

MATTAGAMI LAKE MINES LTD.

Vangorda-Grum  
Sample B

Progress Report # 1

Work performed from Feb. 4 to March 11, 1976.

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## Vangorda-Grum Testwork - Sample B

### Summary:

Upgrading using conventional flotation techniques has not been promising. "Best" results so far have required several cleaning and regrinding stages.

<u>Head Assay</u>	Pb 6.5 %	Cd .001 %
	Zn 10.5 %	SO <sub>2</sub> 19.6 %
	Cu .1 %	Insol 25.6 %
	Ag 3.0 oz/T	Fe 22.5 %
	Au .03 oz/T	S 30.4 %
	As .17 %	

### S.G. 3.8

Grinding (Figure 1) A work index of 11.7 was determined using Bond's method and a sample of Mattagami Lake ore (W.I. 12.1) as a reference. Natural pH of the ore was 6.6 when ground for 30 minutes in distilled water at 67% solids. With the addition of 3#/T of Soda Ash during grinding the pH was 7.3. Approximately 5#/T of Soda Ash was required to obtain a pH of 9.0 for Pb flotation. No difference was seen when adding reagents during or after grinding.

Pb Rougher much Zn and pyrite floats. For a Pb recovery of 85-90% recovery of Zn in the Pb rougher is 50-60%. Rougher concentrates assay approximately 6-7 oz/T Ag, 14-16% Pb and 14-16% Zn. Pb floats slowly (12-14 minutes rougher flotation) with a relatively high rougher tailing obtained in all tests. The lowest assay for the flotation tailings has been 0.9% Pb. An infrasizing of one of the tailings showed the majority of the Pb lost to be in the fines (-10 micron, Figure 2).

Methods tried to depress Zn include:-

1) finer primary grinding - grinding for longer than 30 minutes did not depress any additional Zn and only succeeding in sliming any liberated Pb. Grinds coarser than 30 minutes showed a significant increase in Zn recovered to the Pb rougher (Figure 3).

2) SO<sub>2</sub>, ZnSO<sub>4</sub> - SO<sub>2</sub> was more effective than ZnSO<sub>4</sub> when added to the primary grind and also gave a faster upgrading in the cleaners (fewer cleaning stages required) (Figure 4).

3) NaCN was added in large quantities (.5#/T in primary grind, 1#/T in cleaners) with little corresponding Zn depression.

4) Lime was substituted for Soda Ash in the grind with catastrophic results. The slimes were flocculated and excessive froth built up. Addition of sodium silicate did not eliminate this problem.

Pb Cleaning Zn and pyrite were difficult to depress in the cleaners even with the addition of large quantities of Zn SO<sub>4</sub> or SO<sub>2</sub> and NaCN and with 1 or 2 stage regrinding. On the other hand Pb floated slowly and all cleaner tailings were very high in Pb. Typical results for a batch test are listed in FIGURE 5. Four cleaners were usually employed, the first 2 in Soda Ash and the 3rd and 4th in Lime (FIGURE 6). Regrinding helped to improve the concentrate grade somewhat by depressing Zn and pyrite.

In locked cycle tests the disposition of the 1st Pb cleaner tailings was the biggest problem. This tailing assayed 4-6 % Pb in all tests despite attempts to lower this value (regrinding, scavenging with xanthate). However it also contained a considerable quantity of Zn (25-30 % of Zn for a batch test). If recirculated to the Pb rougher much of the Zn and pyrite floated again and a large circulating load built up. Diverting this stream to the Zn rougher eliminated the circulating load problem but also caused severe contamination of the Zn concentrate by Pb slimes (FIGURE 7, 8). The addition of sodium dichromate to the tailings did not depress Pb in the Zn float.

Zn flotation Zn flotation has been very inconsistent. In duplicate batch tests Zn would often float very nicely in one test and very poorly in the other for no apparent reason.

Z200 did not effectively collect the Zn. Sodium isopropyl xanthate (R-343) gave much better results.

Zn was slow to float in the cleaners (pH 11.5 with Lime). Accordingly the cleaner tailings were high in Zn and when recycled in locked cycle tests the flotation tailings increased from

• < 1% to 2-3% Zn.

10 X 10 TO THE INCH  
KEUFFEL & ESSER CO.  
358-5  
MADE IN U.S.A.

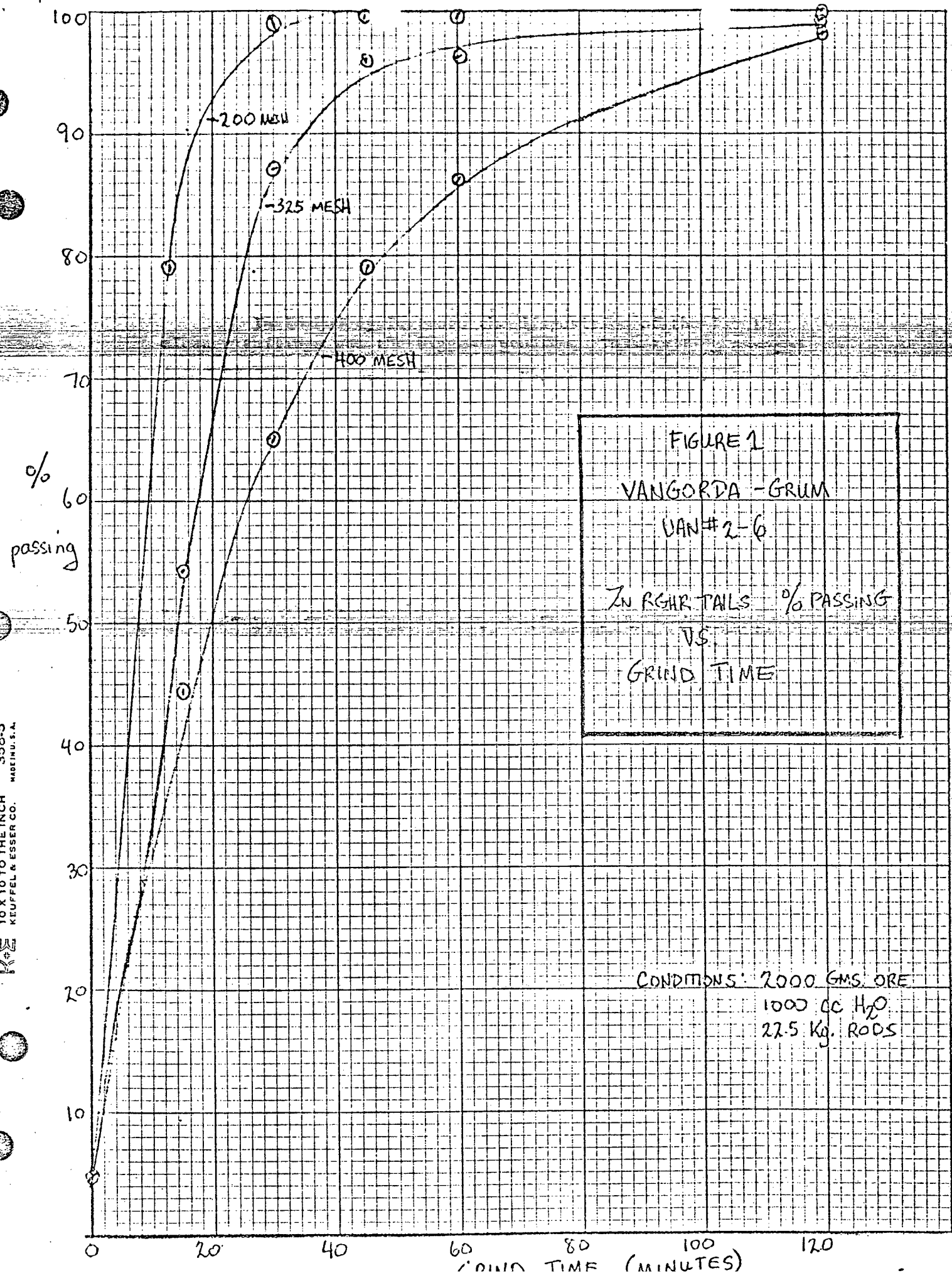


FIGURE 1  
VANGORDA - GRUM  
VAN # 2-6  
Zn REGR. TAILS % PASSING  
VS.  
GRIND TIME

CONDITIONS: 2000 GMS ORE  
1000 CC H<sub>2</sub>O  
22.5 Kg. RODS

FIGURE 2

VAN-29 ZN RGR TAIL (15 MINUTE PRIMARY GRIND)

SIZE	WEIGHT %	ASSEAY OZ/T OR %			% DISTRIBUTION		
		Ag	Zn	Pb	Ag	Zn	Pb
+200 MESH	16.8	.40	1.34	.55	14.0	19.9	8.2
+56 MICRON	9.0	.40	.87	.42	7.5	6.9	3.3
+40 "	19.3	.28	.53	.43	11.2	9.1	7.3
+28 "	20.0	.22	.48	.49	9.2	8.5	8.7
+20 "	11.5	.28	.59	.79	6.7	6.0	8.0
+14 "	5.0	.57	.92	1.36	5.9	4.1	6.0
+10 "	3.2	1.37	1.78	3.38	9.1	5.0	9.6
-10 "	11.4	1.53	4.01	4.86	36.4	40.5	48.9
CALC'D HEAD	96.2	.50	1.17	1.18	100.0	100.0	100.0
ASSAY HEAD			1.10	1.04			

10 X 10 TO THE CENTIMETER 46 1510  
18 X 25 CM. MADE IN U. S. A.  
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FIGURE 3  
UANGORDA - GRUM  
VAN # 2-6

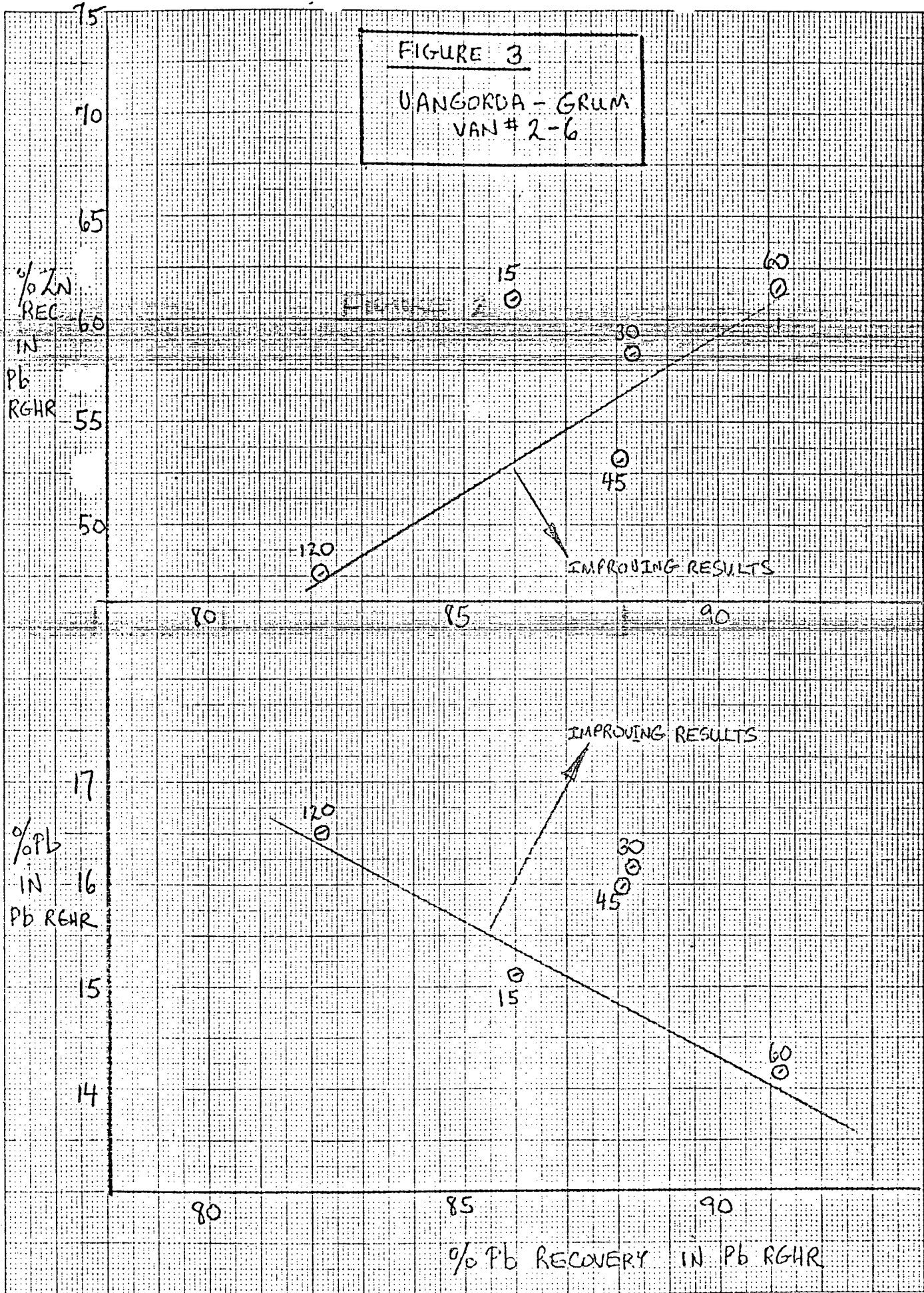


FIGURE 4  
 UANGORDA - GRUM  
 VAN #19-22

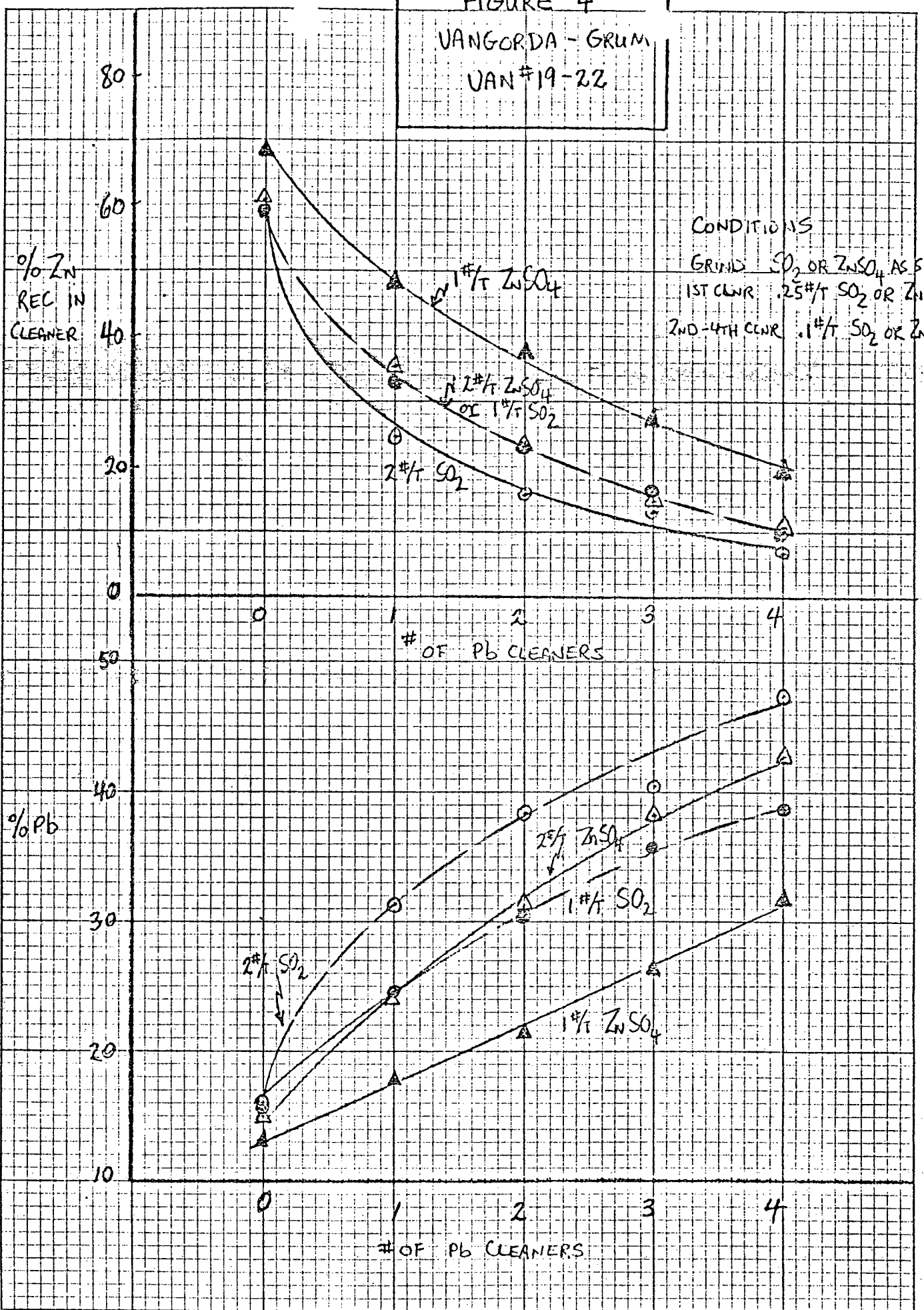


FIGURE 5

UAN - 20

PRODUCT	WEIGHT %	ASSAY OZ/T OR %			% DISTRIBUTION		
		Ag	Pb	Zn	Ag	Pb	Zn
4th Pb CLNR CONC	5.23	21.05	38.99	19.29	37.2	32.2	10.0
4th Pb CLNR TAIL	2.66	11.82	29.36	20.09	10.6	12.3	5.3
3rd Pb CLNR CONC	7.89	17.94	35.74	19.56	47.8	44.5	15.3
3rd Pb CLNR TAIL	4.27	8.22	20.35	19.29	11.9	13.7	8.2
2nd Pb CLNR CONC	12.16	14.53	30.34	19.47	59.7	58.2	23.5
2nd Pb CLNR TAIL	5.03	5.69	13.93	18.29	9.7	11.0	9.1
1st Pb CLNR CONC	17.19	11.47	24.52	18.36	69.4	69.2	32.6
1st Pb CLNR TAIL	17.40	2.77	6.08	15.23	16.3	16.7	26.3
Pb RGHR CONC	34.59	7.33	15.75	17.16	85.7	85.9	58.9
Zn RGHR CONC	21.57	1.34	2.18	17.98	9.8	7.4	38.4
Zn RGHR TAIL	43.84	.31	.98	.63	4.5	6.7	2.7
HEADS	100.0	2.96	6.35	10.09	100.0	100.0	100.0

FIGURE 6

UANGORDA - GRUM  
TYPICAL FLOWSHEET

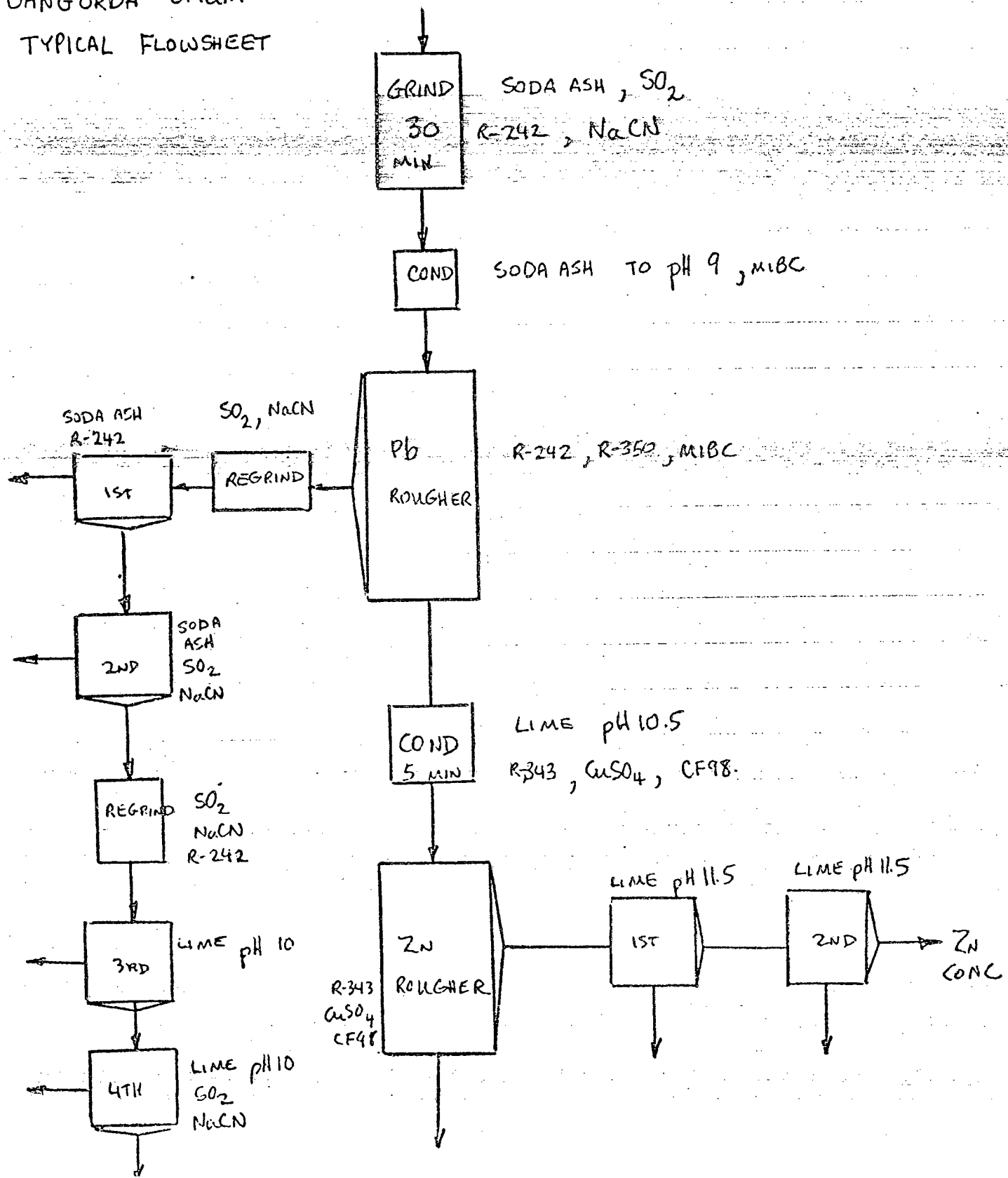


FIGURE 7

UANGORDA - GRUM

UAN #23

3 CYCLE TEST

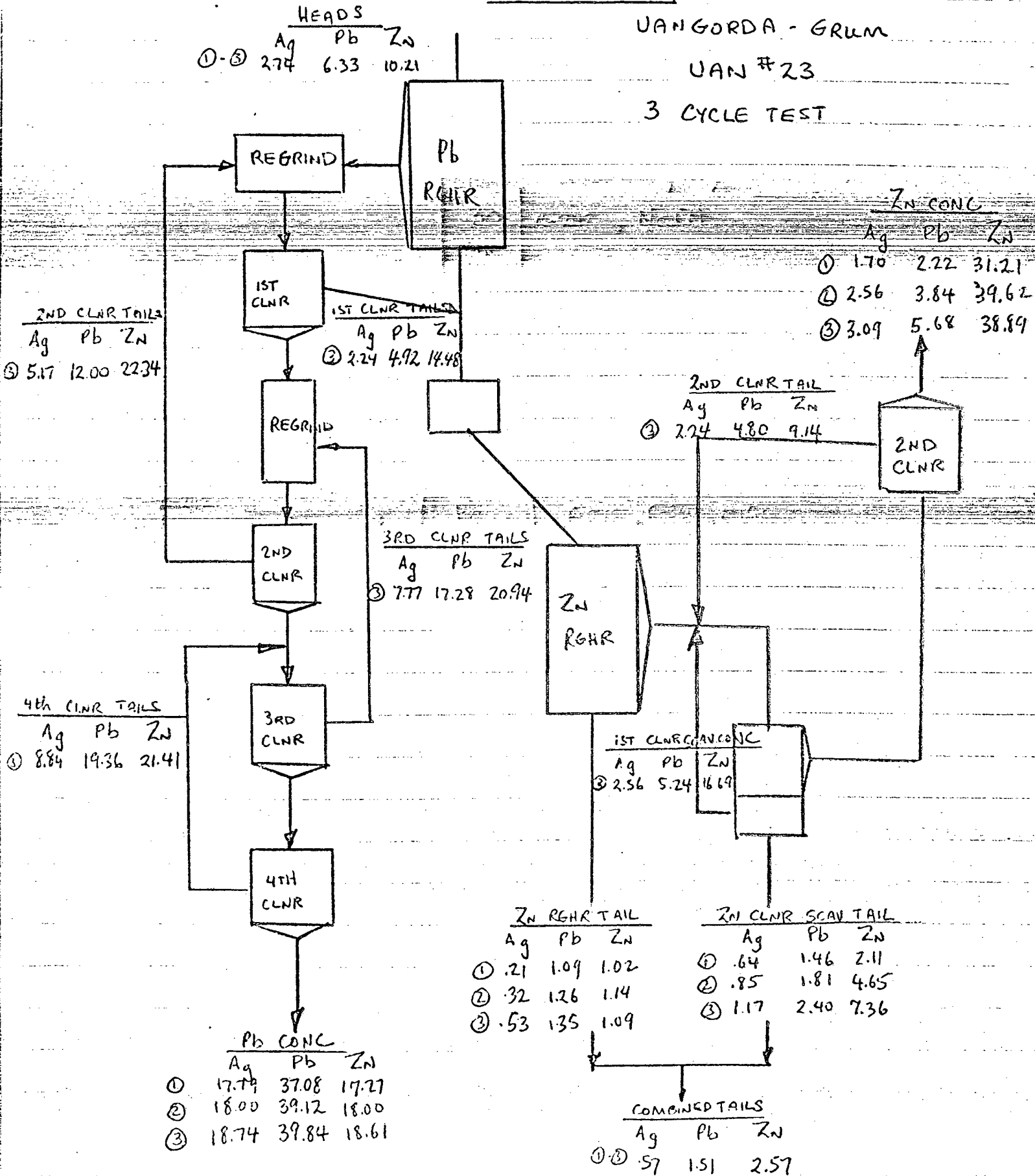


FIGURE 8

UANGORDA - GRUM

UAN #23

CALCULATED CIRCUIT RESULTS

	WEIGHT %	ASSAY OZ/T OR %			% DISTRIBUTION		
		Ag	Pb	Zn	Ag	Pb	Zn
HEAD	100.0	2.98	6.34	10.63	100	100	100
Pb CONC	11.6	18.20	38.85	17.68	72.8	71.2	19.3
Zn CONC	18.3	2.54	4.13	37.10	16.0	12.0	63.9
COMBINED TAILS	70.1	.57	1.51	2.57	11.2	16.8	16.8

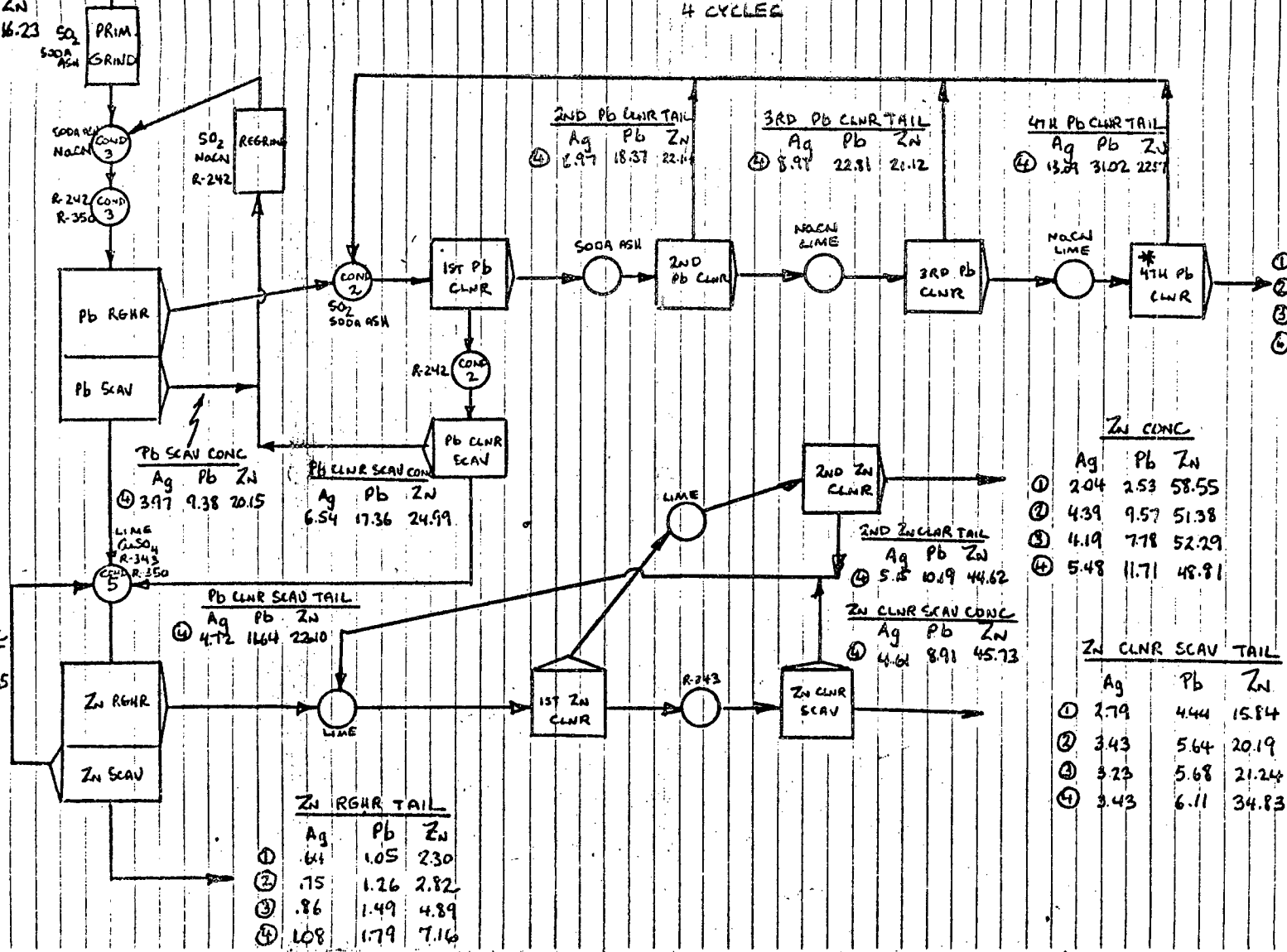
MARCH 31, 19

# VAN-46

4 CYCLES

READS

Ag	Pb	Zn
4.12	9.20	16.23



Pb CONC

	Ag	Pb	Zn
①	35.25	59.86	12.40
②	20.29	50.63	16.74
③	18.14	42.74	20.89
④	18.34	45.29	21.75

Zn CONC

	Ag	Pb	Zn
①	2.04	2.53	58.55
②	4.39	9.57	51.38
③	4.19	7.78	52.29
④	5.48	11.71	48.81

Zn SCAN CONC

Ag	Pb	Zn	
④	2.89	4.79	37.35

Pb SCAN CONC

Ag	Pb	Zn	
④	3.97	9.38	20.15

Pb CLR SCAN CONC

Ag	Pb	Zn	
④	6.54	17.36	24.99

Pb CLR SCAN TAIL

Ag	Pb	Zn	
④	4.72	16.64	22.10

Zn RGR TAIL

	Ag	Pb	Zn
①	.64	1.05	2.30
②	.75	1.26	2.82
③	.86	1.49	4.89
④	1.08	1.79	7.16

Zn CLR SCAN CONC

Ag	Pb	Zn	
④	4.61	8.91	45.73

Zn CLR SCAN TAIL

	Ag	Pb	Zn
①	2.79	4.44	15.84
②	3.43	5.64	20.19
③	3.23	5.68	21.24
④	3.43	6.11	34.83

2ND Pb CLR TAIL

Ag	Pb	Zn	
④	2.97	18.37	22.14

3RD Pb CLR TAIL

Ag	Pb	Zn	
④	8.97	22.81	21.12

4TH Pb CLR TAIL

Ag	Pb	Zn	
④	13.29	31.02	22.57

2ND Zn CLR TAIL

Ag	Pb	Zn	
④	5.2	10.19	44.62