

To K. Morton; cc: W.A. Moore; A. Hall

Date April 27, 1978

From L.J. Connell

Ref.

Subject Isokinetic Roaster Stack Gas Sampling.

Roaster stack gas emissions were sampled on April 17th and April 19th with the following projected arsenic emission rates;

<u>Sample Date</u>	<u>Total As Emission Rate</u>
April 17	0.0094 gr/scf 50.56 lb/day.
April 19	0.0054 gr/scf 28.53 lb/day.

Detailed test results are presented in Table 1.

Little credence should be placed on the April 17th test results due to the poor isokinetic conditions (52.5%) under which the test was conducted, however, the April 19th^{test} is within acceptable limits (108.3% Isokinetic). The poor correlation on the April 17th test is due to operator errors.

The baghouse conditions associated with the April 19th test are as follows;

Baghouse Temperature	225 °F
Baghouse Pressure	1.4 - 2.0 - 1.3 in. of H ₂ O.

The baghouse completed one shaking cycle during the test with the shaking mechanism in operation for 48% of the sampling period.

Particulate emission rates are a factor of 10 higher than those reported during the last half of 1977. The recent values were checked and found to be correct placing the previous year's lower particulate emission rates under suspicion.

A large proportion of the particulate matter is believed to form downstream of the baghouse. It is theorized that fine dust particles passing through the baghouse fabric act as nuclei for condensation of metal oxide (Sb and AS) vapours and elemental sulphur. The theory is supported by the coarse size of the particulate matter collected in the sampling train. The material is much too coarse to have passed

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through the baghouse fabric pore space, supporting the condensation theory or directly due to holes in the bags. The condensation theory is also supported by the chemical analyses of the particulate matter (4.3% As on April 17, 5.2% As on April 19). Baghouse dust passing through a bag hole would be expected to assay 65-75% As.

<u>Test #</u>	<u>78-1</u>	<u>78-3</u>
<u>Sampling Date</u>	<u>April 17th</u>	<u>April 19th</u>
Ambient Temp.	32°F	34°F
Stack Temp.	182°F*	182°F
Dry Gas Volume	20.895 ft ³	49.18 ft ³
Moisture Content	5.87 %	5.98 %
Stack Gas Velocity	9.13 fps	8.96 fps
Stack Gas Volume	26,199 scfm	25,655 scfm
Total Particulate wt.	0.1855 gr/scf	0.0708 gr/scf
Total As wt.	0.0094 gr/scf	0.0054 gr/scf
As to Filter and Probe	0.0080 gr/scf	0.0037 gr/scf
As to Impingers	0.0014 gr/scf	0.0017 gr/scf
As Particulate Emission Rate	43.22 lbs/day	19.55 lbs/day
As Vapour Emission Rate	7.34 lbs/day	8.98 lbs/day
Total As Emission Rate	50.56 lbs/day	28.53 lbs/day
Particulate Emission Rate	1000.8 lbs/day	374.0 lbs/day
Baghouse Particulate As Removal Efficiency	99.81%	99.91%
Baghouse Total As Removal Efficiency	99.78%	99.87%
% Isokinetic	52.54%	108.34%

*Thermocouple malfunctioned, hence, a temperature of 182°F was assumed.