

NORANDA RESEARCH CENTRE

824607

METALLURGICAL ASSISTANCE - SAMATOSUM

PROJECT N-8721-34

PROGRESS REPORT #1

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## INTRODUCTION

The Samatosum Deposit is a high grade, low tonnage base and precious metal deposit being developed by Minnova Inc. The property is located in British Columbia, 25 km east of Barriere and 60 km north of Kamloops. The orebody is on the northwest slope of Samatosum mountain at an elevation of 1370 meters.

## ORE MINERALOGY

Numerous Samatosum drill core samples have been extensively studied by D.J.T. Carson in order to determine the mineralogy, textures and middlings ratings throughout the deposit. Important findings with respect to processing are summarized below<sup>(1)</sup>:

- (a) Ag occurs mainly in tetrahedrite which is medium to coarse grained and should require a primary grind of only 50% -200 mesh for liberation. Tetrahedrite is also the most important copper bearing mineral although chalcopyrite is locally abundant. Electron microprobe analyses of the tetrahedrite averaged 36.1% Cu, 3.8% Ag, 4.9% Zn, 23.3% Sb, 3.4% As and up to 1000 ppm Hg.
- (b) Lead (galena) finer grained than the tetrahedrite.
- (c) The pyrite content is low (<10%) and the presence of generally soft minerals will give a low grinding work index.
- (d) Sphalerite has a very low iron content (<2%) and high grade zinc concentrates should be possible. Zinc recoveries will be lowered somewhat (projected at 70-80%) by losses to the lead-(copper)-silver concentrate due to "chalcopyrite disease" (fine chalcopyrite inclusion on sphalerite), especially in the upper part of the orebody, and the significant zinc content of the tetrahedrite. Zinc activation in the initial ore to be mined (surface to 10 meters) is also anticipated to be high due to the presence of covellite.

- (e) Gold recoveries should be similar to tetrahedrite (90%) due to the strong association of electrum (main gold carrier) with tetrahedrite rather than pyrite or arsenopyrite.
- (f) The orebody has been divided into three zones on the basis of mineralogy/predictive metallurgy/mining sequence:

Zone I - massive high grade ore in the upper part of the proposed open pit

Zone II - disseminated ore in the lower part of the open pit

Zone III - disseminated ore similar to Zone II, but to be mined by underground methods

#### **PREVIOUS METALLURGICAL TESTING**

A few tests on two small, unrepresentative ore samples were carried out at Lakefield Research in early 1987<sup>(3)</sup>. Excellent metal recoveries were obtained to relatively low grade lead concentrates (30%). Unfortunately most of the zinc (75%) also reported in the lead rougher circuit. Some trial copper-lead separations were attempted with only mediocre success. The primary grind employed was quite fine at about 60% -400 mesh.

#### **METALLURGICAL TEST SAMPLES**

Split core from 19 individual holes was received at the Noranda Research Centre during November and December 1987. Details on these samples are given in Table 1. Preliminary flotation tests were carried out on most of the individual samples to determine any major variations in response. The bulk of the testing was then conducted on composites of the three zones.

#### **PRIMARY GRINDING**

The valuable minerals were indeed found to be coarse grained with excellent recoveries being possible at grinds of 50% -200 mesh or coarser. Losses of all

the valuable minerals in the flotation tailings were low. A grind of about 70-75% -200 mesh was used for most of the test program. At this grind the valuable minerals appeared well liberated from each other and regrinding was not employed.

### **ZINC DEPRESSION**

As expected, selectivity between Ag-Cu-Pb and Zn was poor. All of the Zone II and III samples gave very similar results (Table 2). Accordingly, many of the later tests were done with a 50:50 mixture of the Zone II and III composites.

A considerable number of tests were conducted to improve zinc depression. This included various collectors, sulphur dioxide, lime and zinc sulphate. Grinding in the presence of 0.5-1 lb/ton SO<sub>2</sub> and flotation at pH 7.5 (natural pH ore 9) was the only method that proved effective. The zinc loss in the silver-lead rougher concentrate was reduced by half from 75 to 30%. The collector used was relatively unimportant (R-343, R-242, Z-200, R-208 were tested) although lead recoveries were reduced by 10% or more without 242. Lead recoveries also tended to be reduced at higher SO<sub>2</sub> dosages.

### **ZINC CIRCUIT**

The zinc circuit should pose no major problems if zinc losses to the silver-lead concentrate(s) can be controlled at reasonable levels. A high grade concentrate (55-60% Zn) should be obtained although it will also likely be high in silver (500 ppm or higher) and lead (2-5%), especially for Zones II and III, which have low zinc feed grades.

### **SILVER-LEAD UPGRADING/SEPARATION**

In order to produce a saleable silver product, it will probably be necessary to separate the silver (copper) and lead minerals. Some trial silver-lead separation using starch-SO<sub>2</sub> were attempted and show some promise (Table 3) although considerably more testing is required in this very important area. Any silver-copper concentrate will necessarily contain a substantial amount of antimony (over 10% Sb).

The Zone II and III composites contained little chalcopyrite. Chalcopyrite was visible in Zone I flotation.

Gold was recovered mainly with the silver. Gold recovery was generally about 15% lower than the corresponding silver recovery.

### **BULK FLOTATION**

Bulk silver-lead-zinc flotation was carried out in a few tests by the simple addition of small amounts of copper sulphate. Excellent recoveries were obtained for all metals (Table 4). However, due to the fact that this type of concentrate would not be very saleable, bulk flotation was discontinued.

### **BEST RESULTS TO DATE**

The best results achieved to date are listed in Table 5. The relatively simple flowsheet and reagent balance employed is shown in Figure 1.

### **CONCENTRATE CONTAMINATES**

Selected concentrates have been analyzed for various elements. Mercury levels in the silver-lead and zinc concentrates were found to be around 100 ppm (Table 6).

### **FUTURE WORK**

1. Future work should concentrate on separation of the silver-lead minerals to achieve marketable concentrates.
2. Pilot plant testing is recommended both to confirm the effectiveness of SO<sub>2</sub> for zinc depression in the silver-lead rougher circuit and to verify any silver-lead separation procedure that it is to be employed.

## REFERENCES

1. Carson, D.J.T., Noranda Exploration Ltd., memorandum to D. Watkins and K. Stowe, 5 November 1987.
2. Carson, D.J.T., Noranda Exploration Ltd., Mineralogy and predictive metallurgy of the Samatosum deposit, 4 February 1988.
3. Lakefield Research, The recovery of lead and zinc from ree gold silver zinc submitted by Corporation Falconbridge Copper, project report no. 1, 23 February 1987.

TABLE 1 - SAMATOSUM SAMPLE SUMMARY

		Meters	kgs Received	% of Composite	Norex Assays, % or ppm					# of Tests	Test Assays, % or ppm				
					Cu	Pb	Zn	Au	Ag		Cu	Pb	Zn	Au	Ag
RG 193	BCD 9364-73	14.5	27	44						3+	1.0	2.2	5.3		700
194	BCD 9376-81	8.5	16	29						3+	0.4	5.8	1.9		600
97	BCD 5736-39	4.2	5	19	4.6	0.8	25.5	1.3	1,200						
107	BCD 5852	2	1	3	4.2	4.1	37.4	2.9	2,600						
108	BCD 5878, 79	3.3	1.5	5	6.3	9.4	19.6	11.7	13,960						
Composite I				100						9	1.15	3.4	10.5	1.1	750
RG 152	BCD 8464-75, BCS 8376	18.2	34	0	0.2	0.2	0.1	0.2	80	3	.17	.08	.13		80
153	BCS 8383-97	20.6	24	0	0.1	0.2	0.3	0.2	50	3	.10	.25	.45		50
180	BCD 10394-400, BCD 10201	12.0	18	14	1.7	3.1	3.0	3.7	1,970	2+	2.2	3.5	3.3		2580
188	BCD 9328	1.1	2.8	2	1.1	.04	0.2	2.3	1,200	1	1.0	.07	.23		900
191	BCD 9340-42	9.5	4.5	4	0.8	.01	0.3	1.2	740	1	1.0	.03	0.4		1020
90	BCD 5728-31	3.7	5.7	5	1.7	1.1	2.6	3.1	1,930						
100	BCD 5801-08	13.9	19	16	1.0	1.3	2.3	1.0	800	2	1.1	1.1	2.6		810
104	BCD 5886-89	4.4	10	9	0.5	2.3	3.4	0.6	320						
105	BCD 5820-31	14.7	27	25	0.4	2.2	3.6	0.8	370	2	0.5	1.8	3.6		370
137	BCD 5428-38	13.2	28	25	1.5	1.7	3.5	2.7	1,700	2	1.2	2.1	4.2		1100
Compoiste II				100						28*	1.1	1.8	3.2	1.8	1040
RG 179	BCD 10377-88	18.2	35	32	1.2	1.0	1.7	1.9	1,300						
203	BCD 10331-38	11.5	27	18	0.9	1.3	2.2	1.0	700						
209	BCD 10638-43, 45	9.0	20	21	0.7	1.3	2.6	1.1	650						
212	BCD 9427-35	15.0	34	29	1.3	1.3	3.0	2.2	1,400						
Composite III				100						23*	1.0	1.2	2.7	1.4	890

+ includes one 3 cycle test with 1/3 each of 180, 193, 194

\* includes 17 tests with 50:50 mixture Composites II and III

**TABLE 2 - STANDARD SILVER LEAD ROUGHER FLOTATION RESULTS ON VARIOUS SAMPLES\***

Zone	Sample	Test	Weight %	SILVER LEAD ROUGHER CONCENTRATE							
				Pb	Assay, % or g/T			% Distribution			
					Zn	Cu	Ag	Pb	Zn	Cu	Ag
I	193	3	20.9	10.6	11.6	4.6	3,410	95.8	45.7	95.6	97.0
	194	2	13.1	42.0	7.2	3.2	4,400	94.2	50.5	95.8	95.3
	Composite I	21	18.1	16.8	22.8	5.9	4,000	93.6	35.0	89.2	95.3
II	152	14	6.3	1.2	1.2	2.7	1,200	88.4	58.0	95.1	89.7
	153	13	8.3	2.6	3.0	1.2	470	82.6	56.8	92.2	82.9
	180	11	22.0	14.6	11.4	9.2	11,200	91.3	75.3	94.6	95.4
	188	9	7.6	0.8	2.5	10.6	10,940	78.5	83.3	94.0	93.0
	191	10	9.4	0.3	3.4	10.3	10,720	82.2	83.6	98.9	98.8
	100	16	17.8	12.2	5.9	6.1	4,400	94.7	85.2	97.7	98.0
	105	17	17.5	8.9	14.9	2.6	1,920	90.0	73.0	94.7	95.1
	137	20	21.4	8.7	14.2	5.3	4,900	89.8	71.4	95.4	95.8
	Composite II	23	18.7	9.0	13.8	5.9	5,380	92.9	78.4	96.7	96.2
III	Composite III	25	15.1	7.4	14.0	6.7	5,840	90.8	75.2	97.0	97.3

\* Grind 45-65% -200 mesh at natural pH (8.6-9). Float ~4 minutes with R-242, R-343 and Aerofroth 65.

**TABLE 3 - SILVER LEAD SEPARATION COMPOSITE II & III TEST 61, CYCLE 2\***

	Wgt %	Assay, % or ppm					% Distribution				
		Pb	Zn	Cu	Ag	Au	Pb	Zn	Cu	Ag	Au
Ag(Cu) Conc	49.7	14.6	7.3	23.0	21,900	28.0	41.4	43.1	83.7	84.1	71.3
Pb conc	50.3	20.6	9.5	4.4	4,100	11.1	58.6	56.9	16.3	15.9	28.7
Sep Feed	100	17.5	8.4	13.6	12,900	19.5	100	100	100	100	100

\* Condition 3 minutes .05 #/T XD-7, pH 4.5 with SO<sub>2</sub>  
Float 1 minute no reagents

**TABLE 4 - BULK SILVER-LEAD-ZINC FLOTATION**

Zone	Test	Wgt %	Assay, % or ppm					% Distribution				
			Pb	Zn	Cu	Ag	Au	Pb	Zn	Cu	Ag	Au
I	27	Bulk Rgh Conc	31.8	10.2	30.3	3.6	2300		99.2	99.5	99.4	99.0
II	24	Bulk 1st Cl Conc	18.0	9.7	17.4	6.0	5600	10.2	93.5	97.3	96.7	96.6
III	26	Bulk 2nd Cl Conc	12.9	8.5	19.8	7.4	6600		90.2	96.6	95.0	95.7



TABLE 5 - BEST RESULTS TO DATE

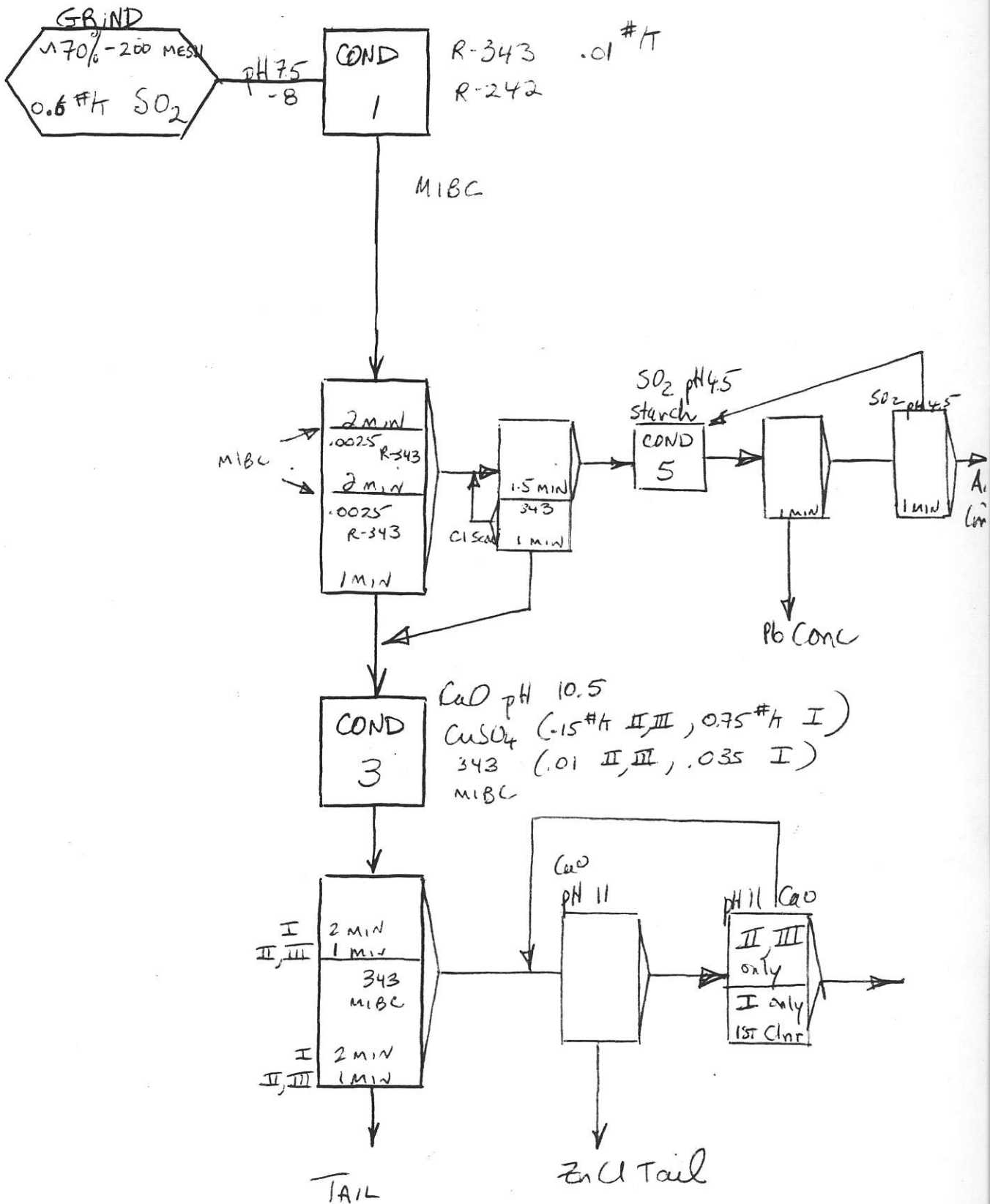
Zone	Product	Wgt %	Assays, % or ppm					Distribution				
			Pb	Zn	Cu	Ag	Au	Pb	Zn	Cu	Ag	Au
I	Ag Conc	4.3	17	9.5	21	14,700	17	21	4	80	83	64
	Pb Conc	3.4	31	17	2.0	1,700	3.5	31	5.5	6	7.5	10
Test 62	Zn Conc	15.0	2	58	0.8	250	1.2	9	85	11	5	16
	Tail	77.3	1.7	0.75	.04	45	0.15	39	5.5	3	4.5	10
	Feed	100	3.4	10.5	1.15	770	1.15	100	100	100	100	100
	Ag Conc	3.8	15	7.3	23	21,900	28	32	9	80	81	61
	Pb Conc	3.8	20	9.5	4.4	4,100	11	44	12	14	14	25
II + III	Zn Conc	3.9	4	58	0.6	575	1.9	9	73	3	2	4
	Tail	88.5	0.3	0.2	.04	35	0.2	15	6	3	3	10
Test 61	Feed	100	1.7	3.1	1.1	1,000	1.8	100	100	100	100	100

TABLE 6 - DETAILED CONCENTRATE ANALYSES

Element	ZONE I		ZONE II + III		Test 61
	Zn Rgh Conc Test 47	Ag Cl Conc Test 21	Ag Cl Conc Cycle 2	Pb Conc Cycle 2	Zn Cl Conc Cycle 2
Ag ppm	260	6870	21,900	4090	530
Au ppm	1.2	8.6	28.0	11.1	1.9
Pb %	0.8	19.1	14.6	20.3	33
Zn %	3.9	15.5	7.3	9.5	<del>3.5</del> 59.6
Cu %	54.2	9.7	23.0	4.4	<del>59.6</del> .56
Hg ppm	120	140	110	24	86
Sb %	.09	3.7	13.8	2.7	0.3
As %		0.6	2.2		.07
Bi %			<.002		<.002
Cd %			.04		.17
Se ppm			130		9
Fe %	2.6		7.5	19.9	3.5
Insol %			5.6		3.2
Ge ppm			<3		<3

# FIGURE 1 SAMATOSUM

## CONCEPTUAL FLOWSHEET



**APPENDIX**

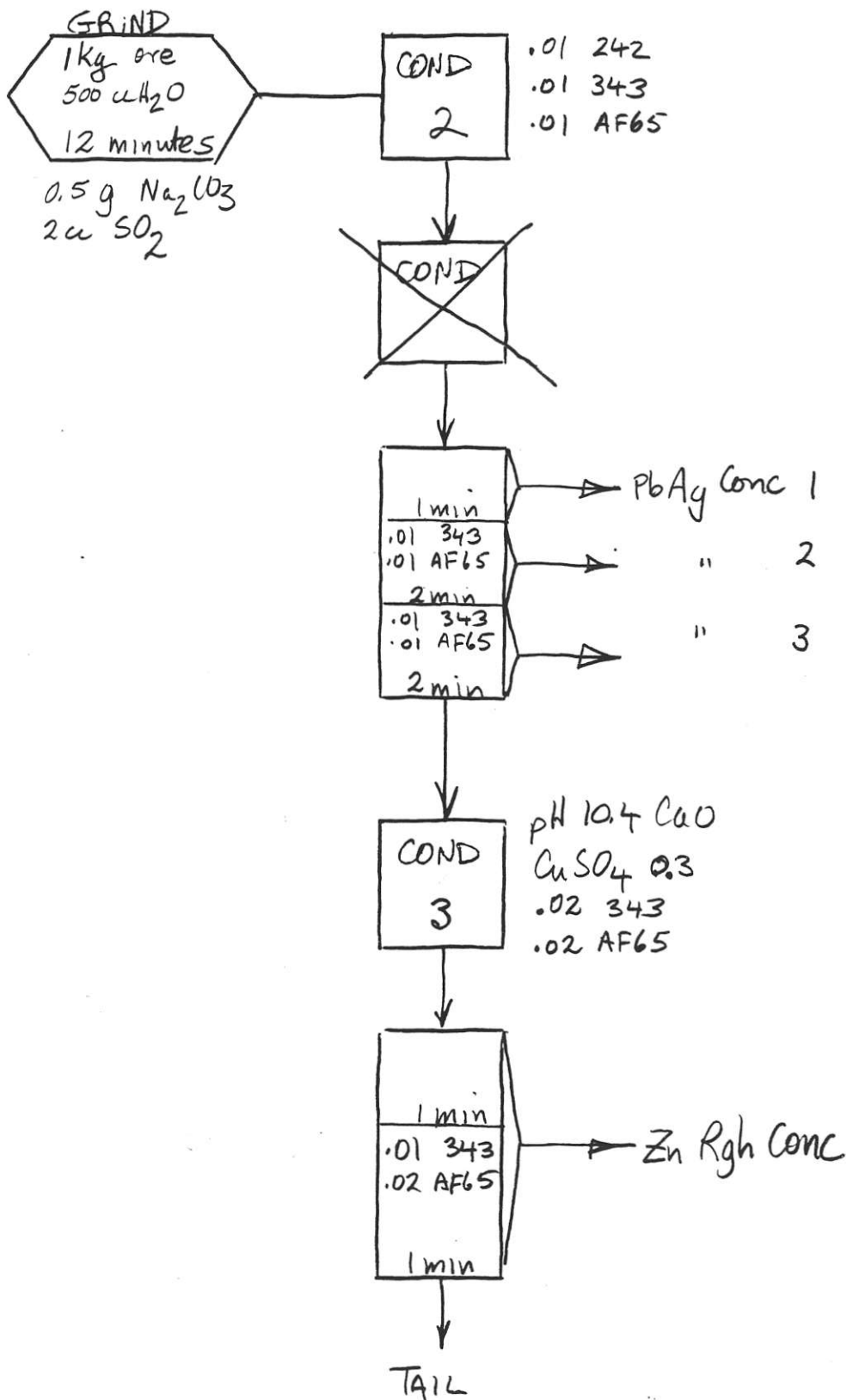
**DETAILED PROCEDURES AND RESULTS**

SAMATOSUM

12 Nov /87

SAM 1

RG 194

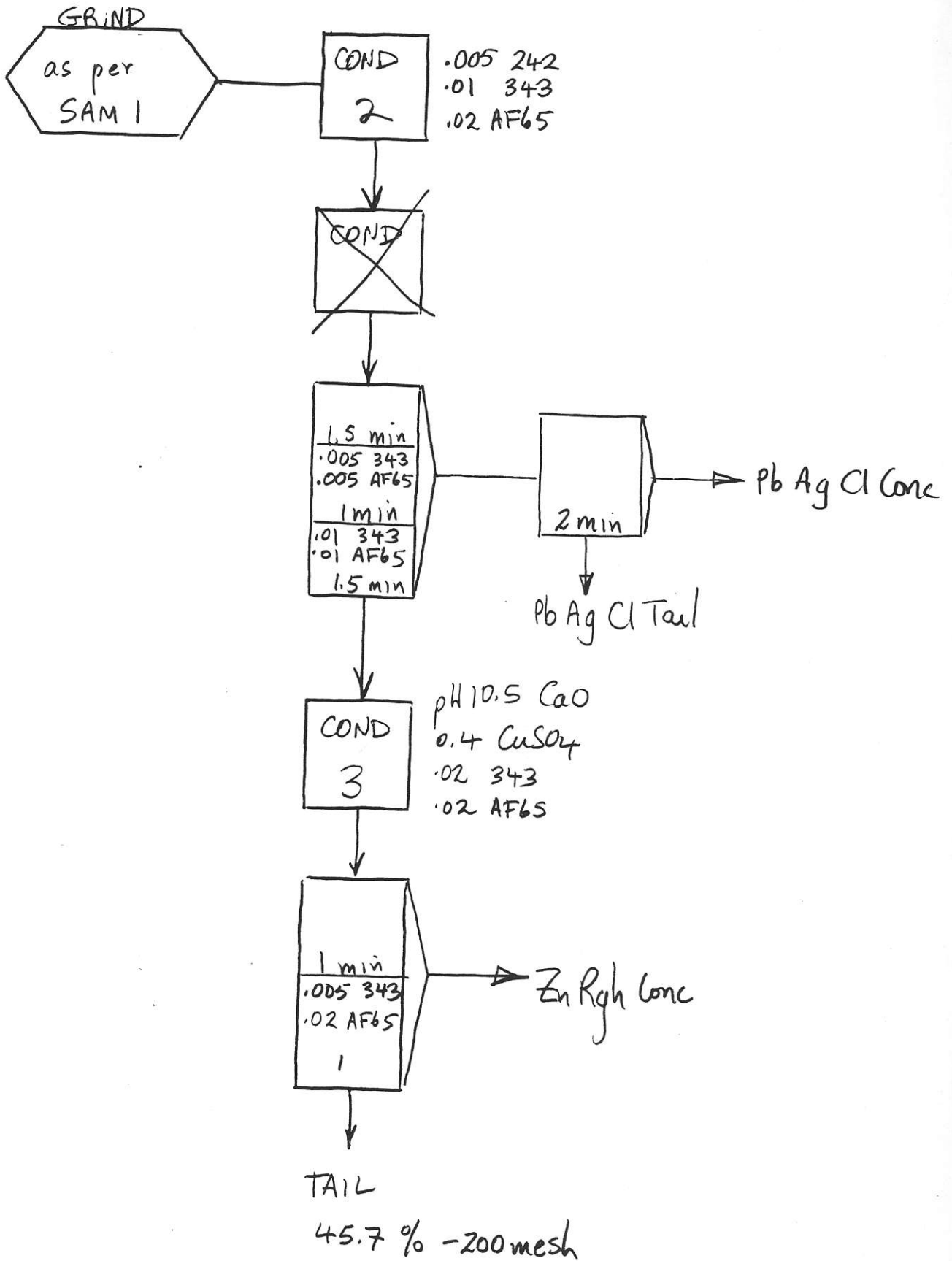


SAMATOSUM

12 Nov/87

SAM 2

RG 194



SAMATOSUM DEPOSITTEST NUMBER 1SAMP. RG194

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PbAg CONC 1	94.7	9.57	48.3	5.53	3.8	5500	79.27	28.28	84.10	84.61
PbAg CONC 2	46.1	4.66	21.5	10.6	.96	1600	17.18	26.39	10.34	11.98
PbAg CONC 3	16.6	1.68	7.3	10.1	.35	560	2.10	9.06	1.36	1.51
Zn RGH CONC	40.9	4.13	1.14	15.2	.11	150	.81	33.58	1.05	1.00
TAIL	791.6	79.97	.047	.063	.017	7	.64	2.69	3.15	.90
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	989.9	100.00	5.83	1.87	.43	622	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 2SAMP. RG194

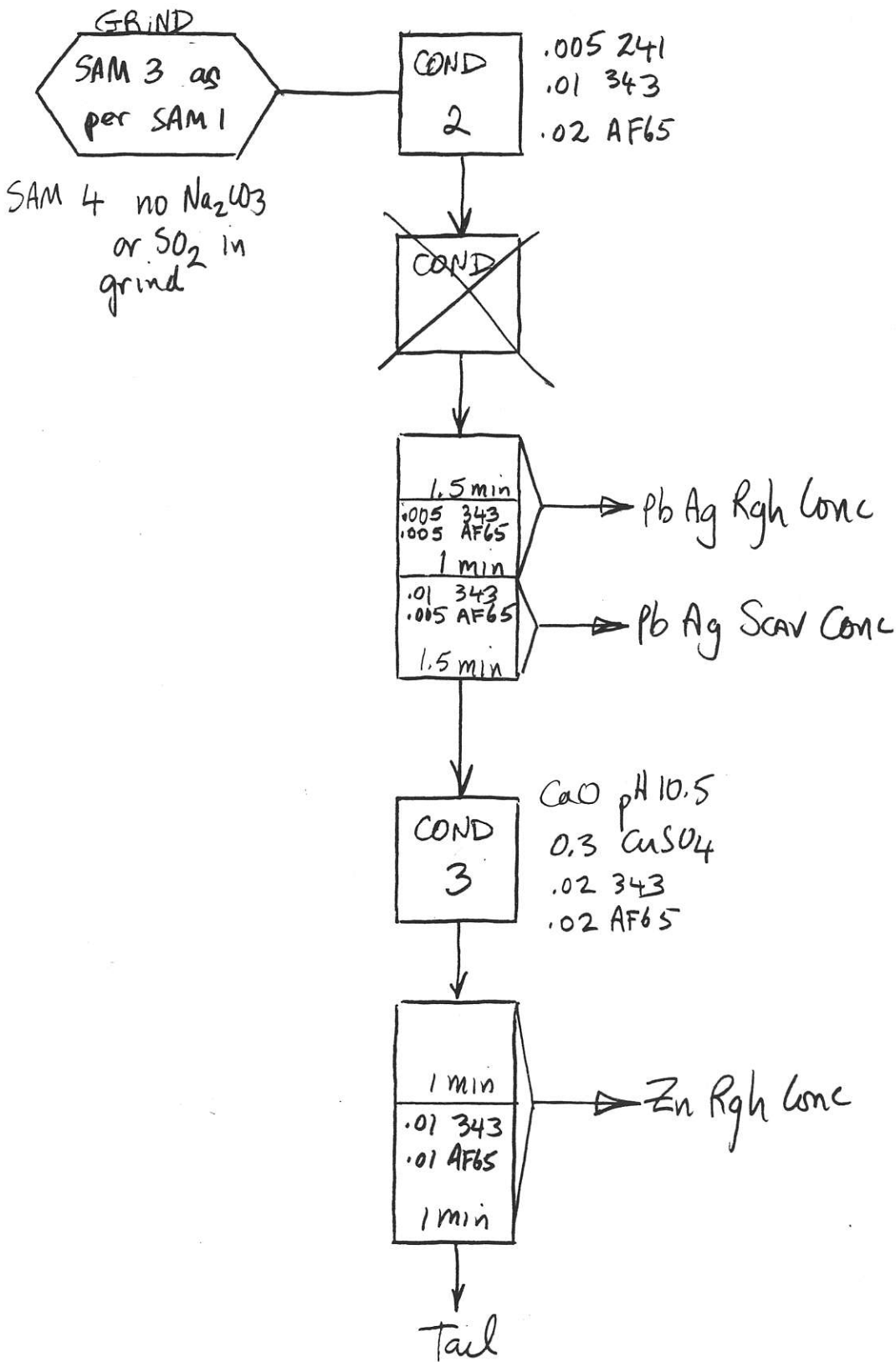
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	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PBAG CL CONC	131.7	13.13	42	7.21	3.23	4400	95.18	50.51	95.76	95.31
PBAG CL TAIL	17.5	1.74	4.2	2.1	.16	280	1.26	1.95	.63	.81
ZN RGH CONC	39.4	3.93	3.88	21.5	.2	310	2.63	45.06	1.77	2.01
TAIL	814.4	81.20	.066	.057	.01	14	.92	2.47	1.83	1.88
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1003	100.00	5.79	1.87	.44	606	100	100	100	100

SAMATOSUM

12 Nov /87

SAM 3,4

RG193



SAM 4 TAILS 47.5% - 200 mesh

SAMATOSUM DEPOSITTEST NUMBER 3SAMP. RG193

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PBAG RGH CONC	158.6	15.88	12.6	9.4	5.94	4400	86.75	28.29	93.35	95.24
PBAG SCAV CONC	49.7	4.98	4.2	18.4	.44	270	9.06	17.35	2.17	1.83
ZN RGH CONC	76.8	7.69	.96	35.9	.44	140	3.20	52.32	3.35	1.47
TAIL	713.7	71.46	.032	.15	.016	15	.99	2.03	1.13	1.46
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	998.8	100.00	2.31	5.28	1.01	734	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 4SAMP. RG193

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PBAG RGH CONC	159.8	16.34	11.1	9.65	5.18	3900	92.66	29.23	92.55	95.48
PBAG SCAV CONC	31.5	3.22	2.46	13.6	.7	410	4.05	8.12	2.47	1.98
ZN RGH CONC	91.9	9.40	.52	35.2	.41	120	2.50	61.33	4.21	1.69
TAIL	694.5	71.03	.022	.1	.01	8	.80	1.32	.78	.85
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	977.7	100.00	1.96	5.40	.91	668	100	100	100	100



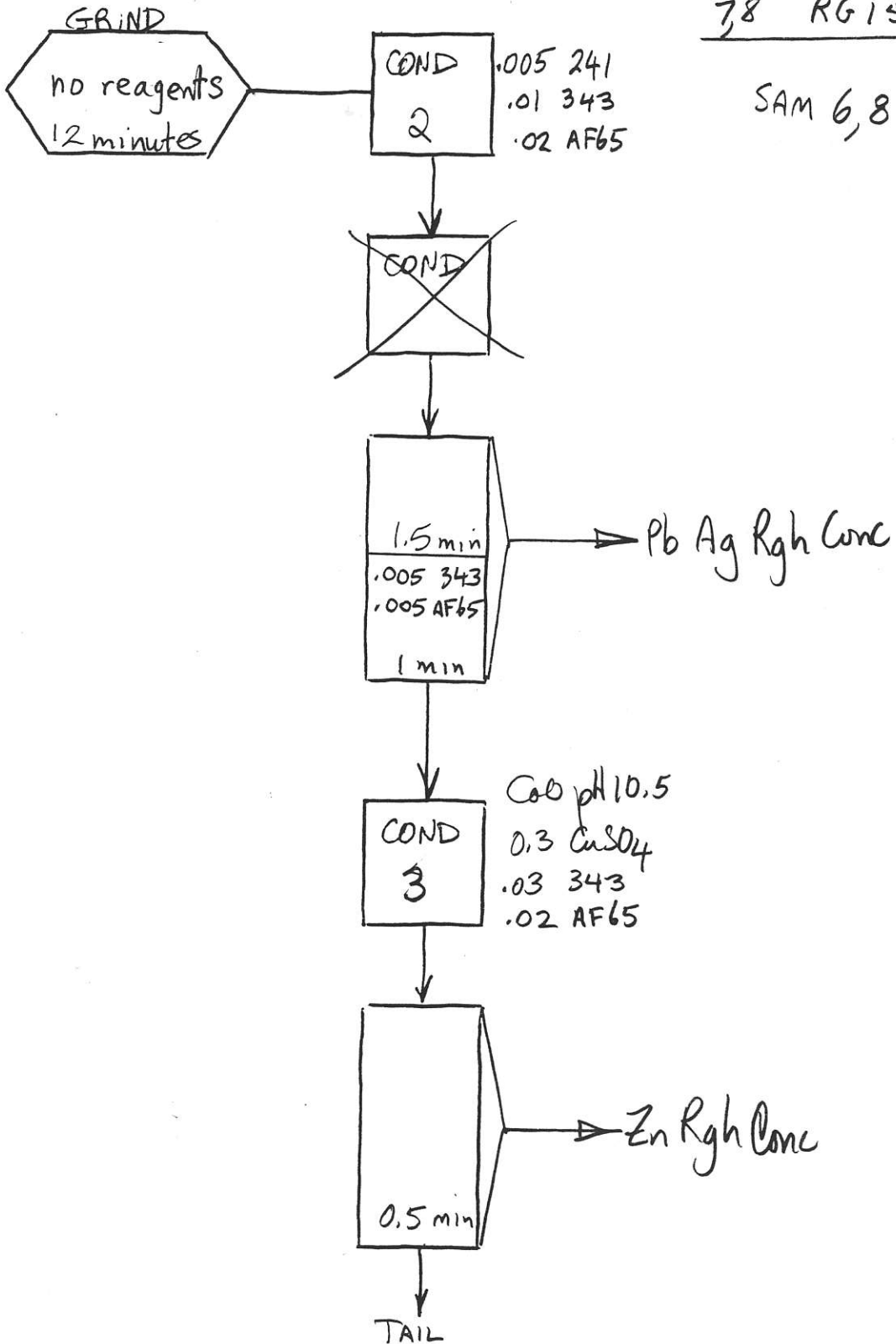
SAMATOSUM

12 Nov /87

SAM 5-8

5,6 RG 152

7,8 RG 153



SAM 6,8 no flotation

SAM 6 32.2 % -200 mesh

SAM 8 31.6 % -200 mesh

SAMATOSUM DEPOSITTEST NUMBER 5SAMP. RG152

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PBAG RGH CONC	84.4	8.74	.71	1.2	1.88	780	86.11	75.97	94.41	88.25
ZN RGH CONC	18.9	1.96	.055	1.33	.086	53	1.49	18.86	.97	1.34
TAIL	862.4	89.30	.01	.008	.009	9	12.39	5.18	4.62	10.40
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	965.7	100.00	.07	.14	.17	77	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 7SAMP. RG153

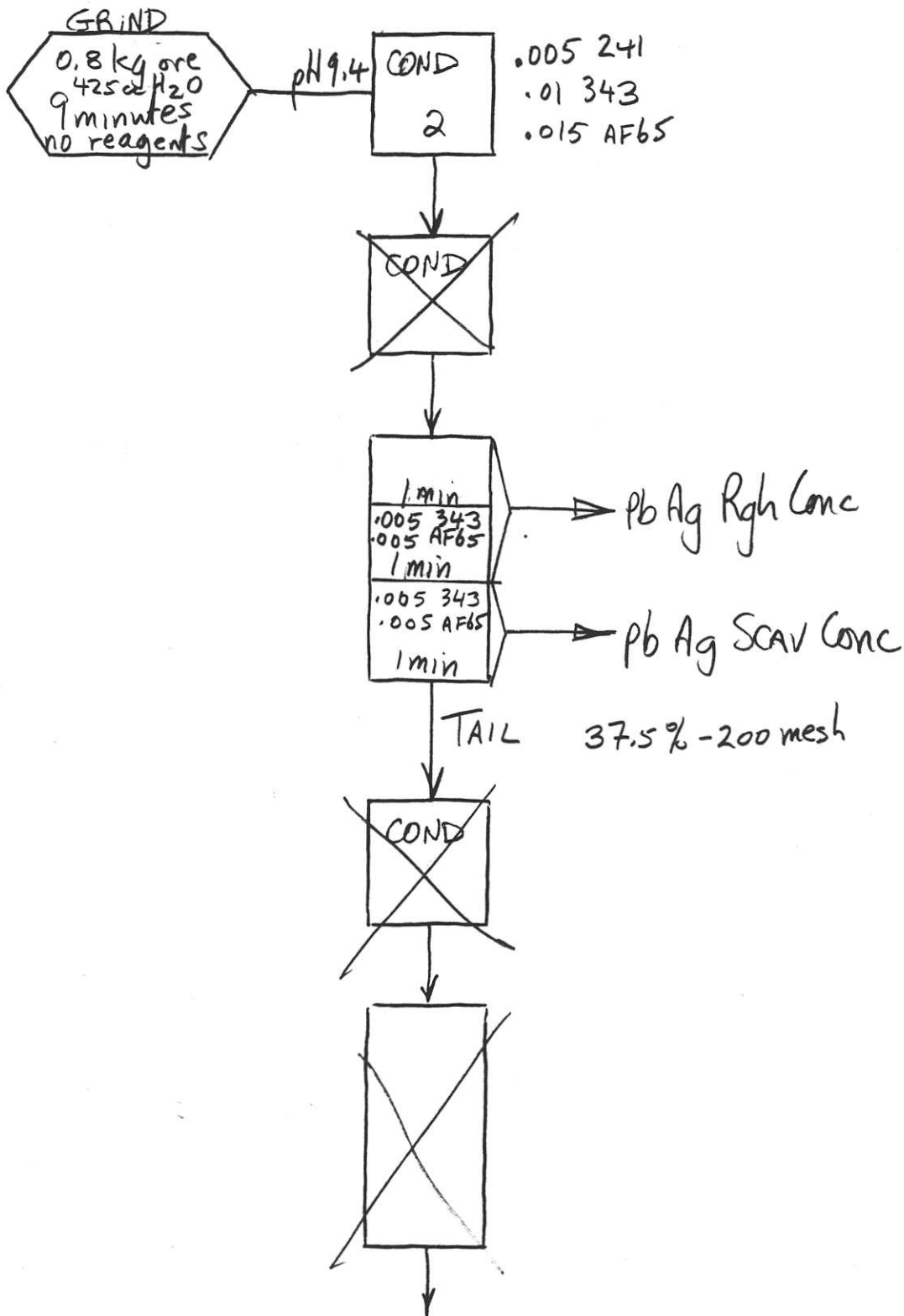
PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PBAG RGH CONC	114.7	11.57	1.65	2.7	.85	370	80.32	68.90	91.96	83.27
ZN RGH CONC	29.1	2.94	.37	3.58	.089	60	4.57	23.18	2.44	3.43
TAIL	847.4	85.49	.042	.042	.007	8	15.11	7.92	5.60	13.30
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	991.2	100.00	.24	.45	.11	51	100	100	100	100

SAMATOSUM

24 Nov /87

SAM 9

RG 188

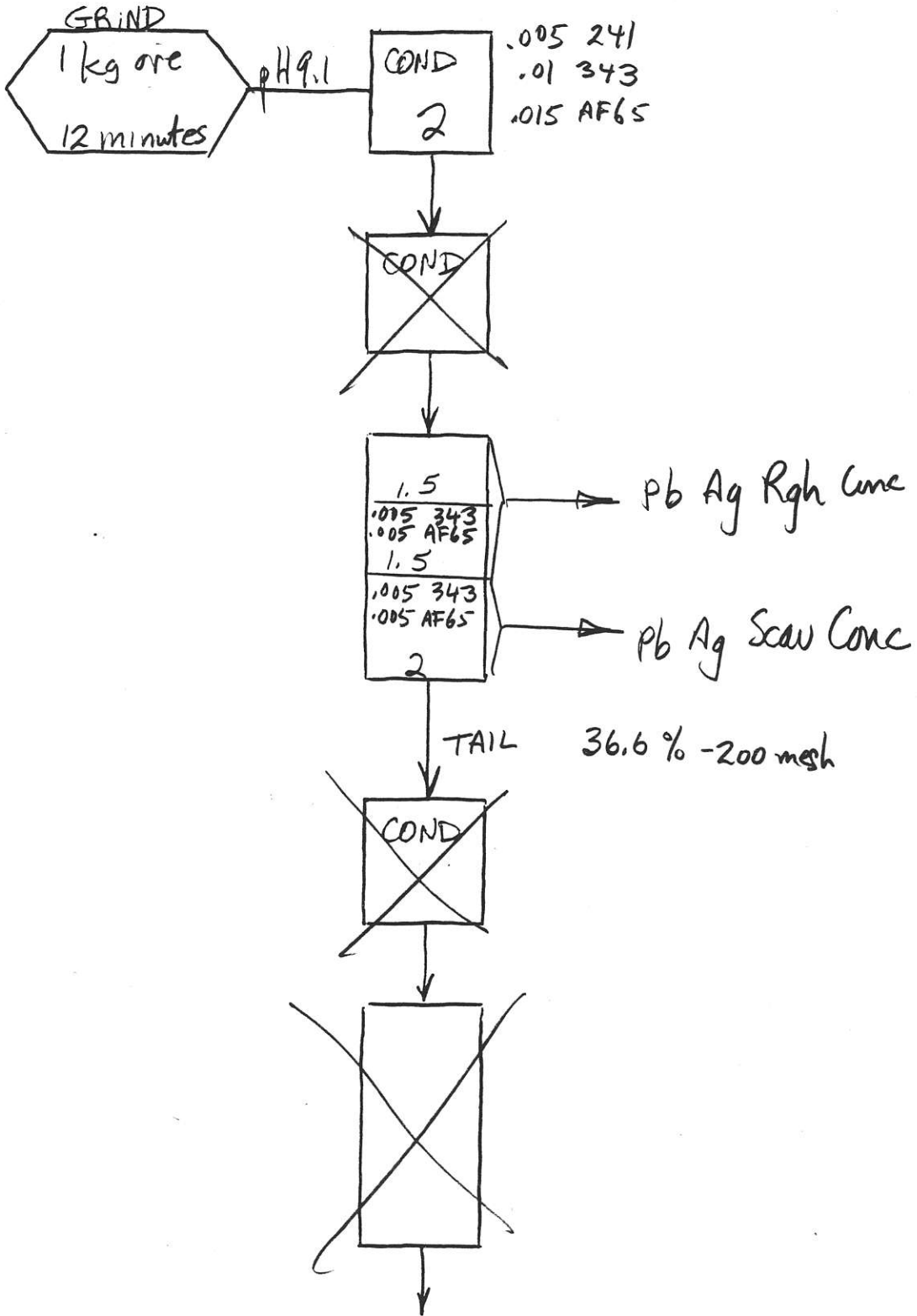


SAMATOSUM

24 NOV/87

SAM 10

RG 191

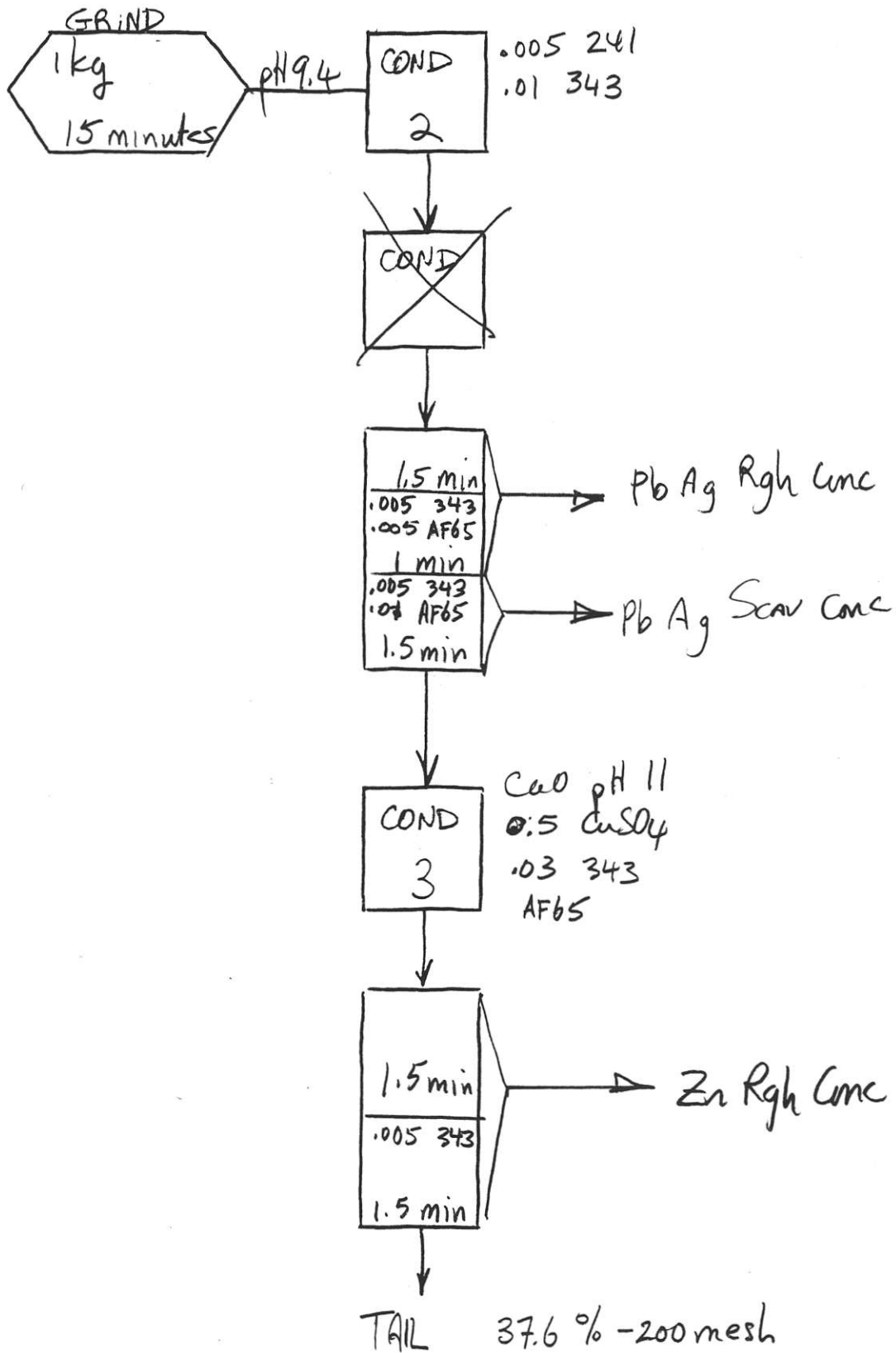


SAMATOSUM

24 Nov/87

SAM 11

RG 180



SAMATOSUM DEPOSITTEST NUMBER 9SAMP. RG188

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PBAG RGH CONC	55.7	6.87	.79	2.62	11.5	11800	74.22	79.20	91.41	90.47
PBAG SCAV CONC	6.1	.75	.42	1.25	2.99	3000	4.32	4.14	2.60	2.52
TAIL	748.6	92.37	.017	.041	.056	68	21.46	16.66	5.98	7.01
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	810.4	100.00	.07	.23	.86	896	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 10SAMP. RG191

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PBAG RGH CONC	84	8.58	.27	3.59	11.2	11700	79.20	80.68	98.26	98.24
PBAG SCAV CONC	8.2	.84	.078	1.35	.73	740	2.23	2.96	.63	.61
TAIL	886.3	90.58	.006	.069	.012	13	18.57	16.36	1.11	1.15
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	978.5	100.00	.03	.38	.98	1022	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 11SAMP. RG180

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PBAG RGH CONC	176.7	17.42	17.2	11.1	11	13500	85.13	58.27	89.19	91.01
PBAG SCAV CONC	46.6	4.59	4.77	12.3	2.52	2500	6.23	17.03	5.39	4.44
ZN RGH CONC	78.2	7.71	2.49	9.63	.9	930	5.45	22.37	3.23	2.77
TAIL	713	70.28	.16	.11	.067	65	3.20	2.33	2.19	1.77
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1014.5	100.00	3.52	3.32	2.15	2584	100	100	100	100

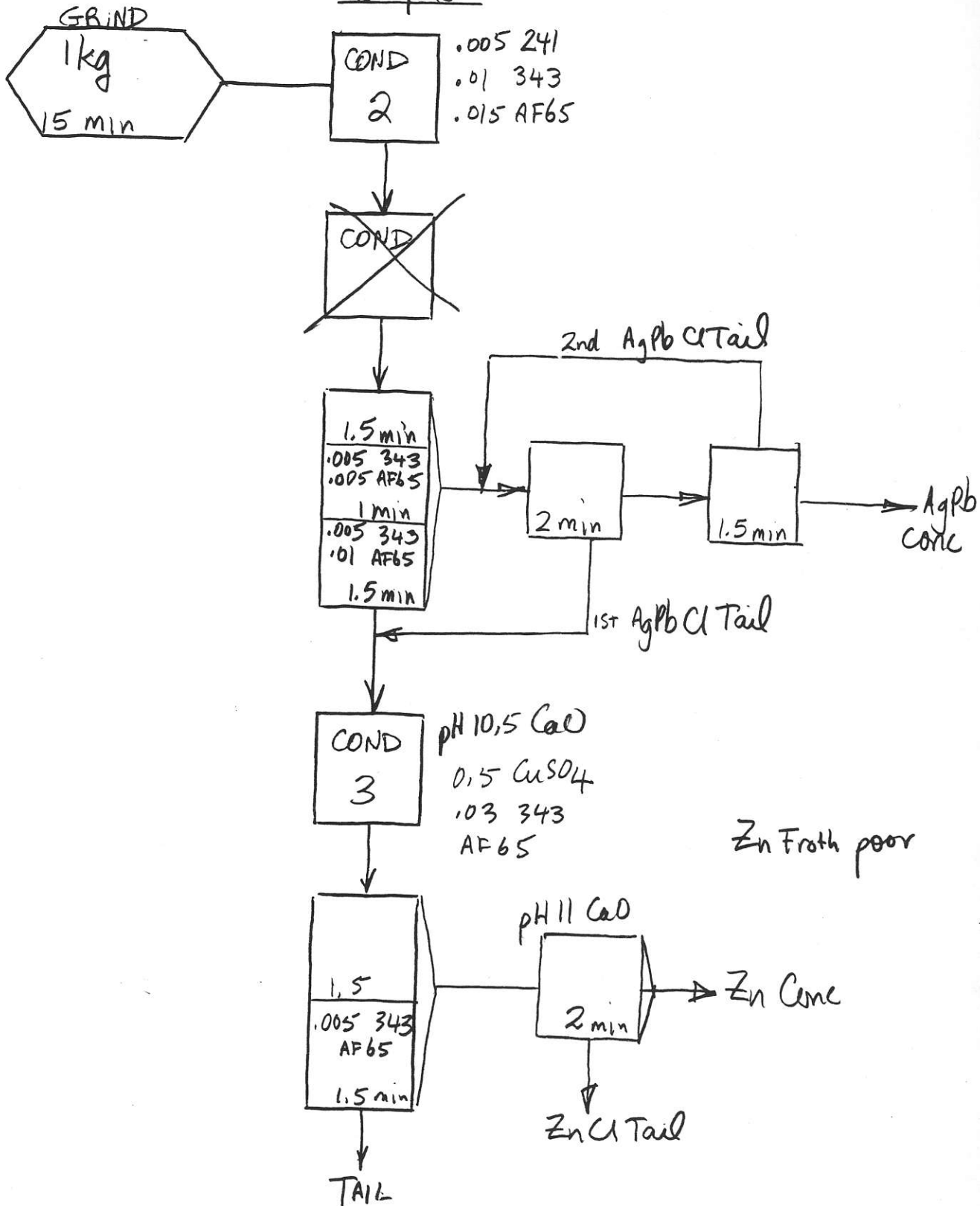
# SAMATOSUM

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## SAM 12

1/3 EACH RG 193, 194, 180

### 3 cycles



TAIL 1 56.5 %-200 mesh

TAIL 2 54.4 "



SAMATOSUM DEPOSITTEST NUMBER 12RG193,194,180 (1/3 each)

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AGPB CONC 1	154	5.29	23.9	11.4	6.77	7800	31.51	17.91	30.83	31.72
2	157.1	5.40	22.1	11	7.08	7900	29.72	17.63	32.89	32.77
3	158.2	5.44	22	11.6	6.57	7400	29.79	18.72	30.73	30.91
1ST AGPB CL TL 3	29.8	1.02	3.4	5.84	.43	460	.87	1.78	.38	.36
2ND AGPB CL TL 3	17.9	.62	10.7	12.8	1.2	1300	1.64	2.34	.64	.61
ZN CONC 1	31.7	1.09	1.93	35.2	.64	510	.52	11.38	.60	.43
2	35	1.20	3.64	39.3	.81	700	1.09	14.03	.84	.65
3	34.7	1.19	4.5	37.7	.8	700	1.34	13.34	.82	.64
ZN CL TAIL 1	31.2	1.07	.92	.98	.2	210				
2	34.4	1.18	1.92	1.58	.31	320	.57	.55	.32	.29
3	34.1	1.17	2.58	1.44	.3	300	.75	.50	.30	.27
TAIL 1	714.8	24.58	.079	.055	.019	19	.48	.40	.40	.36
2	747.1	25.69	.11	.071	.025	21	.70	.54	.55	.41
3	728.6	25.05	.12	.077	.024	21	.75	.57	.52	.40
HEAD	2908.6	100.00	4.02	3.37	1.16	1302	100	100	100	100

SAMATOSUM DEPOSITCYCLE TEST 12PREDICTED RESULTS CYCLES 2+3

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION				
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG	
AGPB CL CONC	157.8	16.35	22	11.3	6.8	7650	91.79	55.21	94.98	95.98	
ZN CONC	34.9	3.62	4.1	38.5	.8	700	3.78	41.60	2.47	1.94	
ZN CL TAIL	34.3	3.55	2.3	1.5	.3	310	2.09	1.59	.91	.85	
RGH TAIL	737.9	76.47	.12	.07	.025	21	2.34	1.60	1.63	1.23	
OVERALL TAIL		80.03	.22	.13	.04	34	4.43	3.19	2.54	2.08	
HEAD	964.9	100.00	3.92	3.35	1.17	1303	100	100	100	100	

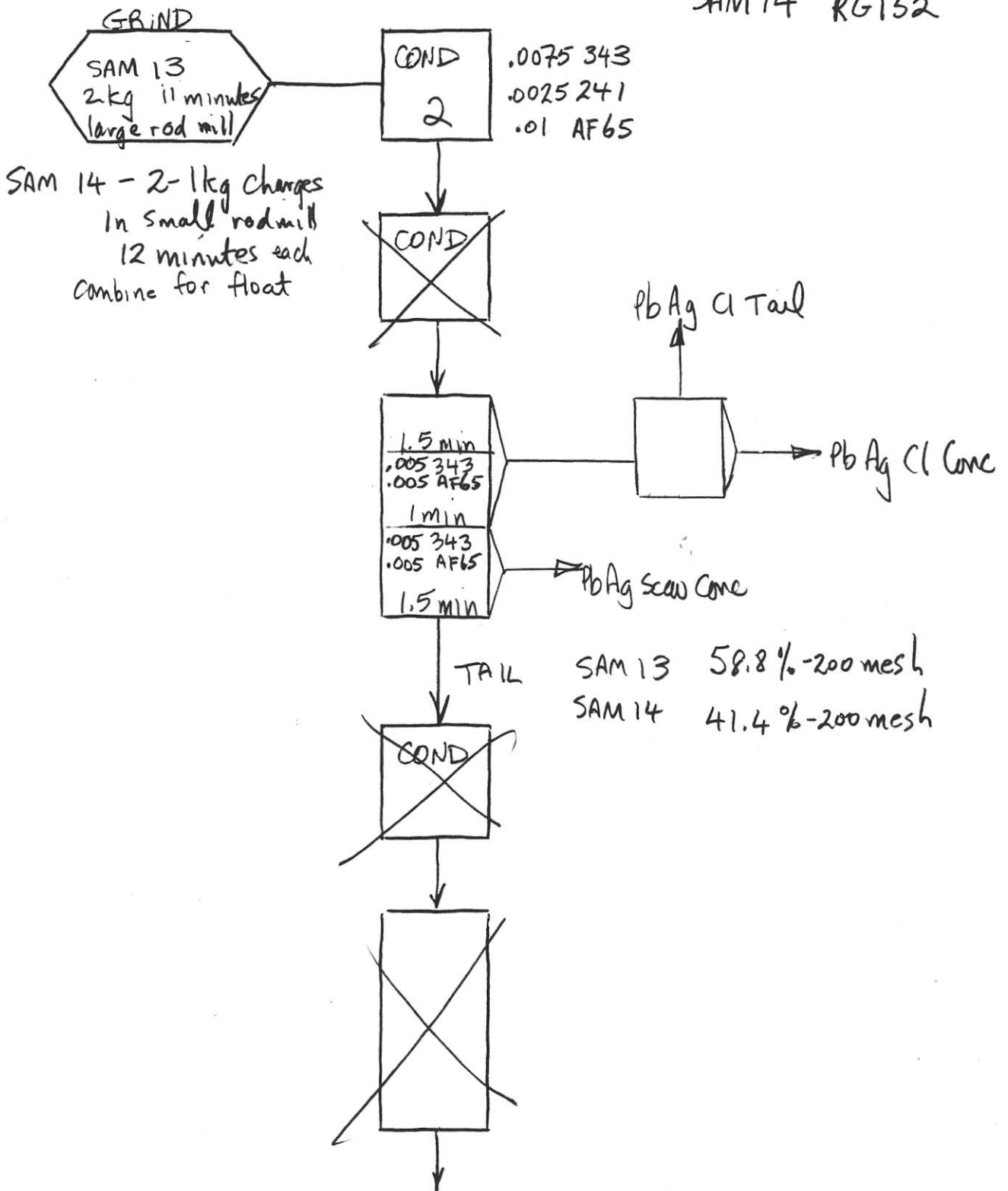
SAMATOSUM

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SAM 13,14

SAM 13 RG153

SAM 14 RG152



SAMATOSUM DEPOSITTEST NUMBER 13SAMP. RG153

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PBAG CL CONC	170	8.31	2.55	3.04	1.21	470	82.61	56.77	92.20	82.94
PBAG CL TAIL	24.9	1.22	.37	.8	.11	62	1.76	2.19	1.23	1.60
PBAG SCAV CONC	37.9	1.85	.49	2.68	.1	58	3.54	11.16	1.70	2.28
TAIL	1814	88.63	.035	.15	.006	7	12.10	29.89	4.88	13.18
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	2046.8	100.00	.26	.44	.11	47	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 14SAMP. RG152

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PBAG CL CONC	124.5	6.26	1.18	1.23	2.66	1200	88.35	58.04	95.14	89.66
PBAG CL TAIL	25.7	1.29	.086	.28	.16	94	1.33	2.73	1.18	1.45
PBAG SCAV CONC	29	1.46	.092	.76	.13	74	1.60	8.35	1.08	1.29
TAIL	1810.6	90.99	.008	.045	.005	7	8.71	30.88	2.60	7.61
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1989.8	100.00	.08	.13	.17	84	100	100	100	100

# SAMATOSUM

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## SAM 15-20

TEST	ORE
15,16	R6100
17,19	R6105
18,20	R6137

**GRIND**  
 1 kg ore  
 525 cc H<sub>2</sub>O except  
 750 cc SAM 20

TEST	minutes	%-200 mesh
15	15	53
16	22	68
17	15	60
18	15	44
19	22	85
20	15	53

COND  
 2  
 .005 241  
 .0075 343  
 .01 AF65

~~COND~~

1.5 min  
 .0025 343  
 .0025 AF65  
 1 min  
 .0025 343  
 .005 AF65  
 1.5 min

SAM 18 - rods pack together with only 525 cc H<sub>2</sub>O

TESTS 15,16  
 18-20 .03 starch  
 SO<sub>2</sub> pH 4.5 (pH 5.5 TEST 20)

COND  
 5

1 min → Pb Ag Cl Conc

Pb Ag Cl Tail

TAIL

~~COND~~

~~COND~~

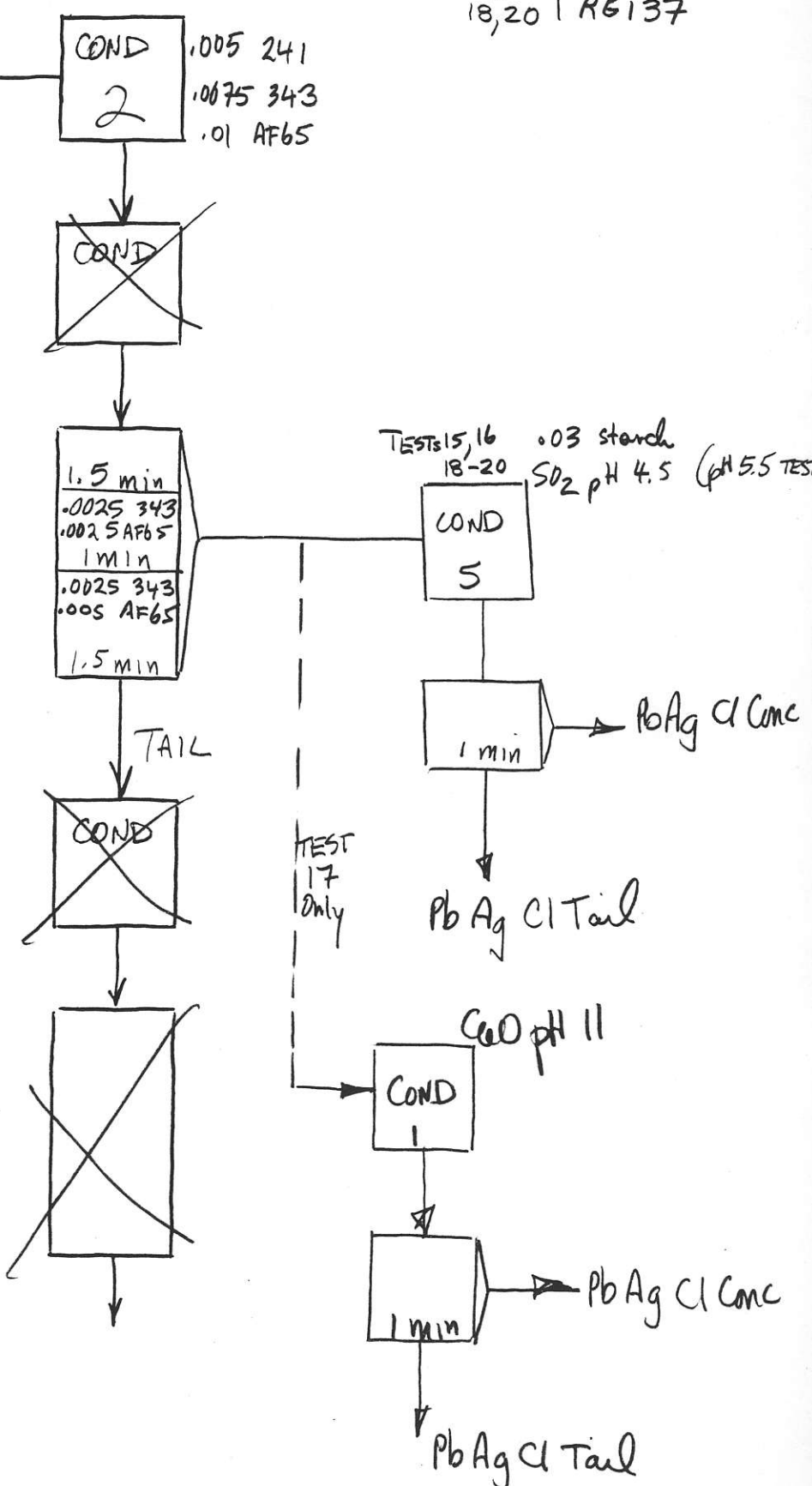
TEST 17 only

COND  
 1

CaO pH 11

1 min → Pb Ag Cl Conc

Pb Ag Cl Tail



SAMATOSUM DEPOSITTEST NUMBER 15SAMP. RG100

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PBAG CL CONC	81.9	8.28	7.6	10.9	11.6	7989	56.65	34.90	81.74	81.11
PBAG CL TAIL	94.9	9.60	4.25	12.5	1.98	1358	36.71	46.38	16.17	15.98
TAIL	811.8	82.12	.09	.59	.03	29	6.65	18.72	2.10	2.92
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	988.6	100.00	1.11	2.59	1.18	816	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 16SAMP. RG100

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PBAG CL CONC	101.9	10.61	8.27	11.6	9.63	6970	79.49	48.13	91.96	92.11
PBAG CL TAIL	69	7.19	2.35	13.2	.9	665	15.30	37.09	5.82	5.95
TAIL	789.2	82.20	.07	.46	.03	19	5.21	14.78	2.22	1.94
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	960.1	100.00	1.10	2.56	1.11	803	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 17SAMP. RG105

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PBAG CL CONC	130.4	12.57	11.13	15.8	3.32	2486	80.58	55.53	88.39	88.32
PBAG CL TAIL	51.1	4.93	3.33	12.7	.61	487	9.45	17.49	6.36	6.78
TAIL	855.6	82.50	.21	1.17	.03	21	9.98	26.98	5.24	4.90
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1037.1	100.00	1.74	3.58	.47	354	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 18SAMP. RG137

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PBAG CL CONC	106.5	10.66	11.01	12.4	8.83	8500	56.62	31.83	82.29	82.60
PBAG CL TAIL	101.7	10.18	5.88	18.4	1.29	1245	28.87	45.10	11.48	11.55
TAIL	790.9	79.16	.38	1.21	.09	81	14.51	23.07	6.23	5.85
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	999.1	100.00	2.07	4.15	1.14	1097	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 19SAMP. RG105

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PBAG CL CONC	50.4	5.15	19.32	14.6	8.62	6257	56.71	20.37	85.45	84.22
PBAG CL TAIL	108.4	11.09	5.27	14.3	.38	326	33.27	42.91	8.10	9.44
TAIL	819	83.76	.21	1.62	.04	29	10.02	36.73	6.44	6.34
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	977.8	100.00	1.76	3.69	.52	383	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 20SAMP. RG137

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
PBAG CL CONC	120.8	12.00	11.08	10.1	8.45	7848	63.73	28.51	85.77	86.00
PBAG CL TAIL	95	9.44	5.77	19.3	1.2	1142	26.10	42.85	9.58	9.84
TAIL	790.6	78.56	.27	1.55	.07	58	10.16	28.64	4.65	4.16
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1006.4	100.00	2.09	4.25	1.18	1095	100	100	100	100

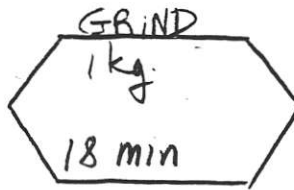


SAMATOSUM

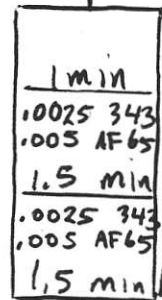
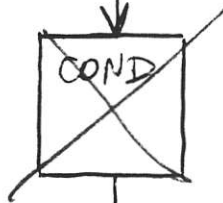
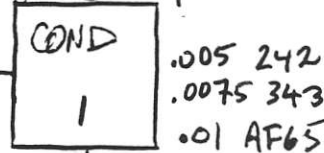
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SAM 21,22

COMPOSITE I



SAM (22) only CaO to pH 10



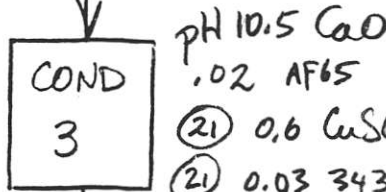
(21) .03 starch

(22) .02 starch, pH 4.5 H<sub>2</sub>SO<sub>4</sub>



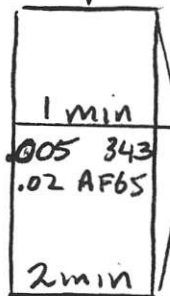
AgCl CONC

AgCl Tail



(22) 0.4 CuSO<sub>4</sub>

(22) 0.02 343



Zn Ryh Conc  
(not good froth)

TAIL  
(21) 74.9 % -200 mesh  
(22) 74.1 % -200 mesh

<u>SAMATOSUM DEPOSIT</u>		<u>TEST NUMBER</u>		<u>21</u>		<u>SAMP. COMP I</u>					
PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION				
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG	
AG CL CONC	88.9	8.88	19.14	15.5	9.73	6874	52.54	11.68	72.18	80.52	
AG CL TAIL	92	9.19	14.47	29.9	2.21	1224	41.10	23.32	16.97	14.84	
ZN RGH CONC	133.8	13.36	1.18	56.5	.87	207	4.87	64.07	9.71	3.65	
TAIL	686.7	68.57	.07	.16	.02	11	1.48	.93	1.15	1.00	
	0	.00	0	0	0	0	.00	.00	.00	.00	
	0	.00	0	0	0	0	.00	.00	.00	.00	
	0	.00	0	0	0	0	.00	.00	.00	.00	
	0	.00	0	0	0	0	.00	.00	.00	.00	
HEAD	1001.4	100.00	3.23	11.78	1.20	758	100	100	100	100	

<u>SAMATOSUM DEPOSIT</u>		<u>TEST NUMBER</u>		<u>21</u>		<u>SAMP. COMP I</u>					
PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION				
	gms	%	As	Hg	Insol	AU	<del>PB</del>	<del>ZN</del>	<del>CU</del>	AU	
AG CL CONC	88.9	8.88	0.6	0	<del>0.6</del>	8.6				68.60	
AG CL TAIL	92	9.19	0	0	0	2.3				18.99	
ZN RGH CONC	133.8	13.36	0.015	0	0	.86				10.32	
TAIL	686.7	68.57	0	0	0	.034				2.09	
	0	.00	0	0	0	0				.00	
	0	.00	0	0	0	0				.00	
	0	.00	0	0	0	0				.00	
	0	.00	0	0	0	0				.00	
HEAD	1001.4	100.00	<del>0.6</del>	<del>0.6</del>	<del>0.6</del>	1.11	100	100	100	100	



SAMATOSUM DEPOSITTEST NUMBER 22SAMP. COMP I

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG CL CONC	134.8	13.52	19.9	20.9	7.56	5105	83.21	25.84	83.60	89.34
AG CL TAIL	38.2	3.83	9.15	22.9	1.87	1248	10.84	8.02	5.86	6.19
ZN RGH CONC	141.8	14.22	.92	49.9	.81	180	4.05	64.89	9.42	3.31
TAIL	682.6	68.44	.09	.2	.02	13	1.91	1.25	1.12	1.15
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	997.4	100.00	3.23	10.93	1.22	772	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 22SAMP. COMP I

PRODUCT	WEIGHT		ASSAYS % OR G/T			% DISTRIBUTION				
	gms	%	<del>PB</del> As	<del>ZN</del> Fe	<del>CU</del> Insol	AU	<del>PB</del>	<del>ZN</del>	<del>CU</del>	<del>AG</del> Au
AG CL CONC	134.8	13.52	0.43	12.7	10.9	6.9				82.77
AG CL TAIL	38.2	3.83	0	9.01	28.6	1.9				6.46
ZN RGH CONC	141.8	14.22	0.012	2.95	16.0	.69				8.71
TAIL	682.6	68.44	0	3.87	78.6	.034				2.07
	0	.00	0	0	0	0				.00
	0	.00	0	0	0	0				.00
	0	.00	0	0	0	0				.00
	0	.00	0	0	0	0				.00
HEAD	997.4	100.00	<del>3.23</del>	<del>10.93</del>	<del>1.22</del>	1.13	100	100	100	100

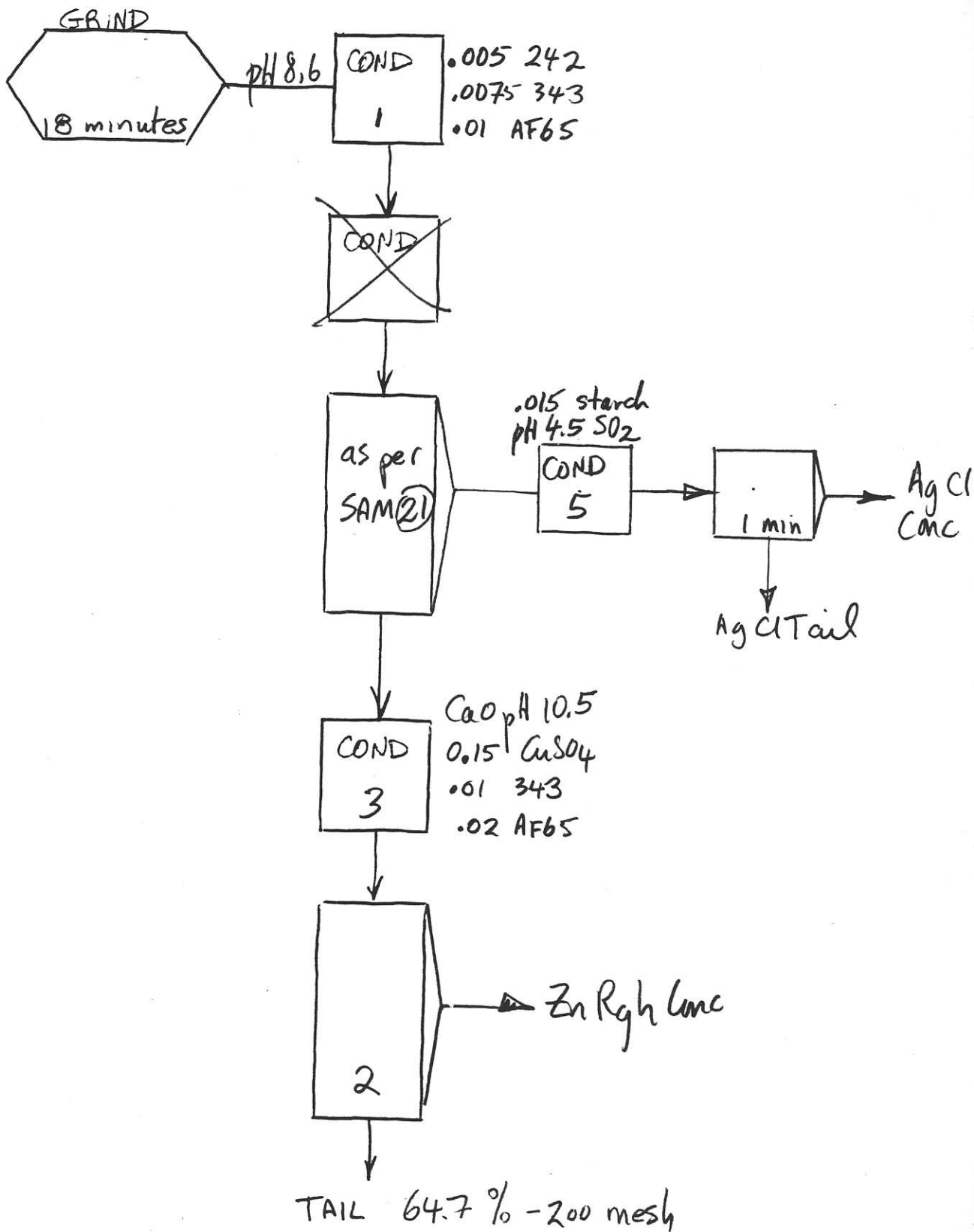


SAMATOSUM

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SAM 23

COMPOSITE II



SAMATOSUM DEPOSITTEST NUMBER 23SAMP. COMP II

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG CL CONC	135.4	13.18	11.54	13.2	7.96	7300	84.04	52.97	92.51	92.01
AG CL TAIL	56.7	5.52	2.9	15.1	.86	789	8.84	25.37	4.19	4.16
ZN RGH CONC	43.5	4.23	1.04	14.8	.34	270	2.43	19.08	1.27	1.09
TAIL	792.1	77.08	.11	.11	.03	37	4.69	2.58	2.04	2.73
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1027.7	100.00	1.81	3.28	1.13	1045	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 23SAMP. COMP II

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AU	PB	ZN	CU	AU
AG CL CONC	135.4	13.18	0	0	0	11.7				86.02
AG CL TAIL	56.7	5.52	0	0	0	2.3				7.08
ZN RGH CONC	43.5	4.23	0	0	0	1.1				2.60
TAIL	792.1	77.08	0	0	0	.1				4.30
	0	.00	0	0	0	0				.00
	0	.00	0	0	0	0				.00
	0	.00	0	0	0	0				.00
	0	.00	0	0	0	0				.00
HEAD	1027.7	100.00	.00	.00	.00	1.79	100	100	100	100



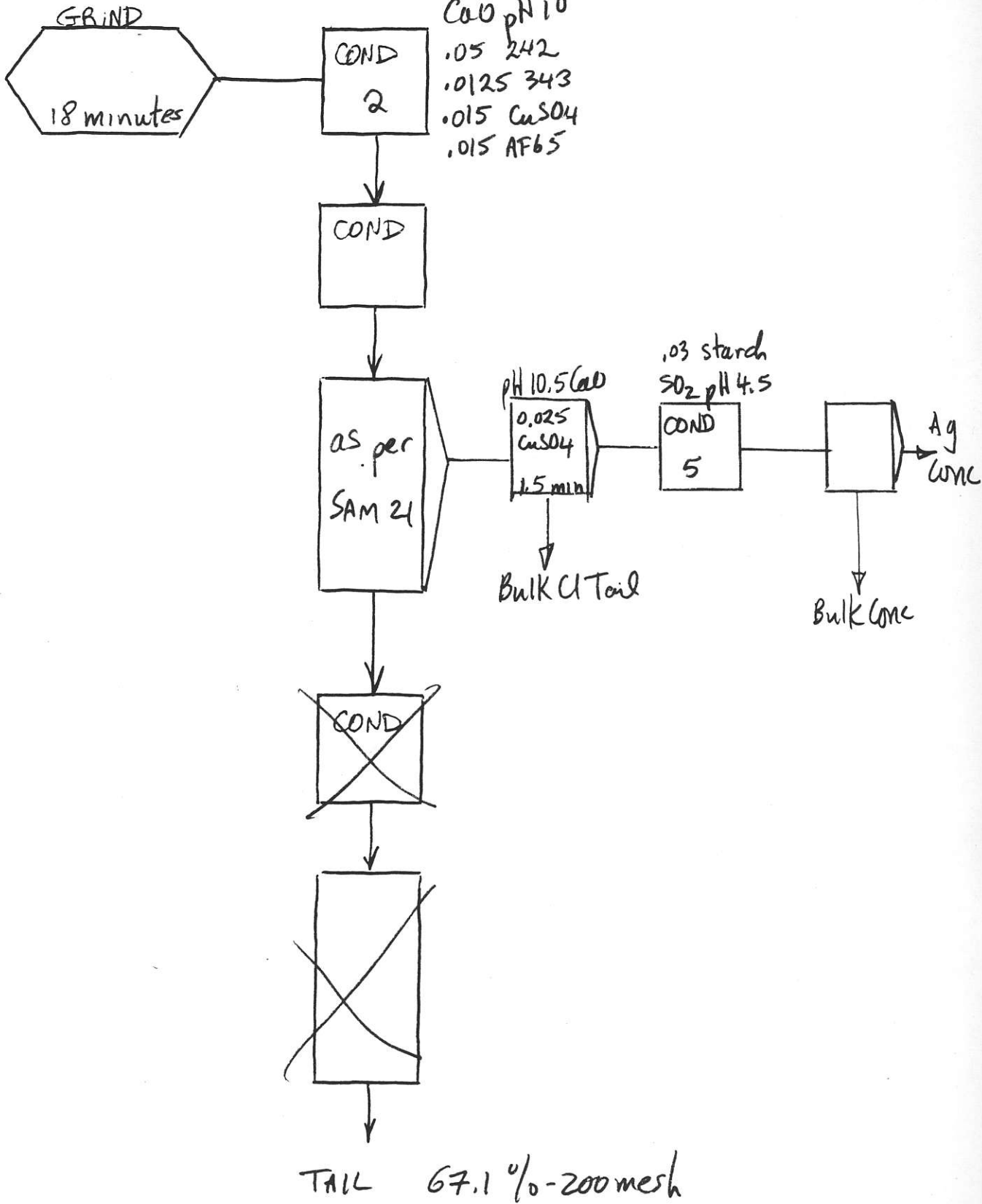


SAMATOSUM

6 JAN / 88

SAM 24

COMPOSITE II



SAMATOSUM DEPOSITTEST NUMBER 24SAMP. COMP II

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG CONC	110.5	11.45	12.24	22.2	8.46	7855	75.33	79.29	86.53	86.73
BULK CONC	62.7	6.50	5.21	8.98	1.75	1570	18.19	18.20	10.16	9.84
BULK CL TAIL	30.8	3.19	.81	.79	.42	374	1.39	.79	1.20	1.15
TAIL	760.7	78.85	.12	.07	.03	30	5.08	1.72	2.11	2.28
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	964.7	100.00	1.86	3.21	1.12	1037	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 24SAMP. COMP II

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AU	PB	ZN	CU	AG
AG CONC	110.5	11.45	0	0	0	12.3				71.59
BULK CONC	62.7	6.50	0	0	0	6.5				21.47
BULK CL TAIL	30.8	3.19	0	0	0	.82				1.33
TAIL	760.7	78.85	0	0	0	.14				5.61
	0	.00	0	0	0	0				.00
	0	.00	0	0	0	0				.00
	0	.00	0	0	0	0				.00
	0	.00	0	0	0	0				.00
HEAD	964.7	100.00	.00	.00	.00	1.97	100	100	100	100

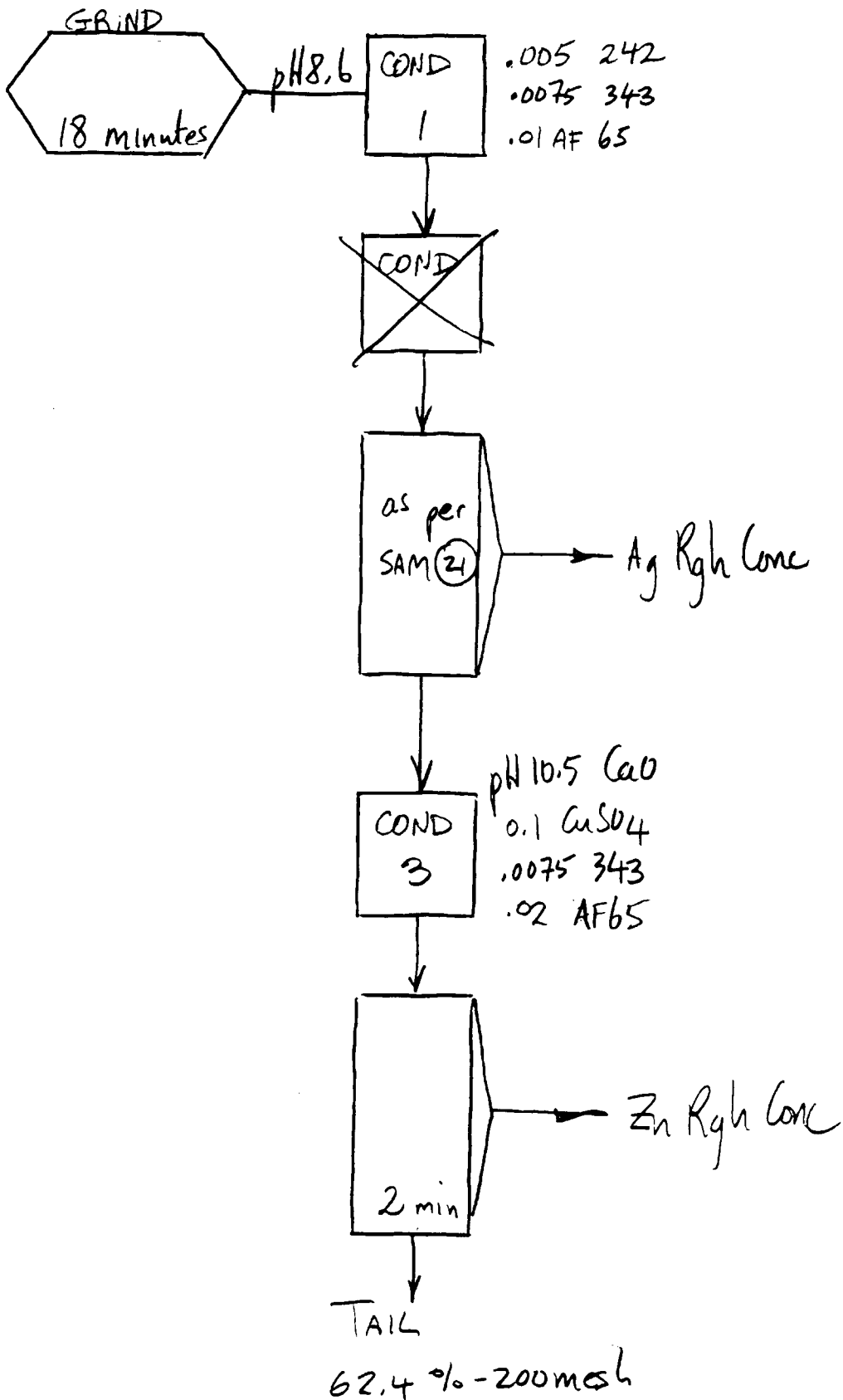


SAMATOSUM

6 JAN /88

SAM 25

COMPOSITE III



SAMATOSUM DEPOSITTEST NUMBER 25SAMP. COMP III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	153	15.14	7.4	14	6.69	5839	90.87	75.17	97.05	97.27
ZN RGH CONC	51.9	5.14	.95	12.7	.29	235	3.96	23.13	1.43	1.33
TAIL	805.4	79.72	.08	.06	.02	16	5.17	1.70	1.53	1.40
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1010.3	100.00	1.23	2.82	1.04	909	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 25SAMP. COMP III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AU	PB	ZN	CU	AU
AG RGH CONC	153	15.14	0	0	0	8.6				92.63
ZN RGH CONC	51.9	5.14	0	0	0	.93				3.40
TAIL	805.4	79.72	0	0	0	.07				3.97
	0	.00	0	0	0	0				.00
	0	.00	0	0	0	0				.00
	0	.00	0	0	0	0				.00
	0	.00	0	0	0	0				.00
	0	.00	0	0	0	0				.00
HEAD	1010.3	100.00	.00	.00	.00	1.41	100	100	100	100





SAMATOSUM DEPOSITTEST NUMBER 26SAMP. COMP III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	S	AU	PB	ZN	S	AU
BULK CONC	127.1	12.87	0	0	34.5	10.3			67.69	91.05
2ND CL TAIL	16.1	1.63	0	0	26	.89			6.46	1.00
1ST CL TAIL	39.5	4.00	0	0	8.37	.86			5.10	2.36
TAIL	804.6	81.49	0	0	1.67	.1			20.74	5.60
	0	.00	0	0	0	0			.00	.00
	0	.00	0	0	0	0			.00	.00
	0	.00	0	0	0	0			.00	.00
	0	.00	0	0	0	0			.00	.00
HEAD	987.3	100.00	.00	.00	6.56	1.46	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 26SAMP. COMP III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
BULK CONC	127.1	12.87	8.53	19.8	7.44	6559	90.12	96.66	94.97	95.73
2ND CL TAIL	16.1	1.63	1.78	1.88	1	843	2.38	1.16	1.62	1.56
1ST CL TAIL	39.5	4.00	.45	.42	.25	171	1.48	.64	.99	.78
TAIL	804.6	81.49	.09	.05	.03	21	6.02	1.55	2.42	1.94
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	987.3	100.00	1.22	2.64	1.01	882	100	100	100	100



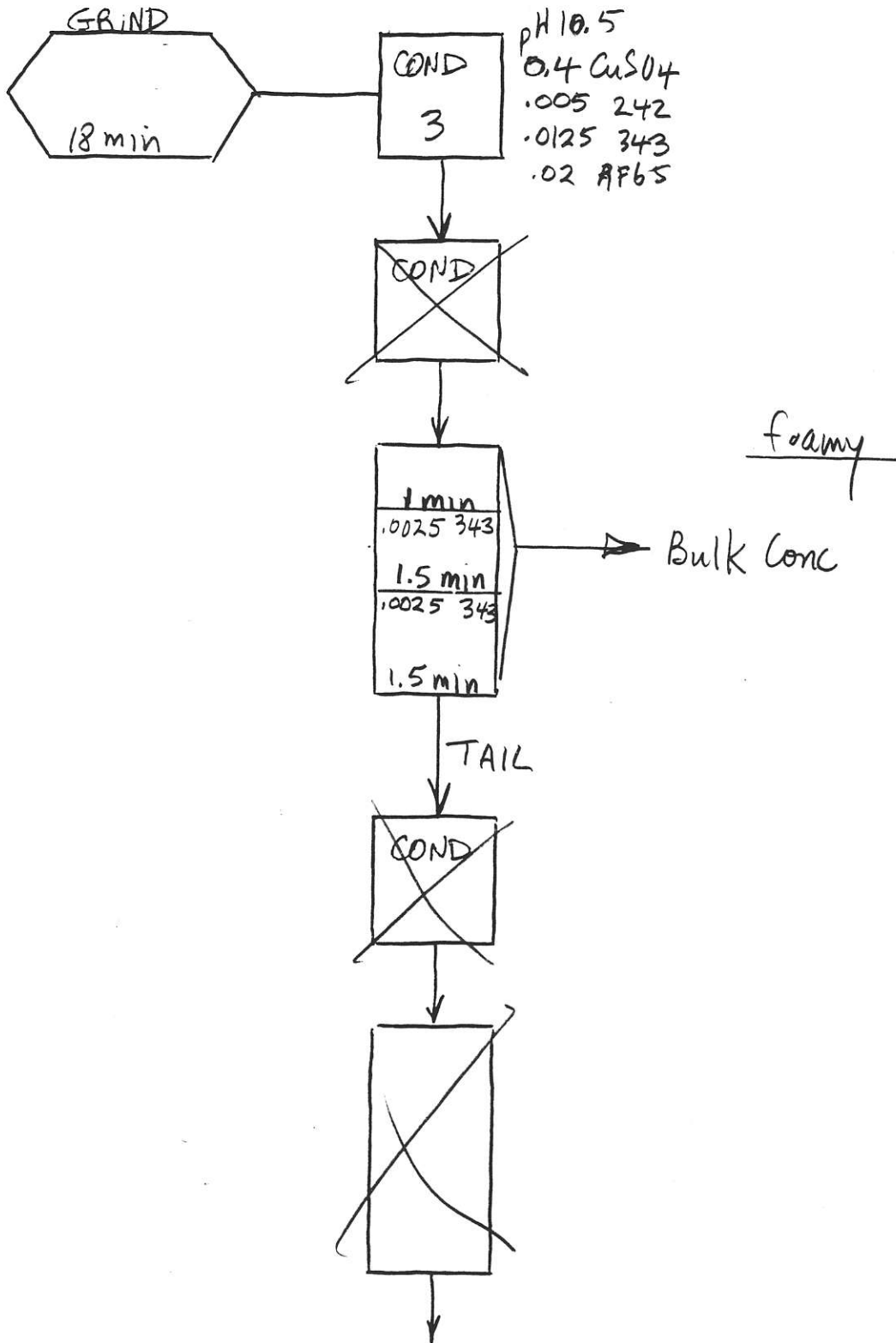


SAMATOSUM

12 Jan/88

SAM 27

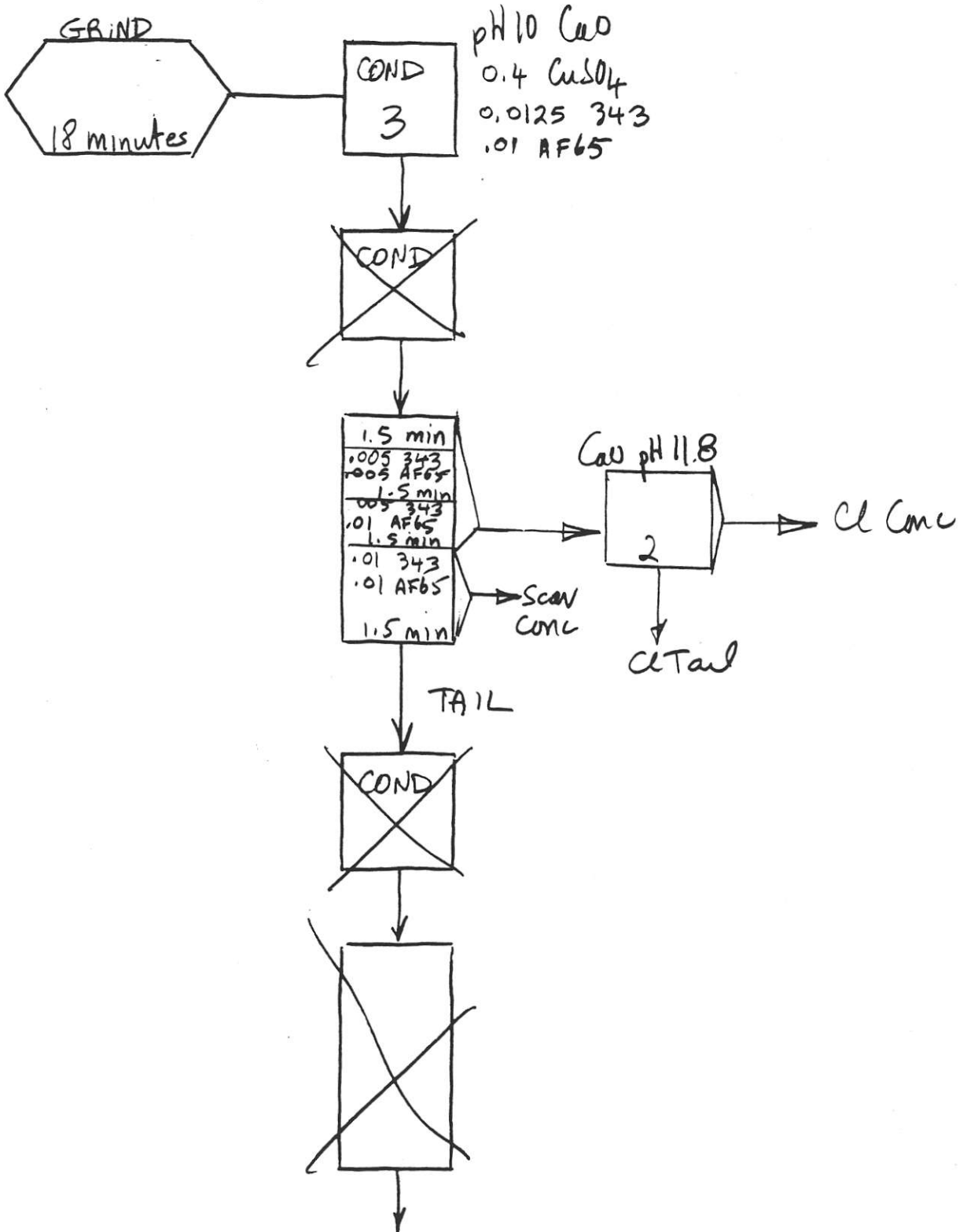
COMPOSITE I



SAMATOSUM

12 JAN/88

SAM 28



SAMATOSUM DEPOSITTEST NUMBER 27SAMP. COMP I

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
BULK CONC	330	31.79	10.2	30.3	3.6	2301	99.17	99.51	99.41	98.98
TAIL	708	68.21	.04	.07	.01	11	.83	.49	.59	1.02
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1038	100.00	3.27	9.68	1.15	739	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 28SAMP. COMP I

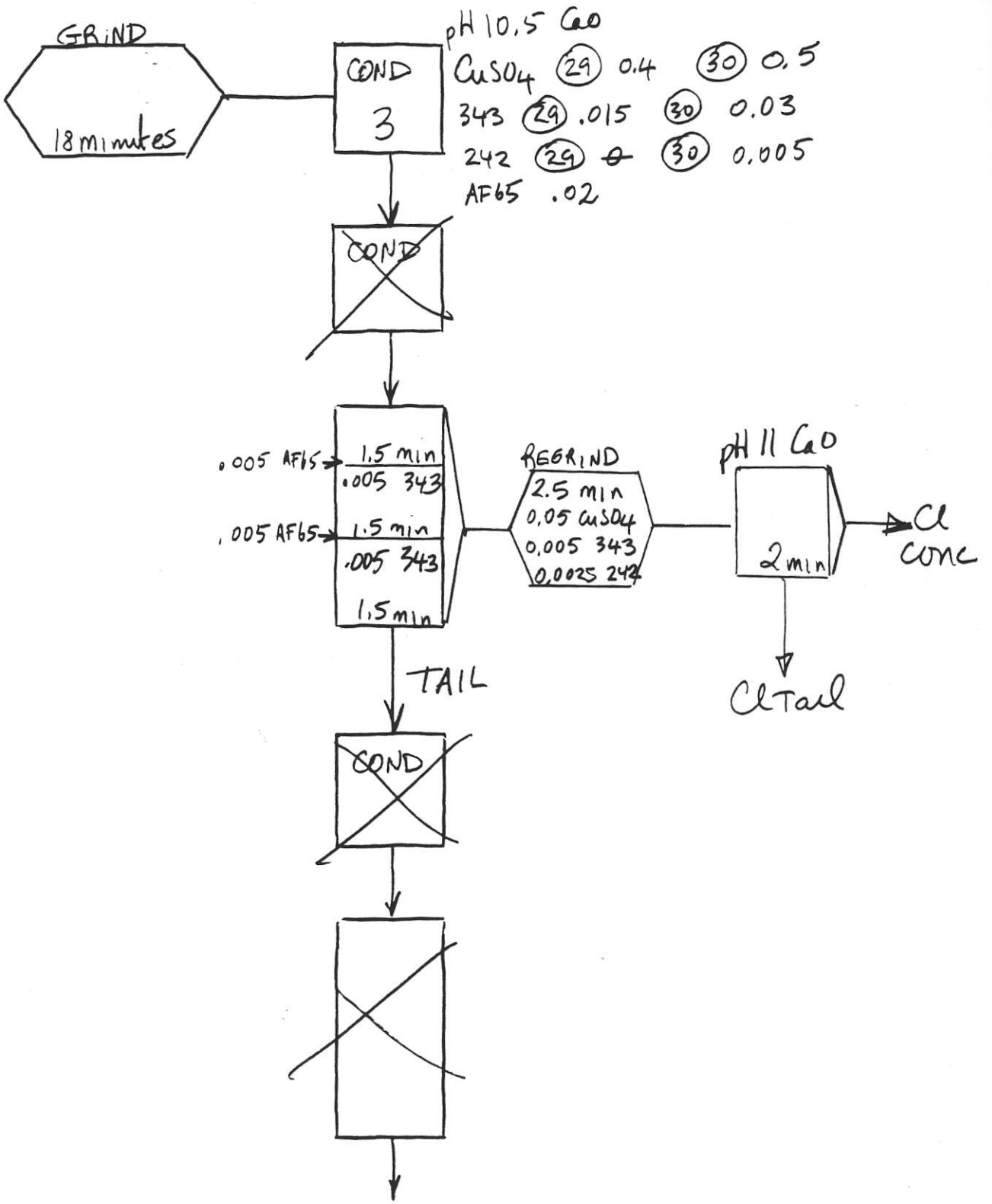
PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
CL CONC	174	18.69	13.7	35.6	5.29	3699	81.75	66.94	86.53	88.39
CL TAIL	18	1.93	4.83	7.82	1.34	1101	2.98	1.52	2.27	2.72
SCAV CONC	89	9.56	4.2	30.6	1.12	559	12.82	29.43	9.37	6.83
TAIL	650	69.82	.11	.3	.03	23	2.45	2.11	1.83	2.05
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	931	100.00	3.13	9.94	1.14	782	100	100	100	100

SAMATOSUM

12 JAN/88

SAM 2930

COMPOSITE I



<u>SAMATOSUM DEPOSIT</u>		<u>TEST NUMBER 29</u>					<u>SAMP. COMP I</u>				
PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION				
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG	
CL CONC	121	12.30	16	29.6	6.83	4999	58.40	35.82	72.68	78.95	
CL TAIL	40	4.07	5.26	13.1	3.24	2098	6.35	5.24	11.40	10.95	
TAIL	823	83.64	1.42	7.16	.22	94	35.25	58.94	15.92	10.10	
	0	.00	0	0	0	0	.00	.00	.00	.00	
	0	.00	0	0	0	0	.00	.00	.00	.00	
	0	.00	0	0	0	0	.00	.00	.00	.00	
	0	.00	0	0	0	0	.00	.00	.00	.00	
	0	.00	0	0	0	0	.00	.00	.00	.00	
HEAD	984	100.00	3.37	10.16	1.16	779	100	100	100	100	

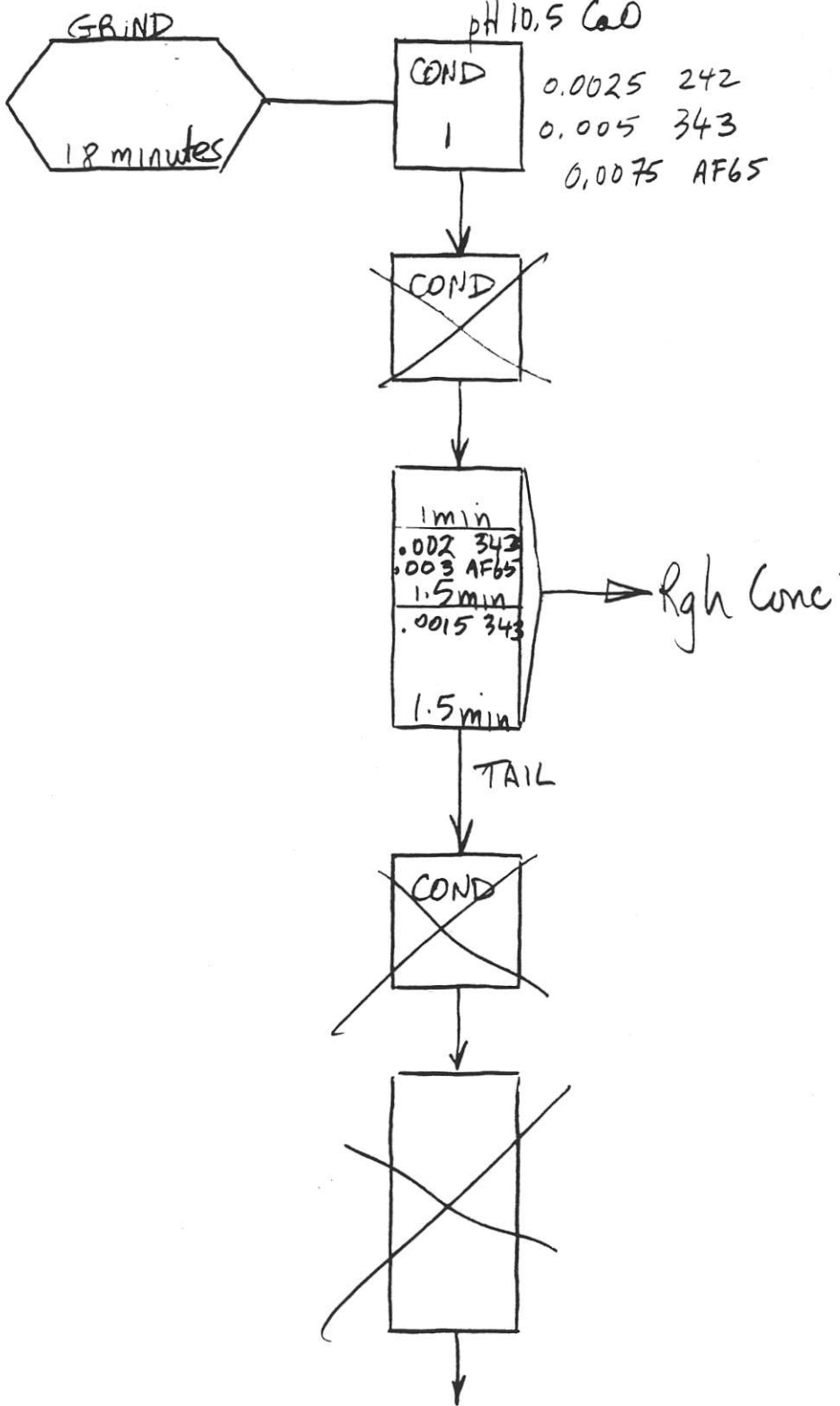
<u>SAMATOSUM DEPOSIT</u>		<u>TEST NUMBER 30</u>					<u>SAMP. COMP I</u>				
PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION				
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG	
CL CONC	122	13.36	13.9	36.7	5.3	3898	57.06	52.67	62.71	67.04	
CL TAIL	88	9.64	9.55	23.6	3.41	2201	28.28	24.43	29.10	27.31	
TAIL	703	77.00	.62	2.77	.12	57	14.67	22.91	8.18	5.65	
	0	.00	0	0	0	0	.00	.00	.00	.00	
	0	.00	0	0	0	0	.00	.00	.00	.00	
	0	.00	0	0	0	0	.00	.00	.00	.00	
	0	.00	0	0	0	0	.00	.00	.00	.00	
	0	.00	0	0	0	0	.00	.00	.00	.00	
HEAD	913	100.00	3.26	9.31	1.13	777	100	100	100	100	



SAMATOSUM

SAM 31

COMPOSITE II

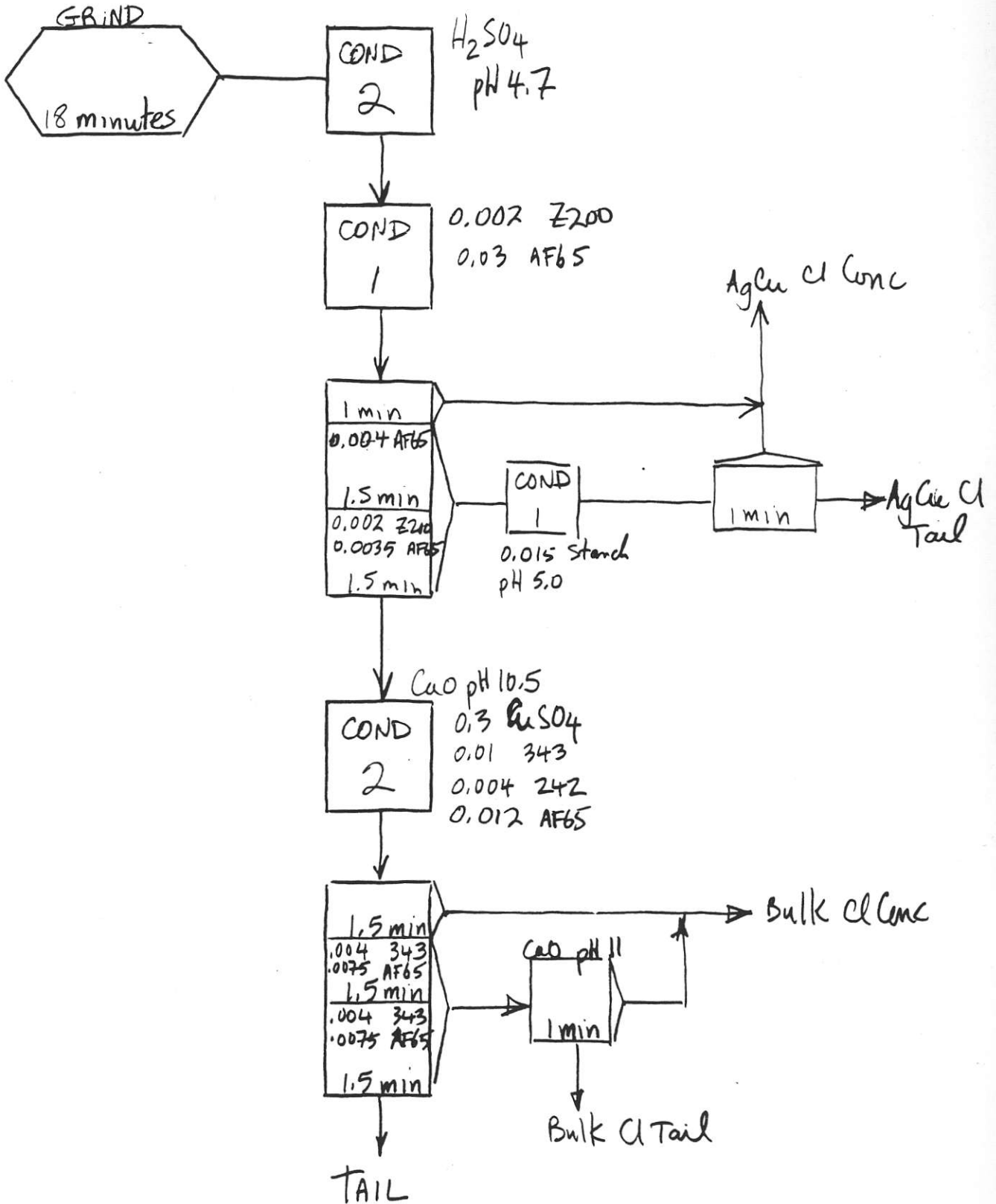




SAMATOSUM

SAM 32

COMPOSITE II



SAMATOSUM DEPOSITTEST NUMBER 31SAMP. COMP II

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
RGH CONC	123	12.23	11.9	11.6	8.33	8000	77.91	43.37	92.65	93.07
TAIL	883	87.77	.47	2.11	.092	83	22.09	56.63	7.35	6.93
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1006	100.00	1.87	3.27	1.10	1051	100	100	100	100

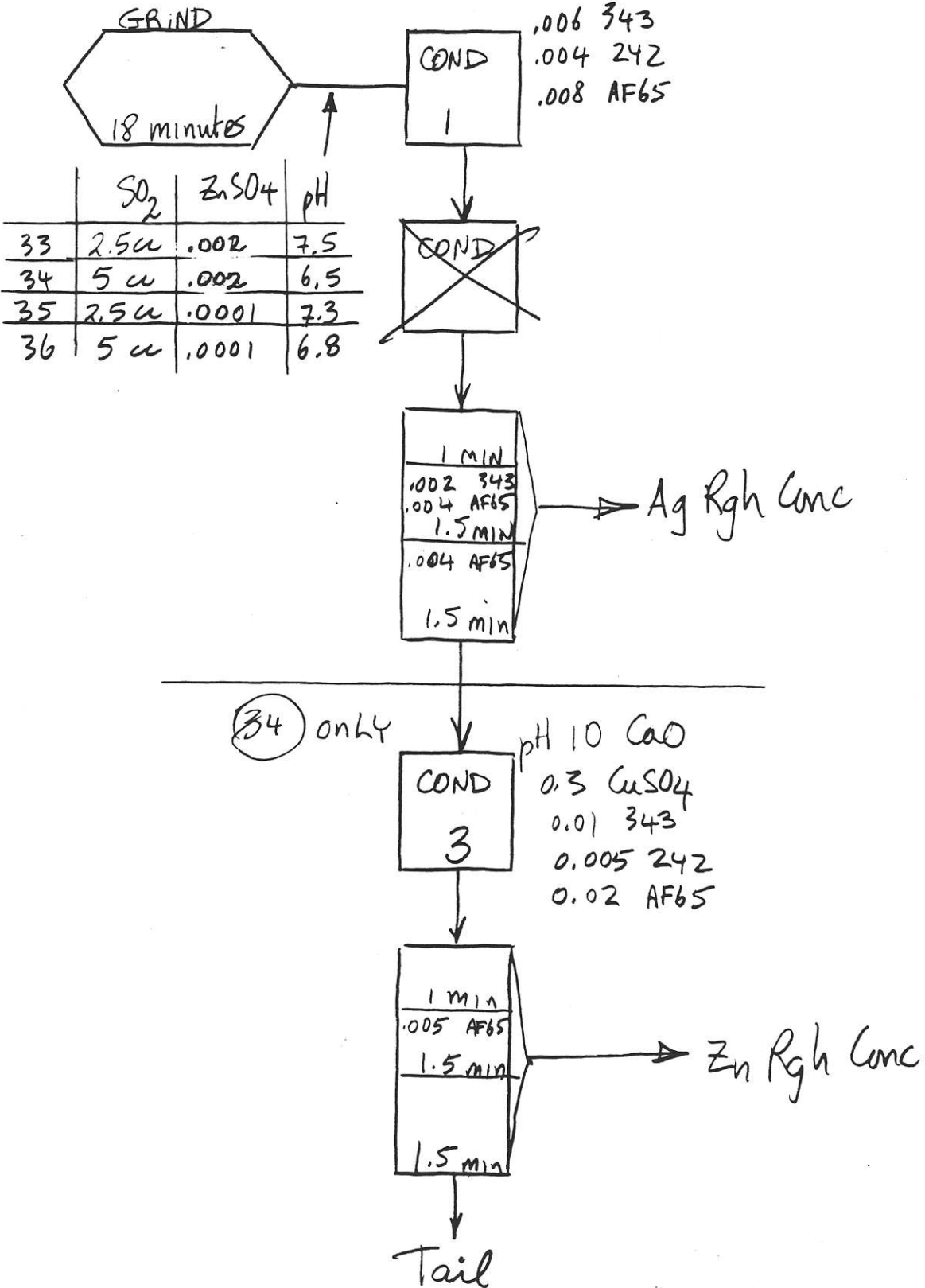
SAMATOSUM DEPOSITTEST NUMBER 32SAMP. COMP II

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AGCU CL CONC	53	5.58	8.56	8.53	15.2	14400	26.18	15.31	77.62	77.57
AGCU CL TAIL	30	3.16	7.04	7.58	3.2	3000	12.19	7.70	9.25	9.15
BULK CL CONC	65	6.85	6.37	30.8	1.5	1400	23.89	67.79	9.39	9.25
BULK CL TAIL	22	2.32	2.83	3.85	.49	460	3.59	2.87	1.04	1.03
TAIL	779	82.09	.76	.24	.036	38	34.16	6.33	2.70	3.01
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	949	100.00	1.83	3.11	1.09	1037	100	100	100	100

SAMATOSUM

SAM 33-36

COMPOSITE II



SAMATOSUM DEPOSITTEST NUMBER 33SAMP. COMP II

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	132	13.91	11.4	8.16	7.43	7200	84.42	34.89	93.75	93.87
TAIL	817	86.09	.34	2.46	.08	76	15.58	65.11	6.25	6.13
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	949	100.00	1.88	3.25	1.10	1067	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 34SAMP. COMP II

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	89	8.77	13.5	7.33	12.4	12100	64.18	20.96	92.95	92.99
ZN RGH CONC	73	7.19	5.68	31.6	.62	610	22.15	74.11	3.81	3.85
TAIL	853	84.04	.3	.18	.045	43	13.67	4.93	3.23	3.17
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1015	100.00	1.84	3.07	1.17	1141	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 35SAMP. COMP II

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	105	10.38	13.5	7.77	9.88	9500	74.32	25.27	91.23	90.91
TAIL	907	89.62	.54	2.66	.11	110	25.68	74.73	8.77	9.09
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1012	100.00	1.88	3.19	1.12	1084	100	100	100	100

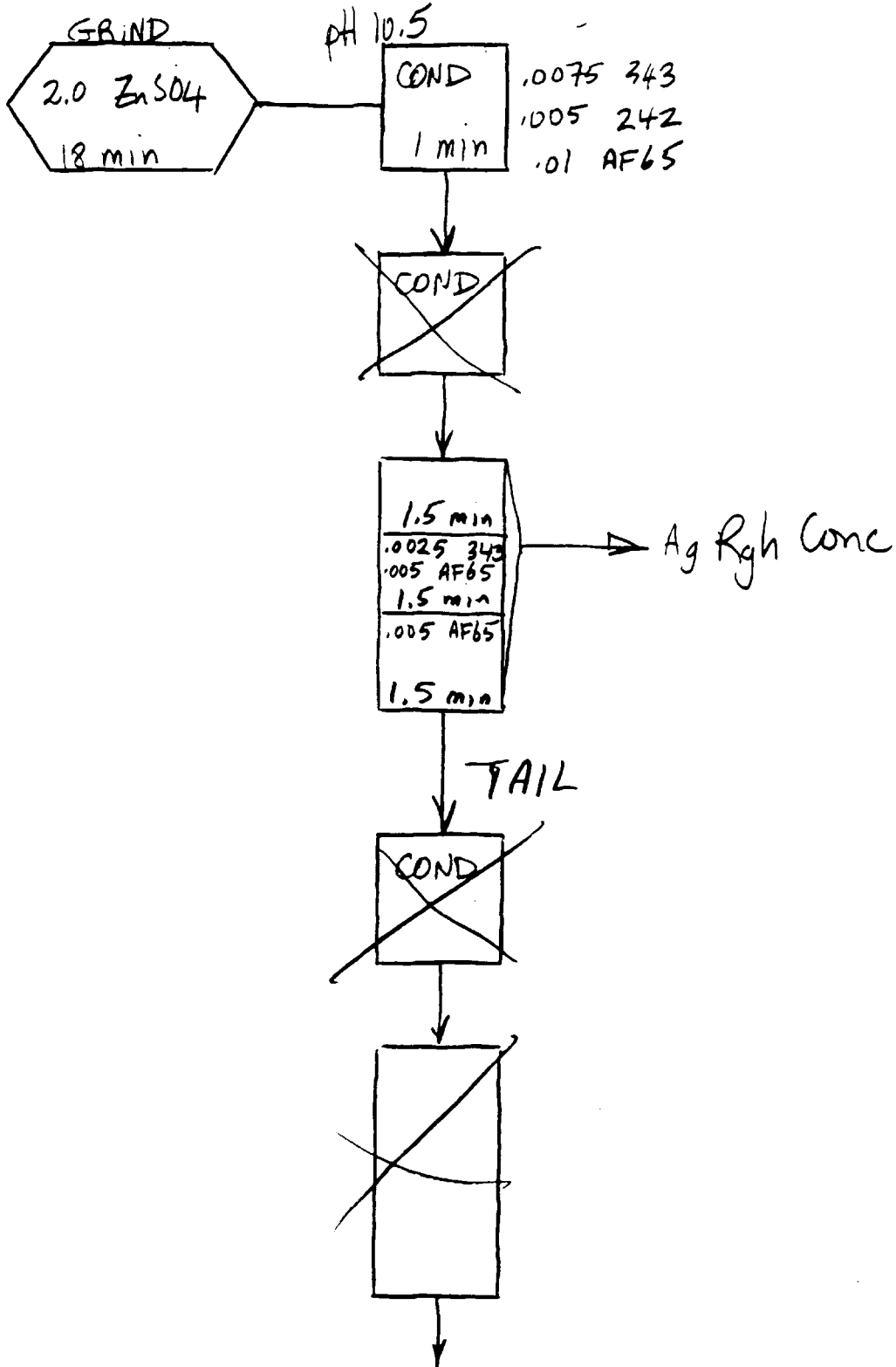
SAMATOSUM DEPOSITTEST NUMBER 36SAMP. COMP II

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	135	13.90	11.7	7.98	7.21	7100	86.30	34.47	92.82	92.80
TAIL	836	86.10	.3	2.45	.09	89	13.70	65.53	7.18	7.20
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	971	100.00	1.88	3.22	1.08	1064	100	100	100	100

SAMATOSUM

SAM 37

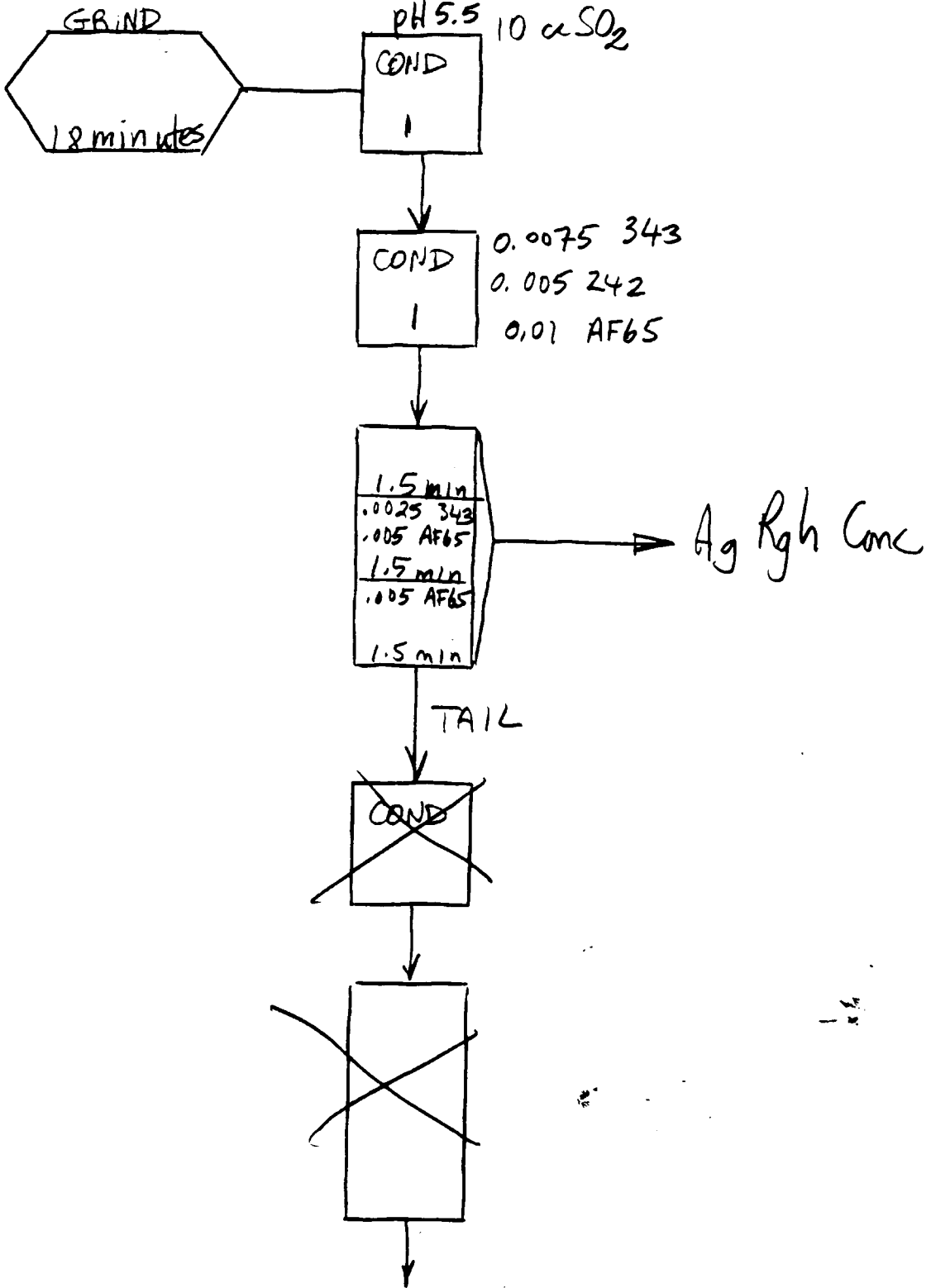
COMPOSITE II



SAMATOSUM

SAM 38

COMPOSITE II



SAMATOSUM DEPOSITTEST NUMBER 37SAMP. COMP II

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	133	13.80	12.5	7.89	7.7	7600	88.89	34.86	96.48	96.28
TAIL	831	86.20	.25	2.36	.045	47	11.11	65.14	3.52	3.72
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	964	100.00	1.94	3.12	1.10	1089	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 38SAMP. COMP II

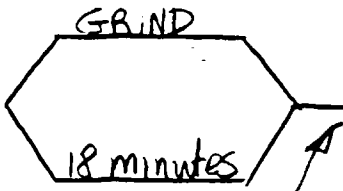
PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	133	13.93	12.2	8.78	7.48	7400	87.58	39.24	96.65	96.38
TAIL	822	86.07	.28	2.2	.042	45	12.42	60.76	3.35	3.62
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	955	100.00	1.94	3.12	1.08	1069	100	100	100	100



SAMATOSUM

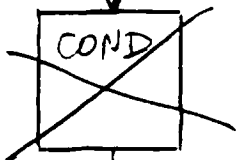
SAM 39-41

COMPOSITE III



TEST	CC SO <sub>2</sub>	pH
39	0	8.2
40	5	6.9
41	10	6.3

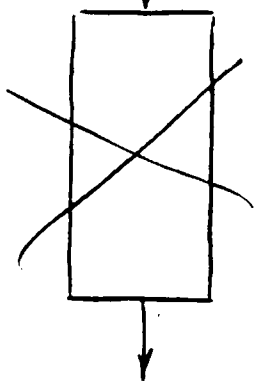
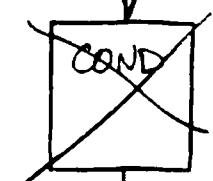
COND .0075 343  
.005 242  
.01 AF65



as per  
SAM 37

Ag Rgh Conc

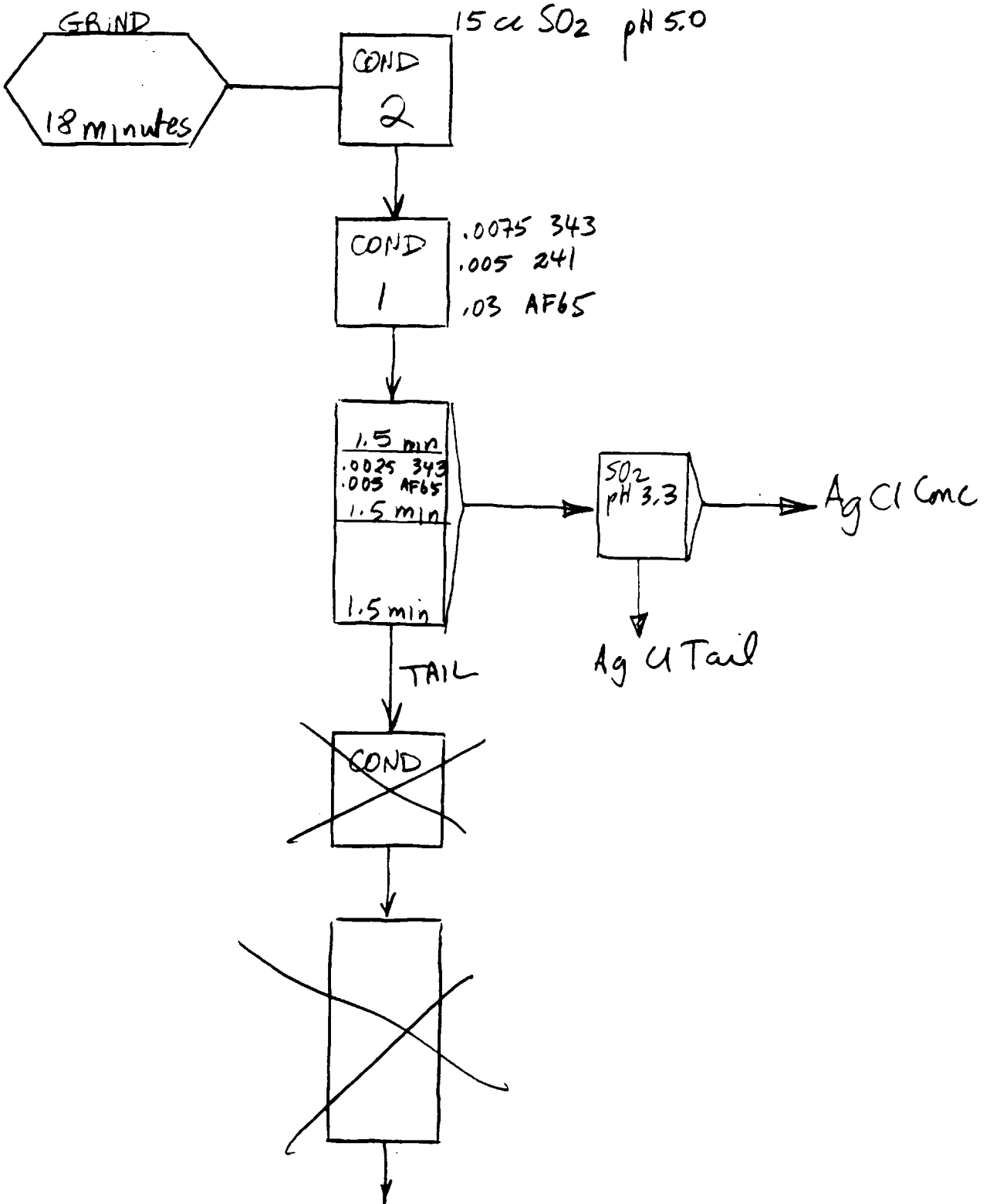
TAIL



SAMATOSUM

SAM 42

COMPOSITE III



SAMATOSUM DEPOSITTEST NUMBER 39SAMP. COMP III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	150	15.20	7.14	11.7	6.21	5400	91.43	75.24	96.95	96.70
TAIL	837	84.80	.12	.69	.035	33	8.57	24.76	3.05	3.30
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	987	100.00	1.19	2.36	.97	849	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 40SAMP. COMP III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	91	8.89	11.4	7.79	10.4	9100	79.31	28.14	94.33	94.07
TAIL	933	91.11	.29	1.94	.061	56	20.69	71.86	5.67	5.93
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1024	100.00	1.28	2.46	.98	860	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 41SAMP. COMP III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	69	6.86	13.7	8.56	13.1	11900	74.79	23.43	89.76	89.76
TAIL	937	93.14	.34	2.06	.11	100	25.21	76.57	10.24	10.24
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1006	100.00	1.26	2.51	1.00	909	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 42SAMP. COMP III

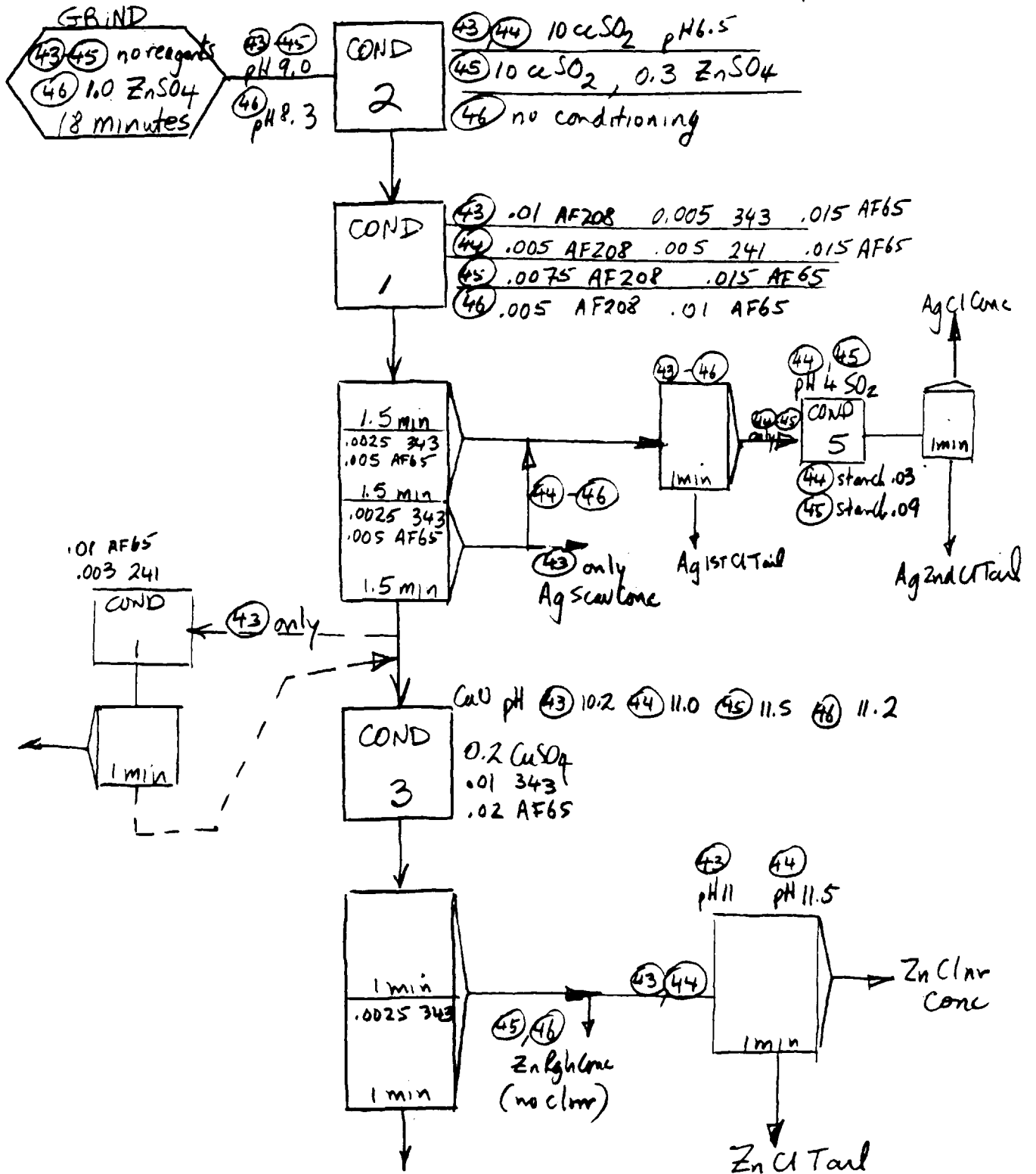
PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG CL CONC	99	9.90	10.9	13.1	8.95	8100	85.76	53.75	92.81	92.58
AG CL TAIL	24	2.40	2.35	7.39	1.58	1400	4.48	7.35	3.97	3.88
TAIL	877	87.70	.14	1.07	.035	35	9.76	38.89	3.22	3.54
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1000	100.00	1.26	2.41	.95	866	100	100	100	100

SAMATOSUM

21 Jan/88

SAM 43-46

COMPOSITES II and III  
50% EACH



SAMATOSUM DEPOSITTEST NUMBER 43SAMP. COMP II+III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG CL CONC	85.8	8.77	14.4	12.2	11	10216	74.51	36.68	91.99	91.98
AG CL TAIL	20.1	2.06	3.29	8.73	1.31	1218	3.99	6.15	2.57	2.57
AG SCAV CONC	14.6	1.49	5.35	11.5	.94	1360	4.71	5.88	1.34	2.08
PYRITE CONC	53.7	5.49	3.02	14.7	.24	221	9.78	27.66	1.26	1.25
ZN CL CONC	27.1	2.77	1.45	22.2	.36	311	2.37	21.08	.95	.88
ZN CL TAIL	20.2	2.07	.44	1.41	.14	97	.54	1.00	.28	.21
TAIL	756.3	77.35	.09	.058	.022	13	4.10	1.54	1.62	1.03
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	977.8	100.00	1.70	2.92	1.05	975	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 44SAMP. COMP II+III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG CL CONC	90.9	9.19	15.2	13.1	10.2	9183	83.75	41.96	90.81	91.79
AG 2ND CL TAIL	5.7	.58	5.22	15.2	2.36	2037	1.80	3.05	1.32	1.28
AG 1ST CL TAIL	22.7	2.30	2.28	6.87	1.41	1228	3.14	5.50	3.13	3.07
ZN CL CONC	30.3	3.06	2.4	39.9	.55	465	4.41	42.60	1.63	1.55
ZN CL TAIL	31.7	3.21	.79	3.92	.26	180	1.52	4.38	.81	.63
TAIL	807.5	81.66	.11	.088	.029	19	5.38	2.50	2.29	1.69
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	988.8	100.00	1.67	2.87	1.03	920	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 45SAMP. COMP II+III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG CL CONC	79.4	7.72	15.7	11.4	11.6	10625	68.93	29.89	85.81	87.17
AG 2ND CL TAIL	12.4	1.21	7.37	15.5	3.27	2788	5.05	6.35	3.78	3.57
AG 1ST CL TAIL	25.8	2.51	3.58	5.94	2.3	2005	5.11	5.06	5.53	5.34
ZN RGH CONC	52.2	5.07	3.46	31.1	.46	405	9.99	53.60	2.24	2.18
TAIL	859.2	83.50	.23	.18	.033	19.5	10.93	5.11	2.64	1.73
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1029	100.00	1.76	2.94	1.04	941	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 46SAMP. COMP II+III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG CL CONC	108.8	10.67	12.9	8.85	8.98	8004	80.40	32.58	90.97	92.72
AG CL TAIL	25.9	2.54	3.03	4.86	1.65	1438	4.50	4.26	3.98	3.97
ZN RGH CONC	65.9	6.46	1.89	24.6	.45	371	7.13	54.85	2.76	2.60
TAIL	819	80.33	.17	.3	.03	8.1	7.98	8.31	2.29	.71
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1019.6	100.00	1.71	2.90	1.05	921	100	100	100	100



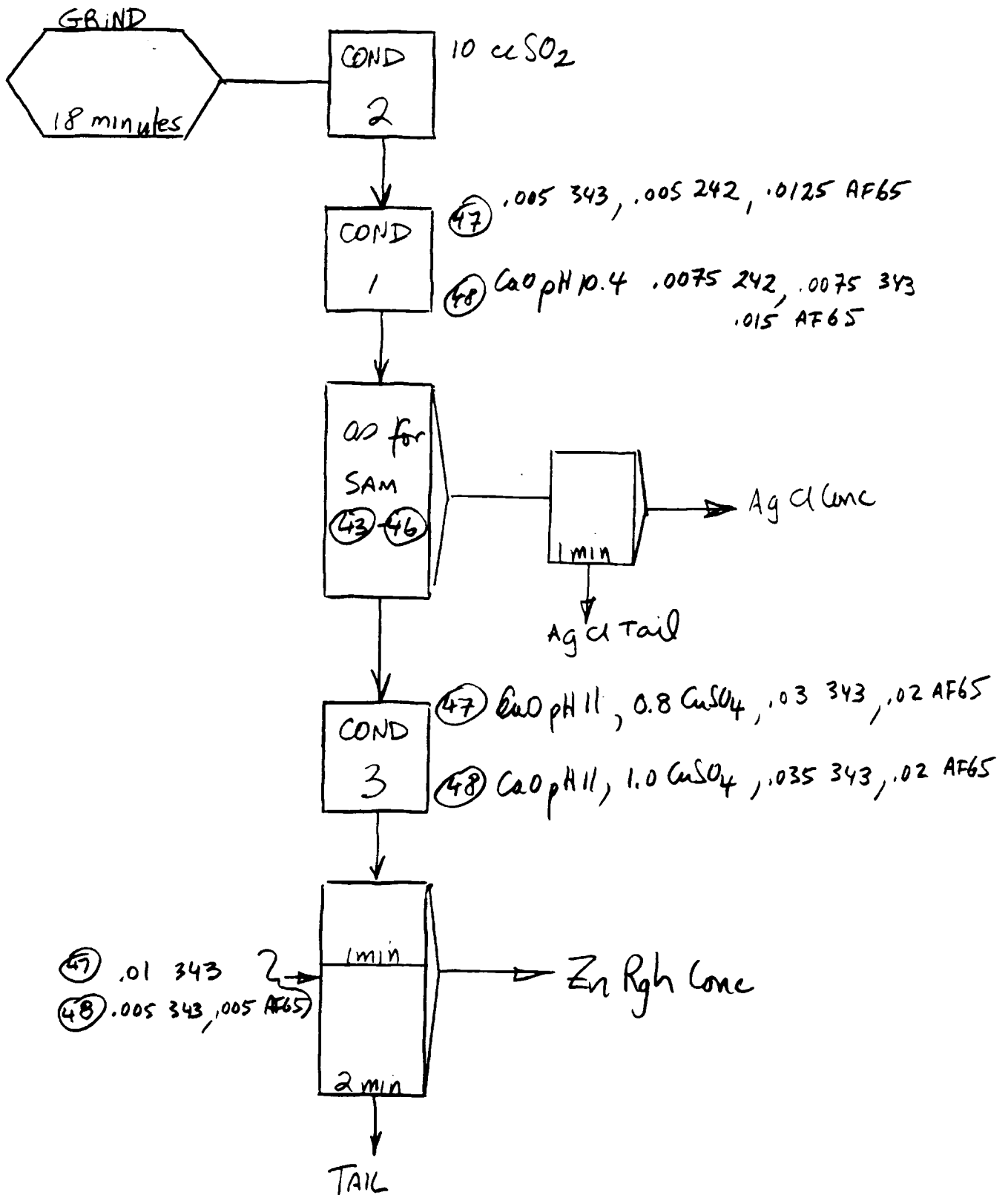


SAMATOSUM

21 Jan/88

SAM 47,48

COMPOSITE I



SAMATOSUM DEPOSITTEST NUMBER 47SAMP. COMP ~~IIII~~ I

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG CL CONC	97.1	9.71	23.2	18.6	9.73	6312	63.96	16.17	83.85	89.75
AG CL TAIL	24.8	2.48	5.83	18.6	1.15	716	4.10	4.13	2.53	2.60
ZN RGH CONC	165.4	16.55	5.38	53	.82	261	25.26	78.49	12.04	6.32
TAIL	712.2	71.26	.33	.19	.025	12.7	6.67	1.21	1.58	1.32
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	999.5	100.00	3.52	11.17	1.13	683	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 48SAMP. COMP ~~IIII~~ I

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG CL CONC	89.7	9.08	26.7	15.7	10.2	6943	71.79	12.66	82.18	89.10
AG CL TAIL	27.1	2.74	5.88	14.3	1.32	870	4.78	3.48	3.21	3.37
ZN RGH CONC	168	17.01	3.86	54.2	.83	264	19.44	81.84	12.52	6.35
TAIL	702.6	71.16	.19	.32	.033	11.8	4.00	2.02	2.08	1.19
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	987.4	100.00	3.38	11.27	1.13	708	100	100	100	100



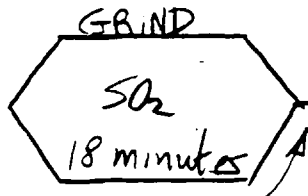


# SAMATOSUM

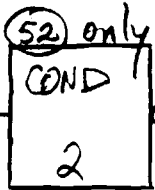
26 Jan/88

## SAM 49-52

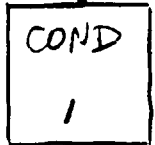
COMPOSITES II and III  
50% each



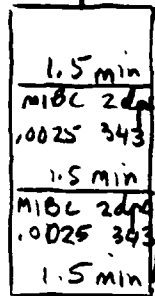
	CaSO <sub>2</sub>	pH
49	2.5	8.5
50	5	7.8
51	10	7.6
52	0	



(52) only 5cc SO<sub>2</sub>  
pH 7.2

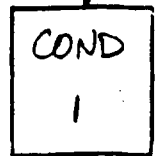


MIBC 4 dps  
.01 343

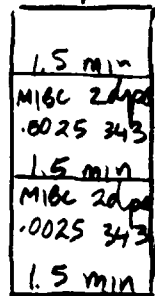


Ag Rgn Conc

SAM (50) only



pH 10.3 CaO  
CuSO<sub>4</sub> 0.2  
343 .01  
MIBC 4dps



pH 11.3 CaO

Bulk Conc

Bulk CI Tails

TAIL

SAMATOSUM DEPOSITTEST NUMBER 49SAMP. COMP II+III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	145	14.75	10	12.1		6550	91.05	65.15		97.25
TAIL	838	85.25	.17	1.12		32	8.95	34.85		2.75
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
HEAD	983	100.00	1.62	2.74		993	100	100		100

SAMATOSUM DEPOSITTEST NUMBER 50SAMP. COMP II+III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	83	8.15	10.5	7.65		11800	56.15	23.50		87.75
BULK CONC	14	1.37	3.61	31.2		3500	3.26	16.17		4.39
BULK CL TAIL	19	1.86	.85	4.52		530	1.04	3.18		.90
TAIL	903	88.62	.68	1.71		86	39.56	57.15		6.96
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
HEAD	1019	100.00	1.52	2.65		1095	100	100		100

SAMATOSUM DEPOSITTEST NUMBER 51SAMP. COMP II+III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	88	8.94	9.34	6.94		9900	56.03	23.01		82.94
TAIL	896	91.06	.72	2.28		200	43.97	76.99		17.06
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
HEAD	984	100.00	1.49	2.70		1067	100	100		100

SAMATOSUM DEPOSITTEST NUMBER 52SAMP. COMP II+III

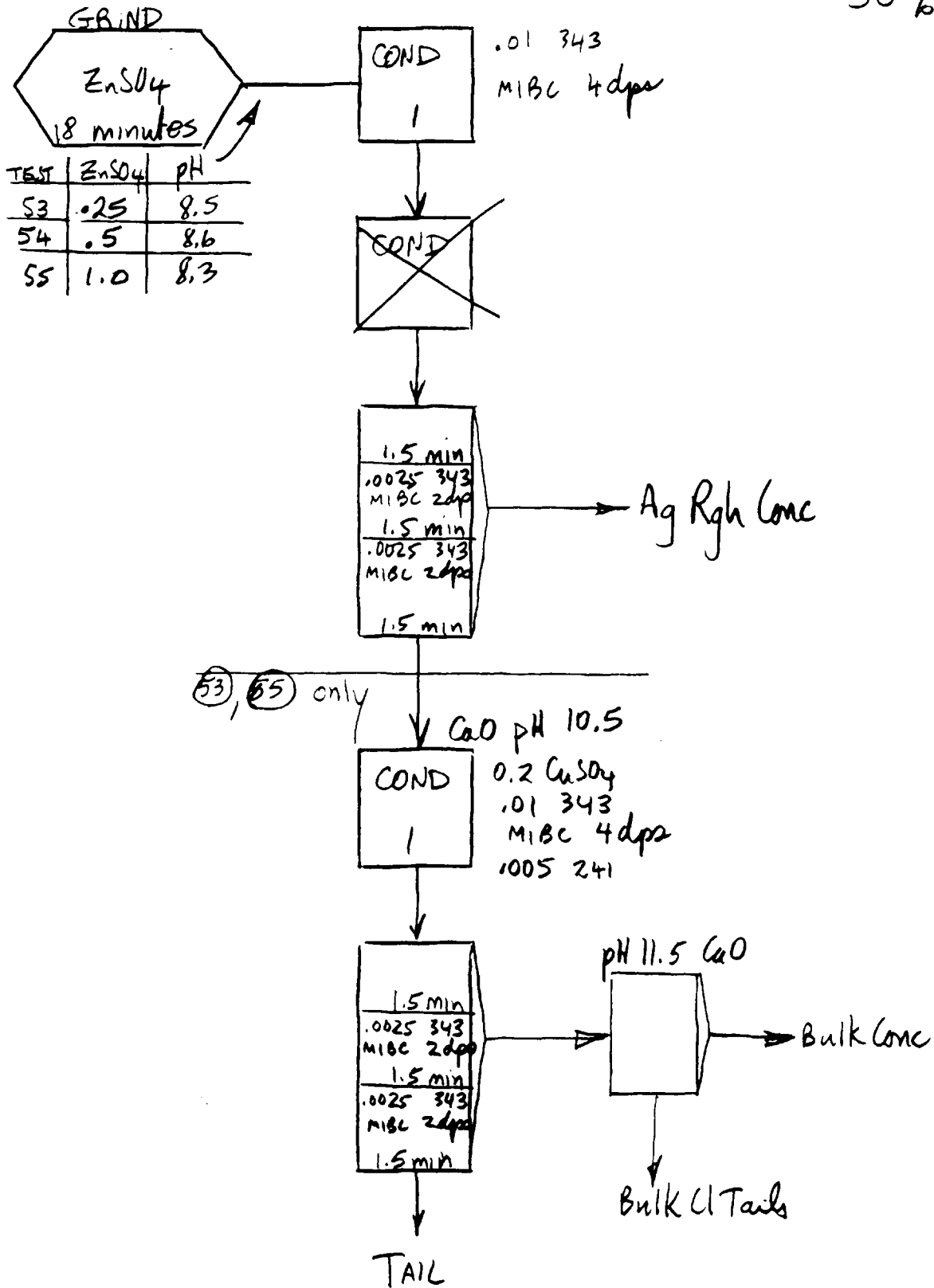
PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	143	14.50	9.5	11.6		6500	89.45	62.12		97.18
TAIL	843	85.50	.19	1.2		32	10.55	37.88		2.82
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
HEAD	986	100.00	1.54	2.71		970	100	100		100

SAMATOSUM

26 JAN/88

SAM 53-55

COMPOSITES II and III  
50% EACH





SAMATOSUM DEPOSITTEST NUMBER 53SAMP. COMP II+III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	204	20.62	6.87	10.5		4400	95.42	80.83		98.31
BULK CONC	12.3	1.24	.89	32.5		270	.75	15.08		.36
BULK CL TAIL	26.1	2.64	.41	2.72		120	.73	2.68		.34
TAIL	747	75.50	.061	.05		12	3.10	1.41		.98
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
HEAD	989.4	100.00	1.48	2.68		923	100	100		100

SAMATOSUM DEPOSITTEST NUMBER 54SAMP. COMP II+III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	200	19.38	7.41	10.5		4600	94.68	74.81		97.62
TAIL	832	80.62	.1	.85		27	5.32	25.19		2.38
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
HEAD	1032	100.00	1.52	2.72		913	100	100		100

SAMATOSUM DEPOSIT

TEST NUMBER 55

SAMP. COMP II+III

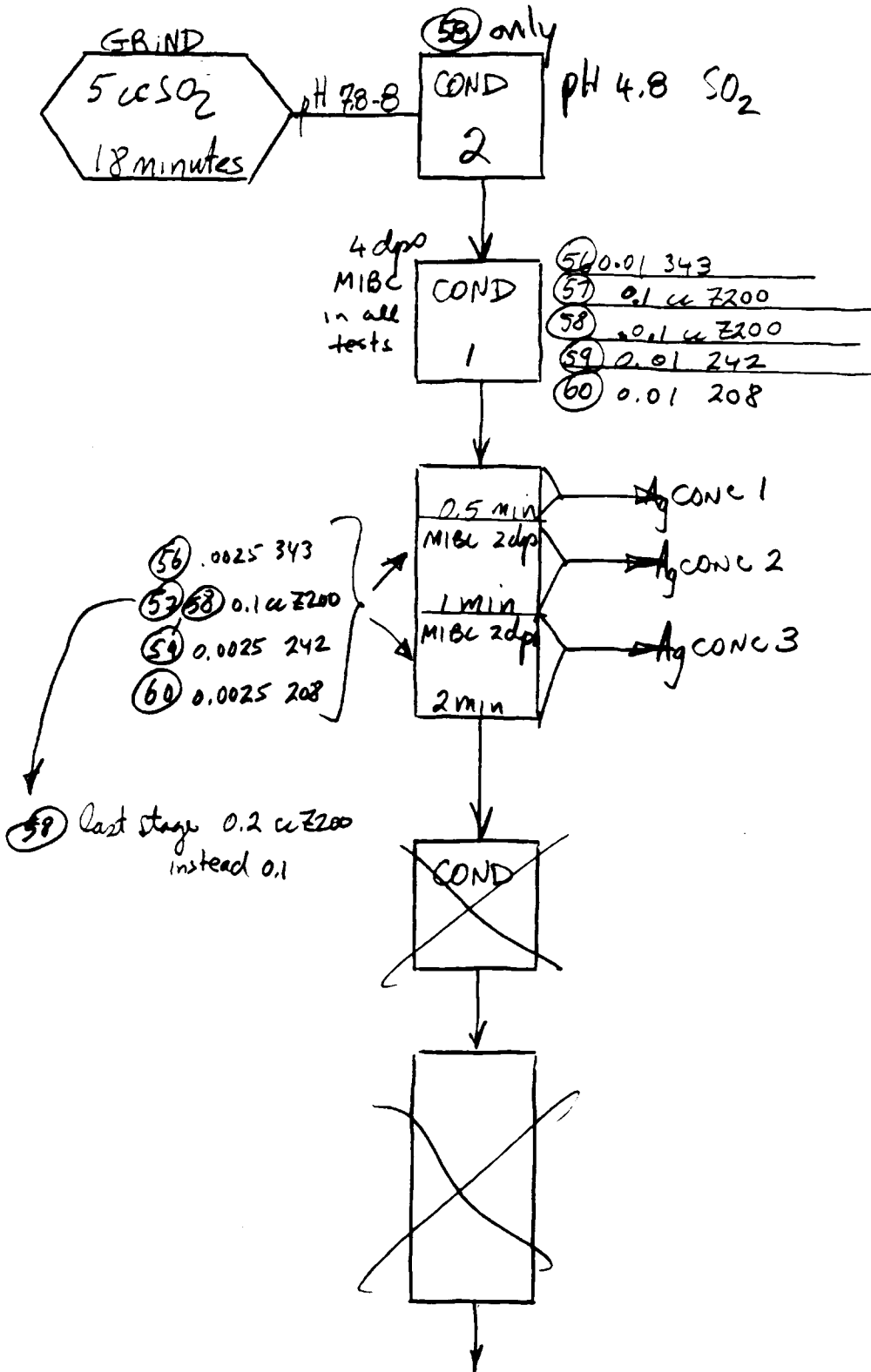
PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC	163	16.74	8.31	9.52		5500	93.19	59.47		97.43
BULK CONC	21	2.16	1.4	43.7		250	2.02	35.17		.57
BULK CL TAIL	17.5	1.80	.67	4.91		170	.81	3.29		.32
TAIL	772	79.30	.075	.07		20	3.98	2.07		1.68
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
HEAD	973.5	100.00	1.49	2.68		945	100	100		100

SAMATOSUM

27 JAN/88

SAM 56-60

COMPOSITES II and III  
50% EACH



SAMATOSUM DEPOSITTEST NUMBER 56SAMP. COMP II+III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC 1	28.7	2.86	17.1	7.27		14100	31.31	7.67		41.33
2	32.1	3.20	15.3	8.21		11600	31.33	9.69		38.03
3	32.2	3.21	10	9.07		4500	20.54	10.74		14.80
TAIL	909	90.72	.29	2.15		63	16.82	71.89		5.85
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
HEAD	1002	100.00	1.56	2.71		977	100	100		100

SAMATOSUM DEPOSITTEST NUMBER 57SAMP. COMP II+III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC 1	62.8	6.39	8.36	9.18		8700	35.77	21.11		57.88
2	61.9	6.30	7.59	11.9		3850	32.01	26.97		25.25
3	40.8	4.15	6.78	13.1		2800	18.85	19.57		12.10
TAIL	817.8	83.17	.24	1.08		55	13.37	32.34		4.77
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
HEAD	983.3	100.00	1.49	2.78		960	100	100		100

SAMATOSUM DEPOSITTEST NUMBER 58SAMP. COMP II+III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC 1	18.8	1.90	14.3	6.55		16700	17.93	4.52		29.70
2	47.1	4.75	10	8.49		10300	31.41	14.69		45.90
3	83.6	8.43	5.36	11.8		2400	29.88	36.24		18.98
TAIL	842.1	84.92	.37	1.44		68	20.78	44.55		5.42
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
HEAD	991.6	100.00	1.51	2.75		1066	100	100		100

SAMATOSUM DEPOSITTEST NUMBER 59SAMP. COMP II+III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC 1	43.7	4.21	17.3	8.79		12800	45.89	13.45		53.36
2	37.5	3.61	14.5	10.7		8400	33.00	14.05		30.05
3	19.6	1.89	8.17	11.8		4800	9.72	8.10		8.98
TAIL	938.1	90.30	.2	1.96		85	11.39	64.39		7.61
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
HEAD	1038.9	100.00	1.59	2.75		1009	100	100		100

~~SAMATOSUM DEPOSIT~~~~TEST NUMBER 60~~~~SAMP. COMP II+III~~

SAMATOSUM DEPOSITTEST NUMBER 60SAMP. COMP II+III

PRODUCT	WEIGHT		ASSAYS % OR G/T			% DISTRIBUTION				
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG RGH CONC 1	25.6	2.60	14.5	9.53		15800	24.12	8.93		40.97
2	31.6	3.21	16.8	13.6		10900	34.49	15.73		34.89
3	22	2.23	12.5	15		5900	17.87	12.08		13.15
TAIL	905.2	91.95	.4	1.91		120	23.52	63.27		11.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
	0	.00	0	0		0	.00	.00		.00
HEAD	984.4	100.00	1.56	2.78		1003	100	100		100

SAMATOSUM

5 FEB/88

SAM 61

3 cycles

COMPOSITE II + III

50% EACH

LARGE ROD MILL  
GRIND  
13 MINUTES  
10 cc SO<sub>2</sub>  
2 kg  
1250 cc H<sub>2</sub>O

pH 8

COND  
1

.01 343  
2 dpa MIBC

~~COND~~

Pb Conc  
Ag Conc  
1 min

1 dpa MIBC

2 MIN  
.005 343  
2 MIN  
.0025 343  
1 MIN

1.5 MIN  
.0005 343  
MIBC  
1 MIN

SO<sub>2</sub> pH 4.5  
COND  
3  
cycle ① .05 XDF + .05 BMS starch  
② .05 XDF  
③ .05 BMS STARCH

COND  
3

CaO pH 10.5  
.15 CuSO<sub>4</sub>  
.01 343  
2 dpa MIBC

1 MIN  
.0025 343  
1 MIN

pH 11 CaO  
1 min

pH 11 CaO  
1 min

Zn Conc

TAIL 84.4% -200 mesh  
TAIL 3



SAMATOSUM DEPOSITTEST NUMBER 61COMPII+III

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG CONC 1	68	1.16	17.3	7.59	21.7	20406	11.56	2.84	23.05	23.48
2	71	1.21	14.6	7.26	23	21911	10.19	2.83	25.51	26.33
3	115.9	1.98	19.5	7.61	17.2	15887	22.21	4.84	31.14	31.16
PB CONC 1	71.8	1.22	17.1	11.9	6.01	5505	12.07	4.69	6.74	6.69
2	72	1.23	20.3	9.52	4.41	4087	14.37	3.77	4.96	4.98
3	30.5	.52	12.9	9.21	2.4	2271	3.87	1.54	1.14	1.17
AG CL SC CONC 3	19.6	.33	10.4	12.9	3.76	3443	2.00	1.39	1.15	1.14
AG CL SC TAIL 3	32.7	.56	2.34	5.62	.77	721	.75	1.01	.39	.40
ZN CONC 1	64.2	1.09	4.95	57.2	.39	363	1.59	20.17	.39	.39
2	66.9	1.14	3.27	59.6	.56	528	2.15	21.90	.59	.60
3	85.3	1.45	5.11	56	.71	605	4.28	26.24	.95	.87
ZN 2ND CL TL 3	24.8	.42	6.31	19	1.18	1022	1.54	2.59	.46	.43
ZN 1ST CL TL 1	31.5	.54	1.34	2.66	.37	296	.41	.46	.18	.16
2	23.9	.41	1.24	3.17	.45	343	.29	.42	.17	.14
3	36.9	.63	1.65	2.36	.48	408	.60	.48	.28	.25
TAIL 1	1657.4	28.26	.18	.14	.038	18	2.93	1.27	.98	.50
2	1656.6	28.25	.26	.15	.031	18.9	4.23	1.36	.80	.53
3	1735	29.59	.29	.23	.041	26	4.95	2.19	1.11	.76

HEAD

5864 100.00 1.74 3.10 1.09 1008 100 100 100 100

SAMATOSUM DEPOSITTEST NUMBER 61COMPII+III

PRODUCT	WEIGHT		ASSAYS % OR G/T		% DISTRIBUTION
	gms	%	AU		AU
AG CONC 1	68	1.16	25.5		16.74
2	71	1.21	28		19.19
3	115.9	1.98	22.8		25.50
PB CONC 1	71.8	1.22	15.4		10.67
2	72	1.23	11.1		7.71
3	30.5	.52	5.16		1.52
AG CL SC CONC 3	19.6	.33	6.6		1.25
AG CL SC TAIL 3	32.7	.56	2.18		.69
ZN CONC 1	64.2	1.09	1.53		.48
2	66.9	1.14	1.93		1.25
3	85.3	1.45	1.92		1.58
ZN 2ND CL TL 3	24.8	.42	7.33		1.75
ZN 1ST CL TL 1	31.5	.54	1.26		.38
2	23.9	.41	1.19		.27
3	36.9	.63	1.64		.58
TAIL 1	1657.4	28.26	.2		3.20
2	1656.6	28.25	.19		3.04
3	1735	29.59	.25		4.19
HEAD	5864	100.00	1.77		100

# SAMATOSUM

## TEST 61

### DETAILED ANALYSES

PRODUCT	% As	<del>ppm</del> ppm Hg	% Sb	% Fe	% Insd	% Se	Bi	% Cd
Ag Conc 1	2.09	85	13.0	7.0	7.06	.017	<.002	.041
2	2.23	110	13.8	7.5	5.58	.013	<.002	.041
3	1.64	85	10.3	11.6	8.31	.023	<.002	.037
Pb Conc 1		33	3.56	19.9				
2		24	2.69	21.7				
3		27	1.47	26.0				
Zn Conc 1	.052	110	0.20	3.8	3.87	.012	<.002	.17
2	.067	86	0.31	3.5	3.24	.009	<.002	.17
3	.077	120	0.39	4.2	3.91	.012	<.002	.16

Ge < 3 g/t in Ag Conc 1,2,3 and Zn Conc 1,2,3



SAMATOSUM

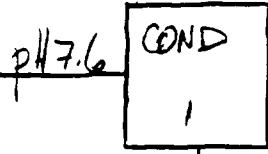
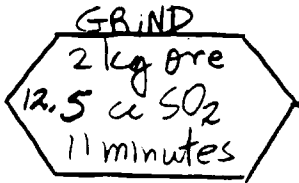
18 FEB 1988

SAM 62

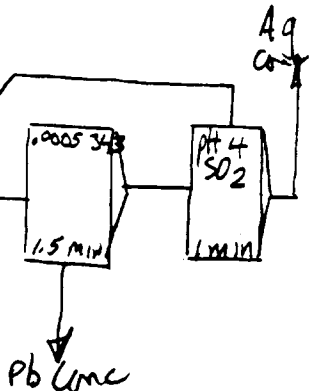
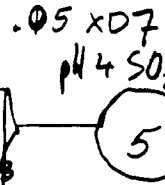
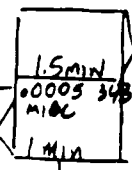
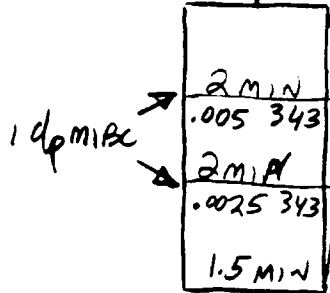
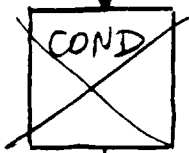
3 cycles.

COMPOSITE I

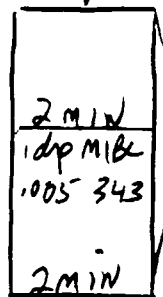
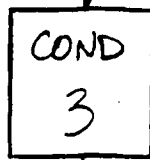
LARGE ROD MILL



.01 343  
.0025 241 cycles ① .005 241 cycles ②+③  
2 dps MIBC



CuO pH 10  
CuSO<sub>4</sub> cycles ① 0.6 #/t cycles ②+③ 0.75 #/t  
343 cycles ① .03 cycles ②+③ .035  
2 dps MIBC



Zn Conc

TAIL

Zn Tail

74.3 % - 200 mesh

SAMATOSUM DEPOSITTEST NUMBER 62COMP I

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG CONC 1	56.7	.95	9.84	6.44	26.3	16783	2.58	.57	21.79	21.08
2	95	1.59	17.9	10.1	20.6	14337	7.87	1.50	28.60	30.18
3	79.1	1.33	15.8	8.94	22.1	15062	5.78	1.11	25.55	26.40
PB CONC 1	29.7	.50	29.3	16.4	4.13	3992	4.03	.76	1.79	2.63
2	79.6	1.33	33.3	17.1	2.13	1847	12.27	2.13	2.48	3.26
3	56.8	.95	28.8	16.1	1.85	1553	7.57	1.43	1.54	1.95
AG CL SC CONC 3	39.8	.67	17	25.3	2.24	1656	3.13	1.58	1.30	1.46
AG CL SC TAIL 3	46.2	.77	1.47	14.9	.4	203	.31	1.08	.27	.21
AG CL TAIL	37.7	.63	36.7	17.4	4.08	3418	7.85	1.03	2.25	2.85
ZN CONC 1	243.5	4.08	1.77	59.6	.79	205	1.99	22.76	2.81	1.11
2	287.9	4.83	1.96	58.2	.87	264	2.61	26.28	3.66	1.68
3	315.7	5.29	2.17	57.8	.8	247	3.17	28.62	3.69	1.73
ZN 1ST CL TL 1	45.3	.76	5.47	21	.73	461	1.15	1.49	.48	.46
2	65.2	1.09	5.36	20	.62	407	1.62	2.04	.59	.59
3	49.5	.83	7.01	10.2	.53	470	1.61	.79	.38	.52
TAIL 1	1429.6	23.97	2.3	2.08	.058	55	15.22	4.66	1.21	1.74
2	1473.6	24.70	1.26	.4	.034	27.4	8.59	.92	.73	.89
3	1533.9	25.72	1.78	.51	.039	37.1	12.64	1.23	.87	1.26
HEAD	5964.8	100.00	3.62	10.69	1.15	757	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 62COMP I

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AU	PB	ZN	CU	AG
AG CONC 1	56.7	.95				19.3				15.20
2	95	1.59				16.4				21.64
3	79.1	1.33				17.5				19.23
PB CONC 1	29.7	.50				6.83				2.82
2	79.6	1.33				3.79				4.19
3	56.8	.95				3.26				2.57
AG CL SC CONC 3	39.8	.67				2.98				1.65
AG CL SC TAIL 3	46.2	.77				.65				.42
AG CL TAIL	37.7	.63				6.38				3.34
ZN CONC 1	243.5	4.08				1.13				3.82
2	287.9	4.83				1.22				4.88
3	315.7	5.29				1.2				5.26
ZN 1ST CL TL 1	45.3	.76				1.93				1.21
2	65.2	1.09				1.29				1.17
3	49.5	.83				1.27				.87
TAIL 1	1429.6	23.97				.33				6.55
2	1473.6	24.70				.096				1.97
3	1533.9	25.72				.15				3.20

HEAD 5964.8 100.00

1.21

100

## CYCLE TEST 62

WEIGHT IN = 1988.3

WEIGHT OUT = ① 1804.8

② 2001.3

③ 2035.0

	weight		ASSAY					UNITS					DISTRIBUTION				
	gm	%	Pb	Zn	Cu	Ag	Au	Pb	Zn	Cu	Ag	Au	Pb	Zn	Cu	Ag	Au
Ag Conc 2,3	87.1	4.33	16.9	9.6	21.2	14670	16.9	73.1	416	91.8	63521	73.2	21.5	4.0	80.0	82.9	63.5
Pb Conc 2,3	68.2	3.39	31.2	16.6	2.0	1700	3.5	105.8	56.2	6.8	5763	11.9	31.1	5.5	5.9	7.5	10.3
Ag Pb Conc (calcd)		7.72	23.2	12.7	12.8	8975	11.0	178.9	97.8	98.6	6928	85.1	52.6	9.5	85.9	90.4	73.8
Zn Conc 2,3	301.8	15.01	2.1	58.0	0.8	250	1.2	31.5	8706	12.0	3753	18.0	9.3	84.8	10.5	4.9	15.6
Zn Conc Tail 3	49.5	2.46	6.0	10.2	0.5	470	1.3	17.2	25.1	1.2	1156	3.2	5.1	2.4	1.0	1.5	2.1
Tail 2,3	1503.8	74.81	1.5	0.45	0.04	32	0.12	112.2	33.7	3.0	2394	9.0	33.0	3.3	2.6	3.2	7.8
Head	2010.4	100	3.40	1027	11.5	766	1.15	339.9	1027.2	114.8	71687	115.3	100	100	100	100	100

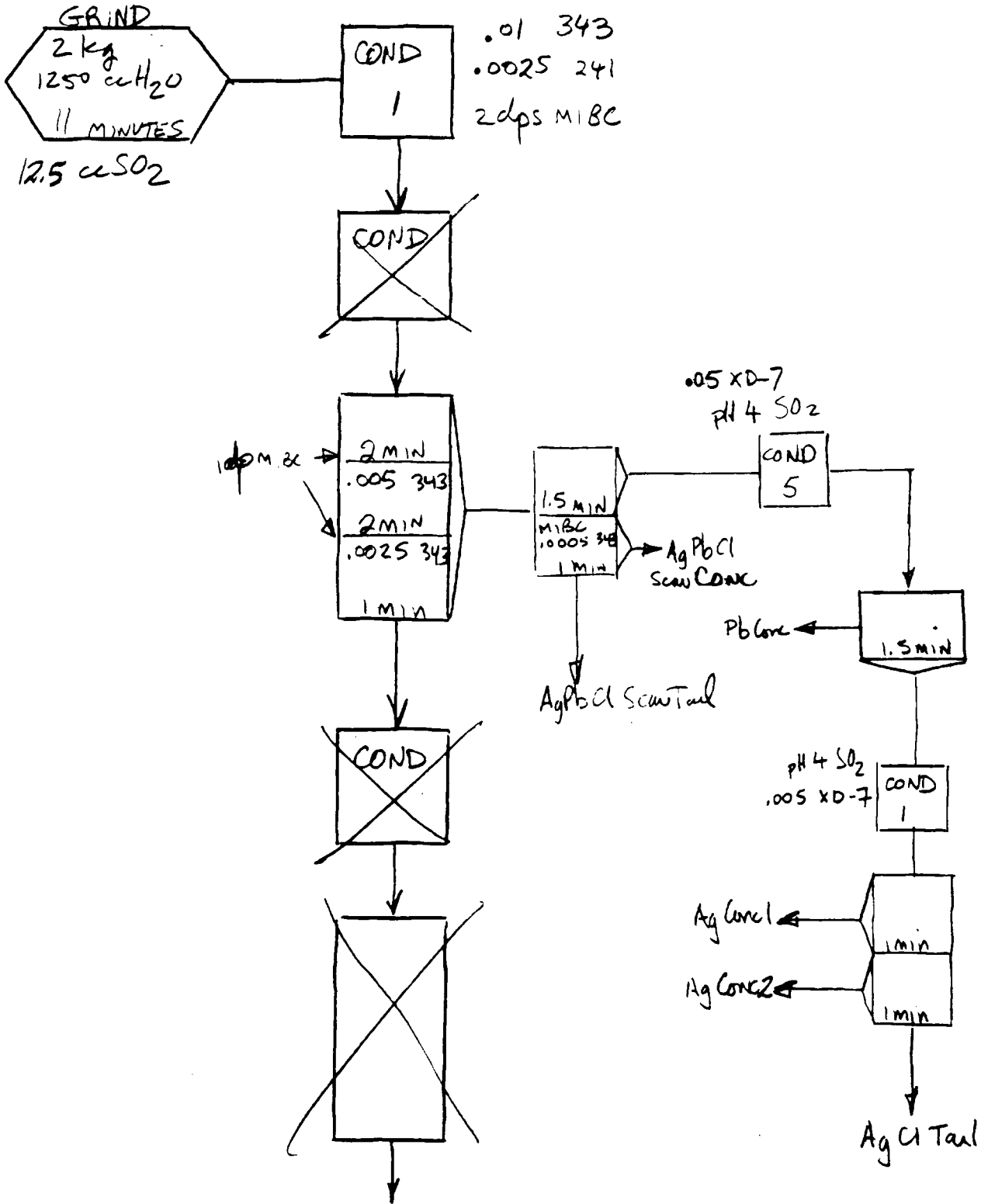


SAMATOSUM

Feb 19/88

SAM 63

COMPOSITE II



SAMATOSUM DEPOSITTEST NUMBER 63SAMP. COMP II

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AG	PB	ZN	CU	AG
AG CONC 1	59.3	3.00	13.1	7.01	23.8	24457	19.94	6.66	64.67	65.00
AG CONC 2	20.7	1.05	21.3	9.24	13.9	14206	11.32	3.07	13.18	13.18
AG CL TAIL	10.5	.53	20.1	10.2	6.34	6716	5.42	1.72	3.05	3.16
PB CONC	48.4	2.44	20	9.35	2.99	3164	24.84	7.25	6.63	6.86
AGPB CL SC CONC	24	1.21	12.5	14.4	4.05	4329	7.70	5.54	4.45	4.66
AGPB CL SC TAIL	24.3	1.23	5.84	10.8	1.96	2105	3.64	4.21	2.18	2.29
TAIL	1792.4	90.54	.59	2.49	.071	60.4	27.14	71.55	5.83	4.85
	0	.00	0	0	0	0	.00	.00	.00	.00
HEAD	1979.6	100.00	1.97	3.15	1.10	1127	100	100	100	100

SAMATOSUM DEPOSITTEST NUMBER 63SAMP. COMP II

PRODUCT	WEIGHT		ASSAYS % OR G/T				% DISTRIBUTION			
	gms	%	PB	ZN	CU	AU	PB	ZN	CU	AG
AG CONC 1	59.3	3.00					31			46.62
AG CONC 2	20.7	1.05					22.6			11.86
AG CL TAIL	10.5	.53					13.6			3.62
PB CONC	48.4	2.44					9.35			11.48
AGPB CL SC CONC	24	1.21					8.98			5.47
AGPB CL SC TAIL	24.3	1.23					4.49			2.77
TAIL	1792.4	90.54					.4			18.18
	0	.00					0			.00
HEAD	1979.6	100.00					1.99			100