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Stack sampling at Yellowknife.

In July of this year, Mr. Dowd and I took samples at the Giant and Con mines in Yellowknife. From our data, and on the basis of the average daily tonnage of arsenic being passed from the roasters to the cleaning plants (as calculated from monthly tonnage figures supplied by the mine managements) we computed the percentage of arsenic removed from the gas before it passed to the stack.

Results were calculated as follows:

T = arsenic discharged from roaster to cleaning plant in tons As per day.

A = Area of cross section of stack in square feet.

Vel = average stack velocity in feet per minute, as determined by pitot readings at the time each sample was collected.

Vol = total volume of gas sampled in cubic feet, calculated to stack conditions.

W = total weight, in grams, of arsenic in "Vol" cubic feet of gas.

1 ton = 907.2 x 1000 grams.

% loss of arsenic to atmosphere =

$$\frac{\text{Vel} \cdot A \cdot W}{\text{Vol}} \cdot \frac{24 \times 60}{907.2 \times 1000} \cdot \frac{1}{T}$$

Efficiency of collector = 100% -- % loss.

At Giant:

T = 10.28 tons As per day.

A = 62.45 sq. feet.

∴ % loss of arsenic to atmosphere = 0.9645 $\cdot \frac{\text{Vel} \cdot W}{\text{Vol}}$

At Con:

T = 3.42 tons per day.

A = 8.714 sq. feet.

$$\therefore \% \text{ loss of arsenic to atmosphere} = 0.4045 \frac{\text{Vel. W}}{\text{Vol}}$$

The following data were obtained:

(a) GIANT TESTS

TEST NO.	DATE	VEL. IN F.P.M	W IN GMS.	VOL IN CU.FT.	% LOSS	% COLLECTED
1	9 Jul. 54	755	6.90	66.2	75.7	24.3
2	12 " "	743	2.38	34.2	49.8	50.2
3	13 " "	767	5.27	67.8	57.4	42.6
4	15 " "	769	4.67	66.5	52.0	48.0
5	15 " "	744	5.03	66.2	54.5	45.5
6	17 " "	748	4.61	61.0	54.6	45.4
7	17 " "	753	4.54	62.6	52.7	47.3
8	19 " "	777	4.87	60.1	60.7	39.3
9	19 " "	752	5.32	58.3	66.2	33.8
					AVGE.	41.8

(b) CON TESTS

10	21 Jul. 54	873	0.22	45.9	1.69	98.3
11	22 " "	905	1.24	189.	2.39	97.6
12	23 " "	900	1.03	188.	2.00	98.0
13	26 " "	846	0.79	173.	1.56	98.4
14	26 " "	850	0.69	168.	1.41	98.6
15	28 " "	850	0.36	149.	0.83	99.1
16	28 " "	788	0.21	95.5	0.70	99.3
17	29 " "	742	1.79	60.4	0.89	99.1
18A	29 " "	1074	0.97	110.8	3.79	96.2
18B	29 " "	1109	1.19	112.2	3.79	96.2
19	30 " "	1110	0.46	44.2	4.67	95.3
					AVGE.	97.8

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