

MEMORANDUM

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Date Dec 19/75

From C.Q. Olesen

Ref.

Subject Arsenic Suppression Tests

Abstract: To use varying amounts of FeCl_3 and CuSO_4 at a constant pH using Na_2CO_3 as the alkaline reagent.

Part I #6 Thickener

← OH means after alkalinity

FeCl_3	CuSO_4	pH	pH _{OH}	As	AsOH	Fe	FeOH	Cu	CuOH
.090	0	5.5	10.9	17.4	14.0	3.6	ND	.07	ND
.018 .18	0	3.5	10.9	17.0	10.5	20.5	ND	.20	.15
.027 .120	0	3.3	10.9	20.2	9.5	108.5	ND	.35	.55
0	.15	6.6	11.1	25.5	22.0	ND	ND	29.8	.08
0	.25	6.4	10.9	26.3	18.8	ND	ND	81.0	.15
0	.50	6.1	10.9	26.3	17.5	ND	ND	200.0	.30
0	0	7.3	10.9	38.5	32.2	.5	ND	3.05	.30

Part II #11 Thickener

FeCl_3	CuSO_4	pH	pH _{OH}	As	AsOH	Fe	FeOH	Cu	CuOH
.40	0	3.0	10.8	97	20	335	ND	.30	.20
.55	0	2.9	10.8	132	11.5	555	.21	.30	.30
.70	0	2.8	10.8	157	10.2	815	.30	.30	.30
0	.45	3.7	10.8	149	28.1	70	ND	209	1.05
0	.50	3.6	10.9	142	26.5	65	ND	240	1.86
0	.75	3.7	10.8	147	22.5	65	ND	365	3.10
0	0	6.2	10.8	165	86	178	.25	ND	.30

Calculations:

Part I #6 Thickener

Avail Fe (mg)	Avail Cu (mg)	Consumed As (mg)	Ratio x/As	Na_2CO_3 limit As attained (ppm)	Ratio x/As	NH_4OH -previous limit As tests attained (ppm)
18.9	0	12.25	1.54	14.0	2.20	3.2
37.8	0	14.0	2.70	10.5	4.15	2.1
56.7	0	14.5	3.91	9.5	6.23	2.1
0	38.2	8.25	4.63	22.0	4.24	12.0
0	63.6	9.85	6.46	18.8	5.53	9.0
0	127.2	10.5	12.11	17.5	9.42	3.0

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Part II #11 Thickener

<u>Avail</u> <u>Fe (mg)</u>	<u>Avail</u> <u>Cu (mg)</u>	<u>Consumed</u> <u>As (mg)</u>	<u>Ratio</u> <u>x/As</u>	<u>Na₂CO₃</u> <u>limit As</u> <u>attained (ppm)</u>	<u>NH₄OH</u> <u>Ratio</u> <u>x/As</u>	<u>-previous tests</u> <u>limit As</u> <u>attained (ppm)</u>
630	0	72.5	8.69	20	2.93	4.6
735	0	76.75	9.58	11.5	3.84	1.8
840	0	77.4	10.85	10.2	4.98	3.0
0	114.5	68.45	1.67	28.1	1.72	2.0
0	127.2	69.25	1.84	26.5	1.92	3.0
0	190.0	71.25	2.67	22.5	2.86	2.0

Conclusions:

- As the above results show it takes less FeCl₃ or CuSO₄ to suppress the arsenic with NH₄OH than with Na₂CO₃, but then the pH was slightly lower in the previous tests. Therefore, tests should be run at varying pH's with a constant amount of FeCl₃ or CuSO₄. Also tests should be run on the ppte's to determine if they reverse upon dilution.