31D09NW0013 OP92-236 CAVENDISH

Final Report for OPAP Grant # OP92-236
Vermiculite Occurrences in Cavendish Township
Southeastern Ontario.

John C. Archibald, B.Sc.Geologist

December 31, 1992.

SOUTHERN ONTARIO MINING DIVISION
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Final Report

on the

Cavendish Vermiculite Project

OPAP File Number OP92-236

Introduction

The purpose of this program was to evaluate the extent and potential of the vermiculite mineralization located in the southern portion of Cavendish Township, in the Eastern Ontario Mining District.

Previous work in the area had outlined several high grade vermiculite occurrences some 2.4 kilometers to the east. Unfortunately their proximity to cottages ccreated a conflict and the program was shelved temporarily.

The work performed in this program consisted of geophysical surveys which included Crone V.L.F. Electromagnetic and proton magnetometer Surveys, cutting, chaining and flagging of lines, geological mapping, and geochemical sampling of the weathered bedrock horizons. The surveys and sampling was done during the summer and fall period of 1992. Sample exfoliation and studies were completed between November 1 and Dec 31, 1992.

Some 15.9 kilometers of line was cut and flagged during the program. A total of 10.6 kilometers of magnetometer and V.L.F. electromagnetics was run, with a spacing of 100 meters between lines and intervals of 25 meters between stations on the lines. A total of 22.8 kilometers of geological mapping was run during this program.

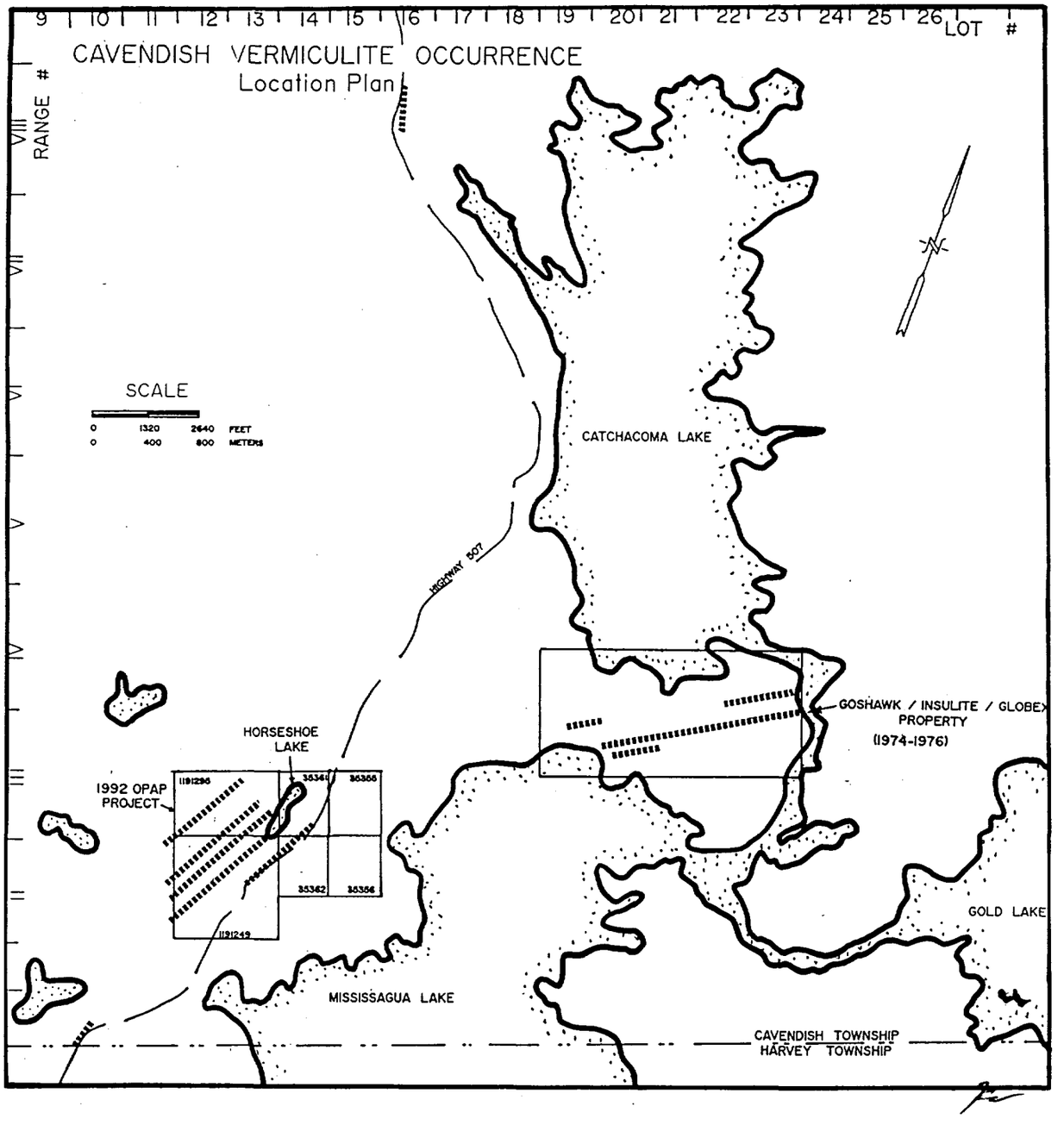
A total of some 338 samples were collected during the geochemical sampling program, ten of which have come from adjacent areas to the north, east, and south of the main survey area. A majority of the samples have come from a marble-dolomite metasedimentary unit.

Approximately 118 of these samples have indicated vermiculite values, of which 35 have significant values.

The second phase of this project involves the evaluation of approximately 92 of these samples by a laboratory for percentage of vermiculite and for the size and density of the vermiculite.

Two other individuals, C.W. Archibald (mining engineer) and F.T. Archibald (geologist), (OPAP grants OP92-265 and OP92-264 respectfully) worked on this same project . Grant OP92-265 consisted of overburden drilling underneath areas that indicated significant vermiculite mineralization to see if values extended to depth, and to carry out assaying through an independent laboratory. Grant OP92-264 covered the portion of the program that included the geophysical surveys, some geological mapping and sampling whereas my portion covered reconnaissance prospecting, mapping, sampling and reconnaissance sample analysis for vermiculite.

A total of 62 days were spent on field work and 18 days on sample preparation and analysis , one day on data research, and 5 days on report preparation. A total of $3397.22 was spent on project expenditures for Grant OP92-236. A total of $11,897.22 was spent on this project by J.C. Archibald in time and expenditures as outlined by the OPAP Program requirements.


CAVENDISH VERMICULITE OCCURRENCE
Location Plan
LOT #
RANGE #
SCALE
0 1320 2640 FEET
0 400 800 METERS
CATCHACOMA LAKE
HIGHWAY 507
GOSHAWK / INSULITE / GLOBE
PROPERTY
(1974-1976)
HORSESHOE LAKE
1992 OPAP PROJECT
1191295
35361
35355
35362
35356
1191249
GOLD LAKE
MISSISSAGUA LAKE
CAVENDISH TOWNSHIP
HARVEY TOWNSHIP

Property

The original property consisted of three patented claims numbered 35355, 35356, and 35362. The original discovery of vermiculite was located on the north-west section of claim 35362. Consequently, it was found that this original discovery was along the eastern contact of a dolomite/marble unit which contained several parallel zones of vermiculite-bearing material, and subsequently claims E01191249 and E01191295 were picked up to cover these areas. The original claims consisted of approximately 130 acres. Since vermiculite-bearing lenses continued off the property onto Crown land, an additional 260 acres was staked onto the main group. The surveys in this program cover an area of approximately 450 acres.

The original vermiculite discovery was made by Harvey Greene on Lots 19 to 23 in Concessions III and IV in the southeast section of Cavendish Township. This program managed to located parallel vermiculite systems on Lots 12 to 14 in Concessions II and III of Cavendish Township.

The property is located some seven kilometers north on Highway #507 which runs between Buckhorn and Gooderham. It is approximately 35 kilometers northwest of Peterborough, 45 kilometers northeast of Lindsay, and approximately 243 kilometers northeast of Toronto. The property is located approximately 1.2 kilometers north of the Cavendish/Harvey Township line along Highway # 507.

The property consists of gently rolling terrain with mature pine, maple, and oak (4 to 12 inch diameter). Overburden cover is shallow and on average is approximately 0.5 to 1.0 meters to bedrock. In the swampy areas, depths of up to 10 meters of overburden were encountered consisting of mainly peaty material and poorly developed basal tills. It was hoped that some of these areas might yield larger volumes of weathered vermiculite that infilled low depressions during the last glacial period.

History

In 1950, Harvey Greene acquired claims in the area where the work program was run. Vermiculite was first located on Lot 14-Concession II, on Lot 23-Concession IV, on Lot 25-Concession IV, and on Lot 22-Concession IV.

In 1973, Globex Minerals Inc prospected and drilled the area immediately to the east of the claims. This program consisted of a limited amount of diamond and augur drilling.

In 1975 and 1976, under the supervision of Mr. C.W.Archibald, Goshawk Mines Ltd. carried out an exploration program consisting of linecutting, soil sampling (auguring), diamond drilling, and backhoe trenching. Approximately 1183 meters of diamond drilling and 3460 meters of backhoe trenching was completed during this program. Vermiculite was located over a strike length of some 1737 meters to depths of up to fifteen feet.

A total of three vermiculite zones were outlined by these previous programs. The zones averaged 122 meters to 274 meters in width, and 183 meters to 823 meters in length. Some 93,3000 cubic yards of vermiculite (of over 5% vermiculite by volume) was located in an area of 366 meters by 152 meters. Due the close proximity to cottages, the program was temporarily shelved.

Geology

The area is underlain by carbonate-rich metasediments of marble and diopside (Grenville), amphibole-rich metasediments, syenite and syenite gneiss, and quartz monzonite. These units are all cut by pegmatite and syenite dykes. The metasediments are formed from metamorphosed limestone. Bands of altered biotite or amphibole-rich material can be seen within areas of intenses shearing as an alteration product of metamorphism

The vermiculite is mainly found witnin the weathered-silicified marble and dolomite bedrock, particularily in the areas bordering shallow swamps. Some pseudo-vermiculite can be seen witnin the amphibolite-rich shears, caused in part by hydrothermal alteration A majority of the vermiculite horizons are located within the marbles around the edges of the Anstruther granite batholith. A thin band of amphibolite is found between the Grenville marbles and the Anstruther batholith. Bands of biotite-rich amphibolite and granite are found to cut the metasedimentary marbles along shear contacts which now appear as schistose material

The modal makeup of the vermiculite is as follows:

40.0-42.4% SiO2

23.6-29.3% MgO

9.8-12.2% Al2O3

5.1-6.7% FeO

0.7-1.1% TiO2/CaO/K2O

The phlogopite, tremolite, and biotite hydrothermally alter to vermiculite, talc, and serpentinite The vermiculite forms at higher temperatures and different Ph than the other minerals. Vermiculite is essentially a hydrated aluminum and magnesium rich mineral

in this area the vermiculite is beige (phlogopite-biotite origin) and green (tremolite-serpentinite origin) and found mainly in sheet-like lenses. The latter is a higher-grade material. There are minor amounts of red colored vermiculite flakes, due to alteration of actinolite. The Mg content is caused by dissolution of dolomite from the calc-silicate rocks.

On the Goshawk/Insulite property to the east of the survey area, the vermiculite bands strike at North 70 degrees East, and dip 20 to 60 degrees to the south.

Geological Survey

The geological survey was run during the summer and fall of 1992. There was a one-week period in November when there was up to seven centimeters of snow cover but this did not effect the survey as the ground conditions were not frozen and outcrops were still visible.

A total of 22.8 kilometers was traversed during the survey, along flagged lines and claim lines. Although this was a reconnaissance program attempting to locate vermiculite bearing material within the marble and dolomite units, differentiation between biotite rich amphibolites and amphibole-rich amphibolites was not made.

A metasedimentary complex of marble and dolomite was located on the property. This unit is approximately 750 meters in width and at least 1200 meters in length, continuing off the property onto crown land in the southwest. Where the metasedimentary unit continues off the property, it appears to narrow but still averages approximately 350 meters in width. To the north, roughly through the mid-section of Horeshoe Lake, the metasedimentary unit is terminated by both amphibolite and syenite units. This same metasedimentary unit appears to outcrop approximately 0.9 kilometers to the south of the property and also 3.2 kilometers to the north of the property.

It appears that the Goshawk Mines Ltd. vermiculite deposit is not connected to the zones outlined during this survey. The new zones occur on the north-west flank of a fold, and the Goshawk deposits occur on the ridge of the same fold; both are separated by biotite-amphibole-syenite amphibolite units. The Goshawk marble-dolomite metasedimentary units extend as far as the east boundary of claim 35355 .

Vermiculite mineralization is found all around the contact area of the metasedimentary unit and within amphibolite-rich shears which are trending from the metasediments and within the sedimentary unit itself.

Along the edges of the metasedimentary unit, the vermiculite bearing zones appear to be confined within lenses. These lenses dip from 45 degrees to 80 degrees, the latter being the prevalent dip to the southwest. The vermiculite mineralization in the central portion of this metasedimentary unit appears to be wider and has greater potential for depth.

The metasedimentary unit is terminated north of Line 6 South (west side of Horseshoe Lake), and appears to pinch south of Line 17 South (southwest of claim 1191249). However, extensions of this zone can be found along Highway #507 a few kilometers south and north of the claim group.

Geochemical-Soil Testing Program

Approximately 338 samples were taken during this phase of the program of which ten were taken in areas adjacent to the main section of the survey grid.

The samples were taken for the most part from the soil horizon immediately above the bedrock. Extra care was taken to try and obtain chips of the bedrock. Dolomite/marble units appeared for the most part to be weathered to semi-weathered. The amphibolite units, with exception of the sheared units, appeared to be more massive and less resistant to weathering processes.

On average the samples were taken at 0.5 to 1.0 meters in depth. The southern and extreme northern sections of the property were overlain by shallow overburden. The areas surrounding Horseshoe Lake and to the southwest of Horseshoe Lake were overlain by deeper overburden averaging 1.0 to 3.0 meters in depth. Drilling by C.W. Archibald (OPAP Grant # OP92-265) indicated that depths of up to 10.0 meters of overburden are found in some of the swamps surrounding Horseshoe Lake. The drilling program was run over areas which indicated high surface values and areas of possible high tonnage situations.

It was found by initial prospecting that the main vermiculite values coincide with the marble/dolomite metasedimentary units, and within sheared amphibolite/amphibolite gneiss units which are in close contact with the metasedimentary units. For this reason a majority of the samples were taken from the marble/dolomite units.

Samples were taken every 25 meters on lines spaced at 100 meters apart.

These samples were evaluated visually by using a propane torch to exfoliate a portion of the samples. Samples were first pulverized before exfoliating to allow for greater surface area and better exfoliation of the micaceous booklets. The samples were divided into three catagories:

A) no visual vermiculite exfoliation

B) visual indication of vermiculite under 10% volume (V or *)

C) visual indication of vermiculite over 10% volume (VG or **or***)

Samples which indicated vermiculite were used in a qualitative determination program to determine:

A) exact percentage of vermiculite

B) size distribution of vermiculite

C) weight of vermiculite (pounds per cubic foot determination).

The initial phase of logging and visual determination took between 0.5 and 1.5 hours per sample on average. The detailed analyses of size distribution and weight determination, including sample drying, averaged 6.6 hours per sample. The samples were dried in a convection oven at temperatures of under 100 degrees F. Low temperatures are needed as higher temperatures will change the exfoliation potential of the vermiculite mineral. The samples are then pulverized and weighed before exfoliation. After exfoliating each sample, the vermiculite is weighed. The samples are then screened using: +4, +4 to -8, +8 to -14, +14 to -28, -28 screen fractions. Each fraction is weighed and then pound per cubic foot determinations are made.

Results of Program

Some 338 geochemical/soil samples were taken during the program. Most of these were obtained within the marble/diopside units and the remainder within amphibolite-rich shear zones. Of the samples taken, 135 (40%) contained vermiculite. Approximately thirty-five of the samples or 34.9% of the vermiculite-bearing samples have visually indicated values of over ten percent vermiculite by volume (upon exfoliation).

Ninety two samples have been analyzed for quantitative analyses and size distribution/density analyses.

Industrial Use for Vermiculite

Vermiculite is primarily used in gypsum plaster, insulation, and replacing sand in concrete. It is desirable due to its low density, high heat resistance, low thermal conductivity, light weight, inert chemical properties, and acoustic (sound-proofing) qualities. It is also cheaper to transport in bulk as a raw product before exfoliation and have it expand to its final product once it reaches its proper market.

Other vermiculite deposits located in Canada are in the Sudbury and Perth areas. Due to the high asbestos/talc contents, these deposits are not in demand. There are only four other producers of vermiculite in the world which include, Libby (Montana), Palabora (South Africa), Enoree (South Carolina), and Santa Luzia (Brazil). The first three are high grade (~90% vermiculite) but within narrow lenses and pods. The last is not in high demand due to a high biotite content.

Vermiculite is generally graded into six catagories: No 1 is coarser than +4 mesh (density of 7 pounds per cubic foot), No.2 is between -4 and +14 mesh (density of 6 pounds per cubic foot), No 3 is between -14 to +28 mesh (5 pounds per cubic foot), and No 4 to No 6 is between -28 and +48 mesh (4 pounds per cubic foot). No 1 is used for loose fill and agricultural purposes, No 2 is used for refrigerator insulation or asphalt impregnation or plaster/concrete aggregate, No 3 is used for agricultural growing or plaster/concrete aggregate, and Nos 4-6 is used for fillers, insecticides, carriers, paint extenders and home insulation. Vermiculite competes with gypsum, perlite, foamed slag, clay, and sand as an industrial mineral. It has a higher K factor and is lighter than the other materials, although it has less compressive strength.

Our concern with this particular occurence is its potential for uses in the environmental field as a capping or liner material for waste and landfill sites and as an absorbant material for toxic spills if the qualities of this particular deposit are amenable to this purpose.

Summary of Results-

Of the 338 samples taken during the surface geochemical/sampling program, 92 of the samples returned vermiculite values. Of the samples which returned vermiculite values, some fourty-one (44.6% of the samples) of them contained significant values. Significant values are determined as those which are over ten percent vermiculite by volume.

Significant values were returned from all five of the vermiculite-bearing anomalies. The highest percentage of vermiculite found in each anomaly is as follows:

Anomaly A- up to 38.05% vermiculite (4-38% average)

Anomaly B- up to 16.28% vermiculite (8-25% average)

Anomaly C- up to 25.89% vermiculite (4-26% average)

Anomaly D- up to 12.97% vermiculite (13-18% average)

Anomaly E- up to 69.44% vermiculite (3-18% average)

Samples were also analyzed from the Insulite/Goshawk property to the east of the survey area and from the roadcut some 1.2 kilometers to the south of the survey area. These returned 14.16% and 14.47% vermiculite rerspectively.

Sampling has indicated that the zones continue to the south-southwest and to the east of the survey area. Two claim blocks of six claims were staked during this program to cover some of the important areas.

A majority of the vermiculite is contained within the -28 to +48 mesh size fraction (grades 4 to 6), but there is sufficient material also in the -14 to +28 (grade 3) mesh size fraction.

Approximately 42 percent of the samples within the -6 to +14 mesh fraction contain material with a density of 3 to 7 pounds per cubic foot, and approximately 23 percent of the samples within the -14 to +28 mesh fractions contain material with the same density. Only 10.9 percent of the samples containing vermiculite contained material coarser than +8 mesh size.

Visual indications during the field studies indicated that Anomaly C and Anomaly E contained coarser vermiculite material with lower densities.

The method of exfoliation of vermiculite using propane torches is sufficient for field studies but it has been found that without proper temperatures at specific time intervals, vermiculite will not expand to its fullest potential. It is therefore estimated that the vermiculite under ideal conditions will occupy more of the coarser mesh intervals, and that the densities will be lower than what this study has indicated. An oven with 1350 to 1700 degrees F should be used for future exfoliation of materials.

Conclusions

This phase of the exploration program has expanded the previously known areas of vermiculite-bearing material which were first located on patented claim E035362. Prospecting, geological mapping, geochemical/soil sampling, VLF-Electromagnetic and magnetometer surveys were all useful tools in outlining these vermiculite deposits. Vermiculite has been found to be associated within defined geological units (metamorphosed limestone), and it has been found that the magnetometer survey is useful in delineating between the iron-rich amphibolites and the iron-poor marble/limestone units.

A total of five vermiculite-bearing zones in total were outlined, encompassing a surface area of over 450 square meters.

It appears that these zones, all of which lie within a marble (metamorphosed limestone/dolomite) unit, trend in a northeasterly direction (N 20 degrees E). These zones are truncated in the middle section of Horseshoe Lake (at Line 6 South), but appear to continue off the property and survey grid to the southwest.

The vermiculite-bearing zones are located either at the contact or in the central portions of the marble complex. At the contact edges the vermiculite material appears to be relatively shallow and unweathered at depth but in the central areas appears to be wider and weathered to greater depths.

It is possible that the material in the central sections of the marble complex is possibly an accumulation of weathered material within a "bowl" or trough; and for this reason there is potential for a large-tonnage situation in this area. Although Anomaly E , in the northwest section of claim E0 35362, has some of the highest vermiculite percentages per volume of material, it is thought that Anomalies C and B respectively have the greatest potential for both grade and volume.

A total of ninety two samples returned significant vermiculite assays. Approximately forty-five percent of the vermiculite-bearing samples contained over ten percent vermiculite by volume and these high-grade samples covered an area of approximately 600 meters square (800 meters east-west and 400 meters north-south). This area is located to the south and southwest of Horseshoe Lake.

Most of the vermiculite mineralization was located in low ground or at the edges of swamps. It is possible that there is one large area of accumulation in some areas where some of the anomalous zones are one of the same. It is also thought that some of these anomalous zones are close enough to each other to be mined as one deposit in the future.

There is sufficient quantities of vermiculite within the -8 to +28 mesh fractions, (the majority in the -14 to +28 mesh range), with a density of 3 to 7 pounds per cubic foot. The exfoliated vermiculite coincides with the industrial catagories of #3 grade to #6 grade. The size and grades outlined by lab analyses indicate that this material is useful as plaster/concrete aggregate, fillers, and paint extenders. With a proper method of exfoliation (using an ideal exfoliation temperature of 1350 to 1650 degrees F. over a specific time period), it is thought that there is sufficient material in the higher-grade/ coarser size fractions which would be useful for insulation purposes. There appeared to be coarser material associated with Anomalies B, C, and E.

It visually appears that the vermiculite in this deposit is relatively free of talc, serpentinite, and other gangue minerals. It also appears that this vermiculite is anhydrous or of the non-absorbing type; thus it would be more useful as an insulating material rather than for planting/agricultural products or as an environmental adsorber. It is too soon to determine from this first phase study whether this material may be condusive to uses in the environmental field.

Recommendations

The next phase should be to evaluate the area and depth of the higher grade mineralization, to outline the tonnage and grade potential. There is a surface area of approximately 400 meters by 800 meters (between Lines 7 south and 11 south on the south and southwest side of Horseshoe Lake) which should be tested to see if this is in effect a large bowl-type accumulation of residual material. At the same time a backhoe should be used to bulk-test and sample at depth (to approximately 4.5 to 5.5 meters depth) on each of the anomalies where high values were indicated. One fence per anomaly would total approximately 500 to 600 meters of trenching. These trenches could be logged, sampled, and backfilled in approximately 40-50 hours of backhoe time.

This vermiculite deposit, contained within a marble complex, appears to terminate to the north but extends to the southwest. The extent of this deposit is unknown and continues to the southwest into an area overlain by crown-land. As the highgrade values continue into this area, it should be geologically mapped and sampled to see the extent of this zone. A magnetometer survey would be useful in outlining geological contacts under swamp or heavy-overburden areas.

Vermiculite mineralization has been located in several other locations off the property such as on the Harvey-Cavendish Township line some 0.8 kilometers to the south, on the Insulite/Goshawk property some 2.4 kilometers to the east, and in a roadcut on Highway #507 in line of strike and some 4.4 kilometers to the northeast. It is possible that all of these areas are geologically related.

Although the marble complex is truncated to the north, it is possible it squeezes and bulges, with the possibility that there are a series of other truncated marble complexes extending further north. There is also a large area of open Crown land underlain by metamorphosed limestone or marble some 3.6 to 4.4 kilometers to the north of the present survey area which should be investigated during the next program phase, at the same time the detailed survey and bulk-sampling programs are being runover this property. The next phase could be carried out during the summer and fall months of 1993 when the ground conditions and exposures are ideal. Part of this work program would include some further in-depth study of the properties of the higher quality vermiculite material to see if it has the chemical properties for uses in the environmental field.

December 31, 1992.
Toronto, Ontario.

J.E.Archibald, B.Sc.Geologist.

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Sample Analysis - OPAP Program OP92-236

Sample Nos./Location	Wet wt (gm)	Dry wt (gm)	Extol wt (gm)	Verm Content
J003	26.5	26.4		X
J004	19.6			*
J007	20.0	20.0		X
J0013	11.9			*
J0017	13.2			*
J0018	19.9	19.9		X
J0019	25.9	25.9		*
J0023	16.5			*
J0030	19.4	19.4		X
J0031	19.7	19.7		X
J0034	19.5	19.5		X
J0036	18.6			*
J0039	15.3			*
J0050	21.6	21.6		X
L5S - 0+50W	21.4			*
L6S + 0+50W	105.2	105.2		X
L6S - 6+50W	24.5	24.5		X
L6S - 8+25W	15.6			*
L6S - 8+50W	14.8	14.8		X
L6S - 7+75W	17.9			*
L6S - 9+25W	19.8			*
L7S - 0+25W	43.1	43.1		X
L7S - 1+00W	71.1			*
L7S - 1+50W	36.5	36.5		X

L8S - 0+75W	49.1	49.1	X
L8S - 1+00W	35.7	35.7	X
L8S - 1+25W	84.2	84.2	X
L8S - 1+50W	20.9		*
L8S - 2+50W	56.2	56.2	X
L8S - 9+00W	15.9		*
L9S - 4+00W	34.6	34.6	X
L9S - 5+25W	17.6		*
L9S - 5+50W	61.8		*
L9S - 5+75W	21.7		*
L9S - 6+00W	23.2		*
L9S - 6+25W	21.4		*
L9S - 8+50W.	13.7		*
L9S - 8+75W	17.6		*
L9S -			
L10S - 2+25W			*
L10S - 5+00W	79.3	79.3	X
L10S - 6+25W	66.3	66.3	X
L10S - 3+75W	157.6	157.6	X
L11S - 3+00W	73.1	73.1	X
L11S - 3+25W	85.1	85.1	X
L11S - 3+50W	97.3	97.3	X

L12S - 1+50W	19.4		
L12S - 3+25W	118.6	118.6	X
L12S - 5+00W	243.7	243.7	X
L12S - 3+50W	29.5	29.5	X
L12S - 4+75W	38.1	38.1	X
L12S - 6+00W	108.8	108.8	X
L12S - 7+75W	46.0	46.0	X
L13S - 1+75W	33.4	33.4	X
L13S - 2+75W	40.3		
L13S - 4+25W	34.6	34.6	X
L13S - 4+75W	25.4	25.4	X
L13S - 5+25W	67.9	67.9	X
L13S - 7+00W	52.5	52.5	X
L13S - 7+50W			
L13S - 7+75W	1.2	1.2	X

PLATE A

Scotts Road

garbage dump

L0

L1 south

L2 south

L3 south

35355

L4 south

Horseshoe Lake

L5 south

L6 south

West Road

L7 south

L18

L8 south

35356

A

B.

C

E

L9 south

35362

L10 south

L11 south

L12 south

L13 south

L18

L14 south

D

L15 south

Kings Road

base line A

L16 south

L17 south

base line B

Snowmobile Road

Open Swamp

Open Swamp

VG

Trappers Inn

Highway # 507

Mississagua Lake

Legend

V- vermiculite (-10%)

VG- vermiculite (+ 10%)

•xx - sampling station

Vermiculite rich zones / trends

CAVENDISH VERMICULITE OCCURRENCE

GEOCHEMICAL SAMPLING LOCATIONS

Scale

0 100 200 300 meters

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PLATE F

Scotts Road

garbage dump

L0

L1 south

L2 south

L3 south

35355

L4 south

Horseshoe Lake

53
2.5

L5 south

L6 south

West Road

L7 south

L18

L8 south

35356

1191295

L9 south

35362

L10 south

L11 south

L12 south

L13 south

L18

Open Swamp

L14 south

1191249

L15 south

base line A

Kings Road

L16 south

L17 south

base line B

Snowmobile Road

Mississagua Lake

Open Swamp

Trappers Inn

Highway # 507

Legend

98 — DRILLHOLE NUMBER
DRILLHOLE LOCATION
4.0 — DEPTH OF HOLE (in meters)

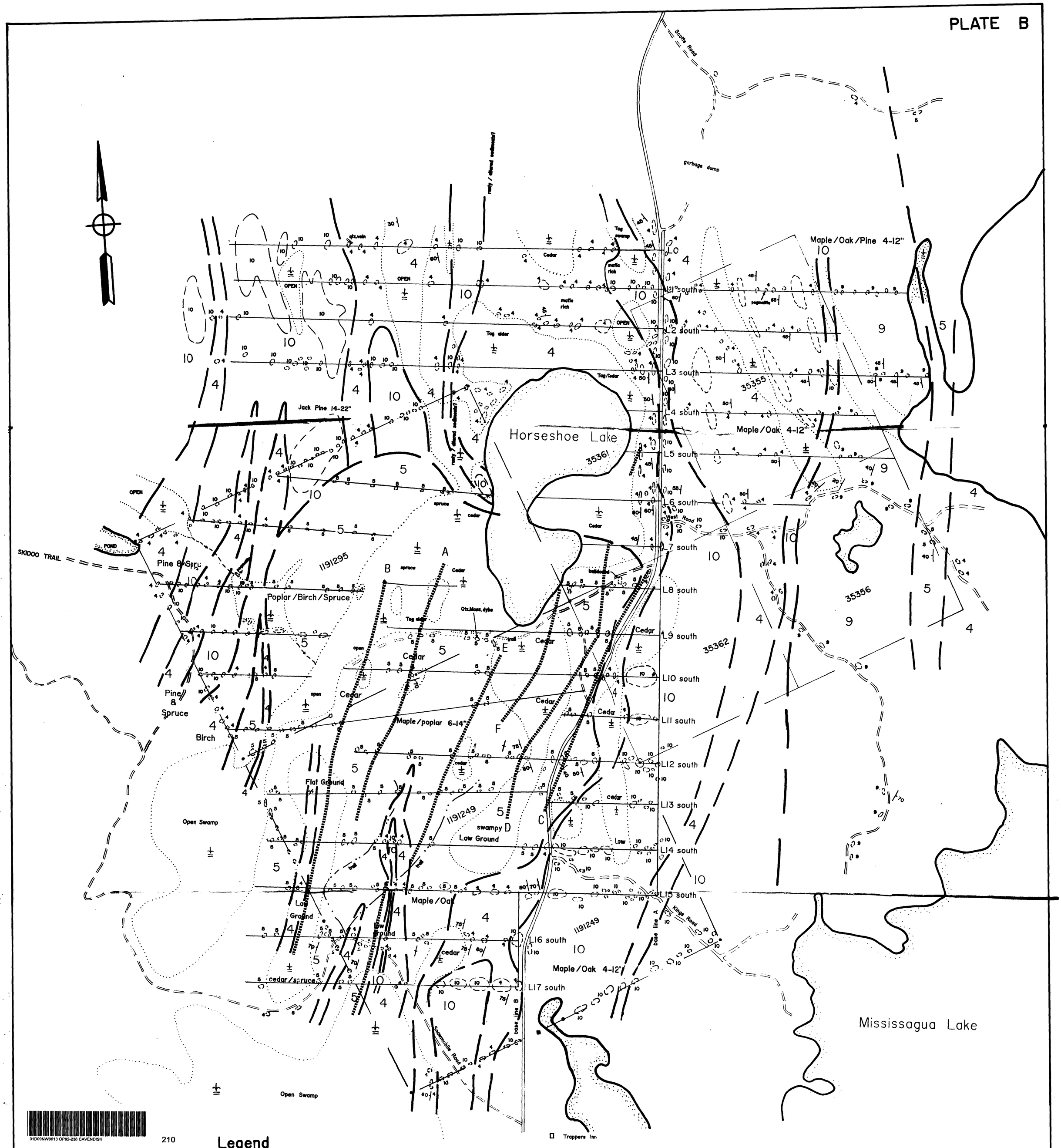
CAVENDISH VERMICULITE OCCURRENCE

OVERBURDEN DRILLING PROGRAM

Scale
0 100 200 300 meters

31D09NW0013 OP92-236 CAVENDISH

PLATE B



31D09NW0013 OP92-236 CAVENDISH

210

Legend

- vermiculite rich trend
- 12 Potassic Pegmatitic INTRUSIVE ROCKS
- 10 Granitic INTRUSIVE ROCKS
- 9 Foliated / Gneissic Syenite INTRUSIVE ROCKS
- 5 CALCAREOUS METASEDIMENT ROCKS (Marble / Diopside / Dolomite)
- 4 Amphibole rich METASEDIMENT ROCKS
- 45 bedding / schistocity
- geological contact
- swamp
- outcropping
- trail
- road

GEOLOGICAL SURVEY
CAVENDISH VERMICULITE OCCURRENCE

Scale
0 100 200 300 meters

PLATE

Scotts Road

garbage dump

L0

L1 south

L2 south

L3 south

L4 south

L5 south

L6 south

West Road

L7 south

L8 south

L9 south

L10 south

L11 south

L12 south

L13 south

L14 south

L15 south

L16 south

L17 south

Horseshoe Lake

35355

35356

35362

1191295

1191249

Open Swamp

Open Swamp

base line A

base line B

Kings Road

Snowmobile Road

Highway # 507

Trappers Inn

Mississagua Lake

18.90 / 6.95 / 38.05 / 8.10 / 6.62 /

12.10 / 7.18 / 9.62 / 6.71 /

8.50 / 0.52 / 21.35 / 20.72 / 13.08 /

4.24 / 8.39 / 20.00 / 15.84 /

8.47 / 28.31 / 25.89 / 4.00 / 23.80 / 25.89 /

6.71 / 16.44 /

25.69 / 25.00 / 9.40 /

15.28 / 12.13 /

20.86 /

1.83 / 13.29 /

9.80 / 0.70 / 9.80 /

2.82 /

12.97 /

17.66 /

0.35 / 17.07 / 20.82 / 2.12 / 9.43 /

6.85 / 28.91 / 37.43 /

0.44 / 4.36 / 23.24 / 41.27 /

4.70 / 28.01 / 13.83 / 16.78

69.44 / 14.05 / 16.02 / 26.54 / 61.54 / 17.66 / 22.12 / 14.44 /

1.05 /

3.08 / 5.83 / 3.12 / 7.03 / 1.27 /

14.78 / 5.03 /

11.66 / 0.73 / 4.63 / 1.56 / 3.00 / 2.58 / 2.83 / 3.79 / 3.88 / 5.36 / 1.21 / 5.03 / 1.96 / 3.19 /

Legend

SURFACE / GEOCHEMICAL SAMPLE → 249 / 5.43 ← DRILLING SAMPLE

(% vermiculite by volume) — (% vermiculite by volume)

C.E. ARCHIBALD — C.W. ARCHIBALD

LINE

SAMPLE LOCATION

VERMICULITE PERCENTAGES & LOCATIONS

CAVENDISH VERMICULITE OCCURRENCE

Scale

0 100 200 300 meters

31D09NW0013 OP92-236 CAVENDISH

230