

To K. Morton

Date July 6, 1978

Copies To W.A. Moore

Ref.

From L.J. Connell

Subject Visit of R. Prokopuk to Discuss EPS Stack Sampling Program.

The air pollution control section of the Edmonton environmental protection service office had originally planned to conduct a stack emission survey at Giant during the week of July 10th, 1978. Inspection of our stack sampling platform has convinced Mr. Prokopuk that our facilities are not compatible with their equipment. As a result he has requested that their scheduled date for sampling be postponed to the week of August 14th to allow them time to prepare the necessary support equipment. They are planning to spend eight days at Giant broken down as follows;

2 Days setting up equipment.

4 Days sampling: 3 As<sub>2</sub>O<sub>3</sub> runs

3 SO<sub>2</sub> runs

1 Particulate determination

1 Day packing up equipment.

1 Day overseeing our own stack sampling procedure.

In discussing our stack sampling procedures with Mr. Prokopuk he suggested three areas where we are introducing errors of varying degree. They are as follows;

1) Pitot Tube Coefficient.

We presently use a pitot tube coefficient of 0.84 which was supplied to us by the equipment manufacturer. Mr. Prokopuk feels this figure is high based upon his experience with pitot nozzles of the same diameter. EPS has each of their pitot tube nozzles calibrated in the wind tunnel facilities at the University of Alberta, thereby eliminating any error introduced by variations in the machining of the pitot nozzles. Nutech supplied us with a single coefficient for all of the Pitot nozzles supplied. R. Prokopuk suggested that we may be introducing up to 10% error through the use of 0.84 as our pitot tube coefficient.

To calibrate our own pitot tube and nozzles we should contact;

Dr. D. Wilson

Dept. of Mechanical Eng.

Chem/Min Bldg., University of Alberta.

## 2) Molecular Weight of Stack Gas.

In calculating our stack emissions we have assumed a constant molecular weight primarily as we do not have the equipment to analyze the stack gases. Mr. Prokopuk points out that their measurements of our stack gases indicates a fluctuation in the relative concentrations of  $\text{As}_2\text{O}_3$  and  $\text{SO}_2$  thereby invalidating our constant molecular weight assumption.

EPS uses a Fisher Hamilton gas partitioner to analyze our stack gas on each sampling run and thereby determine the molecular weight. The cost to Giant of similar equipment would be approximately \$3500. A cheaper although not as accurate a method of analyzing our stack gas would be to use a Fyrite apparatus and measure for  $\text{CO}_2$ ,  $\text{O}_2$ ,  $\text{CO}$  and  $\text{SO}_2$ . Molecular weight would then be determined using the formula  $0.44 \text{ CO}_2 + 0.32 \text{ O}_2 + 0.28(\text{N}_2 + \text{CO}) + 0.64 \text{ SO}_2$ . The major drawback to the Fyrite method is that the gas analyzed is wet and requires the dry molecular weight to be calculated.

## 3) Calibration of Dry gas Meter.

At present we are unable to calibrate our dry gas meter. Contact with Canadian Propane here in Yellowknife confirmed that all their gas meters have to be sent out to be calibrated. To overcome this problem we can send out our spare gas meter to be calibrated and use this meter to calibrate our stack sampling meter.

Mr. Prokopuk is going to send me information regarding a technical course on stack sampling offered in Windsor, Ontario and technical literature on sampling for stack  $\text{SO}_2$  emissions.

Larry Connell