Bennett Vein
Macmurchy Township

Milling of a Gold Ore For Maximum Recovery by Gravity Separation

Date: 22 Aug 2001

Prepared for: Pat Rosko
Prepared by: Michael Nemcsok & Al Kon

Preface

This report investigates the use of gravity separation in the concentration of an auriferous ore sample from Pat Rosko's claim number L1202866. The intent is to gain perspective on the use of gravity separation as a viable milling process on a production scale. Mr. Rosko's goal is to determine the usability of his current milling equipment in processing the ore available on this claim.

The success of gravity separation can also be associated with, or used to predict the free gold content of the rock.

Michael Nemcsok,

Mining Engineering Technician

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Purpose

This report discusses the findings of the experimental laboratory investigation of a gold ore for maximum recovery using gravity concentration. A local prospector is assessing the viability of using a gravity circuit alone for processing of a gold ore from one of his properties.

Background

A gold ore sample from Pat Rosko's Bennet mine property was supplied for experimental mill trial for maximum recovery.

The gold ore was channel sampled from a 45 cm siliceous (quartz) vein woven with very fine chlorite and olivine strands. Country rock surrounding the vein is primarily mafic volcanic and was included in the channel sample across a proposed 1m working width.

Close observation of the sample pieces revealed some native gold in veins in the quartz, paralleling the chlorite veins. Euhedral iron pyrite crystals in the mafic volcanic wall rock were observed, but no pyrite could be found in the quartz vein material.

Approach

Preliminary assay results from TSL laboratories in Saskatoon, Saskatchewan suggested a fairly high grading gold ore of 36.25 g/t (1.279oz/t) gold, 10.3 g/t (0.363oz/t) silver. Visible coarse gold in the sample and a fairly high assay value prompted the use of gravity concentration for maximum recovery as per assignment directions. For a more meaningful report in consideration of Pat Rosko, a shaker table style concentrator was used, replicating the client's own milling equipment.

Hypothesis

Gravity concentration of the ore will yield fairly high recovery of gold from the sample under investigation.

Equipment Used

Jaw Crusher
Cone crusher
Riffler
Rolling Paper
Spatulas
Batch ball mills
10 kg steel slug mill charge
Ro-Tap machine
Set of sieves down to 200 mesh
Steel pans for drying
Sample drying oven
Mass scale
'Shaker Table' style concentrator
Buckets, hose, fittings, etc
1000mL glass beaker for concentrate collection

Procedure

1. The entire sample provided was crushed to 100% passing 3/8", using a clean Jaw crusher and cone crusher.

2. Coning and quartering of the initial sample yielded a 1 assay ton (approximate) sample that was sent for immediate assay for silver and gold by TSL laboratory in Saskatoon, Saskatchewan. A similar sample was submitted to PolyMet Resources Inc. in Cobalt, Ontario.

3. The remaining 4 kg sample was recombined then coned and quartered twice, providing two ~1 kg head samples.

4. Each 1 kg sample was ground dry in a batch ball mill for 5 hours until they were 80% passing 200 mesh. Samples were then oven dried and weighed.

5. One of the two '1kg' samples was put in storage as a back up in case of complications with the concentration attempt.

6. The second 856g sample was mixed with water to form a slurry of approximately 20% water. This slurry was poured into the feeder of an adjusted and running shaker table, and a gravity concentrate was recovered.

7. The middlings were tabled twice, and the resulting concentrate tabled three times. This repetitive tabling simulates the use of two roughers and three concentrating tables.

8. The concentrate was weighed at 0.87g (9.5e-7). The concentrate was a black sand with spectacular gold dust and small nuggets throughout. Magnetic behavior of the black sand indicates a high iron content.

9. The concentrate was weighed and brought to PolyMet labs in Cobalt for gold and silver assays.

Observations

See attached assay reports for assay values of head feed versus concentrate.

Calculations

Percent Recovery (gold) = gold content of concentrate / gold content of head feed

= (392.035oz/t x 0.9568385e-6t) / (0.632oz/t x 0.0009435785t)
= 0.6290757
= 63 % recovery gold

Percent =Recovery (silver) = silver content of concentrate / silver content of head feed.

= (53.33 oz/t x 0.9568385e-6t) / (0.256 oz/t x .0009435785t)
= 0.2112653
= 21 % recovery silver

Discussion

The gold recovery achieved was quite impressive for using shaker tables alone for gravity concentration. This level of success can be attributed largely to careful sample preparation and suggests that the bulk of the gold in the ore is free gold in the quartz.

The silver recovery was not quite as good as we would have liked, this may suggest that the silver is tied up in the pyrite or otherwise bound with gangue. Perhaps other procedures beyond gravity separation alone may have yielded a higher recovery.

Recommendations

Wet grinding in cyanide solution could improve recovery beyond the levels attained in this experiment. Cyanide would leach silver and gold from the grinding ore, freeing it from pyrite and enabling a more complete recovery of the precious metals.

It is possible perhaps that running the tailings through a knelson concentrator may also improve the efficiency of the milling circuit.

Yet another more practical solution might be to grind the ore to a finer consistency (80% passing 300 mesh) thereby liberating the finer particles which might be lost to tailings. Assays of the tailings and further test milling experimentation will define the optimum grinding and separation circuit design.

mnemcsok@hotmail.com

Save Address(es) | Block

Previous Next | Close

From : "aisask" <daniels@ntl.sympatico.ca>

To : <mnemcsok@hotmail.com>

Subject : assays

Date : Wed, 22 Aug 2001 10:15:47 -0400

Attachment : upeC105.jpg (125k)

Reply | Reply All | Forward | Delete | Put in Folder...

Printer Friendly Version

Hi Mike, The assays from cobalt are attached. And from S'toon the numbers are: 36.25 g/t gold 10.3 g/t silver.
Al

PolyMet RESOURCES INC.

PolyMet Resources Inc

1 Presley Street
Cobalt, Ontario
P0J 1C0

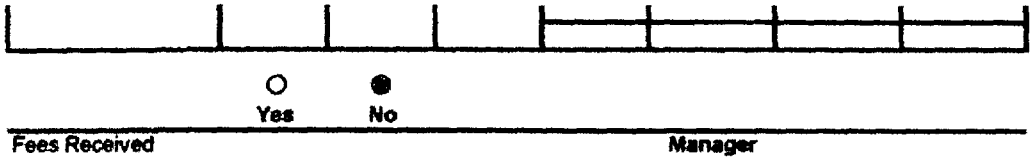
Lot No. 0-035

Date 8/7/01

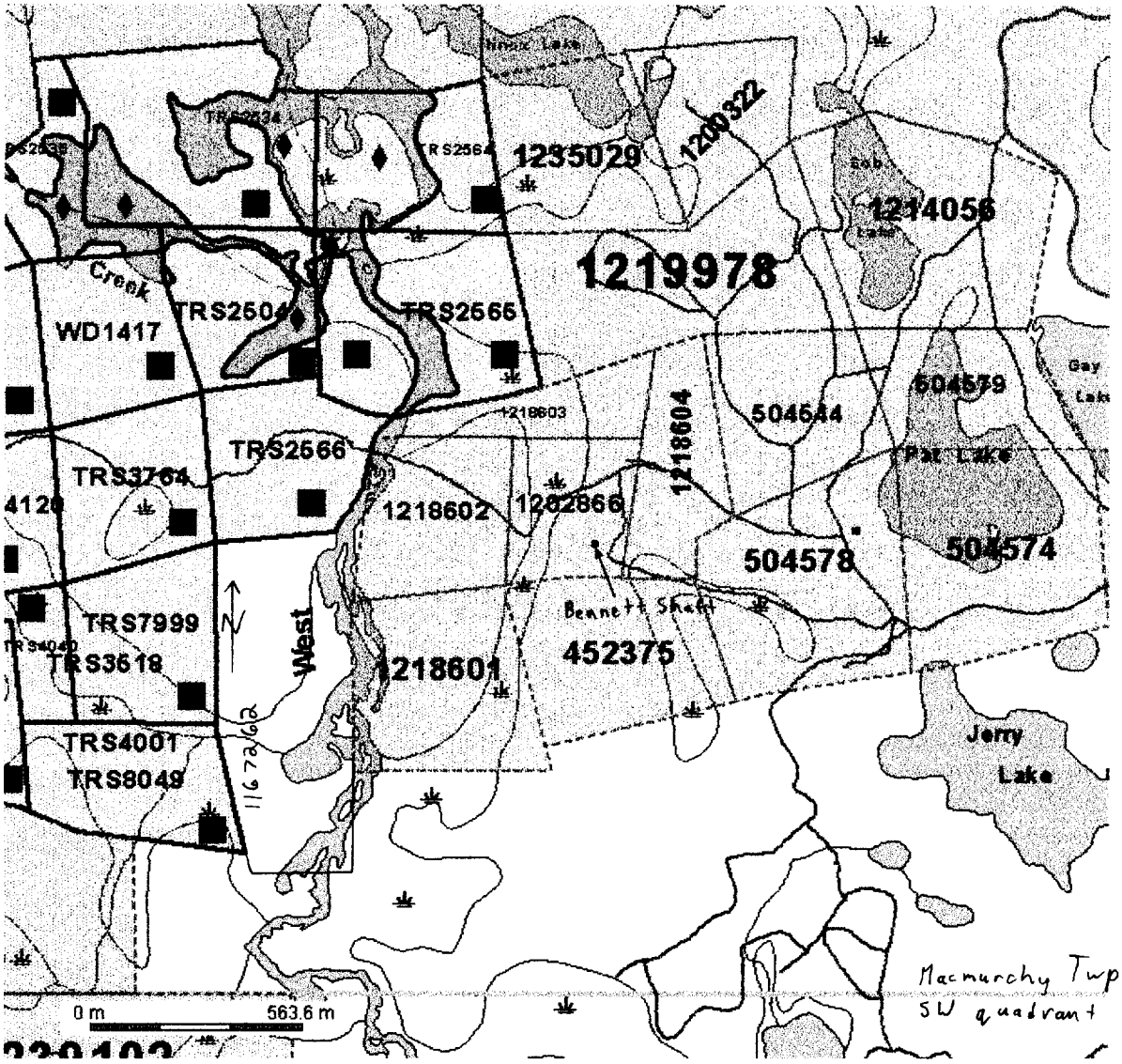
Laboratory Report

Sheet # 146 H.S.M.

Sample Number	Gold Oz/ton	Silver Oz/ton	Palladium Oz/ton	Cu%			
Daphane & Chad							
#1 Head	0.216						
#1 K.C. Conc.	1.104						
#1 Float Feed	0.2						
#1 Table Conc.	2.532						
#2 Head	0.324						
#2 K.C. Conc.	1.084						
#2 Float Feed	0.244						
#2 Table Conc.	1.44						
Mike & Al							
Head A	0.632	0.256					
Conc. A	392.035	53.33					



Except by special permission, reproduction of these results must include any qualifying remarks made by Polymet Resources Inc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1200322
1214056
1219978
Creek
TRS2504
TRS2566
WD1417
504579
504644
1218603
1218604
TRS2566
TRS3764
1218602
1202866
504578
504574
Pat Lake
Bennett Shaft
452375
TRS7999
TRS3618
West
1218601
TRS4001
TRS8049
Jerry
Lake
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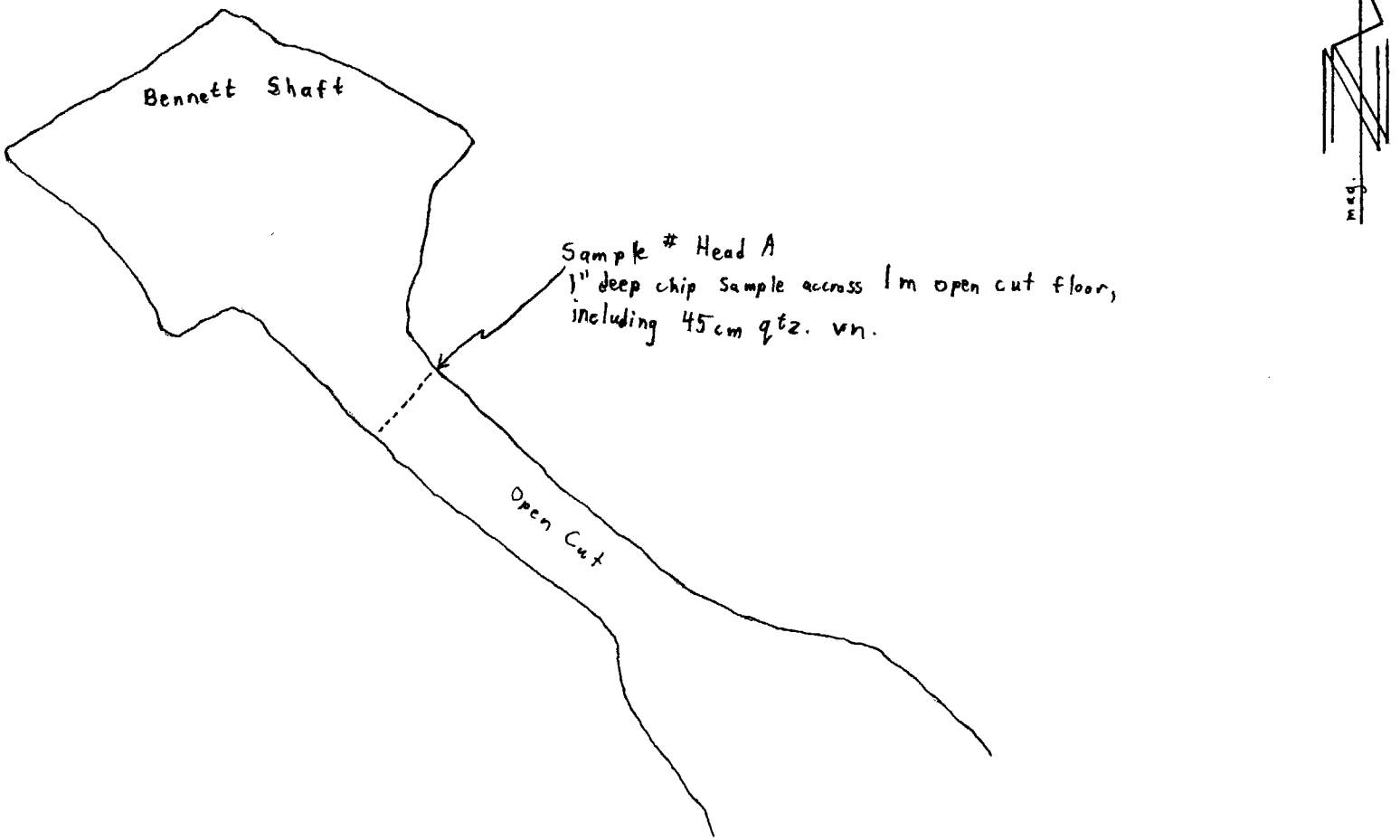
563.6 m
Macmurchy Twp
SW quadrant



SCALE
0 10 20
(feet)

SCALE: 1 inch = 10 feet
DATE: 20 AUG 2001
DRAWN BY: M. NEMCSOK

PAT ROSKO
MACMURCHY TOWNSHIP
BENNETT CLAIM GROUP
SAMPLE SOURCE LOCATIONS

Date	Type of work	Workers	Worker's Tasks	Details	Man hours	Rate ($/h)	Mileage (km)	Materials Description	Materials consumed ($)	Value $
20-Oct-00	Sampling	Michael Nemcsok	Rope work (Rappelling & sampling)	Sample taken from old stope floor.	3	15	300	Sample Bags, Tags & Markers	2	45
23-Oct-00	Test Milling	Michael Nemcsok	Sample Prep, Lab batch milling	A gravity concentrate was prepared to investigate maximum recovery of free gold from sample: Calibrating batch mill setup at HSM.	4	18	0	Hose	10	72
1-Nov-00	Test Milling	Michael Nemcsok	Sample Prep, Lab batch milling	A gravity concentrate was prepared to investigate maximum recovery of free gold from sample: batch mill run of sample at HSM.	4	18	0			72
24-Oct-00	Fire assay of samples milled	Michael Nemcsok	Deliver samples to Polymet Labs	Head and concentrate samples assayed	2	10				20
22-Aug-01	Report Writing	Michael Nemcsok	Researching, Report Writing	Compile results of experimentation into report for Pat Rosko.	8		0	Paper, Photocopies, Binding materials	5	500

Total Mileage (km)	300
Rate ($/km)	0.3
Travel Expenses	90

Total Project Expenditure Value: $ 816

Total Hours	35
Average Hou	27
Travel Expe	90
Total Materi	17
Total Labou	709
Total Value	816

Work Report Summary

Transaction No: W0280.00482 **Status:** APPROVED
Recording Date: 2002-MAR-07 **Work Done from:** 2000-OCT-20
Approval Date: 2002-MAY-09 **to:** 2001-AUG-22

Client(s):

189297 ROSKO, PATRICK ARTHUR

Survey Type(s):

METAL

Work Report Details:

Claim#	Perform	Perform Approve	Applied	Applied Approve	Assign	Assign Approve	Reserve	Reserve Approve	Due Date
L 1202866	$816	$816	$816	$816	$0	0	$0	$0	2006-DEC-02
	$816	$816	$816	$816	$0	$0	$0	$0	

External Credits: $0

Reserve:

$0 Reserve of Work Report#: W0280.00482

$0 Total Remaining

Status of claim is based on information currently on record.

41P11SE2037 2.23196 MACMURCHY

900

Ministry of
Northern Development
and Mines

Ministère du
Développement du Nord
et des Mines

Ontario

GEOSCIENCE ASSESSMENT OFFICE
933 RAMSEY LAKE ROAD, 6th FLOOR
SUDBURY, ONTARIO
P3E 6B5

Tel: (888) 415-9845
Fax:(877) 670-1555

Date: 2002-MAY-29

PATRICK ARTHUR ROSKO
158 BURNSIDE DRIVE
KIRKLAND LAKE, ONTARIO
P2N 1M7 CANADA

Submission Number: 2.23196
Transaction Number(s): W0280.00482

Dear Sir or Madam

Subject: Approval of Assessment Work

We have approved your Assessment Work Submission with the above noted Transaction Number(s). The attached Work Report Summary indicates the results of the approval.

At the discretion of the Ministry, the assessment work performed on the mining lands noted in this work report may be subject to inspection and/or investigation at any time.

If you have any question regarding this correspondence, please contact STEVEN BENETEAU by email at steve.beneteau@ndm.gov.on.ca or by phone at (705) 670-5855.

Yours Sincerely,

Sheila Lessard
Acting Senior Manager, Mining Lands Section

Cc: Resident Geologist

Patrick Arthur Rosko
(Claim Holder)

Assessment File Library

Patrick Arthur Rosko
(Assessment Office)

MINISTRY OF NORTHERN DEVELOPMENT AND MINES
PROVINCIAL MINING RECORDER'S OFFICE

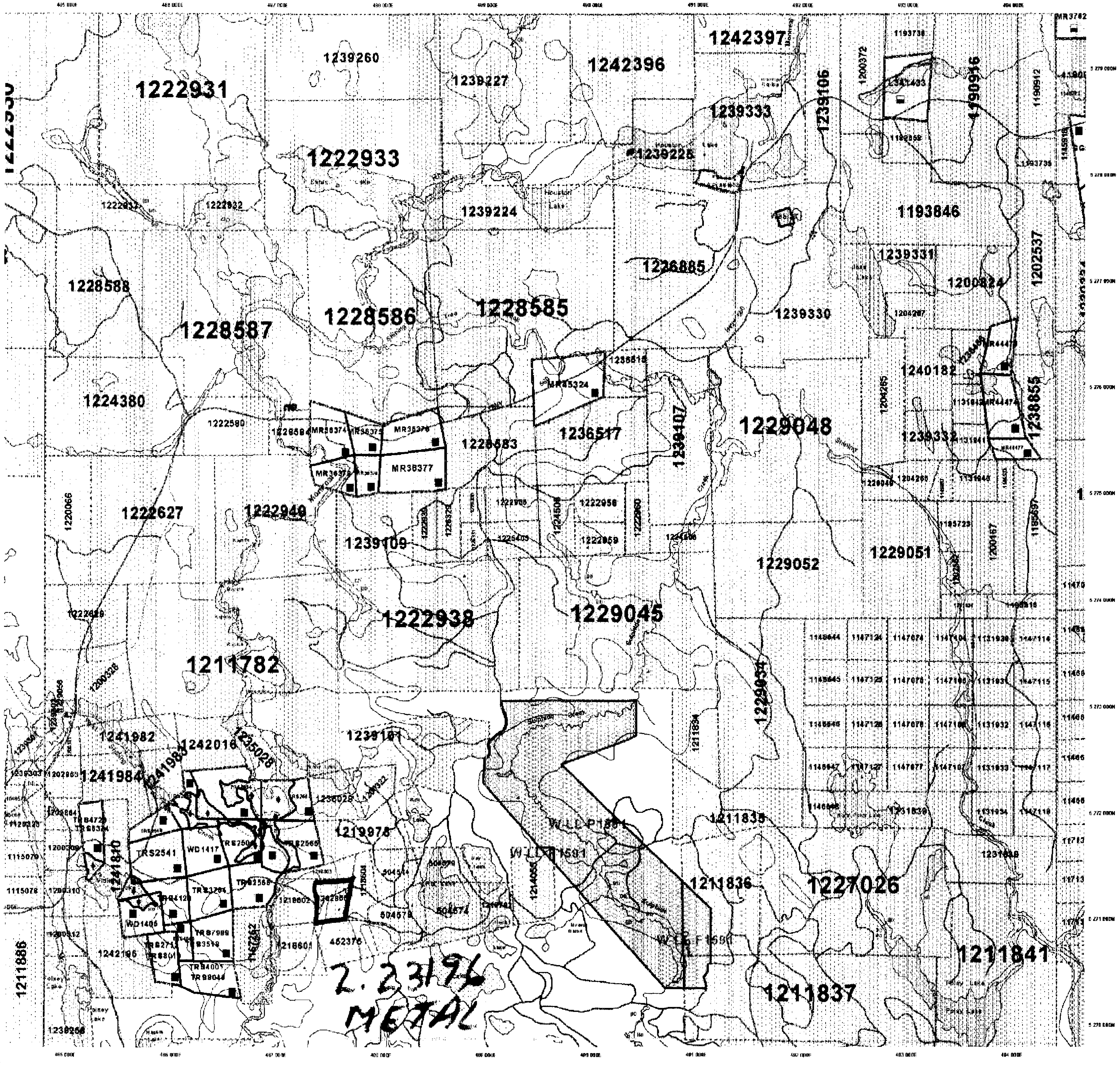
MINING LAND TENURE MAP

Date / Time of Issue Mar 7 2002 16:08h Eastern

TOWNSHIP / AREA **PLAN**
MACMURCHY **G-0988**

ADMINISTRATIVE DISTRICTS / DIVISIONS

Mining Division	Larder Lake
Land Titles/Registry Division	SUDBURY
Ministry of Natural Resources District	TIMMINS



41P11SE2037 2.23196 MACMURCHY

200

2.23196 METAL

TOPOGRAPHIC

Administrative Boundaries
Township
Concession, Lot
Provincial Park
Indian Reserve
Cliff, Pit and Pile
Contour
Contour - Approx, Auxiliary, Depression
Shaft
Mine Headframe
Railway
Road
Trail
Natural Gas Pipeline
Hydro Line
Communication Line
Wooded Area
Monument - Cadastral, Historical, Horiz. Control

LAND TENURE

Freehold Patent
Surface And Mining Rights
Surface Rights Only
Mining Rights Only

Leasehold Patent
Surface And Mining Rights
Surface Rights Only
Mining Rights Only

Licence of Occupation
Uses not Specified
Surface And Mining Rights
Surface Rights Only
Mining Rights Only

Land Use Permit
Order in Council
Water Power Lease Agreement
Mining Claim

LAND TENURE WITHDRAWALS

Areas Withdrawn from Disposition
Mining Act Withdrawal Types
Wsm Surface and Mining Rights Withdrawn
Ws Surface Rights Only Withdrawn
Wm Mining Rights Only Withdrawn
Order in Council Withdrawal Types
W'sm Surface and Mining Rights Withdrawn
W's Surface Rights Only Withdrawn
W'm Mining Rights Only Withdrawn

IMPORTANT NOTICES

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LAND TENURE WITHDRAWAL DESCRIPTIONS

Identifier	Type	Date	Description
W66/77	Ws	Nov 19 2001	SEC.43/70 W66/77 NOV19/78 SRO 189617
W-LL-P1591	Wsm	Feb 26 2002	W-LL-P1591 ONT M&S withdrawal S.35 Mining Act RSO 1990, 26/02/02 Boundary generally depicts area withdrawn.Click to view actual area withdrawn
W-LL-F1591	Wsm	Feb 26 2002	W-LL-F1591 ONT M&S withdrawal S.35 Mining Act RSO 1990, 26/02/02 Boundary generally depicts area withdrawn.Click to view actual area withdrawn
W-LL-F1591	Wsm	Feb 26 2002	W-LL-F1591 ONT M&S withdrawal S.35 Mining Act RSO 1990, 26/02/02 Boundary generally depicts area withdrawn.Click to view actual area withdrawn

IMPORTANT NOTICES

Areas under which special regulations, limitations or conditions exist that affect normal prospecting, staking and mineral development activities.

Those wishing to stake mining claims should consult with the Provincial Mining Recorders' Office of the Ministry of Northern Development and Mines for additional information on the status of the lands shown hereon. This map is not intended for navigational, survey, or land title determination purposes as the information shown on this map is compiled from various sources. Completeness and accuracy are not guaranteed. Additional information may also be obtained through the local Lands Titles or Registry Office, or the Ministry of Natural Resources.

The information shown is derived from digital data available in the Provincial Mining Recorders' Office at the time of downloading from the Ministry of Northern Development and Mines web site.

General Information and Limitations

Contact Information:
Provincial Mining Recorders' Office Toll Free
Willet Green Miller Centre Tel: 1 (888) 415-9845
933 Ramsey Lake Road Fax: 1 (877) 670-1444
Sudbury, ON P3E 6B5
Home Page: www.gov.on.ca/MNDM/MINES/LANDS/mlsmnpge.htm

Map Datum: NAD 83
Projection: UTM (6 degree)
Topographic Data Source: Land Information Ontario
Mining Land Tenure Source: Provincial Mining Recorders' Office

This map may not show unregistered land tenure and interests in land including certain patents, leases, easements, right of ways, flooding rights, licences, or other forms of disposition of rights and interest from the Crown. Also certain land tenure and land uses that restrict or prohibit free entry to stake mining claims may not be illustrated.