

003440

MILL REPORT

APRIL 1982

SUMMARY

Submitted by:

W.N. Wallinger, Mill Superintendent

G.D. Biles, Mill Production Superintendent

A. MILL OPERATIONS

Grinding throughput for the month totalled 308,869 dry tonnes for an average of 10,296 tonnes per day. Concentrate production totalled 36,643 dry tonnes which was 11% above plan.

Interruptions in production were caused by contamination of the primary crusher lubrication system with muck. This was caused by a piece of scrap steel plugging the apron feeder discharge. The breaking of the splice on No.13 conveyor belt on two occasions. The mill was also shutdown on April 9th for the Statutory Holiday.

Delivery of very fine ore from the oxide stockpile caused some problems with plugged chutes in the crushing plant which on occasions resulted in a reduction in the crushing rate.

Finding qualified replacements for vacancies created by operator absenteeism has been a continual problem. These vacancies often have to be filled with employees not fully trained for these positions. Obviously this does have some negative effect on operating efficiency.

TABLE I
PRODUCTION PLAN MAY 1982

	Tonnes
Mill Feed	319,300
Lead Concentrate	11,357
Zinc Concentrate	22,298
TOTAL	33,655

B. MILL MAINTENANCE

Many major mechanical jobs were completed in crushing and grinding during April. They included replacement of bowl and mantle liners in the secondary and No.1 tertiary crusher and replacement of the dust seal in the primary crusher. In grinding feed chutes and feed trunnion liners were replaced in No.1 and No.2 rod mills, feed and discharge trunnion liners and feed chute were replaced on No.3 ball mill, discharge trunnion liner was replaced on the lead regrind mill. A new style feed

B. Mill Maintenance (cont'd)

chute was installed on No.4 rod mill to try to improve the life of these chutes. Installation of on-stream analyzer sample pumps and piping continued. The annual mechanical overhaul of the generators was started. Projects to reduce spillage were continued.

C. MILL METALLURGY

TABLE II
METALLURGICAL BALANCE

Product	D.M.T.	% ASSAY			% DISTRIBUTION		
		Lead	Zinc	g/t Ag	Lead	Zinc	Ag
<u>APRIL 1982</u>							
Dry Feed	308,869	2.0	5.2	37.1	100.0	100.0	100.0
Lead Conc.	10,847	59.6	5.7	521.4	70.3	3.9	49.3
Zinc Conc.	25,796	2.7	47.8	61.3	7.5	76.3	13.8
Tailing	272,226	0.8	1.2	15.5	22.2	19.9	36.9
TOTAL	36,643	59.6	47.8	521.4	70.3	76.3	49.3
<u>APRIL 1982 - YEAR-TO-DATE</u>							
Dry Feed	1,260,917	2.8	4.9	33.4	100.0	100.0	100.0
Lead Conc.	46,099	58.3	6.2	477.0	74.8	4.6	52.1
Zinc Conc.	96,228	2.5	49.1	52.0	6.7	77.0	12.0
Tailing	1,118,590	0.6	1.0	14.0	18.5	18.3	35.9
TOTAL	142,327	58.3	49.1	477.0	74.8	77.0	52.1

Ore from the oxide stockpile was milled exclusively during the month with metallurgical results similar to those obtained during the latter half of March.

C. Mill Metallurgy (cont'd)

The continued inability to increase lead recovery much above the 70% level indicates that the forecast 75% recovery was somewhat optimistic.

Metallurgical efforts in the plant centered on improving the performance of the grinding and flotation circuits and these areas will continue to receive top priority in the coming months.

Progress with the on-stream analyzer has been very satisfactory with seven streams on line by month end.

D.: SAFETY

TABLE III

Department	First Aid	Medical Aid	Lost Time	Total
Operations	4	1	1	6
Repair	1	1	1	3
Metallurgy	-	-	-	-
TOTAL	5	2	2	9

APPENDIX I

MILL OPERATIONS REPORT

Submitted by:

L.D. MacDonald, General Mill Foreman
L.H. Hyde, Surface Foreman
D. Cresswell, Labour Foreman
S. Loveridge, Training Foreman

A. CRUSHING

The primary crusher operated for 372 hours during which a total of 3,284 loads were delivered to the primary crusher, for an average of 7 trucks per operating hour. Crusher operating time was 52%.

A breakdown of available primary crushing time is as follows:

TABLE I

Reason	February		March		April	
	Hours	Pct	Hours	Pct	Hours	Pct
Hang-ups	36.50		27.25		29.75	
Plugged Chutes	6.50		62.00		16.00	
Operating Delays	13.00		19.25		16.00	
Unscheduled Maintenance	3.00		7.00		56.75	
Electrical	31.25		3.00		11.25	
Full Bins	1.00		6.00		2.25	
TOTAL	91.25	14.0	124.75	16.0	132.00	18.0
Scheduled Maintenance	28.25	4.0	74.75	10.0	63.00	9.0
Pit Delays	185.50	28.0	138.25	18.0	129.50	18.0
100% Availability	672.00		744.00		720.00	
Actual Availability	552.25	82.0	559.50	75.0	501.00	70.0
Actual Operating Time	367.00	55.0	421.00	56.0	371.50	52.0

The secondary crushing section operated for 559 hours for a total throughput of 223,978 tonnes; lost time totalled 102 hours (14% available operating time). Scheduled maintenance totalled 35 hours, 5% of the available operating time.

The higher incidents of unscheduled maintenance can be attributed to contamination of the lube system by an apron feeder hang-up, caused by scrap metal and the breaking of No.13 conveyor splice on two occasions.

B. GRINDING

The grinding circuit operated at 80.9% of the time, while actual availability was 93%.

Throughput for the month was 308,869 tonnes (an average of 10,296 tonnes per day).

TABLE II

GRINDING CIRCUIT DOWNTIME

	<u>February</u>	<u>March</u>	<u>April</u>
	Hours	Hours	Hours
Operating Delays	16.37	282.06	116.59
Rod Charging	10.03	6.57	4.51
Scheduled Maintenance	128.79	14.25	108.33
Unscheduled Maintenance	9.75	88.25	17.08
Electrical	12.99	8.33	8.93
N.C.P.C.	17.33		6.05
No Ore	242.64	111.83	315.31
TOTAL	437.90	511.29	576.80

TABLE III

GRINDING MEDIA CONSUMPTION

	<u>April</u>		<u>Year-to-Date</u>		<u>Plan</u>
	kg	kg/t	kg	kg/t	kg/t
Rods, 3"	114,100	0.37	358,700	0.28	0.30
Rods, 4"	65,900	0.21	267,500	0.21	0.40
Balls, 1½"	427,700	1.38	1,432,300	1.14	1.10
Balls, 2"	10,900	0.04	428,300	0.33	0.80
TOTAL	618,600	2.0	2,486,800	1.96	2.60

C. FLOTATION
 TABLE IV
 REAGENT CONSUMPTION

	April		Year-to-Date		Plan
	kg	kg/t	kg	kg/t	kg/t
Sodium Cyanide	35,000	0.11	103,000	0.08	0.09
Soda Ash	11,200	0.04	681,900	0.54	1.23
Lime	2,060,500	6.67	4,322,900	3.43	3.61
Copper Sulphate	251,280	0.81	834,610	0.66	0.47
Xanthate (Z-11)	88,125	0.28	403,149	0.32	0.32
M.I.B.C.	5,440	0.02	19,040	0.02	0.015
Dow 1012	204	0.001	2,448	0.001	0.005
Flocculant	300	0.001	1,250	0.001	0.004
Filter Aid	6,800	0.02	59,000	0.05	0.02
Sodium Sulphite	74,400	0.24	120,400	0.10	0.38

D. DEWATERING

The moisture content of the final concentrate averaged between 6.9 and 8.4%.

TABLE V

	Lead		Zinc		
	#1	#2	#3	#4	#5
% Operating Time	85	82	83	88	80
D.M.T. Filtered	10,847		25,796		
% Moisture Content	6.9		8.4		

E. TAILING DISPOSAL AND WATER SUPPLY

Mill water consumption was 187,201,058 US gallons, an average of 4,333 US gallons per minute. Released from the reservoir was 128,610,310 US gallons, an average of 2,977 US gallons per minute.

F. MOBILE EQUIPMENT

TABLE VI

Equipment	Reason	Days Down	Percent Availability
06-06	Bucket arm and oil leak	3	90
06-010	--	0	100
06-013	--	0	100
51-05	Engine	30	0
53-029	Brake and hydraulic hoist	3	90
53-033	--	0	100
56-07	Starter	4	87
56-10	--	0	100
56-15	--	0	100
AVERAGE			85.2

G. LABOUR

The labour work force was at full authorized strength for all of the month of April.

The labourers on clean-up averaged 53% of the total labour count per day.

The work force concentrated on all areas of the concentrator for clean up.

There were 418 sector bags changed this month.

TABLE VII

LABOUR FORCE	
Number of straight time days worked	21
Average labour count per day	17
Average labourers working per day shift	13.5
Average labourers working on clean-up per day	9

H. LOAD OUT

Excess waiting time due to: Bunching	55.1 hours
Loader Problems	.3
Dusting	.5
Scale	44.8
Miscellaneous	<u>2.5</u>
TOTAL	103.2 hours

TABLE VIII

Type of Train	Total Trucks	Ave. Per Day	Average Time Loading	Average Time Waiting	Average Weight Tonnes Tare	Average Weight Tonnes Net	Tonnes Shipped Total	Tonnes Shipped Average Per Day
A	199	8	3.6	17.9		27.14	40,962	1,575
B	895	36	6.5	24.7	20.95	39.70		

I. TRAINING

No training programs were started in April. Work centered on development of a new grinding manual and scheduling for the summer shutdown.

APPENDIX II

MILL MAINTENANCE REPORT

Submitted by:

W.H. Brown, General Mill Maintenance Foreman

E.O. Wedekind, Chief Heating Plant Engineer

A. MANPOWER

At the end of April, the Mill Maintenance Department had in it's employ, 57 permanent employees and 6 supervisors. The 1051 force worked a total of 8,992 manhours.

In the month of April, 194 mandays were lost due to the following:

Vacation, LOA, Floaters	44
AWOL a) Discipline	0
b) Time off bank account	1
Sick a) Time off bank account	12
b) Medical documentation	25
c) Paid sick days	9
Training (school)	44
Union Leave	2
Dental	3
Compensation	29
Long term disability	21
Other a) Safety	2
b) Temporary postings	0
c) Suspension	2
d) Bereavement or Comp. Leave	0
e) Community	0
f) Orientation	0
g) Employment Committee	0
	<hr/>
TOTAL	194

B. WORK ORDER ACTIVITY AND BACKLOG

During the month of April the work order activity was as follows:

833 work orders issued.

597 work orders completed from those issued.

110 work orders completed from backlog.

Work Order Activity and Backlog (cont'd)

	<u>Work Orders Issued</u>	<u>W.O. Completed from Issued</u>	<u>W.O. Completed from Backlog</u>
Crushing	125	109	11
Grinding	154	98	26
Environmental	49	37	12
Dewatering	131	75	18
Instrumentation	149	124	16
Electrical-Mill	130	71	18
Construction	94	83	8
Electrical Design	1	0	1
TOTAL	833	597	110

In the month of April the outstanding work backlog decreased by 517.5 manhours, from 43,354 to 42,836.5 for the week ending April 30/82.

	<u>Hours Remaining</u>	<u>Number of Work Orders</u>
Crushers	7,334.0	106
Grinding	12,238.0	113
Environmental	5,442.0	59
Dewatering	15,159.5	139
Instrumentation	225.0	56
Electrical-Mill	1,840.0	96
Construction	533.0	41
Electrical Design	65.0	2
TOTAL	42,836.5	612

<u>PRIORITIES</u>	<u>*E</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>*Emergency</u>
Crushers	1	2	6	89	8	
Grinding	2	13	25	51	22	
Environmental	0	7	2	44	6	
Dewatering	2	5	14	84	34	
Instrumentation	8	7	12	24	5	
Electrical-Mill	0	12	25	47	12	
Construction	-	4	8	20	9	
Electrical Design	-	-	1	1	-	
TOTAL	13	50	93	360	96	= 612

C. MAJOR WORK COMPLETED IN APRIL

Area 1 - Crushing

- completed all P.M.'s available.
- changed dust seal, primary lube pumps (2) changed and flushed lube system in primary crusher.
- overhauled No.4 carmen feeder.
- slowed down primary feeder.
- replaced secondary crusher wear parts and rebuilt spare mantle and bowl.
- replaced wear parts No.1 tertiary crusher and rebuilt mantle.
- replaced take-up pulley and wedlock splice No.11 conveyor.

Area 2 - Grinding & Flotation

- completed all P.M.'s available.
- replaced feed chute and feed end trunnion liner on No.1 rod mill.
- replaced No.1 rod mill feed conveyor.
- installed new style trunnion liner and feed chute in No.2 rod mill.
- replaced feed end and discharge end trunnion liners on No.3 ball mill.
- replaced feed chute and trommel screen No.3 rod mill.
- replaced feed seal and discharge trunnion on Pb regrind mill.

Area 3 - Environmental

- completed all crane checks and P.M.'s made available.
- continued work on on-stream analysis completed the following:
 - a) completed installation of the Pb scavenger tails sampler and associated piping.
 - b) completed installation of Zn scavenger tails sampler and associated piping.
 - c) completed installation of Pb concentrate sampler.
- completed installation of working platform for grinding bay crane (to enable electrical to install insul-buss).

Area 3 - Environmental (cont'd)

- completed inspection and installation of a working platform for tech-taylor valve on zinc rougher feed line.
- rerouted Pb return pump.

Area 4 - Dewatering

- completed all P.M.'s made available.
- commenced work on the annual overhaul of No.2 generator.
- completed the welding of brackets for lighting in the heating plant area.
- completed the overhaul of No.2 vacuum pump.
- fabricated and installed modified feed chutes on the dryers 1-5.
- tightened and/or replaced wedges on 1, 3 and 4 dryers.
- replaced the agitator shaft of No.5 filter.

Area 14 - Instrumentation

- see separate report.

Area 16 - Mill Electrical

- continued installing emergency lighting.
- ran services and hooked up pump for 65 foot thickener overflow.

Area 18 - Construction

- installed a 3 foot line from No.6 cyclopac to No.4 rod mill feed chute.
- installed high pressure water lines to the new grinding circuit.
- piped in the zinc regrind conditioners.
- installed pump pumpbox and piping for thickener reclaim water.
- installed ladder and platform for switching 90 foot thickener overflow water from reclaim pumps 1 and 2 to reclaim pump No.3 silo.
- installed filter flails on No.1 and 2 filters.
- completed all pump checks and P.M.'s

Area 19 - Electrical Design

- completed installation of permanent lighting around cake conveyors.

D. MAJOR MAINTENANCE ITEMS IN MAY

- complete the rebuild of primary mantle.
- repair structural steel damage primary crusher.
- install lifter bars No.3 ball mill (upon arrival).
- continue work on the on-stream analyzer system.
- commence annual overhauls on the heating and ventilation units.
- continue the annual summer overhauls on the heating, ash removal, and coal handling systems.
- overhaul No.1 dryer including replacement of refractory in the transition.
- continue elimination of spill points.
- complete all P.M.'s.
- complete all safety items.

E. TRAINING

On April 1st, 1982 there was one millwright apprentice attending vocational school and he will return to the workforce as of May 24th.

The following millwright apprentices will be reporting to following areas on the following dates:

<u>NAME</u>	<u>DATE</u>	<u>LEAVING FROM</u>	<u>REPORTING TO</u>	<u>YEAR OF APPRENTICE</u>
G. Norman	24-5-82	School	Heating Plant	1st year
M. Redmond	17-5-82	Crushing	Welding Shop	1st year
G. Fraser	17-5-82	Construction	Machine Shop	1st year
T. Dares	31-5-82	Cranes & Heaters	Pump Crew	2nd year
B. MacPherson	17-5-82	Grinding	Crushers	2nd year

F. HEATING PLANT

A total of zero tonnes of coal was received from the Carmacks Coal Mine for the month of April 1982. The dryer and generator consumption was 40 and 33 tonnes per day respectively. The No.5 dryer's oil consumption was 1,000 litres per day respectively and oil seepage was reported in the coal crusher basement.

The generator output for this month was $21 \times 10^6 \times 1.055$ kJ (28% of total Btuh available).

No.1 air compressor ran for 20 hours, No.2 ran for 456 hours and No.3 for 228 hours.

There were 2 generators in service.

There were 4 engineers working.

APPENDIX III
MILL METALLURGY REPORT

Submitted by:

S. Chmelyk, Plant Metallurgist
B. Davia, Metallurgist
R. Murarka, Metallurgist
G.W. Chapman, Chief Assayer

A. SUMMARY

Throughput for the month of April was slightly below plan by 131 tonnes. Average daily throughput was below plan by 0.04% at 10,295 tonnes per day. The ore source for the month was the oxide stockpile. Lead grades were very near plan while recoveries were below plan 4.7 units.

The plan was based strongly on the January plant test results during which we received an atypical block of oxide ore. As a result it is felt that our original forecast of 75% lead recoveries may have been optimistic. Zinc recoveries were slightly above plan while grades were below plan by 2.2 units. Some recovery losses are being incurred as a result of a coarse grind. Some grade problems are associated with a drop in the pyrite/pyrrhotite ratio.

B. PLANT METALLURGY

1. Ore Source

	<u>Ore Type</u>	<u>%of Crusher Feed</u>
Oxidized Stockpile	Mainly 2CD, Some 2EF	100%
Copper in Feed	0.15	
Manganese in Feed	0.10	
Pyrite/Pyrrhotite ratio	2.83	

2. Lead Metallurgy

Lead grades on the oxidized material remains very close to plan. Lead recoveries remain off plan about 5 units at around 70%. The 1982 plan was generated based strongly on the results of the January 1982 plant test. During this plant test very promising results were obtained on the lead circuit despite numerous operating problems. The ore type predominant during the plant test (2EF Ave.%Fe: 30-32%) is not the same

2. Lead Metallurgy (cont'd)

as the ore type milled during most of April (2CD Ave%Fe: 20-21%).

Three sampling campaigns were carried out to evaluate the metallurgical performance of G bank lead rougher after the first cell which had been used as an aerator had been converted to a froth producing cell. Two of the three campaigns indicated a substantial improvement in recovery over H which still had the first cell as an aerator. It has been estimated that each 1% improvement in lead recovery would result in a \$335,000 improvement financially. It has been recommended that the aerator on H bank be converted to a froth producing cell as well.

Sodium sulphite has been tested in the plant on a regular on/off schedule during the month. A report will be issued during May. The initial results of the test do not indicate much improvements metallurgically from the use of sulphite.

3. Zinc Metallurgy

Zinc recoveries for the month were slightly higher than plan while grades were below plan by 2.2 units. Zinc recovery especially has shown a trend downward as the ore type predominant has changed from 2EF to 2CD. The recovery losses have been in the zinc rougher circuit in the form of high zinc scavenger tailings. Cyclosizing and microscopic work have indicated that a large portion of the losses are occurring in the coarse fractions. Additional circuit sampling, cyclosizing and microscopic work is planned to better understand the particle size and recovery relationships.

As the ore type has been changing to a lower iron type the pyrrhotite content has remained the same. Hence the pyrite/pyrrhotite ratio has been going down. Experience has shown us that we can expect problems with zinc grade when milling pyrrhotitic ore. Significant losses occurred on several occasions as a result of the efforts of the flotation operators to attain zinc grade targets with this type of ore by increasing their circulating loads and resulting in a high cleaner tails.

4. Manpower

The three metallurgists were supported by a staff of 4 technicians.

C. MET LAB

Collector comparison testwork on Aero 241, 242, Z-200, Z350 and Orform CO220 began April 13th. This testing should be finished by May 7th and a report issued. Cleaner cycle tests will start immediately after this testing is completed.

The Daily Production report is being programmed into the Textronic computer at engineering. This should eliminate the time lost when errors occur in the report (2-4 hours each time depending on the date when the error is discovered). Shift comparisons, load outs and the monthly inventory report should also be in the computer by the month end.

D. GRINDING

1. On A circuit, it was difficult to maintain high densities in the ball mills. Recommendation was made to replace one 30 inch cyclone by a 20 inch cyclone which was installed towards the end of the month. Early indications are that the density in ball mill No.1 (the circuit in which the cyclone has been changed) has increased dramatically to within specifications.

A modified feed chute on No.2 rod mill also improved the density in that rod mill.

Adjustable apexes were installed on No.4 cyclopak. So far no testwork has been carried out to determine the optimum apex size.

2. On B circuit, most modifications are complete. Ceramic apexes (6") have been installed on No.6 cyclopak. The circulating load in No.5 ball mill has increased to about 225% since the lead scavenger concentrate is being pumped to the lead rougher feed box. The P80 of No.5 cyclopac overflow has also dropped but a few surveys will have to be carried out to be able to specify the improved P80.

D. Grinding (cont'd)

3. pH in the grinding mills was monitored on a regular basis. Highest possible pH was maintained in the rod mills by feeding most lime there and minimum amount of lime to the flotation feed. Table I gives the average pH and temperatures in the mills.

TABLE I

	<u>pH</u>	<u>Temp. °C</u>
Rod Mill 1	8.5	13.2
Rod Mill 2	9.6	12.8
Rod Mill 3	7.8	13.0
Rod Mill 4	7.9	12.5
Ball Mill 1	7.6	16.8
Ball Mill 2	9.6	17.0
Ball Mill 3	7.1	14.6
Ball Mill 6	7.4	20.8
Ball Mill 4	7.1	23.0
Ball Mill 5	7.5	27.6

4. The particle size monitor was mechanically working throughout the month perfectly well. There was a drift in the %-325 mesh reading which was constant. This was possibly due to the lower specific gravity of the ore (3.7). The machine was originally calibrated for a specific gravity of 4.2.

The benefits of the PSM are many and will be realized more and more in the future.

5. In future reports, it will be possible to report average monthly particle size distribution and P80 of the ground product. An attempt will be made to include this data in the daily production report.

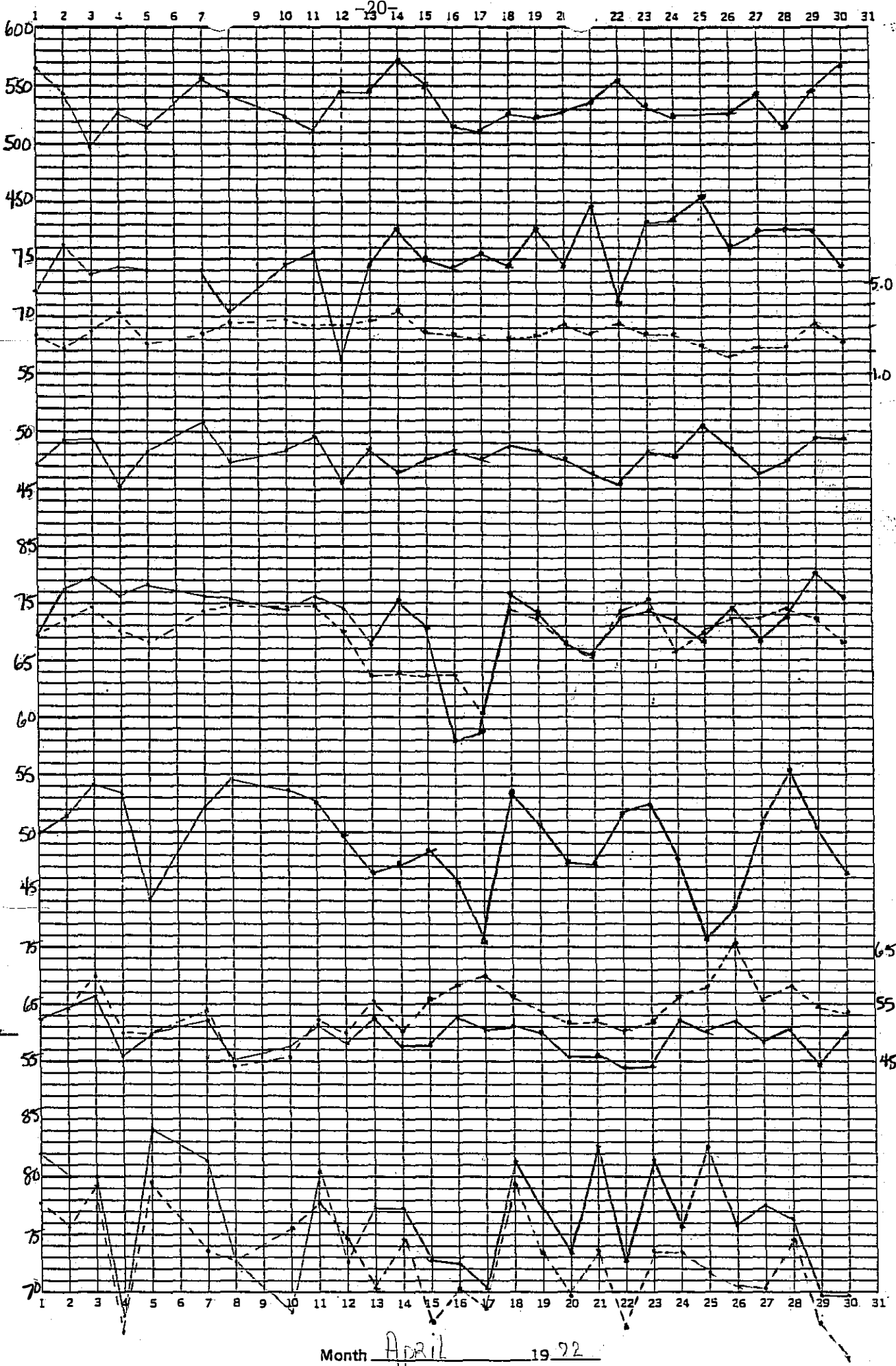
D. Grinding (cont'd)

6. Table II shows steel and power consumption for the month of April and year-to-date figures. The estimated total cost of steel and power was \$3.36 per dry tonne ore ground, down from \$3.50 in March.

TABLE II

	<u>KG BALLS/T</u>		<u>KG RODS/T</u>		<u>KWH/T</u>	
	April	Y.T.D.	April	Y.T.D.	April	Y.T.D.
No.1 cct	0.262	0.495	0.435	0.455	--	--
No.2 cct	0.223	0.428	0.446	0.531	6.882	7.025
No.3 cct	0.499	0.493	0.414	0.497	8.832	8.636
Average	0.328	0.472	0.432	0.494	7.857	7.831
No.4 cct	0.786	0.840	--	--	7.234	7.307
No.A cct	1.114	1.312	0.432	0.494	15.091	15.138
No.B cct	1.460	1.511	0.427	0.491	17.217	17.605
Average	1.287	1.412	0.430	0.493	16.154	16.372
Pb Reg.	0.044	0.062	--	--	0.727	0.708
Zn Reg.	0.133	0.083	--	--	1.454	0.992
TOTAL	1.464	1.557	0.430	0.493	18.335	18.072

SUMMARY OF DAILY PRODUCTION



Tones per Operating Hour

% -200 MESH

% -200 Mesh

% Zn in Zn conc.

% Pb Rec. Rfr
Tot.

% Ag Rec. Total in Pb Conc.

% Pb in Pb C
gm/ T/ Ag / In / Pb / C / H

Zn. Rec. Rgr
Tot.

% Zn in Zn conc.

Pb/Pb RATIO

gm/ Ag in Pb conc (x10)

Month April 19 22

TABLE I II
METALLURGICAL BALANCE
APRIL 1982

Product	D.M.T.	% ASSAY				% DISTRIBUTION			
		Lead	Zinc	Iron	g/t Ag	Lead	Zinc	Iron	Ag
<u>PLAN</u>									
Dry Feed	309,000	2.9	4.7		37.6				
Lead Conc.	11,201	60.0			519.0	75.0			50.0
Zinc Conc.	21,785		50.0				75.0		
TOTAL	32,986	60.0	50.0		519.0	75.0	75.0		50.0
<u>ACTUAL</u>									
Dry Feed	308,869	3.0	5.2	23.6	37.1	100.0	100.0	100.0	100.0
Lead Conc.	10,847	59.6	5.7	8.6	521.4	70.3	3.9	1.3	49.3
Zinc Conc.	25,796	2.7	47.8	11.9	61.3	7.5	76.3	4.2	13.8
Tailing	272,226	0.8	1.2	25.3	15.5	22.2	19.9	94.5	36.9
TOTAL	36,643	59.6	47.8		521.4	70.3	76.3		49.3
<u>VARIANCE (-)</u>									
Dry Feed	(131)	0.1	0.5		(0.5)				
Lead Conc.	(354)	(0.4)			2.4	(4.7)			(0.7)
Zinc Conc.	4,011		(2.2)				1.3		
TOTAL	3,657	(0.4)	(2.2)		2.4	(4.7)	1.3		(0.7)

TABLE IV
METALLURGICAL BALANCE - YEAR-TO-DATE
APRIL 1982

Product	D.M.T.	% ASSAY				% DISTRIBUTION			
		Lead	Zinc	Iron	g/t Ag	Lead	Zinc	Iron	Ag
<u>PLAN</u>									
Dry Feed	1,232,124	2.8	4.7		33.3				
Lead Conc.	45,127	60.6			497.0	78.5			54.6
Zinc Conc.	90,380		50.4				79.1		
TOTAL	135,507	60.6	50.4		497.0	78.5	79.1		54.6
<u>ACTUAL</u>									
Dry Feed	1,260,917	2.8	4.9	25.2	33.4	100.0	100.0	100.0	100.0
Lead Conc.	46,099	58.3	6.2	7.9	477.0	74.8	4.6	1.1	52.1
Zinc Conc.	96,228	2.5	49.1	11.4	52.0	6.7	77.0	3.4	12.0
Tailing	1,118,590	0.6	1.0	27.1	14.0	18.5	18.3	95.4	35.9
TOTAL	142,327	58.3	49.1		477.0	74.8	77.0		52.1
<u>VARIANCE (-)</u>									
Dry Feed	28,793		0.2		0.1				
Lead Conc.	972	(2.3)			(20.0)	(3.7)			(2.5)
Zinc Conc.	5,848		(1.3)				(2.1)		
TOTAL	6,820	(2.3)	(1.3)		(20.0)	(3.7)	(2.1)		(2.5)

TABLE V
METALLURGICAL BALANCE
FORECAST FOR MAY 1982

Product	D.M.T.	% ASSAY				% DISTRIBUTION			
		Lead	Zinc	Iron	g/t Ag	Lead	Zinc	Iron	Ag
<u>OXIDE STOCKPILE</u>									
Dry Feed	215,100	2.9	4.7		37.6				
Lead Conc.	7,278	60.0			556.0	70.0			50.0
Zinc Conc.	15,796		48.0				75.0		
<u>TOTAL</u>	<u>23,074</u>	<u>60.0</u>	<u>48.0</u>		<u>556.0</u>	<u>70.0</u>	<u>75.0</u>		<u>50.0</u>
<u>CFSP II</u>									
Dry Feed	104,200	2.3	3.9		31.9				
Lead Conc.	4,079	47.0			473.0	80.0			58.0
Zinc Conc.	6,502		50.0				80.0		
<u>TOTAL</u>	<u>10,581</u>	<u>47.0</u>	<u>50.0</u>		<u>473.0</u>	<u>80.0</u>	<u>80.0</u>		<u>58.0</u>
<u>TOTAL</u>									
Dry Feed	319,300	2.7	4.4		35.7				
Lead Conc.	11,357	55.3			526.0	72.8			52.3
Zinc Conc.	22,298		48.6				76.4		
<u>TOTAL</u>	<u>33,655</u>	<u>55.3</u>	<u>48.6</u>		<u>526.0</u>	<u>72.8</u>	<u>76.4</u>		<u>52.3</u>

2. Accuracy (cont'd)

EXTERNAL COMPARISON - MARCH

	C.A.M.C.				GENERAL TESTING			
	Lead	Zinc	Iron	Silver	Lead	Zinc	Iron	Silver
Heads	2.77	4.53	28.30	32.5				
Tails	0.64	1.04	29.51	13.6	NOT AVAILABLE DUE TO RE-ASSAY			
Lead	60.52	5.03	7.44	476.3				
Zinc	2.29	48.61	11.75	58.25				

3. Load Out

SKAGWAY RECEIVING AND INVENTORY (W.M.T.)

	Lead	Zinc	Total
Receiving during April 1982	12,039	29,240	41,279
Inventory April 30/82	7,691	30,906	38,597

CONCENTRATES EXPORTED (W.M.T.)

Vessel	Departed	Lead	Zinc	Total
J-180	April 26/82	10,002	10,803	20,805
J-179	April 29/82	5,994	17,911	23,905

4. Copper Sulphate Comparison

Cyprus Anvil - 19.89

Canadian Industries Ltd. - 19.82

ANALYTICAL LABORATORY

1. Production Distribution

Production	No. of Assays	Manhours	% Of Total Hours Worked
A.A. Mill Control	3,425	134.5	17.42
A.A. Pits	1,519	52.0	6.74
A.A. Metallurgy	4,127	106.5	13.80
Wet Mill Control	1,309	211.5	27.40
TOTAL	10,390		
Oil		111.5	14.44
X-Ray Programming		57.0	7.38
Environmental		99.0	12.82
Miscellaneous		--	--

2. Accuracy

INTERNAL COMPARISON FOR APRIL

	MONTHLY AVERAGE				COMPOSITE ASSAY			
	Lead	Zinc	Iron	Silver	Lead	Zinc	Iron	Silver
Heads	2.80	4.54	24.08	37.9	2.73	4.50	24.06	34.8
Tails	0.75	1.19	25.29	15.7	0.76	1.18	25.08	15.2
Lead	59.39	5.64	8.38	537.9	59.51	5.62	8.17	529.1
Zinc	2.55	47.96	11.94	62.4	2.57	47.73	11.90	60.0

APPENDIX IV
MILL INSTRUMENTATION REPORT

Submitted by:

Ken Power, Instrumentation Foreman

A. CRUSHING

The new system for the recorder in primary was installed this month. It provides an offset for the Hydroset pressure pen during a red light condition.

Number one belt weightometer was relocated at the end of this month. Instrumentation to be completed by May 7, 1982.

B. GRINDING

Magnetic flowmeters and Keystone rubber lined diaphragm valves were ordered this month for the rod mill grinding water because of problems with reclaim water.

We are awaiting a quote from Hydroflo to do the same with the pumpboxes.

Ultrasonic level transducers have been installed on No.11 pumpbox. T. Dunford to tie into pump stop/start.

Diaphragm seals for pressure gauges on cyclones have arrived. Some problems have been noted with clogging of the small $\frac{1}{4}$ inch lines.

C. FLOTATION

Floats on Denver cells zinc circuit have been lowered approximately 4 inches at S. Chmelyk's request.

Instrumentation for level indicators on lime tanks has arrived and installation began on the last of this month.

D. DEWATERING

All plugged chute alarm loops on dryers were checked this month at T. Arbuckle's request and everything was found to be in order. T. Dunford to check interlock with cake conveyor.

E. COURIER 300

To date seven of the fourteen samplers have been installed and D. Milkert has done an excellent job of calibration.

The lead and zinc concentrate samplers have been changed to pressure pipe samplers and are in good working condition.

Protection boxes for the tertiary automatic samplers have been installed to prevent spillage and contamination. Separate timers have been installed on two of the samplers because of the larger volume of return sample compared to the other five samples.

F. GENERAL

Manpower at month end: 4 instrument mechanics
1 apprentice instrument mechanic

Overtime: Regular hours: 791
Overtime hours: 81
Percentage : 10

MILL REPORT

MARCH 1982

SUMMARY

Submitted by:

W.N. Wallinger, Mill Superintendent
G.D. Biles, Mill Production Superintendent

A. MILL OPERATIONS

Throughput for the month totalled 347,802 tonnes for an average of 11,219 tonnes per day and was 9% above plan. Total concentrate production of 36,497 dry tonnes was 10% above plan at a grade slightly lower than planned.

Interruptions in production were caused by two apron feeder hang-ups and repairs to one Spencer air blower on flotation. Filtering difficulties and high concentrate inventory in the 23 metre lead thickener restricted throughput from March 17th to the 27th. Eventually this problem resulted in mechanical failure of the rake arm in this thickener.

Many labour hours were spent cleaning frozen lumps of ore from the slot feeders during the month and in physically removing concentrate from the lead filters. Both these jobs resulted in a considerable amount of overtime.

TABLE 1
Production Plan
APRIL 1982

Ore & Product	Tonnes
Mill Feed	309,000
Lead Concentrate	11,201
Zinc Concentrate	21,785
TOTAL	32,986

B. MILL MAINTENANCE

Major mechanical jobs completed in March included the overhaul of one tertiary crusher, completion of new distribution systems for lime and sodium sulphite to the grinding circuits and continued installation of the on-stream analyzer lines. The backlog of identified work was reduced by 3,775 manhours.

With the reduction of forces the mechanical crews in all areas of the mill will be concentrating on mechanical means of reducing spillage. Towards this end improved belt scrapers have greatly reduced spillage from cross conveyors, overflow launders in the OK cell transition boxes have eliminated spillage here and more attention to skirting and scraper adjustments have contributed to reduced spillage throughout. Much work remains to be completed in the area of spillage reduction and this work will continue through April.

C. MILL METALLURGY

Metallurgical results during the first part of the month were adversely affected by erratic flotation feed tonnages resulting from frozen ore in the slot feeders.

The treatment of the oxide stockpile ore commenced March 10th and provided relief with the frozen ore problem. Some pH control problems with the oxide ore required extensive modifications to the lime feeding system during the latter half of the month. The oxide metallurgy has been reasonably close to plan levels with the exception of lead recovery which has persisted in the 70% range.

Late in the month, the on-stream analyzer began providing assays on the first four slurry streams, and initial indications are that the system has a great potential for improving flotation circuit operation.

C. Mill Metallurgy (cont'd)

TABLE II

Product	D.M.T.	% Assay			% Distribution		
		Lead	Zinc	g/t Ag	Lead	Zinc	Ag
<u>OXIDE - MARCH 1982</u>							
Dry Feed	253,998	2.9	4.9	30.4	100.0	100.0	100.0
Lead Conc.	8,611	59.2	6.0	415.0	69.2	4.2	46.3
Zinc Conc.	18,846	2.8	48.4	55.0	7.1	74.1	13.4
Tailing	226,542	0.8	1.2	13.7	23.7	21.7	40.3
TOTAL	27,457	59.2	48.4	415.0	69.2	74.1	46.3
<u>MARCH 1982</u>							
Dry Feed	347,802	2.8	4.6	31.0	100.0	100.0	100.0
Lead Conc.	11,984	58.1	5.8	426.2	71.9	4.4	47.3
Zinc Conc.	24,513	2.6	48.8	54.2	6.5	75.3	12.3
Tailing	311,305	0.7	1.0	14.0	21.6	20.4	40.3
TOTAL	36,497	58.1	48.8	426.2	71.9	75.3	47.3
<u>MARCH 1982 YEAR-TO-DATE</u>							
Dry Feed	952,048	2.8	4.7	32.3	100.0	100.0	100.0
Lead Conc.	35,252	57.9	6.3	463.2	76.4	4.9	53.2
Zinc Conc.	70,433	2.4	49.6	49.1	6.4	77.3	11.3
Tailing	846,364	0.5	0.9	12.9	17.2	17.7	35.6
TOTAL	105,685	57.9	49.6	463.2	76.4	77.3	53.2

D. SAFETY

TABLE III

Department	First Aid	Medical Aid	Lost Time	Total
Operations	4	2	3	9
Maintenance	3	1	1	5
Metallurgy	1	-	-	1
TOTAL	8	3	4	15

APPENDIX I

MILL OPERATIONS REPORT

Submitted by:

L.D. MacDonald, General Mill Foreman
L.H. Hyde, Surface Crew Foreman
D. Cresswell, Labour Foreman
S. Loveridge, Training Foreman

A. CRUSHING

The primary crusher operated for 421 hours during which a total of 4,177 loads were delivered to the primary crusher, for an average of 7 trucks per operating hour. Crusher operating time was 56%.

A breakdown of available primary crushing time is as follows:

TABLE I

Reason	January		February		March	
	Hours	Pct	Hours	Pct	Hours	Pct
Hang-ups	44.75		36.50		27.25	
Plugged Chutes	12.25		6.50		62.00	
Operating Delays	19.50		13.00		19.25	
Unscheduled Maintenance	12.25		3.00		7.00	
Electrical	15.25		31.25		3.00	
Full Bins	19.75		1.00		6.00	
TOTAL	143.75	19.0	91.25	14.0	124.75	16.0
Scheduled Maintenance	35.50	5.0	28.25	4.0	74.75	10.0
Pit Delays	173.75	23.0	185.50	28.0	138.25	18.0
100% Availability	744.00		672.00		744.00	
Actual Availability	565.00	76.0	552.25	82.0	559.50	75.0
Actual Operating Time	391.25	53.0	367.00	55.0	421.00	56.0

The secondary crushing section operated for 568 hours for a total throughput of 208,355 tonnes; lost time totalled 143 hours (19% available operating time). Scheduled maintenance totalled 34 hours, 4% of the available operating time.

B. GRINDING

The grinding circuits were operated at 83.9% availability during the month, with a throughput of 347,802 tonnes (an average of 11,219 tonnes per day).

TABLE II

	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>
	Hours	Hours	Hours
Operating Delays	62.91	16.37	282.06
Rod Charging	7.09	10.03	6.57
Scheduled Maintenance	256.89	128.79	14.25
Unscheduled Maintenance	44.47	9.75	88.25
Electrical	13.36	12.99	8.33
No Ore	114.08	242.64	111.83
NCPC	18.62	17.33	
TOTAL	517.42	437.90	511.29

The higher hours attributed to operation delays were caused by two apron feeder hang-ups totalling 30 hours and high 23 metre thickener inventory from March 17-27th when one "A" circuit mill was kept down.

The unscheduled maintenance increase was caused by the failure of a mechanism on the OK cells totalling 24 hours and the shutdown of a Spencer blower motor due to buildup in the cooling vents.

B. Grinding (cont'd)

TABLE III
GRINDING MEDIA CONSUMPTION

	<u>MARCH</u>		<u>YEAR-TO-DATE</u>		<u>PLAN</u>
	kg	kg/t	kg	kg/t	kg/t
Rods, 4 inch	88,000	0.25	244,600	0.26	0.40
Rods, 3 inch	110,700	0.32	291,000	0.31	0.30
Balls, 1 1/2 inch	385,100	1.11	1,004,600	1.05	1.10
Balls, 2 inch	91,000	0.27	456,500	0.48	0.80
TOTAL	674,800	1.94	1,996,700	2.10	2.60

C. FLOTATION

TABLE IV

	<u>MARCH</u>		<u>YEAR-TO-DATE</u>		<u>PLAN</u>
	kg	kg/t	kg	kg/t	kg/t
Sodium Cyanide	22,400	0.06	68,000	0.07	0.095
Soda Ash	291,800	0.84	670,700	0.70	1.65
Lime	1,257,200	3.60	2,262,400	2.38	2.47
Copper Sulphate	250,142	0.72	583,330	0.61	0.46
Xanthate (Z-11)	138,000	0.40	315,024	0.34	0.308
M.I.B.C.	4,760	0.014	13,600	0.014	0.015
Dow 1012	612	0.002	2,244	0.002	0.0044
Flocculant	325	0.0009	950	0.0009	0.0034
Filter Aid	*26,000	0.075	52,200	0.056	0.020
Sodium Sulphite	0	0.0	46,000	0.05	1.0

* 9,600 kg charged from January, 1982. Actual consumption 0.047.

D. DEWATERING

The moisture content of the final concentrate averaged between 6.1 and 8.1%.

TABLE V

	LEAD		ZINC		
	#1	#2	#3	#4	#5
% Operating Time	83	78	85	85	77
D.M.T. Filtered	11,984		24,513		
% Moisture Content	6.1		8.1		

E. TAILING DISPOSAL AND WATER SUPPLY

Mill water consumption was 181,500,000 US gallons, an average of 4,066 US gallons per minute.

F. MOBILE EQUIPMENT

TABLE VI

Equipment	Reason	Days Down	Percent Availability
06-06	Repair bucket and hydraulic leaks	5	83.8
06-010	Service	1	96.7
51-05	Engine Problems	30	3.2
53-029	Brakes	2	93.5
53-033	---	0	100.0
56-07	Engine	17	45.2
56-10	---	0	100.0
56-13	Engine	31	0.0
56-15	---	0	100.0
Rental 950	---	0	100.0
AVERAGE			72.2

G. LABOUR

The labour force was under authorized strength for most of the month of March.

The labourers on clean-up averaged 45% of the total labour count per day.

The work force concentrated on all areas of the concentrate for clean-up.

There were 389 sector bags changed this month.

TABLE VII

LABOUR FORCE	
Number of straight time days worked	23
Average labour count per day	15.3
Average labourers working per day shift	14.8
Average labourers working on clean-up per day	6.9

H. LOAD OUT

Excess waiting time due to:	Bunching	110.15 hours
	Loader Problems	12.30
	Dusting	0.57
	Scale	2.40
	Miscellaneous	9.13
	TOTAL	134.55 hours

H. Load Out (cont'd)

TABLE VIII

Type of Train	Total Trucks	Ave. per Day	Average Time Minutes		Average Weight Tonnes		Tonnes Shipped Total	Shipped Average Per Day
			Loading	Waiting	Tare	Net		
A	184	6.6	3.7	23.1		26.95	43,255	1,545
B	967	34.5	8.2	30.0	20.75	39.59		

I. TRAINING

During the month no training programs were started due to the cancellation of all postings in March.

There were three training programs completed during the month and one program was terminated before completion during the reduction in forces.

APPENDIX II

MILL MAINTENANCE REPORT

Submitted by:

W.H. Brown, General Mill Mtce Foreman
E.O. Wedekind, Chief Heating Plant Eng.

A. MANPOWER

At the end of March, the Mill Maintenance Department had in it's employ, 58 permanent employees and 6 supervisors. The 1051 force worked a total of 9,588.5 manhours.

In the month of March, 353 mandays were lost due to the following:

Vacation, LOA, Floaters	133
AWOL a) Discipline	1
b) Time off bank account	1
Sick a) Time off bank account	11
b) Medical documentation	7
c) Paid sick days	6
Training (school)	58
Union Leave	4
Dental	1
Compensation	48
Long term disability	53
Other a) Safety	9
b) Temporary postings	0
c) Suspension	18
d) Bereavement of Comp. leave	0
e) Community	0
f) Orientation	0
g) Employment Committee	3
TOTAL	353

B. WORK ORDER ACTIVITY AND BACKLOG

During the month of March the work order activity was as follows:

687 work orders issued.

491 work orders completed from those issued.

169 work orders completed from backlog.

Work Order Activity and Backlog (cont'd)

	<u>Work Orders Issued</u>	<u>W.O. Completed from Issued</u>	<u>W.O. Completed from Backlog</u>
Crushing	126	81	14
Grinding	107	75	35
Environmental	51	37	16
Dewatering	108	64	26
Instrumentation	112	96	21
Electrical - Mill	85	62	50
Construction	96	75	6
Electrical Design	2	1	1
TOTAL	687	491	169

In the month of March the outstanding work backlog decreased by 3,774.5 manhours, from 47,128.5 to 43,354 for the week ending March 31/82.

	<u>Hours Remaining</u>	<u>Number Work Orders</u>
Crushers	7,834.0	100
Grinding	13,075.5	90
Environmental	5,608.0	59
Dewatering	14,524.5	118
Instrumentation	213.0	49
Electrical - Mill	1,224.0	46
Construction	745.5	48
Electrical Design	129.5	2
TOTAL	43,354.0	512

<u>PRIORITIES</u>	<u>*E</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>*Emergency</u>
Crushers	1	1	6	92	0	
Grinding	1	10	28	39	12	
Environmental	-	7	8	42	2	
Dewatering	2	5	38	63	10	
Instrumentation	-	7	11	31	-	
Electrical - Mill	-	2	25	18	1	
Construction	-	4	15	20	9	
Electrical Design	-	-	1	1	-	
TOTAL	4	36	132	306	34	= 512

C. MAJOR WORK COMPLETED IN MARCH

Area 1 - Crushing

- completed all P.M.'s available.
- replaced liners in apron feeder.
- installed weightometer No.1 conveyor.
- replaced bearings, gears, shafts, 1A feeder.
- replaced bearings No.1B screen.
- overhauled No.7 carmen feeder.
- overhauled tertiary 2 crusher.
- overhauled secondary crusher discharge.
- rebuilt spare tertiary mantle.
- repaired transfer scrubber.

Area 2 - Grinding and Flotation

- completed all P.M.'s available.
- replaced conveyor belts No.1 cross conveyor, No.2 transfer conveyor and No.3 cross conveyor.
- installed test apexes on No.4 cyclo pac.
- changed feed seal, feed spout and trommel screen.
- changed out lower mechanism 4201 OK cell.
- replaced trommel screen on Pb regrind.
- overhauled cone crusher bucking room (needs parts).
- completed installation of Na_2SO_3 system.
- changed lime bags and modified trimac system.

Area 3 - Environmental

- completed all P.M.'s and crane checks.
- repaired coil heater 1844.
- completed modifications to met lab rod and ball mills.
- completed installation of lime addition lines.
- re-ran shower and eye wash stations in met lab.
- completed dam for zinc rougher feed.
- installed pipeline from 90 foot thickener to south reclaim tank.
- completed upgrading from 2-3 on Pb transfer pump (1 line).

Area 3 - Environmental (cont'd)

- completed upgrading from 3-4 on zinc transfer pump (1 line).
- continued work on O.S.A. pumps, lines and samplers.
- installed launder piping and converted lead aerator to a rougher cell.

Area 4 - Dewatering

- completed all P.M.'s available.
- replaced torque housing 90 foot thickener.
- repaired rakes, steady bearing, bed and cone valve on 75 foot thickener.
- replaced heads No.1 filter.
- installed shut-off valves on lower vacuum line 1 - 5 filters.
- modified housing, relocated drive and standardized No.5 filter.
- replaced feed end seal No.3 dryer.
- changed out pinion and ducting No.2 dryer.
- changed coal crusher segments.
- installed brackets for cake conveyor lighting.

Area 14 - Instrumentation

- see separate report.

Area 16 - Mill Electrical

- completed all P.M.'s available.
- cleaned out Spencer blower motor No.13-008.
- cleaned oil spill secondary MCC.
- continued on emergency lighting.
- continued installation of lighting cake conveyor floor.

Area 18 - Construction

- completed all P.M.'s (pumps).
- installed new type scrapers in 1, 2, 3 and 4 cross conveyors.
- installed flush line to No.4 ball mill.
- installed potable water line to P.S.M.

Area 18 - Construction (cont'd)

- installed overflow lines to O.K. cells.
- installed screen north reclaim tank.
- installed reclaim water line from the 75 foot thickener to south tank.
- installed spray bars to the regrinds.
- installed lead regrind by-pass.

Area 19 - Electrical Design

- completed wiring for Na_2SO_3 system.

D. MAJOR MAINTENANCE ITEMS IN APRIL

- overhaul carrier and return idlers in apron feeder.
- overhaul secondary crusher.
- overhaul tertiary 2 crusher.
- complete primary mantle rebuild.
- replace lifter bars No.3 ball mill.
- continue work on the O.S.A. pumps, samplers and lines.
- prepare for No.3 dryer overhaul.
- install bag beaters on filters.
- continue with O.S.A. (instrumentation and electrical).
- continue installation of emergency and cake conveyor floor lighting.
- continue eliminating spill points.
- complete all P.M.'s.

E. TRAINING

On March 1, 1982 there were three apprentices attending vocational school and they will return to the work force as of April 19th.

E. Training (cont'd)

The following apprentices will be reporting to the following areas on the following dates:

<u>Name</u>	<u>Date</u>	<u>Leaving From</u>	<u>Reporting to</u>	<u>Y.O.A.</u>
M. Redmond	19-4	School	Crushing	1st year
T. Woods	19-4	School	Pump Crew	1st year
G. Norman	19-4	Planning	School	1st year
R. McIntyre	19-4	Environmental	Grind. & Flot.	2nd year
G. Fraser	19-4	School	Construction	1st year
T. Dares	1-4	Heating Plant	Cranes & Heaters	2nd year

The above mentioned apprentices will report to the supervisors in the areas mentioned at 8:00 AM on the listed dates.

At month end there were 8 apprentices on stream - 3 being lost to reduction of forces. The mill maintenance training supervisor was also lost and any questions regarding apprentices should be addressed to W. Brown, R. Owens or E. Hynes.

F. HEATING PLANT

A total of zero tonnes of coal was received from the Carmacks Coal Mine for the month of March 1982. The dryer and generator consumption was 50 and 32 tonnes per day respectively. The No.5 dryer's oil consumption was 1,032 litres per day respectively and oil seepage was reported in the coal crusher basement.

The generator output for this month was $22 \times 10^6 \times 1.055$ kJ (30% of total Btuh available).

No.1 air compressor ran for a total of 0 hours, No.2 ran for 12 hours and No.3 ran for 708 hours.

Four engineers were working during the month. And the 3 generators were in service.

APPENDIX III
MILL METALLURGY REPORT

Submitted by:

S. Chmelyk, Plant Metallurgist
B. Davia, Metallurgist
R. Murarka, Metallurgist
G.W. Chapman, Chief Assayer

A. SUMMARY

Throughput for the month of March exceeded plan by 22,584 tonnes. Average daily throughput was above plan by 7% at 11,219 tonnes per day.

The oxide stockpile was the predominant ore source for the month. The metallurgical shortfall below the plan for the month is due in large part to the milling of much more oxidized material than was forecast. Lead grades with the oxidized ore were near plan while lead recoveries were below plan by 5.8 units. Improved pH control on the rougher circuit and the ability to increase our cyanide usage have resulted in an improvement. Zinc recoveries on the oxidized material were near plan while grades were below plan by 1.6 units. Utilization of both the zinc regrind mills has shown a significant improvement in zinc grade.

B. PLANT METALLURGY

1. Ore Source

	<u>Blast</u>	<u>Ore Type</u>	<u>% of Crusher Feed</u>
Zone 1	3610 B&F	2EF,2AB	12.5
Crusher Feed High Grade Stockpile		2EF,2AB	9.5
Oxidized Stockpile		2EF	78.0

Copper in Feed 0.16
Manganese in Feed 0.09
Pyrite/Pyrrhotite Ratio 4.29

2. Lead Metallurgy

The ore source for the month was predominantly oxide material from the oxidized stockpile. Lead grades with this material have been close to those forecast. Lead recoveries fell short of plan by 5.8 units. Inadequacies in the lime system resulting in an inability to

2. Lead Metallurgy (cont'd)

maintain a consistent pH on the lead rougher pH resulted in some losses on the lead circuit. Modifications to the system have been completed resulting in a stable pH and more consistent lead metallurgy. Approval to use the new tailings pond has allowed us to increase our cyanide addition and this has resulted in improved metallurgical performance on the lead circuit. There are presently 6 sample streams running on the courier on-stream analyzer giving us assays every three minutes. This information is proving invaluable as tool to control both circuits. Sulphite will be tested on a plant scale in April as the circuit is much stabler now.

We were unable to duplicate the promising results using zinc sulphate with the preactivated zinc ore. Further testwork will be carried out using an Orform D1 depressant manufactured by Phillips Chemicals.

3. Zinc Metallurgy

Zinc recoveries with the oxide ore were very near plan. Zinc grades were slightly below plan. One of the zinc regrinds was down for a good portion of the month as we were encountering problems in the filtering area and it was felt that this may be due to too fine a concentrate. The second regrind mill was started on the first of April as the dewatering problem was no longer critical. A significant improvement in zinc grade was noted with the additional grind. The improved pH control on the lead roughers has improved the performance of the zinc roughers as well. Both circuits are strongly affected by the amount of fines reporting to the grinding circuit, i.e. metallurgy is much better when we are milling only coarse ore from the secondary crushing circuit.

4. Manpower

Dennis Milkert has joined the metallurgical group as a technician bringing us to our authorized level of 4 technicians.

C. MET LAB

The testwork on sodium sulfite was completed mid March. The tests showed sulfite increased both lead and zinc grades and recoveries in the lab. It was recommended to try the sulfite in the plant.

The new grinding setup is in operation and the technicians are in the process of re-establishing grinding parameters for both the rod mill and regrind mill. Testing parameters are also being established for the OK cells and cleaner tests, hopefully, that by the end of April, parallel testwork with Kamloops on the 2A ore will have begun.

SUMMARY OF DAILY PRODUCTION

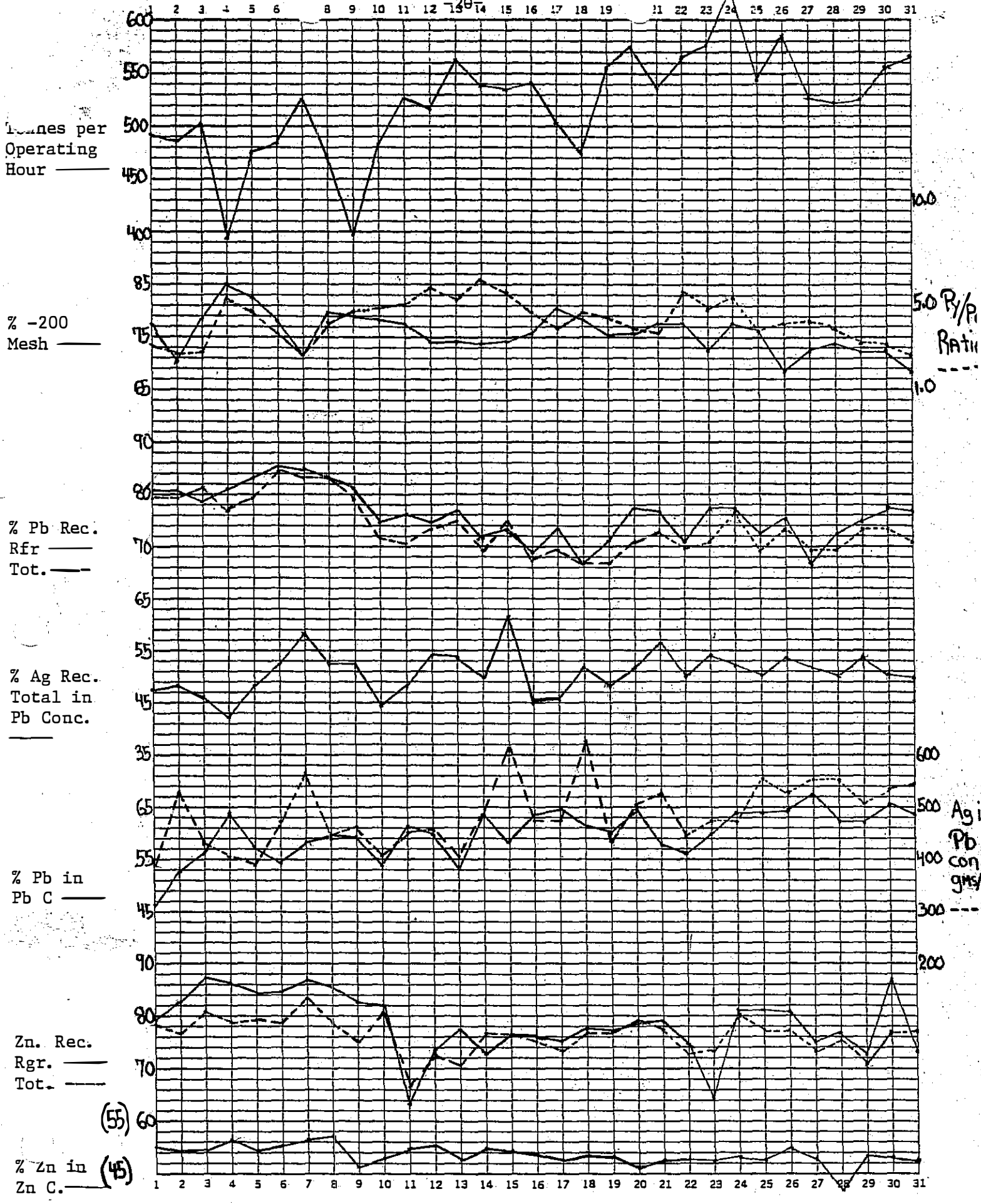


TABLE I
METALLURGICAL BALANCE
OXIDE - MARCH 1982

Product	D.M.T.	% ASSAY				% DISTRIBUTION			
		Lead	Zinc	Iron	g/t Ag	Lead	Zinc	Iron	Ag
<u>PLAN</u>									
Dry Feed	163,600	2.9	4.7		37.6				
Lead Conc.	5,931	60.0			518.6	75.0			50.0
Zinc Conc.	11,534		50.0				75.0		
TOTAL	17,465	60.0	50.0		518.6	75.0	75.0		50.0
<u>ACTUAL</u>									
Dry Feed	253,998	2.9	4.9	28.4	30.4	100.0	100.0	100.0	100.0
Lead Conc.	8,611	59.2	6.0	8.3	415.0	69.2	4.2	1.0	46.3
Zinc Conc.	18,846	2.8	48.4	11.5	55.0	7.1	74.1	3.0	13.4
Tailing	226,542	0.8	1.2	30.5	13.7	23.7	21.7	96.0	40.3
TOTAL	27,457	59.2	48.4		415.0	69.2	74.1		46.3
<u>VARIANCE (-)</u>									
Dry Feed	90,398		0.2		(7.2)				
Lead Conc.	2,680	(0.8)			(103.6)	(5.8)			(3.7)
Zinc Conc.	7,321		(1.6)				(0.9)		
TOTAL	10,001	(0.8)	(1.6)		(103.6)	(5.8)	(0.9)		(3.7)

TABLE II
METALLURGICAL BALANCE
MARCH 1982

Product	D.M.T.	% ASSAY				% DISTRIBUTION			
		Lead	Zinc	Iron	g/t Ag	Lead	Zinc	Iron	Ag
<u>PLAN</u>									
Dry Feed	319,300	2.7	4.4		31.5				
Lead Conc.	11,206	61.0			490.3	78.9			54.6
Zinc Conc.	21,912		50.6				79.7		
TOTAL	33,118	61.0	50.6		490.3	78.9	79.7		54.6
<u>ACTUAL</u>									
Dry Feed	347,802	2.8	4.6	27.6	31.0	100.0	100.0	100.0	100.0
Lead Conc.	11,984	58.1	5.8	8.0	426.2	71.9	4.4	1.0	47.3
Zinc Conc.	24,513	2.6	48.8	11.5	54.2	6.5	75.3	2.9	12.3
Tailing	311,305	0.7	1.0	29.6	14.0	21.6	20.4	96.1	40.3
TOTAL	36,497	58.1	48.8		426.2	71.9	75.3		47.3
<u>VARIANCE (-)</u>									
Dry Feed	22,584	0.1	0.2		(0.5)				
Lead Conc.	778	(2.9)			(64.1)	(7.0)			(7.3)
Zinc Conc.	2,601		(1.8)				(4.4)		
TOTAL	3,379	(2.9)	(1.8)		(64.1)	(7.0)	(4.4)		(7.3)

TABLE III
METALLURGICAL BALANCE - YEAR-TO-DATE
MARCH 1982

Product	D.M.T.	% ASSAY				% DISTRIBUTION			
		Lead	Zinc	Iron	g/t Ag	Lead	Zinc	Iron	Ag
<u>PLAN</u>									
Dry Feed	923,124	2.8	4.7		31.9				
Lead Conc.	33,926	60.9			489.7	79.7			56.4
Zinc Conc.	68,596		50.5				80.5		
TOTAL	102,522	60.9	50.5		489.7	79.7	80.5		56.4
<u>ACTUAL</u>									
Dry Feed	952,048	2.8	4.7	25.8	32.3	100.0	100.0	100.0	100.0
Lead Conc.	35,252	57.9	6.3	7.7	463.2	76.4	4.9	1.1	53.2
Zinc Conc.	70,433	2.4	49.6	11.2	49.1	6.4	77.3	3.2	11.3
Tailing	846,364	0.5	0.9	27.7	12.9	17.2	17.7	95.7	35.6
TOTAL	105,685	57.9	49.6		463.2	76.4	77.3		53.2
<u>VARIANCE (-)</u>									
Dry Feed	71,076				0.4				
Lead Conc.	1,326	3.0			26.5	3.3			3.2
Zinc Conc.	1,837		0.9				3.2		
TOTAL	3,163	3.0	0.9		26.5	3.3	3.2		3.2

D. GRINDING

1. Table IV lists year-to-date figures for kg balls, kg rods and kwh per dry tonne ground or re-ground. At an estimated cost of power at 10¢ per kwh, the total cost of steel and power is \$3.50 per dry tonne ore ground. "A" circuit consumes 10 to 15% less steel and power as compared to "B" circuit. This is probably due to a finer grind obtained from "B" circuit.
2. Changing apexes of the operating cyclones in No.6 cyclo-pac from 3½ inch to 6 inch appeared to cause the product from No.6 circuit to become finer, although there is no significant change in the circulating load. The finer product may be a result of the gradual replacement of 2 inch balls with 1½ inch balls proceeding since January 1982. A switch to cyclones with original apexes will clarify this.

The work index in No.5 circuit is lowered significantly (to about 14) by applying an efficiency factor (for low reduction ratio) which was used incorrectly in the original design calculations because the reduction ratio was assumed to be too high.

Five of the apexes in No.4 cyclo-pac were changed from 4½ inch ceramic to 6 inch ceramic. The effect of this change is unclear at the present time and is under investigation.

3. Mill charging was regularly carried out (3 times a week) to keep the mills charged up to about 40% of their available volume.
4. Many operational problems associated with the operation of the Auto-metric particle size monitor were ironed out and presently it is operating satisfactorily. A few checks and maintenance are done on a shift and weekly basis. Its' future use for improving grinding performance will be planned.

D. Grinding (cont'd)

TABLE IV

	Kg Balls/t	Kg Rods/t	KWH/t
No.1 cct	0.580	0.462	--
No.2 cct	0.497	0.560	7.073
No.3 cct	0.491	0.522	8.579
Average	0.523	0.515	7.826
No.4 cct	0.859	N/A	7.331
No.A cct	1.382	0.515	15.157
No.B cct	1.527	0.510	17.721
Average	1.456	0.512	16.439
Pb Reg.	0.068	--	0.702
Zn Reg.	0.068	--	0.849
TOTAL	1.592	0.512	17.990

ANALYTICAL LABORATORY

MARCH 1982

1. Production Distribution

Production	No. of Assays	Manhours	% Of Total Hours Worked
A.A. Mill Control	3,094	143.5	16.61
A.A. Pits	2,926	80.0	9.26
A.A. Metallurgy	2,663	79.0	9.14
Wet Mill Control	1,462	232.5	26.91
TOTAL	10,145		
Oil		58.0	6.71
X-Ray Programming		70.5	8.16
Environmental		143.5	16.61
Miscellaneous		57.0	6.60

2. Accuracy

INTERNAL COMPARISON FOR MARCH 1982

	MONTHLY AVERAGE				COMPOSITE ASSAY			
	Lead	Zinc	Iron	Silver	Lead	Zinc	Iron	Silver
Heads	2.88	4.63	27.99	32.4	2.77	4.53	28.30	32.5
Tails	0.66	1.05	29.47	13.97	0.64	1.04	29.51	13.57
Lead	60.29	5.03	7.43	490.3	60.52	5.03	7.44	476.3
Zinc	2.37	48.62	17.75	56.4	2.29	48.61	11.75	58.25

2. Accuracy (cont'd)

EXTERNAL COMPARISON - FEBRUARY MONTHLY

	C.A.M.C.				GENERAL TESTING			
	Lead	Zinc	Iron	Silver	Lead	Zinc	Iron	Silver
Heads	2.92	4.50	26.87	32.0	2.78	4.32	24.51	33.6
Tails	0.54	1.24	25.99	11.0	0.48	1.08	26.19	13.16
Lead	56.93	6.02	6.69	457.0	57.33	5.83	6.50	469.2
Zinc	2.68	49.87	10.89	53.0	2.61	49.97	11.15	55.6

3. Load Out

SKAGWAY RECEIVING AND INVENTORY (W.M.T.)

	Lead	Zinc	Total
Receiving during March	11,154	30,608	41,762
Inventory March 31/82	11,648	30,380	42,028

CONCENTRATES EXPORTED (W.M.T.)

Vessel	Departed	Lead	Zinc	Total
J-177	3/3/82	10,009	7,319	17,328
J-178	25/3/82	12,808	10,011	22,819

4. Copper Sulphate Comparison

Cyprus Anvil - 19.87

Canadian Industries Ltd. - 19.82

5. General

Oil Analysis

The analyzer and teletype have been repaired under warranty. The assay lab has been informed by Central Planning department that the initial prediction of 45 samples per week has been increased to 70. Oil analysis is intended to be performed Tuesday, Wednesday and Thursday of each week except in the case of an emergency. Oil standards, comparable to the matrix of each type of oil will be prepared to insure proper calibration of instrument. Operation and maintenance training programs have been deferred until the financial situation improves.

Reduction of Forces

The assay staff has been reduced by one assayer and one bucker. The main problem experienced is the shortage of manpower when employees are on days off. The involvement of assayers in the union executive and grievance committee also creates a shortage of manpower on periodic occasions as well one assayer will be on the bargaining committee.

APPENDIX IV
MILL INSTRUMENTATION REPORT

Submitted by:

K. Power, Mill Instrumentation Foreman

A. GRINDING

No.4 weightometer was calibrated this month after the load cell was changed from 500 lbs to 750 lbs. The new cell is to reduce the sensitivity for automatic control purposes.

The weightometer itself is eventually to be moved inside a proper cabinet in order to keep the instrument clean.

Problems were encountered this month with the grinding water controls. Dirt and plastic was clogging up the water lines to the rod mills and also plugging the impulses for the D.P. cells.

The orifice plates were also found to be wearing away on some water addition points. Jaakko is to look into using mag-flow meters, for this application.

B. REAGENTS

Two one inch control valves for lime addition were relocated to the collector box this month in an attempt to improve pH control.

The conductivity monitor for sodium sulphite hasn't arrived yet so the existing one is being rotated from soda ash to sodium sulphite as required.

C. CRUSHING

Instrumentation for No.1 belt weightometer has been installed in secondary control room and all wiring installed. The weigh scale has to be moved to a more suitable location.

D. HEATING PLANT

Ranges on all temperature recorder controllers have been changed to 0 - 2500^oF from 0 - 2000^oF.

E. LOAD OUT

The new 100 lb. load cell for lead belt has been installed and a calibration has been done. The scale will have to be realigned in the future.

Also a calibration was done on zinc load out belt and it will have to be aligned properly in the future.

F. COURIER 300

Calibration for the on-stream analyzer is continuing on the six streams.

D. Milkert (Met Lab) may be assisting with this work eventually.

No major problems have been encountered with the system this month.

G. GENERAL

Manpower status at month end: M. Ruggles J/M
A. Gonder J/M
T. Jeethan J/M
J. Paivarinne J/M
R. George Appr.

Mark ruggles is giving coverage for the Instrument Department on afternoon shift.

Overtime hours worked for March is 90 hours = 11%.

MILL REPORT
FEBRUARY 1982

SUMMARY

Submitted by:

G.D. Biles, Mill Production Superintendent

A. MILL OPERATIONS

Throughput for the month was virtually right on plan but metal production was 5% less than plan due to lower metal recoveries, resulting from the many changes in ore supply during the month.

During the month eight temporary labourers were hired to clean up dust accumulations and spillage throughout the mill, particularly in the crusher area.

The production forecast for March is as follows:

TABLE I

Ore & Product	Current Forecast Tonnes
Mill Feed	319,300
Lead Concentrate	11,206
Zinc Concentrate	21,912
TOTAL	33,118

Milling ore from the oxide stockpile is scheduled to begin on March 15 and continue through to May. In preparation for higher lime addition, the lime mixing system has been overhauled and a new 4 inch lime loop to the rod mills installed.

B. MILL MAINTENANCE

Major mechanical work in February included installation of a 4 inch lime loop to the grinding circuit, overhauling B bank of Denver cells, and begin installation of a mixing and distribution system for sodium sulphite. Other work included replacement of shaft, gear and bearings on 1A feeder, replacement of feed chutes on No. 1 and 2 rod mills, overall inspection with necessary repairs to the lime mixing circuit and modification to lime unloading piping.

C. METALLURGY

TABLE II
Metallurgical Balance
February 1982 and Year To Date

Product	D.M.T.	% Assay				% Distribution			
		Lead	Zinc	Iron	g/t Ag	Lead	Zinc	Iron	Ag
<u>Feb 1982</u>									
Dry Feed	296,571	2.7	4.4	23.8	33.6	100.0	100.0	100.0	100.0
Lead Conc.	11,588	54.8	6.9	7.9	475.6	78.2	6.5	1.3	55.2
Zinc Conc.	19,076	2.4	49.8	11.0	50.1	5.7	73.0	3.0	9.6
Tailing	265,908	0.5	1.0	25.4	13.2	16.1	20.8	95.7	35.2
TOTAL	30,664	54.8	49.8		475.6	78.2	73.0		55.2
<u>Year to Date</u>									
Dry Feed	604,246	2.8	4.9	24.7	33.0	100.0	100.0	100.0	100.0
Lead Conc.	23,268	57.8	6.6	7.6	482.3	79.0	5.2	1.2	56.3
Zinc Conc.	45,919	2.3	50.1	11.0	46.4	6.3	78.4	3.4	10.7
Tailing	535,059	0.5	0.9	26.6	12.3	14.8	16.3	95.4	33.0
TOTAL	69,187	57.8	50.1		482.3	79.0	78.4		56.3

Frequent changes in ore source and ore type made it virtually impossible to achieve good metallurgical results. In particular periods of oxide, 2A type ore and 3950 V blast had a very adverse effect on overall metallurgical results. Two days of pH control problems in the zinc roughers also resulted in poor zinc metallurgy on those days.

In the metallurgical lab test work is being conducted to develop alternate treatment schemes for type 2A ore and also for Zone III ore 3950 V blast. The ore from 3950 V, some of which was milled on February 21, was diverted to stockpile due to uncontrollable zinc flotation in the lead rougher and cleaner circuits which resulted in very poor lead concentrate grades and poor zinc recoveries. This ore is being stockpiled until

C. Metallurgy (cont'd)

an alternate treatment scheme has been developed.

D. SAFETY

TABLE III

Department	First Aid	Medical Aid	Lost Time	Total
Operations	2	1	2	5
Repair	6	1	5	12
Metallurgy	0	0	0	0
TOTAL	8	2	7	17

APPENDIX I
MILL OPERATIONS REPORT

Submitted by:

L.D. MacDonald, General Mill Foreman

L.H. Hyde, Surface Crew Foreman

D. Cresswell, Labour Foreman

A. CRUSHING

The primary crusher operated for 367 hours during which a total of 3,587 loads were delivered to the primary crusher, for an average of 6 trucks per operating hour. Crusher operating time was 55%.

A breakdown of available primary crushing time is as follows:

TABLE 1

Reason	December Hours	Pct	January Hours	Pct	February Hours	Pct
Hang-ups	29.50		44.75		36.50	
Plugged Chutes	2.50		12.25		6.50	
Operating Delays	12.50		19.50		13.00	
Unscheduled Maintenance	6.25		12.25		3.00	
Electrical/Instr.	16.50		15.25		31.25	
Full Bins	8.75		39.75		1.00	
TOTAL	76.00	10.0	143.75	19.0	91.25	14.0
Scheduled Maintenance	29.75	4.0	35.50	5.0	28.25	4.0
Pit Delays	200.75	27.0	173.75	23.0	185.50	28.0
100% Availability	744.00		744.00		672.00	
Actual Availability	609.50	82.0	565.00	76.0	552.25	82.0
Actual Operating Time	437.50	59.0	391.25	53.0	367.00	55.0

The secondary crushing section operated for 484 hours for a total throughput of 188,851 tonnes; lost time totalled 151 hours (23% available operating time). Scheduled maintenance totalled 37 hours, 6% of the available operating time.

B. GRINDING

The grinding circuits were operated at 83.5% availability during the month, with a throughput of 296,571 tonnes (an average of 10,592 tonnes per day).

Grinding Circuit Downtime

	Dec Hours	Jan Hours	Feb Hours
Operating Delays	68.61	62.91	16.37
Rod Charging	3.94	7.09	10.03
Scheduled Maintenance	98.50	256.89	128.79
Unscheduled Maintenance	22.25	44.47	9.75
Electrical	18.91	13.36	12.99
No Ore	14.25	114.08	242.64
NCPC		18.62	17.33
TOTAL	226.46	517.42	437.90

Grinding Media Consumption

	Kg	Kg/t	Year to Date		Plan
			Kg	Kg/t	Kg/t
Rods, 4"	114,000	0.38	180,300	.30	.40
Rods, 3"	101,700	0.3	156,600	.26	.30
Balls, 2"	47,000	0.16	365,500	.60	0.80
Balls, 1½"	337,700	1.1	619,500	1.02	1.10
TOTAL	600,400	1.94	1,321,900	2.18	

C. FLOTATION

	Kg	Kg/t	Year to Date		Plan
			Kg	Kg/t	Kg/t
Sodium Cyanide	18,800	0.06	45,600	0.08	0.10
Soda Ash	378,900	1.3	378,900	0.63	2.00
Lime	471,000	1.59	1,005,200	1.66	1.50
Copper Sulphate	152,672	.51	333,188	.55	0.45
Xanthate (Z-11)	84,000	0.28	177,024	.29	0.30
M.I.B.C.	4,080	0.014	8,840	0.01	0.015
Dow 1012	1,224	0.004	1,632	0.003	0.004
Flocculant	275	0.001	625	0.001	0.003
Filter Aid	12,400	0.042	26,200	0.043	0.020
Sodium Sulphite	0	0	46,000	0.08	0

D. DEWATERING

The moisture content of the final concentrate averaged between 6.7 and 7.7%.

	Lead		Zinc		
	#1	#2	#3	#4	#5
% Operating Time	69	73	63	84	38
D.M.T. Filtered	11,588		19,076		
% Moisture Content	6.7		7.7		

E. TAILING DISPOSAL AND WATER SUPPLY

Mill water consumption was 209,065,135 U.S. gallons, an average of 5,185 U.S. gallons per minute.

F. MOBILE EQUIPMENT

Equipment	Reason	Days Down	Percent Availability
06-06	Brakes	1	96.4
06-010	Hydraulic leak, brakes, engine stalls	5	82.1
51-05	Starter	4	85.7
53-029		0	100
53-033		0	100
56-07	Steering, engine overhaul	13	53.5
56-10		0	100
56-13	Oil leaks and fumes	28	0
56-15		0	100
Rental 950		0	100
		AVERAGE	81.8

G. LABOUR

The Labour Force was under authorized strength for the month of February.

The labourers on clean-up averaged 58% of the total labour count per day.

The work force concentrated on all areas of the concentrator for clean-up.

G. Labour (cont'd)

There were 191 sector bags changed this month.

LABOUR FORCE

Number of straight time days worked	20
Average labour count per day	15.25
Average labourers working per day shift	12.7
Average labourers working on clean-up per day	8.9

H. LOADOUT

Excess waiting time due to:	Bunching	112.6
	Loader Problems	26.4
	Dusting	.4
	Scale	17.3
	Miscellaneous	3.9
	TOTAL	160.6

Type of Train	Total Trucks	Ave. per Day	Average Time Minutes		Average Weight Tonnes		Tonnes Average Total per Day	
			Loading	Waiting	Tare	Net		
A	170	7	4.1	21.5		26.87		
B	944	34	8.4	32.3	20.90	39.5	41,826	1494

I. TRAINING

A new Dryer Operator Manual was distributed to the existing operators and to staff. The manual is developed using a Task Analysis Format.

DURING THE MONTH

New training programs started	3
Training programs completed	4
Training programs ongoing through the month	1
Req. placed for which there were no applicants	3

APPENDIX II

MILL MAINTENANCE REPORT

Submitted by:

W.H. Brown, General Mill Maintenance Foreman

E.O. Wedekind, Chief Heating Plant Engineer

T.R. Hughes, Mill Maintenance Training Foreman

A. MANPOWER

At the end of February, the Mill Maintenance Department had in its employ 65 permanent employees and 7 supervisors. The 1051 force worked a total of 10,755 manhours.

In the month of February, 233 man days were lost due to the following:

Vacation, LOA, Floaters	66
AWOL a) Discipline	4
b) Time off bank account	3
c) Not determined yet	12
Sick a) Time off bank account	10
b) Medical documentation	13
c) Paid sick days	8
Training (school)	49
Union leave	2
Dental	2
Compensation	51
Long term disability	0
Other a) Safety	1
b) Temporary postings	0
c) Suspension	10
d) Bereavement or comp. leave	2
e) Community	0
f) Orientation	0
TOTAL	<u>233</u>

B. WORK ORDER ACTIVITY AND BACKLOG

During the month of February the work order activity was as follows:

742 work orders issued
515 work orders completed from those issued
207 work orders completed from backlog

B. Work Order Activity and Backlog (cont'd)

	<u>Work Orders Issued</u>	<u>W.O. Completed from issued</u>	<u>W.O. Completed from backlog</u>
Crushing (1)	120	103	17
Grinding (2)	161	110	55
Environmental (3)	55	38	23
Dewatering (4)	93	68	41
Instrumentation (14)	153	104	41
Electrical - Mill (16)	148	88	30
Construction (18)	10	3	0
Electrical - Design (19)	2	1	0
TOTAL	742	515	207

In the month of February the outstanding work backlog decreased by 1502.5 manhours, from 48,631 to 47,128.5 for the week ending February 28, 1982.

	<u>Hours Remaining</u>	<u>Number Work orders</u>
Crushers (1)	8324	102
Grinding (2)	15150	139
Environmental (3)	5805	64
Dewatering (4)	15614	110
Instrumentation (14)	323.5	63
Electrical - Mill (16)	1790.5	99
Construction (18)	64	7
Electrical - Design (19)	57.5	3
TOTAL	47128.5	587

<u>PRIORITIES</u>	<u>*E</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	* Emergency
Crushers (1)	1	2	13	85	1	
Grinding (2)	1	17	48	54	19	
Environmental (3)	1	9	9	43	2	
Dewatering (4)	3	7	27	63	10	
Instrumentation (14)	-	7	19	37	-	
Electrical-Mill (16)	-	5	68	24	2	
Construction (18)	-	-	3	4	-	
Electrical-Design (19)	-	-	2	1	-	
TOTAL	6	47	189	311	34	= 587

C. MAJOR MAINTENANCE WORK COMPLETED IN FEBRUARY

AREA 1 - CRUSHING

- completed all P.M.'s
- changed out bearings, shaft and lower gear 1A feeder
- replaced outboard bearing 1A screen
- replaced bearing 1B screen
- rebuilt discharge 1B screen
- changed #2 conveyor belt
- replaced all decks on secondary screen
- replaced brake #9 conveyor
- replaced round rotor motor #11 CB with induction motor

AREA 2 - GRINDING

- completed all P.M.'s
- changed motor and thrust bearing #4 ball mill
- replaced feed chutes #1 and #2 rod mills
- completed fabrication and installation of rod charges rail system
- completed installation of the 8" fresh water make-up line
- completed installation of air lines to the "B" circuit
- replaced lime suction line
- repaired soda ash pump
- completed the modifications and overhaul of "B" bank Denver flotation cells and mechanisms

AREA 3 - ENVIRONMENTAL

- completed all P.M.'s and safety items
- fabricated and installed tank for conductivity meter probe in soda ash system.
- completed installation of filtration system for CuSO_4
- completed installation of counterweight guard and conveyor platform for #4 rod mill feed conveyor

Major Work Completed in February (cont'd)

- completed installation of the water spray hose reel etc system in flotation
- installed 8x6 pump for Pb filter feed
- installed 5x4 pump for Zn stock tank feed

AREA 4 - DEWATERING

- completed all P.M.'s
- changed wedges, saddles and aligned #5 dryer
- standardized #5 dryer screw feeder
- installed sump pump Zn stock tank room
- installed sump pump Pb stock tank room
- replaced #43 drag chain
- replace #41 drag chain, idlers and take-ups

AREA 14 - INSTRUMENTATION

- see separate report

AREA 16 - MILL ELECTRICAL

- completed all P.M.'s
- ran services for vent fans dryer area (4)
- installed lighting between 9 & 10 slot feeders
- ran services for sump pumps in stock tank room

AREA 99 - OTHER

- completed installation of equipment numbers

MAJOR MAINTENANCE ITEMS IN MARCH

- install weightometer on #1 conveyor
- refurbish transfer tower scrubber
- complete installation of sodium sulphite loop
- start installation of hydraulic units on 2, 5, 8 slot feeders
- complete installation of lime loop
- commence work on OSA pumps
- run upgraded filter feed lines
- complete grinding bay crane platform

E. TRAINING

On February 1, 1982, three new apprentices started into the program. Two of the apprentices were granted 6 months credit each by the Government Apprenticeship Branch.

The three apprentices attending vocational school completed their second year and returned to the Labour Force in mid February. Results of their schooling have not been received by months end, but it is assumed that all three completed the program satisfactorily.

Two postings were put up for trainees in Lubeservice and Tool Crib, with the Lubeservice position being filled by the M/W Helper and the training period scheduled for completion around March 8. The Tool Crib Attendant Trainee position being filled by an employee outside the Department. The training period has been delayed due to a discipline matter.

The on-property schooling for four of the 1st year apprentices continued during this month with completion of their training scheduled for March 5. Research and drafting of lesson plans are continuing for future schooling of the apprentices.

At months end, there are eleven apprentices on stream, with all of them in the work force.

F. HEATING PLANT

A total of zero tonnes of coal was received from the Carmacks Coal Mine for the month of February, 1982. The dryer and generator consumption was 50 and 50 tonnes per day respectively. The No. 5 dryer's oil consumption was 1,025 litres per day respectively and no oil seepage was reported in the coal crusher basement.

The generator output for this month was $33 \times 10^6 \times 1.055$ kJ (44% of total Btuh available).

No. 1 air compressor ran for a total of 9 hours, No. 2 ran for 2 hours and No. 3 ran for 663 hours.

The three generators were in service this month.

Total of 4 engineers in the department, 4 working.

APPENDIX III
MILL METALLURGY REPORT

Submitted by:

G.W. Chapman, Chief Assayer

S. Chmelyk, Plant Metallurgist

ANALYTICAL LABORATORY

1. Production Distribution

Production	No. of Assays	Manhours	% Of Total Hours Worked
A.A. Mill Control	2952	132	15.09
A.A. Pits	1612	60	6.86
A.A. Metallurgy	4292	125	14.29
Wet Mill Control	1455	226	25.83
TOTAL			
Oil Analysis		84	9.6
X-Ray Programming		124.5	14.23
Environmental		119.5	13.66
Miscellaneous		4.0	0.45

2. Accuracy

INTERNAL COMPARISON FOR February 1982

	<u>MONTHLY AVERAGE</u>				<u>COMPOSITE ASSAY</u>			
	Lead	Zinc	Iron	Silver	Lead	Zinc	Iron	Silver
Heads	2.80	4.36	24.61	35.4	2.78	4.32	24.51	33.6
Tails	0.49	1.08	25.96	13.1	0.48	1.08	26.19	13.16
Lead	57.33	5.75	6.76	454.5	57.33	5.83	6.50	469.2
Zinc	2.47	49.95	11.03	54.14	2.61	49.97	11.15	55.6

2. Accuracy (cont'd)

EXTERNAL COMPARISON - January Monthly Composites

	C.A.M.C.				GENERAL TESTING			
	Lead	Zinc	Iron	Silver	Lead	Zinc	Iron	Silver
Heads	2.83	4.90	25.83	30.8	2.80	4.99	25.65	29.0
Tails	0.48	0.83	28.10	11.53	0.50	0.89	27.68	11.0
Lead	62.94	5.37	6.21	459.2	62.77	5.25	6.23	460.0
Zinc	2.30	50.28	10.80	45.7	2.40	50.21	11.01	45.0

3. Load Out

SKAGWAY RECEIVING AND INVENTORY (W.M.T.)

	Lead	Zinc	Total
Receiving during February/82	14,744	28,338	
Inventory February/82	23,311	17,098	

CONCENTRATES EXPORTED (W.M.T.)

Vessel	Departed	Lead	Zinc	Total
J-176 Asia Anvil	22/2/82	-	22,508	22,508

4. Copper Sulphate Comparison

Cyprus Anvil - 20.00

Canadian Industries Ltd. - 19.93

A. SUMMARY

Throughput for the month of February exceeded plan by 447 tonnes. Average daily throughput was above plan by 0.2% at 10,592 tonnes per day. Some oxidation present in the crusher feed stockpile resulted in metallurgical losses in both circuits during the first week of the month. The mill had considerable problems adapting to the many changes in ore supply and ore type, resulting in metallurgical losses, particularly zinc recovery. There was a severe problem on the 21st with premature zinc flotation when milling material from 3950 V blast. This material has been stockpiled and test work is being conducted to develop a treatment scheme. Lead grades for the month were low because of graphite dilution when milling the 2A (graphitic quartzitic) ore type.

B. PLANT METALLURGY

1. Ore Source

	<u>Blast</u>	<u>Ore Type</u>	<u>% of Crusher Feed</u>
Zone 1	3610 A	2AB, 2EF	8.9
	3610 D	2AB, 2EF, 2CD	7.7
	3610 E	2F, 2E	9.5
Zone 3	3930 D	2AB, 2CD	5.6
	3950 V	2CE, 2CD	3.5
	3950 Ramp	2CD, 2AB	1.7
Crusher Feed High Grade Stockpile		2EF, 2AB	39.2
Crusher Feed Oxidized Stockpile		2AB, 2CE	24.0
Copper in Feed		0.17	
Manganese in Feed		0.09	
Pyrite/pyrrhotite ratio		4.19	

B. Plant Metallurgy (cont'd)

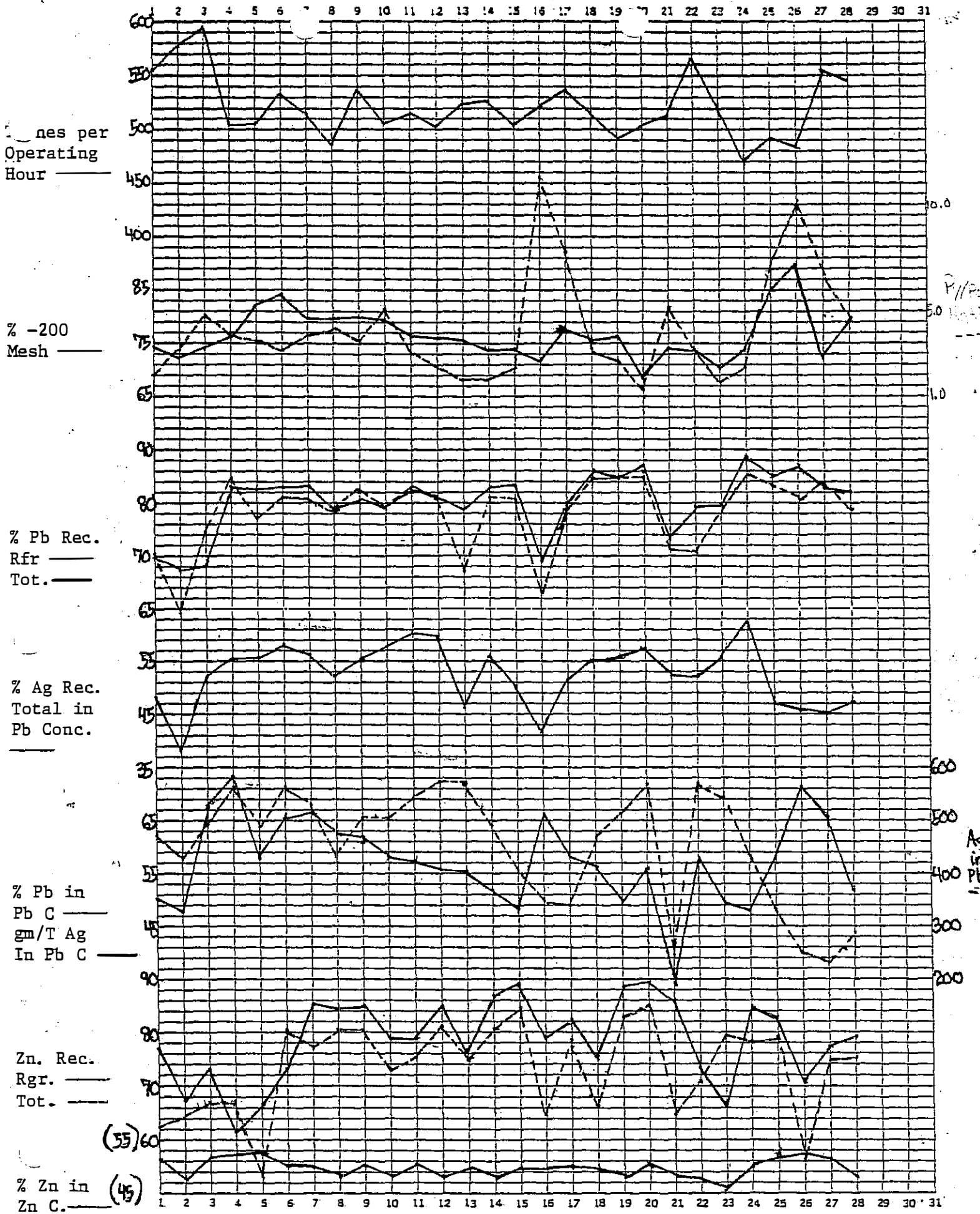
2. Lead Metallurgy

The ore source for the first week of the month was predominantly crusher feed stockpile. This material had been sitting in the stockpile for some time and was quite oxidized. As a result, both lead grades and recoveries were well below plan for the period 1-4 February. Lead grades were down for most of the month due to graphite dilution because of the predominant 2A (graphitic quartzitic) ore type. A severe problem with premature zinc flotation was encountered on the 21st with material from 3950 V blast in Zone 3. Nearly 25% of the zinc was reporting to the lead final concentrate compared to a normal distribution of about 5%. Because of the severity of the problem and the inability of the mill to handle this material, it was decided to stockpile it until some test work could be done to determine a suitable treatment scheme. Test work in the laboratory indicated some improvement at very high cyanide addition rates. Environmental constraints though will limit our cyanide usage. Some very promising results have been obtained using high dosages of zinc sulphate to the primary grind - additional test work is being done to confirm this work. The inconsistent ore supply during the month with frequent and rapid changes from one ore type to another resulted in significant metallurgical losses as the mill was not able to respond to the many changes.

3. Zinc Metallurgy

Zinc recoveries were very low the first week of the month due to the oxidized ore from the crusher feed stockpile. The zinc metallurgy was very sensitive to the numerous changes in ore type during the month. The change from a massive sulphide (2EF) ore type to the 2A (graphitic quartzitic) ore type for example would necessitate a cut in reagent consumption to about one half. The circuit would depress periodically from an excess of reagents because of the lag in the operator's adjustment

LOGBOOK OF LABEL PRODUCTION



Month February 1981

3. Zinc Metallurgy (cont'd)

as the ore change is taking place. The increased frequency of assays from the Courier onstream analyser will enable us to pick up these changes more quickly resulting in a shorter reaction time. The zinc pre-activation problem on the 21st resulted in a large drop in the zinc recovery. Some metallurgical losses on both circuits were incurred as a result of several mill shutdowns during the month.

4. Manpower

The three metallurgists were supported by a staff of three technicians.

METALLURGICAL BALANCE - February, 1982

Product	D.M.T.	% ASSAY				% DISTRIBUTION			
		Lead	Zinc	Iron	g/t Ag	Lead	Zinc	Iron	Ag
<u>PLAN</u>									
Dry Feed	296,124	2.8	4.3		31.9				
Lead Conc.	11,039	60.7			490.0	80.5			57.3
Zinc Conc.	19,840		50.6				78.5		
TOTAL	30,879	60.7	50.6		490.0	80.5	78.5		57.3
<u>ACTUAL</u>									
Dry Feed	296,571	2.7	4.4	23.8	33.6	100.0	100.0	100.0	100.0
Lead Conc.	11,588	54.8	6.9	7.9	475.6	78.2	6.5	1.3	55.2
Zinc Conc.	19,076	2.4	49.8	11.0	50.1	5.7	73.0	3.0	9.6
Tailing	265,908	0.5	1.0	25.4	13.2	16.1	20.8	95.7	35.2
TOTAL	30,664	54.8	49.8		475.6	78.2	73.0		55.2
<u>VARIANCE (-)</u>									
Dry Feed	447	(0.1)	0.1		1.7				
Lead Conc.	549	(5.9)			(14.4)	2.3			2.1
Zinc Conc.	(764)		(0.8)				(5.5)		
TOTAL	215	(5.9)	(0.8)		(14.4)	(2.3)	(5.5)		(2.1)

METALLURGICAL BALANCE - YEAR-TO-DATE

February 1982

Product	D.M.T.	% ASSAY				% DISTRIBUTION			
		Lead	Zinc	Iron	g/t Ag	Lead	Zinc	Iron	Ag
<u>PLAN</u>									
Dry Feed	603,824	2.9	4.8		32.1				
Lead Conc.	22,719	60.8			489.4	80.1			57.3
Zinc Conc.	46,484		50.4				80.9		
TOTAL	69,403	60.8	50.4		489.4	80.1	80.9		57.3
<u>ACTUAL</u>									
Dry Feed	604,246	2.8	4.9	24.7	33.0	100.0	100.0	100.0	100.0
Lead Conc.	23,268	57.8	6.6	7.6	482.3	79.0	5.2	1.2	56.3
Zinc Conc.	45,919	2.3	50.1	11.0	46.4	6.3	78.4	3.4	10.7
Tailing	535,059	0.5	0.9	26.6	12.3	14.8	16.3	95.4	33.0
TOTAL	69,187	57.8	50.1		482.3	79.0	78.4		56.3
<u>VARIANCE (-)</u>									
Dry Feed	422	(0.1)	0.1		0.9				
Lead Conc.	549	(3.0)			(7.1)	(1.1)			(1.0)
Zinc Conc.	(765)		(0.3)				(2.5)		
TOTAL	(216)	(3.0)	(0.3)		(7.1)	(1.1)	(2.5)		(1.0)

Grinding

1. Changes in cyclone apexes for #5 cyclopac were made in the early part of the month. Results of grinding surveys carried out thus far are reported in Tables I and II. There has been a slight drop in the P_{80} of tertiary mills but the work indices are still high.

There has been an improvement in the circulating load for ball mill #5 except the survey done on February 19, 1982. It will be known from surveys done in the immediate future if this was due to sampling error or not.

2. At the time of writing this report, apexes in #4 and #6 cyclopac cyclones were being changed from $4\frac{1}{2}$ " to 6" diameter. This should help increase the circulating load in ball mills 4 and 6.

Water consumption rose in February mainly because of using more cyclones particularly in #5 cyclopac. The necessity of reducing water consumption has necessitated using less cyclones. The changes being made in #4 and #6 cyclopacs coupled with a modified operating strategy (being implemented at present) may alleviate this problem.

3. Mill charging was done more on the basis of horse power draw as more power-meters were repaired. Some are still inoperative. Table III shows a list of faulty or inoperative meters.

4. A program was started to monitor media and power consumption per tonne ground for each mill on a monthly basis. Table IV lists the essential figures obtained cumulative for the months of January and February 1982.

It is noticed that ball mill #6 consumes significantly more KWH, Kb balls per dry tonne ground as compared with ball mills 1, 2 and 3 for similar size reduction.

The tertiary mills consume significantly higher power and steel as compared with rod mills and secondary ball mills 1, 2 and 3. This is also evident from high work indices obtained for these mills during grinding surveys (Tables 1 and 11)

Grinding (cont'd)

Power and steel consumption for Zn regrind mill is much higher than for Pb regrind mill because of relative softness of the Pb rougher concentrate.

TABLE I

GRINDING SURVEY: A-CIRCUIT

Grinding Unit	DEC 18/81			JAN 22/82			Feb 18/82		
	P ₈₀	W _I	C/L	P ₈₀	W _I	C/L	P ₈₀	W _I	C/L
1 RMD	660	11.1					729	12.9	
1 BMD							387		
1 BMF							575		
1 COF	200	10.8	245				194	10.9	287
2 RMD	860	10.7					531	11.3	
2 BMD							240		
2 BMF							407		
2 COF	202	9.2	315				152	10.7	164
3 RMD	1100	10.6		750	12.0		857	15.1	
3 BMD							310		
3 BMF							456		
3 COF	197	11.1	250	175	12.9		187	13.2	480
4 BMD							121		
4 BMF							160		
4 COF	102	26.6	185	75	16.9		77	21.2	163
COMMENTS	Many assumptions made on HP draws W _I for tertiary grinding is high and C/L low. Must use more cyclones.			Not enough information for C/L calculation. HP draws not adequate. Improvement in P ₈₀ of 4 COF due to better charging.			P80 of Pb scavenger concentrate = 33 μm		

TABLE II

GRINDING SURVEY: B-CIRCUIT

Grinding Unit	DEC 22/81			DEC 31/81			FEB 4/82			FEB 9/82			FEB 15/82			Feb 19/82		
	P80	W _I	C/L	P80	W _I	C/L	P80	W _I	C/L	P80	W _I	C/L	P80	W _I	C/L	P80	W _I	C/L
4 RMD	1070	11.2		1250	12.8		750	12.5		710	11.0		900	13.6		975	17.3	
5 BMD	113			110			116			108			102			109		
5 BMF	137			132			134			130			127			136		
5 COF	91	24.3	100	77	19.2	100	78	20.9	235	68	14.3	250	74	19.3	205	61	19.3	170
6 RMD	279			266			-			261			231			240		
6 BMF	339			375			-			477			628			640		
6 COF	161	13.3	289	155	13.3	235	163	16.7	170	172	15.9	205	155	15.3	200	139	16.4	230

COMMENTS

All mills charged up. No.5 cyclopac has new 3½" apex installed 2 days ago. No.5 mill discharge cool. C/L in 6 dropped

Circuit is more balanced but still not satisfactory.

Pressure noticed on No.6 pack apexes. May have caused lower C/L and also affected No.5 performance. Memo given out not to touch pressure regulators. P80 of Pb scavenger concentrate = 52 µm.

P80 of Pb scavenger concentrate = 37 µm

TABLE III

No. 1 Rod mill	Faulty KWH meter
No. 4 Rod mill	Possibly faulty power factor meter
No. 3 Ball mill	Possibly faulty KWH meter
No. 2 Zn regrind	Faulty KWH meter
Pb Regrind	Faulty KWH meter

TABLE IV

	KWH/dry t	Kg rods/balls/ dry t	Kg rods/balls KWH	Cents/ Dry t
Rod Mill #1	-	-	-	-
Rod Mill #2	3.3	.57	.17	38
Rod Mill #3	3.2	.46	.14	30
Rod Mill #4	3.2	.58	.18	38
Ball Mill #1	3.8	.46	-	38
Ball Mill #2	3.7	.38	-	31
Ball Mill #3	4.9	.33	-	27
Ball Mill #4	7.1	.69	.10	59
Ball Mill #5	7.3	.66	.09	57
Ball Mill #6	7.5	.61	-	50
Pb Regrind	-	.26	-	22
Zn Regrind	-	.47	-	40

Met Lab

Work on the oxide ore/sodium sulfite testing is almost complete. Testing should finish March 9. Due to lack of manpower the Pb and Zn concentrate cycloszing has been put back on a weekly basis instead of daily. Mill mechanical is investigating the redesigning of our grinding set up to handle both mills. They are running into some trouble locating suitable rollers. The technicians will be spending most of the month learning to do cleaner tests in preparation for parallel float work with Kamloops.

APPENDIX IV

MILL INSTRUMENTATION REPORT

Submitted by:

E.B. Tinkler, Senior Instrumentation Foreman

K. Power, Instrumentation Foreman

A. SECONDARY

No. 6 and 12 weightometers have been checked and calibrated this month. We found a rock jammed in the weighscale on No. 6 conveyor and the electronics case filled with dust on No. 12 conveyor.

The electronics have been replaced on the fine ore bin level scanner. The spare level transducer and the one on "A" bin have failed. A replacement has been ordered.

B. GRINDING

No. 4 ball mill gear lube alarm has been run into the control room alarm system.

Plugged chute interlocks have been fitted to all the rod mill feed chutes.

No. 3 rod mill and No. 2 and 4 pumpbox water addition control valves have been overhauled this month.

C. FLOTATION

The level control valves on the O.K. cells have been modified to give split range control of the process.

D. DEWATERING

Speed controls have been fitted to the lead and zinc thickener underflow diaphragm pumps. The lead speed control appears to be working well. The zinc controls have not functioned due to excessive loading on the speed control motor. The motor works well when disconnected but stalls when connected to the pump's controls. We are in touch with Kilborn and the suppliers about this problem.

The zinc loadout weightometer had to be rewired due to wear and resulting electrical short on the chassis.

E. REAGENTS

The soda ash silo weight indicator seems to be functioning now. Any problems with the system now (ie drifting) could be caused by cold weather and temperature changes.

The reagent building alarm annunciator has been transferred to the main control room along with the relative alarms needed there.

F. MISCELLANEOUS

A fire water pressure recorder has been installed in the control room complete with low pressure alarm. The installation will be complete when a recorder has been fitted.

One man spent 20 hours checking and setting up the heating system in the Chateau Jomini complex for Townsite Maintenance.

All the electronics for the three nuclear weigh scales and the old mass flow system have been returned to Ramsey for disposal. The nuclear radiation sources will be shipped after removal from the plant is complete.

The Western Systems maintenance contractors left February 23, 1982. Planning has all the paperwork and is in the process of typing it up for future use.

Jouko Päivärinne has joined the Instrumentation Department February 24 as a journeyman.

G. COURIER 300 ON-STREAM ANALYZER

The Courier Analyzer was down for the first ten days of this month, awaiting parts from Finland. These parts arrived on site on the tenth of February and we began to install them. Phil Cancilla from Outokumpu arrived shortly after, just in case there were more problems.

On power-up, everything was found to be in good working condition.

Calibration restarted on February 18 after all the sampl'y had been thoroughly cleaned and the x-ray tube refocused.

The Zn rougher feed sample point which was relocated is now providing an excellent sample.

During this month, the Pb rougher feed sample pump went down due to a damaged seal. Also on this pump, the speed needs to be reduced.

The remaining streams, Pb con, Zn con, Zn scav tails, Zn 1st cleaner tails, Zn rougher feed, were all sampled at regular intervals to try and build up a suitable sample scheme. To date, Pb and Zn con have been partially calibrated.

There is a need for some sort of cover or divider to be installed on each secondary sampler to prevent contamination of one sample to the next.

Also a trough needs to be installed by the mechanics under the secondary sampler with a suitable drain to prevent spills from pouring into MCC room.

Solenoids and red valves needed to complete the remaining eight streams have been ordered. So far only the solenoids have arrived.

The report printer for the operators has arrived in Toronto and is awaiting a V-I adapter before shipment to minesite.

MILL REPORT

JANUARY 1982

SUMMARY

Submitted by:

G.D. Biles, Mill Production Superintendent

A. MILL OPERATIONS

Mill throughput for the month of January was 307,675 DMTonnes and was 7% above plan and concentrate production was 30% above plan at 38,524 DMTonnes.

The extremely cold weather during the month contributed directly to two mill shutdowns when a frozen waterline broke in the xanthate sump flooding this area with 4 feet of water and during the oxide test when the primary crusher pocket froze up and plugged the crusher.

Freeze dried ore from the crusher feed stockpile caused extremely dusty conditions throughout the crusher building.

The production forecast for February is as follows:

TABLE 1

Ore & Product	Current Forecast Tonnes
Mill Feed	288,400
Lead Concentrate	* 10,648
Zinc Concentrate	* 19,152
TOTAL	29,800

* presently under review.

B. MILL MAINTENANCE

On January 12, 13 and 14th the shaft welds and stator plate fasteners on the OK 38 cells were inspected with six shafts being replaced due to poor welding and all stator plate fasteners replaced. This resulted in a 30 hour mill shutdown. During this time No.4 rod mill pedestal cracks were also sealed to prevent the entrance of corrosive solutions into the pedestal which could eventually lead to damage to the reinforcing steel.

C. METALLURGY

Table 2
METALLURGICAL BALANCE
JANUARY 1982
and also Year-to-Date

Product	D.M.T.	% Assay			% Distribution		
		Lead	Zinc	g/t Ag	Lead	Zinc	g/t Ag
Dry Feed	307,675	2.9	5.3	32.3	100.0	100.0	100.0
Lead Conc.	11,680	60.9	6.3	488.9	79.7	4.5	57.4
Zinc Conc.	26,844	2.2	50.3	43.8	6.7	82.8	11.8
Tailing	269,151	0.5	0.8	11.4	13.6	12.7	30.8
TOTAL	38,524	60.9	50.3	488.9	79.7	82.8	57.4

TABLE 3
OXIDE PLANT TEST JANUARY 4-8/82

Product	D.M.T	% Assay			% Distribution		
		Lead	Zinc	Iron	Lead	Zinc	Iron
Dry Feed	31,526	2.93	4.65	32.75	100.00	100.00	100.00
Lead Conc.	1,019	64.44	5.52	6.92	71.01	3.83	0.68
Zinc Conc.	2,019	2.86	46.87	12.60	6.25	64.58	2.46
TOTAL	28,487	0.74	1.63	34.15	22.73	31.59	94.22

TABLE 4
SULPHIDE ORE JANUARY 1982

Product	D.M.T.	% Assay			% Distribution		
		Lead	Zinc	Iron	Lead	Zinc	Iron
Dry Feed	276,149	2.90	5.37	24.81	100.00	100.00	100.00
Lead Conc.	10,661	60.55	6.35	7.29	80.7	4.56	1.1
Zinc Conc.	24,825	2.19	50.58	10.81	6.8	84.60	3.9
TOTAL	240,664	0.42	0.67	27.14	12.5	10.83	95.4

C. Metallurgy (cont'd)

Metallurgical results overall were downgraded by the mill oxide test. The oxide results were affected by some reagent additions problems but overall lead metallurgy was better than anticipated but zinc metallurgy was much worse than forecast.

Lead and zinc metallurgy on the sulphide ore showed some slight improvements over previous months.

D. SAFETY

Table 5

Department	First Aid	Medical Aid	Lost Time	Total
Operations	2	1	2	5
Repair	-	2	-	2
Metallurgy	-	-	-	-
TOTAL	2	3	2	7

APPENDIX I
MILL OPERATIONS REPORT

Submitted by:

L.D. MacDonald, General Mill Foreman
D. Cresswell, Labour Foreman
K. Drover, Acting Surface Foreman
S. Loveridge, Mill Training Foreman

A. CRUSHING

The primary crusher operated for 391 hours during which a total of 3,643 loads were delivered to the primary crusher, for an average of 6 trucks per operating hour. Crusher operating time was 53%. Actual availability was 76%.

A breakdown of available primary crushing time is as follows:

TABLE 1

Reason	<u>November</u>		<u>December</u>		<u>January</u>	
	Hours	Pct	Hours	Pct	Hours	Pct
Hang-ups	14.50		29.50		44.75	
Plugged Chutes	3.00		2.50		12.25	
Operating Delays	8.50		12.50		19.50	
Unscheduled Maintenance	9.00		6.25		12.25	
Electrical/Instrumentation	3.00		16.50		15.25	
Full Bins	75.50		8.75		39.75	
TOTAL	113.50	16.0	76.00	10.0	143.75	19.0
Scheduled Maintenance	70.25	10.0	29.75	4.0	35.50	5.0
Pit Delays	193.25	27.0	200.75	27.0	173.75	23.0
100% Availability	720.00		744.00		744.00	
Actual Availability	536.50	75.0	609.50	82.0	565.00	76.0
Actual Operating Time	343.25	48.0	437.50	59.0	391.25	53.0

The secondary crushing section operated for 515 hours for a total throughput of 149,055 tonnes; lost time totalled 174 hours (23% available operating time). Scheduled maintenance totalled 55 hours, 7% of the available operating time.

B. GRINDING

The grinding circuits were operated at 82.6% availability during the month, with a throughput of 307,675 tonnes (an average of 9,925 tonnes per day).

TABLE 2
GRINDING CIRCUIT DOWNTIME

	<u>Nov.</u>	<u>Dec.</u>	<u>Jan.</u>
	Hours	Hours	Hours
Operating Delays	720.28	68.61	62.91
Rod Charging	3.80	3.94	7.09
Scheduled Maintenance	60.42	98.50	256.89
Unscheduled Maintenance	15.92	22.25	44.47
Electrical	39.55	18.91	13.36
No Ore		14.25	114.08
N.C.P.C.			18.62
TOTAL	846.30	226.46	517.42

TABLE 3
GRINDING MEDIA CONSUMPTION

	<u>January</u>		<u>Year-to-Date</u>		<u>Plan</u>
	kg	kg/t	kg	kg/t	kg/t
Rods	121,200	0.40	121,200	0.40	0.80
Balls, 2"	318,500	1.04	318,500	1.04	0.80
Balls, 1" and 1 1/2"	281,800	0.92	281,800	0.92	1.10
TOTAL	721,500	2.36	721,500	2.36	2.70

C. FLOTATION

TABLE 4
REAGENT CONSUMPTION

	<u>January</u>		<u>Year-to-Date</u>		<u>Plan</u>
	kg	kg/t	kg	kg/t	kg/t
Sodium Cyanide	26,800	0.09	26,800	0.09	0.10
Soda Ash	0	0.00	0	0.00	2.00
Lime	534,200	1.74	534,200	1.74	1.50
Copper Sulphate	180,516	0.59	180,516	0.59	0.40
Xanthate (Z-11)	93,024	0.30	93,024	0.30	0.20
M.I.B.C.	4,760	0.015	4,760	0.015	0.015
Dow 1012	408	0.001	408	0.001	0.004
Flocculant	350	0.001	350	0.001	0.005
Filter Aid	13,800	0.04	13,800	0.04	0.020
Sodium Sulphite	46,000	0.15	46,000	0.15	

D. DEWATERING

The moisture content of the final concentrate averaged between 6.4 and 8.1%.

TABLE 5

	<u>Lead</u>		<u>Zinc</u>		
	#1	#2	#3	#4	#5
% Operating Time	75	80	83	79	73
D.M.T. Filtered	11,680		26,844		
% Moisture Content	6.4		8.1		

E. TAILING DISPOSAL AND WATER SUPPLY

During the month of January, one length of pipe was retracted from the tailings line.

Total water consumption for the month of January was 207,134,656 US gallons, an average of 4,640 US gallons per minute.

F. MOBILE EQUIPMENT

TABLE 6

Equipment	Reason	Days Down	Percent Availability
06-06	--	0	100
06-010	Motor	6	81
51-05	Starter, torque converter	12	61
53-029	Frozen	2	94
53-033	--	0	100
56-07	Starter	13	58
56-10	Starter	3	90
56-13	Seized	31	0
56-15	Flat Tire	8	74
Rental 950	Flat Tire	6	81
AVERAGE			74

G. LABOUR

The labour work force was under authorized strength for all of the month of January. The labourers on clean-up averaged 40% of the total labour count per day. The work force concentrated on all areas of the concentrate for clean-up.

There were 447 sector bags changed this month.

TABLE 7

LABOUR FORCE	
Number of straight time days worked	20
Average labour count per day	13.9
Average labourers working per day shift	10.2
Average labourers working on clean-up per day	4.7

H. LOAD OUT

Excess waiting time due to:	Bunching	139.5 hours
	Loader Problems	56.6
	Dusting	.2
	Scale	11.3
	Miscellaneous	8.1
	TOTAL	215.7 hours

TABLE 8

Type of Train	Total Trucks	Ave. per Day	Average Time Minutes		Average Weight Tonnes		Tonnes Shipped Total	Shipped Average Per Day
			Loading	Waiting	Tare	Net		
A	137	5	5.2	37.3		26.83	40,466	1,349
B	929	31	8.7	36.1	20.79	39.58		

I. TRAINING

This month eight training requisitions were posted. Of these, three training programs were not filled due to a lack of applicants.

I. Training (cont'd)

Two training programs were completed during the month.

- 1 filter helper
- 1 garbage truck driver
- 1 grinding steel person

Four training programs will continue into February.

- 1 grinding operator
- 1 flotation operator
- 1 bucker
- 1 filter operator

Two training programs continued into the new year.

- 1 grinding operator
- 1 flotation operator

APPENDIX II
MILL MAINTENANCE REPORT

Submitted by:

W.H. Brown, General Mill Maintenance Foreman
E.O. Wedekind, Chief Heating Plant Engineer
T.R. Hughes, Mill Maintenance Training Foreman

A. MANPOWER

At the end of January, the Mill Maintenance Department had in its employ, 61 permanent employees and 6 supervisors (and 1 temporary). The 1051 force worked a total of 11,462 manhours.

In the month of January, 248 mandays were lost due to the following:

Vacation, LOA, Floaters	61
AWOL a) Discipline	6
b) Time off Bank Account	2
Sick a) Time off Bank Account	20
b) Medical documentation	22
c) Paid sick days	9
Training (school)	88
Union Leave	2
Dental	2
Compensation	28
Long term disability	-
Other a) Safety	-
b) Temporary postings	-
c) Suspension	3
d) Bereavement or comp. leave	-
e) Community	1
f) Orientation	4
	<hr/>
TOTAL	248

B. WORK ORDER ACTIVITY AND BACKLOG

During the month of January the work order activity was as follows:

806 Work order issued.

532 Work orders completed from those issued.

138 Work orders completed from backlog.

B. Work Order Activity and Backlog (cont'd)

	<u>Work Orders Issued</u>	<u>W.O. Completed from Issued</u>	<u>W.O. Completed from Backlog</u>
Crushing	71	48	12
Grinding	169	122	17
Environmental	87	62	21
Dewatering	104	68	27
Instrumentation	165	120	20
Electrical - Mill	210	112	41
TOTAL	806	532	138

In the month of January the outstanding work backlog increased by 4,853.5 manhours, from 43,777.5 to 48,631 for the week ending January 1982.

	<u>Hours Remaining</u>	<u>Number Work Orders</u>
Crushers	6,370	99
Grinding	16,379.5	173
Environmental	6,232	76
Dewatering	13,242.5	136
Instrumentation	782	62
Electrical - Mill	5,625	131
TOTAL	48,631	677

PRIORITIES	<u>*E</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	* Emergency
Crushers	-	3	20	75	1	
Grinding	-	28	42	77	26	
Environmental	-	17	13	43	3	
Dewatering	1	10	38	72	15	
Instrumentation	-	6	16	40	-	
Electrical - Mill	4	1	101	21	4	
TOTAL	5	65	230	328	49	

C. MAJOR WORK COMPLETED IN JANUARY

Area 1 - Crushing

- completed all P.M.s.
- changed out dust seal primary crusher.
- overhauled No.8 carmen feeder.
- completely overhauled No.1A feeder including replacement of upper feed chute, pan liner, 8X8's, shaft and bearings.
- changed out tube secondary screen.
- changed round wound motor No.8 conveyor.
- changed counter-weight pulley bearings and skirting No.11 conveyor.
- repoured nord-pac No.2 tertiary mantle.
- installed hydraulic vari-speed drives on No.10A and 10B conveyors.
- rebuilt primary pinion for warehouse storage.

Area 2 - Grinding

- completed all P.M.'s.
- completed overhauls on the following pumps: 35-001, 39-008, 39-003, 37-016, 35-042, 35-017, 34-005, 34-006, 34-011, 34-012.
- relocated zinc rougher sampler and lines.
- continued work on frozen water and reagent lines.
- replaced No.1 ball mill clutch drum.
- repaired or replaced No.1 rod mill feed conveyor 4 times.
- replaced fallen out lifter bars No.3 ball mill (2 times).
- replaced feed chute No.3 rod mill.
- replaced trommel screen No.3 ball mill.
- replaced apexes and overflow lines on tertiary cyclo-pac.
- repaired No.4 rod mill feed conveyor bend pulley.
- repaired feed chute and replaced seal No.5 ball mill.
- replaced feed chute No.4 rod mill.

C. Major Work Completed in January (cont'd)

Area 3 - Environmental

- completed all P.M.'s.
- change coil in heater 18-015.
- installed washable filters in heater 18068.
- continued with setup of fabrication shop.
- fabricated and installed platform for fire valve in cable vault.
- fabricated electrical shack for coal crusher.
- extended lime feed system to all rod mills.
- re-piped eye wash station in met lab.
- installed dart valves in lead and zinc first cleaner feed boxes.
- made up drawings and materials list for new lime loop.
- tested welds, replaced defective shafts and mechanisms, repaired stators etc. on OK cells.

Area 4 - Dewatering

- completed all P.M.'s.
- changed all thickener final drive oil from 220X to 440X.
- modified access to 75 foot and 90 foot thickener underflows.
- upgraded lead filter feed line from 3 inch to 6 inches.
- completed upgrading of motors and retarding speed on cake conveyors.
- completed switching of filter agitators from chain drive to V-belt drive.
- completed removal of 20⁰ of filter bridge blocks.
- completed modifications of filter head grease systems.
- fabricated and installed new guards on the cake conveyor and filter agitator drives.
- tightened and replaced tire wedges on No.1-4 dryers.
- changed 4 trunnion rollers and aligned No.5 dryer.
- changed out chain and guide rails on 20-044 ash chain conveyors.
- changed out motor on No.3 Joy compressor.

C. Major Work Completed in January (cont'd)

Area 8 - Instrumentation

See separate report.

Area 16 - Electrical

- rewire controls from old slot feeders to new control room.
- continued work on faulty breaker panels.
- continued work on primary crane and elevator.
- changed 16 collector shoes flotation crane.
- converts No.10A and 10.B from electric variable speed to hydraulic vari-speed.
- installed welding outlets in secondary crusher.

D. MAJOR MAINTENANCE ITEMS IN FEBRUARY

- continue MCC, equipment, control room numbering verifications.
- overhaul of tertiary No.1 crusher.
- weightometer No.5 conveyor.
- reline No.3 ball mill completely.
- work on sodium sulphite loop.
- complete work on lime distribution loop.
- start on hydraulic drives for 2, 5, 8 slot feeders.
- complete installation of make-up air fans in dewatering.
- complete all P.M.'s and safety items.

E. HEATING PLANT

A total of zero tonnes of coal was received from the Carmacks Coal Mine for the month of January 1982. The dryer and generator consumption was 55 and 66 tonnes per day respectively. The No.5 dryer's oil consumption was 1,026 litres per day respectively and no oil seepage was reported in the coal crusher basement.

The generator output for this month was $44 \times 10^6 \times 1.055$ kJ (58.6% of total Btuh available).

E. Heating Plant (cont'd)

No.1 air compressor ran for a total of 157 hours, No.2 rod for 278 hours and No.3 ran for 448 hours.

Three generators were in service during the month.

A total of four engineers were working during January.

APPENDIX III
MILL METALLURGY REPORT

Submitted by:

S. Chmelyk, Plant Metallurgist
G.W. Chapman, Chief Assayer
R. Murarka, Metallurgist
B. Davia, Metallurgist
G. Piwowar, Engineer-in-Training

A. SUMMARY

Throughput for the month of January exceeded plan by 19,375 tonnes. Average daily throughput was above plan by 7% at 9,925 tonnes per day. Both the lead and zinc metallurgy were adversely affected by the milling of oxide ore during a test run January 4th to January 8th. Although many problems were encountered during the test rendering the results somewhat inconclusive, it was noted that the lead metallurgy especially grade was better than forecast while zinc metallurgy particularly recovery was less than that forecast. Metallurgy on sulphide ore continued to show improvements. Both lead grades and recoveries were below plan although lead grades did show an improvement over last months results. Lead grades were down during the last week of the month due to graphite dilution as result of milling some low sulphide ore. Zinc recovery on sulphide ore continued to improve this month and was near plan.

B. PLANT METALLURGY

1. Ore Source

	<u>Blast</u>	<u>Ore Type</u>	<u>% of Crusher Feed</u>
Zone 1	3630 D,B	2EF, 2CD	23
Zone 3	3950 Ramp	2CE, 2BCD	6
	3910 E,F		
	3950 AA	2CE, 2EF	1
CFSP High Grade		2EF, 2CE	45
CFSP Oxidized Stockpile		2EF, 2CE	25

Copper in Feed 0.12
Manganese in Feed 0.07
Pyrite/Pyrrhotite ratio 4.84

B. Plant Metallurgy (cont'd)

2. Lead Metallurgy

Lead recoveries were down slightly as a result of milling the oxide ore during the oxide plant test January 4th to January 8th. The results of the oxide plant test indicated better metallurgy than was forecast in the 1982 plan. The major problem encountered during the test affecting the lead metallurgy was the lack of pH control on the lead roughers. The lime distribution system will be modified for the milling of oxide so that we will no longer encounter this problem. Lead grade especially was not the problem that had been anticipated. Lead grade for the month continued to show improvement over previous months as illustrated below.

	<u>Oct. 1981</u>		<u>November</u>		<u>December</u>		<u>January (Sulphide ore)</u>	
	<u>Lead</u>	<u>Zinc</u>	<u>Lead</u>	<u>Zinc</u>	<u>Lead</u>	<u>Zinc</u>	<u>Lead</u>	<u>Zinc</u>
Grade	56.5	49.3	56.7	49.5	59.1	50.6	60.6	50.6
Recovery	76.6	78.2	81.4	81.0	80.6	82.5	80.7	84.6

Lead concentrate grades were down considerably during the last four days of the month due to graphite dilution as a result of milling some extremely graphitic talcose low grade material from Zone 3.

Screen analysis on the lead scavenger concentrate indicates that the material is quite fine - as mentioned in the grinding section. Cyclosizer work and possibly some microscopic work will be done comparing the lead scavenger concentrate to the lead rougher concentrate and assessing the need for returning scavenger concentrate to the tertiary grinding circuit.

3. Zinc Metallurgy

Zinc metallurgy for the month suffered noticeably as result of the oxide plant test. Zinc metallurgy on the oxide was significantly poorer than that forecast although there were considerable problems encountered during the test such as inadequate reagent supply and inconsistent ore supply of a uniform oxidation level that make the results

3. Zinc Metallurgy (cont'd)

on the zinc metallurgy somewhat inconclusive.

Taking into account the period when we were milling only sulphide ore, continued improvement of two units in zinc recovery is noted with no loss in grade as compared to previous months.

Due to problems with the soda ash slurry loop lime was used as a substitute pH modifier on the lead rougher circuit for most of the month. Experience has shown that zinc metallurgy - particularly zinc grade suffers as a result of using lime on the lead circuit. Testwork in the laboratory will shed some light on this possibility.

Projects planned in the plant include:

- 1) Reducing concentrate grades to target levels.
- 2) Detailed plant sampling including product sizing, air flows and densities.
- 3) Experimentation with pH levels to ensure the optimum is being used.

4. Manpower

Bonnie Davia joined the metallurgy department as a metallurgist on the 25th of January. Bonnie will be in charge of the functions of the metallurgical laboratory. The three metallurgists were supported by a staff of 3 technicians.

FIGURE I - SUMMARY OF DAILY PRODUCTION

-19-

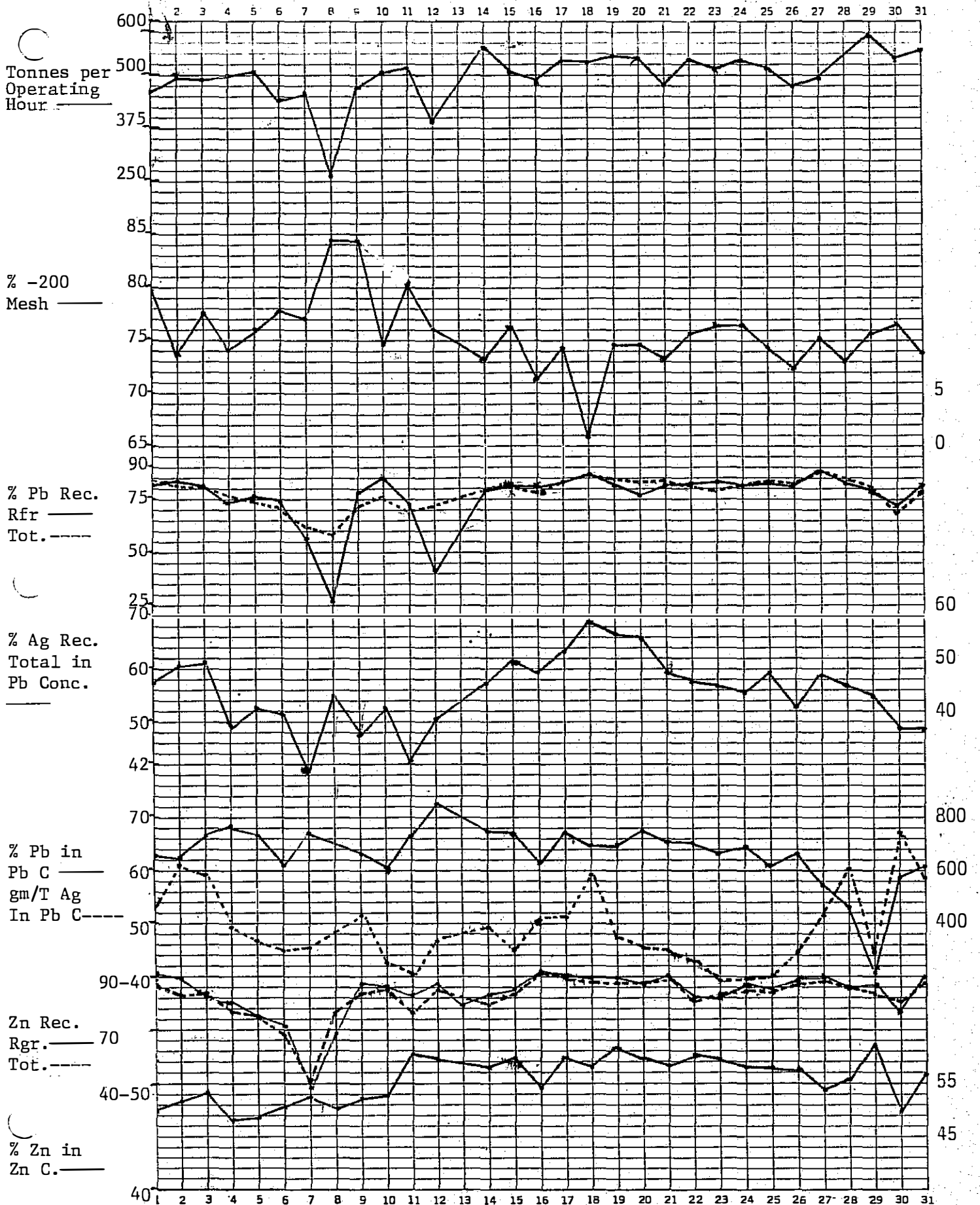


TABLE 1
 METALLURGICAL BALANCE
 JANUARY 1982
 and also Year-to-Date

Product	D.M.T.	% ASSAY				% DISTRIBUTION			
		Lead	Zinc	Iron	g/t Ag	Lead	Zinc	Iron	Ag
<u>PLAN</u>									
Dry Feed	288,300	2.6	4.2		26.1				
Lead Conc.	9,802	65.0			484.0	85.0			63.0
Zinc Conc.	19,793		52.0				85.0		
TOTAL	29,595	65.0	52.0		484.0	85.0	85.0		63.0
<u>ACTUAL</u>									
Dry Feed	307,675	2.9	5.3	25.6	32.3	100.0	100.0	100.0	100.0
Lead Conc.	11,680	60.9	6.3	7.3	488.9	79.7	4.5	1.1	57.4
Zinc Conc.	26,844	2.2	50.3	10.9	43.8	6.7	82.8	3.7	11.8
Tailing	269,151	0.5	0.8	27.9	11.4	13.6	12.7	95.2	30.8
TOTAL	38,524	60.9	50.3		488.9	79.7	82.8		57.4
<u>VARIANCE (-)</u>									
Dry Feed	19,375	0.3			6.2				
Lead Conc.	1,878	(4.1)			4.5	(5.3)			(5.6)
Zinc Conc.	7,051		(1.7)				(2.2)		
TOTAL	8,929	(4.1)	(.17)		4.5	(5.3)	(2.2)		(5.6)

TABLE 3
OXIDE PLANT TEST JANUARY 4-8/82

Product	D.M.T.	% ASSAY			% DISTRIBUTION		
		Lead	Zinc	Iron	Lead	Zinc	Iron
Dry Feed	31,526	2.93	4.65	32.75	100.00	100.00	100.00
Lead Conc.	1,019	64.44	5.52	6.92	71.01	3.83	0.68
Zinc Conc.	2,019	2.86	46.87	12.60	6.25	64.58	2.46
TOTAL	28,487	0.74	1.63	34.15	22.73	31.59	94.22

TABLE 4
SULPHIDE ORE JANUARY 1982

Dry Feed	276,149	2.90	5.37	24.81	100.00	100.00	100.00
Lead Conc.	10,661	60.55	6.35	7.29	80.7	4.56	1.1
Zinc Conc.	24,825	2.19	50.58	10.81	6.8	84.60	3.9
TOTAL	240,664	0.42	0.67	27.14	12.5	10.83	95.4

C. GRINDING

Many improvements were made in the grinding during the month of January:

a) The grinding surveys of 'B' circuit (expansion section) carried out since September 1981 were re-organized and corrections made where necessary. It was discovered that No.4 rod mill and No.6 ball mill were grinding very close to design specifications while No.5 ball mill was not.

b) Larger apexes (3½" diameter) were purchased and installed on No.5 cyclopac cyclones. An immediate improvement in the performance of these cyclones and consequently that of ball mill No.5 has been

C. Grinding b) (cont'd)

noticed. Prior to the change, circulating load in ball mill No.5 was much lower than the design value and the discharge slurry temperature averaged 28°C. This meant that insufficient feed in the mill caused conversion of much energy into heat. At higher slurry temperature, the grinding balls corrode much faster. The annual consumption of 2 inch balls for 1981 was 1,070 tonnes while that of 1½ inch balls was 1,930 tonnes. This trend has changed in January when 2 inch and 1½ inch ball consumptions were 319 and 282 tonnes respectively. The discharge temperature has also dropped sharply and circulating load has increased. The quantitative data will be available at a later date.

c) An analysis of the 'A' circuit (old circuit) survey done on December 16th ,1981 indicates that primary and secondary grind work indices are slightly lower than the value used for design calculations while the work index found for tertiary grinding is much higher (27 KWH/t) than the design value. These results were confirmed by another survey on No.3 circuit on January 22, 1982 when the work index for tertiary grinding was still higher (17 KWH/t) than the design value but much lower than the December 16th value. This may be a result of improved charging of the mills. The circulating load in ball mill No.4 was found to be lower than 200% which is the design value. Measures similar to cyclopac 5 will be taken in near future to improve the circulating load in ball mill No.4.

d) Close monitoring of media charge in the mills was started by measuring horse power draw. This is being done on alternate day basis. An attempt is being made to ensure full charge at most times.

e) A recommendation and decision was made to charge ball mill No.6 with 1½ inch balls rather than 2 inch balls. Design calculations show that 2 inch balls are excessively large for the fine grinding taking place in the secondary mill. Changes are being made in the purchase order for grinding balls. An improvement in the grinding efficiency should be seen gradually as the 1½ inch balls replace the larger balls in the mill.

C. Grinding (cont'd)

f) It was discovered that the lead scavenger concentrate being returned to tertiary grinding is finer than 55 μm P80. The need for returning this material to grinding is being re-assessed.

g) Provision was made to sample the cyclone feed slurry in all circuits. These samples will lead to a better understanding of cyclone efficiency and circulating loads.

h) Particles size monitor (PSM) was in continuous service during the month but due to the lower specific gravity ore at times, the PSM reading was lower than the actual % -325 mesh.

i) Manpower shortage for regular grinding surveys was a problem but arrangements are now being made to alleviate this problem.

D. METALLURGICAL LABORATORY

For the month of February the metallurgical laboratory will be working on flotation tests on the usage of sodium sulphite in standard rougher circuits involving both oxide and sulphide ores. Flotation tests are also being performed comparing lime to soda ash as a pH modifier. Both sets of test work should be completed by mid February and a report issued then. Other projects are troubleshooting the monthly inventory, and weekly summary programs and developing methods for tighter control on our standard laboratory floats.

E. ANALYTICAL LABORATORY

1. Production Distribution

Production	No. of Assays	Manhours	% Of Total Hours Worked
A.A. Mill Control	2,949	158	15.75
A.A. Pits	1,732	67.5	6.73
A.A. Metallurgy	2,578	118.0	11.76
Wet Mill Control	1,500	224.0	22.23
TOTAL	8,759		
Oil		83.0	8.28
X-Ray Programming		104.0	10.37
Environmental		226.0	22.53
Miscellaneous		22.5	2.24

2. Accuracy

INTERNAL COMPARISON FOR JANUARY

	MONTHLY AVERAGE				COMPOSITE ASSAY			
	Lead	Zinc	Iron	Silver	Lead	Zinc	Iron	Silver
Heads	2.78	4.95	26.23	31.5	2.83	4.90	25.83	30.8
Tails	0.48	0.83	28.10	11.53	0.48	0.83	27.91	11.4
Lead	63.11	5.40	6.28	490.45	62.94	5.37	6.21	459.2
Zinc	2.45	50.34	10.91	48.78	2.30	50.28	10.80	45.67

2. Accuracy (cont'd)

EXTERNAL COMPARISON - DECEMBER MONTHLY COMPOS

	C.A.M.C.				GENERAL TESTING			
	Lead	Zinc	Iron	Silver	Lead	Zinc	Iron	Silver
Heads	3.18	5.18	27.30	41.28	3.26	*5.40	27.15	40.0
Tails	0.50	0.73	30.26	14.15	0.49	*0.79	30.30	16.0
Lead	62.34	5.41	6.63	535.5	62.01	*5.57	6.71	505.0
Zinc	1.90	50.98	10.94	45.14	1.94	50.84	10.94	47.0

* Re-assay

3. Load Out

SKAGWAY RECEIVING AND INVENTORY (W.M.T.)

	Lead	Zinc	Total
Receiving during January 1982	11,770	26,997	38,767
Inventory January 31, 1982	11,268	8,567	19,835

CONCENTRATES EXPORTED (W.M.T.)

Vessel	Departed	Lead	Zinc	Total
J-175 Asia Anvil	22/1/82	6,000	16,316	22,316

4. Copper Sulphate Comparison

Cyprus Anvil - 19.51

Canadian Industries Ltd. - 19.52

APPENDIX IV
MILL INSTRUMENTATION REPORT

Submitted by:

E.B. Tinkler, Senior Instrumentation Foreman
K. Power, Instrumentation Foreman

A. GRINDING

Modified spare low level control unit for apron feeder cut-out. Electricians found a faulty relay unit in the electrical system of the controls.

B. SECONDARY

10A and 10B speed control systems has been completed. The low level interlock on the storage bins now cuts off the signal to the control actuator on the hydraulic drive unit.

The fine ore bin level indicator unit failed and to date we are awaiting parts to complete the repairs.

C. GRINDING

The time controlled lime addition to the rod mills has been partially completed. We require the timers and valves.

Lube failure alarms for No.1,2,3 and regrind mills have been run into the main control room.

Water addition control valve on 5 and 6 pumpbox had to be changed and overhauled.

Plugged chute alarms have been fitted to No.4 rod mill and No.1 rod mill feed chutes.

All the instrumentation has been removed from the old control room apart from that fitted to the small water panel.

D. FLOTATION

The Z-11 valve to zinc rougher flotation feed had to be removed and checked out. It was found that some damage had occurred to the valve when it saw service on copper sulphate. The valve is now awaiting spare parts to carry out the repairs.

Z-11 flows to lead rougher and zinc rougher feed have been recalibrated for instrument spans of 0-15000 cc/min.

E. DEWATERING

Thickener diaphragm pump speed controls have been fitted and are in the process of being setup. The zinc thickener speed control does not function at present. We suspect gear box problems on the pump itself.

F. LOAD OUT

The electronics for the nuclear weigh scales are in the process of being removed. These parts along with the mass flow source of the old zinc circuit will be shipped to Ramsey Rec. Ltd for disposal.

G. REAGENTS

The soda ash pressure control valve had to be removed and overhauled. It was found that when the mechanics fit the valve, the valve seized when too much pressure was applied to the pipe flanges. The valve was also found to be densely coated with layer after layer of soda ash deposits.

A level rubber tube has been fitted to the sodium sulphite tank. This unit has been tee'd to the soda ash level control loop via a 3-way valve. The 3-way valve has been identified as to which tank the level control will control. (Water addition valve piping has to be modified.)

G. Reagents (cont'd)

The current relay on the sodium cyanide level control had to be changed due to a relay failure in the unit.

H. MISCELLANEOUS

The instrumentation at the valve house is at present being commissioned.

M. Ruggles attended a meeting on the Assay Lab's new spectrometer. The meeting was given by the makers representative and included some maintenance procedures.

F. Stanley, a consultant from Kenonic Controls Ltd., arrived January 19, 1982. Fred will be setting up loop numbers and recommending PM schedules for mill instrumentation.

A. Gonder had a fair and impartial hearing on the 15th of this month. Allen was given a written reprimand for leaving his workplace without permission.

I. ON-STREAM ANALYZER

On the second of January, 1982 the on-stream analyzer developed a fault which made it necessary to shutdown and calibration to stop.

The X-Ray generator "G" cabinet seemed to be the heart of the problem. Visual inspection showed burnt resistors and smoke coming from the rotary transformer.

The Outokumpu office in Toronto indicated that the X-Ray tube had broken down and that they would send a replacement. Also they were to look into getting parts for the rotary transformer.

On January 8th, 1982 the new X-Ray tube was installed and after power-up the same problems existed. Next a rotary transformer was shipped from Finland and it was installed. This did not solve the problem.

I. On-Stream Analyzer (cont'd)

The Outokumpu representative arrived on site on the 20th of January and began troubleshooting. He replaced several modules, but nothing seemed to work. Finally, the cause of the problem was traced back to the power distribution cabinet and it was found to have on phase shorted to ground. This condition was corrected and more troubleshooting was carried out.

After replacing more parts, we had solved most of the problems caused by the short circuit, but were still unable to power-up to 50 KV.

After looking at the high voltage tank set, we found that the secondary winding had an open circuit, caused by high current being drawn. The high voltage tank has been shipped from Finland and is scheduled to arrive in Vancouver on February 1st, 1982. The Outokumpu representative will be notified and he will return to the minesite just in case there are more problems.

Also during this month, the report printer for the operators arrived on site and was not functional. This will be sent back to Toronto for replacement for the newer LA 34. The original LA 34 printer that we received had some minor keyboard problems, but the entire keyboard was replaced to solve the problem.