

To H.E. Pawson; W.L. Richardson; File

Date March 24, 1972

From M.E. Lane

Ref.

Subject Use of Iron Salts in Waste Treatment

Iron salts were added to various waste solutions with the object of forming Ferrous Arsenates and/or complex Calcium-Ferrous salts, and thereby reducing the soluble Arsenic content of the solutions.

The table attached shows the results of the tests.

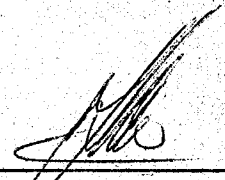
All solutions reacted favorably to the addition of Iron salts with the lime; it will be necessary to do further tests to find the minimum requirements. The salts had no effect in the absence of lime, but this may have been due to acidity of solutions.

The iron was added in the form of Ferrous Chloride or Ferrous Sulphate crystals. In both cases, the reagent was "old stock" which had oxidised, and consequently, had to be dissolved in an acid solution. This tended to 'confuse' the data as regards lime consumption. The effect on Arsenic precipitation seemed to be the same for both salts.

It is interesting to note that an addition of 1 lb./ton of Ferrous Chloride to the #8 Agitator discharge (treated waste) reduced the Arsenic content from 13.3 to 2.1 p.p.m. It may be possible to achieve sufficient reduction in Arsenic content by substituting the Iron salt for some of the lime currently being added.

J. McKay is presently making inquiries re. price and availability of various salts.

MEL/mw


M.E. Lane
Mill Engineer

(See ~~graph~~ table attached)

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<u>Sample</u>	<u>pH</u>	<u>As(ppm)</u>	<u>% As Reduction</u>
#11 Thickener O'flow (DWTO)	-	96.8	-
#11 Thickener O'flow + 1 lb./ton Lime	-	25.6	73.6
#11 Thickener O'flow + 1 lb./ton Lime + 1 lb./ton FeCl ₂	-	9.3	90.4
#11 Thickener O'flow + 1 lb./ton Lime + 1 lb./ton FeSO ₄	-	9.3	90.4
#11 Thickener O'flow + 1 lb./ton FeCl ₂	-	87.2	9.9
#11 Thickener O'flow + 1 lb./ton FeSO ₄	-	96.8	-

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#11 Thickener O'flow	6.1	113.6	-
#11 Thickener O'flow + 1 lb./ton Lime	10.8	21.0	81.5
#11 Thickener O'flow + 1 lb./ton Lime + 1 lb./ton FeCl ₂	7.7	13.5	88.1
#11 Thickener O'flow + 0.5 lb/ton Lime + 0.5 lb/ton FeCl ₂	7.2	30.9	72.8

#6 Thickener O'flow (MWT0)	6.5	30.4	-
#6 Thickener O'flow + 1 lb./ton Lime	11.35	8.3	72.7
#6 Thickener O'flow + 1 lb./ton Lime + 1 lb./ton FeCl ₂	10.6	1.9	93.8
#6 Thickener O'flow + 0.5 lb./ton Lime + 0.5 lb./ton FeCl ₂	7.7	9.8	67.8

Carbon Plant Thickener O'flow (C.P.T.O.)	6.9	40.0	-
C.P.T.O. + 1 lb./ton Lime	11.8	13.1	67.3
C.P.T.O. + 1 lb./ton Lime + 1 lb./ton FeCl ₂	11.2	4.1	89.8

<u>Sample</u>	<u>pH</u>	<u>As(ppm)</u>	<u>%As Reduction</u>
C.P.T.O. + 0.5 lb/ton Lime	10.4	3.1	92.3
D.T.B.	8.3	518.0	-
D.T.B. + 1 lb./ton Lime	9.3	456.0	12.0 @
D.T.B. + 1 lb./ton Lime + 1 lb./ton FeCl ₂	8.5	344.0	33.6 @
D.T.B. + 0.5 lb./ton Lime + 0.5 lb./ton FeCl ₂	8.3	380.0	26.6 @
#8 Agitator Discharge (Treated Waste Solutions)	12.3	13.3	- *
#8 Agitator Discharge + 1 lb/ton FeCl ₂	12.4	2.1	84.2*

* If we assume that 80% Arsenic reduction had already been achieved in the agitator, the total reduction after addition of FeCl₂, would be 96%.

@ Normal practice is to add approximately 10 lbs./ton of Lime, so these results only serve as an indication of the effect of the Iron additions.