Torch 1 and 2 Mineral Claims

Omineca Mining Division

(Minfile # 093K 101)

NTS: 93K/7E

Longitude: 124 30 40
Latitude: 54 22 55

1994 Report on the Initial Separation of Vermiculite Ore

by:

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Introduction

The Torch 1 and 2 mineral claims were staked May 28, 1993 to cover a little known occurrence of vermiculite isolated along weathered portions of a Jurassic diorite intrusive in the Fort St. James area of British Columbia. A small 14 kilogram sample of intensely weathered intrusive was taken from a road cut on the property, concentrated by Process Research Associates of Vancouver, and then sent off to W.R Grace of South Carolina for expansion and density testing. It is thought this material may be suitable for agricultural applications.

This report highlights the work done by Process Research Associates and these costs will be applied towards assessment requirements.

Location, Access and Topography

The mineral claims are located 48 kilometres north of Vanderhoof B.C. on Highway #27 and then a further 18 kilometres west of Fort St. James along a well maintained logging road (Map #1). The property itself lies on the north side of Sowchea Creek and has several small but driveable gravel roads through the center of the claims that connect to the main logging roads.

Most of the area is relatively flat and covered by thin to moderate (< 5m - 10m) glacial tills. Widely spaced stands of small lodgepole pine are found throughout the property making the bush very easy and manageable to work.

Claim Status

Two mineral claims cover the main exposures of vermiculite along a driveable road north of Sowchea Creek. Claim details are as follows:

Claim Name	Record #	NTS	Expiry	# Units	M.D.
Torch 1	317869	93K/7E	May 28,2001	1	Omineca
Torch 2	317870	---"---	May 28,2001	1	Omineca

(expiry using statement of costs in this report)

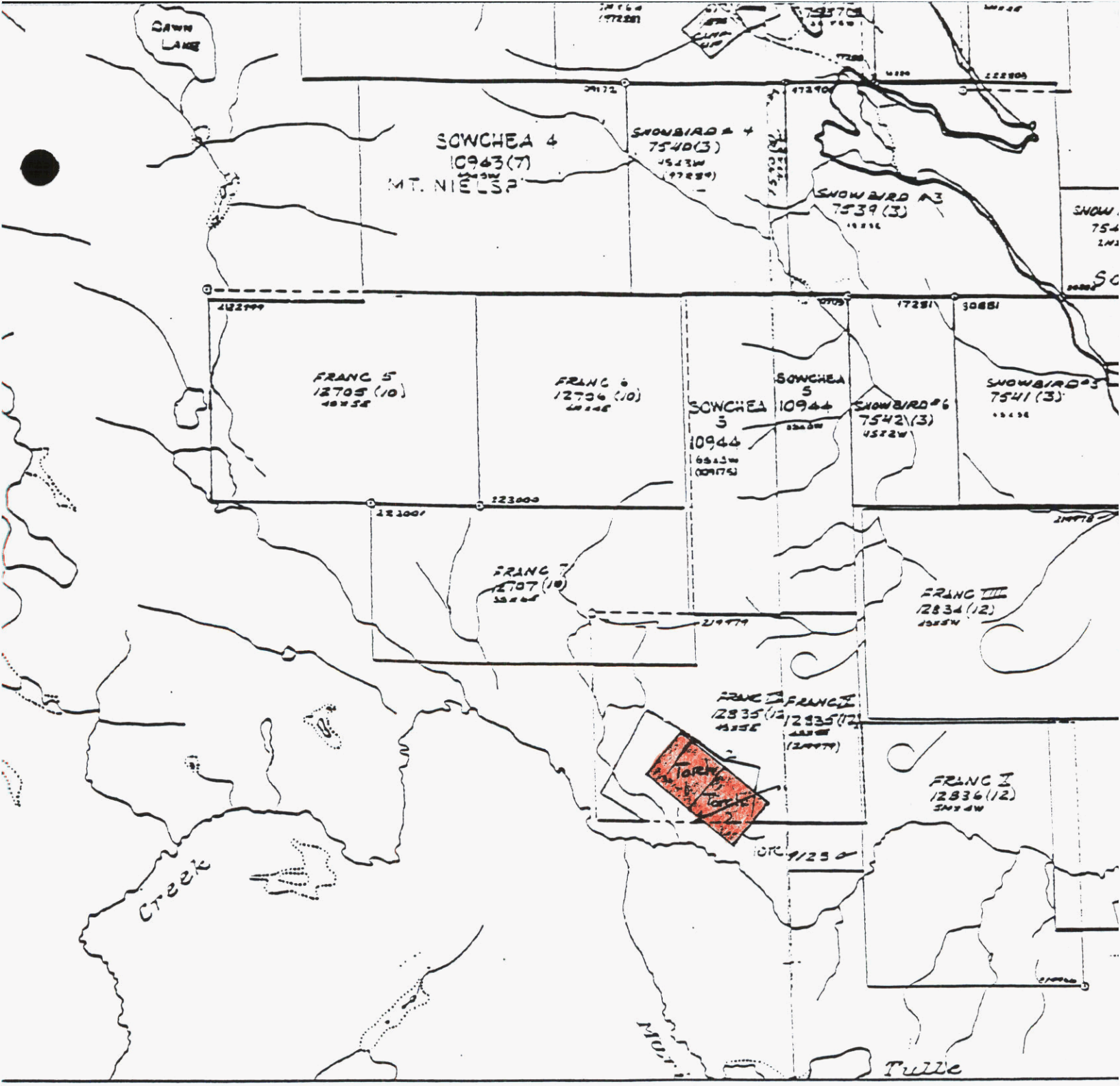
Scale 1:7 500 000 or 1 centimetre represents 75 kilometres

75 0 75 150 225 300 375 450 kilometres

Lambert Conformal Conic Projection, Standard Parallels 49°N and 77°N.
Modified Polyconic Projection, North of Latitude 80°.

PROPERTY LOCATION

TORCH 1+2



CLAIM MAP

TORCH 1+2

1:50 000

NTS:
93K2E 8W

Previous Property Work

The Sowchea Creek vermiculite prospect is a relatively new find. The property was first staked by A. Almond in 1987 and previous to that time no known recorded work was done to assess the vermiculite potential of the weathered diorite. During the summer of 1989 the British Columbia Ministry of Mines collected small bulk samples from these showings with the purpose of determining if the material meets industry standards and whether or not this vermiculite prospect, among others, could potentially supply local British Columbia market demand.

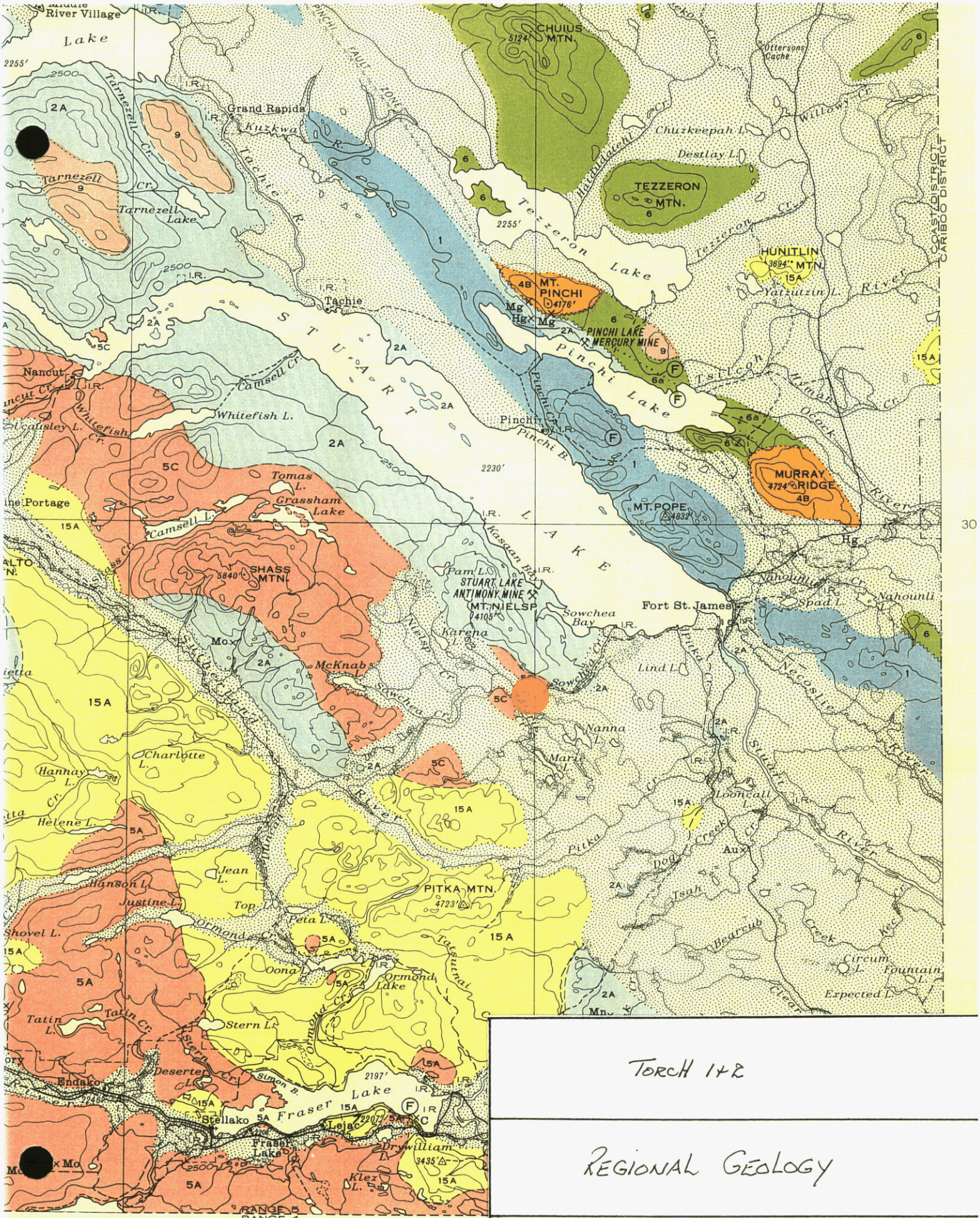
Local Geology

The most recent regional mapping project of the area has been work done by H.Tipper of the GSC in 1979 (map #1424). On the local scale and using Tipper's work,(Map #2) the surrounding area and property is underlain by medium grained Late Jurassic granodiorite and hornblende diorite related possibly to the Topely Intrusions. These granitic to dioritic suites intrude rafted Carboniferous to Jurassic Cache Creek Group sediments, volcanics and ultramafics. Overlying and dominating much of the landscap to the west are young flat lying Oligocene and Miocene basalts and andesites of the Endako Group. Locally, only a limited amount of rock exposure has been located , generally found along the small hilltops and in some of the river gulleys. Vermiculite has been located on the Torch property north of Sowchea Creek and exposed in a northwest trending 160 meter long zone of intensely weathered diorite. Much of the prospect is covered with glacial overburden. This fact combined with the very limited amount of past geological mapping has made interpretation very preliminary at best.

1994 Work Program

A 14 kilogram sample of highly weathered hornblende diorite was collected during the assessment year with the idea of concentrating and testing the quality of vermiculite ore. The material outcrops along a roadcut in the center of the property over a distance of approximately 160 meters and is covered at both ends by varing thicknesses of glacial tills. Test work on the vermiculite is summarized by Berhard Klien of Process Research Associates as follows:

> *"The mineral sample that was processed weighed approximately 14kg. Sample preparation involved dry screening the material at 6 mesh; cone crushing the +6 mesh fraction to -6 mesh; recombining the fractions; and wet screening at 60 mesh. The size distribution of the sample is presented in Table 1. The material was subjected to tabling, jigging and high intensity magnetic separation.*



30

TORCH 1+2

REGIONAL GEOLOGY

LEGEND

CENOZOIC

TERTIARY

OLIGOCENE OR LATER

ENDAKO GROUP

15A, 15B

15A, mainly basaltic and andesitic basalt, andesite, and dacite; flow breccia and agglomerate
15B, trachytic and andesitic flows, dykes, and sills; may be older than 15A

EOCENE OR OLIGOCENE

Rhyolitic flows, tuffs, and intrusions; minor dacite, andesite, and basalt

13

Conglomerate, sandstone, and shale; minor tuff

CRETACEOUS AND TERTIARY

UPPER CRETACEOUS OR LATER

12A | 12B

12A, andesite, trachyte, and rhyolite; intercalated arkose and conglomerate
12B, rhyolite, dacite, andesite, basalt; minor related tuffs and breccias; may be partly or entirely of same age as 14

UPPER CRETACEOUS AND PALEOCENE

SUSTUT GROUP

11

Conglomerate, shale, greywacke, and tuff

MESOZOIC

JURASSIC OR CRETACEOUS

UPPER JURASSIC (?) OR LOWER CRETACEOUS

USILIKA FORMATION: conglomerate; minor sandstone and shale; may be partly younger

UPPER JURASSIC OR LOWER CRETACEOUS

OMINECA INTRUSIONS

9

Granodiorite, quartz diorite, diorite; minor granite, syenite, gabbro, and pyroxenite

JURASSIC AND (?) CRETACEOUS

TACHEK GROUP

8

Andesite and andesite breccia; basalt and rhyolite

PART OF HAZELTON GROUP

7

Andesite, trachyte, basalt, and related breccias

TRIASSIC AND JURASSIC

UPPER TRIASSIC AND LATER

TAKLA GROUP

6

Andesitic and basaltic flows, tuffs, breccias, and agglomerates; interbedded conglomerate, shale, greywacke, limestone, and coal; 6a, shale, greywacke, conglomerate, tuff, and limestone (Upper Triassic)

PERMIAN (?) AND/OR LATER

POST-MIDDLE PERMIAN, PRE-UPPER JURASSIC (?)

TOPLEY INTRUSIONS

5

5A, granite and granodiorite
5B, syenite
5C, diorite

POST-MIDDLE PERMIAN, PRE-UPPER TRIASSIC (?)

TREMBLEUR INTRUSIONS

4

4A, peridotite, dunite; minor pyroxenite and gabbro; serpentinized and silicified equivalents
4B, pyroxenite, minor peridotite and gabbro; serpentinized and silicified equivalents. May be in part post-Triassic

PENNSYLVANIAN (?) AND PERMIAN

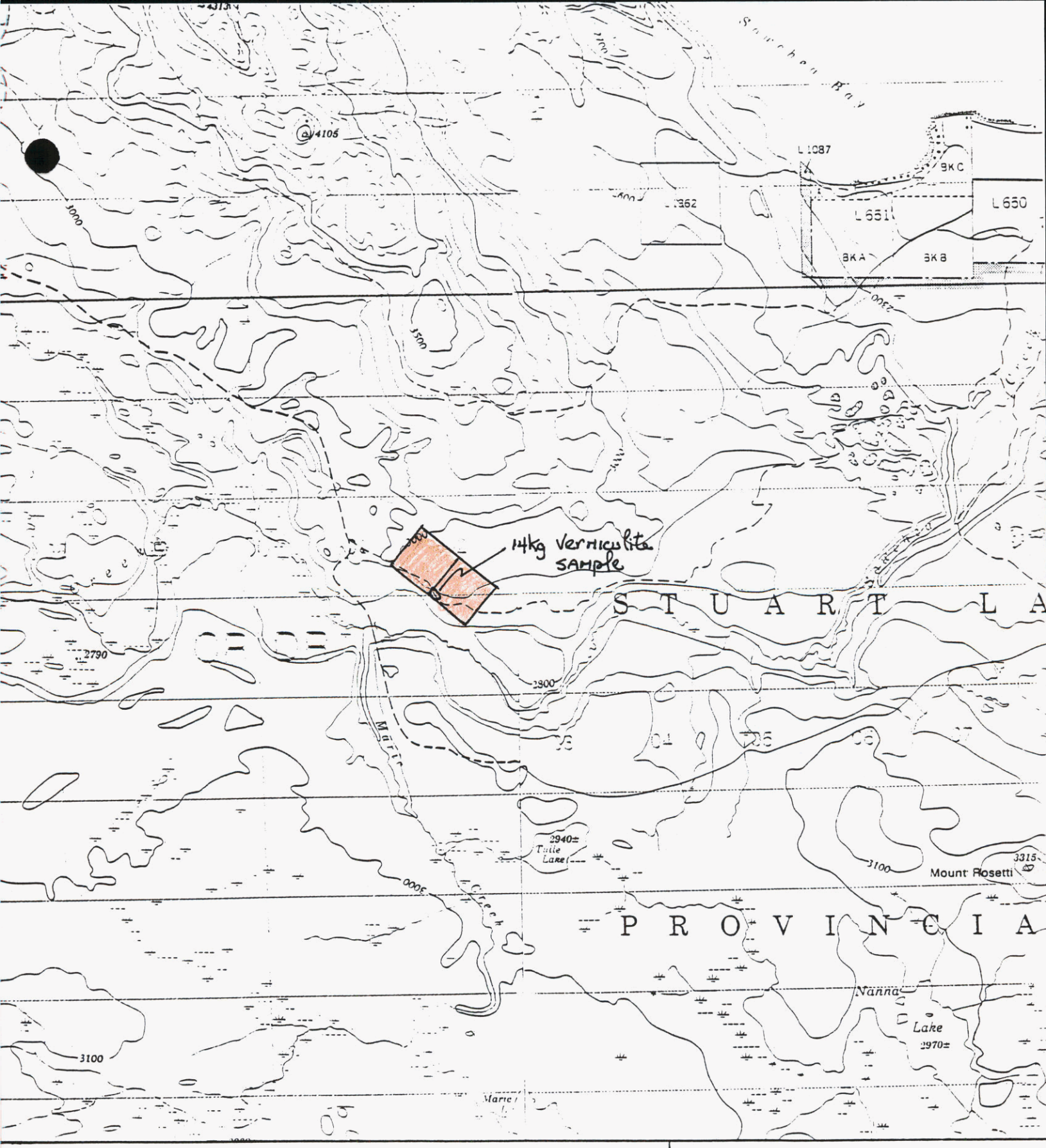
CACHE CREEK GROUP

Andesitic flows, tuffs, and breccias with minor basic intrusions (greenstones); chlorite- and hornblende schists; minor argillite, chert, and limestone. May include some Takla group rocks (6)

PALÆOZOIC

2A, 2B

2A, ribbon chert, argillaceous quartzite, argillite, slate, greenstones similar to 3; limestone; minor conglomerate and greywacke; metamorphosed equivalents; small bodies of 4
2B, argillite, slate, greenstones similar to 3; minor chert and limestone. Relation of 2B to 2A not known; both in part older than 1, and may be in part younger than 3



Scale 1:50,000 Échelle

0 1 2 3 Milles

0 1000 2000 3000 4000 Mètres

0 1000 2000 3000 4000 Verges

TORCH 1+2

SAMPLE LOCATION

SCALE 1:50,000 NTS: 93K/7,8

Table 1. Size distribution of crushed sample.

Size Fraction	Weight (g)	Weight (%)
+10	840.6	5.9
-10+14	3,516.8	24.8
-14+35	5,431.8	38.3
-35+60	2,319.0	16.3
-60	2,086.7	14.7
Total	14,194.9	**100.0**

Table 2. Distribution of magnetic fractions from processing with the Permroll High Intensity Magnetic Separator.

Product	Roll Speed (rpm)	Weight (g)	Weight (%)
-7+10 mesh			
Non-mags	-150	210.6	25.1
Para 1	-225+150	316.8	37.7
Para 2	-300+225	229.3	27.3
Para 3	+300	83.9	10.0
Total		**840.6**	**100.1**
-10+14 mesh			
Non-mags	-175	1273.0	36.2
Para 1	-250+175	1169.4	33.3
Para 2	-325+250	826.8	23.5
Para 3	+325	247.6	7.0
Total		**3516.8**	**100.0**
-14+35 mesh			
Non-mags	-200	3500.8	64.5
Para 1	-300+200	1401.0	25.8
Para 2	+300	527.0	9.7
Total		**5431.8**	**100.0**
-35+60 mesh			
Non-mags	-200	1945.4	47.3
Para 1	-300+200	1040.3	25.3
Para 2	+300	1125.0	27.4
Total		**4110.7**	**100.0**

Table 3. Distribution of jig products from gravity concentration of paramagnetic fractions.

Product	Weight (g)	Weight (%)
-14+35 mesh paramags		
Jig concentrate	205.1	10.7
Jig tails	1706.0	89.3
Total	**1911.1**	**100.0**
-10+14 mesh paramags		
Jig concentrate	72.5	3.3
Jig tails	2143.8	96.7
Total	**2216.3**	**100.0**

Initially, it was proposed to recover the vermiculite from the -6 +60 mesh fraction using a Gemini shaking table. Although some separation was observed, the design of the table made it difficult to recover a vermiculite product without recovering the fine waste particles with it.

Tests were then performed using a Permroll High Intensity Magnetic Separator to attempt to separate the paramagnetic vermiculite from the non-magnetic waste material. For these tests, the sample was screened into narrow size fractions at -6 +10 mesh, -10 +14 mesh and -14 +35 mesh and -35 mesh. Each fraction was feed to a separator using various roll speeds. The separator was very effective in rejecting a significant amount of mostly quartz material (between 25.1% and 64.5% of the total weight of material in specific size fractions) while maintaining high vermiculite recoveries (based on visual estimates). The waste product contained mostly quartz and very little vermiculite. The vermiculite products, however, contained large amounts of hornblende, magnetite and unliberated magnetite/quartz particles. The proportion of unliberated particles decreased with decreasing particle size such that only a small percentage of the -14 mesh particles were not liberated. The roll speed of the separator was controlled to produce fractions of varying magnetic strength in order to attempt to separate the vermiculite from other paramagnetic material. While some magnetic fractions have higher vermiculite grades than others, it was not possible to produce a high grade product. The weight distributions of the magnetic fractions from each size fraction are presented in Table 2.

To attempt to upgrade the paramagnetic products further, they were fed to a 2 inch laboratory jig. The jig was very effective in upgrading the -14 +35 mesh vermiculite product producing a sample the appeared to have high grade. The jig was less effective with the -10 +14 mesh fraction, but by replacing the steel shot with larger diameter glass beads, some upgrading was achieved. The concentrate contained some waste material and considerable losses were observed in the jig tails. It was not possible to concentrate the +10 mesh vermiculite using the laboratory jig. The weight distributions of products produced with the jig are presented in Table 3."

Conclusion

Additional prospecting and small bulk sampling of zones with higher concentration of vermiculite will be needed to upgrade the potential of the Torch property. It is recommended that detailed prospecting of the area be carried out along surrounding hilltops, stream valleys and road cuts in the local area, with the idea of isolating contact zones between the intrusive suite and the overlying Endako Group basalts and andesites. It is along these zones the potential of unglaciated vermiculite concentration will be the greatest.

REFERENCES

Collings, R.K. and Andrews, P.A. (1991): Mica and Vermiculite. Canmet Summary Report # 5. 35 pages.

Hindman, J.R. (1992): Vermiculite. Mining Engineering. June 1992, pages 577 - 578.

Klein, B. (1993): Report on Processing of Vermiculite Sample. Process Research Associates, Vancouver. Private file.

Meisinger, A.C. (1988): Vermiculite. U.S Bureau of Mines Minerals Yearbook 1988.

Morin,L and Lamothe, J.M (1990) Testing on Perlite and Vermiculite Samples from British Columbia. CANMET Testing. B.C. Ministry of Energy, Mines and Petroleum Resources. Geological Fieldwork 1990, Paper 1991-1, pages 265-268.

Tipper, H.W. (1963): Nechako River Map-area, British Columbia; Geological Survey of Canada, Memoir 324, Map 907A.

Tipper, H.W. et al. (1979) Parsnip River Area, G.S.C. Map #1424

White, G.V (1989): Perlite and Vermiculite Occurrences in British Columbia; B.C Ministry of Energy, Mines and Petroleum Resources. Geological Fieldwork 1989, Paper 1990-1, pages 481-487

Wilson, H.S. (1981): Lightweight Aggregates - Vermiculite etc. Canmet Report 81-15E. Pages 1 - 10.

STATEMENT OF COSTS (Torch 1 & 2 claims)

Labour	1 day Al Jackson, J.Cuttle (Sample collection and prospecting)	600.00
Truck Rent	2 days @ 60/day	120.00
Travel	Lodging, 1 night	39.00
	Food and gas	210.00
Supplies	(Maps, flagging, etc)	40.00
Sample analysis	(process Research Associates)	865.25
Report Preparation	(J.Cuttle @ 1.5 days)	450.00
	(Photo copies etc.)	15.00
	Total	**2339.25**

MINFILE NUMBER: 093K 101 NATIONAL MINERAL INVENTORY:

NAME(S): SOWCHEA CREEK

STATUS: Prospect
NTS MAP: 093K07E
LATITUDE: 54 22 55
LONGITUDE: 124 30 40
ELEVATION: 850 Metres
LOCATION ACCURACY: Within 500M
COMMENTS: Location centered on largest outcrop of weathered diorite (Geological Fieldwork 1989, p. 487, Figure 5-1-8).

MINING DIVISION: Omineca
UTM ZONE: 10
NORTHING: 6026854
EASTING: 401857

COMMODITIES: Vermiculite

MINERALS
SIGNIFICANT: Vermiculite Mica
MINERALIZATION AGE: Jurassic

DEPOSIT
CHARACTER: Disseminated
CLASSIFICATION: Magmatic Syngenetic Industrial Min.
DIMENSION: 150 Metres STRIKE/DIP: TREND/PLUNGE:
COMMENTS: Exposed diorite outcrops.

HOST ROCK
DOMINANT HOST ROCK: Plutonic

STRATIGRAPHIC AGE	GROUP	FORMATION	IGNEOUS/METAMORPHIC/OTHER
Jurassic			Unnamed/Unknown Informal

LITHOLOGY: Medium Grained Hornblende Diorite
Medium Grained Diorite
Diorite

GEOLOGICAL SETTING
TECTONIC BELT: Intermontane PHYSIOGRAPHIC AREA: Nechako Plateau
TERRANE: Stikinia Plutonic Rocks

CAPSULE GEOLOGY

The Sowchea Creek vermiculite propsect occurs north of Sowchea Creek, about 17 kilometres southwest of Fort St. James.

Vermiculite is concentrated in a zone of weathered medium grained hornblende diorite of Jurassic age, exposed in 5 outcrops along a roadcut over a distance of 150 metres. Expandable mica also occurs in fresh medium grained diorite exposed southwest and northeast of the weathered diorite.

Exfoliation tests were carrried out on a sample of vermiculite by CANMET, Energy, Mines and Resources Canada. Vermiculite content of the tested sample averaged 11.8 per cent (Geological Fieldwork 1990, p. 267, Table 3-1-1). The material may be too fine-grained for use as loose insulation; 89 per cent of the vermiculite was found to occur in size fractions below 1.65 millimetres. Bulk densities of the minus 1.65 millimetre size fractions, ranged from 357 to 434 kilograms per cubic metre, above the ASTM range of 88 to 128 kilograms per cubic metres specified for loose insulation.

BIBLIOGRAPHY

EMPR FIELDWORK *1989, pp. 481-487; *1990, pp. 265-268
GSC MEM 252
GSC MAP 630A, 971A, 1424A

DATE CODED: 910507 CODED BY: PSF FIELD CHECK: N
DATE REVISED: 910508 REVISED BY: PSF FIELD CHECK: N

STATEMENT OF QUALIFICATIONS

I, **JIM CUTTLE,** of the Municipality of North Vancouver, in the Province of British Columbia, certify as follows regarding the work performed on the **Torch 1 and 2 Mineral Claims** in the **Omineca Mining Division.**

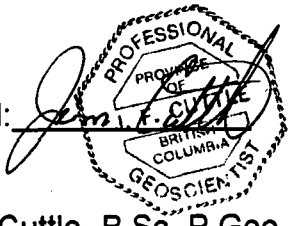
That I am a geologist having practised my profession in Canada and Norway for the past 14 years.

I was present on the **Torch 1and 2** mineral claims when work was performed

That I am a graduate of the University of New Brunswick with a Bachelor of Science in Geology.

That I am presently working as a private consultant at the home address of P.O # 37009, 2930 Lonsdale Ave, North Vancouver, B.C.

That I am a certified member of the Association of Professional Engineers and Geoscientists of British Columbia.

Signed: 

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