Province of British Columbia

Ministry of Energy, Mines and Petroleum Resources

ASSESSMENT REPORT
TITLE PAGE AND SUMMARY

TYPE OF REPORT/SURVEY(S)	TOTAL COST
METALLURGICAL TESTING	$25,000.00

AUTHOR(S) G. A. Kosick
G. S. Dobby

SIGNATURE(S)

DATE STATEMENT OF EXPLORATION AND DEVELOPMENT FILED Feb. 21, 1991 YEAR OF WORK 1990

PROPERTY NAME(S) MOUNT POLLEY

COMMODITIES PRESENT Cu, Au

B.C. MINERAL INVENTORY NUMBER(S), IF KNOWN

MINING DIVISION Cariboo NTS 93A/12E

LATITUDE 52°33'N LONGITUDE 121°38'W

NAMES and NUMBERS of all mineral tenures in good standing (when work was done) that form the property [Examples: TAX 1-4, FIRE 2 (12 units); PHOENIX (Lot 1706); Mineral Lease M 123; Mining or Certified Mining Lease ML 12 (claims involved)]:

CB1 (20 units), CB4 (8 units), CB5 (20 units), CB8 (8 units), CB9 (20 units), CB16 (20 units), CB19 (20 units), CB20 (20 units), PM1 (20 units), PM2 (20 units), PM3 (20 units), PM4 (20 units), PM5 (20 units), PM6 (20 units), PM7 (12 units), PM8 (20 units), PM9 (6 units), PM10 (6 units), PM11(15 units), PM12 (15 units), PM13(12 units)

OWNER(S)
(1) Imperial Metals Corporation (2)

MAILING ADDRESS
800-601 West Hastings Street
Vancouver, B.C. V6B 5A6

OPERATOR(S) (that is, Company paying for the work)
(1) Imperial Metals Corporation (2)

MAILING ADDRESS
800-601 West Hastings Street
Vancouver, B.C. V6B 5A6

21238

SUMMARY GEOLOGY (lithology, age, structure, alteration, mineralization, size and attitude):

Porphyry type copper-gold deposit hosted by a multiple alkalic intrusive complex dated 184±7 million years. Geological reserves using 0.25% copper equivalent cutoff grade estimated at 230,976,000 tonnes. Principal primary minerals, magnetite and auriferous chalcopyrite occur as disseminations and veinlets in an intrusion breccia formed near the top of the complex. Metallurgical testing of oxidized ore (29% to 58% of Cu as oxide) by column flotation indicates recovery levels of 62% to 66% for copper and 72.4% to 77.3% for gold.

REFERENCES TO PREVIOUS WORK

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FIGURES

TABLES

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INTRODUCTION

This report pertains to column flotation metallurgical testing of the Mount Polley ore performed by Minnovex Technologies Inc. at the Coastech Inc. pilot plant facility in North Vancouver, B.C., in the period of February 26 to March 2, 1991. The testing of oxidized ore that represents the mill feed in the first year of production was part of a comprehensive metallurgical testing program carried out in order to establish a recovery method for the Mount Polley ore and provide parameters for the process flowsheet and mill design in conjunction with the feasibility study by Wright Engineers Ltd. completed in July 1990.

LOCATION AND ACCESS

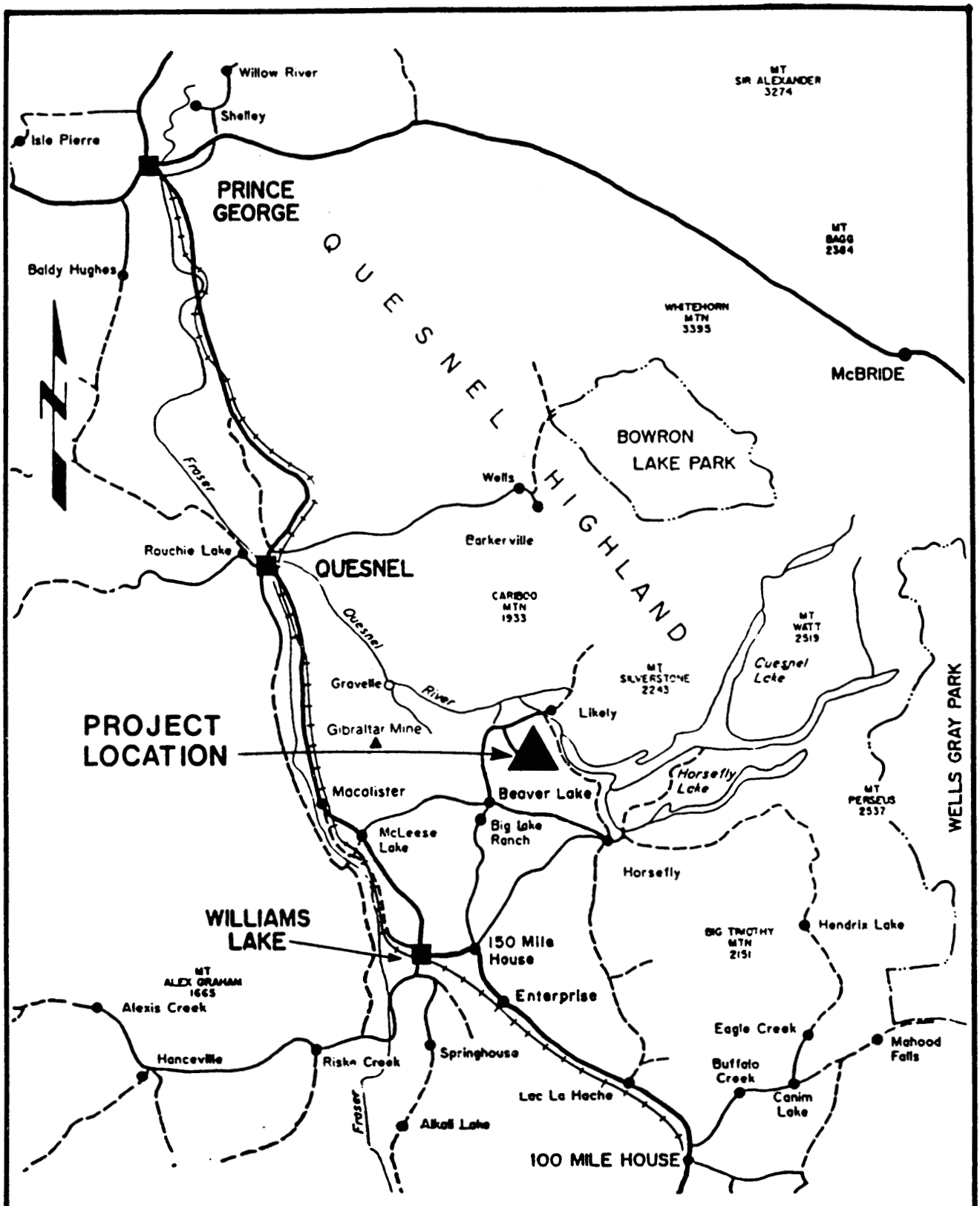
The project is located in the Cariboo Region of Central British Columbia, approximately 56 km by air northeast of Williams Lake. The site is accessible by paved road from Williams Lake to Morehead Lake, a distance of 85 km, and then by gravel forestry road for the final 14 km to the site. The nearest settlement is the community of Likely located on the west side of Quesnel Lake, 8 km from the project (Figure 1).

THE PROPERTY

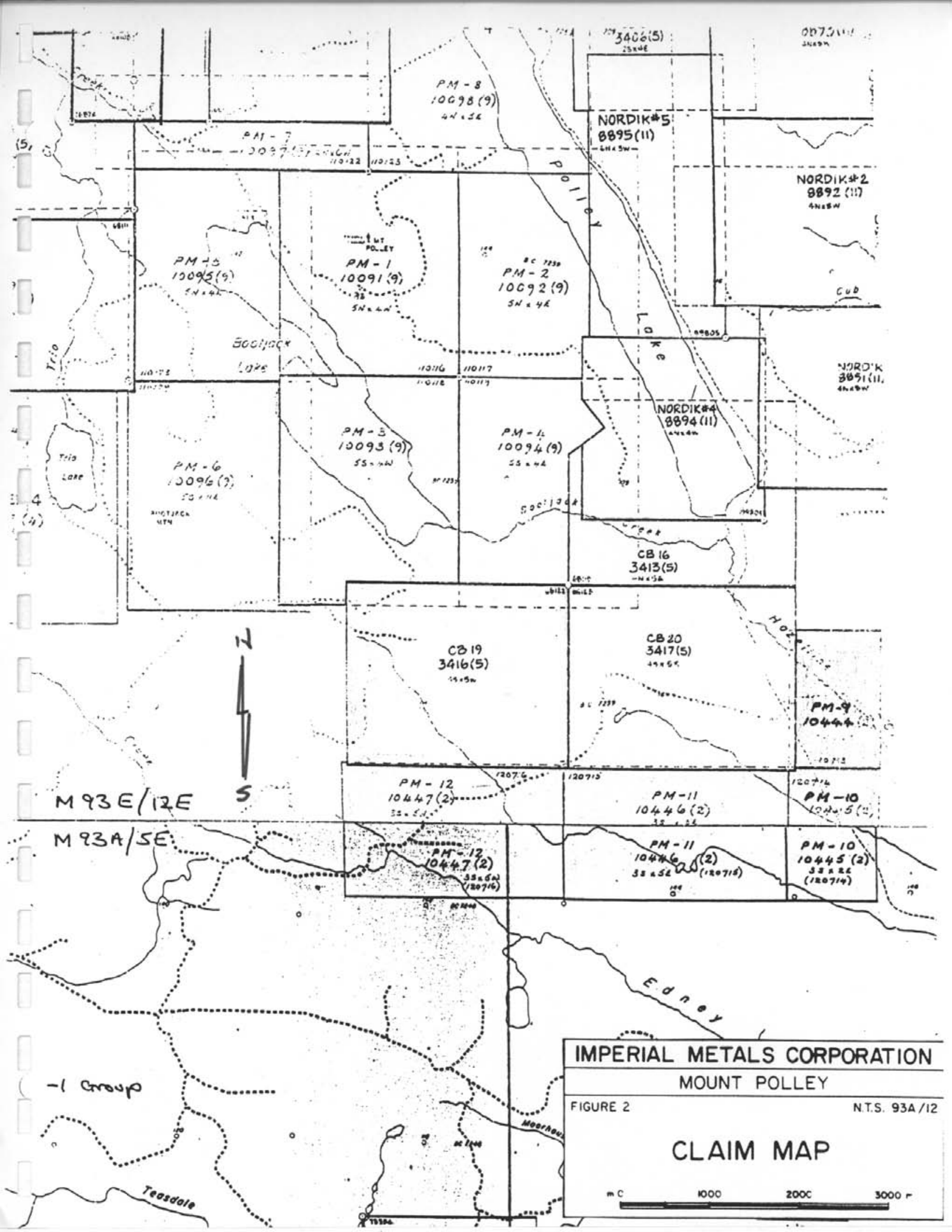
The Mount Polley property consists of 21 contiguous claims (342 units) that cover approximately 8,550 ha (21,127 acres). The list of claims and their location are shown in Table A and Figure 2.

TABLE A
LIST OF CLAIMS

Claim	Number of Units	Record Date
CB1	20	May 4, 1981
CB4	8	May 4, 1981
CB5	20	May 4, 1981
CB8	8	May 4, 1981
CB9	20	May 4, 1981
CB16	20	May 4, 1981
CB19	20	May 4, 1981
CB20	20	May 4, 1981
PM1	20	Sept. 17, 1989
PM2	20	Sept. 17, 1989
PM3	20	Sept. 17, 1989
PM4	20	Sept. 14, 1989
PM5	20	Sept. 29, 1989
PM6	20	Sept. 29, 1989
PM7	12	Sept. 17, 1989
PM8	20	Sept. 17, 1989
PM9	6	Feb. 23, 1990
PM10	6	Feb. 23, 1990
PM11	15	Feb. 23, 1990
PM12	15	Feb. 21, 1990
PM13	12	Sept. 26, 1990
21 claims	340 units	



IMPERIAL METALS CORPORATION MOUNT POLLEY PROJECT WILLIAMS LAKE BRITISH COLUMBIA		LOCATION PLAN			
WRIGHT ENGINEERS LIMITED VANCOUVER CANADA	Drawn F.G.	Appr.	FIGURE No.		REV
	Check	Appr. Date	A	1	


PM-8
10098(9)
4N x 5E
NORDIK#5
8895(11)
6N x 5W
NORDIK#2
8892(11)
4N x 5W
PM-7
PM-3
10095(9)
5N x 4E
PM-1
10091(9)
5N x 4W
PM-2
10092(9)
5N x 4E
Polley
Lake
Trio
Goodjack
Lake
NORDIK#4
8894(11)
4N x 4W
PM-5
10093(9)
5S x 4W
PM-4
10094(9)
5S x 4E
PM-6
10096(9)
5S x 4E
Trio
Lake
Goodjack
Mtn
Goodjack
Creek
CB 16
3413(5)
4N x 5E
CB 19
3416(5)
4S x 5W
CB 20
3417(5)
4S x 5E
PM-9
10444
PM-12
10447(2)
5S x 5E
(120716)
PM-11
10446(2)
5S x 5E
(120715)
PM-10
10445(2)
5S x 5E
(120714)
N
S
M 93E/12E
M 93A/5E
Edney
Moorhouse
Teasdale
-1 Group
IMPERIAL METALS CORPORATION
MOUNT POLLEY
FIGURE 2
N.T.S. 93A/12
CLAIM MAP
m C
1000
2000
3000 F

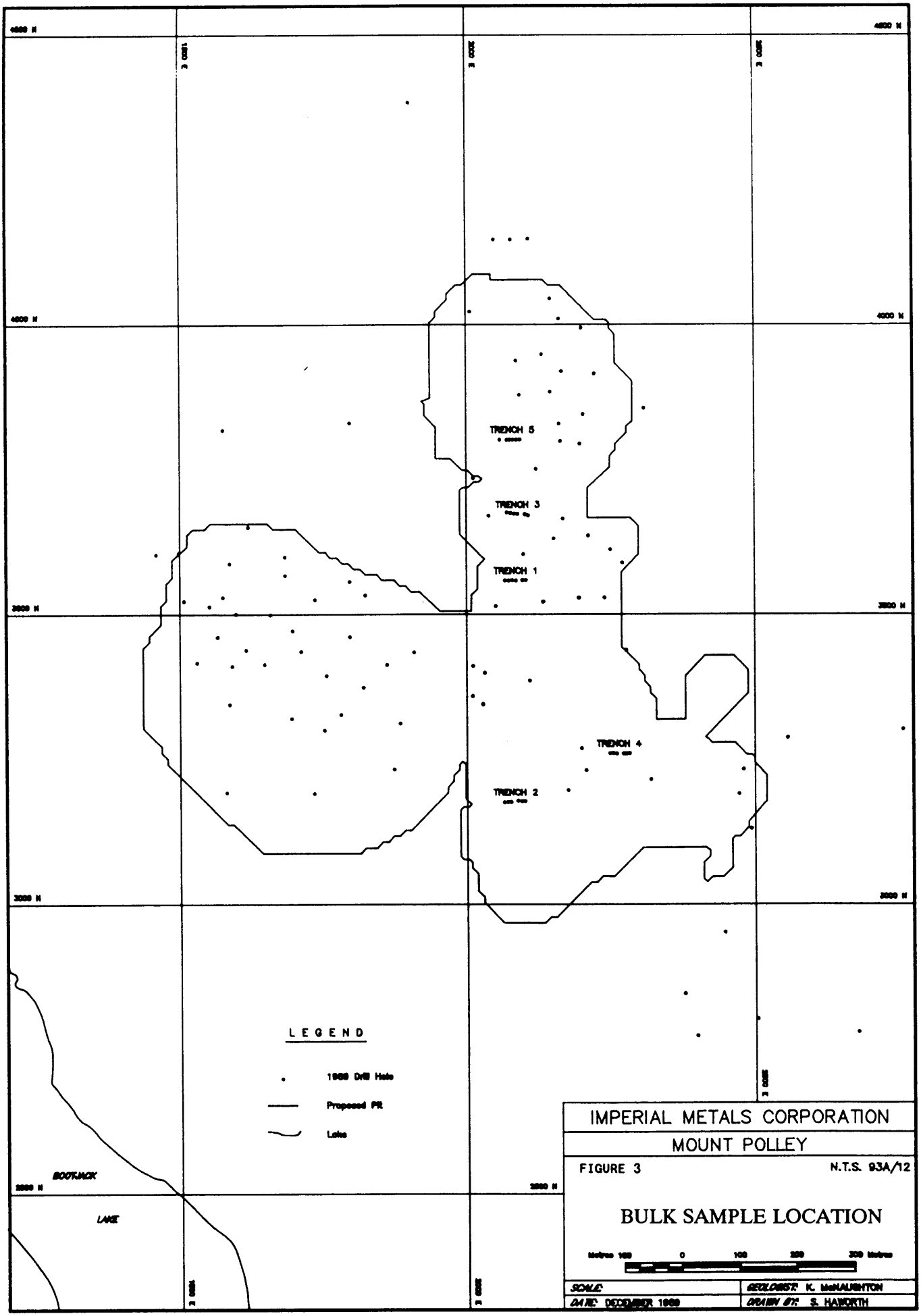
BULK SAMPLING

Six bulk samples totalling approximately 200 tons of ore were excavated from five trenches, located within the boundary of the proposed open pit (Figure 3). The samples represented the porphyry copper-gold ore with various degrees of oxidation found in the Mount Polley orebody. The selection of sample sites was made on the basis of oxidation levels of core from exploration holes previously drilled at each trench location.

Site preparation, drilling, blasting and loading were done by Pascho Blasting of Kamloops, using Texron T850 drill, Cat 235 excavator and Cat 510 loader.

The trenches were drilled to a depth of 6m and blasted in a single round using 3" bit and 1.0 x 1.0m blast hole pattern. After blasting the samples were placed on a level pad by spreading the material and stacking successive layers. A split sample weighing approximately 30 tons was taken by cutting off the side of each pad and loading it into a dump truck and trailer.

At the Coastech Research Lab the bulk samples were crushed by jaw and cone crushers to -¼" and reduced to 500 kg for metallurgical pilot plant testing.


4600 N
3200 E
3400 E
3600 E
4400 N
4200 N
3800 N
3600 N
TRENCH 5
TRENCH 3
TRENCH 1
TRENCH 4
TRENCH 2
LEGEND
1988 Drill Hole
Proposed Rd
Lake
BOOTJACK
LAKE
IMPERIAL METALS CORPORATION
MOUNT POLLEY
FIGURE 3
N.T.S. 93A/12
BULK SAMPLE LOCATION
Metres 100 0 100 200 300 Metres
SCALE
GEOLOGIST K. McNAUGHTON
DATE DECEMBER 1988
DRAWN BY S. HAWORTH

Minnovex Technologies Inc.
444 Woburn Ave., Toronto, Ontario M5M 1L7 Phone (416) 781-5890

COLUMN FLOTATION PILOT PLANT WORK ON MOUNT POLLEY ORE

by

MINNOVEX TECHNOLOGIES INC.

Final Report

March 7, 1990

Submitted to

COASTECH RESEARCH INC.
Vancouver, B.C.

G.A. Kosick, P.Eng.
President

G.S. Dobby, Ph.D.
Vice-President
Technical Development

ABSTRACT

A program was undertaken by Minnovex Technologies Inc. to investigate the effectiveness of flotation columns for copper cleaning of Mount Polley Ore. A portable column flotation pilot plant, owned and operated by Minnovex Technologies, was integrated with the main pilot plant at Coastech Research and used to allow investigation of columns configured as circuits. The results of the test program indicate that a column flotation cleaning circuit will produce a minimum copper concentrate grade in the order of 24% to 26% copper at an average recovery of about 62% to 66% Cu (with respect to cleaner circuit feed) from a feed grade ranging from 0.72% to 1.09% Cu.

In terms of gold, the column cleaning circuit produces much better results on the new ore composite in comparison to the first ore composite. The first composite results gave a gold recovery (with respect to cleaner feed) of 72.4% at a concentrate grade of 29.1 g/t Au from an average feed grade of 1.71 g/t. The new ore composite, gave a gold recovery of 77.3% at a concentrate grade of 39.5 g/t from an average feed grade of 1.00 g/t.

To achieve these results, the column circuit would consist of two columns configured in the CC/Scavenger-closed (i.e. the primary column tails would feed the scavenger column and the scavenger column concentrate would report back to the feed of the primary column. The primary column concentrate would be final concentrate.

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EXECUTIVE SUMMARY

Pilot Plant Description

The pilot plant used at Coastech Research to treat the rougher and scavenger concentrates from Mount Polley ore, consists of three column cells 10 cm diameter by 6.0 m high. High capacity, variable speed peristaltic pumps are employed for feed and tailings pumping. The tailings pumps operate via a 4-20 mA signal from the column control system. The pilot plant is controlled by the Minnovex column control system, "ColumnEX".

Program Objectives

The objectives of the column pilot plant test program were as follows:

1. Determine the metallurgical performance that can be attained in copper cleaning through the application of flotation column circuits.
2. Compare cleaning of combined rougher and scavenger concentrates with separate cleaning of these products.
3. Compare cleaning circuit performance of two different ore composites.
4. Do a preliminary investigation of different column circuit configurations.

Program Summary

A total of 21 pilot plant runs were carried out on copper cleaning between February 26 and March 2, 1990, inclusive. Table 1 lists the circuit configuration and feed stream for each pilot plant run. Most of the tests were conducted using the CC/Scavenger-closed configuration, wherein tailings from the first column are fed to the second column, and second column concentrate is recycled to the first column feed. First column concentrate is final product. Wash water was added to the first column only. One run (Test 160) was conducted using a mechanical cell in place of the second column (CM/Scavenger-closed).

Subsequent processing of the second column tailings varied as follows:

a) recycle to primary scavenger conditioner (i.e. closed circuit),

b) open circuit with no further processing, and

c) open circuit with flotation in a Denver #5 mechanical cell, with mechanical cell concentrate recycled to primary scavenger conditioner and rejection of mechanical cell tailings.

Table 1

SUMMARY OF MINNOVEX COLUMN PILOT PLANT TESTS

Date	Test No.	Circuit Studied	Circuit Feed	Column Circuit Tails
Feb 26	146	CC/Scav	Oxide Sc. Conc.	Closed-
Feb 26	147	CC/Scav	Oxide Sc. Conc.	Closed-
Feb 27	148	CC/Scav	Oxide Sc. Conc.	Closed-
Feb 27	149	CC/Scav	Oxide Sc. Conc.	Closed-
Feb 27	150	CC/Scav	Comb. Conc.	Closed-
Feb 28	151	CC/Scav	Comb. Conc.	Closed-
Feb 28	152	CC/Scav	Comb. Conc.	Closed-
Feb 28	153	CC/Scav	Comb. Conc.	Closed-
Feb 28	154	CC/Scav	Comb. Conc.	Closed-
Feb 28	155	CC/Scav	Comb. Conc.	Rejected
Feb 28	156	CC/Scav	Comb. Conc.	Rejected
Mar 1	157	CC/Scav	Comb. Conc.	Rejected**
Mar 1	158	CC/Scav	Comb. Conc.	Rejected**
Mar 1	159	CC/Scav	Comb. Conc.	Rejected**
Mar 1	160	CM/Scav	Comb. Conc.	Rejected
Mar 1	161*	CC/Scav	Comb. Conc.	Rejected**
Mar 2	162*	CC/Scav	Comb. Conc.	Rejected**
Mar 2	163*	CC/Scav	Comb. Conc.	Rejected
Mar 2	164*	CC/Scav	Comb. Conc.	Closed-
Mar 2	165*	CC/Scav	Comb. Conc.	Closed-
Mar 2	166*	CC/Scav	Comb. Conc	Rejected**

* Tests 161 to 166 were conducted on the new feed composite.

** Column circuit tailings were scavenged by one Denver #5 mechanical cell; mechanical cell tailings were rejected as final tails and mechanical cell concentrate was sent to the primary scavenger conditioner.

CONCLUSIONS AND RECOMMENDATIONS

1. The column cleaning circuit produces much better gold results on the new ore composite in comparison to the first ore composite. The first composite results gave a gold recovery (with respect to cleaner feed) of 72.4% at a concentrate grade of 29.1 g/t Au from an average feed grade of 1.71 g/t. The new ore composite, gave a gold recovery of 77.3% at a concentrate grade of 39.5 g/t from an average feed grade of 1.00 g/t. This suggests an ageing problem with the first ore composite.

2. The copper sulphides float more readily than the copper oxides and the gold recovery tends to follow the recovery of the copper sulphides.

3. The results of the test program indicate that a column flotation cleaning circuit will produce a minimum copper concentrate grade in the order of 24% to 26% copper at an average recovery of about 62% to 66% Cu (with respect to cleaner circuit feed) from a feed grade ranging from 0.72% to 1.09% Cu. These results can be considered conservative because a review of the operating data has established the best operating parameters for the circuit configurations that were run, therefore, the average results of future pilot runs should be better.

4. Separate cleaning of oxide and sulphide primary concentrates appears to have metallurgical benefits. If the Mount Polley feasibility is successful, it is recommended that more column work be carried out to clean oxides and sulphides separately using columns.

5. The upgrading in the primary column is excellent considering the low feed grades. If the feasibility is successful, it may be very beneficial to examine a column/mechanical cell roughing circuit. It is also felt that cleaner recoveries can be increased if other column circuit configurations are tried.

6. Overall circuit recoveries should be higher than the cleaner recoveries for both copper and gold if the required retention time is built into the new plant.

Metallurgical Capabilities of The Column Cleaner Circuit

Bulk Cleaning (First Ore Composite - Tests 150 to 160)

Seven tests were used in the following averages. Tests 155,156 and 157 were not used in the following averages because there was too much DF-250 addition to the primary scavenger bank at this timeresulting in lower final concentrate grades than can be expected. Test 151 was omitted due to a large circulating load which produced a lower recovery than can be expected.

Copper

The column cleaning circuit produced an average cleaner recovery of 66% Cu at an average grade of 26.0% Cu from an average feed of 1.09% Cu (all cleaner circuits were two stage with the second stage functioning as a cleaner scavenger). These results can be considered conservative because an analysis of the operating conditions indicate that a 1 to 2% increase in grade could be achieved with no loss in cleaner recovery, now that the best operating conditions have been established.

Gold

The column cleaning circuit produced an average cleaner recovery of 72.4% Au at an average grade of 29.1 g/t from an average feed of 1.71 g/t.

Bulk Cleaning (New Ore Composite - Tests 161 to 166)

Tests 164 and 165 were omitted from the average as it is suspected that the Df-250 addition rate was excessive resulting in lower grades than can be expected.

Copper

The column cleaning circuit produced an average cleaner recovery of 61.5% Cu at an average grade of 24.3% Cu from an average feed of 0.72% Cu (all cleaner circuits were two stage with the second stage functioning as a cleaner scavenger).

The feed grade of the new composite was much lower than the first ore composite. It is expected that the copper metallurgy of the new ore composite would at least equal the metallurgy of the first composite given similar feed grades.

Gold

The column cleaning circuit produced an average cleaner recovery of 77.3% Au at an average grade of 39.5 g/t from an average feed of 1.00 g/t. Clearly, the new ore composite gave much superior performance in comparison with the first ore composite. There may have been an ageing problem in the first composite.

In general, it is safe to say that the overall circuit recoveries for copper and gold in an operating plant will exceed the cleaner circuit recoveries if the correct rougher capacity is installed to accommodate circulating loads, etc.

Comparison of Conventional Cleaning to Column Cleaning

Tests 146 to 149 were carried out using the column circuit for cleaning copper oxide and conventional cells for cleaning copper sulphide. The average recovery of copper sulphides in the conventional cleaner cells was 60.5% (balance by assays only). In comparison, the average recovery of copper sulphides around the column cleaner circuit for tests 150 to 160 was 86.0% (average of the seven representive tests - same ore composite but doing bulk cleaning). This wide difference is a primarily due to a lower retention time in the conventional cleaner circuit.

Separate Cleaning of Oxides and Sulphides Versus Bulk Cleaning

It does appear advantageous to do separate cleaning of oxides from a metallurgical standpoint, although it may not be justified economically. Tests 146, 147 and 149 gave an average copper oxide cleaner recovery of 59% at a grade of 10.9% Cu from an average feed of 0.41% Cu oxide (for comparison purposes, test 148 was omitted from the average due to a low feed grade). In tests 150 to 160 (combined cleaning), the average copper oxide cleaner recovery was 42.1% at a grade of 7.4% Cu from an average feed of 0.50% Cu oxide.

Cleaner Configurations

Table 1 outlines configurations for the various cleaner circuit tests. This information in combination with the test data sheets in the appendix will provide Coastech with the information required to evaluate the effect of open circuit cleaning on overall circuit recoveries. It is likely that greater retention time in the mechanical cell cleaner scavenger (mech. cell conc. is recycled back to conditioner) will enhance the performance of open circuit cleaning.

RESULTS and DISCUSSION

Terminology used in this report is summarized as follows:

TERMINOLOGY

Flowrates are quoted in both L/min and superficial velocity (cm/sec).

Superficial velocity = volume flowrate/column cross-sectional area.

L/min = 4.9 x superficial velocity for the Minnovex pilot plant.

Bias	Flow of water through the froth zone. (Negative bias implies a flow of feed water upward through the froth; positive bias implies a flow of wash water downward through the froth)
Froth density	Bulk density of the froth zone measured by pressure drop.
Collection zone density	Bulk density of the collection zone measured by pressure drop.
Collection zone slurry density	Average of tailings & feed slurry densities.
Gas holdup(%)	100 x [1-(collection zone bulk density) / (collection zone slurry density)]

Nominal retention time = collection zone volume/tailings slurry flowrate.

Liquid retention time = nominal retention time x (1-fractional gas holdup)

An overall summary of the column pilot plant performance is given in Table 2. Details on the individual pilot plant test results are given in the Appendix.

Table 2

AVERAGE METALLURGICAL PERFORMANCES

Test No.	FEED					CONCENTRATE						
	%Cu (Tot)	%Cu (NS)	Au (g/t)	% of Cu as oxide	Rate (L/min)	%Cu (Tot)	Grade %Cu (NS)	Au (g/t)	% Recovery Cu (Tot)	Cu (NS)	Cu (S)	Au
Feed: Cu oxide scavenger conc												
146	0.57	0.40	0.72	70	2.2	13.9	8.9	16.8	52	47		*43
147	0.42	0.31	0.59	74	2.2	18.7	14.5	14.1	43	46		*60
148	0.25	0.17	0.26	68	2.9	15.4	12.7	10.6	24	29		*27
149	0.67	0.52	0.45	78	3.0	10.7	9.2	7.8	76	85		*53
Feed: Combined sulfide plus oxide primary concentrates (first ore composite)												
150	1.31	0.52	2.3	40	2.7	20.0	6.5	22.8	72	59	81	*79
151	0.67	0.39	1.0	58	7.5	26.8	8.0	40.9	42	22	70	*53
152	1.01	0.53	1.6	52	3.6	28.0	8.8	12.7	57	35	81	*71
153	0.9	0.46	1.4	51	3.8	19.8	6.6	30.3	55	36	70	*71
154	1.30	0.62	2.1	48	3.0	27.7	8.8	44.1	67	45	87	*68
155	1.40	0.50	2.7	36	0.9	8.6	2.3	24.5	85	63	97	*89
156	0.79	0.34	1.3	43	1.3	8.8	2.9	15.6	79	61	93	*83
157	0.65	0.31	1.2	48	2.2	8.0	2.5	13.3	64	41	85	*84
158	1.02	0.41	1.9	40	2.4	20.4	5.0	36.6	74	45	93	*87
159	1.01	0.45	0.6	44	2.0	31.8	8.2	7.2	71	41	95	*48
160	1.09	0.48	2.1	44	1.6	34.9	7.8	50.1	68	34	95	*83
Feed: Combined sulfide plus oxide primary concentrates (new ore composite)												
161	0.91	0.31	1.2	34	1.3	26.9	4.9	46.2	67	36	83	*81
162	0.76	0.22	0.9	29	1.5	24.0	1.8	36.1	64	16	84	*76
163	0.56	0.18	0.7	32	1.4	20.1	1.2	NA	56	11	77	NA
164	0.52	0.22	0.5	42	2.5	8.7	1.2	13.2	54	17	81	*71
165	0.53	0.23	0.8	43	2.7	9.5	2.0	15.1	54	27	74	*81
166	0.66	0.23	0.9	35	2.2	26.0	0.9	36.1	54	5	80	*75

* Au recoveries were calculated using the Au assays only. It is felt that this method is more reliable than calculating the Au recoveries using the weight distribution based upon total Cu (the error is high using this method - refer to test data sheets in the appendix). The above table also shows that the Au recoveries follow the Cu sulphide recoveries quite strongly.

The CM/Scav-closed circuit (test 160) suggests that a mechanical cell can perform well as a cleaner scavenger in this application, however, for a new mill it would be beneficial to use a column for the controllability of circulating loads and grade.

APPENDIX

DETAILS OF COLUMN PILOT PLANT TESTWORK ON MOUNT POLLEY ORE

Tests 146 to 166

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-146 (PP1)
Date: February 26, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Copper Oxide Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Recycled To Conditioner

METALLURGICAL BALANCE

Stream	Weight	Grade			Distribution		
	% Distn.	% Cu Total	% Cu Non-Su	Au g/t	% Cu Total	% Cu Non-Sul	% Au
New Feed	100.00	0.57	0.40	0.72	100.0	100.0	100.0
Final Conc	2.13	13.87	8.89	16.79	51.9	47.4	49.8
Final Tail	97.87	0.28	0.21	0.42	48.1	51.4	57.1
Cleaner (Col 3)							
Cleaner Feed	101.34	0.62	0.43	0.77	109.4	108.4	108.1
Cleaner Conc	2.13	13.87	8.89	16.79	51.9	47.4	49.8
Cleaner Tail	99.21	0.33	0.23	0.32	57.4	57.0	44.1
Scavenger (Col 2)							
Scavenger Feed	99.21	0.33	0.23	0.32	57.4	57.0	44.1
Scavenger Conc	1.34	3.98	2.50	4.33	9.4	8.4	8.1
Scavenger Tail	97.87	0.28	0.21	0.42	48.1	51.4	57.1

Continued Next Page ....

T-146 (PP1)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	2.2	6	1.04	140
Cleaner (Col 3)				
Feed	2.3	6	1.04	142
Wash Water	0.4	0	1.00	0
Concentrate	0.05	6	1.04	3.0
Tailings	2.7	5	1.04	139
Scavenger (Col 2)				
Feed	2.7	5	1.04	139
Wash Water	0	0	1.00	0
Concentrate	0.03	6	1.04	1.9
Tailings	2.6	5	1.04	137

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	5.0	6.2
Gas Rate (cm/s)	1.03	1.28
Wash Water (cm/s)	0.08	0.00
Bias (cm/s)	0.07	-0.01
Froth Depth (cm)	45	10
Tailing Flow (cm/s)	0.55	0.54
Froth Density	0.08	-
Collection Zone Bulk Density	0.95	0.97
Collection Zone Slurry Density	1.04	1.04
Gas Holdup (%)	9	6
Nominal Retention Time (min)	16	17
Liquid Retention Time (min)	14	16

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-147 (PP2)
Date: February 26, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Copper Oxide Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Recycled To Conditioner

METALLURGICAL BALANCE

Stream	Weight	Grade			Distribution		
	% Distn.	% Cu Total	% Cu Non-Su	Au g/t	% Cu Total	% Cu Non-Sul	% Au
New Feed	100.00	0.42	0.31	0.59	100.0	100.0	100.0
Final Conc	0.98	18.70	14.54	14.13	43.4	45.7	23.4
Final Tail	99.02	0.24	0.17	0.24	56.6	54.3	40.3
Cleaner (Col 3)							
Cleaner Feed	100.00	0.42	0.31	0.59	100.0	100.0	100.0
Cleaner Conc	0.98	18.70	14.54	14.13	43.4	45.7	23.4
Cleaner Tail	99.02	0.24	0.18	0.46	56.6	57.5	77.2
Scavenger (Col 2)							
Scavenger Feed	99.02	0.24	0.18	0.46	56.6	57.5	77.2
Scavenger Conc	0.00	5.55	3.90	5.06	0.0	0.0	0.0
Scavenger Tail	99.02	0.24	0.17	0.24	56.6	54.3	40.3

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T-147 (PP2)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	2.2	6	1.04	140
Cleaner (Col 3)				
Feed	2.2	6	1.04	140
Wash Water	0.4	0	1.00	0
Concentrate	0.02	6	1.04	1.4
Tailings	2.7	5	1.04	138
Scavenger (Col 2)				
Feed	2.7	5	1.04	138
Wash Water	0	0	1.00	0
Concentrate	0.00	6	1.04	0.0
Tailings	2.7	5	1.04	138

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	4.0	6.2
Gas Rate (cm/s)	0.82	1.28
Wash Water (cm/s)	0.08	0.00
Bias (cm/s)	0.08	0.00
Froth Depth (cm)	37	10
Tailing Flow (cm/s)	0.55	0.55
Froth Density	0.14	-
Collection Zone Bulk Density	0.97	0.96
Collection Zone Slurry Density	1.04	1.04
Gas Holdup (%)	7	7
Nominal Retention Time (min)	16	17
Liquid Retention Time (min)	15	15

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-148 (PP3)
Date: February 27, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Copper Oxide Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Recycled To Conditioner

METALLURGICAL BALANCE

Stream	Weight	Grade			Distribution		
	% Distn.	% Cu Total	% Cu Non-Su	Au g/t	% Cu Total	% Cu Non-Sul	% Au
New Feed	100.00	0.25	0.17	0.26	100.0	100.0	100.0
Final Conc	0.39	15.42	12.70	10.61	24.3	29.4	16.1
Final Tail	99.61	0.19	0.14	0.19	75.7	82.0	71.6
Cleaner (Col 3)							
Cleaner Feed	100.99	0.40	0.29	0.36	161.1	174.0	140.4
Cleaner Conc	0.39	15.42	12.70	10.61	24.3	29.4	16.1
Cleaner Tail	100.60	0.34	0.24	0.33	136.8	142.0	127.7
Scavenger (Col 2)							
Scavenger Feed	100.60	0.34	0.24	0.33	136.8	142.0	127.7
Scavenger Conc	0.99	15.42	12.70	10.61	61.1	74.0	40.4
Scavenger Tail	99.61	0.19	0.14	0.19	75.7	82.0	71.6

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T-148 (PP3)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	2.9	12	1.09	378
Cleaner (Col 3)				
Feed	2.9	12	1.09	382
Wash Water	0.4	0	1.00	0
Concentrate	0.01	12	1.09	1.5
Tailings	3.3	11	1.08	380
Scavenger (Col 2)				
Feed	3.3	11	1.08	380
Wash Water	0	0	1.00	0
Concentrate	0.03	12	1.09	3.7
Tailings	3.3	11	1.08	377

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	5.0	6.4
Gas Rate (cm/s)	1.03	1.32
Wash Water (cm/s)	0.08	0.00
Bias (cm/s)	0.08	-0.01
Froth Depth (cm)	20	10
Tailing Flow (cm/s)	0.69	0.68
Froth Density	-	-
Collection Zone Bulk Density	0.99	0.98
Collection Zone Slurry Density	1.09	1.08
Gas Holdup (%)	9	9
Nominal Retention Time (min)	13	13
Liquid Retention Time (min)	12	12

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-149 (PP4)
Date: February 27, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Copper Oxide Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Recycled To Conditioner

METALLURGICAL BALANCE

Stream	Weight % Distn.	Grade % Cu Total	Grade % Cu Non-Su	Grade Au g/t	Distribution % Cu Total	Distribution % Cu Non-Sul	Distribution % Au
New Feed	100.00	0.67	0.52	0.45	100.0	100.0	100.0
Final Conc	4.76	10.68	9.24	7.75	75.8	84.5	82.5
Final Tail	95.24	0.17	0.12	0.22	24.2	22.0	46.9
Cleaner (Col 3)							
Cleaner Feed	102.70	0.77	0.59	0.52	118.2	115.7	119.8
Cleaner Conc	4.76	10.68	9.24	7.75	75.8	84.5	82.5
Cleaner Tail	97.94	0.29	0.21	0.22	42.4	39.6	48.2
Scavenger (Col 2)							
Scavenger Feed	97.94	0.29	0.21	0.22	42.4	39.6	48.2
Scavenger Conc	2.70	4.52	3.03	3.27	18.2	15.7	19.8
Scavenger Tail	95.24	0.17	0.12	0.22	24.2	22.0	46.9

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T-149 (PP4)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	3.0	5	1.04	156
Cleaner (Col 3)				
Feed	3.1	5	1.04	160
Wash Water	0.4	0	1.00	0
Concentrate	0.14	5	1.04	7.4
Tailings	3.3	5	1.03	152
Scavenger (Col 2)				
Feed	3.3	5	1.03	152
Wash Water	0	0	1.00	0
Concentrate	0.08	5	1.04	4.2
Tailings	3.2	5	1.03	148

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	5.0	6.4
Gas Rate (cm/s)	1.03	1.32
Wash Water (cm/s)	0.07	0.00
Bias (cm/s)	0.05	-0.02
Froth Depth (cm)	20	10
Tailing Flow (cm/s)	0.67	0.66
Froth Density	-	-
Collection Zone Bulk Density	0.95	0.94
Collection Zone Slurry Density	1.04	1.03
Gas Holdup (%)	8	9
Nominal Retention Time (min)	13	14
Liquid Retention Time (min)	12	13

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-150 (PP5)
Date: February 27, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Recycled To Conditioner

METALLURGICAL BALANCE

Stream	Weight	Grade			Distribution		
	% Distn.	% Cu Total	% Cu Non-Su	Au g/t	% Cu Total	% Cu Non-Sul	% Au
New Feed	100.00	1.31	0.52	2.29	100.0	100.0	100.0
Final Conc	4.68	20.05	6.54	22.79	71.6	58.9	46.6
Final Tail	95.32	0.39	0.26	0.52	28.4	47.7	21.7
Cleaner (Col 3)							
Cleaner Feed	100.33	1.32	0.52	2.30	100.8	101.0	100.9
Cleaner Conc	4.68	20.05	6.54	22.79	71.6	58.9	46.6
Cleaner Tail	95.65	0.40	0.27	0.61	29.2	49.7	25.4
Scavenger (Col 2)							
Scavenger Feed	95.65	0.40	0.27	0.61	29.2	49.7	25.4
Scavenger Conc	0.33	3.25	1.51	6.31	0.8	1.0	0.9
Scavenger Tail	95.32	0.39	0.26	0.52	28.4	47.7	21.7

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T-150 (PP5)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	2.7	3	1.02	83
Cleaner (Col 3)				
Feed	2.7	3	1.02	83
Wash Water	0.4	0	1.00	0
Concentrate	0.13	3	1.02	3.9
Tailings	3.0	3	1.02	79
Scavenger (Col 2)				
Feed	3.0	3	1.02	79
Wash Water	0	0	1.00	0
Concentrate	0.01	3	1.02	0.3
Tailings	3.0	3	1.02	79

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	7.8	6.9
Gas Rate (cm/s)	1.60	1.42
Wash Water (cm/s)	0.08	0.00
Bias (cm/s)	0.06	-0.00
Froth Depth (cm)	37	10
Tailing Flow (cm/s)	0.61	0.61
Froth Density	0.26	-
Collection Zone Bulk Density	0.90	0.93
Collection Zone Slurry Density	1.02	1.02
Gas Holdup (%)	12	9
Nominal Retention Time (min)	14	15
Liquid Retention Time (min)	13	14

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-151 (PP6)
Date: February 28, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Recycled To Conditioner

METALLURGICAL BALANCE

Stream	Weight	Grade			Distribution		
	% Distn.	% Cu Total	% Cu Non-Su	Au g/t	% Cu Total	% Cu Non-Sul	% Au
New Feed	100.00	0.67	0.39	1.03	100.0	100.0	100.0
Final Conc	1.06	26.81	8.03	40.86	42.4	21.8	42.2
Final Tail	98.94	0.39	0.27	0.49	57.6	68.5	46.9
Cleaner (Col 3)							
Cleaner Feed	100.36	0.72	0.42	1.11	107.6	106.9	108.2
Cleaner Conc	1.06	26.81	8.03	40.86	42.4	21.8	42.2
Cleaner Tail	99.30	0.44	0.31	0.59	65.2	78.9	57.3
Scavenger (Col 2)							
Scavenger Feed	99.30	0.44	0.31	0.59	65.2	78.9	57.3
Scavenger Conc	0.36	14.32	7.52	23.69	7.6	6.9	8.2
Scavenger Tail	98.94	0.39	0.27	0.49	57.6	68.5	46.9

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T-151 (PP6)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	7.5	5	1.04	389
Cleaner (Col 3)				
Feed	7.6	5	1.04	390
Wash Water	0.4	0	1.00	0
Concentrate	0.09	5	1.03	4.1
Tailings	7.9	5	1.03	386
Scavenger (Col 2)				
Feed	7.9	5	1.03	386
Wash Water	0	0	1.00	0
Concentrate	0.03	5	1.04	1.4
Tailings	7.9	5	1.03	385

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	4.0	6.5
Gas Rate (cm/s)	0.82	1.34
Wash Water (cm/s)	0.08	0.00
Bias (cm/s)	0.06	-0.01
Froth Depth (cm)	37	10
Tailing Flow (cm/s)	1.63	1.63
Froth Density	0.26	-
Collection Zone Bulk Density	0.90	0.93
Collection Zone Slurry Density	1.04	1.03
Gas Holdup (%)	13	10
Nominal Retention Time (min)	5	6
Liquid Retention Time (min)	5	5

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-152 (PP7)
Date: February 28, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Recycled To Conditioner

METALLURGICAL BALANCE

Stream	Weight % Distn.	Grade % Cu Total	Grade % Cu Non-Su	Grade Au g/t	Distribution % Cu Total	Distribution % Cu Non-Sul	Distribution % Au
New Feed	100.00	1.01	0.53	1.55	100.0	100.0	100.0
Final Conc	2.07	27.95	8.82	12.65	57.3	34.5	16.9
Final Tail	97.93	0.44	0.33	0.49	42.7	61.0	31.1
Cleaner (Col 3)							
Cleaner Feed	100.43	1.05	0.55	1.60	104.1	104.6	103.9
Cleaner Conc	2.07	27.95	8.82	12.65	57.3	34.5	16.9
Cleaner Tail	98.36	0.48	0.36	0.73	46.7	66.8	46.3
Scavenger (Col 2)							
Scavenger Feed	98.36	0.48	0.36	0.73	46.7	66.8	46.3
Scavenger Conc	0.43	9.61	5.70	14.14	4.1	4.6	3.9
Scavenger Tail	97.93	0.44	0.33	0.49	42.7	61.0	31.1

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T-152 (PP7)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	3.6	5	1.04	189
Cleaner (Col 3)				
Feed	3.7	5	1.04	190
Wash Water	0.4	0	1.00	0
Concentrate	0.08	5	1.03	3.9
Tailings	4.0	5	1.03	186
Scavenger (Col 2)				
Feed	4.0	5	1.03	186
Wash Water	0	0	1.00	0
Concentrate	0.02	5	1.04	0.8
Tailings	4.0	5	1.03	185

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	7.0	7.8
Gas Rate (cm/s)	1.44	1.60
Wash Water (cm/s)	0.08	0.00
Bias (cm/s)	0.07	-0.00
Froth Depth (cm)	37	10
Tailing Flow (cm/s)	0.82	0.82
Froth Density	0.26	-
Collection Zone Bulk Density	0.90	0.93
Collection Zone Slurry Density	1.04	1.03
Gas Holdup (%)	13	10
Nominal Retention Time (min)	11	11
Liquid Retention Time (min)	9	10

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-153 (PP8)
Date: February 28, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Recycled To Conditioner

METALLURGICAL BALANCE

Stream	Weight	Grade			Distribution		
	% Distn.	% Cu Total	% Cu Non-Su	Au g/t	% Cu Total	% Cu Non-Sul	% Au
New Feed	100.00	0.90	0.46	1.37	100.0	100.0	100.0
Final Conc	2.48	19.80	6.60	30.26	54.5	35.5	54.7
Final Tail	97.52	0.42	0.14	0.40	45.5	29.7	28.5
Cleaner (Col 3)							
Cleaner Feed	100.38	0.94	0.48	1.43	104.5	105.0	104.7
Cleaner Conc	2.48	19.80	6.60	30.26	54.5	35.5	54.7
Cleaner Tail	97.90	0.46	0.15	0.43	50.0	31.9	30.7
Scavenger (Col 2)							
Scavenger Feed	97.90	0.46	0.15	0.43	50.0	31.9	30.7
Scavenger Conc	0.38	10.81	6.13	17.07	4.5	5.0	4.7
Scavenger Tail	97.52	0.42	0.14	0.40	45.5	29.7	28.5

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T-153 (PP8)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	3.8	6	1.04	238
Cleaner (Col 3)				
Feed	3.8	6	1.04	239
Wash Water	0.4	0	1.00	0
Concentrate	0.09	6	1.04	5.9
Tailings	4.1	6	1.04	233
Scavenger (Col 2)				
Feed	4.1	6	1.04	233
Wash Water	0	0	1.00	0
Concentrate	0.01	6	1.04	0.9
Tailings	4.1	5	1.04	232

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	7.0	7.8
Gas Rate (cm/s)	1.44	1.60
Wash Water (cm/s)	0.08	0.00
Bias (cm/s)	0.06	-0.00
Froth Depth (cm)	35	10
Tailing Flow (cm/s)	0.84	0.85
Froth Density	0.26	-
Collection Zone Bulk Density	0.93	0.95
Collection Zone Slurry Density	1.04	1.04
Gas Holdup (%)	11	9
Nominal Retention Time (min)	10	11
Liquid Retention Time (min)	9	10

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-154 (PP9)
Date: February 28, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Recycled To Conditioner

METALLURGICAL BALANCE

Stream	Weight	Grade			Distribution		
	% Distn.	% Cu Total	% Cu Non-Su	Au g/t	% Cu Total	% Cu Non-Sul	% Au
New Feed	100.00	1.30	0.62	2.13	100.0	100.0	100.0
Final Conc	3.16	27.69	8.80	44.09	67.2	44.8	65.3
Final Tail	96.84	0.44	0.31	0.70	32.8	48.4	31.8
Cleaner (Col 3)							
Cleaner Feed	100.60	1.35	0.65	2.20	104.7	106.3	103.9
Cleaner Conc	3.16	27.69	8.80	44.09	67.2	44.8	65.3
Cleaner Tail	97.44	0.50	0.33	0.95	37.5	51.9	43.5
Scavenger (Col 2)							
Scavenger Feed	97.44	0.50	0.33	0.95	37.5	51.9	43.5
Scavenger Conc	0.60	10.18	6.46	13.80	4.7	6.3	3.9
Scavenger Tail	96.84	0.44	0.31	0.70	32.8	48.4	31.8

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T-154 (PP9)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	3.0	5	1.04	156
Cleaner (Col 3)				
Feed	3.0	5	1.04	156
Wash Water	0.4	0	1.00	0
Concentrate	0.09	5	1.04	4.9
Tailings	3.3	5	1.03	152
Scavenger (Col 2)				
Feed	3.3	5	1.03	152
Wash Water	0	0	1.00	0
Concentrate	0.02	5	1.04	0.9
Tailings	3.3	4	1.03	151

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	7.0	7.8
Gas Rate (cm/s)	1.44	1.60
Wash Water (cm/s)	0.08	0.00
Bias (cm/s)	0.06	-0.00
Froth Depth (cm)	35	10
Tailing Flow (cm/s)	0.67	0.68
Froth Density	0.25	-
Collection Zone Bulk Density	0.93	0.92
Collection Zone Slurry Density	1.04	1.03
Gas Holdup (%)	10	11
Nominal Retention Time (min)	13	13
Liquid Retention Time (min)	12	12

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-155 (PP10)
Date: February 28, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Rejected

METALLURGICAL BALANCE

Stream	Weight % Distn.	Grade % Cu Total	Grade % Cu Non-Su	Grade Au g/t	Distribution % Cu Total	Distribution % Cu Non-Sul	Distribution % Au
New Feed	100.00	1.40	0.50	2.68	100.0	100.0	100.0
Final Conc	13.84	8.56	2.29	24.45	84.6	63.4	126.3
Final Tail	86.16	0.25	0.16	0.34	15.4	27.6	10.9
Cleaner (Col 3)							
Cleaner Feed	127.41	1.28	0.50	2.36	116.3	128.0	112.1
Cleaner Conc	13.84	8.56	2.29	24.45	84.6	63.4	126.3
Cleaner Tail	113.58	0.39	0.27	0.49	31.6	61.3	20.6
Scavenger (Col 2)							
Scavenger Feed	113.58	0.39	0.27	0.49	31.6	61.3	20.6
Scavenger Conc	27.41	0.83	0.51	1.18	16.3	28.0	12.1
Scavenger Tail	86.16	0.25	0.16	0.34	15.4	44.8	10.9

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T-155 (PP10)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	0.9	7	1.05	66
Cleaner (Col 3)				
Feed	1.1	7	1.05	84
Wash Water	0.4	0	1.00	0
Concentrate	0.12	7	1.05	9.1
Tailings	1.3	6	1.04	74
Scavenger (Col 2)				
Feed	1.3	6	1.04	74
Wash Water	0	0	1.00	0
Concentrate	0.24	7	1.05	18.0
Tailings	1.0	6	1.04	57

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	6.8	7.3
Gas Rate (cm/s)	1.40	1.50
Wash Water (cm/s)	0.08	0.00
Bias (cm/s)	0.06	-0.05
Froth Depth (cm)	35	15
Tailing Flow (cm/s)	0.27	0.20
Froth Density	0.26	-
Collection Zone Bulk Density	0.93	0.95
Collection Zone Slurry Density	1.05	1.04
Gas Holdup (%)	11	9
Nominal Retention Time (min)	33	45
Liquid Retention Time (min)	29	41

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-156 (PP11)
Date: February 28, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Rejected

METALLURGICAL BALANCE

Stream	Weight	Grade			Distribution		
	% Distn.	% Cu Total	% Cu Non-Su	Au g/t	% Cu Total	% Cu Non-Sul	% Au
New Feed	100.00	0.79	0.34	1.29	100.0	100.0	100.0
Final Conc	7.08	8.79	2.93	15.60	78.8	61.1	85.7
Final Tail	92.92	0.18	0.14	0.24	21.2	38.3	17.3
Cleaner (Col 3)							
Cleaner Feed	144.60	0.72	0.35	1.10	131.1	147.2	123.5
Cleaner Conc	7.08	8.79	2.93	15.60	78.8	61.1	85.7
Cleaner Tail	137.51	0.30	0.22	0.28	52.2	89.0	29.3
Scavenger (Col 2)							
Scavenger Feed	137.51	0.30	0.22	0.28	52.2	89.0	29.3
Scavenger Conc	44.60	0.55	0.36	0.68	31.1	47.2	23.5
Scavenger Tail	92.92	0.18	0.14	0.24	21.2	38.3	17.3

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T-156 (PP11)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	1.3	18	1.15	264
Cleaner (Col 3)				
Feed	1.9	18	1.15	382
Wash Water	0.4	0	1.00	0
Concentrate	0.08	20	1.17	18.7
Tailings	2.2	15	1.12	364
Scavenger (Col 2)				
Feed	2.2	15	1.12	364
Wash Water	0	0	1.00	0
Concentrate	0.51	20	1.17	117.9
Tailings	1.7	13	1.10	246

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	5.0	7.3
Gas Rate (cm/s)	1.03	1.50
Wash Water (cm/s)	0.08	0.00
Bias (cm/s)	0.07	-0.10
Froth Depth (cm)	45	10
Tailing Flow (cm/s)	0.45	0.35
Froth Density	0.22	-
Collection Zone Bulk Density	0.97	0.95
Collection Zone Slurry Density	1.13	1.11
Gas Holdup (%)	14	15
Nominal Retention Time (min)	19	26
Liquid Retention Time (min)	16	22

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-157 (PP12)
Date: March 1, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Rejected After Mech. Scav.

METALLURGICAL BALANCE

Stream	Weight	Grade			Distribution		
	% Distn.	% Cu Total	% Cu Non-Su	Au g/t	% Cu Total	% Cu Non-Sul	% Au
New Feed	100.00	0.65	0.31	1.19	100.0	100.0	100.0
Final Conc	5.16	8.00	2.46	13.31	63.5	41.0	57.7
Final Tail	94.84	0.25	0.18	0.21	36.5	55.1	16.3
Cleaner (Col 3)							
Cleaner Feed	100.00	0.65	0.31	1.19	100.0	100.0	100.0
Cleaner Conc	5.16	8.00	2.46	13.31	63.5	41.0	57.7
Cleaner Tail	94.84	0.25	0.17	0.23	36.5	52.0	17.9
Scavenger (Col 2)							
Scavenger Feed	94.84	0.25	0.17	0.23	36.5	52.0	17.9
Scavenger Conc	0.00	0.63	0.43	0.64	0.0	0.0	0.0
Scavenger Tail	94.84	0.25	0.18	0.21	36.5	55.1	16.3
Mech. Cleaner Scav. (Ind. Performance)							
Scavenger Feed	94.84	0.25	0.18	0.21	100.0	100.0	100.0
Scavenger Conc.	28.45	0.46	0.32	0.41	55.2	53.3	60.0
Scavenger Tail	66.39	0.16	0.12	0.13	44.8	46.7	40.0

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T-157 (PP12)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	2.2	14	1.11	342
Cleaner (Col 3)				
Feed	2.2	14	1.11	342
Wash Water	0.4	0	1.00	0
Concentrate	0.1	14	1.11	18
Tailings	2.5	12	1.09	325
Scavenger (Col 2)				
Feed	2.5	12	1.09	325
Wash Water	0	0	1.00	0
Concentrate	0.00	12	1.09	0.0
Tailings	2.5	12	1.09	325

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	5.0	7.3
Gas Rate (cm/s)	1.03	1.50
Wash Water (cm/s)	0.08	0.00
Bias (cm/s)	0.06	0.00
Froth Depth (cm)	65	25
Tailing Flow (cm/s)	0.51	0.51
Froth Density	0.22	-
Collection Zone Bulk Density	1.01	0.99
Collection Zone Slurry Density	1.10	1.09
Gas Holdup (%)	8	9
Nominal Retention Time (min)	16	18
Liquid Retention Time (min)	15	16

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-158 (PP13)
Date: March 1, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Rejected After Mech. Scav.

METALLURGICAL BALANCE

Stream	Weight	Grade			Distribution		
	% Distn.	% Cu Total	% Cu Non-Su	Au g/t	% Cu Total	% Cu Non-Sul	% Au
New Feed	100.00	1.02	0.41	1.91	100.0	100.0	100.0
Final Conc	3.69	20.35	5.01	36.60	73.6	45.1	70.7
Final Tail	96.31	0.28	0.22	0.27	26.4	51.7	13.6
Cleaner (Col 3)							
Cleaner Feed	104.10	1.16	0.49	2.07	118.8	125.4	113.1
Cleaner Conc	3.69	20.35	5.01	36.60	73.6	45.1	70.7
Cleaner Tail	100.41	0.46	0.30	1.70	45.3	73.5	89.4
Scavenger (Col 2)							
Scavenger Feed	100.41	0.46	0.30	1.70	45.3	73.5	89.4
Scavenger Conc	4.10	4.69	2.54	6.09	18.8	25.4	13.1
Scavenger Tail	96.31	0.28	0.22	0.27	26.4	51.7	13.6
Mech. Cleaner Scav. (Ind. Performance)							
Scavenger Feed	96.31	0.28	0.22	0.27	100.0	100.0	100.0
Scavenger Conc.	4.76	1.05	0.71	0.91	18.5	15.9	16.6
Scavenger Tail	91.56	0.24	0.17	0.26	81.5	84.1	83.4

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T-158 (PP13)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	2.4	10	1.08	255
Cleaner (Col 3)				
Feed	2.5	10	1.08	266
Wash Water	0.4	0	1.00	0
Concentrate	0.1	14	1.11	9
Tailings	2.8	9	1.06	256
Scavenger (Col 2)				
Feed	2.8	9	1.06	256
Wash Water	0	0	1.00	0
Concentrate	0.08	12	1.09	10.5
Tailings	2.7	9	1.06	246

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	4.0	6.8
Gas Rate (cm/s)	0.82	1.40
Wash Water (cm/s)	0.08	0.00
Bias (cm/s)	0.07	-0.02
Froth Depth (cm)	50	10
Tailing Flow (cm/s)	0.58	0.56
Froth Density	0.19	-
Collection Zone Bulk Density	0.98	0.95
Collection Zone Slurry Density	1.07	1.06
Gas Holdup (%)	8	11
Nominal Retention Time (min)	15	16
Liquid Retention Time (min)	13	15

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-159 (PP14)
Date: March 1, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Rejected After Mech. Scav.

METALLURGICAL BALANCE

Stream	Weight	Grade			Distribution		
	% Distn.	% Cu Total	% Cu Non-Su	Au g/t	% Cu Total	% Cu Non-Sul	% Au
New Feed	100.00	1.01	0.45	0.59	100.0	100.0	100.0
Final Conc	2.25	31.80	8.24	7.20	71.0	41.3	27.5
Final Tail	97.75	0.30	0.21	0.32	29.0	45.6	53.0
Cleaner (Col 3)							
Cleaner Feed	102.21	1.15	0.53	0.84	116.5	121.4	144.7
Cleaner Conc	2.25	31.80	8.24	7.20	71.0	41.3	27.5
Cleaner Tail	99.96	0.46	0.28	0.70	45.5	62.2	118.6
Scavenger (Col 2)							
Scavenger Feed	99.96	0.46	0.28	0.70	45.5	62.2	118.6
Scavenger Conc	2.21	7.53	4.36	11.92	16.5	21.4	44.7
Scavenger Tail	97.75	0.30	0.21	0.32	29.0	45.6	53.0
Mech. Cleaner Scav. (Ind. Performance)							
Scavenger Feed	97.75	0.30	0.21	0.32	100.0	100.0	100.0
Scavenger Conc.	13.58	0.92	0.62	1.05	42.6	41.0	45.6
Scavenger Tail	84.17	0.20	0.13	0.29	57.4	59.0	54.4

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T-159 (PP14)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	2.0	10	1.08	213
Cleaner (Col 3)				
Feed	2.0	10	1.08	218
Wash Water	0.6	0	1.00	0
Concentrate	0.0	14	1.11	5
Tailings	2.6	8	1.06	213
Scavenger (Col 2)				
Feed	2.6	8	1.06	213
Wash Water	0	0	1.00	0
Concentrate	0.04	12	1.09	4.7
Tailings	2.5	8	1.06	208

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	4.0	6.8
Gas Rate (cm/s)	0.82	1.40
Wash Water (cm/s)	0.12	0.00
Bias (cm/s)	0.11	-0.01
Froth Depth (cm)	50	10
Tailing Flow (cm/s)	0.53	0.51
Froth Density	-	-
Collection Zone Bulk Density	0.95	0.93
Collection Zone Slurry Density	1.07	1.06
Gas Holdup (%)	11	12
Nominal Retention Time (min)	16	18
Liquid Retention Time (min)	14	16

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-160 (PP15)
Date: March 1, 1990
Equipment Used: Column 3 + (1) Denver #5 Mech. Cell
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate
Flowsheet: CM/SCAV-closed -- Cleaner Tail Rejected

METALLURGICAL BALANCE

Stream	Weight % Distn.	Grade % Cu Total	Grade % Cu Non-Su	Grade Au g/t	Distribution % Cu Total	Distribution % Cu Non-Sul	Distribution % Au
New Feed	100.00	1.09	0.48	2.10	100.0	100.0	100.0
Final Conc	2.11	34.94	7.76	50.10	67.7	34.1	50.4
Final Tail	97.89	0.36	0.26	0.36	32.3	53.0	16.8
Cleaner (Col 3)							
Cleaner Feed	174.66	1.22	0.64	2.03	195.9	232.2	169.0
Cleaner Conc	2.11	34.94	7.76	50.10	67.7	34.1	50.4
Cleaner Tail	172.55	0.81	0.22	0.28	128.2	79.1	22.6
Scav. - Mech Cell							
Scavenger Feed	172.55	0.81	0.22	0.28	128.2	79.1	22.6
Scavenger Conc	74.66	1.40	0.85	1.94	95.9	132.2	69.0
Scavenger Tail	97.89	0.36	0.26	0.36	32.3	53.0	16.8

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T-160 (PP15)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	1.6	14	1.11	249
Cleaner (Col 3)				
Feed	2.8	14	1.11	435
Wash Water	0.4	0	1.00	0
Concentrate	0.02	20	1.17	5.3
Tailings	3.2	12	1.10	429
Mech. Cell Scav.				
Feed	3.2	12	1.10	429
Wash Water	0	0	1.00	0
Concentrate	0.80	20	1.17	185.8
Tailings	3.1	8	1.06	244

OPERATING CONDITIONS

	Column 3 (Cleaner)
Gas Rate (L/min)	4.0
Gas Rate (cm/s)	0.82
Wash Water (cm/s)	0.08
Bias (cm/s)	0.08
Froth Depth (cm)	50
Tailing Flow (cm/s)	0.66
Froth Density	0.11
Collection Zone Bulk Density	0.95
Collection Zone Slurry Density	1.10
Gas Holdup (%)	14
Nominal Retention Time (min)	13
Liquid Retention Time (min)	11

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-161 (PP16)
Date: March 1, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate (New Ore Composite)
Flowsheet: CC/SCAV-closed -- Cleaner Tail Rejected After Mech. Scav.

METALLURGICAL BALANCE

Stream	Weight	Grade			Distribution		
	% Distn.	% Cu Total	% Cu Non-Sul	Au g/t	% Cu Total	% Cu Non-Sul	% Au
New Feed	100.00	0.91	0.31	1.21	100.0	100.0	100.0
Final Conc	2.26	26.85	4.91	46.17	66.7	35.8	86.5
Final Tail	97.74	0.31	0.19	0.23	33.3	59.9	18.6
Cleaner (Col 3)							
Cleaner Feed	101.79	1.01	0.36	1.38	112.6	118.0	116.5
Cleaner Conc	2.26	26.85	4.91	46.17	66.7	35.8	86.5
Cleaner Tail	99.53	0.42	0.29	0.33	45.9	93.1	27.5
Scavenger (Col 2)							
Scavenger Feed	99.53	0.42	0.29	0.33	45.9	93.1	27.5
Scavenger Conc	1.79	6.41	3.11	11.09	12.6	18.0	16.5
Scavenger Tail	97.74	0.31	0.19	0.23	33.3	59.9	18.6
Mech. Cleaner Scav. (Ind. Performance)							
Scavenger Feed	97.74	0.31	0.19	0.23	100.0	100.0	100.0
Scavenger Conc.	18.80	0.73	0.47	0.72	45.3	47.6	60.2
Scavenger Tail	78.94	0.21	0.14	0.21	54.7	52.4	39.8

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T-161 (PP16)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	1.3	13	1.09	177
Cleaner (Col 3)				
Feed	1.3	13	1.09	181
Wash Water	0.4	0	1.00	0
Concentrate	0.0	15	1.11	4
Tailings	1.7	10	1.07	176
Scavenger (Col 2)				
Feed	1.7	10	1.07	176
Wash Water	0	0	1.00	0
Concentrate	0.02	12	1.08	3.2
Tailings	1.7	10	1.07	173

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	5.0	7.3
Gas Rate (cm/s)	1.03	1.50
Wash Water (cm/s)	0.08	0.00
Bias (cm/s)	0.08	-0.00
Froth Depth (cm)	50	15
Tailing Flow (cm/s)	0.34	0.34
Froth Density	0.09	-
Collection Zone Bulk Density	0.97	0.96
Collection Zone Slurry Density	1.08	1.07
Gas Holdup (%)	10	10
Nominal Retention Time (min)	25	26
Liquid Retention Time (min)	22	24

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-162 (PP17)
Date: March 2, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate (New Ore Composite)
Flowsheet: CC/SCAV-closed -- Cleaner Tail Rejected After Mech. Scav.

METALLURGICAL BALANCE

Stream	Weight	Grade			Distribution		
	% Distn.	% Cu Total	% Cu Non-Sul	Au g/t	% Cu Total	% Cu Non-Sul	% Au
New Feed	100.00	0.76	0.22	0.94	100.0	100.0	100.0
Final Conc	2.02	24.03	1.78	36.12	63.9	16.4	77.7
Final Tail	97.98	0.28	0.16	0.23	36.1	71.3	24.0
Cleaner (Col 3)							
Cleaner Feed	101.84	0.84	0.25	1.07	112.5	114.4	116.0
Cleaner Conc	2.02	24.03	1.78	36.12	63.9	16.4	77.7
Cleaner Tail	99.82	0.37	0.21	0.36	48.6	95.3	37.7
Scavenger (Col 2)							
Scavenger Feed	99.82	0.37	0.21	0.36	48.6	95.3	37.7
Scavenger Conc	1.84	5.17	1.72	8.18	12.5	14.4	16.0
Scavenger Tail	97.98	0.28	0.16	0.23	36.1	71.3	24.0
Mech. Cleaner Scav. (Ind. Performance)							
Scavenger Feed	97.98	0.28	0.16	0.23	100.0	100.0	100.0
Scavenger Conc.	7.54	0.76	0.39	0.97	20.9	18.8	32.4
Scavenger Tail	90.44	0.24	0.14	0.18	79.1	81.2	67.6

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T-162 (PP17)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	1.5	13	1.09	213
Cleaner (Col 3)				
Feed	1.5	13	1.09	217
Wash Water	0.2	0	1.00	0
Concentrate	0.0	15	1.11	4
Tailings	1.7	11	1.08	212
Scavenger (Col 2)				
Feed	1.7	11	1.08	212
Wash Water	0	0	1.00	0
Concentrate	0.03	12	1.08	3.9
Tailings	1.7	11	1.08	208

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	5.0	7.3
Gas Rate (cm/s)	1.03	1.50
Wash Water (cm/s)	0.05	0.00
Bias (cm/s)	0.04	-0.01
Froth Depth (cm)	40	15
Tailing Flow (cm/s)	0.36	0.35
Froth Density	0.10	-
Collection Zone Bulk Density	0.98	0.98
Collection Zone Slurry Density	1.08	1.08
Gas Holdup (%)	10	9
Nominal Retention Time (min)	24	26
Liquid Retention Time (min)	22	23

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-163 (PP18)
Date: March 2, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Rejected

METALLURGICAL BALANCE

Stream	Weight	Grade			Distribution		
	% Distn.	% Cu Total	% Cu Non-Su	Au g/t	% Cu Total	% Cu Non-Sul	% Au
New Feed	100.00	0.56	0.18	0.70	100.0	100.0	100.0
Final Conc	1.56	20.09	1.22	0.00	56.1	10.6	0.0
Final Tail	98.44	0.25	0.14	0.22	43.9	76.6	30.9
Cleaner (Col 3)							
Cleaner Feed	103.83	0.78	0.34	0.72	145.5	195.9	106.6
Cleaner Conc	1.56	20.09	1.22	0.00	56.1	10.6	0.0
Cleaner Tail	102.27	0.49	0.31	0.18	89.5	176.1	26.3
Scavenger (Col 2)							
Scavenger Feed	102.27	0.49	0.31	0.18	89.5	176.1	26.3
Scavenger Conc	3.83	6.66	4.51	1.21	45.5	95.9	6.6
Scavenger Tail	98.44	0.25	0.14	0.22	43.9	76.6	30.9

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T-163 (PP18)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	1.4	14	1.11	210
Cleaner (Col 3)				
Feed	1.4	14	1.11	218
Wash Water	0.2	0	1.00	0
Concentrate	0.02	16	1.13	3.3
Tailings	1.6	12	1.09	215
Scavenger (Col 2)				
Feed	1.6	12	1.09	215
Wash Water	0	0	1.00	0
Concentrate	0.04	16	1.13	8.0
Tailings	1.6	12	1.09	207

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	5.0	7.3
Gas Rate (cm/s)	1.03	1.50
Wash Water (cm/s)	0.05	0.00
Bias (cm/s)	0.04	-0.01
Froth Depth (cm)	40	15
Tailing Flow (cm/s)	0.34	0.32
Froth Density	0.12	-
Collection Zone Bulk Density	1.01	0.99
Collection Zone Slurry Density	1.10	1.09
Gas Holdup (%)	8	9
Nominal Retention Time (min)	26	28
Liquid Retention Time (min)	24	25

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-164 (PP19)
Date: March 2, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Recycled To Conditioner

METALLURGICAL BALANCE

Stream	Weight	Grade			Distribution		
	% Distn.	% Cu Total	% Cu Non-Su	Au g/t	% Cu Total	% Cu Non-Sul	% Au
New Feed	100.00	0.52	0.22	0.50	100.0	100.0	100.0
Final Conc	3.18	8.74	1.19	13.16	53.5	17.2	83.7
Final Tail	96.82	0.25	0.16	0.15	46.5	70.4	29.6
Cleaner (Col 3)							
Cleaner Feed	104.84	0.56	0.23	0.55	112.1	109.0	116.1
Cleaner Conc	3.18	8.74	1.19	13.16	53.5	17.2	83.7
Cleaner Tail	101.66	0.30	0.18	0.20	58.7	83.2	39.6
Scavenger (Col 2)							
Scavenger Feed	101.66	0.30	0.18	0.20	58.7	83.2	39.6
Scavenger Conc	4.84	1.30	0.41	1.66	12.1	9.0	16.1
Scavenger Tail	96.82	0.25	0.16	0.15	46.5	114.4	29.6

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T-164 (PP19)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	2.5	7	1.05	186
Cleaner (Col 3)				
Feed	2.6	7	1.05	195
Wash Water	0.4	0	1.00	0
Concentrate	0.08	7	1.05	5.9
Tailings	3.0	6	1.04	189
Scavenger (Col 2)				
Feed	3.0	6	1.04	189
Wash Water	0	0	1.00	0
Concentrate	0.12	7	1.05	9.0
Tailings	2.9	6	1.04	180

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	5.0	7.8
Gas Rate (cm/s)	1.03	1.60
Wash Water (cm/s)	0.08	0.00
Bias (cm/s)	0.07	-0.02
Froth Depth (cm)	35	10
Tailing Flow (cm/s)	0.62	0.59
Froth Density	-	-
Collection Zone Bulk Density	0.98	0.98
Collection Zone Slurry Density	1.05	1.04
Gas Holdup (%)	7	6
Nominal Retention Time (min)	14	16
Liquid Retention Time (min)	13	15

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-165 (PP20)
Date: March 2, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate
Flowsheet: CC/SCAV-closed -- Cleaner Tail Recycled To Conditioner

METALLURGICAL BALANCE

Stream	Weight	Grade			Distribution		
	% Distn.	% Cu Total	% Cu Non-Su	Au g/t	% Cu Total	% Cu Non-Sul	% Au
New Feed	100.00	0.53	0.23	0.77	100.0	100.0	100.0
Final Conc	3.04	9.45	2.00	15.09	54.3	26.5	59.6
Final Tail	96.96	0.25	0.16	0.15	45.7	67.4	18.3
Cleaner (Col 3)							
Cleaner Feed	103.79	0.61	0.24	0.90	118.9	107.8	122.0
Cleaner Conc	3.04	9.45	2.00	15.09	54.3	26.5	59.6
Cleaner Tail	100.75	0.34	0.21	0.20	64.6	92.0	26.2
Scavenger (Col 2)							
Scavenger Feed	100.75	0.34	0.21	0.20	64.6	92.0	26.2
Scavenger Conc	3.79	2.64	0.47	4.46	18.9	7.8	22.0
Scavenger Tail	96.96	0.25	0.16	0.15	45.7	109.6	18.3

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T-165 (PP20)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	2.7	7	1.05	200
Cleaner (Col 3)				
Feed	2.8	7	1.05	208
Wash Water	0.4	0	1.00	0
Concentrate	0.08	7	1.05	6.1
Tailings	3.2	6	1.04	202
Scavenger (Col 2)				
Feed	3.2	6	1.04	202
Wash Water	0	0	1.00	0
Concentrate	0.10	7	1.05	7.6
Tailings	3.1	6	1.04	194

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	4.5	7.8
Gas Rate (cm/s)	0.93	1.60
Wash Water (cm/s)	0.08	0.00
Bias (cm/s)	0.07	-0.02
Froth Depth (cm)	60	10
Tailing Flow (cm/s)	0.66	0.64
Froth Density	0.24	-
Collection Zone Bulk Density	0.99	0.97
Collection Zone Slurry Density	1.05	1.04
Gas Holdup (%)	6	7
Nominal Retention Time (min)	13	14
Liquid Retention Time (min)	12	13

Column Flotation Pilot Plant Testwork on Mt. Polley Ore.
Conducted by MINNOVEX TECHNOLOGIES INC.

Test No: T-166 (PP21)
Date: March 2, 1990
Equipment Used: Columns 2 + 3
Feed Stream: Combined Sulfide and Oxide Rougher + Scavenger Concentrate (New Ore Composite)
Flowsheet: CC/SCAV-closed -- Cleaner Tail Rejected After Mech. Scav.

METALLURGICAL BALANCE

Stream	Weight % Distn.	Grade % Cu Total	Grade % Cu Non-Sul	Grade Au g/t	Distribution % Cu Total	Distribution % Cu Non-Sul	Distribution % Au
New Feed	100.00	0.66	0.23	0.85	100.0	100.0	100.0
Final Conc	1.36	26.03	0.91	36.12	53.7	5.4	57.6
Final Tail	98.64	0.31	0.16	0.22	46.3	68.6	25.4
Cleaner (Col 3)							
Cleaner Feed	102.44	0.76	0.25	1.03	118.0	109.9	123.1
Cleaner Conc	1.36	26.03	0.91	36.12	53.7	5.4	57.6
Cleaner Tail	101.08	0.42	0.21	0.41	64.3	92.3	48.5
Scavenger (Col 2)							
Scavenger Feed	101.08	0.42	0.21	0.41	64.3	92.3	48.5
Scavenger Conc	2.44	4.87	0.93	8.08	18.0	9.9	23.1
Scavenger Tail	98.64	0.31	0.16	0.22	46.3	68.6	25.4
Mech. Cleaner Scav. (Ind. Performance)							
Scavenger Feed	98.64	0.31	0.16	0.22	100.0	100.0	100.0
Scavenger Conc.	21.58	0.56	0.31	0.77	39.5	42.4	76.6
Scavenger Tail	77.06	0.24	0.15	0.11	60.5	57.6	23.4

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T-166 (PP21)

MATERIAL BALANCE

Stream	Slurry Flow L/min	Weight % Solids	Slurry s.g.	Solids Flow g/min
Circuit Feed	2.2	9	1.06	210
Cleaner (Col 3)				
Feed	2.3	9	1.06	215
Wash Water	0.4	0	1.00	0
Concentrate	0.1	5	1.03	3
Tailings	2.8	7	1.05	212
Scavenger (Col 2)				
Feed	2.8	7	1.05	212
Wash Water	0	0	1.00	0
Concentrate	0.04	11	1.08	5.1
Tailings	2.8	7	1.05	207

OPERATING CONDITIONS

	Column 3 (Cleaner)	Column 2 (Scavenger)
Gas Rate (L/min)	4.8	7.3
Gas Rate (cm/s)	0.99	1.50
Wash Water (cm/s)	0.08	0.00
Bias (cm/s)	0.07	-0.01
Froth Depth (cm)	60	10
Tailing Flow (cm/s)	0.57	0.58
Froth Density	0.07	-
Collection Zone Bulk Density	1.00	0.96
Collection Zone Slurry Density	1.06	1.05
Gas Holdup (%)	5	8

STATEMENT OF QUALIFICATIONS

I, Glenn A. Kosick of MINNOVEX TECHNOLOGIES Inc. certify that:

1. I am a 1984 graduate of Queen's University, Kingston, with a Bachelor of Science (Honours) degree in Mining Engineering.

2. I have worked in the mineral processing field as a metallurgical engineer since my graduation.

3. As co-author of the **Report on Column Flotation Pilot Plant Work on Mount Polley Ore**, I have based my conclusions on testing conducted by Minnovex Technologies Inc. at the Coastech Research Lab in North Vancouver, B.C.

4. I have no interest in the Mount Polley property or in the securities of Imperial Metals Corporation.

Signed at Toronto
This 19 day of April, 1991.

Glenn Kosick

STATEMENT OF QUALIFICATIONS

I, Glenn S. Dobby of Minnovex Technologies Inc. certify that:

1. I am graduate of McGill University, Montreal with a B. Eng. degree (1974), M. Eng. degree (1977) and Ph.D degree (1984) in Metallurgical Engineering.

2. I have worked in the mineral processing field as a metallurgical engineer and a research scientist since my graduation.

3. As co-author of the Report on Column Flotation Pilot Plant Work on Mount Polley Ore, I have based my conclusions on testing conducted by Minnovex Technologies Inc. at the Coastech Research Lab in North Vancouver, B.C.

4. I have no interest in the Mount Polley property or in the securities of Imperial Metals Corporation.

Signed at Toronto
This 19 day of Dec/1, 1991.

Glenn S. Dobby