WHITE ROCK ENGINEERING, INC.

November 9, 1987

Mr. Fred Schmidt
E. I. Du Pont de Nemours Company
Experimental Station - B/304
Wilmington, DE 19898

Dear Fred;

Following up our discussion on the measurement of low-abrasivity materials, we have done considerable work with such materials, but I had to refresh my memory because it has been about six years since we were involved.

We worked with a client on the development of a low-value Miller Number test and came up with the use of a 316 stainless steel wear-block which, we determined by comparison tests, has a wear-rate of 4.3 time that of 27% chrome iron, the "standard" for Miller Number test. Preliminary tests on the activated carbon showed little or unmeasureable mass-loss with 27% chrome iron so we tried low carbon steel with catastrophic results - an excessive rate of mass-loss was experienced, no doubt due to the corrosivity of activated carbon. The 27% chrome iron is in itself somewhat corrosion resistant and such a feature is most desirable in the Miller Number test so that the corrosive effects do not override the abrasive effects. 316 stainless steel gave reasonable losses so we successfully completed a series of tests to compare the relative abrasivity of several samples of activated carbon for the client.

On Exhibit 1 we show a fictitious Miller Number of 37 calculated from losses of the 316 SS block. In Exhibit 2 the LM (Low Miller) number of 8.6 is merely the fictitious Miller Number divided by the factor 4.3, mentioned above. Note that the LM value of 8.6 is related to the true Miller Number but is considered more precise because of the wider range of losses for small changes in abrasivity at the low end of Mohs scale.

Accordingly, we feel the LM derived Miller Number, using 316 SS wear block, is a true representation of the abrasivity of low value slurries. We are confident that we could determine an accurate relative abrasivity for the gun cleaning abrasive you mentioned.

We are basing our quotation on the need to relate not only the effects of oil as compared to water but to verify the Number in relation to a "true" 27% chrome iron Miller Number.

For your information we are enclosing the description of Morganite - note the extremely high hardness. Also please find an abbreviated list of low Miller Number slurries.

We came across a description of a book on pumps (enclosed) in which you or your associates may be interested.

Sincerely,

John E. Miller, PE

QUOTATION

We are pleased to submit the following prices for performing a series of abrasivity test on your gun-cleaning abrasive (Morganite);

TEST 1 - Standard Miller Number Test; Morganite-distilled Water Slurry, 50 % by mass concentration.

TEST 2 - Standard Miller Number Test; Morganite-oil (as furnished) slurry, 50 % by mass concentration.

TEST 3 - Low Miller Number Test; Morganite-distilled Water Slurry, 25 % by mass concentration.

Test 4 - Low Miller Number Test; Morganite-oil (as furnished) slurry, 25% by mass concentration.

4 Low Abrasivity Miller Number Tests @	460.00ea	$1,840.00
24 Consulting (Estimated)	125.00/hr	3,000.00
		$4,840.00

Material required for test:
2 kg dry solid material
1 litre oil (client specification)
4 316 SS wear blocks (G75-82 dimensions)