

# MEMORANDUM

To ..... A.R.C.; M.P.; A.E.L.; File.....  
From ..... H.E. Pawson.....  
Subject ..... MILL WASTE TREATMENT.....

Date..... July 13, 1970.....  
Ref. ....

After revising the Lab Helpers' schedule with a consequent new time schedule for taking waste samples, (late morning) it was discovered that mill waste arsenic was extraordinarily high. A preliminary survey revealed that the Carbon Plant wastes were responsible. To ensure that no other variables were present, a complete testing and assaying program was instituted. This report is the result. As well as the material in this report, other influencing factors were discovered; i.e. Thickener bypass to Baker Creek from flooding pump box (121 ppm). These are being rectified.

HEP/mw

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H.E. Pawson  
Mill Superintendent

To H.E. Pawson; cc: A.K. Campbell, M. Friesen

Date July 13, 1970

From M.E. Lane

Ref.

Subject MILL WASTE TREATMENT

### INTRODUCTION:

In recent years the mill waste treatment practice has entailed pumping all Arsenic-rich solutions to an agitator where they are treated with milk-of-lime. This was modified a few years ago when it was found necessary to treat the barren solution and dust residue from the Dust Treatment Plant separately from other solutions, due to the exceptionally high soluble Arsenic content (400-600 ppm).

When the Mill Plant began operation in May of this year, it was necessary to transfer this treatment process to a thickening tank. This does not give as good a result as the agitator, due to the absence of agitation, consequently the mill waste has since been found to contain slightly more soluble arsenic.

It was also discovered that during a four-hour period in the middle of the day, the waste showed a considerably higher arsenic assay, and this was found to be associated with the overflow from a thickener in the Carbon Plant which received a feed surge just prior to this period.

In view of these circumstances, it is considered necessary to modify the process, and so a series of tests were carried out to investigate the possibilities of improving the situation.

### PROCEDURE:

Samples were obtained of the mill waste solutions which need treating for arsenic and they were assayed for soluble arsenic. Each was then treated with an addition of 1.0 lb./ton of lime, as is carried out in the current process (with the exception of the Dust Treatment barren solution). A composite sample was also treated in the same manner, the solutions having been mixed in approximately the same proportion as in the current process.

The solutions were then divided into two groups, the first containing those which contained a particularly large arsenic concentration (1st Calcine Wash Thickener Overflow, Carbon Plant Thickener Overflow, and Dust Treatment Barren Solution). Tests were

then carried out to assess the amount of lime necessary to obtain a satisfactory treatment if these groups were treated separately.

INDEX TO WASTE SOLUTIONS AND THE PROPORTIONS OF EACH IN THE TOTAL AMOUNT:

1) Barren Solution	(300 T.P.D.)	18.8%
2) Calcine Residue Solution	(200 T.P.D.)	12.5%
3) Second Calcine Wash Thickener Overflow	(450 T.P.D.)	28.1%
4) Carbon Plant Thickener Overflow	(250 T.P.D.)	15.6%
5) First Wash Thickener Overflow	(350 T.P.D.)	21.9%
6) Dust Treatment Barren	( 50 T.P.D.)	3.1%

RESULTS:

<u>Sample Composition</u>		<u>Lime Addition</u>	<u>Arsenic Assay (ppm)</u>	
			<u>Before</u>	<u>After</u>
A:	Barren Solution	1.0 lb./T.	7	3
	Calcine Residue Solution	1.0 lb./T.	10	3
	2nd Wash Thickener Overflow	1.0 lb./T.	28	7
	Carbon Plant Thickener Overflow	1.0 lb./T.	283	105
	1st Wash Thickener Overflow	1.0 lb./T.	121	33
	Dust Treatment Barren Solution	1.0 lb./T.	470	177
B:	Barren Solution	1.0 lb./T.	10	1
	Calcine Residue Solution	}	10	2
	2nd Wash Thickener Overflow			
C:	Carbon Plant Thickener Overflow	1.0 lb./T.	190	70
	1st Wash Thickener Overflow	1.5 lb./T.	190	37
	Dust Treatment Barren Solution	2.0 lb./T.	190	14
		4.0 lb./T.	190	1
D:	<u>Current Process:</u>			
	Barren Solution			
	Calcine Residue Solution	0.5 lb./T.	57	33
	2nd Wash Thickener O'flow	1.0 lb./T.	60	24
	Carbon Plant Thickener O'flow			
	1st Wash Thickener O'flow			

CONCLUSIONS:

The results indicate that a satisfactory treatment can be obtained by splitting the waste products into two groups and adding 0.5 lb/ton of lime to one group and 4.0 lb/ton to the other.

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This would give an overall consumption of approximately 3000 lb. of lime per day, as compared with the current consumption of approximately 2200 lbs. per day.

It may be noted that the three solutions in Group B have a combined Arsenic assay which is below that of the current treated mill waste.

Further investigation may reveal that a reasonable treatment can be obtained with less than 4.0 lb./ton of lime.

MEL/mw

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M.E. Lane  
Mill Engineer