrokinetic study indicate that better electrokinetic response is obtained when poly ammonium naphthalene sulfonates are used as dispersants (Table 1.)

The stability study shows that when a 60 % slurry is prepared using PSOC 1493 as the coal source, a non flowable paste is obtained from the

bottom port within 24 hours, whereas a slurry made using PSOC-1475 and 1487 retain their fluidity for a period of two weeks. The settling rate of the 1487 slurry shows a greater degree of settling than that of 1475. The effectiveness of the additives in dispersing the coal particles is found to be in the order MCG-32A-LS>A-23-S>A-23>Igepal 990

PLANS FOR NEXT QUARTER

Plans are currently under way to purchase a Haake RV-20. This will allow simultaneous characterization of both the rheological and stability characterization of the slurry. Also four additional coals have been received from the Penn State Coal Data Bank. This will increase the volume of samples being investigated under identical conditions and preparation and thus provide a more meaningful results to the analytical expression being sought.

Table 1.

Zeta Potential Measurements of 50% Coal Slurries at pH=10 and
Additive Concentration of 0.25 % Coal Weight.

Zeta Potential	PSOC-1475	PSOC-1487	PSOC-1493	Additive
(MV)				
	-29 <u>±</u> 5	-23 <u>±</u> 4	-25 <u>±</u> 6	A-23
	-33 <u>±</u> 7	-21 <u>±</u> 3	-23 <u>±</u> 4	A-23-S
	-18 <u>±</u> 6	-14 <u>±</u> 3	-9 <u>±</u> 2	Igepal 990
	-26 <u>±</u> 4	-19 <u>±</u> 5	-21 <u>±</u> 6	MCG-32A-LS

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