2048

PRELIMINARY GEOLOGICAL REPORT

ON THE

MAG 1 TO 36 MINERAL CLAIMS

LAT. 50° 50' - LONG. 115° 40'

MOUNT BRUSSILOF

RADIUM, BRITISH COLUMBIA

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
O. BAYKAL

Expiry Date: November 28, 1969

BY:

ORHAN BAYKAL, P. ENG., P. GEOL.

AUGUST, 1969

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Mount Brussilof, British Columbia

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PRELIMINARY GEOLOGICAL REPORT

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MOUNT BRUSSILOF

RADIUM, BRITISH COLUMBIA

INTRODUCTION:

This preliminary report has been written for the purpose of assessing the geological and mineralogical possibilities of the Mag 1 to 36 Mineral Claims, located in the Mount Brussilof area, about 23 miles northeast of Radium, British Columbia.

The field work was done by the writer in June of 1969. The geology of the area was mapped and outcrops of magnesite were investigated and sampled. Aerial photographs were used for mapping and interpretation purposes.

RECOMMENDATIONS:

The Mag 1 to 36, Mineral Claims are located in an area where a large deposition of sedimentary magnesite appears to have taken place. The geological setting and favorable mineralogical possibilities of the claims are such that an economic deposit may be anticipated.

Based on data obtained during the field work and on the considerations outlined above, the following programme can be recommended for the Mag 1 to 36 Mineral Claims.

PHASE 1: PRELIMINARY FEASIBILITY STUDY:

1. Detailed geological mapping and systematic sampling of the magnesite deposit.
2. Shallow holes for trenching and preliminary, but more detailed, investigation and evaluation of the magnesite occurence.
3. Instrument Survey of the existing mineral claims and possible staking of additional claims.
4. Marketing arrangement:

The cost of the above outlined programme can be estimated to be between $15,000.00 and $25,000.00.

PHASE 2: FEASIBILITY REPORT:

Following satisfactory completion of Phase 1, the second phase of the programme can be started. This phase of the programme will consist of:

1. Extensive diamond drilling to outline and block out reserves of magnesite.
2. Road building to provide access for the equipments needed at the site.

3. Plant study and design.

LOCATION AND ACCESSIBILITY:

The map-area, located in British Columbia, is about 28 air-miles northeast of Radium Hot Springs, British Columbia, about 8 miles west of the Alberta - British Columbia boundary, 4 miles south of the southern boundary of Mount Assiniboine Provincial Park and 5 miles east of the eastern boundary of the Kootenay National Park (Figure 1).

Access into the area is best secured by a gravel road, known as Settlers Road. This road intersects Highway 93, about 2 miles north of the Radium View Point and follows the Kootenay River in a south-easterly direction for a distance of about 7 miles, it crosses the Kootenay River, where a new bridge has been built and follows the Kootenay River until it reaches Canal Flats, about 40 miles south.

The road leading into the property turns north at the bridge. It follows the southern flank of Cross River and the eastern flank of Mitchell River. This part of the road is about 5 miles long, and had been cleared and used. However, it has not been repaired and will have to be restored before it can be used again. Consequently, during the field work, the use of a helicopter was found to be more convenient.

PHYSIOGRAPHY:

The topography of the area is structurally controlled and dominated by a series of northwesterly trending mountains which are deeply incised by transverse valleys. Those valleys contain streams that flow into the river that occupy the major longitudinal valleys found between the above ridges.

The mountains have an elevation of over 9,000 feet. Mount Brussilof is over 9,800 feet high and Mount Docking attains an elevation of 9,363 feet. The elevation of the intervening valley floors of the Mitchell River and Cross River vary between 3,900 feet to 4,200 feet. The above two rivers flows toward the south and southwest and are tributaries of the Kootenay River. The valleys, in this area, are fairly broad and do not pose any problems with respect to road building.

The cover of vegetation consists mostly of pine and spruce trees that are set apart with little deadfalls and underbrush. The timber line is controlled by the altitude and the slope of the mountain. As such, it varies between 5,000 feet to 7,500 feet.

PROPERTY:

The property, located along the western flank of Mount Brussilof, latitude 50° 50' and longitude 115° 40', consist of a grouped 36 Mineral Claims (Figure 2) known as the Mag claims. They have been grouped under the name of "Swain" and their record numbers are from 14269 to 14304 (inclusive).

They were staked and recorded by Mr. P. Roy Swainson of Calgary, Alberta.

The approximate boundary of the claims is shown in Figure 2. In order to properly define this boundary, a survey is considered to be in order.

GEOLOGY:

The high area is underlain mostly by the Cambrian formation, and the Middle Cambrian Cathedral formation underlies most of the area covered by the claim block.

TABLE OF FORMATIONS

Paleozoic:

Middle Cambrian:

Cathedral Formation:	Dolomite, and Magnesite beds, ± 1,200 feet thick.
Mount Whyte Formation:	Limestone and shale, thin bedded, ± 500 feet thick.

Lower Cambrian:

St. Piran Formation:	Slate, phyllite and orthoquartzite, about 1,200 to 2,000 feet thick.

ST. PIRAN FORMATION:

The east flank of Mount Docking is underlain by the St. Piran formation of Lower Cambrian age. This formation consists chiefly of grey, green to purplish slate and phyllite and orthoquartzite.

The slates are thin-bedded and blue-grey in color. The orthoquartzite consists mostly of white fine-grained quartz imbedded in a siliceous matrix. The well defined bedding is 6 inches to 2 feet thick and weathers white to a mottled brown. This unit is found at the base of the formation and immediately overlies the pronounced pre-Cambrian unconformity.

MOUNT WHYTE FORMATION:

The Mount Whyte formation, which underlies a small area within the claim block, is found east of the Mitchell River fault (Figure 3) and along the east flank of Aurora Creek. This cross-bedded formation consists of a monotonous sequence of thin-bedded limestone and shale.

The shale is grey to dark-grey and siliceous. The limestone is dark-grey, fine-grained and argillaceous. The limestone has a tendancy to grade laterally into a sandy, fine-grained dolomite and fine-grained, calcareous sandstone.

CATHEDRAL FORMATION:

The Cathedral Formation, the principal and cliff-forming formation, underlies most of the area found east and northeast of the Mitchell River fault (Figure 3).

The formation is a massive carbonate section, about 1,200 feet thick. The carbonate is in the form of a fine-grained, argillaceous, sandy, light-grey to dark-grey dolomite. The sand grains consist of

quartz and the dark-grey dolomite is mostly argillaceous with pronounced cross-bedding.

This formation contains the magnesite beds that are of particular interest in this area. The magnesite beds occur mostly in massif form that are 200 to 300 feet thick (Figure 3). Minor magnesite beds are also found above and below the two massif beds. These secondary beds are thinner, and like the major beds are overlain and underlain by dolomite.

STRUCTURAL GEOLOGY:

The structural pattern of the area is quite simple. Two major features are present: the Mitchell River thrust fault and the gently folded strata found east of this fault.

The Mitchell River fault strikes about N25°W and dips steeply to the southwest. It has thrusted the lower-Cambrian against the middle-Cambrian formations. The trace of this fault, which can be seen in Plate 1, can be followed toward the east flank of Tangle Peak. In Tangle Peak, the fault has produced tight anticlines and synclines accompanied by overturned drag folds in the strata overlying the fault plane (Plate 1).

From a regional standpoint, the northwest projection of this fault seems to aligne and merge with the Stephen-Dennis fault zone. Consequently this fault appears to be one of the major thrust faults. It is about 100 miles long and divides the Main Range sub-province into an eastern sector and a western sector.

The area east of the Mitchell River fault appears to be gently folded and relatively undisturbed except for a small subsidiary cross-fault that extends eastward, dips to the north and displaces the magnesite beds. The prevailing strike of the beds in this area is about N 46° E with a gentle dip of 6° to 10° to the northwest. These beds form the west flank of a gently folded anticline the axis of which is almost at the eastern border line of the map-area.

ECONOMIC GEOLOGY:

According to the present interpretation of the geological and structural setting of the map-area, it appears that two major magnesite beds are present within the Cathedral formation.

The upper bed, called "A" bed in Figure 3, at sample Location 1, is about 250 - 280 feet thick and appears to be a massive homogeneous deposit of magnesite. This bed can be followed across the Mt. Brussilof's western face to the mountain found between Aurora Creek and Mitchell River. However in this area, this bed or zone, looses its homogeneous setting, becomes feathery and the magnesite beds of different thickness are thus separated by dolomite beds which are barren of magnesite.

The lower bed, called "B" bed, at sample Locality 2, is about 200 to 250 feet thick. The same as the upper bed, it appears to be a massive homogeneous deposit of magnesite. This bed could also be followed across the western face of Mt. Brussilof and into the same mountain found between Aurora Creek and Mitchell River. However,

unlike bed "A", this zone appears to retain its massive and homogenous setting. In sample localities 3-4 and 5, the magnesite occurs again in massif form throughout a vertical distance of 250 feet. Consequently, it can be stated that the lower bed "B" is more continous and appears to retain its massif and homogeneous form across the western face of Mt. Brussilof to sample localities 3-4 and 5. The stratigraphic separation in between the two beds appears to be in the order of 450 to 500 feet.

The magnesite, is white to greyish and usually coarsely crystalline. At about sample locality 2, it becomes medium to finely crystalline, but becomes coarsely crystalline again at locality 3-4 and 5. On weathered surface, iron staining and disintegration take place. The disintegration causes the magnesite to crumble into separated coarse crystals giving the appearance of a magnesite "sand".

Sampling has been conducted on the magnesite beds by the Geological Survey of Canada, P. Sparks, R.W. Oddy, and the writer. The analyses of all the different samples have yielded the same type of results indicating a Magnesite, $MgCO_3$ content varying between 87% to 99%, possibly averaging 97% $MgCO_3$ (Appendix "A", "B" & "C" and Plate 2).

The Geological Survey analyses indicate for bed "A" at location 1, an $MgCO_3$ content of 98% to 99%. The sample collected by the writer yielded an MgO value of 46.83% and a CO_2 value of 51.29%, equivalent to an $MgCO_3$ content of 98.12%. Likewise, in sample localities 3-4 and 5, the $MgCO_3$ content was analyzed as being between 98.06% and 98.48% against a G.S.C. sampling by Leech of 99%. In the same area sample collected by R.W. Oddy gave an $MgCO_3$ content between 97.43% and 97.54% (Plate 3 & 4).

On examing assay of sample at location 1, it appears that the magnesite bed "A" has a higher Fe_2O_3 (Appendix A) content (0.94%) than the lower bed "B" (0.77% to 0.80%).

As far as the genesis of the magnesite deposit is concerned it appears that the deposit is of sedimentary origin. It was formed probably by the deposition of $MgCO_3$ from concentrated solution in a saline environment. The original solution could have been in form of magnesium sulphate reacting with sodium carbonate to yield insoluble hydrated magnesite which has been accumulated as a relatively pure $MgCO_3$ precipitate.

As far as the possible reserves are concerned it can be stated, at this stage, that about 10,000,000 tons of $MgCO_3$ can be recovered from this property by an open-pit mining method. The above figure will have to be confirmed by subsequent work. However, enough data has been collected to recommend a preliminary feasibility study which will include detailed geological mapping and systematic sampling. This operation will be followed, if warranted, by further diamond drilling and sampling, in order to outline an economic ore body.

SUMMARY:

The geological study that has been conducted on this property has indicated that two major beds of relatively pure magnesite occur within the Cathedral formation of middle-Cambrian age. The upper "A" bed is thought to be about 250 to 280 feet thick and the lower "B" about 200 to 250 feet thick. This lower "B" magnesite bed is considered to have a more homogeneous continuity than the upper "A" bed.

A possible reserve of about 10,000,000 tons of $MgCO_3$ can be expected to be recovered by open-pit mining method. This reserve would have to be ascertained through further detailed geological work and sampling on this property.

The investigation conducted to date fully justifies the next phase of the exploration which entails detailed geological study and systematic sampling of the magnesite deposit.

ORHAN BAYKAL, P. Eng., P. Geol.

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DECLARATION

I, Orhan Baykal of 718 - 8 Avenue, S.W., Calgary, Alberta certify that I am a graduate of Michigan Technological University holding a B.Sc. degree in Mining Engineering, and a graduate of the University of Michigan holding a M.Sc. degree in Geology.

I am a registered member of the Association of Professional Engineers of Alberta holding Professional Engineer and Professional Geologist certificates and a non-resident registered member of the Association of Professional Engineers of the Province of British Columbia.

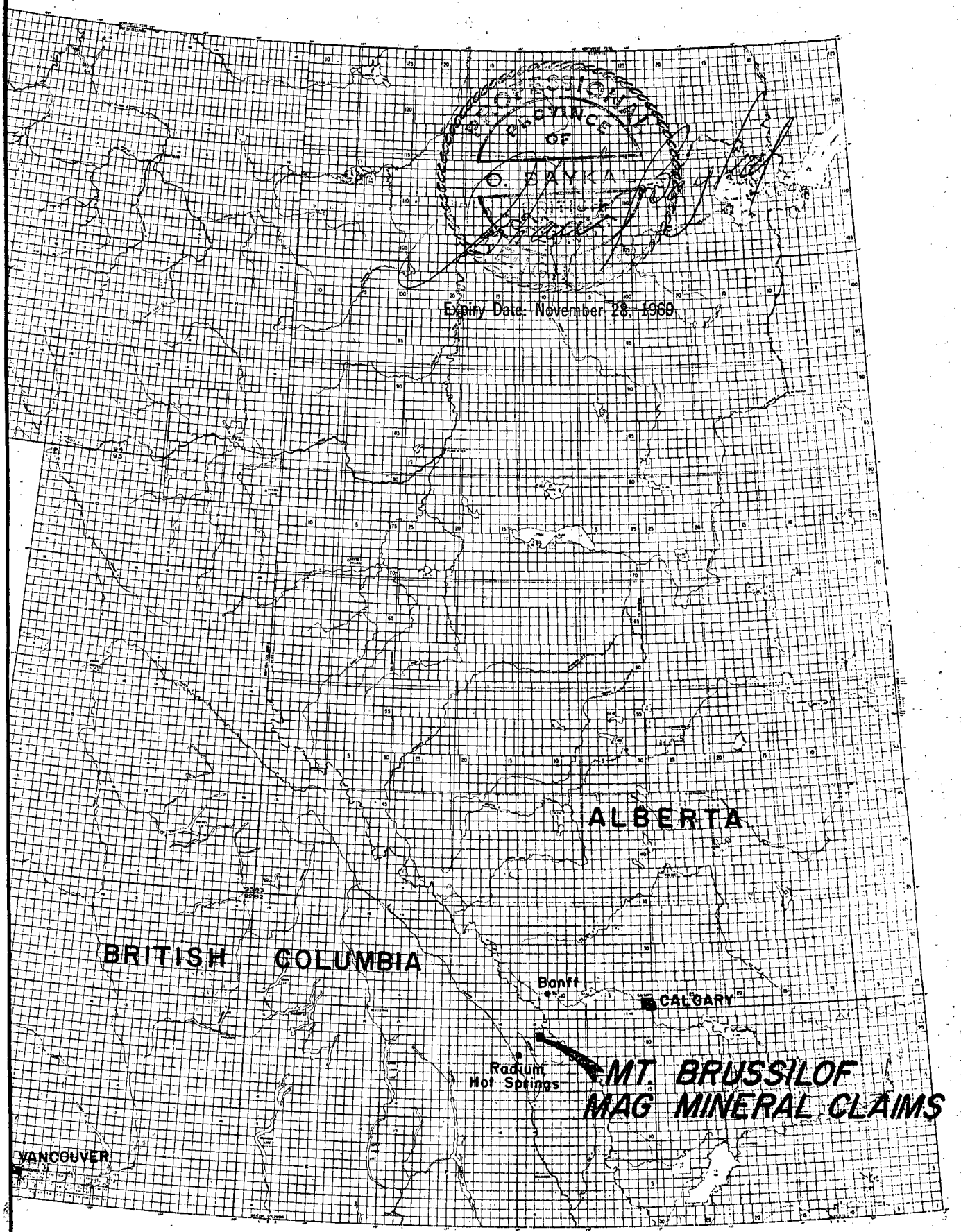
My report on this property is based on field work done during June, 1969, supplemented with investigation of aerial photographs and of available geological publications.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
O. BAYKAL

Expiry Date: November 28, 1969

Orhan Baykal

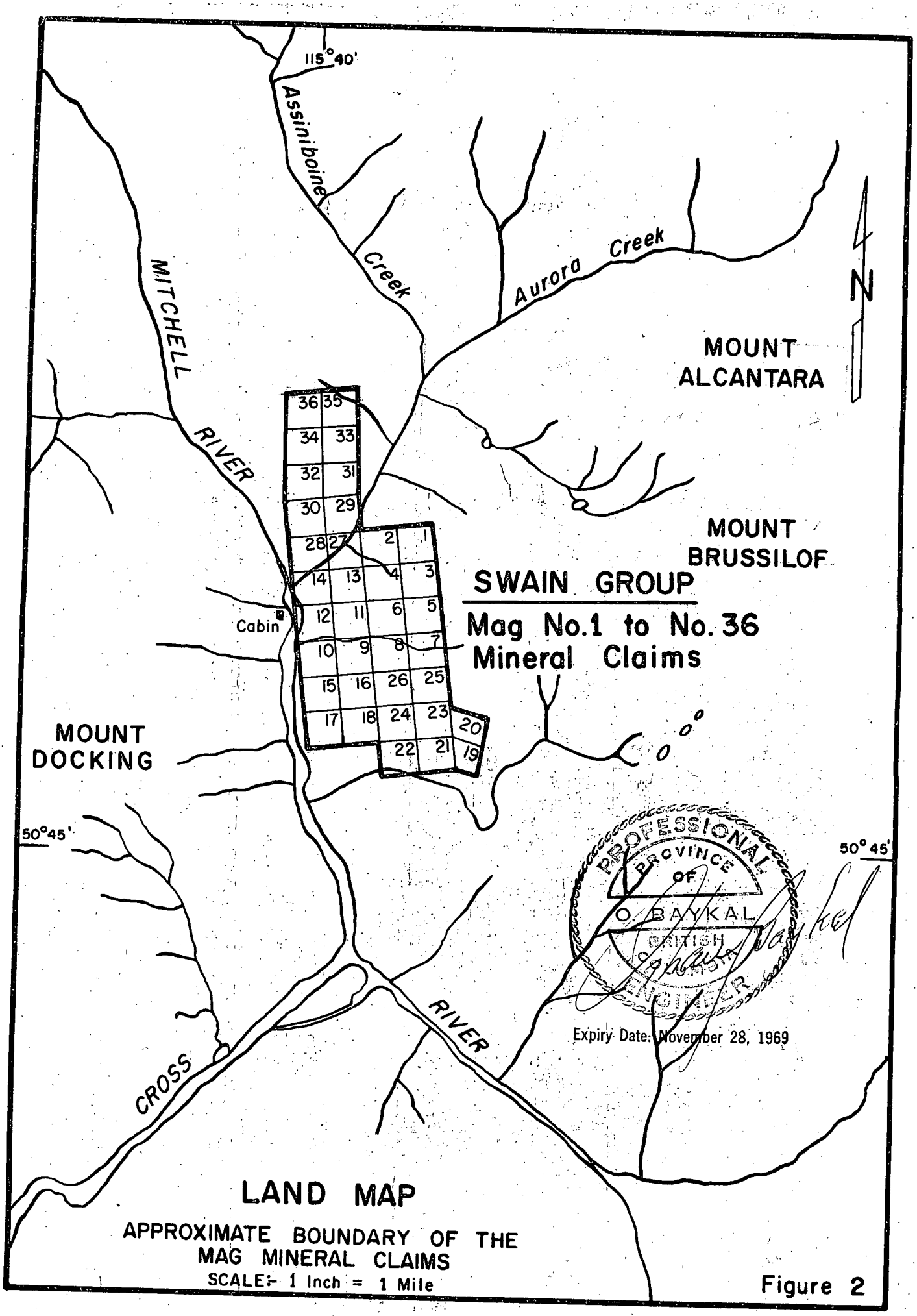
ORHAN BAYKAL, P. ENG., P. GEOL.



LOCATION MAP

Figure 1

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 2048 MAP #1


115°40'
Assiniboine Creek
Aurora Creek
MITCHELL RIVER
N
MOUNT ALCANTARA
MOUNT BRUSSILOF
SWAIN GROUP
Mag No.1 to No.36
Mineral Claims
Cabin
MOUNT DOCKING
50°45'
50°45'
CROSS RIVER
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
O. BAYKAL
Expiry Date: November 28, 1969
LAND MAP
APPROXIMATE BOUNDARY OF THE MAG MINERAL CLAIMS
SCALE:- 1 Inch = 1 Mile
Figure 2

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT

NO. 2048 MAP #2

East

West

Plate 1: Panoramic Pictures taken from Location L-1, looking south and showing the West Flank of Mt. Brussilof and the Valley of Mitchell River.

North

South

Plate 2: Panoramic Pictures taken from Location L-2, looking east and showing the West Flank of Mt. Brussilof.

Plate 3:

Magnesite "A" Seam at Sample Locality X-1. Picture taken from helicopter.

Plate 4:

Picture taken from Location L-2, looking north and showing Sample Localities X-3-4 and 5.

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

4605 - 12th Street N.E. Calgary 67, Alberta

July 25, 1969

Appendix-A

Mr. O. Baykal
Baykal Minerals Ltd.
109, 718 - 8th Avenue S.W.
CALGARY 2
Alberta

Laboratory Number: C69-4910
Five Ore Samples for Analyses

Dear Sir:

As requested in your letter of July 9th, we give you the following:

CONTENT % WEIGHT	SAMPLE #1	SAMPLE #2	SAMPLE #3	SAMPLE #4	SAMPLE #5
Magnesium Oxide (MgO)	46.83	47.02	46.48	46.66	47.01
Calcium Oxide (CaO)	0.53	0.49	0.53	0.55	0.43
Iron Oxide (Fe_2O_3)	0.94	0.77	0.80	0.80	0.80
Aluminum Oxide (Al_2O_3)	0.10	0.10	0.10	0.10	0.10
Silica Dioxide (SiO_2)	0.14	0.09	0.10	Nil	Nil
Carbon Dioxide (CO_2)	51.29	51.52	51.58	51.82	51.44
Acid Insoluble (Most Likely $BaSO_4$)	0.17	0.02	0.28	0.06	0.18
Total	100.00	100.01	99.87	99.99	99.96
	$\pm$ 0.1%	$\pm$ 0.1%	$\pm$ 0.1%	$\pm$ 0.1%	$\pm$ 0.1%

Averaging the magnesium oxide on the five samples, we arrive at a magnesium carbonate that is 97.87% pure.

To the writer's knowledge this is the purest bulk sample of magnesite that has been analyzed. It is well worth investigating as the magnesium market is on an upswing and the large producers in the U.S.A. cannot meet the growing demands. Magnesium besides being 40% lighter than aluminum is worth 40% more.

Yours truly,

W. Morrison

W. Morrison

Appendix B

ANALYSIS OF SAMPLE

SUBMITTED BY F.R. SPARKS, P. ENG.

Those samples were collected from approximately the same areas as Localities 1 - 2 and 4, indicated in this report and shown in Figure 3.

CaO	1.35%	to	2.40%	
SiO_2	2.10%	to	2.10%	
Fe_2O_3	0.75%	to	0.75%	
$BaSO_4$	Nil		Nil	
Al_2O_3	0.2%	to	0.20%	
			5.45%	Traces
% $MgCO_3$			94.55%	Pure

Therefore % MgO (Magnesia) approx. 43.0%

BONDAR-CLEGG & COMPANY LTD.
geologists • geochemists • analysts • assayers
1500 PEMBERTON AVENUE, NORTH VANCOUVER, B.C.
Phone 988-5315

Appendix "C"

CERTIFICATE OF ASSAY

TO Mr. Richard W. Oddy, Exploration Dept. (1)
Imperial Oil Enterprises Ltd.,
500 Sixth Avenue South West,
CALGARY 1, Alberta

Report No.: 02R-28-14

Date: October 18, 1968

I hereby certify that the following are the results of assays made by us upon the herein described ore samples.

MARKED	GOLD		SILVER	MgO	CO_2*	Fe_2O_3	SiO_2	CaO	Al_2O_3**		TOTAL VALUE PER TON (2000 LBS.)
	Ounces per Ton	Value per Ton	Ounces per Ton	Percent	Percent	Percent	Percent	Percent	Percent	Percent	
26616				45.96	51.47	.38	.05	1.66	.49		
26617				46.01	51.53	.32	.06	1.36	.57		
26618				46.16	51.36	.48	.06	1.28	.52		

* As Ignition Loss

** Not Requested.

NOTE: ~~Columbium analysis will take an additional 2 - 3 weeks.~~

NOTE:
Rejects retained two weeks
Pulps retained three months
unless otherwise arranged.

Gold & Silver values reported on these sheets have not been adjusted to compensate loses and gains inherent in fire assay methods.

Gold calculated at $..... per ounce

Registered Assayer, Province of British Columbia

Assessment 2048

BAYKAL MINERALS LTD.

109, 718 - 8TH AVENUE S.W.
CALGARY, ALBERTA
TELEPHONE 269-2490

November 4, 1969

Mr. W. G. Mundell
Mining Recorder
P.O. Box 39
Golden, B. C.

Dear Sir:

Re: Swain Group
Mag 1 to 36 Mineral Claims
Your File 13 - 4

This is the first chance we have had to get together with Mr. P. Roy Swainson with respect to your letter of October 17, 1969.

In this present letter I will venture to answer all the questions that had been raised in your October 3, 1969 letter (Ref. 13 - 3).

1. Map must show outcrops:

In the geological map that had been submitted along with the report, the outcrop of the Magnesite beds have been shown. Since this deposit is of bedded nature, the magnesite horizons which outcrops along the west flank of Mt. Brussilof has been shown as bands of Magnesite beds and such beds have been called Magnesite "A" bed. or horizon if you wish and Magnesite "B" bed. These beds are actual outcrops of Magnesite that are not restricted to specific

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TELEPHONE 269-2490

area that can be seen, as stated previously, along the western flank of Mt. Brussilof.

2. Maps Must be Signed:

The maps have been signed and the reports have been returned to your office by Mr. P. Roy Swainson.

3. Cost Statement as per Section 12 of Regulations:

A. Blasting & Trenching-

Wages for June 15 to 22, 1969, Incl.		
John Kruszewski - 8 days @ $50.00	$400.00	
Clem Swainson - 8 days @ $25.00	200.00	$600.00
Expenses - June 14 to 21, 1969, Incl.		
Dynamite, fuse and caps	37.50	
Car - 420 miles @ $.10	42.00	
Motel - 2 Nights @ $12.50	25.00	
Meals, groceries and misc.	90.50	195.00

B. Geological Field Survey & Report

12 days @ $175.00	2,100.00	
Misc. - Hotel, etc.	127.75	2,227.75

C. Geological Field Work Help

John Kruszewski - June 24 to 28, 1969		
@ $50.00 day (5 days)	250.00	
Helicopter	382.50	
Misc.	41.50	674.00

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CALGARY, ALBERTA
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4. Assessment Costs to be Charged Against Specific Mineral Claims

A. Blasting & Trenching: Mag No. 30 to 36 (Incl.)

B. Report and Misc.: Mag No. 1 to 29 (Incl.)

The geological report took longer to write than the twelve days indicated above. However, the amount has been kept to the same sum that had been reported earlier.

I hope that the above informations have been outlined satisfactorily and according to your request.

Sincerely yours,

O. Baykal, P. Eng., P. Geol.
Baykal Minerals Ltd.

OB:br

GEOLOGICAL MAP
OF
SWAIN GROUP
MAG 1-36 MINERAL CLAIMS
MOUNT BRUSSILOF - B.C.

By : ORHAN BAYKAL P. Eng., P. Geol.

June 1969 Scale :- 4" = 1 Mile

LEGEND

Paleozoic

MIDDLE CAMBRIAN

3 — Cathedral Formation : Dolomite, and Magnesite.

2 — Mount Whyte Formation : Limestone and Shale.

LOWER CAMBRIAN

1 — St. Piran Formation : Slate, Phyllite and Orthoquartzite.

Formational Boundary (Defined, Approximate, Assumed)

Bedding (Horizontal, Inclined, Vertical)

Fault (Defined, Approximate, Assumed) Arrow in Direction of Dip

Magnesite :- A Bed, B Bed (Approximate Position)

Sample Locality x3

Picture Location oL-2

2048

Figure 3