

G I A N T
YELLOWKNIFE MINES LIMITED

MEMO TO: S.E. El-Alfy
CC: J.S. McAlpine; G. Doerksen
FROM: Don Cooper
DATE: October 11, 1988
SUBJECT: TRP - PLANT MONTH END REPORT - SEPTEMBER 1988

METALLURGICAL AND OPERATIONS

Seventeen batches of carbon were processed during September in the stripping plant resulting in 4133 oz. Au recovered to cathodes and 2931 oz. Au to bullion produced. This was the first month that ounces stripped exceeded ounces loaded to carbon. The rate of loaded carbon transfer is now in the 4 to 6 hour range for a batch of carbon. Improvements in the washing of the carbon on the loaded carbon screen are now needed since entrained slurry is now causing considerable delays in the washing stage. Eductor sizing is not a problem in the strip plant as yet since the delays involved in transferring carbon from the acid wash vessel to the strip vessels is caused by plugging of the bottom strip vessel screens and hence slow drainage of water. An attempt to speed this up by installing an overflow drain on the top of the vessels met with little success due to plugging of the top screens. The lower screens and slow drainage problems may be caused by wood fibres alone. One solution to the above may be to remove the upper screen while educting to the strip vessel and run the overflow lines back to the acid wash vessel to trap any carbon carryover. The change from a 35 to 28 mesh polyurethane screen deck on the loaded carbon screen and the installation of the DSM screen ahead of the loaded carbon screen helped considerably in speeding up the rate of carbon transfer to the plant.

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The number of cathodes was increased to 5 per electrowinning cell as well as the steel wool content was increased to 2 1/2 pounds per cathode. This allows loading of one cathode per cell every second batch. The strip solution is changed every 3 to 3 batches resulting in reasonably constant rectifier voltages and also has provided a workable system while concentration has been on the CIL recoveries.

Carbon adsorption in the CIL system has improved considerably with the increased stripping rate, new carbon addition and more even carbon distribution in the CIL tanks. Adsorption MTD averaged 89.40% while it roughly averaged 93% for the latter half of the month. Fresh carbon initially purchased was 6 X 12 type while the extra 60 tonnes purchased was 6 X 16. By month end the carbon density in the CIL tanks was about 19.55 grams per litre.

Erratic solution sample assays were determined to be caused by contamination of the sample bottles. Currently only new or acid washed bottles are used. Potassium permanganate is being added to the sample buckets on the automatic samplers to stop the leaching action in the containers. In addition samples are filtered every six hours to assist in obtaining accurate results.

CIL feed tonnage was limited to 8000 tpd maximum for the month of September and on September 19 the feed flow rate was limited to 2500 USGPM. This was done to prevent variations in plant recoveries possibly caused by retention time. No major difference in recoveries was noticed that could be attributed to retention time alone.

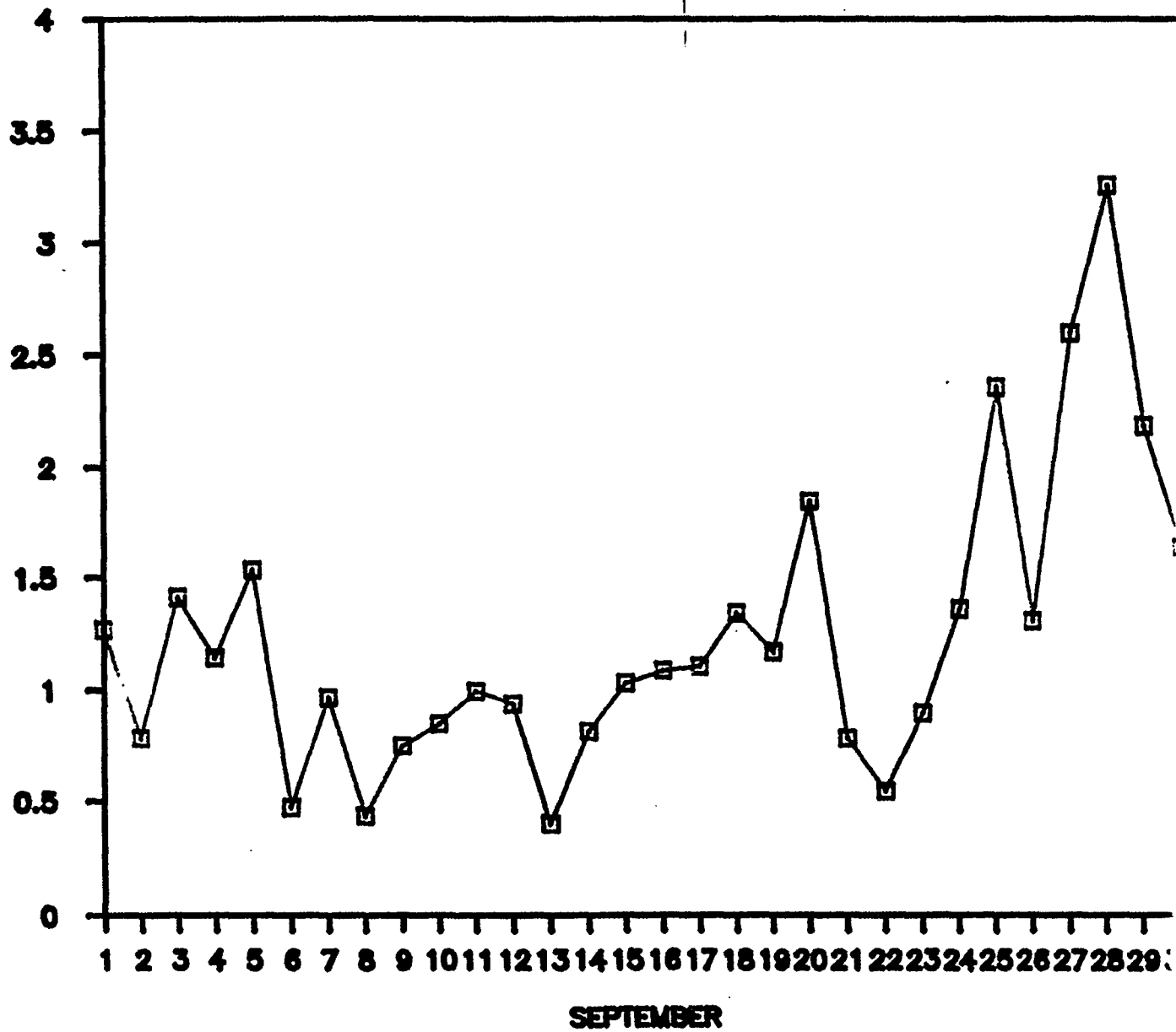
On September 20 cyanide addition was changed from control based on feed tonnage (mass flow) to volume of feed. This was done since on many occasions the cyanide concentration in the CIL system would drop due to high volumetric feed rates but low solids density. Due to the variation in both solids content and volumetric flow rate consideration is being given to adding cyanide at a fixed flow rate independent of either mass or volumetric CIL feed rate. On September 23 cyanide addition was increased to approximate 2 lbs/ton of feed ore. The results of this test are summarized in the following two graphs. Although the average gold recoveries during this period showed no significant increase over the preceding periods the general trend is towards higher recoveries. It is most likely that addition rates of between 1.0 and 1.5 lbs/ton will provide the optimum recoveries. X

Scaling problems in the cyanide circulation system and in the magnetic flow metering system were encountered this month. This problem will be examined and a suitable anti-scaling additive may be required. During August 11.30 hours of downtime resulted from plugged cyanide circulation lines due to scale breaking away inside pipe.

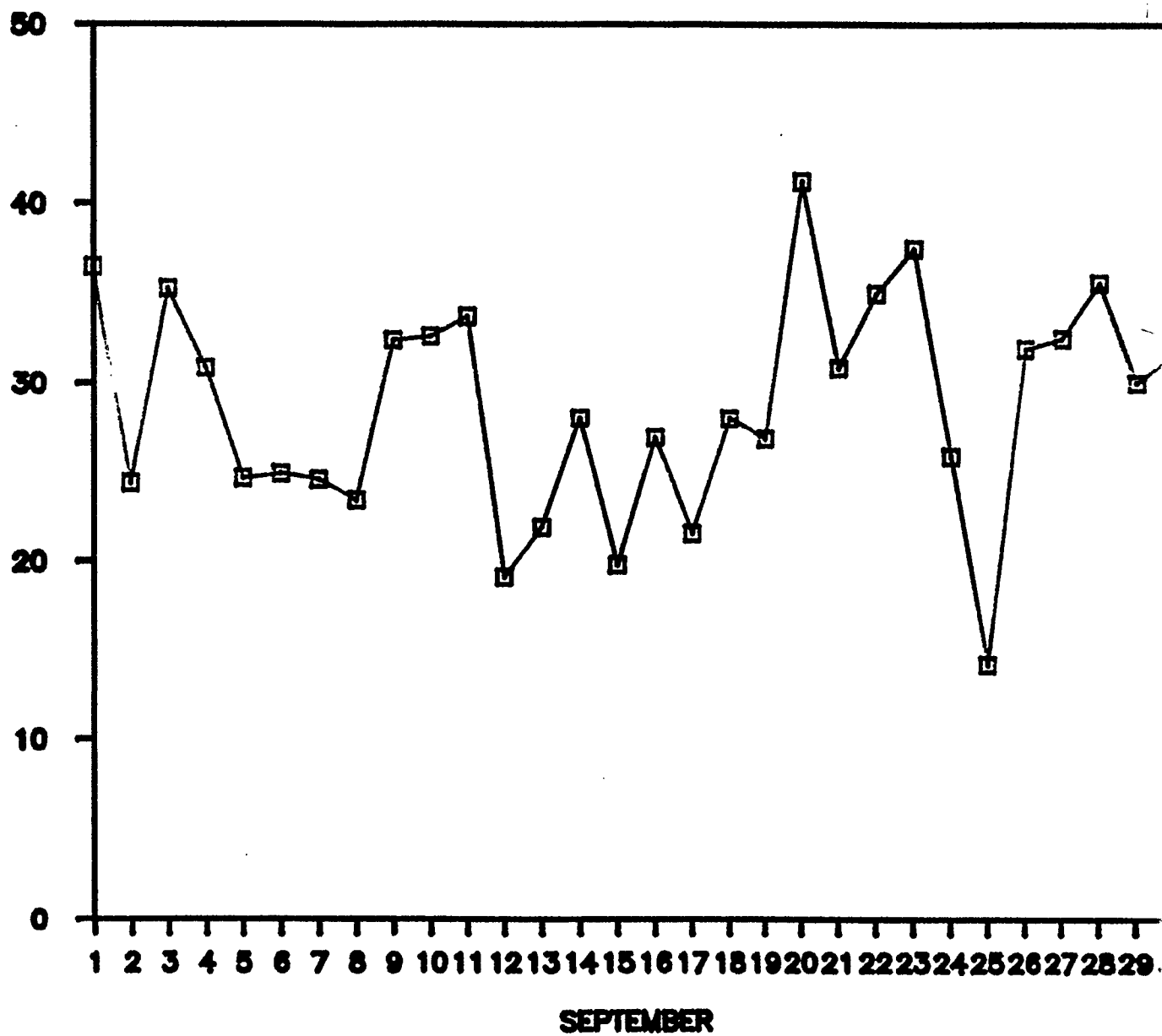
MECHANICAL

- Installed 28 mesh urethane panels on loaded carbon screen (replaced 35 mesh panels).
- Air sparges installed in surge tank (2 installed Sept. 3 plus 2 more Sept. 15).
- Removed metal piping on barren tank ventilation fan suction-installed HDPE fused pipe.
- "Y" in tailings line leaking, removed and installed straight spool piece.
- Installed DSM screen ahead of loaded carbon screen.
- Completed cement work under Trash/Safety screen deck.
- Cyanide addition points changed to tank feed boxes.
- Raised sides of kiln feed hopper to increase capacity.
- Fabrication of spool pieces on strip vessel discharge to allow valves to remain connected when removing screens.
- Installed mechanical seal in Toyo (100 h.p.).
- Installed expanded metal trash screen on end of load carbon screen.
- Acid pump discharge line changed to PVC.
- Repairs to pipelines in Polishing Pond area.
- Repairs to Toyo pumps.
- Shelving for cold storage warehouse.
- Patched hole in acid wash vessel.

SEPTEMBER CIL CYANIDE CONSUMED lb/ton



SEPTEMBER CIL RECOVERIES



ELECTRICAL

- Kiln motion failure setting changed - wouldn't start - motion failure setting too close to trip point.
- Installation of lights in cold storage shed, monitor areas and vapourizer shed.
- Cable connection to gen-sets.
- UPS system for North Pond.
- Lime system PLC program.
- Ground fault alarm system and meters for electrowinning cells.
- Toyo pumps - cables, timers (for starter), moisture sensor.
- Tie in 75 KVA transformer - North Pond.
- Repairs to heat tracing.
- Installed lighting at Derrick screen area.
- Siren for high CN gas alarm.
- Solenoid/valve installed on gland water lines to CN transfer and circulating pumps - when pumps shutdown, gland water shuts off automatically.
- Monitor memory controls.

INSTRUMENTATION

1. Checked calibration on CIL feed density on September 5th and 14th. Very accurate.
2. Calibrated HCN detectors on September 6th.
3. Calibrated trommel density on September 3rd and 14th.
4. Received Rosemount electronics modules from the Rosemount Service Centre. These modules were previously damaged from power oscillations. A total of 3 modules were received. I tested these modules and one is still faulty.

5. Calibrated the acid wash pH probe on September 10th. Calibrated the trash screen underflow pH probe on September 6th and 15th.
6. Replaced rupture disk on strip vessel #1 due to a pressure build-up.
7. Cleaned out the cyanide addition metering valve on the barren solution tank.
8. Matched level indications on the barren solution tank. Two level detecting devices are present on the vessel which are: 1) Milltronic's ultrasonic level transmitter and 2) level gauge mounted 1' from the bottom. Having trouble matching these devices since the temperature of the surroundings and the amount of vapours present in the vessel affect the accuracy of the ultrasonic transmitter. I matched the devices when the solution is being mixed since this is the time when the indication is most needed.
9. The solution heater has been shutting down quite frequently. The modulating controller lost all calibration values. Replaced controller and entered new values. The solution heater would complete it's purge cycle but would not ignite. Removed the ignition electrodes and discovered that the terminals were shorting out behind the electrodes instead of at the electrodes. Tightened the terminals and it works fine.

The solution heater would shutdown and alarm randomly. We think that the ultraviolet flame sensor is losing its ability to sense the flame. New sensor on its way, also a representative from Volland is arriving on September 20th.

10. Replaced electronics module in #3 cyanide addition flow transmitter, checked flow rates in all three additions. #1 and #2 are accurate but #3 is off by a significant amount. Currently checking the flow element in the pipe.
11. Checked calibration of CIL feed density on September 28th.
12. Checked calibration of trommel density on September 27th.
13. Calibrated the acid wash pH probe on September 23.
14. Calibrated CIL pH probe on September 28th.
15. Worked on the solution heater. Adjusted the fuel/air mixture for efficiency. Adjusted the control parameters for more stable control of temperature.

16. Replaced CIL surge tank level indicator. Operators claimed the other indicator was faulty.
17. Replaced the ultraviolet flame sensor on the solution heater.
18. Received 3 rupture disks from suppliers.
19. Installed ball valves on the blow-off lines of the rupture disks.
20. Changed the remote setpoint for cyanide addition from mass flow (tons/hr) to feed flow (GPM).
21. Cleaned #1, 2 and 3 cyanide addition flowmeters. Re-calibrated each device. #3 cyanide addition still isn't operating correctly. Suspect that the seal has been broken and cyanide has leaked into the electronics.
22. Replaced the temperature indicators on top of the strip vessels.
23. Installed the strip vessel feed flow meter. Having problems with the operation of the device.
24. Installed the electrowinning cells feed flowmeter.
25. Replaced membrane and electrolyte for each HCN gas detector. Calibrated each device.
26. Cleaned #1 cyanide addition valve.

DOWNTIME RECORD

SEPTEMBER 1988

<u>DATE</u>	<u>HOURS</u>	<u>EXPLANATION</u>
Sept. 1	1.50	Barge pumps - electrical.
2	1.00	Low feed on 50 hp Toyo - blown motor.
3	4.30	Air sparge installation in surge tank.
4	0.20	Low feed - using 50 hp Toyo in North Pond.
5	3.00	Repairs to CIL feed line (pH bleed), tailings line hole at pump.
10	1.40	Low feed - surge tank level low.
11	3.60	Low feed - surge tank level low.
12	1.00	Power failure
	3.90	Repairs to "Y" in tailings line - install spool piece.
15	0.60	Polishing Pond down to extend ramp.
16	3.20	Low feed - problems with Toyo at Polishing Pond.
17	3.70	Low feed - North Pond pumps down, changing pumps in Polishing Pond.
18	0.50	Changing screens - Derrick trash screens.
	0.40	Blasting ditch for CIL tank drainage.
19	3.90	Low feed - piping problems in North and Polishing Ponds.
20	3.50	Power failure.
	1.50	Tailings pump - blown fuse.
	5.30	Low feed - Toyo pump, Polishing Pond.
21	1.50	Change screen cloth on Derrick Trash screens.
	2.50	Low feed - moving crane, North Pond Toyo pump problems, Polishing Pond.
22	0.40	Safety screens plugged.
23	0.90	Safety screens plugged.
24	0.80	Low feed.
25	2.20	Low feed.
26	4.20	Low feed - North Pond, Toyo motor burned out.
27	3.30	Low feed - Changed from 50 to 100 hp Toyo, North Pond.
28	3.50	Low feed - Sanded line - North Pond, from Toyo.
29	1.70	Low feed - Moved monitor Polishing Pond, switched monitors, North Pond.
30	2.50	Low feed - Advance Polishing Pond ramp - Toyo not pumping.
TOTAL	66.00	

1 DOWNTIME ANALYSIS - JUNE TO SEPTEMBER 1988

1. Summary

June to September -	Operating Hours (Budget)	2928.00
	Operating Hours (Actual)	2694.27
	Availability (%)	92.02
	Downtime Hours	233.73
	Downtime (%)	7.98

2. Breakdown

	Total Downtime Hours	% of Total Downtime Hours	% Contribution to Downtime
Plant - Electrical	3.10	1.33	0.11
Mechanical	28.62	12.25	0.98
Instrumentation	---	---	---
Operating	23.43	10.02	0.80
Modifications(1)	22.68	9.70	0.77
Mining	115.00	49.20	3.93
Water Supply	9.08	3.89	0.31
Power Failure	<u>31.82</u>	<u>13.61</u>	<u>1.08</u>
TOTAL	233.73	100.00	7.98

- (1) Installation of diffuser pipe in surge tank (6.48 hours).
 Conversion of CIL feed pump to gland water (9.40 hours).
 Vibration tests by consultant on surge tank (0.60 hours).
 Air sparge installation on surge tank (4.30 hours).
 Blasting for CIL tank drainage trench (0.40 hours).
 Changing type of Trash screen cloths (1.50 hours).

From the above the actual downtime for the plant was 2.20% for the June to September period.

A considerable amount of the mining area downtime was due to problems with the Toyo pumps especially with the lower seal mechanism. In addition, since CIL feed densities dropped drastically when the agitator in the surge tank was shutdown the CIL feed was shutdown before the agitator was shut off. This method of operation provides at most 2 hours of surge capacity. Installation of proper size air spargers at the end of the season should solve this problem. Some of the mining problems encountered in September may have been due to the limitations of feed flow and tonnage placed on plant throughput.

Don Cooper
 TRP Plant Superintendent

REAGENT CONSUMPTION - SEPTEMBER 1988

REAGENT	MONTH		YEAR TO DATE	
	LBS *(LITRES)	LBS/TON *(LITRES/TON)	LBS	LBS/TON
PROPANE	101,206	0.546	172,069	0.204
¹ CARBON	70,560	0.380	170,870	0.203
LIME	58,600	0.316(.)	605,469	0.719
MURIATIC ACID	1,993	0.011	6,477	0.008
CAUSTIC SODA	29,271	0.158	117,565	0.140
SODIUM CYANIDE	278,333	1.501	852,682	1.013
STEEL WOOL	45	0.00024	140	0.0002

1. Carbon added to CIL.

(.) Purchased 60 tonnes of new carbon but has not yet all been received.

TRF METALLURGICAL BALANCE
(C.I.L.)

DATE: SEPT. 30, 1988

DAY

RECOVERIES (%)	COMBINED GRADES oz/Ton Au.	AVAILABILITY (HRS/%)	
SOLIDS			
DISSOLUTION 31.58	HEADS 0.078	OP.HRS.(BUDG)	24.0
ADSORPTION 94.66	TAILS 0.053	OP.HRS.(ACT)	21.5
TOTAL 31.79	CIL RECOVERY	AVAIL.(%)	89.6
	TO CARBON 179.988 oz.	DOWNTIME(HRS)	2.50
LOW FEED SUPPLY.			
CIL FEED SOLUTION ASSAY:	0.0048		

MONTH TO DATE

RECOVERIES (%)	COMBINED GRADES oz/Ton Au..	AVAILABILITY (HRS/%)	
SOLIDS			
DISSOLUTION 28.66	HEADS 0.073	OP.HRS.(BUDG)	720
ADSORPTION 89.40	TAILS 0.052	OP.HRS.(ACT)	654
TOTAL 28.14	CIL RECOVERY	AVAIL.(%)	90.8
	TO CARBON 3829.88 oz.	DOWNTIME(HRS)	66

YEAR TO DATE

RECOVERIES (%)	COMBINED GRADES oz/Ton Au..	AVAILABILITY (HRS/%)	
SOLIDS			
DISSOLUTION 30.29	HEADS 0.079	OP.HRS.(BUDG)	3672
ADSORPTION 69.78	TAILS 0.061	OP.HRS.(ACT)	3314.27
TOTAL 22.66	CIL RECOVERY	AVAIL.(%)	90.3
	TO CARBON 15001.38 oz.	DOWNTIME(HRS)	357.73

TRP METALLURGICAL BALANCE
(C.I.L.)

DAY

DATE: SEPT. 30, 1988

FEED :				RECLAIM SOLUTION			TOTAL
Tons	Percent Solids	Ounces Au/Ton	Ounces Au.	Tons	Ounces Au/Ton	Ounces Au.	Ounces Au.
7302.1	41.39	0.075	549.65	10341.4	0.0016	16.55	566.19
TAILS :				TAILS SOLUTION			TOTAL
7302.1	41.39	0.052	376.06	10341.4	0.0010	10.15	386.21

MONTH TO DATE

FEED :				RECLAIM SOLUTION			TOTAL
Tons	Percent Solids	Ounces Au/Ton	Ounces Au.	Tons	Ounces Au/Ton	Ounces Au.	Ounces Au.
186638.6	36.21	0.070	13069.41	328741.8	0.0016	538.38	13607.79
TAILS :				TAILS SOLUTION			TOTAL
186638.6	36.21	0.050	9323.70	328741.8	0.0014	454.21	9777.91

YEAR TO DATE

FEED :				RECLAIM SOLUTION			TOTAL
Tons	Percent Solids	Ounces Au/Ton	Ounces Au.	Tons	Ounces Au/Ton	Ounces Au.	Ounces Au.
843294.3	32.50	0.076	64137.24	1751495.2	0.0012	2068.23	66205.47
TAILS :				TAILS SOLUTION			TOTAL
843294.3	32.50	0.053	44708.49	1751495.2	0.004	6495.60	51204.09

**TRP METALLURGICAL BALANCE
(STRIP CIRCUIT)**

DAY BATCH No.88-30.

DATE: SEPT. 30, 1988

TONS OF CARBON (EST.)	LOADED CARBON		STRIPPED CARBON		CATHODE RECOVERED
	oz Au/TON	oz Au	oz Au/TON	oz Au	oz Au
4.288	59.380	254.621	1.100	4.717	249.905

STRIP CIRCUIT RECOVERY: 98.14

MONTH (BATCH Nos.88-014 TO 88-30)

TONS OF CARBON (EST.)	LOADED CARBON		STRIPPED CARBON		CATHODE RECOVERED
	oz Au/TON	oz Au	oz Au/TON	oz Au	oz Au
77.430	55.475	4295.444	2.135	165.297	4132.891

STRIP CIRCUIT RECOVERY: 96.21

YEAR (BATCH Nos.88-01 TO 88-30)

TONS OF CARBON (EST.)	LOADED CARBON		STRIPPED CARBON		CATHODE RECOVERED
	oz Au/TON	oz Au	oz Au/TON	oz Au	oz Au
133.305	49.367	6580.848	2.710	361.297	6222.299

STRIP CIRCUIT RECOVERY: 94.55

TRP BULLION PRODUCED

SEPTEMBER 1988 (BAR Nos. TRP-003 TO TRP-008)

TOTAL WEIGHT OZS.	ASSAY FINENESS		TROY OUNCES	
	GOLD	SILVER	GOLD	SILVER
4,324.787	677.805	220.744	2,931.361	954.669

YEAR TO DATE (BAR Nos. TRP-001 TO TRP-008)

TOTAL WEIGHT OZS.	ASSAY FINENESS		TROY OUNCES	
	GOLD	SILVER	GOLD	SILVER
5,826.258	678.579	211.978	3,953.574	1,235.039

CATHODES CURRENTLY CONTAIN (ozs Au): 2268.725

ESTIMATED CIL CARBON GOLD INVENTORY

DATE:
 SEPT. 30, 1988

DAY

FROM INVENTORY	TO INVENTORY		NET CHANGE
CARBON TO STRIP oz Au	CIL RECOVERY TO CARBON oz Au	STRIPPED CARBON oz Au	PLUS (MINUS) oz Au
254.621	179.988	4.717	-69.916

MONTH

FROM INVENTORY	TO INVENTORY		NET CHANGE
CARBON TO STRIP oz Au	CIL RECOVERY TO CARBON oz Au	STRIPPED CARBON oz Au	PLUS (MINUS) oz Au
4295.444	3889.345	165.297	-240.802

YEAR

FROM INVENTORY	TO INVENTORY		NET CHANGE
CARBON TO STRIP oz Au	CIL RECOVERY TO CARBON oz Au	STRIPPED CARBON oz Au	PLUS (MINUS) oz Au
6580.852	15396.72	361.297	9177.17

CURRENT CIL CARBON GOLD INVENTORY oz Au: 9177.17

METALLURGICAL BALANCE VS TANK SAMPLE INVENTORY
SEPT. 30, 1988

CIL TANK NUMBER	WEIGHTS		ASSAY	TOTAL
	gms/L	TONS	ozs Au/ton	ozs Au
1	19.00	55.70	59.44	3310.676
2	10.10	29.61	45.22	1338.863
3	34.60	101.43	36.71	3723.443
4	27.00	79.15	20.00	1582.989
5	35.10	102.89	14.40	1481.678
6	35.60	104.36	12.50	1304.501
TOTAL		473.14		12742.15
AVERAGE	26.90		26.93	

CARBON ASSAYS FROM 28TH SAMPLES.

	CIL CARBON oz Au	INVENTORY TONS CARBON	INVENTORY oz Au/TON
FROM MET. BALANCE	9,177.170	311.90	29.42
FROM TANK SAMPLING	12,742.151	473.14	26.93
DIFFERENCE	(3,564.981)	-161.24	2.49

TONS OF FRESH CARBON ADDED TO DATE: 311.901