010

Moose River Gypsum

Industrial Mineral Testing Program

December 1996

Qual. #

Prepared for James Bay Lowlands Gypsum Development Group

By New Worlds Engineering

Industrial Mineral Testing Program - Moose River Gypsum

Goal

Perform processing and physical property testing on samples of Moose River gypsum, to determine the type and form of hemi-hydrate (stucco) that can be produced. A materials testing program, which includes the measurement of calcining temperatures and time, water up-take and setting times, will reveal the specific properties of the stucco to determine marketing potential.

Gypsum

Gypsum is a non-metallic mineral, found as a rock composed of 79.1% calcium sulfate and 20.9 % chemically bonded water by weight (calcium sulfate dihydrate $CaSO_4 \cdot 2H_2O$). Gypsum was formed during the Silurian period of the Paleozoic Era of the geological calendar. This corresponds to approximately 300 million years ago. In absolutely pure form, gypsum rock is white. However, as found in nature, it most often contains impurities whose presence makes the rock appear gray, brown, pink and even black.

The water contained in the structure gives this mineral some particularly useful properties. Gypsum readily gives up, or takes on this crystalline water. With the application of a moderate amount of heat in a process known as calcining, gypsum is converted into what is commonly called "Plaster of Paris" or stucco. This hemihydrate calcium sulfate ($CaSO_4 \cdot \frac{1}{2}H_2O$) can easily be changed back to the dihydrate form by simply mixing it with liquid water. Conveniently, there is a certain "setting" time between the addition of water, and when the dihydrate becomes fully solid. This means that the mixture can be shaped before it hardens.

Gypsum and its products have been known and used from the earliest times. The Ancient Assyrians called it Alabaster and used it for sculpting. Five thousand years ago the Egyptians had learned to make plaster from it. The ancient Greeks named this mineral "Gypsos", from which came the name "Gypsum". One particular form of the mineral, clear and transparent in layers like mica, was used as temple windows many centuries before glass was invented. The Greeks called it "Selene" after the moon goddess - today we call it Selenite.

In modern times gypsum is used in the manufacturing of many products including: drywall board, plaster, sheathing, toothpaste, blackboard chalk, and as filler in paints. It is also used as a surgical casting material and molds for false teeth.

In the gypsum industry, calcining is the step of reducing dihydrate to hemihydrate or anhydrous ($CaSO_4$) form. In the very early history of gypsum plaster production, pieces of rock were simply heated in an open wood fire to bring about the dehydration process. Today, stucco is produced using sophisticated vertical kilns or fluid bed roasters. Quality control of mined material has become critical in terms of impurities, sizing and

separation of natural anhydrates. These factors have been found to significantly alter the form and usefulness of the stucco produced. Laboratory tests, such as the type performed for this report, are the first step in determining the possible uses of the gypsum found in the Moose River area.

Hemihydrate

Hemihydrate calcium sulfate has two basic forms, alpha and beta, the processes and properties of each are outlined below:

Alpha Hemihydrate - produced in a water saturated atmosphere at temperature >97°C. This is usually accomplished at elevated temperature in an autoclave in the presence of steam. It is more stable, or less reactive, than the beta form, and has a slower rate of strength development. This is a disadvantage in many uses of stucco, but nevertheless rehydrated alpha hemihydrate makes a denser, stronger plaster which has advantages in other uses.

Beta Hemihydrate - can be produced in a vacuum or non-saturated atmosphere at 100°C. Usually it is produced in a less than saturated environment at atmospheric pressure. The beta form is cheaper to produce and is usually used for wall board. It requires more water to form, but it sets quicker. Beta form was produced during this testing program.

	*Normal Consistency **	*Setting Range (minutes)*	*Typical set expansion (in per in)*	*Avg. compresive strength dry (psi)*
Alpha	40-43	20-30	0.003	5500
Beta	64-66	10-20	0.0018	2000

*parts water to 100 parts stucco by weight to make a pourable slurry.

Processing Tests

Material that was ground to 100% passing 100 mesh was heated in open crucibles to determine the temperatures and times at which steam is produced. Steam should be produced when the material has reached the temperature range of 116°C to 121°C. Once the temperature range is determined, the time required to evolve the water can be determined also. This can be done by measuring the time between when the material first starts to produce steam and when it stops.

The gypsum used in the these trials was obtained from General Surveys and Exploration. Approximately 50 kg of gypsum was selected from the gypsum provided. Selection was made based upon the apparent anhydrate content of the pieces. Pieces containing primarily anhydrate were not included in the crushing and grinding process. After crushing and grinding the material was screened to100% passing 100 mesh before use.

To determine the temperature and time range in which water evolution begins, and to also determine the time required to fully evolve the water, a series of 5 sets of 2 samples each were placed in a temperature controlled, atmospheric pressure oven. Each 50 g sample was placed in a crucible and removed at the appropriate time. Removal times were chosen to start when steam was first produced. Confirmation of stream production was determined by observing a glass plate covering a hole in the top of the oven. Water droplets form on the cooler surface of the glass as soon as steam appears in the oven. Because the temperature would rise and fall when each sample was removed, the precise temperature at which steam was first produced was not determined. The oven temperature controller was set at 180°C to 200°C.

Steam production began after 20 minutes of heating. The droplets disappeared from the window at approximately 35 minutes. Samples removed after only 20 minutes of heating did not set properly when water was added after heating and cooling of the sample. This confirms that little or no conversion to hemihydrate had occured before 20 minutes. Samples removed after 35 minutes of heating set within 1 to 2½ minutes when water was added after heating and cooling of the powdered gypsum. The amount of water added also increased substantially as the heating time was increased. Table #1 shows the results of the tests performed.

Treatment Time	Temperature Range	Observations
20 min.	100-170°C	- water vapour @ 20 min.
40 min.	140 - 200°C	- water vapour stopped @ 35 min.
60 min.	160 - 200°C	- no vapour
90 min.	180 - 200°C	- no vapour
120 min.	180 - 200°C	- no vapour

To more precisely determine the processing times, two samples were heated at different temperatures for up to 120 minutes and weighed every 10 minutes during that time. Figure 1 shows the decrease in mass of the samples as they were heated. Based upon the total mass lost by each sample (8.485 g for Sample A, and 10.006 g for Sample B) significant amounts of water was evolved from the chemical structure. To produce hemihydrate 15.7% of the total mass should be lost. Sample A lost 16.9% of its mass, Sample B lost 21.3% of its mass. Mass losses greater than 15.7% are generally caused by the evaporation of water vapour in the material, before the loss of crystalline water occurs. In other words, the samples dried out in the oven before water was evolved from the dihydrate. Table 2 shows a breakdown of mass loss results accounting for loss of moisture in the sample.

GYPSUM TEST (weight loss)

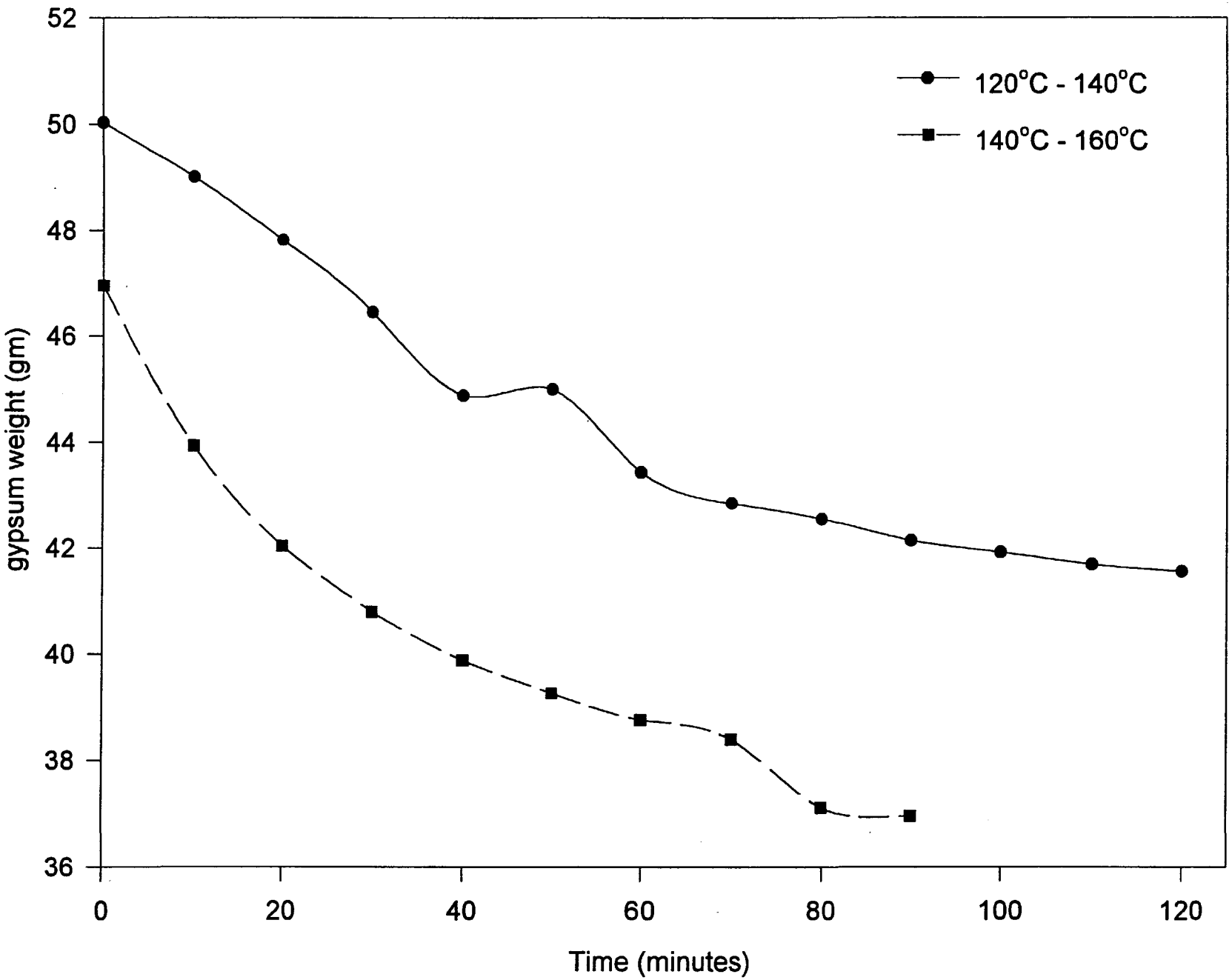


Table 2

	Sample A (120-140°C)	Sample B (140-160°C)
Starting Weight	50.035 g	46.955 g
Moisture loss (typical 5%)	2.502 g	2.348 g
Dry Weight	47.533 g	44.607 g
Hemihydrate weight	40.070 g	37.604 g
Actual final weight	41.550 g	36.951 g

Property Testing

Once a specific range of processing parameters is defined, some physical properties of the stucco can be examined. Of particular interest are the normal consistency (ie. water up-take in parts of water per 100 parts of stucco by weight) and the setting time.

Normal consistency can be determined by adding various amounts of water to a set of constant mass samples. Beta plaster usually requires 64 to 66% by weight of water to make a pourable slurry. Normal consistencies as calculated are shown in Table 3.

Table 3

Treatment Time	Water to Form Slurry	Normal Consistency	Observations
20 min.	30 ml.	60	Not fully set in 24 hours
40 min.	40 ml.	80	- set time 1 minute - noticeable heat produced during setting
60 min.	45 ml.	90	- set time 2 minutes - noticeable heat produced during setting
90 min.	50 ml.	100	- set time 2.5 minutes - noticeable heat produced during setting
120 min.	50 ml.	100	- set time 2.5 minutes - noticeable heat produced during setting

The normal consistency values compare favourably for beta hemihydrate. Since the test is subjective in nature, (i.e. subjective judgment is required to determine when a slurry is formed) it is not unusual to have higher values reported for normal consistency. Beta hemihydrate usually requires >60% water by weight to form a slurry.

Setting times, however, are unusually quick. Beta hemihydrate generally takes more than 10 minutes to set. Since the numbers remain consistent throughout the program though, it is clear that the setting times must be a result of some additional component in the natural gypsum used. Small levels of certain impurities are known to produce rapid setting times. It would be advisable to perform elemental analysis of the gypsum used to determine the type of impurities contained. Fast setting times have considerable advantages for some types of applications such as drywall and other manufactured materials.

Conclusions

The Moose River gypsum tested in this program can be used to form beta hemihydrate using common and traditional methods and techniques. Evolution of water was shown to occur at a temperature greater than 100°C after 20 minutes of heating. Normal consistency was determined to be >60. These factors are normal for gypsum commonly used to form beta hemihydrate.

Unusually quick setting times were demonstrated for the hemihydrate produced. This factor might be caused by natural impurities in the gypsum, something which could on one hand be exploited as a production advantage in the manufacture of formed materials, while on the other hand could prove to be a limiting factor for usage. It will be critical to examine this aspect before further recommendations can be made with respect to possible products and formulations.

Beta hemihydrate is most suited for the manufacture of wallboard and the formulation of plasters for building markets. The two key factors for success in these applications are early strength development and cost. Beta hemihydrate is considerably less expensive to produce than the alpha form, which requires expensive autoclave equipment. The Moose River gypsum clearly appears to be suited for general, simple calcining to produce common beta hemihydrate. At very least this material is ideally suited for use as wallboard filler and building plaster applications which make up more than 80% of the use of gypsum in North America.

Appendix A

Report from Mikro-Tek - attached

GYPSUM TEST #1

- gypsum ground and screened to 100% < 100 mesh (approx. 50 kilos)
- heated 40 gm. for 3.5 hr. @ 180 - 200°C
- added water to hydrated gypsum and non-heated gypsum (control) to form uniform slurry

HYDRATED SAMPLE (40 gm)	GYPSUM CONTROL (40 gm)
10 ml. H_2O	15 ml. H_2O
- set in 4 min - heat produced - edges brown/burnt colour	- hardened in 30 min. - still not set in 24 hrs.

GYPSUM TEST #2

- gypsum ground and screened to 100% < 100 mesh
- 50 gm samples x 2 reps per treatment = 100 g/treatment
- temperature set @ 180 - 200°C
- samples were heated for specificied times
- after heating and cooling water was added to form consistent slurry

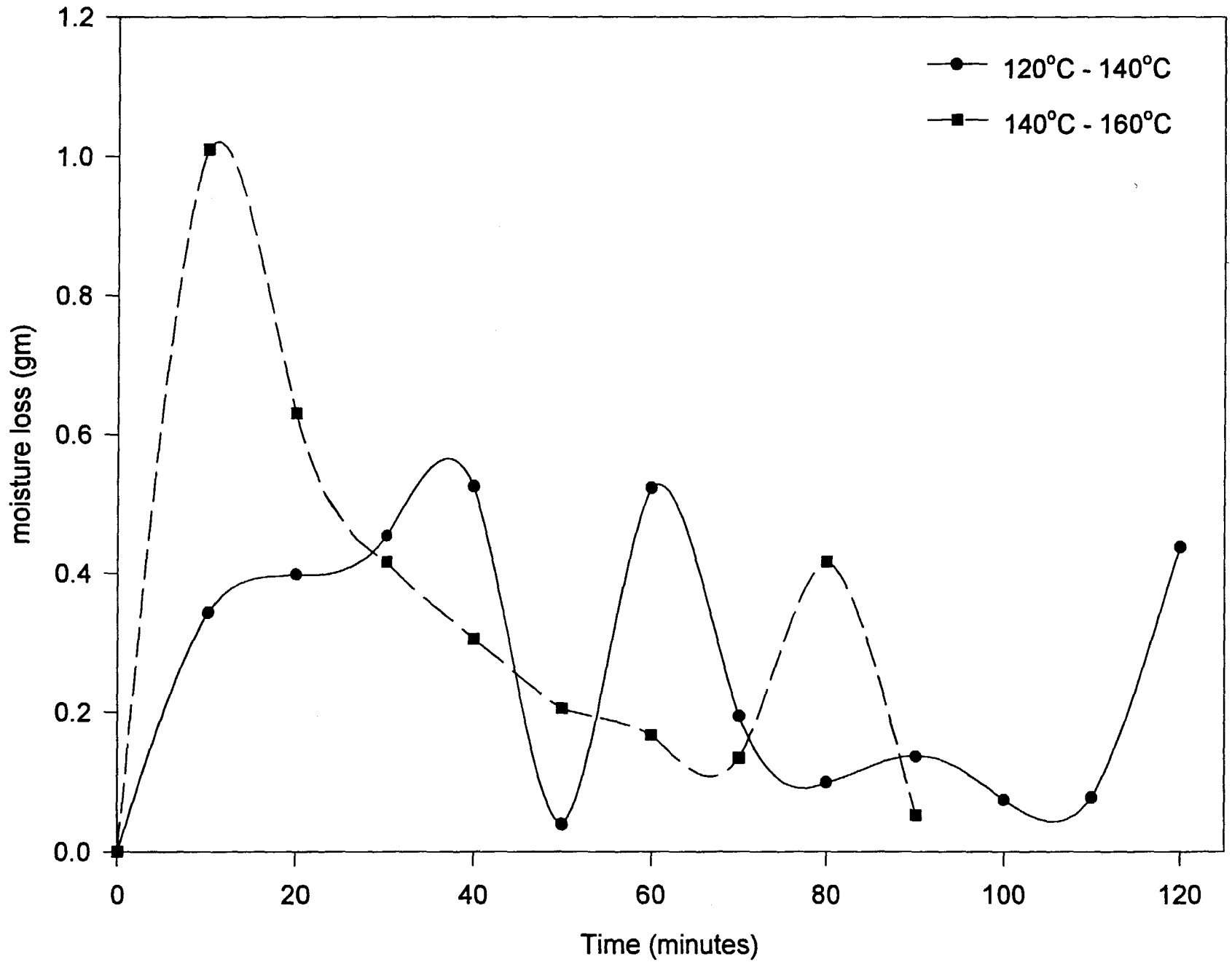
TREATMENT TIME	TEMPERATURE RANGE	H_2O TO FORM SLURRY	OBSERVATIONS
20 min	100 - 170°C	30 ml.	- water vapour @20 min - not fully set in 24 hrs.
40 min	140 - 200°C	40 ml.	- vapour stopped @ 35 min - set time 1 min. - heat produced
60 min	160 - 200°C	45 ml.	- set time 2 min - heat produced
90 min	180 - 200°C	50 ml.	- set time 2.5 min. - heat produced
120 min	180 - 200°C	50 ml.	- set time 2.5 min. - heat produced

GYPSUM TEST SUMMARY #3 (A & B)

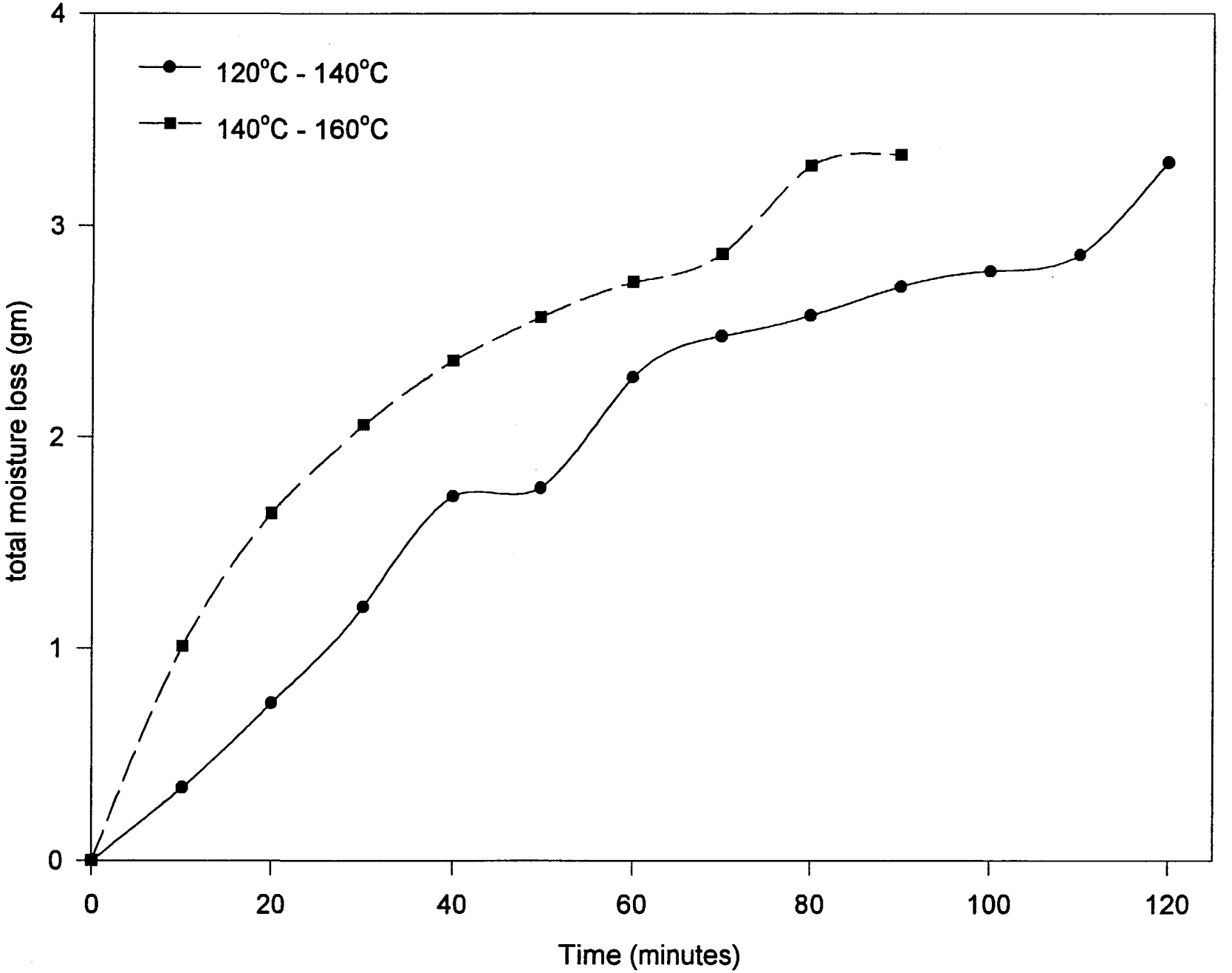
- ground and screened gypsum to 100% < 100 mesh
- starting weight of gypsum : A - 50.035 g (total of 3 reps)
  B - 46.957 g (total of 3 reps)
- samples were heated at set temperature and weights taken every 10 minutes
- set temperature for Test A - 120°C - 140°C
  Test B - 140°C - 160°C

	TEST A		TEST B	
TIME (min.)	Avg. Wt. (gm)	H_2O lost (gm)	Avg. Wt. (gm)	H_2O lost (gm)
0	50.034	-	46.956	-
10	49.005	0.343	43.926	1.010
20	47.811	0.398	42.036	0.630
30	46.449	0.454	40.788	0.416
40	44.874	0.525	39.873	0.305
50	44.994	0.039	39.258	0.205
60	43.425	0.523	38.757	0.167
70	42.843	0.194	38.355	0.134
80	42.546	0.099	37.107	0.416
90	42.138	0.136	36.951	0.052
100	41.916	0.074		
110	41.685	0.077		
120	41.550	0.437		

GYPSUM TEST (moisture loss)



GYPSUM TEST (total moisture loss)



Appendix B

Direct Cost:

Wages: Consultants	
New Worlds Engineering, 14 hours x $95 per hour	$1330.00
GST	$ 93.10
	$1423.10
Laboratory Services:	
Mikro-Tek	
Crushing and Grinding - 50 kg	$ 400.00
Screening 100% passing 100 mesh	$ 250.00
Hydration tests, setting time tests, processing tests	$4800.00
Sub-total	$5450.00
GST	$ 381.50
	$5831.50
Total Cost	$7254.60

New Worlds Engineering, 3234665 Canada Inc.
68 Castlewood Ave. , Timmins, ON, Canada, P4R 1L5
Phone: 705 268 0948, 267 5363 Fax: 705 264 1161

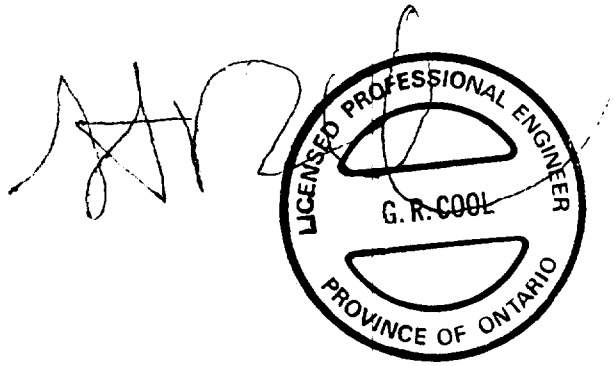
New Worlds Engineering

This report is submitted by New Worlds Engineering, 3234665 Canada Inc.

To: James Bay Lowlands Gypsum Development Group

Date: December 6, 1996.

Author: Grant R. Cool, Ph.D., P.Eng.



MIKRO-TEK

DIVISION OF M. KEAN RESOURCES INC.

MICROBIAL TECHNOLOGIES FOR THE ENVIRONMENT•MINING•FORESTRY•AGRICULTURE

FAX TRANSMISSION FORM

FAX TO:	MNDM	**FAX #:**	705-670-5863
ATTENTION:	Steve Beneteau	**DATE:**	February 24/97
FAX FROM:	Mark Kean	**PAGES:**	1 (including cover sheet)

RE: Gypsum laboratory work for claims in Canfield and Carrol townships
Transaction Numbers W9660.00596&7

The analytical work for the report was conducted at:

Mikro-Tek
36 Emerald St
P.O. Box 2120
Timmins Ontario
P4N 7X8

Contact: Mark Kean
Phone: 705-268-3536
Fax: 705-268-7411

Ontario Ministry of Northern Development and Mines

Declaration of Assessment Work Performed on Mining Land

Mining Act, Subsection 65(2) and 66(3), R.S.O. 1990

Transaction Number (office use): W9660.00630
Assessment Files Research Imaging

Personal information collected under the authority of the Mining Act. Under section 8 of the Mining Act, the information is used to correspond with the mining land holder. Questions about this collection may be directed to the Ministry of Northern Development and Mines, 6th Floor, 933 Ramsey Lake Road, Sudbury, Ontario, P3E 6B5.

42I14SW0004 2.17045 CARROLL

900 2.17045

Instructions: - For work performed on Crown Lands before recording a claim, use form 0240.
- Please type or print in ink.

1. Recorded holder(s) (Attach a list if necessary)

Name	Client Number
KEVIN COOL	120650
Address	**Telephone Number**
190 QUEEN AVE,	264-6718
TIMMINS, ON. P4N 4L7	Fax Number: SAME
Name	**Client Number**
MARK KEAN	151090
Address	**Telephone Number**
P.O. BOX 2120	268-3536
TIMMINS, ON. P4N 7X8	Fax Number: 268-7411

2. Type of work performed: Check (✓) and report on only ONE of the following groups for this declaration.

☒ Geotechnical: prospecting, surveys, assays and work under section 18 (regs) ☐ Physical: drilling, stripping, trenching and associated assays ☐ Rehabilitation

Work Type	Office Use
INDUSTRIAL MINERAL TESTING	Commodity
	Total $ Value of Work Claimed: 7254
Dates Work Performed From: 10 (Day) 09 (Month) 96 (Year) To: 09 (Day) 12 (Month) 96 (Year)	NTS Reference
Global Positioning System Data (if available)	Mining Division: Porcupine
Township/Area: CARROLL / CANFIELD TNP.	Resident Geologist District: Timmins
M or G-Plan Number: G1413 + G1415	

Please remember to:
- obtain a work permit from the Ministry of Natural Resources as required;
- provide proper notice to surface rights holders before starting work;
- complete and attach a Statement of Costs, form 0212;
- provide a map showing contiguous mining lands that are linked for assigning work;
- include two copies of your technical report.

RECEIVED
FEB 12 1997
MINING LANDS BRANCH

3. Person or companies who prepared the technical report (Attach a list if necessary)

Name	Telephone Number
NEW WORLDS ENGINEERING	268-0948
Address	**Fax Number**
68 CASTLEWOOD AVE, TIMMINS, ON.	264-1161
Name	**Telephone Number**
Address	**Fax Number**
Name	**Telephone Number**
Address	**Fax Number**

4. Certification by Recorded Holder or Agent

I, MARK KEAN AND KEVIN COOL (Print Name), do hereby certify that I have personal knowledge of the facts set forth in this Declaration of Assessment Work having caused the work to be performed or witnessed the same during or after its completion and, to the best of my knowledge, the annexed report is true.

Signature of Recorded Holder or Agent	Date
	DEC. 9/96
Agent's Address	**Telephone Number** / **Fax Number**
	above / above

5. Work to be recorded and distributed. Work can only be assigned to claims that are contiguous (adjoining) to the mining land where work was performed, at the time work was performed. A map showing the contiguous link must accompany this form.

	Mining Claim Number. Or if work was done on other eligible mining land, show in this column the location number indicated on the claim map.	Number of Claim Units. For other mining land, list hectares.	Value of work performed on this claim or other mining land.	Value of work applied to this claim.	Value of work assigned to other mining claims.	Bank. Value of work to be distributed at a future date.
eg	TB 7827	16 ha	$26, 825	N/A	$24,000	$2,825
eg	1234567	12	0	$24,000	0	0
eg	1234568	2	$ 8, 892	$ 4,000	0	$4,892
1	1170590	1	0	400	0	0
2	1170589	1	0	400	0	0
3	1131388	1	0	400	0	0
4	1190293	1	0	400	0	0
5	1190294	1	0	400	0	0
6	1190295	4	7254	1600	5654	454
7	1190296	2	0	800	0	0
8	1190297	6	0	2400	0	0
9						
10						
11						
12						
13						
14						
15						
		Column Totals	7254	6800	5654	454

1170590 1170589 1131388 1190293 1190294 1190295 1190296 1190297

RECEIVED
FEB 12 1997
MINING LANDS BRANCH

I, KEVIN COOL + MARK KEAN (Print Full Name), do hereby certify that the above work credits are eligible under subsection 7 (1) of the Assessment Work Regulation 6/96 for assignment to contiguous claims or for application to the claim where the work was done.

Signature of Recorded Holder or Agent Authorized in Writing	Date
	Dec 9/96

6. Instructions for cutting back credits that are not approved.

Some of the credits claimed in this declaration may be cut back. Please check (✓) in the boxes below to show how you wish to prioritize the deletion of credits:

- ☒ 1. Credits are to be cut back from the Bank first, followed by option 2 or 3 or 4 as indicated.
- ☐ 2. Credits are to be cut back starting with the claims listed last, working backwards; or
- ☐ 3. Credits are to be cut back equally over all claims listed in this declaration; or
- ☐ 4. Credits are to be cut back as prioritized on the attached appendix or as follows (describe):

Note: If you have not indicated how your credits are to be deleted, credits will be cut back from the Bank first, followed by option number 2 if necessary.

For Office Use Only

Received Stamp

RECEIVED
DEC 9 1996
1105
PORCUPINE MINING DIVISION

Deemed Approved Date	Date Notification Sent
March 9/97	
Date Approved	Total Value of Credit Approved
Approved for Recording by Mining Recorder (Signature)	

ATTN: DARLENE

Ontario Ministry of Northern Development and Mines

Statement of Costs for Assessment Credit

Transaction Number (office use): W9660.00630

FROM: KEVIN COOL, CLIENT # 120650

Personal information collected on this form is obtained under the authority of subsection 6(1) of the Assessment Work Regulation 6/96. Under section 8 of the Mining Act, the information is a public record. This information will be used to review the assessment work and correspond with the mining land holder. Questions about this collection should be directed to the Chief Mining Recorder, Ministry of Northern Development and Mines, 6th Floor, 933 Ramsey Lake Road, Sudbury, Ontario, P3E 6B5.

2.17045

Work Type	Units of Work Depending on the type of work, list the number of hours/days worked, metres of drilling, kilometres of grid line, number of samples, etc.	Cost Per Unit of work	Total Cost
INDUSTRIAL MINERAL			
TESTING	(CONSULTANT) 14 HRS	95	1330
	G.S.T.	93	93
CRUSHING, GRINDING, SCREENING	(LAB SERVICES) 57 HRS	95.61	5450
+ HYDRATION TESTS	G.S.T.	381	381
Associated Costs (e.g. supplies, mobilization and demobilization).			—
Transportation Costs			—
Food and Lodging Costs			
		Total Value of Assessment Work	7254.00

RECEIVED
FEB 12 1997
MINING LANDS BRANCH

Calculations of Filing Discounts:

1. Work filed within two years of performance is claimed at 100% of the above Total Value of Assessment Work.
2. If work is filed after two years and up to five years after performance, it can only be claimed at 50% of the Total Value of Assessment Work. If this situation applies to your claims, use the calculation below:

TOTAL VALUE OF ASSESSMENT WORK × 0.50 = Total $ value of worked claimed.

Note:
- Work older than 5 years is not eligible for credit.
- A recorded holder may be required to verify expenditures claimed in this statement of costs within 45 days of a request for verification and/or correction/clarification. If verification and/or correction/clarification is not made, the Minister may reject all or part of the assessment work submitted.

Certification verifying costs:

I, KEVIN COOL (please print full name), do hereby certify, that the amounts shown are as accurate as may reasonably be determined and the costs were incurred while conducting assessment work on the lands indicated on the accompanying Declaration of Work form as [signature] (recorded holder, agent, or state company position with signing authority) I am authorized to make this certification.

Signature	Date

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

Telephone: (705) 670-5853
Fax: (705) 670-5863

February 27, 1997

Gary White
Mining Recorder
60 Wilson Avenue, 1st Floor
Timmins, ON
P4N 2S7

Dear Sir or Madam:

Submission Number: 2.17045

Subject: Transaction Number(s):		Status
	W9660.00630	Approval

We have reviewed your Assessment Work submission with the above noted Transaction Number(s). The attached summary page(s) indicate the results of the review. WE RECOMMEND YOU READ THIS SUMMARY FOR THE DETAILS PERTAINING TO YOUR ASSESSMENT WORK.

If the status for a transaction is a 45 Day Notice, the summary will outline the reasons for the notice, and any steps you can take to remedy deficiencies. The 90-day deemed approval provision, subsection 6(7) of the Assessment Work Regulation, will no longer be in effect for assessment work which has received a 45 Day Notice.

Please note any revisions must be submitted in DUPLICATE to the Geoscience Assessment Office, by the response date on the summary.

NOTE: This correspondence may affect the status of your mining lands. Please contact the Mining Recorder to determine the available options and the status of your claims.

If you have any questions regarding this correspondence, please contact Steve Beneteau by e-mail at beneteau_s@torv05.ndm.gov.on.ca or by telephone at (705) 670-5855.

Yours sincerely,

ORIGINAL SIGNED BY
Ron C. Gashinski
Senior Manager, Mining Lands Section
Mines and Minerals Division

Correspondence ID: 10599
Copy for: Assessment Library

Work Report Assessment Results

Submission Number: 2.17045

Date Correspondence Sent: February 27, 1997 **Assessor:** Steve Beneteau

Transaction Number	First Claim Number	Township(s) / Area(s)	Status	Approval Date
W9660.00630	1190295	CARROLL, CANFIELD	Approval	February 24, 1997

Section:
18 Other INDUS

Correspondence to:

Mining Recorder
Timmins, ON

Resident Geologist
Timmins, ON

Assessment Files Library
Sudbury, ON

Recorded Holder(s) and/or Agent(s):

Kevin Cool
TIMMINS, ONTARIO

KEVIN SCOTT COOL
TIMMINS, Ontario

Correspondence ID: 10599

~~LANDS STAKED AFTER AUGUST 30/96~~
~~SUBJECT TO PENDING APPLICATION MNR RE: NON-METALLIC MINERALS~~ APPLICATION DENIED JAN. 7/97

REFERENCES

AREAS WITHDRAWN FROM DISPOSITION

M.R.O. – MINING RIGHTS ONLY
S.R.O. – SURFACE RIGHTS ONLY
M.+S. – MINING AND SURFACE RIGHTS

	Description	Order No.	Date	Disposition	File
(1)	SEC.36/80	WP1/91	20/08/91	M.+S.	
(2)	SEC.36/80	N.R.W.66/83	18/11/83	M.R.O.	171506

NOTES

FLOODING RIGHTS ON MOOSE RIVER TO CONTOUR 100' RESERVED TO H.E.P.C.

FLOODING RIGHTS ON ABITIBI RIVER FROM SAND RAPIDS DOWNSTREAM TO ALLAN RAPIDS TO CONTOUR 75', FROM SAND RAPIDS UPSTREAM TO BLACKSMITH RAPIDS TO CONTOUR 126'

SURFACE AND MINING RIGHTS R/W AND EXTRA LAND PATENTED TO O.N.R. FILE 173009

SMD 1415

EBBITT TOWNSHIP

CANFIELD TOWNSHIP

STAPELLS TOWNSHIP

1M 2M 3M 4M 5M 6M 7M 8M

287 M 286 M 285 M 284 M 283 M 282 M 281 M 280 M

Renison River
Louise L.
MOOSE RIVER
ABITIBI RIVER
Medicine Creek
West Branch Kagawask Creek
Megiganamisk L.
Medicine L.
Asinabi Rapids
Sand Rapids
Trail
STRING BOG
D.N.R.
S.L.
R.I.
Q.I.
P.I.
M.I.
N.I.
W.I.

~~1187266~~
~~1187265~~
~~1187264~~
1223459 (15 UNITS)
~~1188872~~
~~1131390~~ ~~1170583~~ ~~1170584~~ 1223458
~~1131384~~
~~1170585~~ ~~1170581~~ ~~1170587~~
~~1131388~~ ~~1170589~~ ~~1170590~~
~~1190297~~
~~1190294~~
~~1190295~~ ~~1190296~~
~~193216~~ 1223471
~~193215~~ 1223472
~~193212~~ 1223469
1223470 ~~193217~~
(16 UNITS) (12 UNITS) (6 UNITS) (4 UNITS)

2.17045
INDUS

LEGEND

- HIGHWAY AND ROUTE No
- OTHER ROADS
- TRAILS
- SURVEYED LINES
  - TOWNSHIPS, BASE LINES, ETC
  - LOTS, MINING CLAIMS, PARCELS, ETC
- UNSURVEYED LINES
  - LOT LINES
  - PARCEL BOUNDARY
  - MINING CLAIMS ETC
- RAILWAY AND RIGHT OF WAY
- UTILITY LINES
- NON-PERENNIAL STREAM
- FLOODING OR FLOODING RIGHTS
- SUBDIVISION OR COMPOSITE PLAN
- RESERVATIONS
- ORIGINAL SHORELINE
- MARSH OR MUSKEG
- MINES
- TRAVERSE MONUMENT

DISPOSITION OF CROWN LANDS

TYPE OF DOCUMENT	SYMBOL
PATENT, SURFACE & MINING RIGHTS	●
" SURFACE RIGHTS ONLY	◓
" MINING RIGHTS ONLY	◒
LEASE, SURFACE & MINING RIGHTS	■
" SURFACE RIGHTS ONLY	◨
" MINING RIGHTS ONLY	◧
LICENCE OF OCCUPATION	▼
ORDER-IN-COUNCIL	OC
RESERVATION	(R)
CANCELLED	⊗
SAND & GRAVEL	(S)

2.17045

SCALE: 1 INCH = 40 CHAINS

FEET 0 1000 2000 4000 6000 8000
METRES 0 200 1000 2000
1 KM 2 KM

TOWNSHIP
CARROLL

M N R ADMINISTRATIVE DISTRICT
MOOSONEE
MINING DIVISION
PORCUPINE
LAND TITLES / REGISTRY DIVISION
COCHRANE

Ontario Ministry of Natural Resources
Ministry of Northern Development and Mines

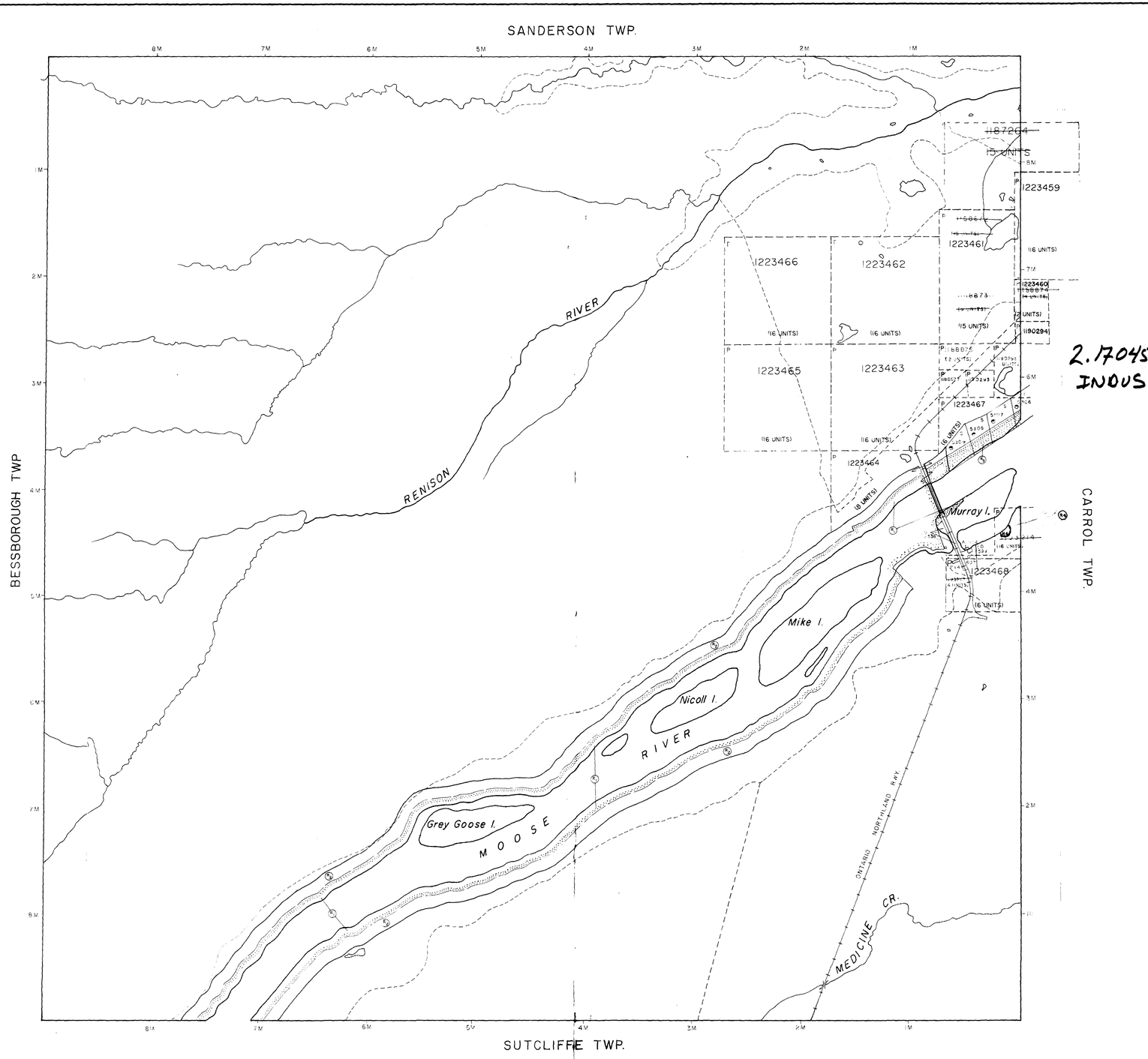
MAY/93
ACTIVATED MAY 20, 1993
BY D.C.
CHECKED BY B.B.

Number
G-1415

~~CLAIMS STAKED AFTER AUGUST 30, 96~~
~~SUBJECT TO PENDING APPLICATION MNR RE: NON-METALLIC MINERALS~~ APPLICATION DENIED JAN. 7/97

G-1413

REFERENCES



THE INFORMATION THAT APPEARS ON THIS MAP HAS BEEN COMPILED FROM VARIOUS SOURCES AND ACCURACY IS NOT GUARANTEED. THOSE WISHING TO STAKE MINING CLAIMS SHOULD CONSULT WITH THE MINING RECORDER, MINISTRY OF NORTHERN DEVELOPMENT AND MINES FOR ADDITIONAL INFORMATION ON THE STATUS OF THE LANDS SHOWN HEREON.

LEGEND

- HIGHWAY AND ROUTE No.
- OTHER ROADS
- TRAILS
- SURVEYED LINES
  - TOWNSHIPS, BASE LINES, ETC.
  - LOTS, MINING CLAIMS, PARCELS, ETC.
- UNSURVEYED LINES
  - LOT LINES
  - PARCEL BOUNDARY
  - MINING CLAIMS ETC.
- RAILWAY AND RIGHT OF WAY
- UTILITY LINES
- NON-PERENNIAL STREAM
- FLOODING OR FLOODING RIGHTS
- SUBDIVISION OR COMPOSITE PLAN
- RESERVATIONS
- ORIGINAL SHORELINE
- MARSH OR MUSKEG
- MINES
- TRAVERSE MONUMENT

DISPOSITION OF CROWN LANDS

TYPE OF DOCUMENT	SYMBOL
PATENT, SURFACE & MINING RIGHTS	●
" , SURFACE RIGHTS ONLY	◐
" , MINING RIGHTS ONLY	◑
LEASE, SURFACE & MINING RIGHTS	■
" , SURFACE RIGHTS ONLY	◧
" , MINING RIGHTS ONLY	◨
LICENCE OF OCCUPATION	▼
ORDER-IN-COUNCIL	OC
RESERVATION	⊕
CANCELLED	⊗
SAND & GRAVEL	⊕

AREAS WITHDRAWN FROM DISPOSITION

M.R.O. – MINING RIGHTS ONLY
S.R.O. – SURFACE RIGHTS ONLY
M. + S. – MINING AND SURFACE RIGHTS

Description	Order No.	Date	Disposition	File
①	W 62/72	2-10-76	S & M Rights	63199
②	PROPOSED MISSINAIBI PARK BDRY EXPANSION NOTICE RECEIVED 4 of JULY, 1991			
③	MINING RIGHTS ONLY WITHDRAWN UNDER SECTION 35 OF THE MINING ACT R.S.O. 1990, ORDER NO. NRW 66/83			

MISSINAIBI PROVINCIAL PARK

(P4) — THE MINING AND SURFACE RIGHTS ARE WITHDRAWN FROM PROSPECTING, STAKING OUT, SALE OR LEASE UNDER SECTION 35 OF THE MINING ACT R.S.O. 1990 DATED JAN. 23, 1996 AT 3:15 P.M., ORDER NO. W-P-4/96 NWR.

2.17045

SCALE: 1 INCH = 40 CHAINS

FEET 0 1000 2000 4000 6000 8000
METRES 0 250 1000 2000
(1 KM) (2 KM)

TOWNSHIP
CANFIELD

M.N.R. ADMINISTRATIVE DISTRICT
MOOSONEE

MINING DIVISION
PORCUPINE

LAND TITLES / REGISTRY DIVISION
COCHRANE

Ontario
Ministry of Natural Resources
Ministry of Northern Development and Mines

Date JANUARY, 1993
A.F.D. MARCH 8/93
By D.C.

Number G-1413

G-1413

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