

MEMORANDUM

To H.E. Pawson; c.c. J.M. Mortimer; L.Price

Date

From R.J. Tucker

Ref. Fe 1

Subject Waste Treatment - Stability of Arsenic Precipitate

Three 24 hour samples each of #5 agitator effluent, #8 agitator effluent and mill waste were taken on February 2, 1975. Solutions from all 9 samples were analyzed for Cu. and As.

One sample of each stream was sealed to the atmosphere, a second sample was agitated on rolls and a third sample was allowed to stand unagitated and open to the atmosphere. The reject portion of the second sample of each stream was retained unagitated and open to the atmosphere. The solutions from these three rejects were also analyzed for Cu. and As. at the start of the test.

After 7 days the solutions from all 12 samples were again analyzed for Cu. and As.

No.	Stream	Sample Treatment	pH		As. p.p.m.		Cu. p.p.m.	
			Initial	Final	Initial	Final	Initial	Final
1.	#5	Sealed	11.2	9.8	17.7	97.0	286	325
2A.	Agitator	Agitated	11.1	9.7	11.8	172	298	270
2B		(Reject Open)	11.0	9.6	32.5	220	304	480
3.		Open	11.0	9.3	18.3	227	294	480
4.	Mill	Sealed	9.8	9.4	10.2	12.0	10.2	11.2
5A	Waste	Agitated	9.8	7.9	10.2	12.0	10.3	11.8
5B		Reject Open	9.7	8.8	9.9	8.1	10.5	5.0
6.		Open	9.6	8.1	10.2	13.2	11.2	13.9
7.	#8	Sealed	10.9	11.0	16.1	8.1	0.20	N.D.
8A	Agitator	Agitated	10.8	8.0	15.5	22.0	0.64	1.90
8B		Reject Open	10.8	7.4	14.9	N.D.	0.88	0.13
9		Open	11.1	10.1	18.2	8.4	0.33	0.16

All samples were retained in either glass or plastic containers except samples 5B and 8B which were kept in galvanized pails.

The most obvious observation is that the highest degree of resolution of precipitated arsenic is occurring in the treated waste from the Carbon Plant (#5 agitator). There is a significant re-solution of the arsenic in this stream regardless of the method of sample treatment. The As. assay on samples 2B and 3 was significantly increased by evaporation of the solutions.

The second striking result is the marked decrease in soluble arsenic in samples 5B and 8B i.e. the two samples contained in galvanized pails. In the case of the #8 agitator sample (8B) the arsenic level was reduced from 14.9 p.p.m. to <1 p.p.m. with a final pH of 7.4.

MEMORANDUM

To H.E. Pawson; c.c. J.M. Mortimer; L. Price

Date.....

From R.J. Tucker

Ref. Fe. 1 Cont'd

Subject Waste Treatment - Stability of Arsenic Precipitate

- 2 -

Agitation did not appear to affect the stability of the arsenic precipitate in the mill waste sample but had a marked effect on both #5 and #8 agitator samples. The redissolved arsenic in mill waste samples 4 and 5A was approximately equivalent to the amount of arsenic redissolved in sample 2A. The increased As. assay for sample 6 was again due to evaporation of the solution.

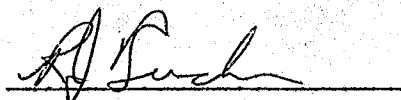
The reducing conditions of the sealed bottle tests (1, 4 and 7) tended to lessen the dissolution of the precipitated arsenic in the Carbon Plant effluent but had no appreciable effect on the samples of the other two streams.

An assessment of the causes and effects of varying pH's is difficult to achieve from these results and will not be attempted. The significant consideration being the stability of the arsenic precipitate at pH 7.4 in test 8B.

CONCLUSION:

Given the present waste treatment system and the previously apparent problem that precipitated arsenic was redissolving between the mill tailings box and the tailings pond outfalls, the first priority would appear to be an attempt to fix the arsenic precipitated in the #5 agitator.

Current testwork indicated that the use of lime and ferrous sulphate to treat the dust treatment barren will produce significantly lower arsenic levels than presently achieved in the #5 agitator. The precipitate formed appears to be much more stable.



R.J. Tucker
Mill Metallurgist.