

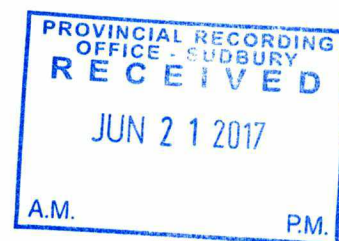
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Kimberlite Indicator Mineral Separation

Manitouwadge Exploration

(A17-03867)



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Prepared by: Jennifer Steyn, Metallurgy Manager, Actlabs

June 3, 2017

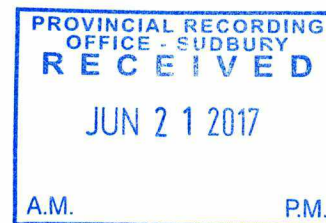
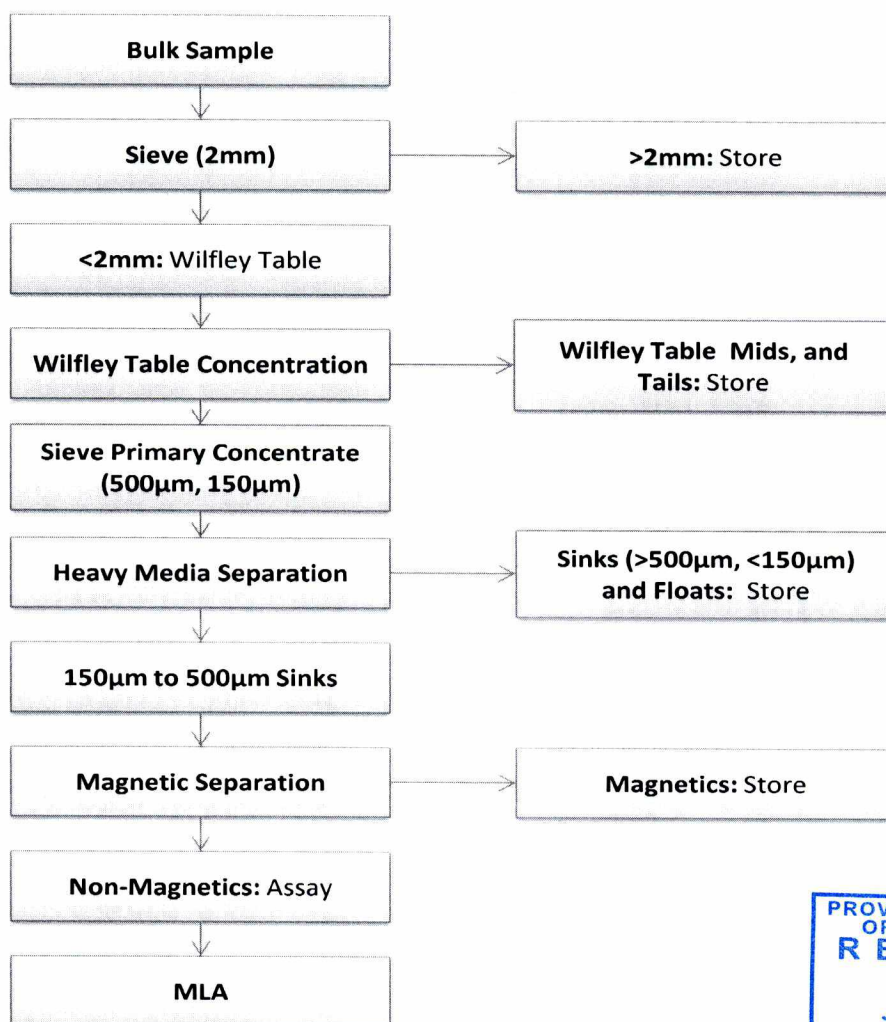


1. Objective

The Kimberlite Indicator Mineral (KIM) separation test is designed to concentrate the heavy minerals and provide a suitable subsample for mineral identification. The mineral identification was done by automated mineralogical techniques.

2. Procedure

The following flowsheet indicates the procedure used to process the sample.



2.1. Sample Preparation

The sample was dried and weighed when received. The sample was sieved to remove the +2mm particles.

2.2. Wilfley Table Concentration

The -2mm fraction was concentrated on a Wilfley Shaking table. The table was optimized to concentrate the heavier particles while minimize the accumulation of light weight material. All fractions were dried and weighed. The table concentrate was sieved into size fractions using 500µm and 150µm sieves. The midlings and tailings were stored.

2.3. Heavy Media Separation

Heavy media separation was performed on the +150µm concentrate fraction. The heavy media used was lithium metatungstate at a SG of 3.0. The separated float and sink material was thoroughly washed, dried, and weighed.

2.4. Magnetic Separation

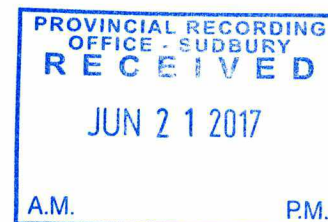
The sinks fraction from the heavy media separation was further purified using a magnet to remove any magnetic impurities.

3. Results

The following tables contain the results from the tests.

3.1. Wilfley Table

Fraction	Mass	
	g	%
Feed	2558.71	100%
Tailings	1504	58.8%
Midlings	1016.17	39.7%
Conc. +500µm	6.69	0.3%
Conc. +150µm	8.61	0.3%
Conc. -150µm	23.24	0.9%



3.2. Heavy Media Separation

Fraction	Mass (g)		Distribution (%)	
	Sinks	Floats	Sinks	Floats
Conc. +500µm	0.47	6.15	7%	93%
Conc. +150µm	2.98	5.51	35%	65%
Conc. -150µm	7.91	15.09	34%	66%
Total	11.36	26.75	30%	70%

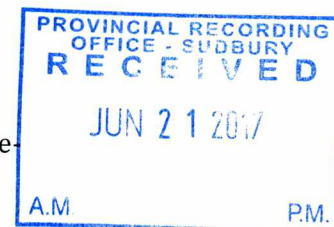
3.3. Magnetic Separation

Fraction	Mass (g)	
	Non-mags	Mags
Conc +150µm Sinks	2.29	0.69

3.4. MLA Mineralogical Characterization

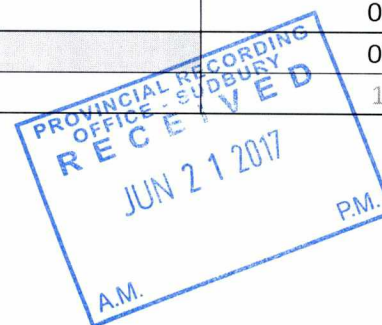
The full mineralogical report is supplied as an excel file, "A17-03675_Manitouwadge-Exploration_Report"

The full mineral list is as follows



		Mineral Wt%	
		Client ID	HMS Wilfley Conc +150
		ActLabs ID	1
Silicates	Garnets	Garnet_CaFe low TiAlMgMn (Andradite)	0.12
		Garnet_CaFeAl (Andradite)	0.88
		Garnet_AlMn low FeCaMg (Spessartine)	0.33
		Garnet_AlFeMn low CaMg (Almandine-Spessartine)	0.55
		Garnet_AlFeCaMn low Mg (Andradite-Spessartine)	0.62
		Garnet_AlFeMnCa low Mg (Andradite-Spessartine)	0.04
		Garnet_AlFeCa low Mg (Grossular-Almandine)	0.59
		Garnet_AlFeMgCa low Mn (Grossular-Almandine)	2.45
		Garnet_CaAl low Fe (Grossular)	0.14
		Garnet_AlFe low MgMnCa (Almandine)	22.84
		Garnet_AlFe low MnMgCa (Almandine)	1.30
		Garnet_AlFeMg low Ca (Almandine)	16.94
		Clinopyroxene	5.00

	Orthopyroxene	1.76
	Amphibole (Anthophyllite)	0.66
	Amphibole (Hornblende)	20.41
	Allanite	0.09
	CaAl low Fe Silicate	4.35
	Epidote	0.61
	Plagioclase	1.19
	K-Feldspar	0.35
	Tourmaline	0.10
	Kyanite/Sillimanite	0.13
	Staurolite	0.22
	Titanite	2.46
	Chlorite	0.17
	Biotite/Muscovite	0.20
	Quartz	2.15
	Zircon	0.49
Oxides & Hydroxides	Fe Oxide	6.63
	Fe Oxide Ti	0.25
	Ilmenite	1.87
	Ti Oxide Fe	1.25
	Ti Oxide	0.47
	Chromite Spinel	0.01
	Gibbsite	0.00
	Fe Hydroxide	0.82
Sulphides	Pyrite/Pyrrhotite	0.28
	Chalcopyrite	0.01
Carbonates	Calcite	0.25
	Dolomite	0.07
	Siderite	0.04
Phosphate	Apatite	0.77
	Monazite	0.10
	Goyazite	0.00
Others	Others	0.02
	Total	100



Note:

An attempt was made to quantify the variability in the garnets and therefore were broken down into 12 entries.

The "Clinopyroxene" entry is most likely augite with trace amounts of diopside.

There may be some overlap between the orthopyroxenes and the anthophyllite entries as composition is very similar. The Anthophyllite entry has been kept apart from the other amphiboles, mostly hornblende with some actinolite.

The "CaAl low Fe Silicate" entry may be an altered garnet but has been kept separate. The composition looks similar to epidote but also very similar to the EDX composition of the "Garnet_CaAl low Fe (Grossular))" entry. This entry may still be considered part of the "Garnet_CaAl low Fe (Grossular))" entry.

The "Biotite/Muscovite" entry includes a mix of biotite, muscovite and low amounts of phlogopite.

The "Others" entry includes mixed and unclassifiable phases.

4. Discussion

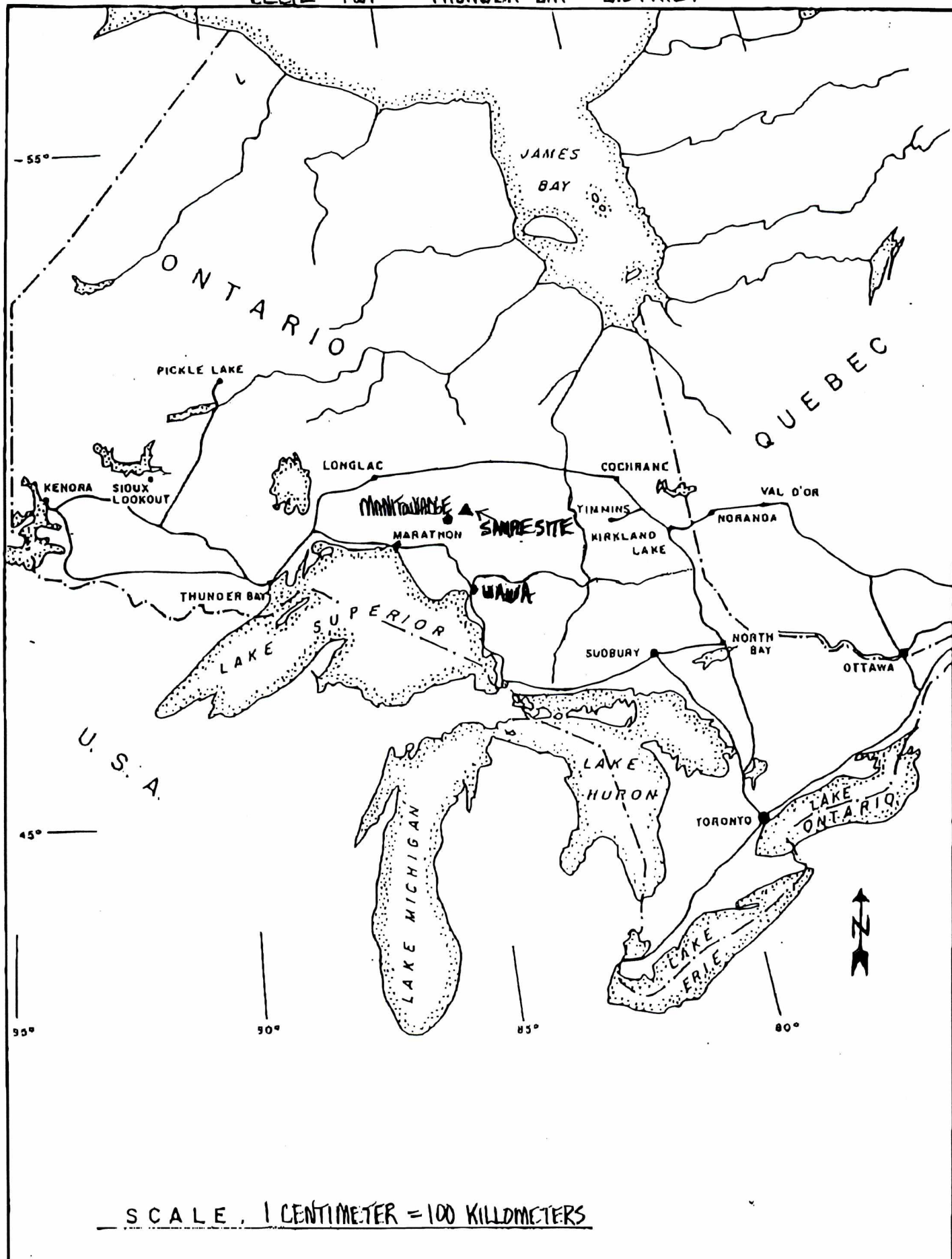
The EDS spectra of the garnets showed that none contained chromium and were elevated in iron. Therefore no G9 or G10 garnets were found.

This indicates that this sample is not a Kimberlite.

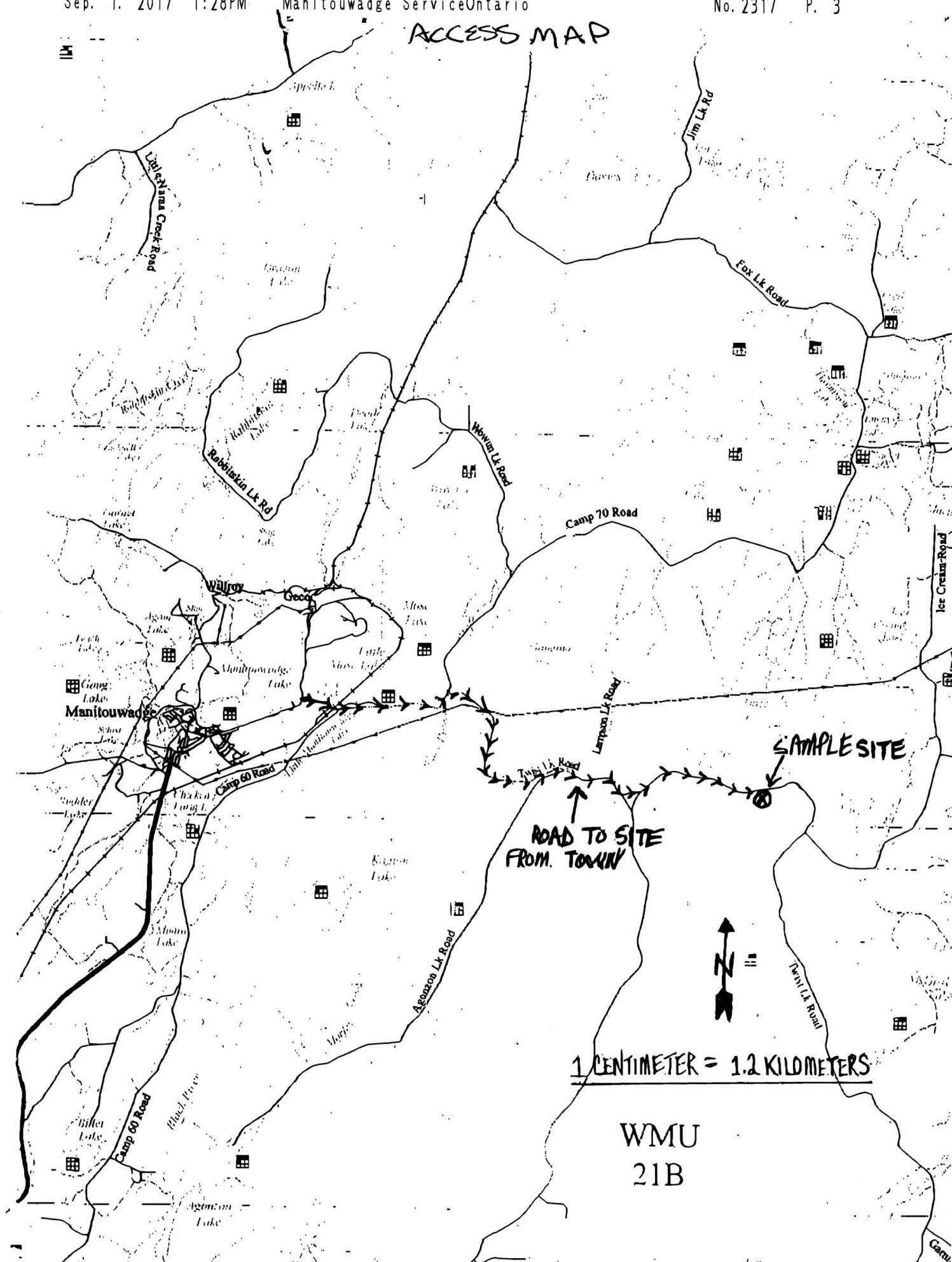


REG GIONET SAMPLE SITE LOCATION CLAIM # 1142225

CECIL TWP THUNDER BAY DISTRICT



ACCESS MAP

WMU
21B

REG GUNNEL TRAIL CUT TO POTENTIAL KEMBERLITE

CECIL TWP THUNDER BAY DISTRICT

CLAIM # 1192225

1187403

1187401

SMALL LAKE

TWIST ROAD

OLD BUSH
ROAD

GRAB SAMPLE

1192225

SMALL CREEK

N

SCALE - 14 CENTIMETER = 400 METERS

[---] - TRAIL CUT TO DRILL SITE

[⊕] - POTENTIAL KEMBERLITE PIPE

[▲▲] - HEAVILY WOODED

[+++] - SWAMP

TRAIL CUTTING MAP.