Ministry of
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Ontario Geological Survey
Open File Report 5889

Industrial Mineral Occurrences & Deposits in Northwestern Ontario

1994

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ONTARIO GEOLOGICAL SURVEY

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Industrial Mineral Occurrences & Deposits in Northwestern Ontario

By

P. Hinz and R.M. Landry

1994

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Red Lake, Box 324, Ontario Government Building, Red Lake P0V 2M0
Schreiber-Hemlo, Suite B002, 435 James St. S., Thunder Bay P7C 6E3
Sioux Lookout, Box 3000, Queen and Fourth, Sioux Lookout P8T 1C6
Thunder Bay, Suite B002, 435 James St. S., Thunder Bay P7E 6E3

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ABSTRACT:

Industrial minerals are defined as "Any rock, mineral or naturally occurring substance of economic value, excluding metallic ores, mineral fuels or gemstones; one of the non-metallics." (American Geological Institute 1972).

Industrial minerals are an important contributor to the Ontario and Canadian economies, they are used daily in a wide range of products and processes. Applications of industrial minerals include: abrasives; ceramics; chemicals; construction materials; electronics/optical uses; extenders and fillers; fertilizers; fluxes; foundry sands; glass; pigments; refractories and drilling muds.

There are over 50 industrial minerals known to occur in northwestern Ontario. Many of the occurrences described in this report warrant further examination to determine their economic potential. It should be noted that this report contains only a fraction of the reported occurrences in northwestern Ontario. Information on many more is available from the Industrial Minerals Geologist's file housed in the Resident Geologist's Office in Thunder Bay.

ACKNOWLEDGEMENTS:

The author wishes to acknowledge the efforts of Ken G. Fenwick for his dedication and support to the Industrial Minerals Project. From its beginning in 1984, as the Building Stone Inventory, to its final days Mr. Fenwick was its most ardent supporter. His recognition of northwestern Ontario's industrial mineral and dimension stone potential is greatly appreciated.

The Resident and Staff Geologists in all the northwestern Ontario offices provided essential support for this project and acted as liaisons with the local prospecting fraternity. Their assistance was greatly appreciated. Specifically M.C. Smyk (Schreiber-Hemlo District) provided assistance on numerous property visits in the Schreiber-Hemlo District. C.C. Storey (Kenora District) provided invaluable assistance and information on numerous properties in the Kenora District.

The assistance of the staff of the Mineral Development Office in Kenora, D. Beard and S. Schelske, is greatly appreciated.

C. Komar reviewed this report. A.R. Dowton and S.E. Warren provided professional and efficient secretarial support throughout the project.

Assistance in the field and office was provided by R.M. Landry and R.T. Lucas, whose efforts are gratefully appreciated. Numerous company representatives, prospectors and M.N.D.M. staff provided invaluable information and field assistance on occurrences in northwestern Ontario.

Special thanks to M.C. Gerow in whose footsteps I followed and for setting an example of client service and promotion of the industrial mineral potential in northwestern Ontario which I tried to continue.

And finally to my wife and family for their support throughout this project.

P. Hinz

INDUSTRIAL MINERAL OCCURRENCES AND DEPOSITS IN NORTHWESTERN ONTARIO

BY: P. HINZ AND R.M. LANDRY

INTRODUCTION:

The "Industrial Minerals" project was initiated in March 1991 to monitor and stimulate exploration, development and production of industrial minerals in northwestern Ontario. This project was jointly funded by the four-year CANADA-ONTARIO 1991 Northern Ontario Development Agreement, a subsidiary agreement to the Economic Regional Development Agreement (ERDA) signed by the governments of Canada and Ontario.

The primary objectives of the project were: to document and investigate new and previously known industrial mineral occurrences; to provide client services via property visits, sample analyses and information exchange; introduce public education through prospector classes, oral presentations and poster displays; and increase awareness of northwestern Ontario industrial minerals at technical seminars, workshops and conferences.

This report documents the industrial mineral deposits and occurrences visited by the author since 1991.

The area covered in this report is comprised of the six Resident Geologist Districts in northwestern Ontario (Figure 1). The districts include Kenora, Red Lake, Sioux Lookout, Thunder Bay, Beardmore-Geraldton and Schreiber-Hemlo.

BACKGROUND:

The production and use of industrial minerals in northwestern Ontario on a commercial scale is linked with the development and prosperity of the region. The initial exploitation of the industrial mineral resources was directly linked with the construction of the Canadian Pacific Railway. Syenites from the Marathon area and sandstones from quarries near the town of Nipigon supplied stone for the construction of railway trestles to span the Black, Pic, Little Pic, Steel and Nipigon rivers. The completion of railway signalled a construction boom in northwestern Ontario. Building materials such as sandstone, marble and brick increased in demand. Early prospectors located favourable sources which were subsequently put into production. An abundance of historical references to dimensional stone quarries, shale quarries and clay pits can be found.

Development of industrial mineral resources was not restricted to the construction of the railways. From 1935 to 1940, W.S. Hall of Cole, Ontario explored and developed a lime deposit northwest of Red Lake. Mr. Hall recognized the need for "quick lime" in the mill-circuits of the Red Lake gold mines.

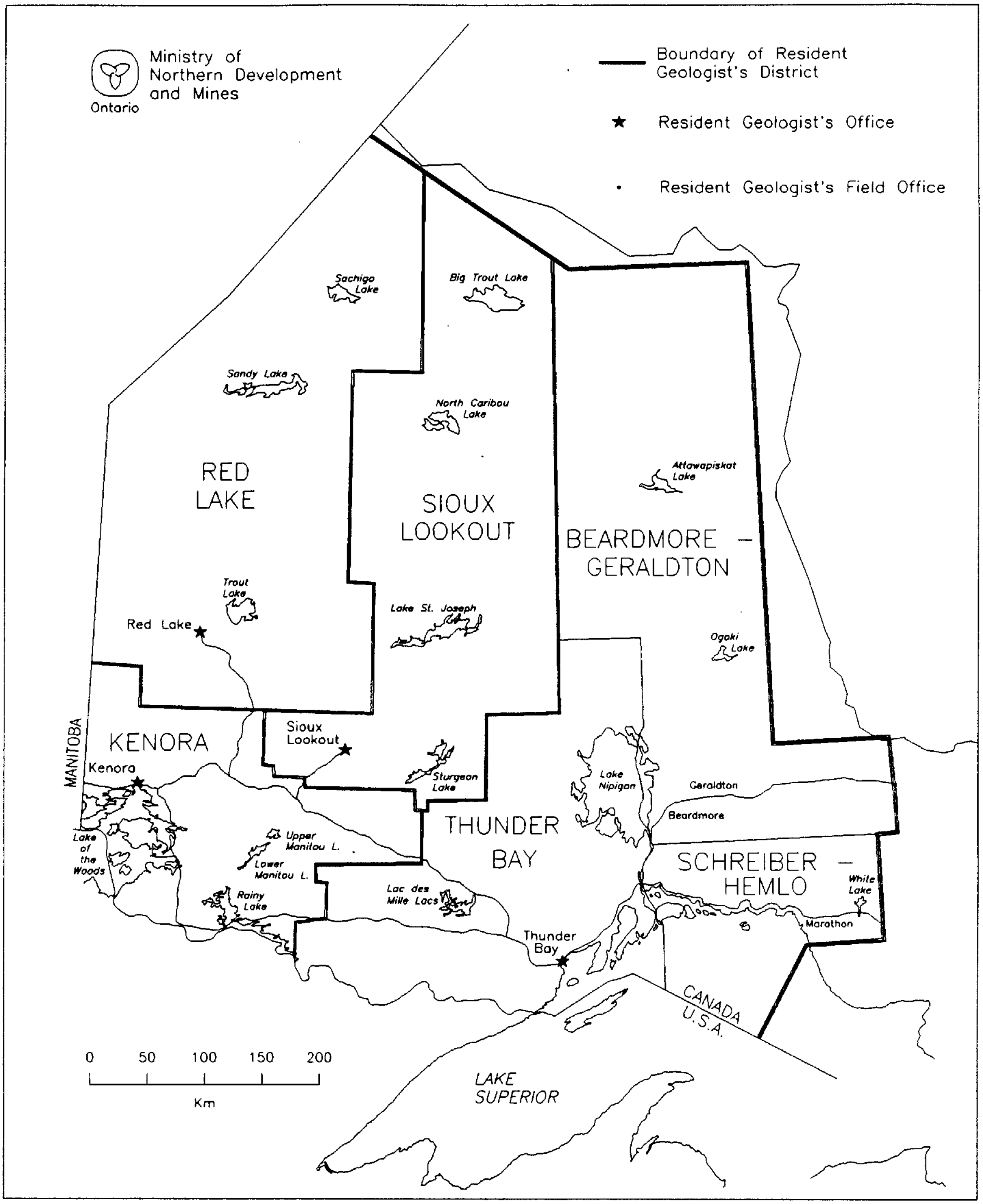

Figure 1: Northwestern Ontario Resident Geologist Districts

Lime was supplied to the Howey, McKenzie Red Lake and Cochenour Willans mines (Horwood 1940) in 1939. During this period the Arctic Peat Moss Corporation Ltd. brought a peat bog into production approximately 14 km southwest of Fort Frances. Operations continued from 1942 to 1952 with 15 575 metric tonnes (17 168 tons) of horticultural peat being produced.

More recent production (1993) is summarised in Table 1. Crystal Quarries Ltd., owned by Ted Hansen of Keewatin, operated a quartz quarry, south of Muskeg Bay, Eagle Lake. Crystal Quarries has supplied crushed quartz for use in the production of silicon sealant, precast terrazzo tiles and landscape stone. At Cygnet Lake, 45 km northwest of Kenora, prospector Al Minor produced crushed stone from a red granite quarry. The crushed material is used for landscaping and precast concrete. Barwick Peat Ltd. continued production of horticultural peat from the Barnhardt peat deposit located 13 km north-northeast of the town of Emo. L.T.L. Contracting of Thunder Bay produced crushed diabase for use as weeping tile beds, driveway fill and soil erosion protection. Phil Thorgrimson removed a small amount of soapstone from the past producing Grace Mining Company quarry, located on Eagle Lake.

TABLE .1. INDUSTRIAL MINERAL PRODUCERS AND SEASONAL PRODUCERS--1993

Producer	Location	Commodity	Products/Production
1. Minor, J.A. & Sons	Cygnet Lake	crushed red granite	crushed red granite for precast concrete; landscaping stone; 10 000 tons produced
2. Thorgrimson, P.	Eagle Lake	soapstone	carving stone; 20 tons
3. Barwick Peat Ltd.	north of Emo	horticultural peat	harvesting of peat, stockpiling at plant site; 20 000 bales for 1993
4. L.T.L. Contracting	north of Thunder Bay	diabase	rip rap, weeping tile stone, driveway ballast; 20 000 tons
5. Crystal Quarries Ltd.	south of Eagle Lake	white quartz	crushed quartz for use in production of silicon sealant, precast panels, landscaping stone; 19 000 tons produced in 1992

Currently, there are over 50 industrial minerals known to occur in northwestern Ontario. These minerals are found in concentrations which range in size from occurrence to producing quarries. For this report, properties or sites visited which received little or no work yet contained an industrial mineral commodity(s) are labelled an occurrence. Prospects are properties or sites which received a moderate amount of work, such as stripping, trenching or geotechnical survey. Past producers are properties which are currently inoperative and/or possess potential reserves. Producers are represented by properties which are currently producing industrial minerals as a commercial product.

REGIONAL GEOLOGY:

The geology of northwestern Ontario is both varied and complex. The area is underlain by rocks of the Superior and Southern Provinces. The Superior Province, its nine subprovinces (Figure 2) and the Proterozoic geology of the Lake Superior area (Southern Province) are all described in detail in the Ontario Geological Survey's, Geology of Ontario, Special Volume 4, Parts 1 (Thurston et al. ed. 1991). The reader who wants greater detail in the geological descriptions is encouraged to examine the Geology of Ontario volume.

CURRENT PROJECT:

The current project consisted of:

A) Visiting industrial mineral producers, past producers, prospects and occurrences in northwestern Ontario. Documenting the geology, mineralogy and other relevant information.

B) Sampling the sites and where warranted conduct geochemistry, physical and beneficiation tests relative to the commodity(s) present.

C) Conducting property visits to prospectors to provide advice on: the potential of their property; work required to develop their property; and contacts in the industrial minerals industry.

The purpose of these activities was to: accurately document as many producers, past producers, prospects and occurrences as possible; promote the potential for industrial minerals in the area; educate prospectors, explorationists and the public on industrial minerals in northwestern Ontario .

The vastness of the area covered and the relatively short field season prevented the author from visiting all the potential sites in the northwest.

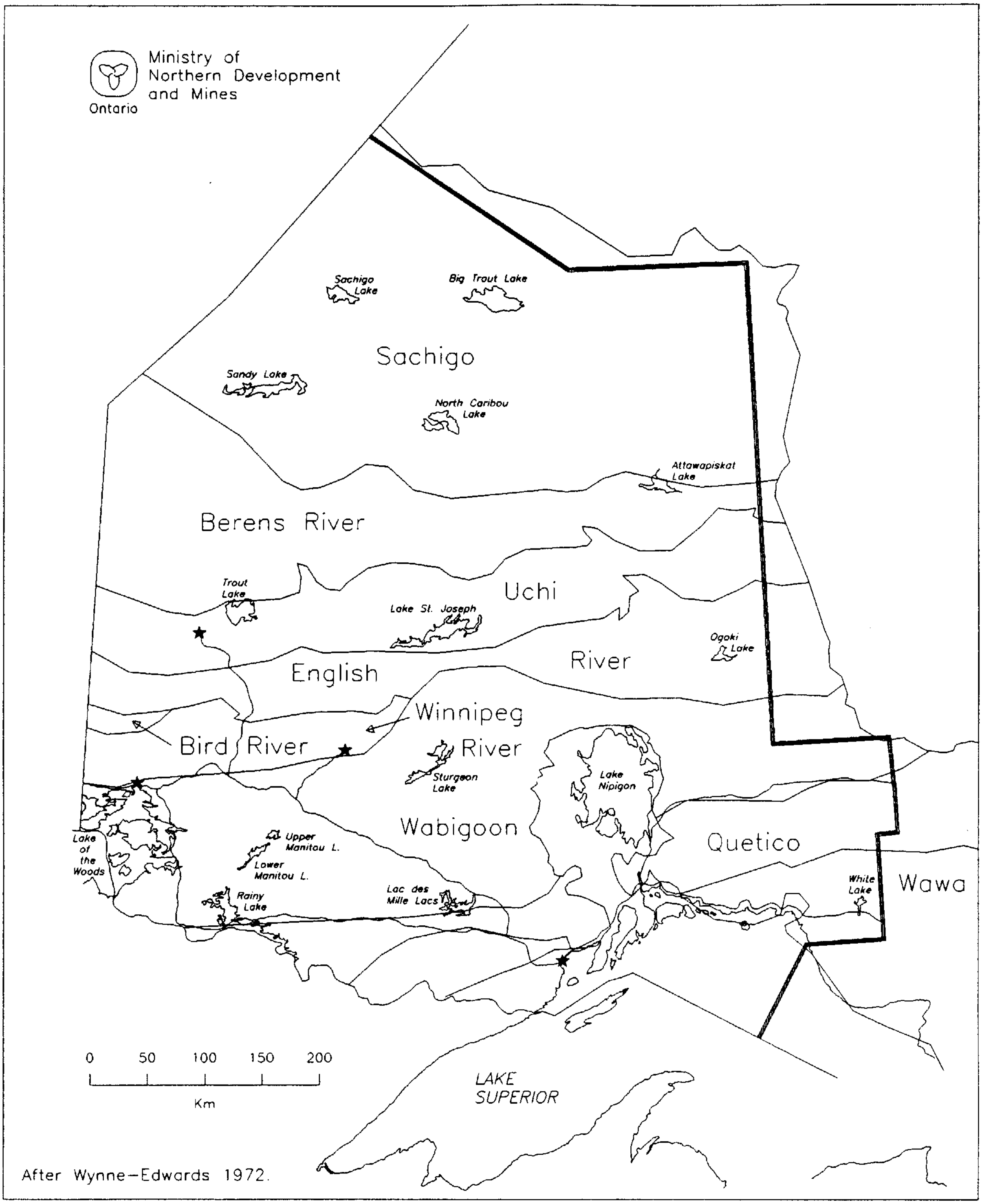

Figure 2: Geological Subprovince Boundaries in northwestern Ontario

CONCLUSIONS:

The deposits, prospects and occurrences in this report examined by the author are all described in an objective manner. The author has put forth the technical information from which industrial mineral industry representatives and prospectors can derive information which could aid them in determining which sites are worthy of further investigation. With over 50 industrial mineral commodities known to occur in the area, the potential for industrial minerals in northwestern Ontario is significant. Traditionally linked to the construction industry, industrial mineral resources in the area have the potential to supply more high-end markets. Commodities such as high-purity quartz, feldspar, anorthosite, lime and peat are all known to occur in large quantities. Traditional prospecting, mineral exploration and development has been focussed on precious and base metals. The prospector or entrepreneur who targets industrial minerals will quickly realize the potential these commodities present and that very few explorationists are involved in looking for them.

RECOMMENDATIONS:

The primary recommendation that the author has for the reader is to pursue industrial minerals as a viable exploration commodity. This report touches on only a fraction of the known industrial mineral occurrences in northwestern Ontario. The Industrial Mineral Geologist's files, stored in the Resident Geologist's Offices in Thunder Bay, is a wealth of information which should be examined by any person looking to prospect or explore for industrial minerals. These files contain historical references, geological, geochemical, beneficiation and market information. Along with the files is an extensive library of references related to industrial mineral exploration, testing, specifications, uses, markets and prices.

In northwestern Ontario, commodities which have the highest potential for discovery and development are graphite and high-purity quartz.

GRAPHITE

Graphite is a product of metamorphism and is found world-wide in a range of schists, gneisses and marbles. Graphite used in industrial processes is grouped into three types: crystalline (flake); lump; and amorphous. Flake graphite which can be upgraded to +90% carbon is in high demand and commands a high price.

Areas in northwestern Ontario which should be examined for graphite potential are the Quetico and English River Subprovinces. Both subprovinces are high temperature metamorphic terranes ranging from upper amphibolite to granulite facies. Ductile shear zones in the subprovinces should be investigated for the development of flake graphite. Prospecting and outcrop examination is most effective in evaluating graphite occurrences. Geophysical and geochemical surveys are of limited use when trying to locate a graphite occurrence.

SILICA

Opportunities exist for specialized silica products, these include: fused silica for electronic and chemical industries; silicon carbide for advanced ceramics; monocrystalline silica used in silicon chips; high purity ground silica (minimum 99.5% SiO_2) as abrasives, cleansers and fillers; and chemical grade silicon for silicones. All require silica which can meet stringent standards for purity.

In northwestern Ontario, a structure which has potential to host a very large silica resource is the Gravel River fault. This fault traverses the Schreiber-Hemlo district northeast from Cypress Bay, Lake Superior, north of Dickison Lake, into Long Lake and continues northeast into the James Bay Lowlands. In the vicinity of Dickison Lake, quartz veins ranging in width from 3 to 300 m have been reported. Whether these veins are free of chemical impurities needs to be determined.

Quartz arenites of the Sibley Group are another potential source of silica. The Quarry Island occurrence hosts known reserves of 12.5 Mt with grades ranging from 92.8 to 99.1% SiO_2 (Bernatchez 1986). Due to logistical and environmental difficulties related to developing offshore deposits it may be best to restrict exploration to onshore areas.

When evaluating potential sources, samples should be analysed for iron, alumina, titanium and heavy metals to ppm values. Also calcium and sodium should be checked if carbonate is present.

KENORA DISTRICT

1) **PROPERTY NAME**: Bad Vermilion Lake Anorthosite

DATE(S) VISITED: June 1992

2) **ALTERNATE NAME(S)**:

3) **COMMODITY**: **Main**: Anorthosite **Secondary**: TiO_2

4) **DEVELOPMENT HISTORY AND OWNERSHIP**:

PAST:		All previous exploration work in the area was for titanium and gold.
	1943	The Butler brothers staked 56 unpatented mining claims on the southwest shore of Bad Vermilion Lake over a titaniferous magnetite occurrence. A 2.5 ton bulk sample was sent to Minneapolis for testing. Seven short holes were drilled.
	1957	Stratmat Ltd. staked a large group of claims on the north shore of Seine Bay. Geological mapping, geophysics and diamond drilling was conducted to evaluate the titanium potential of the rocks.
	1985	Titan Titanium International Inc. staked 45 unpatented claims on the southwest shore of Bad Vermilion Lake. Six holes totalling 2143 feet were drilled.
CURRENT:	1994	Portions of the Bad Vermilion complex are covered by patented claims and various claim holders.

5) **LOCATION AND ACCESS**:

N.T.S.	52 C/10 NE		
Latitude:	48· 43' 30"	**Northing:**	5396721
Longitude:	92· 40' 00"	**Easting:**	0524516

GENERAL LOCATION:

Hinz and Lucas (1993) described the geology of the complex:

> The Bad Vermilion Lake intrusion is situated approximately 50 km east of Fort Frances in northwestern Ontario. It covers an area of 100 km^2, straddling Bad Vermilion Lake and extending southwest to Seine Bay on Rainy Lake.

ACCESS:

The body is accessible via the town of Mine Centre on Highway 11, and Bad Vermilion Lake (Figure 3).

MAP REFERENCES:

Claim Map G-2665, Bad Vermilion Lake, Kenora Mining District
Maps P.2201 and P.2202, Mine Centre Area, West and East Halves, District of Rainy River (Wood et al. 1980)
Iron and Copper Deposits near Mine Centre (Parsons 1918)

REFERENCES:

Ashwal, Morrison, Phinney and Wood (1983)
Assessment Files, Kenora
Braaten (1991)
Coleman (1896)
Harris (1974)
Hinz and Lucas (1993)
Industrial Minerals Geologist's Files, Thunder Bay
Parsons (1918)
Resident Geologist's Files, Kenora District, Kenora
Storey (1990)

6) **GENERAL GEOLOGY AND STRUCTURE:**

The Bad Vermilion Lake anorthosite occurs within a differentiated anorthositic-gabbroic intrusion. The area surrounding the intrusion was mapped by Wood et al. (1980) and a preliminary map was produced. The overall intrusion is exposed over approximately 30 km, with the most promising anorthosite outcrops occurring in the northeast portion of the intrusion. A study conducted by Ashwal et al. (1983) concentrated on the Seine Bay (southwestern) portion of the intrusion and did not sample the more massive northeastern portion.

The intrusion is a composite and possibly differentiated intrusive body approximately 25 km long and 7 km wide; its long axis strikes northeast. The elongate lobe that traverses along the northwestern shore of Bad Vermilion Lake and the north shore of Seine Bay represents the northernmost portion of the intrusion; this lobe consists of medium-grained equigranular gabbro. South and east from this gabbroic lobe the content of modal plagioclase increases; we observed a transition from gabbro to anorthositic (quartz) gabbro to gabbroic anorthosite to true anorthosite. The best examples of the latter that we observed occur in the north-central portion of the intrusion along the lake shore in the general vicinity of Finger and Island Bays. Gabbro also occurs in other portions of the intrusion, suggesting a periodic layered character; a composite, episodically-intrusive character; or a combination of both. The intrusion locally contains rafted blocks of mafic volcanics, and is cross-cut by Proterozoic diabase dykes.

Outcrop exposures on the western shoreline were primarily gabbro to gabbroic anorthosite. Some shearing was observed and pods of titanomagnetite were noted. One such pod was sampled (IM-92-001) and analysed for its TiO_2 content. Outcrops to the east contained an increased amount of anorthosite. The following west to east sequence was observed: gabbro; anorthositic gabbro; gabbroic anorthosite; massive anorthosite. Each rock-type represented an increase in modal plagioclase content.

7) **MINERALOGY:**

Plagioclase content was above 90% and in some places it neared 95%. Cumulate crystals up to 10 cm were seen and outcrops had a "golf-ball" like appearance. Intercumulate chlorite was seen and could represent altered mafic minerals (amphibole/pyroxene). Epidote was noted and may indicate the presences of saussuritization.

OTHER FEATURES:

Outcrops with large plagioclase crystals displayed a "pitted" or "etched" weathering. This may represent a high percentage of acid-soluble high anorthite end-member which is etching out due to acidic rain-water.

8) **ECONOMIC FEATURES:**

Diamond drilling by Titan Titanium (Industrial Minerals Geologist's Files, Thunder Bay and Assessment Files, Kenora) fixed reserves of titanium oxide at:

3,480,000 tons grading 10% TiO_2

1,530,000 tones grading over 15% TiO_2

9) CHEMICAL ANALYSIS:

SAMPLE NO.	Al_2O_3	CaO	Fe_2O_3	MgO	Na_2O	K_2O	SiO_2	MnO	TiO_2	P_2O_5
IM-92-001	----	---	---	----	---	----	---	---	13.0	---
-002	23.0	9.42	3.86	1.06	5.62	0.40	53.2	0.06	0.18	0.04
-003	21.8	13.4	6.95	2.44	3.07	0.07	47.5	0.10	0.43	0.06
-004	13.5	4.44	3.91	0.81	4.68	0.43	69.1	0.05	0.48	0.11
-005	29.7	13.2	2.90	2.14	2.31	1.36	45.7	0.04	0.08	0.02
-006	27.7	12.7	3.59	3.11	3.08	0.20	45.8	0.05	0.15	0.02
-007	28.0	12.3	4.85	4.12	2.24	0.35	43.7	0.07	0.17	0.02
-008	27.4	18.1	3.18	1.47	1.86	0.02	45.4	0.05	0.10	0.02
-009	25.6	14.8	4.72	3.48	1.49	0.07	46.0	0.07	0.13	0.02
-010	27.0	17.4	4.08	1.85	1.21	0.10	45.8	0.05	0.12	0.02
-011	27.8	12.7	3.30	1.63	3.27	0.96	47.7	0.05	0.25	0.03
-029	27.7	16.7	3.15	2.24	1.68	0.07	45.7	0.07	0.32	0.04
-030	26.7	12.7	5.60	4.67	1.49	0.09	45.2	0.07	0.08	0.02
-031	28.0	12.8	3.05	2.19	2.43	0.60	44.2	0.05	0.26	0.02
Braaten	30.5	14.0	1.20	0.50	2.40	0.10	50.9		0.08	0.02
Ashwal	31.1	14.9	0.89	0.93	2.91	0.12	47.6	0.01	0.07	0.03

Analyses for IM-92 samples conducted by Geoscience Laboratory, Ontario Geological Survey, Sudbury

10) COMMENTS/RECOMMENDATIONS:

When these results are compared with what is considered a "good" anorthosite (Braaten 1991), as shown in the table above. It is apparent that the section of the Bad Vermilion we examined does not meet the required criteria. The Al_2O_3 content comes close, however, the Fe_2O_3 percentage is far above acceptable levels. TiO_2 is also high in many of the samples. These results indicate that the anorthosite examined would not be suitable for alumina leaching. However, Ashwal et al. (1983) sampled the southwestern portion of the complex extensively and obtained favourable results. It would be worth while to examine the area of the Bad Vermilion Lake intrusion covered by Ashwal in hope of locating suitable material.

The potential for titanium should not be overlooked. Results obtained by Titan Titanium Int. Inc. and Stratmat Ltd. indicate a significant resource with high potential.

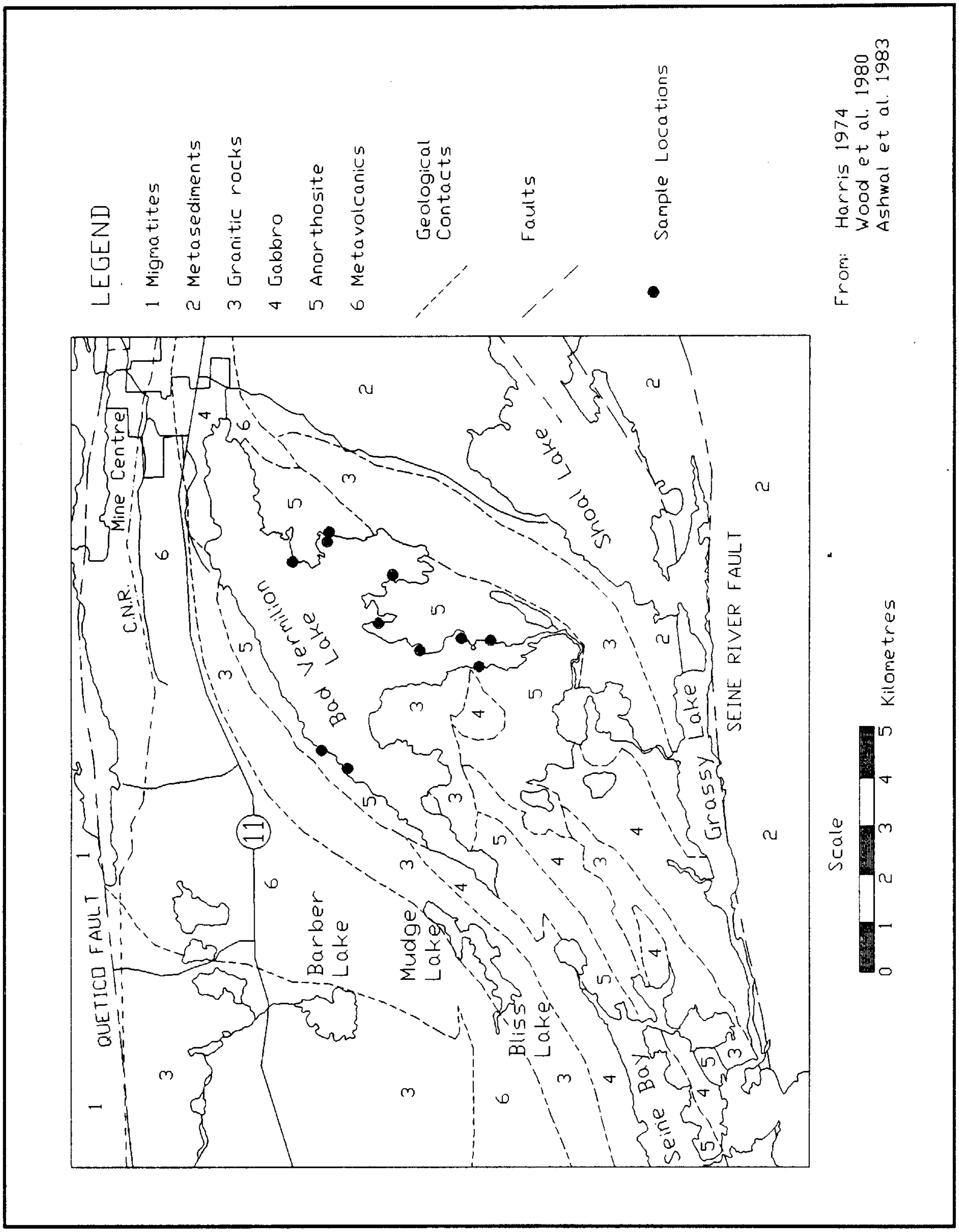

Figure 3: Bad Vermilion Lake Anorthosite, geology and sample locations

1) **PROPERTY NAME**: Crystal Quarries Ltd.

DATE(S) VISITED: August 1992

2) **ALTERNATE NAME(S)**: Hansen White Quartz

3) **COMMODITY**: **Main**: Quartz, silica **Secondary**:

4) **DEVELOPMENT HISTORY AND OWNERSHIP**:

PAST:		Prior to 1985 the area had not been explored for its industrial mineral potential.
	1985	T. Hansen staked the occurrence after discussing sources of white rock for use as aggregate with C. Storey (MNDM).
	1986	The quartz vein was stripped and drilled to a depth of 30 ft. Approximately 5000 tons was blasted and shipped to customers in Winnipeg and Minneapolis.
	1987	Crystal Quarries Ltd. was incorporated and production of landscaping stone and aquarium stone. Approximately 500 tons was produced.
CURRENT:	1994	The property is still held by Ted Hansen. Production is slated to resume in the spring.

5) **LOCATION AND ACCESS**:

N.T.S.	52 F/11SW		
Latitude:	49· 35' 50"	**Northing:**	5493676
Longitude:	93· 18' 30"	**Easting:**	0477718

GENERAL LOCATION:

The quarry is located south of Muskeg Bay, Eagle Lake, approximately 30 km due south of Vermilion Bay.

ACCESS:

The quarry is accessed by a network of logging roads. From the intersection of Highways 594 and 502, travel south on Highway 502 for 17.9 km. Turn right on Century Road, travel for 30.7 km, at the fork in the road stay right. At 34.1 km cross the Bear Narrows Bridge. At the next fork in the road stay right again, the quarry is at 56.9 km from the Highway 502 and Century Road intersection.

MAP REFERENCES:

Claim Map G-2586, Line Lake Area, Kenora Mining Division
48d, Eagle Lake Area, (Moorhouse 1938)
Map P.2826, Precambrian Geology of the Mulcahy Gabbro, (Sutcliffe and Smith 1985)

REFERENCES:

Blackburn (1978)
Davies and Watowich (1956)
Industrial Minerals Geologist's Files, Thunder Bay
Moorhouse (1938)
Resident Geologist's Files, Kenora District, Kenora
Storey (1986)

6) **GENERAL GEOLOGY AND STRUCTURE:**

Blackburn (1978) described the geology of the area:

> Metavolcanic and metasedimentary rocks trend northeasterly. As noted in the Eagle Lake-Wabigoon Lake-Stormy Lake area immediately to the east ... the metasediments of the Warclub "series" lie to the northwest, and the Populus metavolcanics to the southeast, and are in sharp mutual contact.

The quartz vein is hosted in hornblende-biotite diorite and quartz diorite. The vein as exposed in the pit is approximately 220 feet long by 90 feet wide and 40 feet deep.

7) **MINERALOGY:**

The quarried material consists of "bull" white quartz. Impurities within the quartz comprise less than 1% of the total composition. Impurities include pyrite and arsenopyrite.

OTHER FEATURES:

8) **ECONOMIC FEATURES:**

The reserves are calculated at 136 966 tons grading 99.8% SiO_2 to a depth of 60 feet below the current pit floor. (B. Dugal, personal communications).

9) **CHEMICAL ANALYSIS:**

SAMPLE NO.	SiO2	Al_2O_3	Fe_2O_3	CaO	MgO	Na_2O	MnO	P_2O_5
Q1	99.60	0.32	0.005	0.003	0.001	0.008	<0.0005	0.027
Q2	99.57	0.37	0.0057	0.003	0.0011	0.009	<0.0005	<0.005

Analyses by Lakefield Research, Lakefield, Ontario

10) **COMMENTS/RECOMMENDATIONS:**

Ted Hansen, owner of Crystal Quarries Ltd. is an example of a prospector recognizing the potential of industrial minerals. The large barren quartz vein which is being quarried was ignored due to its lack of mineralization. However, this type of vein is exactly what Mr. Hansen was looking for. Silica is used for a wide range of products such as precast tiles, silicone gel, silicone metal and electronics. These high-end products require silica meeting rigid specifications. Prospectors should keep this in mind when they prepare to write-off a large barren quartz vein.

1) **PROPERTY NAME**: Dyment Ballast Quarry

DATE(S) VISITED: August 1992

2) **ALTERNATE NAME(S)**:

3) **COMMODITY**: **Main:** Railway ballast

4) **DEVELOPMENT HISTORY AND OWNERSHIP**:

PAST:		The area around the quarry has been explored for gold and base metals since 1907. There has been no previous exploration for industrial minerals.
	1983	Canadian Pacific Railways obtained a Quarry Permit from the Ministry of Natural Resources and began production.
	1991	Last round of production ceased. A stockpile sufficient for 2-3 years was left on site.
CURRENT:	1994	Canadian Pacific Railways still maintains their quarry permit over the site. No production has occurred since 1991, however, material continues to be removed from the stockpile.

5) **LOCATION AND ACCESS**:

N.T.S.	52 F09/NW		
Latitude:	49° 37' 28"	**Northing:**	5496872
Longitude:	92° 22' 42.5"	**Easting:**	0544989

GENERAL LOCATION:

The ballast quarry is located approximately 42 km southeast of Dryden. It is situated on the northwest shore of Kennabutch Lake in south-central Avery Township.

ACCESS:

The quarry is accessed by an all-weather gravel road which departs north from Highway 17 approximately 3 km west of Borups Corners. Follow the main gravel road north for approximately 6 km. A gate closes off access to the quarry at this point. The quarry is another kilometre past the gate.

MAP REFERENCES:

Claim Map G-2575, Avery Township, Kenora Mining Division
Map 2443, Kenora-Fort Frances Sheet (Blackburn 1981)
Map 2529, Melgund Lake Area, MacFie and Avery Townships (Berger 1989)

REFERENCES:

Berger (1989)
Hinz and Lucas (1992)

6) GENERAL GEOLOGY AND STRUCTURE:

Berger (1989) described the geology of the area:

> The Melgund Lake area is underlain by Archean rocks of the Superior Province of the Canadian Shield. Supracrustal lithologies (Ayres et al. 19850 comprise 75 percent of the map area and are composed of mafic, intermediate and felsic metavolcanics, related subvolcanic intrusions including gabbroic sills and dikes, and feldspar and quartz-feldspar-phyric dikes, clastic and chemical metasediments. Felsic plutonic rocks composed of quartz monzonite, granodiorite, quartz monzodiorite, monzonite, tonalite and granite have intruded the supracrustal rocks in four spatially separated locations. A distinctive suite of granitic pegmatite and aplite intrusions also occur within the map area.

7) MINERALOGY:

The quarry is underlain by primarily mafic metavolcanics with some minor felsic metavolcanics. The mafic metavolcanics are described by Berger (1989) as hornblende- and plagioclase-phyric rocks. The metavolcanics are described by Berger (1989):

> The mafic metavolcanics underlying Avery, MacFie and eastern McAree townships are composed predominantly of flows, minor pillow breccia, and hyaloclastite with very minor interflow cherty metasediments. An important subdivision of these mafic metavolcanics is the separation of plagioclase-phyric rocks ("leopard rock") from aphyric rocks. However, there is a

complete gradation from aphyric sequences to plagioclase-phyric sequences containing up to 30 percent phenocrysts. In most cases, rocks classified as aphyric may contain a few widely separated, small (less than 1 cm diameter) plagioclase phenocrysts. Rocks containing more than 1 percent plagioclase phenocrysts were mapped as plagioclase phyric.

OTHER FEATURES:

8) **ECONOMIC FEATURES:**

Hinz and Lucas (1992) described the operations at the quarry:

> This summer near Dyment, 42 km southeast of Dryden, at a Canadian Pacific Railway ballast quarry, a 21 man crew was contracted to produce 400 000 tons of crushed intermediate metavolcanic rock. This quarry has sufficient reserves to provide ballast for the next 40 years.

9) **CHEMICAL ANALYSIS:**

10) **COMMENTS/RECOMMENDATIONS:**

This quarry supplied all the ballast for Canadian Pacific Railway's operations in Ontario, Manitoba, Saskatchewan and parts of Alberta. The undersized material was being tested for bridge repairs in Winnipeg. Operations were slated to resume in 1995 of 1996.

1) **PROPERTY NAME:** Kawashegamuk Lake Fluorite Occurrence

DATE(S) VISITED: June 1992

2) **ALTERNATE NAME(S):**

3) **COMMODITY:**

Main: Silica, fluorite

Secondary: Tungsten, corundum

4) **DEVELOPMENT HISTORY AND OWNERSHIP:**

PAST:		The area has been extensively explored for gold in the past. There are numerous gold occurrences, prospects and past producers located nearby. No previous exploration has evaluated the industrial mineral potential of the area.
	1991 to present	The occurrence was discovered by A. Glatz and A. Kozowy. A total of 136 claim units covering 8 miles of strike-length were staked. Prospecting, stripping and sampling was conducted on the property.
CURRENT:	1994	A. Glatz and A. Kozowy still hold the property.

5) **LOCATION AND ACCESS:**

N.T.S.	52 F/8 NW		
Latitude:	49· 27' 00"	**Northing:**	5477510
Longitude:	92· 17' 00"	**Easting:**	0551946

GENERAL LOCATION:

The property is located approximately 50 km east of Dryden and 19 km south of Borup's Corners.

ACCESS:

The property is accessed by: taking Highway 603 south from Highway 17 at Borup's Corners, for 14 km; then south-east along an old Canadian Pacific Forest Products hauling road for 5 km. The various showings are accessed by means of recently constructed bulldozer trails which traverse eastward from this latter road.

MAP REFERENCES:

Claim Map G-2585, Kawashegamuk Lake, Kenora Mining Division
Map P.2570, Kawashegamuk Lake Area, Eastern Part (Kresz et al. 1982)

REFERENCES:

Assessment Files, Kenora
Blackburn and Kresz (1981)
Industrial Minerals Geologist's Files, Thunder Bay
Resident Geologist's Files, Kenora District, Kenora

6) **GENERAL GEOLOGY AND STRUCTURE:**

The occurrence lies within a contact zone between the Revell Batholith and the Stormy Lake greenstone belt. The zone roughly parallels the contact with the batholith and contains a mixture of granitic and intensely altered volcanic material. Large amounts of quartz, fluorite and sericite are present at numerous locations on the property.

7) **MINERALOGY:**

Although the occurrence has been exposed through stripping with a backhoe it was not possible to get a true width of the mineralization. The fluorite mineralization is said to extend over 4 km. Five showings have been excavated over the 4 km strike length.

Showing No. 5: An area measuring 46 m x 20 m has been exposed. Two rock-types are seen, a massive quartz-rich granitic looking rock and a fine-grained sericite-muscovite-fluorite +/- pyrite schist. The schistose rock presumably would be the remnants of the host volcanic rocks which have been intensely altered.

Showing No. 4: This showing is a small outcrop of granite with sericite, on the side of a ridge. Fluorite is seen along with trace pyrite, apparently A. Glatz obtained 0.15% W from assays. A 3 m+ quartz vein is located south of the showing and is barren and bull white.

Showing No. 3: The showing consists of a large stripped outcrop. Fluorite is seen throughout the outcrop up to 1-2% with localised variations. The fluorite occurs primarily within the sheared sericitic schist. To the south is a large mass (25 m diameter) of apparently barren quartz.

Showing No. 2: This is the highest grade showing and is seen as a 1.5 m wide zone of fluorite-sericite schist in contact with a 1 m wide quartz vein. Up to 40% fluorite is seen in the zone over a strike-length of 25 m. A quartz vein is exposed over 10.7 m in the trench and contains chloritic xenoliths. The xenoliths represent fragments of the host metavolcanic rocks.

Showing No. 1: This showing is exposed on a cut base-line, it is the site where fluorite was first discovered by the property owners. A quartz-sericite-chlorite-fluorite schist is in contact with a 2-3 m wide quartz vein which strikes 310°. Generally, fluorite comprises up to 5% of the rock, however, higher-grade sections are seen. A. Glatz reported molybdenite and fuchsite at this site (which were observed) and corundum (which was not seen). Fine-grained pyrite pyrite was also seen in trace amounts.

8) ECONOMIC FEATURES:

9) CHEMICAL ANALYSIS:

Sample No.	F %	Sn ppm	W ppm
IM-92-12	2.60	< 2	10
IM-92-13	1.71	< 2	20
IM-92-14	0.79	< 2	590
IM-92-15	2.71	< 2	30
IM-92-16	1.24	< 2	10
IM-92-17	0.11	< 2	10
IM-92-18	1.94	< 2	270
IM-92-19	3.69	< 2	140

Showing No. 5	IM-92-12	- massive granitic rock
	IM-92-13	- ser-musc-fl schist
Showing No. 4	IM-92-14	- qtz-ser-fl schist
Showing No. 3	IM-92-16	- sheared volcanics
	IM-92-17	- massive granitic rock
Showing No. 2	IM-92-15	- high-grade fluorite float
Showing No. 1	IM-92-18	- sheared volcanics
	IM-92-19	- quartz

Analyses by Chemex Labs, Ltd.

10) COMMENTS/RECOMMENDATIONS:

Initially this occurrence was being examined for its gold potential. Poor results and the predominance of fluorite led the prospectors to evaluate its fluorite potential. These results are not favourable, however, the discovery of large masses (>25 m) of quartz has brought new life to the property.

1) **PROPERTY NAME:** Treelined Lake Graphite Occurrence

DATE(S) VISITED: July 1991

2) **ALTERNATE NAME(S):** Harrison Graphite Property
Black Sturgeon Graphite Deposit
Treelined Lake Uranium Occurrence

3) **COMMODITY:** **Main:** Graphite **Secondary:** Uranium

4) **DEVELOPMENT HISTORY AND OWNERSHIP:**

PAST:	1968	Claims were staked by a prospector named Linklater over a uranium occurrence. Trenching, stripping and sampling was conducted.
	1976	The occurrence was re-staked by J. Harrison and G. Perkins. T. Skiming sampled Linklaters trenches.
	1987	The occurrence was staked for its graphite potential by G. Zebruck and R. Keuhnbaum. Property optioned to Bellwether Resources Ltd. An additional 17 claims were staked by Bellwether with trenching, geophysics and sampling conducted during the winter.
	1988	Trenching, bulk sampling and magnetometer survey were conducted.
	1990	The property was returned to G. Zebruck and R. Keuhnbaum.
CURRENT:	1994	G. Zebruck and R. Keuhnbaum still hold the property.

5) **LOCATION AND ACCESS:**

N.T.S.	52 L/08SW		
Latitude:	50° 17' 54"	**Northing:**	5572607
Longitude:	94° 27' 28"	**Easting:**	0395776

GENERAL LOCATION:

The property is located approximately 59 km north of Kenora, between Treelined and Trout Lakes (Figure 4).

ACCESS:

The property can be accessed by truck on a series of logging roads and finally a well beaten skidder trail. Travel north on Highway 666 to the town of Redditt. Take the English River Road and travel north for approximately 48 km. The Treelined Lake Road which is little more than a tote road leads to the west. Take this road for approximately 2 km. At the end of the road an old bush road continues to the occurrence.

MAP REFERENCES:

Claim Map G-2651, Treelined Lake Area, Kenora Mining Division
Map P.1028, Operation Kenora-Sydney Lake,
Umfreville-Separation Lakes Sheet (Breaks et al. 1975)

REFERENCES:

Assessment Files, Kenora
Blackburn et al. (1989)
Industrial Minerals Geologist's Files, Thunder Bay
Kennedy and Sherlock (1989)
Redden (1987)
Resident Geologist's Files, Kenora District, Kenora
Storey (1990)

6) GENERAL GEOLOGY AND STRUCTURE:

The occurrence is hosted in metasedimentary and derived metatexite (Breaks 1991) rocks of the English River Subprovince. Kennedy and Sherlock (1989) described the geology of the occurrence:

> The property is underlain by migmatitic granitic rocks and highly metamorphosed metasediments. This geology has been interpreted to represent an original sequence of siliceous and argillaceous sediments that has been subjected to intense metamorphism.

7) MINERALOGY:

The mineralogy of the occurrence is described by Kennedy and Sherlock (1989):

> Graphite is concentrated in narrow shear zones and disseminated in meta-arkose bands. Graphitic mineralization is accompanied by varying amounts of sulphides, primarily pyrrhotite with some pyrite and chalcopyrite.

OTHER FEATURES:

8) **ECONOMIC FEATURES**:

Kennedy and Sherlock (1989) describe the dimensions and grade of the occurrence:

> Bellwether defined graphite mineralization over a width of at least 110 m (360 feet), with a weighted average of 0.875 percent carbon. Continuous, mineralized bands were not identified across this zone. Preliminary assay results indicated that the grade varies from 0.1 to 5.69 percent carbon over 3 m (10 feet) within the zone. The strike length of the graphite mineralization is undefined.

9) **CHEMICAL ANALYSIS**:

Bellwether Resources Ltd. (Assessment Files, Kenora) reported the following assays:

Sample No.	Total Carbon %
G24238	2.97
24244	5.81
24245	2.32
24247	4.50
24248	6.94
24249	4.53
24250	3.36
24253	4.61
24256	2.43
24257	2.97
G24270	2.90
24280	3.32
24286	2.52

Analyses by Warnock Hersey Professional Services Ltd.

10) **COMMENTS/RECOMMENDATIONS**:

This is one of a number of flake graphite occurrences in northwestern Ontario known to occur within ductile shear zones in high temperature metamorphic terranes. The other occurrences are located in the Quetico Subprovince north of Manitouwadge.

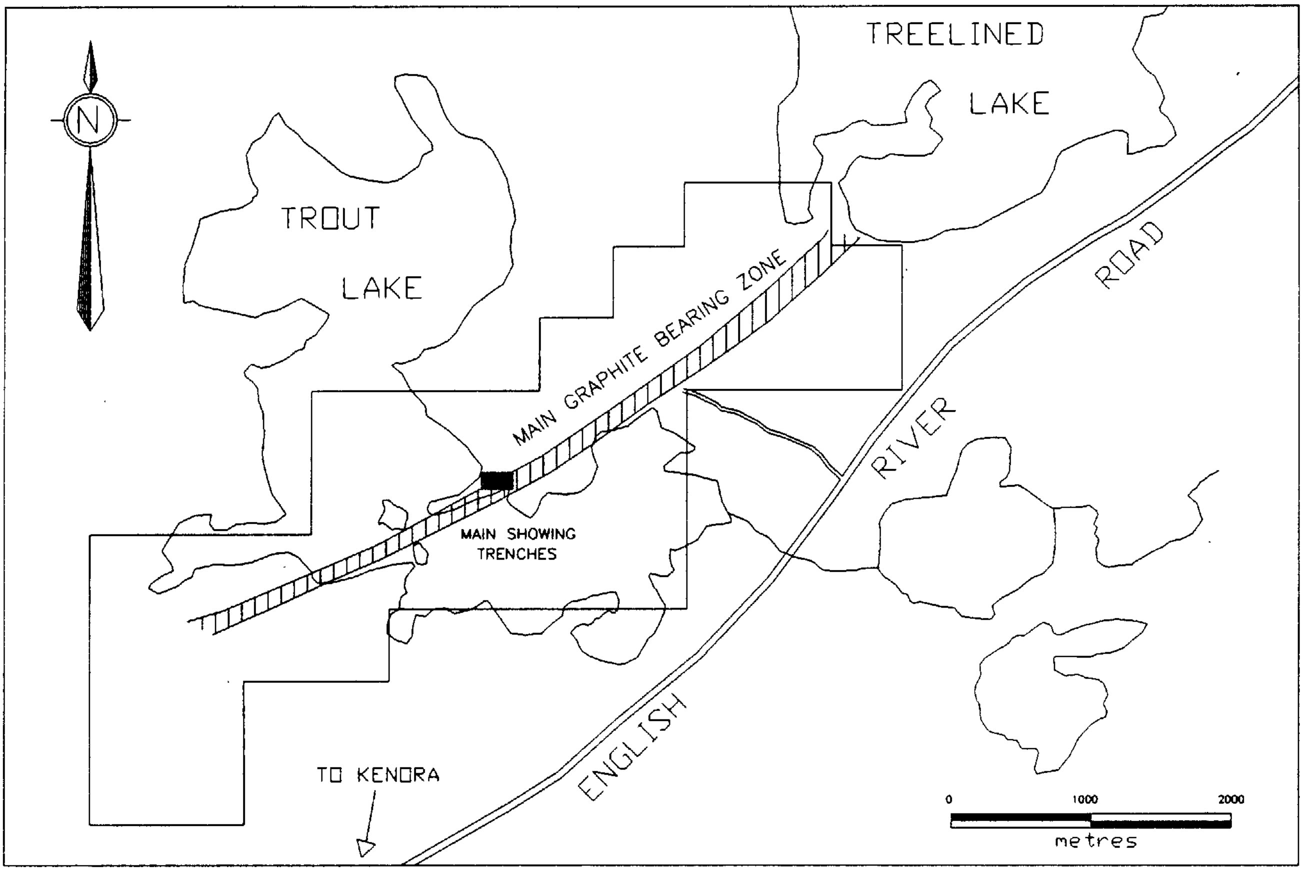

Figure 4: Treelined Lake Graphite Occurrence

1) **PROPERTY NAME**: Watcomb Ballast Quarry

DATE(S) VISITED: July 1991

2) **ALTERNATE NAME(S)**:

3) **COMMODITY**: **Main**: Railway Ballast

4) **DEVELOPMENT HISTORY AND OWNERSHIP**:

PAST:		This area has received very little exploration for precious, base metal or industrial minerals.
	1971	Canadian National Railways obtained a Quarry Permit from the Ministry of Natural Resources and began operations.
	1991	Operations ceased in September.
CURRENT:	1994	Canadian National Railway continues to hold a permit on the quarry. However, there are currently no plans to resume operations.

5) **LOCATION AND ACCESS**:

N.T.S.	52 G/14SW		
Latitude:	49· 50' 30"	**Northing:**	5521396
Longitude:	91· 20' 30"	**Easting:**	0619735

GENERAL LOCATION:

The quarry is located on the southeastern border of Slaught Township, approximately 50 km southeast of Sioux Lookout.

ACCESS:

The quarry can be accessed by Highway 642 from either Sioux Lookout or Silver Dollar on Highway 599. From Sioux Lookout drive 50 km southeast on Highway 642. From Silver Dollar drive 12 km northwest on Highway 642. The quarry is located on the south side of the highway.

MAP REFERENCES:

Claim Map G-2525, Press Lake Area, Sioux Lookout Mining Division
Map 39b, Sturgeon Lake Area (Graham 1930)
Map 46d, Superior Junction-Sturgeon Lake Area (Horwood 1937)

Map P.524, Watcomb-Clarkdon Area, West Half (1969)
Map 557A, Watcomb, Kenora and Rainy River Districts, Ontario (Tanton 1940)
Map 2209, Watcomb Area (Trowell 1970)

REFERENCES:

Blackburn _et al._ (1991)
Hinz and Lucas (1992)
Industrial Minerals Geologist's Files, Thunder Bay
Trowell (1983)

6) GENERAL GEOLOGY AND STRUCTURE:

The quarry is underlain by the North Sturgeon Lakes volcanic rocks of the Western Wabigoon Subprovince (Blackburn _et al._ 1991). The volcanic rocks consist of sequences of mafic flows and intermediate to felsic fragmentals. Minor metasedimentary rocks in the area include wacke and conglomerates.

7) MINERALOGY:

The mineralogy of the mafic to intermediate flows are described by Trowell (1983):

> The metavolcanics are variably massive, foliated, and schistose. Banding in metavolcanics marginal to the batholithic complexes is due to the accentuation of primary bedding features of tuffaceous members or to metamorphic differentiation accompanying deformation.
>
> The mafic to intermediate metavolcanics consist of the following mineral assemblages: (1) plagioclase (albite-oligoclase) + tremolite-actinolite + quartz +/- chlorite +/- chloritoid (uncommon) +/- biotite +/- epidote +/- carbonate +/- white mica for rocks of the greenschist facies rank and (2) plagioclase (oligoclase-andesine) + hornblende +/- anthophyllite +/- quartz +/- biotite +/- clinopyroxene +/- garnet +/- epidote +/- zoisite +/- carbonate for rocks of the almandine-amphibolite facies rank. Accessories include iron-titanium oxides, sphene, apatite, pyrite, pyrrhotite, and uncommon chalcopyrite. Retrograde zeolites were noted in rocks of the far northern part of the map area.

OTHER FEATURES:

8) **ECONOMIC FEATURES:**

When the quarry was visited it employed a 17-21 person crew and was producing approximately 5,000 tons per day. Over 130,000 tons of ballast was being stockpiled per month. The pit was at a depth of 72 feet and was not forecast to be deepened.

9) **CHEMICAL ANALYSIS:**

Trowell (1983) conducted geochemistry on the mafic to intermediate metavolcanics of the North Sturgeon Lake Assemblage which hosts the Watcomb Quarry. Results are listed below:

SAMPLE NO.	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Na_2O	MnO	P_2O_5	TiO_2
E3-5	58.00	14.70	2.06	6.63	3.14	3.75	0.11	0.19	0.92
E4-4	54.70	11.80	2.27	6.44	8.67	2.53	0.13	0.15	0.71

Analyses by Geoscience Laboratories, Ontario Geological Survey, Toronto

10) **COMMENTS/RECOMMENDATIONS:**

The quarry ceased operations in September of 1992. Pit Foreman E. Kerluk of Broda Construction stated that Canadian National Railways was considering abandoning the Watcomb Quarry. He stated that the south wall of the pit had reached the extent of quarriable material. A subsequent visit in 1993 found a significant stockpile still present. It appeared that there would be at least 2 to 3 years of material still available.

THUNDER BAY DISTRICT

1) **PROPERTY NAME**: Black Bay Peninsula

DATE(S) VISITED: July 1992

2) **ALTERNATE NAME(S)**:

3) **COMMODITY**: **Main**: Black sand **Secondary**:

4) **DEVELOPMENT HISTORY AND OWNERSHIP**:

PAST:	1896	Dr. A.P. Coleman of the Ontario Bureau of Mines reported an occurrence of magnetite iron sand on the east side of Black Bay
	1932	J.S. Dobie shipped 200 pounds of black iron sand to the federal Department of Mines, Testing and Research Laboratory. The sample was tested, " to determine the grade and character of the concentrate which could be produced by magnetic concentration, ...".
	1936	W.B. Timm of the federal Department of Mines and Resources reported tests conducted on a 40 pound sample of titaniferous sand. The tests were to "determine: (1) whether a clean magnetite iron concentrate could be produced; (2) whether a concentrate containing over 40% titanium oxide (TiO_2) could be made.".
	1956	Steep Rock Iron Mines conducted tests on behalf of Alexander Phillips. The sample was assayed, screened, concentrated by both wet and dry magnetic methods and examined under binocular microscope. The sample was found to be uneconomic.
CURRENT:	1993	The patented claims were listed in 1992 for sale as camp lots.

5) **LOCATION AND ACCESS:**

N.T.S.	52 A/09NE		
Latitude:	48· 40' 00"	**Northing:**	5391062
Longitude:	88· 21' 00"	**Easting:**	0400598

GENERAL LOCATION:

The occurrence is located on the east shore of Black Bay approximately 14 miles south-southwest of the hamlet of Hurkett (Figure 5).

ACCESS:

The occurrence is accessed by boat from landings at either Hurkett or Squaw Bay.

MAP REFERENCES:

Claim Map G-66, Laurie Lake, Thunder Bay Mining Division
Map 2304, Black Bay Peninsula, Thunder Bay District (McIlwaine, Wallace and Assistants 1976)
Map 2232, Nipigon-Schreiber Sheet (Carter 1973)

REFERENCES:

Coleman (1896)
Industrial Minerals Geologist's Files, Thunder Bay
Parsons et al. (1932)
Timm (1936)
McIlwaine and Wallace (1976)

6) **GENERAL GEOLOGY AND STRUCTURE:**

The occurrence consists of a raised beach deposit of gravelly sand. The deposit is glaciolacustrine in nature and extends for approximately 4 km. The area is surrounded by glaciolacustrine deposits and hosts peat bogs and swamps. The underlying rocks are extrapolated as being Osler Group and Sibley Group sediments. The Olser Group overlies the Sibley Group rocks and are composed of massive and amygdaloidal basalts and sandstone. They unconformably overlie the Sibley Group sandstones.

7) **MINERALOGY:**

Four samples were submitted for determination of their constituent minerals:

BS1: the dark minerals included clinopyroxene, hornblende and minor titanite, magnetite (partly hematised), and biotite. Light minerals which are less abundant included pink garnet, orthoclase, plagioclase and quartz. Also present are assorted rock and wood fragments.

BS2: the abundant dark minerals consists of clinopyroxene, hornblende, along with minor titanite, biotite and magnetite. Light minerals include plagioclase, orthoclase, quartz and pink almandine. Various rock fragments are also present.

BS3: this sample contains magnetite (partly hematised), hornblende, clinopyroxene, and garnet. Large leucocratic grains consist of quartz, albite and orthoclase.

BS4: this consists of magnetite, with minor pink almandine, clinopyroxene, ilmenite, amphibole, albite, and quartz. Occasional grains of yellow-green olivine are also seen.

Analyses by Geoscience Laboratory, Ontario Geological Survey, Toronto

8) ECONOMIC FEATURES:

Six samples were taken, combined and subjected to heavy mineral concentrate processing. The samples were sieved into two size fractions, passed through a Reading PR71 magnetic separator to obtain high magnetic, para-magnetic and non-magnetic fractions. Due to the high percentage of clinopyroxene and hornblende this process was not able to separate out the magnetite or ilmenite.

9) CHEMICAL ANALYSIS:

The six products obtained from the heavy mineral concentrate processing were sent for TiO_2 analyses.

Sample Number	TiO_2%
IM-93-001	1.25
IM-93-002	1.18
IM-93-003	4.11
IM-93-004	3.16
IM-93-005	3.52
IM-93-006	3.36

10) COMMENTS/RECOMMENDATIONS:

Although this occurrence is not of economic significance, it confirms the presence of titanium bearing black sands in the vicinity of the Black Bay Peninsula. In 1992 a contractor was drilling a water well and intersected 10 m of black sand at a depth of 9 m. A sample was taken and returned up to 7% TiO_2. This, however, was not confirmed by the authors.

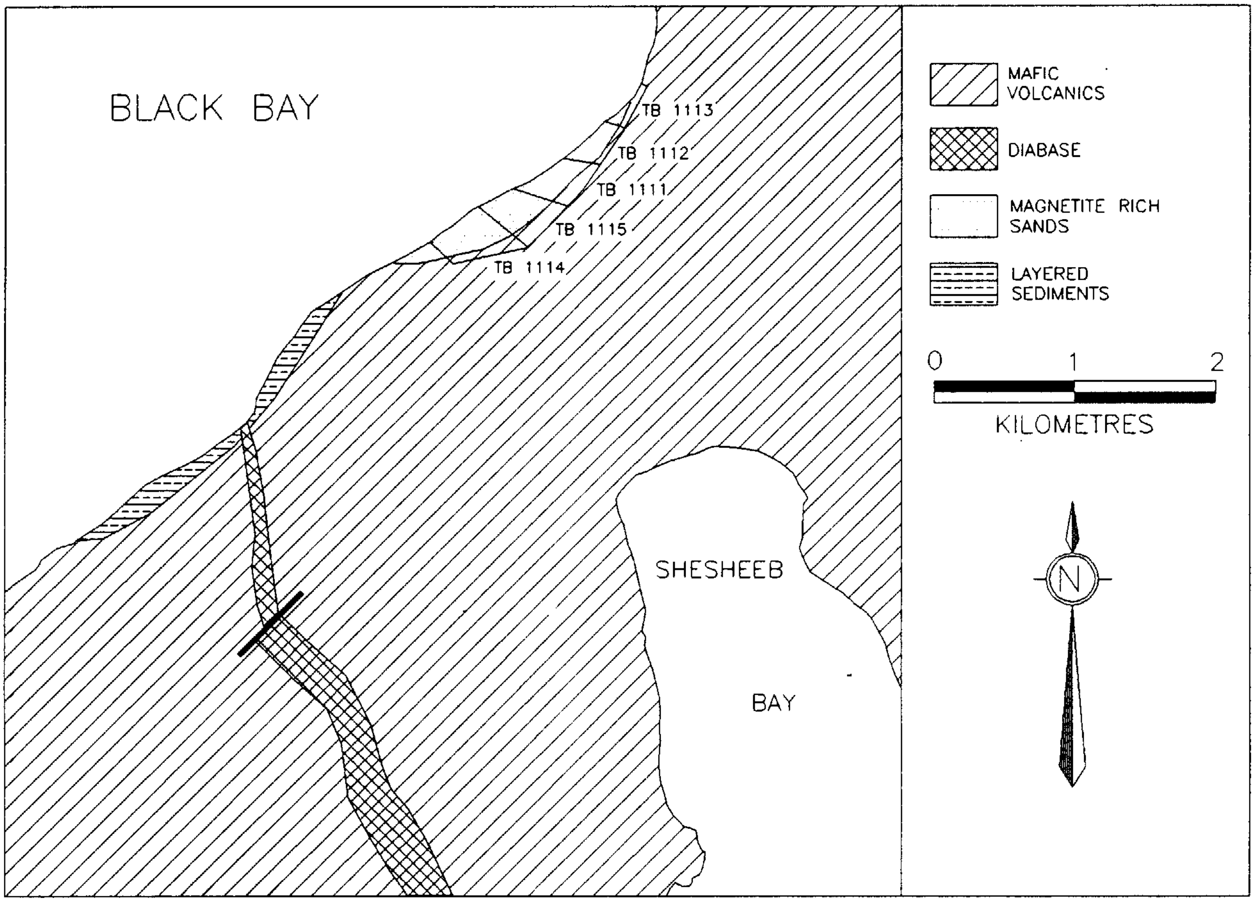

Figure 5: Black Bay Peninsula (Black Sand)

1) **PROPERTY NAME**: Buda Pegmatite

DATE(S) VISITED: September 1993

2) **ALTERNATE NAME(S)**: Buda Feldspar Deposit

3) **COMMODITY**: **Main**: Feldspar **Secondary**:

4) **DEVELOPMENT HISTORY AND OWNERSHIP**:

PAST:	1939	Staked by L. Blank of Winnipeg, Manitoba. Trenching and sampling conducted.
	1965	Staked by F. Minoletti of Thunder Bay, Ontario.
	1979	Staked by P. Skalesky, W. Peterson and T. Peterson, all of Thunder Bay.
	1982	Claims brought to lease.
	1990	Claims adjacent to leased claim staked by J. Williams.
CURRENT:	1993	Patented claims held by the Petersons and the estate of P. Skalesky.
		J. Williams still holds the unleased claims.

5) **LOCATION AND ACCESS**:

N.T.S.	52 A/12NW		
Latitude:	48· 40' 15"	**Northing:**	5394498
Longitude:	89· 49' 30"	**Easting:**	0292019

GENERAL LOCATION:

The occurrence is located 60 km northwest of Thunder Bay in Goldie Township, Concession 16, Lots 5 to 8 (Figure 6).

ACCESS:

From Shabaqua drive west on Highway 17 for 4.8 km. Turn right onto a gravel bush road, at 7.6 km cross the Oskandaga River bridge. At 8.3 km turn left and continue to the Oskandaga River. Cross the river and continue for another 0.8 km. The southern boundary of claim TB 514047 crosses the road at this point.

MAP REFERENCES:

Claim Map G-658, Goldie Township, Thunder Bay Mining Division
Map P.2855, Goldie Township (Carter 1985)
Map 2097G, Sunshine, Aeromagnetic Series (1962)
Map 5045, Kaministiquia Area (Mollard 1979)
Map S265, Thunder Bay Surficial Geology (Zoltai 1965)

REFERENCES:

Carter (1990)
Coleman (1895)
Industrial Minerals Geologist's Files, Thunder Bay
Kennedy (1980)
Mollard (1979)
Resident Geologist's Files, Thunder Bay District, Thunder Bay
Scott (1981)
Zoltai (1965)

6) GENERAL GEOLOGY AND STRUCTURE:

Carter (1990) described the geology of the area:

> Precambrian rocks are Archean in age. The supracrustal rocks comprise a Keewatin-type sequence of subaqueous metavolcanic rocks with minor interlayered metasediments, a Quetico-type sequence of metasediments with a minor interlayered, probably subaerial metavolcanics, which overlie and straddle the other two sequences unconformably.
>
> The metamorphosed mafic intrusives comprise gabbroic rocks which are commonly strongly magnetic, and the felsic intrusive rocks range from diorite to muscovite granite-pegmatite.

7) MINERALOGY:

Carter (1990) described the mineralogy:

> The dike consists of white muscovite-microcline granite-pegmatite, the microcline forming crystals up to 25 cm long and 5 cm across. The muscovite occurs in books with crystals up to 3 cm across. Accessory minerals observed were black tourmaline (schorl), and pale blue apatite; these minerals comprising about 1% of the rock. Quartz occurs as anhedral grains. In addition spessartine was reported (Scott 1981).

OTHER FEATURES:

Carter (1990) described the dimensions of the occurrence:

> The central part of the dike strikes N20°E, and is 60 m long. This part of the dike, which forms the largest outcrop, is lens-shaped measuring 10-15 m across at the ends and is 20 m across the central part. A detailed study of other outcrops in the vicinity of the main occurrence by Scott (1981) indicates that the dike has an "exposed strike length of greater than 1200 feet and a maximum apparent width of 85 feet and dips from between 45° and 50° east" (Scott 1981, p. 36), and indicates that the dike extends southwestwards beyond the boundary of the stock to the Trans Canada Pipeline.

8) **PHYSICAL PROPERTIES:**

9) **CHEMICAL ANALYSIS:**

Sample #	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	MnO	CaO	Na_2O	K_2O	P_2O_5
87-MCK-07	65.20	0.02	18.40	0.18	0.0	0.0	0.02	0.14	3.50	11.30	0.06
87-MCK-08	66.40	0.02	18.30	0.14	0.0	0.0	0.02	0.12	3.53	10.50	0.07
87-MCK-09	64.60	0.00	19.00	0.04	0.0	0.0	0.01	0.11	2.96	12.10	0.16

Analyses by Geoscience Laboratory, Ontario Geological Survey, Toronto

10) **COMMENTS/RECOMMENDATIONS:**

In 1992 a number of inquiries were made concerning information available on the Buda Pegmatite occurrence. The main interest was the potential for dental grade feldspar in the southwestern portion of the area. No work was recorded and the interested parties did not visit the property.

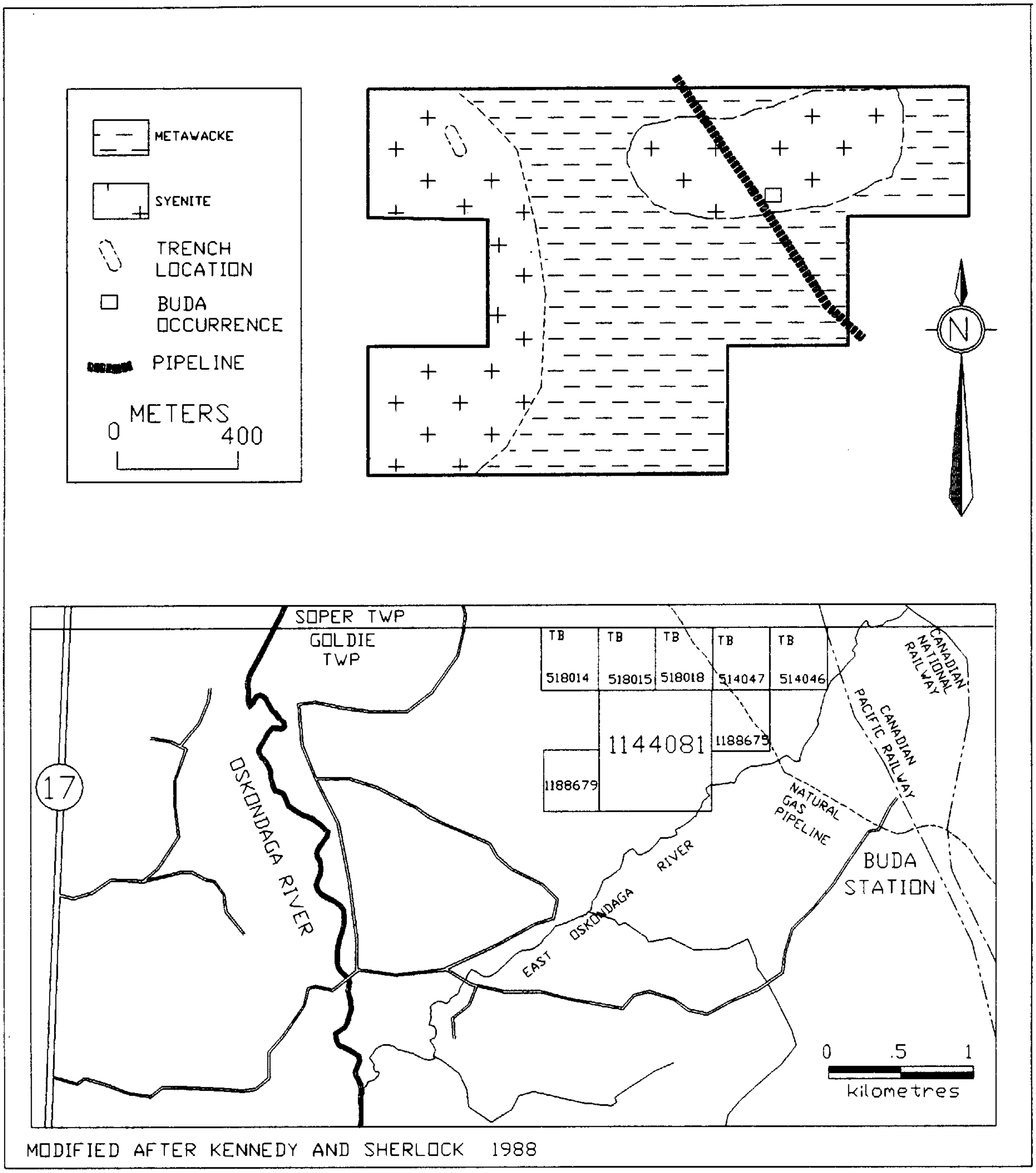

Figure 6: Buda Pegmatite, location and general geology

1) **PROPERTY NAME**: Chrome Lake Mine

DATE(S) VISITED: August 1992

2) **ALTERNATE NAME(S)**: Obonga Lake Chrome

3) **COMMODITY**: **Main**: Chromite **Secondary**:

4) **DEVELOPMENT HISTORY AND OWNERSHIP**:

PAST:

1928 An occurrence of chromite was observed by W.K. Keefe and R.A. MacDonald. They staked the occurrence and transferred ownership to Golden Centre Mines Inc. of New York.

1930 Consolidated Chromium Corporation, a subsidiary of Golden Centre Mines, was organized to develop the property. Development work, consisting of stripping, trenching and drilling was conducted. A shaft was sunk to a depth of 350 feet, with levels at 100 and 225 feet.

Operations ceased in late fall when Charles V. Bob Company of New York, owner of Golden Centre Mines Inc., collapsed. Ownership of the property was not protected.

1932 Chromium Alloy Company Ltd. was incorporated and gained control of the property.

1933 Chromium Alloy Co. sent 70 tons of ore to Niagara Falls, New York for beneficiation tests.

1934 Chromium Mining and Smelting Corp. Ltd. was formed and took control of the property. Twenty-three holes were drilled totalling 5,000 feet. Reserves for the 'E' zone of 225,000 tons averaging 17% Cr_2O_3 were indicated over a strike-length of 770 feet to a depth of 300 feet (Chromium Mining and Smelting Corp., Ltd., Annual Report 1935).

	1936	Mining operations re-commenced. A 50 ton concentrator was constructed on the property. Mining resumed on the existing levels and on a new 325 foot level.
	1937	Underground work was discontinued due to poor ore recovery. A Cr/Fe ratio of less than 1:1 was produced in the concentrate and earlier ore reserves were disproved.
	1938	Operations ceased after minimal surface and underground drilling.
	1974	The property remained idle until Chromium Mining and Smelting Corp., Ltd. merged with two companies to form Chromasco Ltd.
	1986	Chromasco Ltd. re-organized and became Timminco Metals, a division of Timminco Ltd.
CURRENT:	1993	Timminco Metals still holds the property.

5) LOCATION AND ACCESS:

N.T.S.	52 H/14		
Latitude:	49· 58' 10"	**Northing:**	5537984
Longitude:	89· 29' 20"	**Easting:**	0321519

GENERAL LOCATION:

The Chrome Lake Mine is located 175 km north of Thunder Bay and 50 km southwest of Armstrong. Highway 527 lies 24 km to the east of the property.

ACCESS:

Access to the property is by either float or ski equipped aircraft or helicopter. A winter road leaves the highway and accesses the northwest bay of Obonga Lake. The road extends through the centre of the property to the east of Chrome Lake (Figure 7).

MAP REFERENCES:

Map P.326, Garden-Obonga Lakes Sheet, Pye and Baillie
Map P.416, Obonga Lake Area, West Part (Kustra 1966)
Map P.417, Obonga Lake Area, East Part (Kustra 1966)
Map P.963, Operation Ignace-Armstrong, Obonga Lake-Lac des Iles Sheet (Breaks, Bowen and Sage 1974)

REFERENCES:

Assessment Files, Thunder Bay
Graham (1931)
Hurst (1931)
Industrial Minerals Geologist's Files, Thunder Bay
Kidd (1933)
Kustra and Assistants (1966)
Resident Geologist's Files, Thunder Bay District
Whittaker (1986)

6) GENERAL GEOLOGY AND STRUCTURE:

Whittaker (1986) describes the geology as follows:

> The serpentinized ultramafic intrusion at Puddy and Chrome Lakes is exposed for 7 km along strike and is approximately 1 km in width. The intrusive body is emplaced at the contact between Archean quartzofeldspathic paragneisses and Archean volcanogenic metasediments. A stock of porphyritic quartz monzonite, intruding both paragneiss and the metasediments, forms part of the southwest contact. Magnetic data indicate a southerly dip.
>
> Rocks of the intrusion include dunite, peridotite, and minor pyroxenite, all of which are serpentinized. North-striking and east-striking dikes of probable Late Precambrian age cut the intrusion. Faulting, indicated by intense shearing of the ultramafic rocks, is evident at the west end of Puddy Lake and at the north end of Chrome Lake. Country rock xenoliths of paragneiss occur along the north contact of the intrusion at Puddy Lake. The xenoliths are elongate slabs aligned parallel to the contact.

7) MINERALOGY:

Johnson and Blomberg (Assessment Files, Thunder Bay) describe the mineralogy of the property:

> Chromite mineralisation occurs in three forms: layered; disseminated and podiform.

Disseminated chromite is the most widely distributed style of chromite mineralisation and it occurs along with layered and massive chromite (>75 percent chromite). Chromite, in disseminated form, is very fine grained and forms 5 to 15 percent of the serpentinite. At the north end of Chrome Lake, disseminated chromite has been redistributed by shearing into wispy schlieren-type concentrations 0.2 inches thick and up to 1.5 inches long, separated by black-green, strongly foliated serpentinite.

Chromite in layered form is also best exposed at the north end of Chrome Lake where the layered zone is approximately 1.6 feet thick, strikes north, and dips easterly. The layers are deflected to a northwesterly strike as an east-striking fault contact with the paragneisses to the north is approached. Individual chromite layers vary from 0.4 inches to 2.3 inches thick and consist of cumulate concentrations of fine- to medium-grained subhedral chromite.

OTHER FEATURES:

8) **ECONOMIC FEATURES:**

Merritt (1938) describe a number of deposits which were investigated around the mine site:

"E"-zone was mined for some 8000 tons, from a surface open cut and underground in 1936-37. Ore occurred in high-grade lenses or vein-like structures. At shutdown there remained 25000 tons grading 12% Cr_2O_3 down to 300 feet (Chromium Mining & Smelting Corp. Ltd., Sept. 1937 Interim Report), or 32000 tons at 9.7% including 7410 tons at 10.2% Cr_2O_3 in a surface dump.

"A"-zone occurs at the north end of Chrome Lake and extends eastward across the lake. From drilling results on the west side of the lake to a depth of 450 feet down dip (35·S) there is the possibility of developing about 1000000 tons of 7% Cr_2O_3.

"B"-zone outcrops .25 miles east of Chrome Lake. It consists of a flat body of chromite about 2 feet thick. Although estimated (1930) to contain 5000 tons at 34% Cr_2O_3, a drill hole aimed at this body failed to intersect any chromite.

"D"-zone lies about 500 feet west of "A" and consists of occasional chromite streaks in serpentinite.

"G"-zone extends eastward 1700 feet from the southeast corner of Chrome Lake, as indicated by drilling. "Considering the mass as a whole for a length of 1000 feet and an average width of 180 feet, the body would contain about 1500000 tons per 100 feet of depth ... running 2.3% Cr_2O_3

"H"-zone, at an unstated locality, based on limited drilling "shows promise ... of substantial tonnage at a grade up to 9% ... more promise than either "G" or "A" zones.

9) <u>CHEMICAL ANALYSIS</u>:

Sample	SiO2	Al2O3	Fe2O3	MgO	CaO	MnO	K2O	P2O5	Cr2O3	Na2O	TiO2
1 Serpn.	35.10	4.51	18.60	23.20	3.10	0.19	0.38	0.04	3.48	0.28	0.23
2 Serpn.	33.10	1.37	12.00	33.80	1.11	0.14	0.04	0.02	2.90	0.01	0.09
3 Serpn.	34.90	1.26	11.10	34.40	0.80	0.14	0.07	0.02	1.48	0.10	0.06
4 Serpn.	28.00	15.90	18.80	23.80	0.44	0.15	<0.01	0.11	0.25	<0.01	1.47
5 Serpn.	26.30	5.46	14.20	24.40	2.04	0.31	<0.01	0.02	16.80	0.01	0.30
6 Serpn.	49.10	11.40	10.90	12.00	7.30	0.21	0.89	0.06	1.08	1.34	0.47

Serpn. - Serpentinite

(Assessment Files, Thunder Bay)

10) <u>COMMENTS/RECOMMENDATIONS</u>:

The remote location and small reserves make it unlikely that this mine will be reopened. Historically, the site is interesting in that many of the old buildings remain along with much of the equipment.

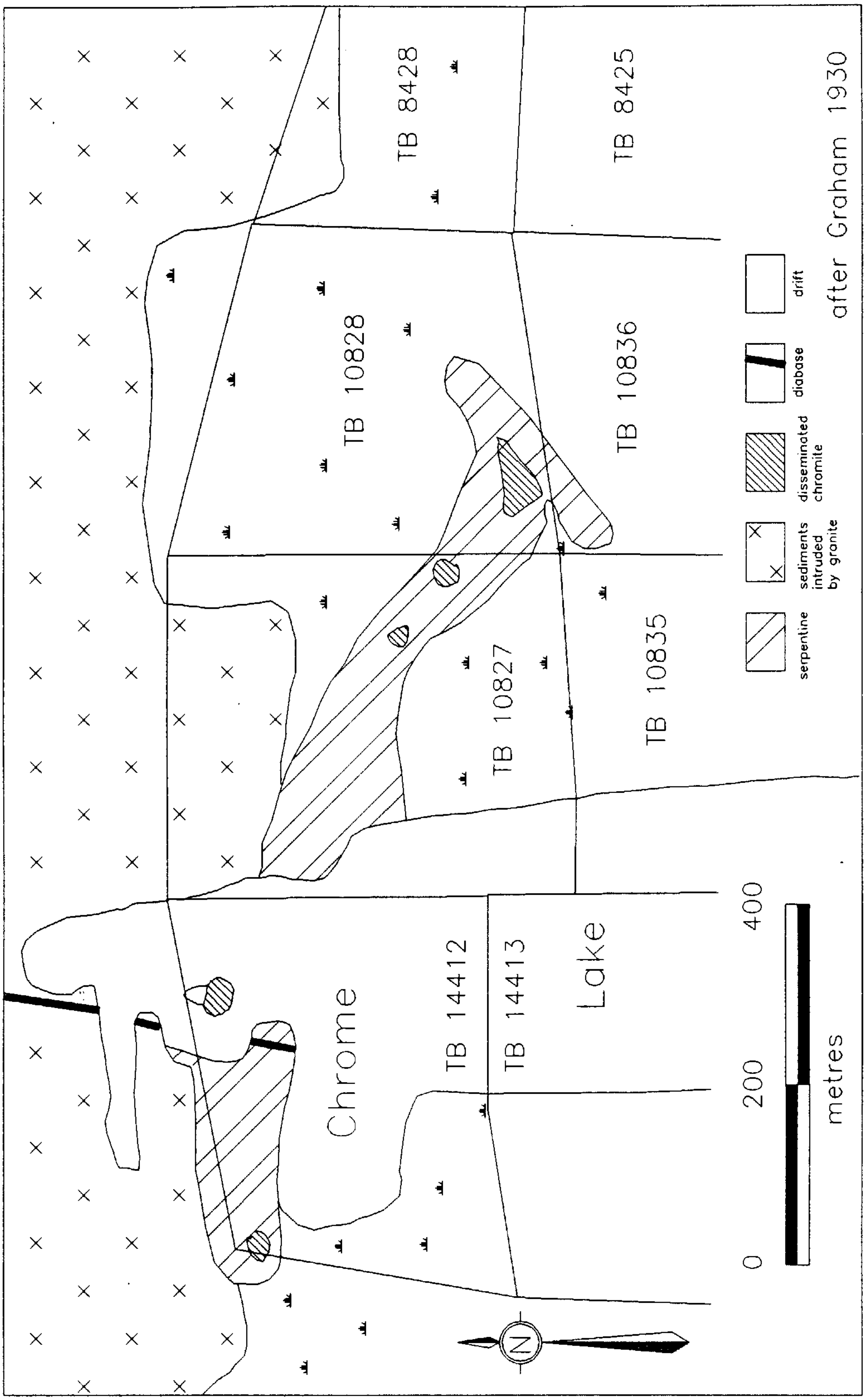

Figure 7: Chrome Lake Mine, general geology

1) **PROPERTY NAME**: L.T.L. Diabase Quarry

DATE(S) VISITED: August 1992

2) **ALTERNATE NAME(S)**:

3) **COMMODITY:** **Main:** Diabase **Secondary:**

4) **DEVELOPMENT HISTORY AND OWNERSHIP:**

PAST:	1880s to present	Various quarries were developed for their diabase. It was used for construction of the Thunder Bay Harbour breakwater and for rip rap.
	1984	L.T.L. Contracting Ltd. began development of the quarry to produce material for rip rap, soil erosion protection and rock wool insulation.
CURRENT:	1994	L.T.L. Contracting still owns the property and continues production.

5) **LOCATION AND ACCESS:**

N.T.S.	52 A/06NE		
Latitude:	48° 25' 00"	**Northing:**	5364610
Longitude:	89° 08' 30"	**Easting:**	0341531

GENERAL LOCATION:

The quarry is located approximately 1.5 km north of the Thunder Bay city limits on Highway 11/17.

ACCESS:

The property can be accessed by either Highway 11/17 or Lakeshore Drive. Follow Highway 11/17 approximately 1.5 km north and turn right onto a short access road.

MAP REFERENCES:

Claim Map G-672, MacGregor Township, Thunder Bay Mining Division
Map P.2984, MacGregor Township, West Half (Scott 1990)

REFERENCES:

Industrial Minerals Geologist's Files, Thunder Bay
Resident Geologist's Files, Thunder Bay District
Scott (1990)
Tanton (1931)

6) GENERAL GEOLOGY AND STRUCTURE:

Scott (1990) described the geology of the area:

> All rocks in MacGregor Township are of Precambrian age. Rocks of both the Superior and Southern Province of the Canadian Shield are exposed in the map area. As currently exhumed, the unconformity between the Superior and the overlying Southern Province rocks straddles the southern portion of MacGregor Township and subparallels the north shore of Thunder Bay, Lake Superior. The dominant structural element present is the Lake Superior Basin and its associated lithologies.
>
> Diabase dikes intrude all lithologies and are considered to be Late Precambrian in age.

7) MINERALOGY:

Scott (1990) describes the diabase as follows:

> The diabase is medium grey in colour, usually of fine grain size, and exhibits an orange-brown weathered surface. In sills, well-developed columnar jointing is common. Granophyric phases exist in a series of small quarries north of the Terry Fox Lookout. Peculiar inclusions of banded agate-like chert and partially assimilated shales can be found in the diabase. These xenoliths are of Gunflint and Rove Formation rocks that have been incorporated in the diabase during its emplacement.

OTHER FEATURES:

8) ECONOMIC FEATURES:

The diabase is being used for the following: bank stabilization along the Neebing, McIntyre and Kaministiquia rivers; in the production of rock wool insulation; for the construction of a rock island at the mouth of McVicars Creek; driveway surface material; and in the stabilization of Kakabeka Falls.

9) **CHEMICAL ANALYSIS**:

Sample No.	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5
87MCK-0006	49.85	0.83	15.43	2.36	9.64	0.19	8.36	11.03	1.87	0.36	0.06

Analyses by Geoscience Laboratory, Ontario Geological Survey, Toronto

10) **COMMENTS/RECOMMENDATIONS**:

Although L.T.L. Contracting lost the contract for supplying Partek Insulation with diabase for the production of rock wool insulation, the operations have continued. The quarry now supplies mainly a local market with construction grade material. However, L.T.L. is still looking for other contracts and uses for their material.

1) **PROPERTY NAME:** Trafalgar Bay Soapstone Occurrence

DATE(S) VISITED: June 1992

2) **ALTERNATE NAME(S):**

3) **COMMODITY:** **Main:** Soapstone **Secondary:**

4) **DEVELOPMENT HISTORY AND OWNERSHIP:**

PAST:		The area had seen no exploration for industrial minerals prior to 1992.
	1992	R.R. Parker located a new soapstone occurrence and staked a single claim over it.
CURRENT:	1994	R.R. Parker still holds the occurrence.

5) **LOCATION AND ACCESS:**

N.T.S.	52 B/07SE		
Latitude:	48° 21' 20"	**Northing:**	5358318
Longitude:	90° 37' 45"	**Easting:**	0675635

GENERAL LOCATION:

The occurrence is located approximately 3.6 km north-northeast of Trafalgar Bay of Northern Light Lake. Northern Light Lake is located 96 km west of Thunder Bay.

ACCESS:

Access to the property is as follows: from the Northern Lights Lake landing east for 1.5 km, take a bush trail north for 200 m, this trail connects to a logging road. Follow the logging road northwest for 4.5 km, take a bush trail northwest for 3 km. This connects with another logging road. Take this road northwest for 6 km to a fork in the road, take the left fork for 200 m. The occurrence is on the northwest side of the road.

MAP REFERENCES:

Claim Map G-771, Titmarsh Lake, Thunder Bay Mining Division
Map P.188, Quetico Sheet, Compilation Series (Pye and Fenwick 1963)

REFERENCES:

Industrial Minerals Geologist's Files, Thunder Bay

6) **GENERAL GEOLOGY AND STRUCTURE:**

The area is underlain by Precambrian igneous and metamorphic rocks of the Wawa subprovince. The occurrence is hosted in a serpentinized ultramafic, possibly peridotite. The occurrence is exposed as a series of small outcrops over a strike length of 56.4 m. The outcrops observed were very small, highly fractured and deeply weathered.

7) **MINERALOGY:**

Veinlets of asbestos-like chrysotile are abundant at the eastern end of the exposure. The veinlets area typically less than 1 cm in width and display a fibrous texture. Clots of whitish to ivory coloured material are seen, these could be serpentine which has been stripped of its iron to produce the magnetite veinlets. Sulphides are rare and when seen are fine-grained pyrite.

OTHER FEATURES:

8) **ECONOMIC FEATURES:**

9) **CHEMICAL ANALYSIS:**

10) **COMMENTS/RECOMMENDATIONS:**

A slabbed sample displayed reticulate and anastamosing magnetite veining. The sample appears quite similar to samples from the Puddy Lake occurrence. The stone is carvable, however, the abundance of magnetite would make it difficult to work with.

BEARDMORE-GERALDTON DISTRICT

1) **PROPERTY NAME:** Barino Construction Croll Lake Stock

DATE(S) VISITED: August 1992

2) **ALTERNATE NAME(S):**

3) **COMMODITY:** **Main:** Aggregate **Secondary:**

4) **DEVELOPMENT HISTORY AND OWNERSHIP:**

PAST: No previous exploration or development has been conducted on this site.

CURRENT: 1994 Barino Construction is currently developing a site to produce crushed aggregate for highway construction.

5) **LOCATION AND ACCESS:**

N.T.S.	42 E/10		
Latitude:	49° 46' 42"	**Northing:**	5513843
Longitude:	86° 36' 00"	**Easting:**	528800

GENERAL LOCATION:

The site is located approximately 5 km southwest of Longlac, in south-central Oakes Township and 200 m north of Highway 11.

ACCESS:

The site is accessed by an all-weather gravel road maintained by Kimberley-Clark (Figure 8). The road is located 5 km west of Longlac, and travels north of Highway 11.

MAP REFERENCES:

Claim Map G-307, Longlac Area, Thunder Bay Mining Division
Map 2538, Northern Long Lake Area (Kresz and Zayachivsky 1991)

REFERENCES:

Kresz and Zayachivsky (1991)
Industrial Minerals Geologist Files, Thunder Bay
Resident Geologist's Files, Beardmore-Geraldton District, Thunder Bay

6) GENERAL GEOLOGY AND STRUCTURE:

An engineering report conducted by Dominion Soils Investigation Inc. (Industrial Minerals Geologist's Files, Thunder Bay) described the geology of the area:

> The bedrock underlying the Longlac area is of Precambrian age and belongs to the eastern Wabigoon and Quetico subprovinces of the Superior structural province of the Canadian Shield. The rocks in the area consist of highly metamorphosed sedimentary and volcanic rocks which have been intruded by igneous rocks of various compositions. The proposed quarry site is located within a granitic body known as the Croll Lake Stock. The Croll Lake Stock is an elliptical intrusion, approximately 150 km^2 in area. It consists mainly of medium to coarse grained felsic granitic rocks with compositional variations throughout. A predominant near vertical foliation strikes roughly northwest-southwest.

7) MINERALOGY:

The dominant lithology is a hornblende granodiorite.

JOINTING:

Jointing on the property is described by Dominion Soils Investigation Inc. (Industrial Minerals Geologist's Files, Thunder Bay):

> Jointing occurs in 2 to 3 sets plus random orientations. The joints mainly comprise stress relief joints which are commonly tight and which can be either infilled or not.

OTHER FEATURES:

8) PHYSICAL PROPERTIES:

Physical tests conducted on the property included: Bulk relative density and absorption (MTO Lab Test LS604); Magnesium sulphate soundness (MTO Test LS606); Los Angeles abrasion (MTO Lab Test LS605); Petrographic number (MTO Lab Test LS609); Accelerated mortar bar expansion (A.S.T.M. Test P214-1990); Dry rodded unit weight (MTO Test LS400); Point load tests; and grain size analyses.

(Industrial Minerals Geologist Files, Thunder Bay)

9) CHEMICAL ANALYSIS:

10) COMMENTS/RECOMMENDATIONS:

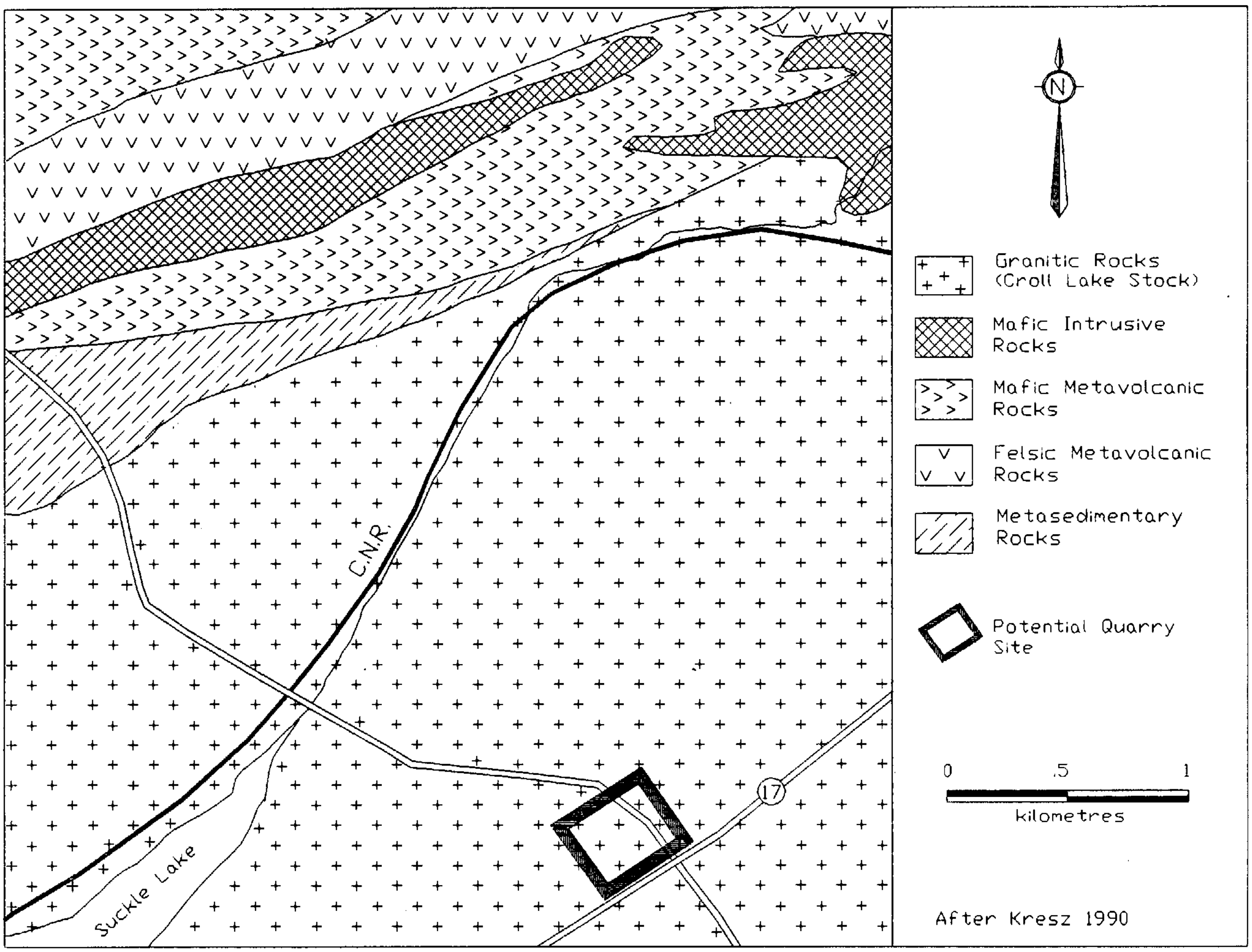

Figure 8: Barino Construction, Croll Lake Stock, general geology

1) **PROPERTY NAME**: Dead Horse Creek Diatremes

DATE(S) VISITED: 1983-1987; to present

2) **ALTERNATE NAME(S)**: West Dead Horse Creek subcomplex
Main Mineralized Zone

3) **COMMODITY**: **Main**: Th, U **Secondary**: Be, Zr, Y

4) **DEVELOPMENT HISTORY AND OWNERSHIP**:

PAST:

1977	Gulf Minerals Canada Ltd. staked a claim group to cover a radioactivity anomaly. Limited prospecting was completed.
1978	Gulf Minerals Canada Ltd. completed geological mapping and diamond drilling (8 holes; 944 m).
1981	Gulf Minerals Canada Ltd. completed one diamond drill hole (130.1 m).
1982	Property re-staked by D.O. Walsten. No work recorded.
1984	Property re-staked by O. Belisle.
1985	Property optioned to Highwood Resources. A grid was cut and geochemical sampling conducted. Property returned to O. Belisle.
1987	Unocal Canada Ltd. optioned the property from Jet Exploration-O. Belisle. An exploration program of geological mapping, soil geochemistry, stripping, and geophysics (Magnetometer and Radiometric) surveys were completed.
1988	Unocal Canada Ltd. relogged and sampled the Gulf Minerals Canada Ltd. diamond drill holes.
1991	Unocal Canada Ltd. returned the property to O. Belisle.

CURRENT: 1994 — The property is still held by O. Belisle.

5) LOCATION AND ACCESS:

N.T.S.	42D/15SE		
Latitude:	48· 50' 30"	**Northing:**	5409688
Longitude:	86· 40' 25"	**Easting:**	0523949

GENERAL LOCATION:

The Dead Horse Creek diatreme complex is located in Walsh Township approximately 4 km north of Highway 17 along the Dead Horse Creek access road. The road intersects Highway 17 approximately 26 km northwest of the town of Marathon.

ACCESS:

Access is via Highway 17 and north on the Dead Horse Creek (Figure 9) access road for 4.0 km.

MAP REFERENCES:

Claim Map G-636, Walsh Township, Thunder Bay Mining Division
2107 Jackfish-Middleton Area (Walker 1967)
Chart A, Diatremes North of Lake Superior, Figures 7, 8, 10 and 11 (Sage 1982)
Map P.3232, Port Coldwell Complex, West Half (Walker et al. 1993)

REFERENCES:

Assessment Files, Thunder Bay
Industrial Minerals Geologist's Files, Thunder Bay
Sage (1982)
Smyk et al. (1993)
Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay

6) GENERAL GEOLOGY AND STRUCTURE:

Sage (1982) described the general geology as follows:

> The Dead Horse complex has maximum dimensions of 1600 by 400 m, and is elongated in a north-northeast direction.
>
> The breccia consists of angular to subrounded clasts of locally derived rocks (Photo 7) in a matrix of comminuted rock debris which has been locally extensively altered. Clasts up to 1 m have been seen, but most frequently they are 0.3 m or less. Mitchell and Platt (1977) reported the presence of Sibley-like

clasts similar to those found in the McKellar Creek structure, but the author has not observed such clasts. As with the McKellar Creek structure, no evidence of clast zonation or multiple explosive events was observed. The alteration is extremely variable within the breccia. The first indication of alteration is reddening of clast margins. With more intense alteration, the entire clast is bright brick red and hard to break. Such extensively replaced clasts break with a crude conchoidal fracture. The extensively altered breccias are generally highly radioactive. In the southwest corner and at the west contact of the South Dead Horse subcomplex, are isolated, highly radioactive outcrops of breccia with a carbonate matrix. These outcrops consist dominantly of fine-grained, grey carbonate with isolated red clasts weathering 4 to 5 cm in relief. The clasts have an open framework supported by the carbonate matrix. A lamprophyre dike rich in carbonate cuts the breccia in the face of a cliff in the southwest corner of the complex. The general lack of carbonate within the enclosing wall rocks indicates that the carbonate found in the breccia has been introduced. The author considers the carbonate to be of magmatic origin.

The style of brecciation and type of alteration are identical to altered and fenitized breccias observed by the author at the margins of some carbonatite complexes. In the northeast corner of the south subcomplex is an extensive zone of scapolite replacement. The clasts are not red, but grey on weathered surface. This zone is appreciably more radioactive than the highly altered red breccia. Scapolite is usually identifiable on the weathered surface as white prismatic fibres and on the fresh surface as greenish brown fibres that blend into the matrix. The replacement tends to occur preferentially in the more siliceous metasedimentary clasts. The scapolite weathers out of the clasts giving a worm-eaten appearance to the clasts. The scapolite zone is a more intense zone of alteration than represented by the red breccias. Carbonate, amphibole, and disseminated pyrite are common in the matrix of the scapolite zone, and form part of the replacement mineralogy.

> The complex has been cut by dikes of carbonate, diabase, porphyritic trachytoidal diabase, and syenite aplite.
>
> A limited reconnaissance of the Port Coldwell complex by the author showed that dikes cutting the Port Coldwell complex are visually identical to the porphyritic trachytoidal diabase and syenite aplite dikes are nearly always radioactive and have been prospected for their uranium and niobium content within the Port Coldwell complex (private records, Noranda Mines Limited). Walker (1967) considered monzonite and quartz monzonite along the east flank of the diatreme structure to be part of the Port Coldwell alkalic complex. The author has assumed that this correlation is correct. Rb-Sr isochron dating by Bell et al. (1970) indicates an isotope age of 1085±15 Ma for the Port Coldwell complex, establishing a maximum age for the diatreme since monzonite occurs as clasts within the breccia.
>
> On the basis of field observations, the author considers the Dead Horse Creek diatreme to be the brecciated and altered top of an unexposed carbonatite intrusion, perhaps younger than the main period of alkalic rock emplacement at Port Coldwell, but older than some diking of that complex. The structure is thus an integral part of the alkalic rock-carbonatite petrogenetic province located north of Lake Superior.
>
> The Dead Horse Creek structure is elongated north-northeasterly, and lies across Dead Horse Creek. Lithologic units cannot be correlated across the creek, indicating the presence of a fault. This interpreted fault may have exerted control on positioning of the diatreme-forming event.

Sage (1982) also goes into further detail of the individual rock types present in the complex in his study of the area. Sage (1982) described the structure of the diatreme complex:

The breccia structure is approximately 1600 m long and up to 400 m wide, and comprises three subcomplexes. West of the south subcomplex is a minor subcomplex approximately 60 m long and 15 m wide which is referred to as the West Dead Horse subcomplex, approximately 240 by 60 m with a northwest-striking long axis, and referred to as the East Dead Horse subcomplex. The main breccia zone has a trend east of north, however the small western and eastern structures are elongated in a northwest direction. These small structures may occupy small faults cross-cutting the Early Precambrian rocks enclosing the main structure.

The main structure appears to cross Dead Horse Creek at a shallow angle with most of the structure lying east of the north-south trending creek. The author was not able to correlate lithologies across the creek, and would concur with Walker (1967) that the creek is occupied by a fault. This fault is referred to as the Dead Horse Creek Fault, and may represent the structure controlling the emplacement and northeast trend of the diatreme intrusion.

A number of small faults occur marginally to the breccia. It is uncertain whether these faults cut the breccia, or existed prior to breccia emplacement and exerted control on the emplacement. The author suspects that these faults are older than the breccia, and that they may have been re-activated. However, no fault has been traced completely through the breccia.

Within the south subcomplex, the more centrally located outcrops are limited in a number but appear to be less brecciated and less altered than more marginal exposures. The core of the structure may therefore be less brecciated and altered than the periphery. The author has obtained more intense radioactivity readings on the spectrometer in a similar spatial distribution. Within the central and northern subcomplexes, less intense brecciation and alteration may be located towards the margins.

> The south margin of the West Dead Horse structure is sheared and brecciated, and locally, sheared and brecciated rock hosts the high grade uranium-thorium mineralization of this subcomplex. While some breccia-wallrock contacts are sharp, others are more gradational as brecciation and alteration fade into unaltered rock.
>
> Along the southern and western flanks of the South Dead Horse subcomplex, the massive diabase unit may have exerted local control on emplacement of the breccia.

One of the five diatreme subcomplexes that comprise the Dead Horse Complex, the West Dead Horse Creek subcomplex hosts the Main Mineralized Zone that has been the main target of recent economic interest. It has been described by *Knox (1987) and most recently by Smyk <u>et al.</u> (1993):

> The Main Mineralized Zone (MMZ) is a composite unit that comprises diverse, hydrothermally altered and rare-metal mineralized rocks. It is steeply dipping, curved to tabular zone 82 m long, averaging 1.5 m in width, and is apparently closed at both ends (Knox, 1987). Diamond drilling has intersected the MMZ at depth but it is poorly mineralized. The structure in which the MMZ is situated crosscuts the diatreme breccia, is exposed for 140 m and may continue under overburden. As first described by Knox (1987), the MMZ consists of strongly hematitized and silicified rocks, presumably of Archean age, which have been fractured, brecciated and veined by quartz. Patchy carbonate also occurs along the zone's margins. Where hosted by diatreme breccia, the MMZ consists of irregular, anastomosing quartz veins and vein-breccias in a hematitized host. Pink grains of phenakite are visible in these quartz veins and pods.
>
> Rare-metal mineralization within the MMZ is erractically distributed. The highest grade, most strongly radioactive zones are distinguishable in the field as hard, chocolate-brown, massive, fine-grained rocks with a conchoidal fracture.

7) **MINERALOGY**:

Sage (1982) described the mineralogy of the complex:

> The Dead Horse Creek structure has the greatest economic potential of any diatreme structures yet identified on the north shore of Lake Superior. The author has obtained spectrometer readings 10 times background in some areas. Thorium appears to dominate over uranium. A selected group of samples was submitted for analysis which disclosed anomalous quantities of uranium, thorium, rare earths, beryllium, and in one instance zirconium. Base or precious metals previously reported by Fenwick and Scott (1978) were not found in significant quantities. The silver-lead mineralization reported by Fenwick and Scott (1978) was likely from an accidental clast of mineralized rock derived from lead-silver-zinc veins that cut the Early Precambrian rocks of the area (Walker 1967). With perhaps the exception of beryllium, the anomalous metal contents are diagnostic or characteristic of a carbonatite.

Sage (1982) continues describing the mineralogy as:

> Comparison of minor element abundance in the Dead Horse Creek diatreme and its wall rocks show that in addition to U, Th and Be, other elements (Ba, Sr, Nb, Pb, rare earths, phosphorous, and titanium) are enriched in the diatreme. The anomalous niobium, rare earths, phosphorous, and titanium imply a relationship to alkalic rock-carbonatite magmatism. Erratic, but slightly higher Pb, V, Co and Mo are indicated. Chromium and zinc appear relatively the same, and copper values are erratic. Lithium and possibly nickel appear depleted.

The main mineral constituent of the Main Mineralized Zone is a fine-grained, calcium zirconosilicate. Zircon, uraninite, thorite, monazite-(Ce) and xenotime-(Y) also have been identified. Riebeckite is common peripheral to the zone in the diatreme breccia (Smyk <u>et al.</u> 1993)

8) **ECONOMIC FEATURES:**

The main mineralized zone at the West Dead Horse Creek subcomplex is 82 m long and averages 1.5 m in width. Channel sampling conducted by Unocal indicated that the zone averages 0.058%Y_2O_3, 1.85% ZrO_2, 0.202% BeO, and 0.031% U_3O_8 (*Knox 1987).

9) **CHEMICAL ANALYSES:**

Sage (1982, p.53) reported the following spectrometer analyses:

Rock Type	All Recorded Data			All Recorded Data Minus Rejected High Values		
	No. of Readings		Average	No. of Readings		Average
Mafic to	86	T1	3462	77	T1	2638
intermediate		T2	199		T2	164
metavolcanics		T3	50		T3	46
Laminated tuff	3	T1	1400			
associated with			T2	69		
metavolcanics		T3	42			
Metasediments	138	T1	4256	132	T1	4064
		T2	238		T2	231
		T3	56		T3	54
Breccia	172	T1	14185	160	T1	10945
		T2	6977		T2	5488
		T3	179		T3	136

Rock Type	All Recorded Data			All Recorded Data Minus Rejected High Values		
	No. of Readings		Average	No. of Readings		Average
Trondhjemite	3	T1	3000			
		T2	163			
		T3	41			
Lamprophyre	3	T1	19333			
dikes		T2	2327	Readings erratic		
		T3	712			
Aplite (Early	5	T1	11120			
Precambrian)		T2	506	Readings erratic		
		T3	136			

Diabase (Late Precambrian)	14	T1	3650			
		T2	189	Readings consistent		
		T3	52			
Diabase (Middle Precambrian)	15	T1	3087	13	T1	2754
		T2	154		T2	145
		T3	43		T3	43
Trondhjemite (Late Precambrian)	19	T1	5105	15	T1	4533
		T2	275		T2	252
		T3	66		T3	59
Syenite (Late Precambrian)	4	T1	12250			
		T2	705	Readings erratic		
		T3	165			
Porphyritic Diabase (Late Precambrian)	3	T1	5667			
		T2	280	Readings consistent		
		T3	69			

NOTE: All readings in counts per minute
T1 = Th + U + K
T2 = Th + U
T3 = Th

Sage (1982, p.54)

Selected spectrometer readings at high grade showing at West Dead Horse subcomplex (Sage 1982, table 9, chart b for assays of select samples).

	Readings		Remarks
DH 127	T1	20000	Sheared rock.
	T2	1100	
	T3	350	
DH 128	T1	off scale	Sheared rock, trace of U staining.
	T2	30000	
	T3	11000	
DH 129	T1	5500	Granite aplite immediately north of high grade showing.
	T2	320	
	T3	55	
DH 130	T1	off scale	Sheared rock.
	T2	10000	
	T3	2300	
DH 131	T1	off scale	Sheared, brecciated, and silicified.
	T2	3300	
	T3	1100	
DH 132	T1	off scale	Red, silicified, hematized breccia.
	T2	10000	
	T3	3300	

DH 133	T1	5500	Metasediments enclosing shear zone. Unsheared, unmineralized.
	T2	300	
	T3	55	
DH 134	T1	20000	Red, silicified, hematized breccia.
	T2	1500	
	T3	260	
DH 135	T1	5000	Metasediments enclosing shear zone. Unsheared, unmineralized.
	T2	350	
	T3	60	

NOTE: All readings in counts per minute
T1 = Th + U + K
T2 = Th + U
T3 = Th

Sage (1982, p. 54)

Samples of the Diatreme Breccia analysed by Resident Geologist personnel yielded:

Sample Number	Nb ppm	Zr ppm	Be ppm	P205 %	Th ppm	U ppm	La ppm	Y ppm
87BUN-1	300	11.6%	6170	0.06	5200	3100	48	98
-2	125	2.4%	150	0.76	1100	680	10	32
-3	100	2.8%	240	0.08	1500	820	8	36
-4	110	1200	20	2.03	120	56	140	140
-5	180	1300	8	2.46	280	89	255	235
88BDH-1	-50	1.0%	210		348	280	12	140
-3	-50	6300	595		450	400	12	115
-4	14	257	12		64	7.5	5.7	67
-5	-50	11.6%	4045		2.5%	4600	14	335
-7	-50	5.1%	9765		4710	1600	8.7	1190
-8	-5	585	7700		33	15	10	12
-9	110	1528	22		404	58	310	269
-11	9	3480	8		564	120	720	463
-12	142	220	11		87	26	110	102
DH 89-6	<0.1%	8.6%	5570		1.7%			2900
-7	15	1482	1.2%		73			22

Sampled Lithologies:

87 BUN -01: High-grade main mineralized zone (MMZ)
-02: Altered zone, peripheral to MMZ
-03: Altered zone, peripheral to MMZ
-04: Heterolithic (?) diatreme breccia
-05: Heterolithic diatreme breccia

88 BDH -01: Altered zone, peripheral to MMZ
-03: " " " " " "
-04: " " " " " "
-05: High grade MMZ
-07: Altered zone, peripheral to MMZ
-08: Quartz vein in MMZ, phenakite-rich
-09: Heterolithic diatreme breccia
-11: Silicocarbonatite dike
-12: " " " " " "

DH 89 - 6: High-grade MMZ
- 7: " " "

(Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay)

10) <u>COMMENTS/RECOMMENDATIONS</u>:

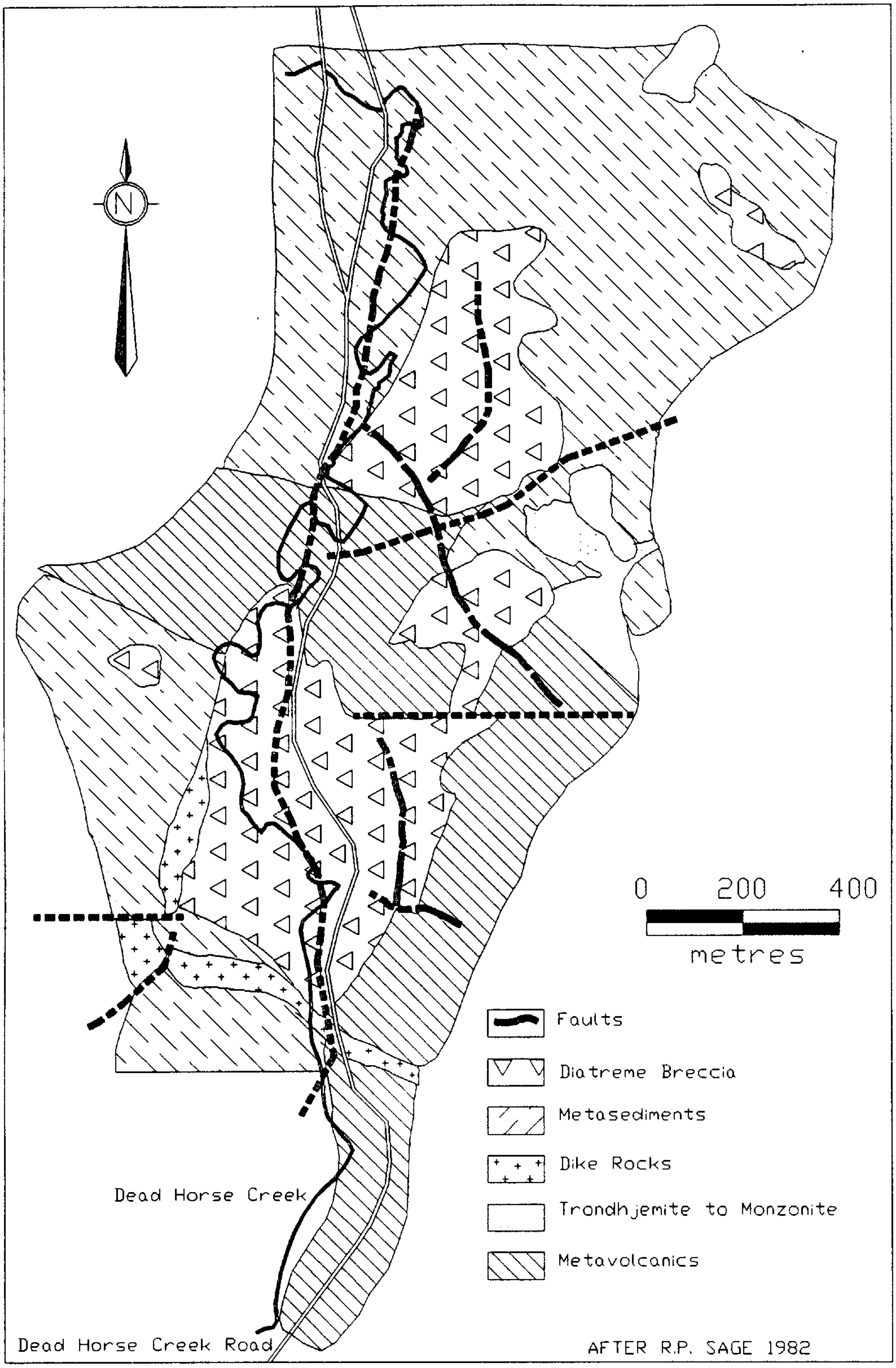

Figure 9: Dead Horse Creek Diatremes, geology

1) PROPERTY NAME: Dickison Lake Quartz Occurrence

DATE(S) VISITED: September 1993

2) ALTERNATE NAME(S):

3) COMMODITY: **Main:** Quartz, silica **Secondary:**

4) DEVELOPMENT HISTORY AND OWNERSHIP:

PAST: 1954 Large quartz veins were identified by M.W. Bartley as part of a regional reconnaissance survey conducted for the Canadian Pacific Railway Company.

CURRENT: 1994 The quartz occurrences are all open.

5) LOCATION AND ACCESS:

N.T.S.	42 E/3SW		
Latitude:	49° 09' 00"	**Northing:**	5444003
Longitude:	87° 26' 00"	**Easting:**	0468399

GENERAL LOCATION:

The occurrence is located 39 km north-northwest of the town of Schreiber.

ACCESS:

At present (1993) access to the occurrence is difficult (Figure 10) and is best achieved by helicopter. The closest road is approximately 13 km to the northeast and accesses the northern end of Dickison Lake. Another road, approximately 5 km to the northwest provides access to the western (opposite) side of the Gravel River Valley.

MAP REFERENCES:

Claim Map G-31, Dickison Lake Area, Thunder Bay Mining Division
Map 2293, Dickison Lake Area (Carter 1975)

REFERENCES:

Bartley (1954)
Carter (1975)
Hinz and Lucas (1992)
Industrial Minerals Geologist Files, Thunder Bay
Resident Geologist Files, Schreiber-Hemlo District, Thunder Bay

6) **GENERAL GEOLOGY AND STRUCTURE:**

The occurrence is located within the Quetico Subprovince and was mapped by Carter (1975). The area is underlain by a mixture of metasedimentary schists, gneisses and migmatitic rocks of Precambrian age. The occurrence located by the author is near a contact between the metasediments and migmatites. To the north is the Gravel River Fault zone. The fault is the major structural feature in the area and is marked by a 61 m (200 feet) cliff on the north side. The Gravel River and valley is within the fault zone.

7) **MINERALOGY:**

The quartz is bull white in the centre and clouded with almost completely digested host rock inclusions at the margins.

OTHER FEATURES:

The first reference to the quartz veins is by M.W. Bartley (1954) in an unpublished report for the Canadian Pacific Railway Company. Bartley stated, " Many quartz veins were noted in the western part of the area. They range in width from several feet to 90 feet generally, but one measures 300 feet across." The 300 foot-wide vein was of prime interest to the author. Independant confirmation of the existence of the quartz vein was provided by H. Klatt (Newmont Canada Inc., personal communication, 1992). Klatt was examining the area when he came across an unusually wide vein which measured 300 m (984 feet) in width.

The author, prospected the area and located a quartz vein with an apparent width of 61 m (200 feet). Grab samples were taken across the vein, results are shown below.

8) **ECONOMIC FEATURES:**

9) **CHEMICAL ANALYSIS:**

SAMPLE NO.	SiO_2	Al_2O_3	Fe2O3	MgO	Na_2O	K_2O	CaO	MnO	TiO_2	P_2O_5
IM-92-038	98.27	0.38	0.60	0.06	0.14	0.05	0.14	<.01	0.01	0.10
IM-92-039	98.08	0.35	0.55	0.07	0.14	0.03	0.13	<.01	0.01	0.11
IM-92-040	98.46	0.23	0.40	0.02	0.14	0.02	0.13	<.01	<.01	0.11
Si-metal		<.01	<.05				<.02		<.005	

Analyses by Chemex Labs, Ltd.

10) **COMMENTS/RECOMMENDATIONS:**

When the results are compared with specifications for silicon metal it is seen that the primary impurities (Al_2O_3, Fe_2O_3, CaO and TiO_2) are all above the required tolerance levels. The results are encouraging and the author feels they warrant further investigation.

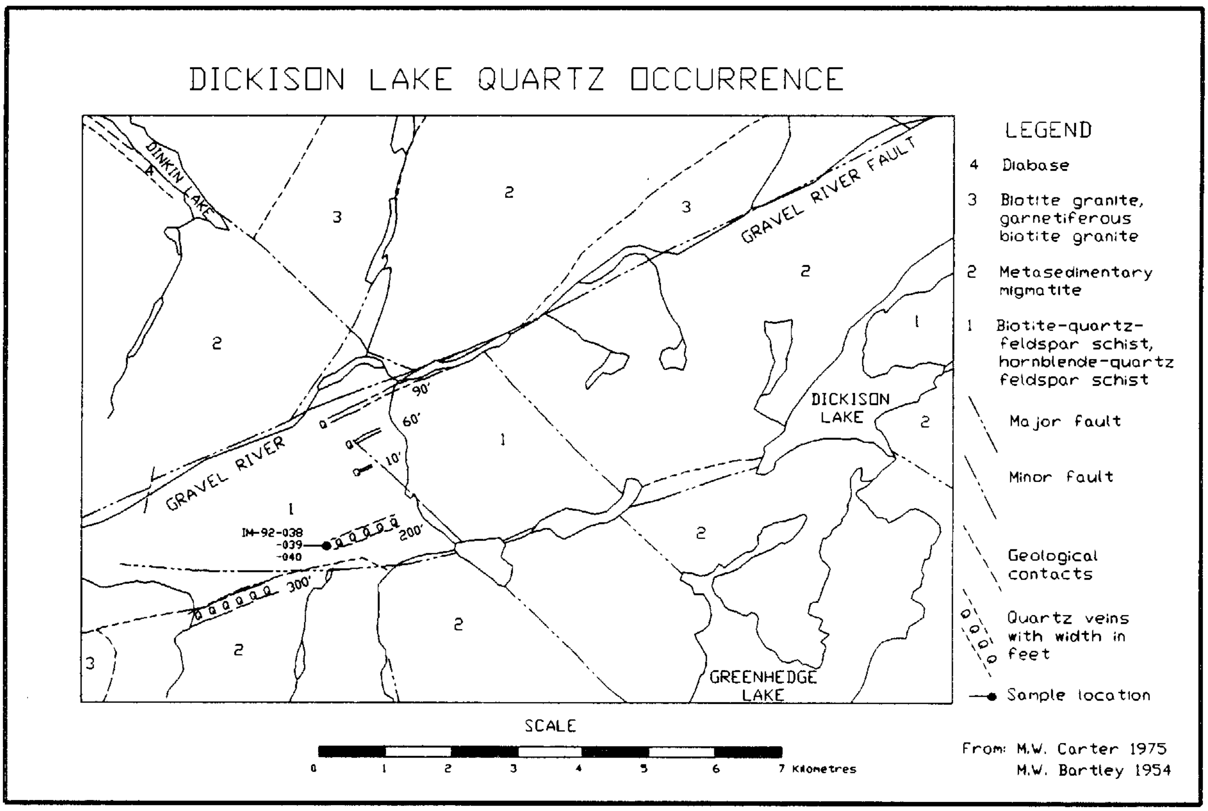

Figure 10: Dickison Lake Quartz Occurrence, location and general geology

1) **PROPERTY NAME**: Gravel River Calcite Occurrence

DATE(S) VISITED: August 1992

2) **ALTERNATE NAME(S)**:

3) **COMMODITY:** **Main:** Calcite **Secondary:**

4) **DEVELOPMENT HISTORY AND OWNERSHIP:**

PAST:	1958	The occurrence was staked by C. Farley. No work was recorded.
	1965	J.G. Simard staked the occurrence. No work was recorded.
	1967	J.G. Simard re-staked the occurrence. No work was recorded.
	1981	J.E. Nelson staked the occurrence. No work was recorded.
CURRENT:	1994	The occurrence is currently unstaked.

5) **LOCATION AND ACCESS:**

N.T.S.	42 E/04SE		
Latitude:	49° 00' 52"	**Northing:**	5429071
Longitude:	87° 41' 15"	**Easting:**	0449728

GENERAL LOCATION:

The occurrence is located approximately 38 km northwest of Schreiber on the west bank of the Gravel River (Figure 11).

ACCESS:

The occurrence is only accessible by helicopter at this time. A road passing within 78 m of the occurrence is no longer usable, as the bridge crossing the Gravel River has collapsed. The veins can be accessed by snowmobile in the winter. The road is located 5 km east of where the Gravel River intersects Highway 17. The occurrence is located 15 km north of the highway, west of the road.

MAP REFERENCES:

Claim Map G-45, Gravel River, Thunder Bay Mining Division
Map 2232, Nipigon-Schreiber Sheet (Carter et al. 1973)
Map 2293, Dickison Lake (Carter 1975)

REFERENCES:

Carter (1975)
Industrial Minerals Geologist's Files, Thunder Bay
Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay
Speed, Mason and Vos (1985)

6) GENERAL GEOLOGY AND STRUCTURE:

The occurrence is located within the Quetico Subprovince and is just south of the area mapped by Carter (1975). The area is underlain by a mixture of metasedimentary schists, gneisses, migmatitic and granitic rocks of Precambrian age. The occurrence located by the author is south of the metasediments and migmatites, within a hornblende-biotite granite identified by Speed, Mason and Vos (1985). The Gravel River Fault zone is located approximately 6 km north of the occurrence. The fault is the major structural feature in the area and is marked by a 61 m (200 feet) cliff on the north side.

7) MINERALOGY:

Speed, Mason and Vos (1985) gave the following description of the occurrence:

> A large calcite vein occurs on the east-facing side of a steep granite cliff, which is 62 m (200 ft) or more in height. The vein is from 4 to 5 m (13-16 ft) wide at the base of the exposure. It strikes approximately east-west (N85°-90°E) and dips vertically. The vein can be seen exposed about 15 m (50 ft) up the side of the hill where it appears to be thinning slightly.
>
> This contact with the country rock of both veins is very sharp. Medium-grained calcite occurs in a 30 cm (12 in) wide zone at the south contact of the main vein. There is then an abrupt change to very coarse-grained calcite crystals. Other changes in crystal size were not observed in the main vein due to a black stain on the calcite. The vein appears to become more quartz-rich towards the north contact.
>
> A third narrow calcite vein, about 30 cm (12 in) wide was observed to the north and up the hill from the main vein. This vein appears to strike north 70° east and dips 70 to 75° towards the north. This vein is very irregular in nature, and in one place contains a couple of centimetres of amethystine quartz on the hanging wall.

OTHER FEATURES:

8) **ECONOMIC FEATURES:**

9) **CHEMICAL ANALYSIS:**

Industrial Minerals staff obtained sample IM-92-041 while samples 131 to 133 are analyses reported by Speed, Mason and Vos (1985).

SAMPLE NO.	SiO_2	Al_2O_3	Fe2O3	CaO	Na_2O	K_2O	MgO	MnO	TiO_2	P_2O_5	LOI
IM-92-041	1.89	0.06	0.20	53.95	0.13	<0.01	0.12	0.54	<0.01	<0.01	42.06
131	0.81	----	----	61.60	----	----	0.00	----	----	----	41.00
132	1.56	----	----	61.10	----	----	0.00	----	----	----	40.20
133	5.09	----	----	52.70	----	----	0.00	----	----	----	38.70

Analyses conducted by: IM-92-0141 - Chemex Laboratories
131 to 133 - Geoscience Laboratories, Ontario Geological Survey, Toronto

10) **COMMENTS/RECOMMENDATIONS:**

This occurrence was visited by helicopter during the summer of 1992 as part of our Dickison Lake reconnaissance. Although the analyses are quite interesting it should be noted the veins are of limited size and currently inaccessible.

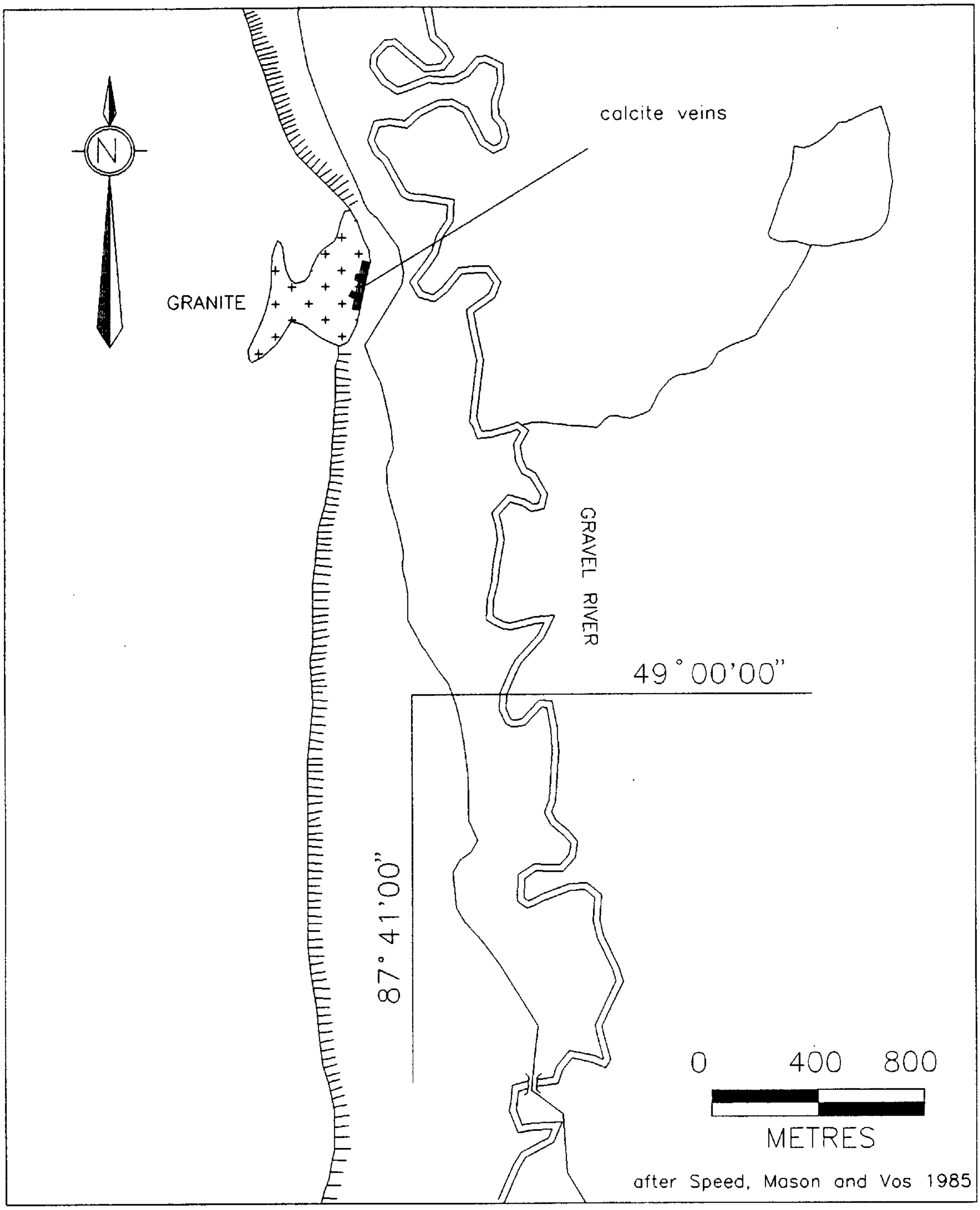

Figure 11: Gravel River Calcite Occurrence, location

1) **PROPERTY NAME:** Gustafson Occurrence

DATE(S) VISITED: August 1991

2) **ALTERNATE NAME(S):** TB 1985, TB 1986 Port Munro Occurrence
Potvin Occurrence
Johnson Property

3) **COMMODITY:** **Main:** Nb, Ce **Secondary:** U_3O_8, ThO_2

4) **DEVELOPMENT HISTORY AND OWNERSHIP:**

PAST:	1949	Occurrence was discovered by T. Gustafson. Stripping, trenching and sampling were completed.
	1954	T. Gustafson reacquired the claims and all interest was transferred to H. E. Martin. Further trenching and sampling was completed.
	1959 to 1967	Restaked by numerous people.
	1976	O. Hicks staked the occurrence and optioned it to Gulf Minerals Canada Ltd. No work was reported.
	1987	P. Moses restaked the claims.
CURRENT:	1994	The occurrence is currently unstaked.

5) **LOCATION AND ACCESS:**

N.T.S.	42D/16SW		
Latitude:	48·46'45"	**Northing:**	5402841
Longitude:	86·26'15"	**Easting:**	0541326

GENERAL LOCATION:

Seeley Lake area .20 km north of Port Munro, McCoy Township approximately 1.5 km west of Highway 17.

ACCESS:

Access is via Highway 17 and the showings are along the Canadian Pacific Railway tracks near Port Munro (Figure 12).

MAP REFERENCES:

Claim Map G-61, McCoy Township, Thunder Bay Mining Division
Map 2220, Manitouwadge-Wawa Sheet (Milne et al. 1972)

REFERENCES:

Industrial Minerals Geologist's Files, Thunder Bay
Pye (1954)
Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay

6) GENERAL GEOLOGY AND STRUCTURE:

Pye (1954) gave the following account of this occurrence:

> The columbium deposits are columbium bearing syenite dikes cutting basic intrusives intimately associated with the laurvikite and red syenites. These dikes are found in numerous localities. They are generally fine-grained, five feet or less in average width, and are radioactive in that they give readings of 2 to 3 times background on the geiger-counter. In general, such radioactivity indicates the presence of small amounts of columbium, and assays giving up to 1% combined U_3O_8 and Cb_2O_5 have been reported from numerous occurrences by several prospectors who have staked ground in the area.
>
> The best showing was staked by Thor Gustafson in 1949, and work on this occurrence led to the rush this year. The showing occurs on claims TB 49939 and 52039 along the railway just west of Port Munro. It is a syenite dike, from 5 to 20 feet in width, in a fine-grained basic intrusive, and has been traced 1500 feet in an eastwest direction. The dip varies from 85·N to vertical. The dike rock is pink and fine-grained, and contains numerous irregular cracks which are filled by a coarse-grained green pyroxene, and where this pyroxene is most abundant the best grade material has been found. This radio-activity is such as to give readings anywhere from 30 to 60 times background throughout the length of the dike. Assays of grab samples indicate up to 1.35% Cb_2O_5, 0.08% U_3O_8, 3.00% ThO_2, and 12% cerium. It is also reported that gallium (Ga) may also be present.

7) **MINERALOGY:**

(See General Geology And Structure)

8) **ECONOMIC FEATURES:**

9) **CHEMICAL ANALYSES:**

Analyses of two grab samples collected by the Resident Geologist's office personnel in 1977 and reported in Fenwick and Scott (1977) were as follows: 0.42 and 1.0 pound U_3O_8; 0.92 and 1.27% Cb_2O_5; and 0.45% and 0.5% Ce, respectively. The first sample also assayed 0.45% zinc.

Sample Number	Location on Picket Line	Width (feet)	Percent (Cb_2O_5)
1	0 + 00	4.0	1.56
2	2 + 25E	5.0	1.27
3	5 + 00E	6.5	1.17
4	5 + 30E	3.0	1.13
5	9 + 00E	grab	0.29

Samples taken by T. Gustafson, results reported by Eric Nelson, Port Arthur.

(Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay)

10) **COMMENTS/RECOMMENDATIONS:**

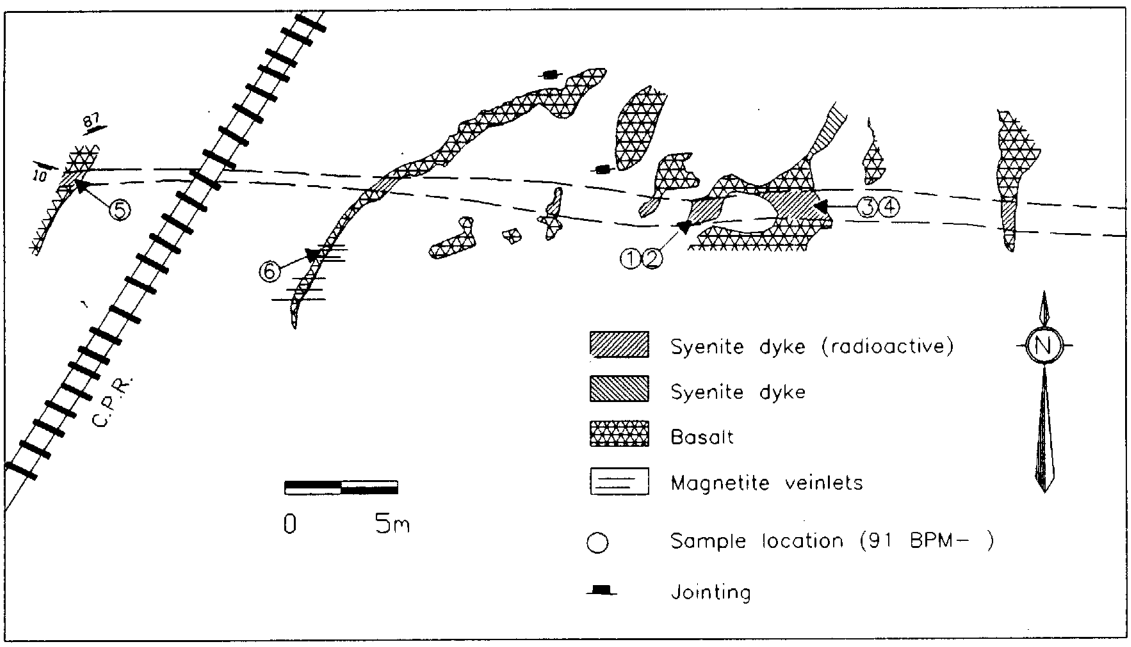

Figure 12: Gustafson Occurrence, geology and sample locations

1) **PROPERTY NAME:** Halonen Amethyst-Barite Occurrence

DATE(S) VISITED: July 1991

2) **ALTERNATE NAME(S):**

3) **COMMODITY:** **Main:** Fluorite, barite **Secondary:** Amethyst

4) **DEVELOPMENT HISTORY AND OWNERSHIP:**

PAST:	1965	Occurrence found and staked by M. Sauriol of Fort William. No work recorded.
	1973	Occurrence staked by J.E. Halonen of Schreiber.
	1974	Trenching and blasting conducted by J.E. and L. Halonen.
	1977	Occurrence staked by L. Halonen. Additional stripping and blasting conducted.
	1978	Occurrence re-staked by L. Halonen.
	1979	Property re-staked by L. Halonen.
	1982 to 1985	L. and V. Halonen conducted stripping, trenching, drilling and blasting work.
	1986	L. Halonen and D. Coulter conducted some manual stripping and mechanical stripping with a loader.
CURRENT:	1994	The claim is currently held by L. Halonen.

5) **LOCATION AND ACCESS:**

N.T.S.	42 D13/NE		
Latitude:	48° 54' 00"	**Northing:**	5416312
Longitude:	87° 37' 45"	**Easting:**	0453888

GENERAL LOCATION:

The occurrence is located approximately 28.5 km northwest of Schreiber, in south-central Yesno Township. A series of trenches are located between Nishin and Wabasta Lakes.

ACCESS:

The occurrence is accessible by motor vehicle. Approximately 28.5 km northwest of Schreiber a portion of the old Highway 17 branches to the north of the existing highway. Travel approximately 500 m and the main showing is on the west side of the road.

MAP REFERENCES:

Claim Map G-85, Middle Fox Lake, Thunder Bay Mining Division
Map 2232, Nipigon-Schreiber Sheet (Carter et al. 1973)

REFERENCES:

Assessment Files, Thunder Bay
Guillet (1964)
Industrial Minerals Geologist's Files, Thunder Bay
Kilborn Limited and Mineral Development Section, MNDM (1991)
Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay
Vos (1976)

6) **GENERAL GEOLOGY AND STRUCTURE:**

The area in which the occurrence is found has not been mapped. Extrapolating from mapping conducted by Carter (1989) to the east, the occurrence is underlain by the Archean age Whitesand Lake Batholith. Carter (1989) stated that the batholith, "extends in an east-west direction for 16 km - and in a north-south direction for about 8 km but extends westwards and southwards beyond the limits of the map-area". The batholith is comprised of medium - to coarse-grained alkali-feldspar granites with a grey phase ranging in modal composition from monzodiorite to quartz monzonite.

7) **MINERALOGY:**

The Halonen occurrence consist of a series of veins and breccia zones which host amethyst, barite, fluorite and epidote mineralization. In some places the amethyst occurs in vugs and displays pale to dark purple colours with some red. The crystals are drusy to palisade with well developed pyramidal crystal terminations. Barite is pink in colour with bladed to sheaf-like crystal form. Epidote alteration is pervasive within the brecciated host rock and wallrock. Some epidote is seen within the vein material as a dark lime green mineral. Some rare purple fluorite is seen as euhedral cubes.

OTHER FEATURES:

8) **ECONOMIC FEATURES**:

9) **CHEMICAL ANALYSIS**:

10) **COMMENTS/RECOMMENDATIONS**:

This site may have some potential for development as an amethyst mine or mineral collecting site. It could take advantage of tourist traffic travelling along Highway 17 on the northshore of Lake Superior.

1) **PROPERTY NAME**: Kilometre 23 Occurrence

DATE(S) VISITED: May 1990

2) **ALTERNATE NAME(S)**:

3) **COMMODITY**: **MAIN**: Nb, Zr **SECONDARY**: amy

4) **DEVELOPMENT HISTORY AND OWNERSHIP**:

PAST:	ca.1978	Four claims were staked by N. Hibbart and sporadically restaked in subsequent years. Limited trenching and test pitting were carried out.
CURRENT:	1994	The occurrence is currently open for staking.

5) **LOCATION AND ACCESS**:

N.T.S.	42 D15/SW		
Latitude:	48· 59' 20"	**Northing:**	5426045
Longitude:	86· 42' 00"	**Easting:**	0521949

GENERAL LOCATION:

The occurrence straddles the western branch of the Dead Horse Creek forest access road (Figure 13), approximately 5 km north of Foxtrap Lake.

ACCESS:

The occurrence is situated approximately 23 km north along the Dead Horse road from its junction with Highway 17, 30 km west of Marathon. The showings are exposed in a gravel pit on the east side of the road and in a cleared area to the west of the road.

MAP REFERENCES:

Map 2232, Nipigon-Schreiber Sheet (Carter et al. 1973)

REFERENCES:

Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay
Scott (1979)

6) GENERAL GEOLOGY AND STRUCTURE:

The geology was described by Hinz (in Schnieders, Smyk and Hinz 1990):

> The area is underlain predominantly by syenitic and granitic rocks which are brecciated, cut by small, anastomosing quartz veinlets and hematitized along fractures in the vicinity of a hematite-rich syenite dyke. The dyke is usually a massive, fine-grained pink rock with closely spaced joints, some of which are filled with calcite. It is approximately 5 m wide, strikes at 120° and dips 20° to the north. Sections of the dyke are strongly fractured, brecciated in-situ and hematitized. Angular white quartz fragments are cemented by massive hematite. Other brecciated sections contain rounded, rebrecciated xenoliths in a coarser-grained, igneous matrix. Marginal to the main dyke, smaller, variably oriented, syenitic to aplitic dykes intrude crenulated biotite schists and granitic rocks to the north and south, respectively. The biotite schists, interpreted as migmatitic metasedimentary rocks, are epidotized and hematitized along fractures.
>
> A small pit has been sunk on a 20 cm wide quartz vein and flat-lying, parallel quartz veinlets approximately 25 m north of the main dyke. The vein is heavily mineralized with fine-grained, net-textured pyrite. A grab sample of the vein returned no gold or silver and 0.034% Cu. Gossanous outcrops occur along strike with the main dyke. Radiation at these showings were estimated to be 3 to 4 times the background level.
>
> On the west side of the road, a 20 m wide diabase dykes strikes at 170° and intrudes granitoid rocks. There are no outcrop exposures of the syenite dyke, but along strike, gossanous, carbonate-rich, sandy regolith has developed. Euhedral crystals of smoky to amethystine quartz have been recovered from this unconsolidated material. Crystals with pyramidal terminations and doubly terminated, penetration twins may reach 4 cm in size. It is suggested that this regolith has resulted from the deep weathering of vuggy, quartz-carbonate-hematite-rich sections of the dyke and/or brecciated portions therein.
>
> Landsat satellite images reveal several northwest-striking faults in the area. The Kilometre 23 dyke is perhaps related to these structures. It is interesting to note that this occurrence is situated between the uraniferous Dead Horse Creek diatremes and the Prairie Lake carbonatite. Other similar occurrences could likely be found along these structures. This amethyst occurrence is the farthest east of any in the Schreiber-Hemlo District.

7) **MINERALOGY**:

See General Geology and Structure.

8) **ECONOMIC FEATURES**:

9) **CHEMICAL ANALYSES**:

Grab sampling of gossanous outcrops by J. Scott in 1979 returned the following assays:

Sample No.	U (ppm)	Th (ppm)	Zr (ppm)	Be (ppm)	Nb (ppm)
F-150-79	37	40	2500	10	700
F-151-79	24	30	500	5	600
F-152-79	14	130	300	4	1000

A grab sample of the dark, massive quartz vein with net-textured pyrite from the pit in 1990 assayed nil Au, nil Ag and 0.034% Cu.

10) **COMMENTS/RECOMMENDATIONS**:

This amethyst occurrence is notably the farthest east of any amethyst occurrence in the Schreiber-Hemlo District.

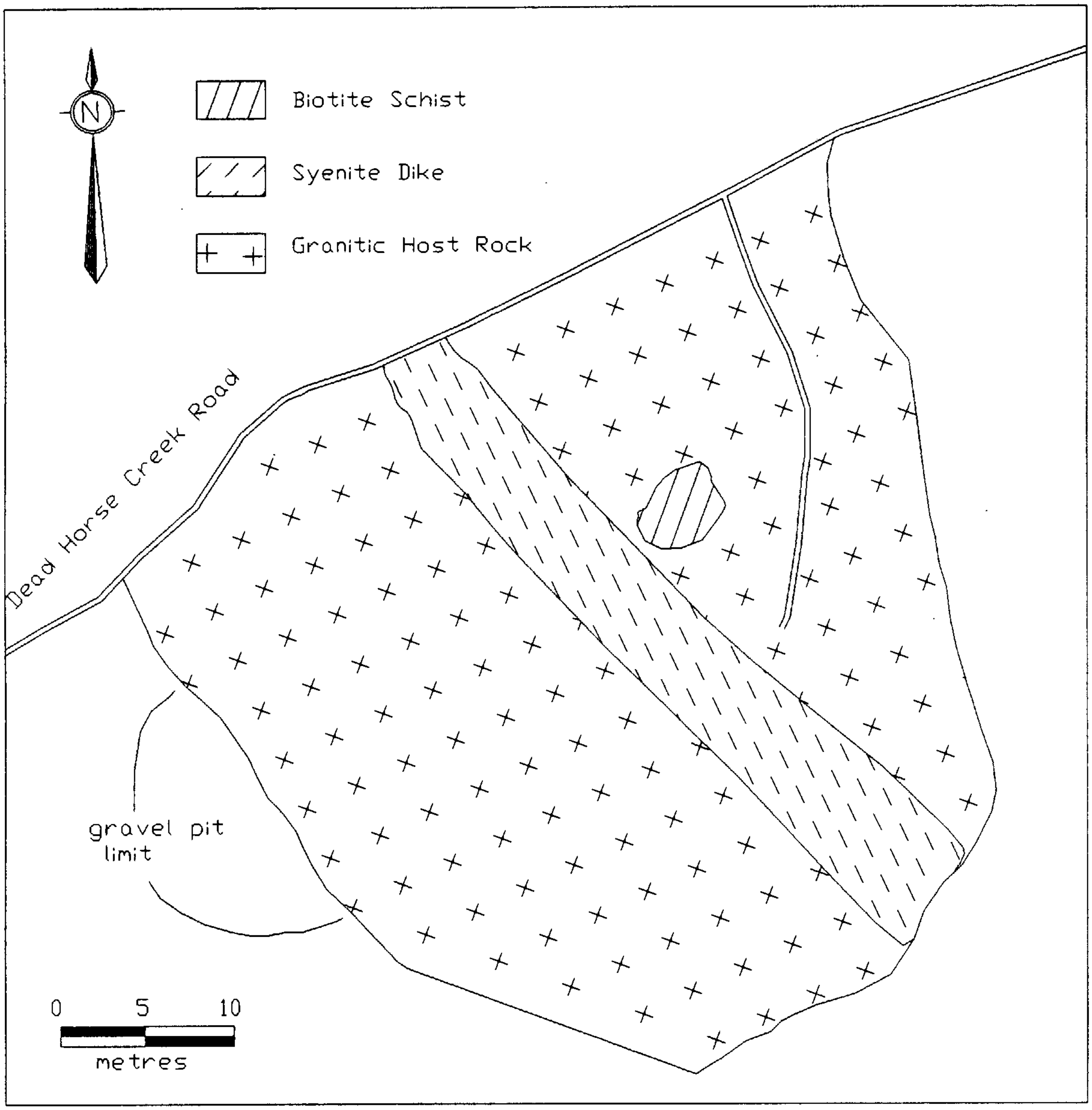

Figure 13: Kilometre 23 Occurrence, general geology

1) PROPERTY NAME: Marathon Columbium Property Occurrences

DATE(S) VISITED: July 1992

2) ALTERNATE NAME(S):

3) COMMODITY: **Main:** Cb, Nb **Secondary:** U, Zr

4) DEVELOPMENT HISTORY AND OWNERSHIP:

PAST:	1954	Following the discovery of columbium occurrences made by Orchan Uranium Mines Ltd. to the south, J. Kigour and other individuals staked a total of 29 claims; the claims were subsequently optioned to Noranda Mines Ltd.
		J. Kilgour discovered the Number 1 showing.
	1955	Three men carried out reconnaissance mapping in conjunction with prospecting, trenching and sampling of the Number 1 (main) showing.
		Work was suspended following discouraging assay results; claims lapsed 1955, 1957.
	1967	Property staked by E. Nabigon; no work recorded.
CURRENT:	1994	The property is currently unstaked.

5) LOCATION AND ACCESS:

N.T.S.	42 D/16SW		
Latitude:	48· 49' 45"	**Northing:**	5408390
Longitude:	86· 27' 15"	**Easting:**	0540061

GENERAL LOCATION:

The main showings occur approximately 16 km northwest of Marathon and 3 km north of Highway 17.

ACCESS:

A trail extends north from a point 1.5 km west of Wolf Camp Lake from the highway to the showings.

MAP REFERENCES:

Map 2220, Manitouwadge-Wawa Sheet (Milne et al. 1972)
Map P.114, Port Coldwell Area (Puskas 1961)
Map P.3232, Port Coldwell Complex, West Half (Walker et al. 1993)

REFERENCES:

Industrial Minerals Geologist's Files, Thunder Bay
Pye (1954)
Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay
Scott (1987)
Walker et al. (1991, 1992, 1993)

6) **GENERAL GEOLOGY AND STRUCTURE:**

Pye (1954) briefly described the discovery of the main showing:

> Another showing was examined on ground held by Noranda about 4 miles north east of Red Sucker Cove. On claim TB 63007 a prospector named J. Kilgour has located a dike of syenite pegmatite in a fine-grained basic rock. The dike strikes northeast and dips vertically. It has been traced for 900 feet and has an average width of 6 feet.
>
> Radioactivity is such as to give a reading of about 3 times background on the geiger counter and assays of grab samples indicate up to 0.8% columbium and 0.03% U_3O_8. Of interest is the presence of a green pyroxene as an essential constituent of the rock and the development of a shearing parallel to the strike of the dike.

Noranda Mines Ltd. geologists (Industrial Minerals Geologist's Files, Thunder Bay) described the local geology:

> Most of the west part of the group is underlain by syenite -- a portion of the syenite stock that extends to the Port Coldwell area. The south part of this syenite within the claim group is the typical red syenite of the area, the northern part is a grey syenite, probably a hybrid rock as it appears to be a mixture of pink syenite and diorite. A small zone of rusty weathering diorite occurs near the contact of these syenite types. Pink porphyritic syenite is encountered in small areas and in some of the dykes.

The east side of the property is underlain by Keewatin basalt cut by syenite dykes. Potentially the most favourable ground in the claim group, it covers about 4 claims in the area.

Several strong intersecting faults cross the property, and are indicated by their topographic expression of gullies, ravines and cliffs. All the showings discovered to date have been in the vicinity of these faults.

Walker et al. (1993) re-mapped the Coldwell complex. Using up-to-date nomenclature, the property is underlain by: recrystallized amphibole quartz syenite; amphibole syenite; gabbro; and mafic volcanic, subvolcanic and hypabyssal intrusive rocks.

7) MINERALOGY:

Optical and x-ray analyses were conducted on magnetic separates of Marathon Property samples by E. Nuffied at the University of Toronto in 1955 (Resident Geologist Files, OMNDM, Thunder Bay, Ont.). He confirmed the presence of pyrochlore $(Na,Ca)_2$ $(Nb,Ta)_2$ O6 (OH,F) as the only columbium- (i.e. niobium) bearing mineral. He also noted that zircon and ferro-magnesian silicates were abundant and suggested that uranium may be associated with the pyrochlore.

OTHER FEATURES:

8) ECONOMIC FEATURES:

Noranda Mines Ltd. personnel (Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay) calculated that each vertical foot of the dyke constituting the main showing should carry 2274 pounds (1031 kg) Cb_2O_5.

9) CHEMICAL ANALYSIS:

Grab samples taken in 1954 (Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay) during initial prospecting returned 0.77%, 0.26% and 0.53% Cb_2O_5.

A description of showings and assays from 1955 (Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay) is given below:

Showing No. 1:	A grab sample assaying 0.77% Cb_2O_5 was taken from the south end of a red syenite dyke about 1150 feet long which curves northward in a broad arc from a northeast strike through N-S to a northwest strike. It appears to average 4 to 5 feet wide and is radioactive wherever exposed.
Sample #6224,	channel across 9 feet, 75 from north end of dyke. 0.46% Cb_2O_5 (Woodbridge), 0.42% (O.D.M.).
Sample #6225,	channel across 40", 150 feet from north end. 0.28% Cb_2O_5 (McGill), 0.33% Cb_2O_5, 0.008% U_3O_8, 1.10% ZrO_2 (O.D.M.).
Sample #6226,	channel across 40", from a small cliff about midway along length of showing. 0.21% Cb_2O_5 (McGill).
Sample #6227,	channel across 7.5 feet. From south end of showing, in vicinity of 0.77% Cb_2O_5 grab, 0.47% Cb_2O_5 (Woodbridge), 0.42% Cb_2O_5 (O.D.M.).
Sample #6227(a)	representative (50 lbs.+) same place as #6227.
Showing No. 2:	Is a narrow (18-20") syenite dyke that assayed 0.27% Cb_2O_5 in a grab sample. This was not resampled. It is exposed across the gully from the south end of #1 showing.
Showing No. 3:	Occurs a hundred feet southwest of No. 2. It is a dark red syenite dyke about 4 feet wide and is exposed for about 30 feet. A grab sample assayed).53% Cb_2O_5.
Sample #6223,	channel across 2 feet on north side. 0.81% Cb_2O_5.

Showing No. 4: A radioactive red syenite dyke about 2.5 feet wide is exposed on the cliff face on the west side of the ravine about 1/4 mile south of No. 1 showing. It strikes N-S and dips 45· W.

Sample #6228, channel across 2.5 feet.

Kilgour No.4, sample returned 0.24% Cb_2O_5.

Showing No. 5: About 200 feet south of showing No. 4 a syenite dyke about 15 feet wide, striking N.30·W is exposed for 50 feet. This was channel sampled by Kilgour (#5). 0.14% Cb_2O_5.

Several other smaller dykes were noted in the vicinity of the above showings, but none of these were sampled, being too narrow to be of interest.

On the south side of the small lake in the south part of the group, several dykes and plugs of syenite cut the greenstone near the contact. A small exposure of red syenite on the property boundary on the shore of the lake was found to be radioactive and was grab sampled.

Sample #6229 Trace Cb_2O_5.

An exposure of dark coarse grained syenite at the campsite on the lake shore was grab sampled.

Sample #6230 Trace Cb_2O_5.

Showing No. 6: A very magnetic radioactive red syenite dyke striking N.40·W. and dipping 70·S is exposed for 30 feet, about 1/4 mile northwest of the campsite. It averages about 4.5 feet wide.

Sample #6231,	channel over 4.5 feet. Trace Cb_2O_5.
Kilgour #6	Trace Cb_2O_5.
	An exposure of red syenite on the shore of the lake about 200 feet north of showing No. 6. Radioactive to about 4x background. Attitude not apparent so exposure was grab sampled.

Results of sampling of the main (No. 1) showing (Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay) are described:

> This showing is located just south of No. 4 post of claim T.B. 63008 and curves northward through that claim into claim T.B. 63356. This dyke extends as a red syenite dyke for 1,300 feet, then continues as a wider dyke of syenite porphyry for an undetermined distance. The average width of the red syenite dyke is 3.7 feet, whereas the porphyritic portion is about 9 feet wide. The change between the rock types is not gradational but rather gives indication of a multiple injection.
>
> Sampling was done by channeling in trenches blasted at approximately 50 foot intervals. The first trench was made at the south end of the showing near the stream, and work progressed north until a total of 19 trenches had been blasted. About 20 lbs. was taken per sample, crushed with a Mitchell No. 0 crusher and riffled, splitting 5 lbs. for assay, 5 lbs. for check, and the remainder retained for metallurgical tests.
>
> The dyke was geigered at 10 foot intervals and the readings recorded on the detailed map of the showing; all readings were in the vicinity of 4x background. The boulder strewn area between trenches 5 and 6 was too heavily overburdened to sample or geiger.

The results of the channel sampling of the trenches (Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay) are listed below:

Trench	Sample	Width	Rock Type	$\%Cb_2O_5$ X-ray	$\%Cb_2O_5$ Chem.
1	1	3.0'	red syenite	0.17	0.34
2	2	3.0'	syenite porphyry	0.20	0.32
3	3	3.0'	red syenite	0.38	0.62
4	4	3.0'	" "	0.37	0.40
5	5	3.0'	" "	0.30	0.52
6	6	3.0'	" "	0.23	0.37
7	7	3.5'	" "	0.30	0.54
8	8	3.5'	" "	0.31	0.50
9	9	3.0'	" "	0.25	0.30
10	10	3.5'	" "	0.21	0.27
11	11	3.5'	" "	0.36	0.58
12	12	3.0'	" "	0.19	0.29
13	13	3.0'	" "	0.23	0.31
14	14	3.0'	" "	0.43	0.40
15	15	3.0'	" "	0.42	0.40
16	16	3.0'	" "	0.37	0.40
17	17	2.5'	" "	0.41	0.42
18	18a	4.0'	" "	0.25	0.31
19	18b	3.0'	" "	0.15	0.24
20	18c	4.0'	" "	0.31	0.34

Cited samples (Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay) returned the following assays:

Sample No.	Cb_2O_5 (%)			U_3O_8 (%)			ZrO_2 (%)		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
6224	0.46	0.42						1.29	
6225		0.33	0.28		0.008			1.10	
6226		0.23	0.21		0.0077			0.80	
6227	0.47	0.42						2.44	
6227(a)									
6223	0.81	0.78							
6228			0.24						
K #4		0.24							
K #5		0.14							
6229			trace						
6230			trace						
6231			trace						
K #6			trace						

Key: (1) X-Ray Assay Laboratories, Woodbridge, Ont.
(2) Ontario Department of Mines, Laboratory Branch
(3) McGill University, X-ray Laboratory

Several of the "X" showings (Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay) were also sampled and tested:

Across the steam to the south of #1 showing are outcroppings of a syenite which is a probable continuation of the main dyke. It can be traced for 400 feet. A grab sample assayed 0.53% Cb_2O_5 and a chip sample over 2 feet assayed 0.81% (Woodbridge) and 0.78% (O.D.M.).

Showing X is a large syenite dyke striking westward from the west shore of Johnston Lake. Samples taken at intervals across its 150 foot width yielded the following values:

X	A	0.039%	Cb_2O_5
X	B	0.14%	"
X	C	0.017%	"
X	D	0.016%	"
X	E	0.021%	"
X	F	0.090%	"
X	G	trace	"

Showing X2 is a 30 foot wide dyke striking E.-W. which is located in the porphyry cliff 1,500 feet north of showing #1. A grab sample assayed 0.17% Cb_2O_5. Showing X2 is an irregular syenite dyke exposed at the north end of showing #1. A grab sample assayed 0.17% Cb_2O_5.

Showing X3 is a syenite dyke 3 feet wide, radioactive to about five times background. It is located in the porphyry cliff above a large talus pile. A grab sample yielded 1.17% Cb_2O_5 and a 20 lbs. channel sample of the fresh rock gave 0.53% Cb_2O_5.

Showing X5 is a 5 foot wide dyke located 1,700 feet south of showing #1 on the west side of the steam. A grab sample assayed 0.056%.

Showing X6 is about 30 feet wide and is a possible continuation of X1.

10) <u>COMMENTS/RECOMMENDATIONS</u>:

1) PROPERTY NAME: Orchan Columbium Showing

DATE(S) VISITED: August 1991

2) ALTERNATE NAME(S): Orchan Uranium Mines Limited
Johnson Property (?)
Potvine Property (?)

3) COMMODITY: **Main:** Cb, Nb **Secondary:** U, Ce

4) DEVELOPMENT HISTORY AND OWNERSHIP:

PAST:	1932 to 1949	The area was staked by various individuals. No work was recorded.
	1954	S. Moses and F. Minoletti staked 34 claims which they optioned to Orchan Uranium Mines Limited. Reconnaissance mapping, diamond drilling and sampling was conducted on several occurrences within the property.
	1956	Claims lapsed.
	1956 to 1967	Various individuals staked the property, no work was recorded.
	1991	Property re-staked by C. Lance. Transferred to L. Bardswich.
	1993	Claims cancelled.
CURRENT:	1994	The showing is currently unstaked.

5) LOCATION AND ACCESS:

N.T.S.	42 D/16SW		
Latitude:	48· 46' 30"	**Northing:**	5402378
Longitude:	86· 26' 15"	**Easting:**	0541329

GENERAL LOCATION:

The occurrence is located in McCoy Township approximately 7 km northeast of Marathon on the Lake Superior.

ACCESS:

The occurrence is accessed via Highway 17 approximately 7 km west of the Marathon turn off. The showing is 1.2 km south of the highway on the east and west shores of Port Munro.

MAP REFERENCES:

Claim Map G-613, Seeley Lake Area, Thunder Bay Mining Division
2220, Manitouwadge-Wawa Sheet (Milne et al. 1972)
P.1520, Schreiber Sheet (Springer 1978)
Map P.3233, Port Coldwell Complex, East Half (Walker et al. 1993)

REFERENCES:

Assessment Files, Thunder Bay
Currie (1980)
Industrial Minerals Geologist Files, Thunder Bay
Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay
Walker et al. (1991, 1992, 1993)

6) **GENERAL GEOLOGY AND STRUCTURE:**

Red syenite dikes, believed to be related to a plug of red syenite several miles long and about one-half mile wide, which occurs on the west contact of a large augite syenite intrusive, range in size from a few inches to thirty or more feet. These dikes are radioactive and are columbium bearing. The dikes have penetrated along well defined north-south and east-west fractures and appear to form a fairly continuous pattern in the Port Munro area. The zone extends southward for at least two miles along the west side of the syenite plug.

(Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay)

7) **MINERALOGY:**

Mineralization in the dikes besides the finely disseminated columbium mineral include magnetite, pyrite, chalcopyrite, and fluorite.

(Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay)

8) **ECONOMIC FEATURES:**

9) **CHEMICAL ANALYSES:**

Columbium-uranium values ranging from 0.1 to 1.66% Nb_2 (Cb_2) O_5 and from 0.01 to 0.12% U_3O_8 have been obtained from grab samples taken from red syenite dikes and sills in the Port Munro area.
(Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay).

10) **COMMENTS/RECOMMENDATIONS:**

1) **PROPERTY NAME**: Pays Plat Occurrence

DATE(S) VISITED: September 1991

2) **ALTERNATE NAME(S)**:

3) **COMMODITY**: **Main**: Barite, fluorite **Secondary**:

4) **DEVELOPMENT HISTORY AND OWNERSHIP**:

PAST:		The property was examined for its silver potential from the 1880s to the 1970s.
	1987 to 1989	P. Moses staked the occurrence and conducted mechanical stripping on a number of showings.
CURRENT:	1994	The occurrence is currently open.

5) **LOCATION AND ACCESS**:

N.T.S.	42 D/13NE		
Latitude:	48· 53' 45"	**Northing**:	5415810
Longitude:	87· 33' 45"	**Easting**:	0458770

GENERAL LOCATION:

The occurrence is located 1.8 km north of Highway 17 at Pays Plat First Nation, in southeastern Yesno Township.

ACCESS:

The property is accessed by a walking trail from Pays Plat First Nation. Walking time is approximately 45 minutes.

MAP REFERENCES:

Claim Map G-85, Middle Fox Lake Area, Thunder Bay Mining Division

Map 2232, Nipigon-Schreiber Sheet (Carter et al. 1973)

REFERENCES:

Industrial Minerals Geologist's Files, Thunder Bay

Resident Geologist's Files, Schreiber-Hemlo District

6) **GENERAL GEOLOGY AND STRUCTURE**:

The occurrence is hosted in granite/granite gneisses of the Quetico Subprovince. The vein system is approximately 3-4' wide and is exposed in a series of small trenches on the east side of a ridge. The veins trend north-south.

7) **MINERALOGY**:

Masses of white to pink euhedral barite are present within the vein. Barite-rich sections reach up to 16-20 cm wide. Purple fluorite, white calcite and white drusy quartz are the other vein minerals. Less than 1% disseminated sulphides (pyrite and chalcopyrite) are present within the vein material.

OTHER FEATURES:

8) **ECONOMIC FEATURES**:

9) **CHEMICAL ANALYSIS**:

Sample No.	Ba (ppm)	$BaSO_4$ (%)
IM-91-041	11600	1.97
IM-91-042	51300	8.72
IM-91-043	42000	7.14

Analyses conducted by Geoscience Laboratories, Ontario Geological Survey, Toronto

10) **COMMENTS/RECOMMENDATIONS**:

The Pays Plat occurrence may be an indication of other potential mineral occurrences in the area. The area surrounding the occurrence has never been mapped in detail at any scale. The area should be prospected in detail to evaluate any potential mineral occurrences.

1) **PROPERTY NAME:** Pic Island Nepheline Syenite — **DATE(S) VISITED:** September 1993

2) **ALTERNATE NAME(S):** W.C. Arrowsmith Property
Denison Mines Ltd. Property

3) **COMMODITY:** **Main:** Nepheline **Secondary:**

4) **DEVELOPMENT HISTORY AND OWNERSHIP:**

PAST:	1953	W.C. Arrowsmith staked 6 claims, TB 45113 to 45118 incl. Thirteen holes totalling 539 feet were drilled. No analyses were conducted.
	1960 to 1961	R. Preston and L. Gaudreau staked the eastern half of Pic Island. All interest transferred to Denison Mines Ltd
	1976	A. Moses staked 12 claims on Pic Island and transferred all interest to D. Fairbairn. No work was recorded.
	1992	A. MacDonnell staked a portion of the Denison Mines property.
CURRENT:	1994	A. MacDonnell still holds claims on Pic Island.

5) **LOCATION AND ACCESS:**

N.T.S.	42 D/10NE		
Latitude:	48° 42' 25"	**Northing:**	5394737
Longitude:	86° 36' 00"	**Easting:**	0529429

GENERAL LOCATION:

Pic Island is located 17 km due west of Marathon and 2 km due south of the Coldwell Peninsula.

ACCESS:

Pic Island is accessible by boat from launches located at Neys Provincial Park and Coldwell Harbour.

MAP REFERENCES:

Claim Map G-607, Pic Island Area, Thunder Bay Mining Division
Map P.114, Port Coldwell Area (Puskas 1967)
Map P.3232, Port Coldwell Complex, West Half (Walker et al. 1993)
Figure 17, Geological Map of Coldwell Alkaline Complex-Ontario (Currie 1980)

REFERENCES:

Currie (1980)
Industrial Minerals Geologist's Files, Thunder Bay
Puskas (1967)
Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay
Walker et al. (1991, 1992, 1993)

6) GENERAL GEOLOGY AND STRUCTURE:

The general geology of the island has been described by Walker et al. (1992) (Figure 14):

> The Port Coldwell alkalic complex was emplaced into Archean rocks of the Wawa Subprovince of the Superior Province during the early stages of the Mesoproterozoic Midcontinent Rift at 1108$\pm$1 Ma (Heaman and Machado 1992). The complex is located at the north end of the Thiel fault, a zone of faulting that separates grabens with different subsidence history in the rift (Cannon et al. 1989). A north-trending magnetic high occurs between the rocks of the Port Coldwell alkalic complex and those of the Midcontinent Rift beneath Lake Superior (Gupta 1991). Samples of different magmatic suites from the Port Coldwell alkalic complex dated by the U-Pb zircon-baddeleyite method (Heaman and Machado 1992) are all within analytical error.
>
> The Port Coldwell alkalic complex consists of a variety of felsic syenites and gabbroic rocks (Figure 19.2). Mitchell and Platt (1977, 1978) subdivided the Port Coldwell alkalic complex into 3 centres of alkalic magmatism emplaced by cauldron subsidence associated with major faults.

7) **MINERALOGY:**

Walker et al. (1993) described the different phases of the nepheline syenites:

> There are 2 areas of amphibole nepheline syenite within the Port Coldwell alkalic complex: 1 centred over Pic Island and the other between Little Pic River and Red Sucker Cove within the western part of the complex. Both areas are typified by a texturally variable suite of syenite types with gradational contacts. The variation is complicated by brecciation and assimilation resulting from the intrusion of a second phase of heterogeneous amphibole nepheline syenite and later amphibole quartz syenite.
>
> The amphibole nepheline syenite is white to black, medium grained with variable proportions of nepheline, amphibole, biotite, apatite and zeolites. Locally, the nepheline syenite is well layered with melanocratic nepheline syenite grading into mesocratic syenite. The melanocratic layers locally contain olivine.
>
> At the margins of the main nepheline syenite unit are additional textural varieties of nepheline syenite. These textural varieties include a white to pink mesocratic nepheline-amphibole syenite with stubby euhedral-amphibole prisms and white to pink, mesocratic nepheline syenite with interstitial amphibole and euhedral lath to columnar feldspar.
>
> A second phase of heterogeneous amphibole nepheline syenite intrudes the nepheline syenite described in the previous paragraph and exhibits a variety of textures. These result from brecciation and assimilation of older nepheline syenite and alkaline gabbro. Further complexity is a result of mixing with mafic magma.

OTHER FEATURES:

8) **ECONOMIC FEATURES:**

Walker et al. (1993) says the following about the nepheline syenites potential:

The nepheline syenites within the Port Coldwell alkalic complex have been examined by Denison Mines Limited in 1960 as a potential source for nepheline. The results indicated that the nepheline had too high an iron content to be of economic value (Puskas 1967). This may be due to the zeolite and hematite crystallization in the nepheline syenites during postcrystallization alteration.

Based on the results of the present study, nepheline occurs in 2 different units; amphibole nepheline syenite and heterogeneous amphibole nepheline syenite. The distribution of these rock types has been outlined, and samples of each of the different varieties have been taken by the Resident Geologist's Office in order to determine the modal abundance of nepheline in the rocks. It is anticipated that with the analytical results, it will be possible to isolate the areas that are the best targets for evaluating the potential of nepheline as an industrial mineral within the Port Coldwell alkalic complex.

9) CHEMICAL ANALYSIS:

Sample No.	SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO	Cr2O3
IM-92-045	62.7	20.0	1.47	0.18	1.66	7.57	4.71	0.11	0.14	0.03	0.03
-046	59.2	19.7	2.88	0.85	2.59	7.47	4.51	0.30	0.22	0.07	<0.01
-047	62.2	19.6	2.08	0.46	1.98	6.68	5.40	0.21	0.17	0.05	0.01
-048	61.9	18.5	2.57	0.58	1.70	6.05	6.11	0.40	0.24	0.06	0.01
-049	56.6	19.6	3.80	2.04	5.68	5.10	3.91	0.41	0.78	0.07	<0.01
-050	58.4	22.5	0.79	0.26	4.59	6.34	3.67	0.12	0.31	0.01	<0.01
-051	58.5	21.5	2.16	0.84	4.80	6.05	3.90	0.26	0.45	0.04	<0.01
-052	58.9	20.4	2.77	0.78	3.57	5.71	5.64	0.31	0.34	0.07	<0.01
-053	60.2	21.0	1.46	0.23	1.54	6.95	6.67	0.05	0.07	0.05	0.01

Analyses by Lakefield Research.

10) COMMENTS/RECOMMENDATIONS:

Although the geochemical results are interesting, they are not good enough to warrant development on the island. Logistical problems of developing on an island, roughness of the terrain and the possibility that the island will be added to Neys Provincial Park, indicate that the nepheline syenite will probably never be extracted.

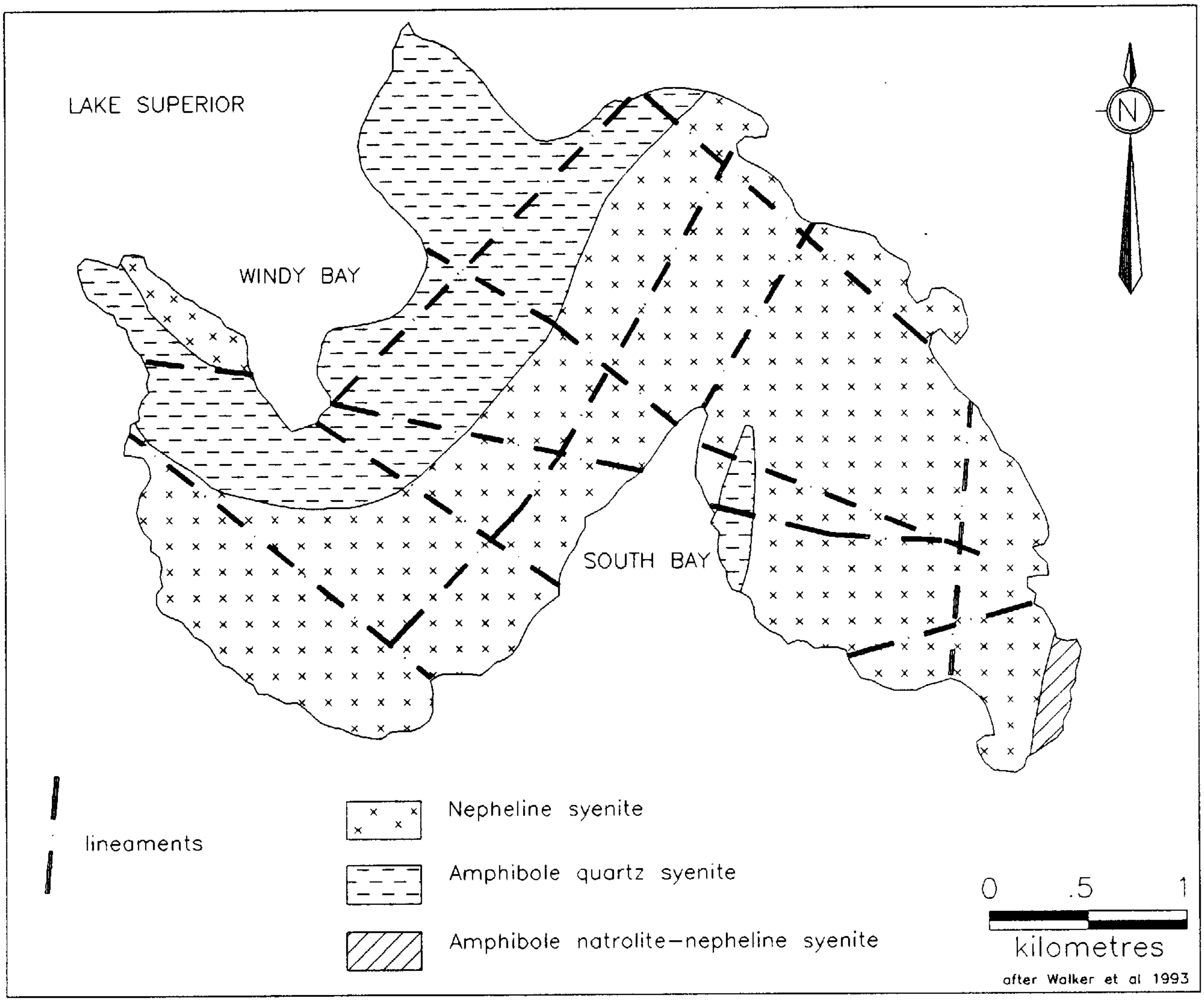

Figure 14: Pic Island Nepheline Syenite, location and general geology

1) PROPERTY NAME: Port Coldwell Nepheline Syenite

DATE(S) VISITED: August 1992

2) ALTERNATE NAME(S): Port Coldwell Mines and Metals Ltd.
Port Coldwell Mining Syndicate
Denison Mines Ltd.
Conwest Explorations Co. Ltd.
Unimin Canada Ltd.

3) COMMODITY: **Main:** Nepheline **Secondary:**

4) DEVELOPMENT HISTORY AND OWNERSHIP:

PAST:

1898	R. Jackson of Port Coldwell attempted to develop the nepheline syenite as a dimension stone. Samples were slabbed and polished and quarrying was planned but not executed.
1942	Port Coldwell Mines and Metals, Ltd. was organized in September 1942 to develop their property.
1943	Port Coldwell Mining Syndicate advertised its nepheline syenite property near Port Coldwell. Bulk sampling was conducted in June 1942 with samples being sent to Montreal and the U.S.
1943 to 1949	Property development ceased and the property lay dormant.
1957	Coldwell Mines and Metals charter cancelled.
1960	Denison Mines Ltd. staked four claims in the vicinity of Tunnel and Echo lakes.
1962	Denison Mines Ltd. conducted geological mapping and diamond drilling on its claims. Large samples were blasted and sent for bench, mill and beneficiation testing.
1981	D. Fairbairn obtained a lease for claims TB 133533-556, TB 133560 and TB 133970.

1985	D. Fairbairn transferred all claims to Conwest Exploration Company Ltd.
1990	W.G. Hubler transferred claims TB 28703-705 to Unimin Canada Ltd.

CURRENT:

There are 9 claims covering the bulk of the nepheline syenite in the Port Coldwell area.

TB 28703 to 705 incl. are held by Unimin Canada Ltd.
TB 133553 to 556 incl., TB 133560 and TB 133970 are held by Conwest Exploration Company Ltd.

5) LOCATION AND ACCESS:

N.T.S.	42 D/15 SE		
Latitude:	48· 45' 38"	**Northing:**	5400734
Longitude:	86· 30' 50"	**Easting:**	0535727

GENERAL LOCATION:

The occurrence is located 12.5 km north west of the town of Marathon at the hamlet of Coldwell. The Canadian Pacific Railways mainline bisects the nepheline syenite exposures (Figure 15).

ACCESS:

Access is by a short road south of Highway 17 through the hamlet of Coldwell and then southeast along the railway mainline for approximately 2 km.

MAP REFERENCES:

Claim Map G-781, Coldwell Township
Map P.114, Port Coldwell Area (Puskas 1967)
Map P.360, Schreiber Sheet (Pye 1966)
Map P.2132, Deadhorse Creek Area (Mason 1981)
Map P.3232, Port Coldwell Complex, West Half (Walker et al. 1993)

REFERENCES:

Assessment Files, Thunder Bay
Industrial Minerals Geologist's Files, Thunder Bay
Kerr (1910)
Puskas (1967)
Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay
Walker et al. (1991, 1992, 1993)
Mitchell and Platt (1981)

6) **GENERAL GEOLOGY AND STRUCTURE:**

The Port Coldwell Alkalic complex was emplaced into Archean rocks of the Wawa Subprovince of the Superior Province during early stages of the Middle Proterozoic Midcontintent Rift at 1108 +/- 1 Ma (Heaman and Machado 1987). The nepheline syenites are contained within Centre 2 of the Port Coldwell complex. The emplacement of the nepheline syenites followed the intrusion of biotite-bearing alkaline gabbros and preceded a series of lamprophyres and tinguaites.

7) **MINERALOGY:**

The mineralogy of the nepheline syenites are remarkably similar while having a variety of textures. Textures range from allotriomorphic granular to porphyroclastic to mosaic granuloblastic. The nepheline syenites are classed as amphibole nepheline syenites, they are pyroxene-poor and contain accessory biotite, natrolite, titanomagnetite, apatite, zeolite, fluorite, zircon , sphene and sodalite (Mitchell and Platt 1981).

OTHER FEATURES:

8) **ECONOMIC FEATURES:**

9) **CHEMICAL ANALYSIS:**

Sample No.	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	Na2O	K2O	TiO2	P2O5	Cr2O5	LOI
IM-92-053A	63.9	18.9	2.05	0.23	0.05	1.17	6.55	6.23	0.16	0.07	<0.01	0.19
-054	63.1	18.4	3.06	0.13	0.08	1.05	6.42	6.23	0.14	0.05	0.01	0.21
-055	64.2	18.7	2.06	0.13	0.06	0.89	6.45	6.57	0.15	0.06	<0.01	0.36
-056	65.3	18.1	1.34	<0.05	0.03	0.56	7.32	5.69	0.02	0.01	0.01	0.45
Blue Mtn.	60.1	23.5	0.08	0.03	----	0.40	10.4	5.00	----	----	-----	0.45

Analyses for samples 053A to 056 conducted by Lakefield Research.

10) **COMMENTS/RECOMMENDATIONS:**

When the chemistry of samples collected around the Port Coldwell area are compared with a representative analyses from Unimin's Blue Mountain property the differences are quite apparent. The Coldwell samples are lower than the Blue Mountain product in alumina content, combined alkalis and significantly higher in Fe_2O_3.

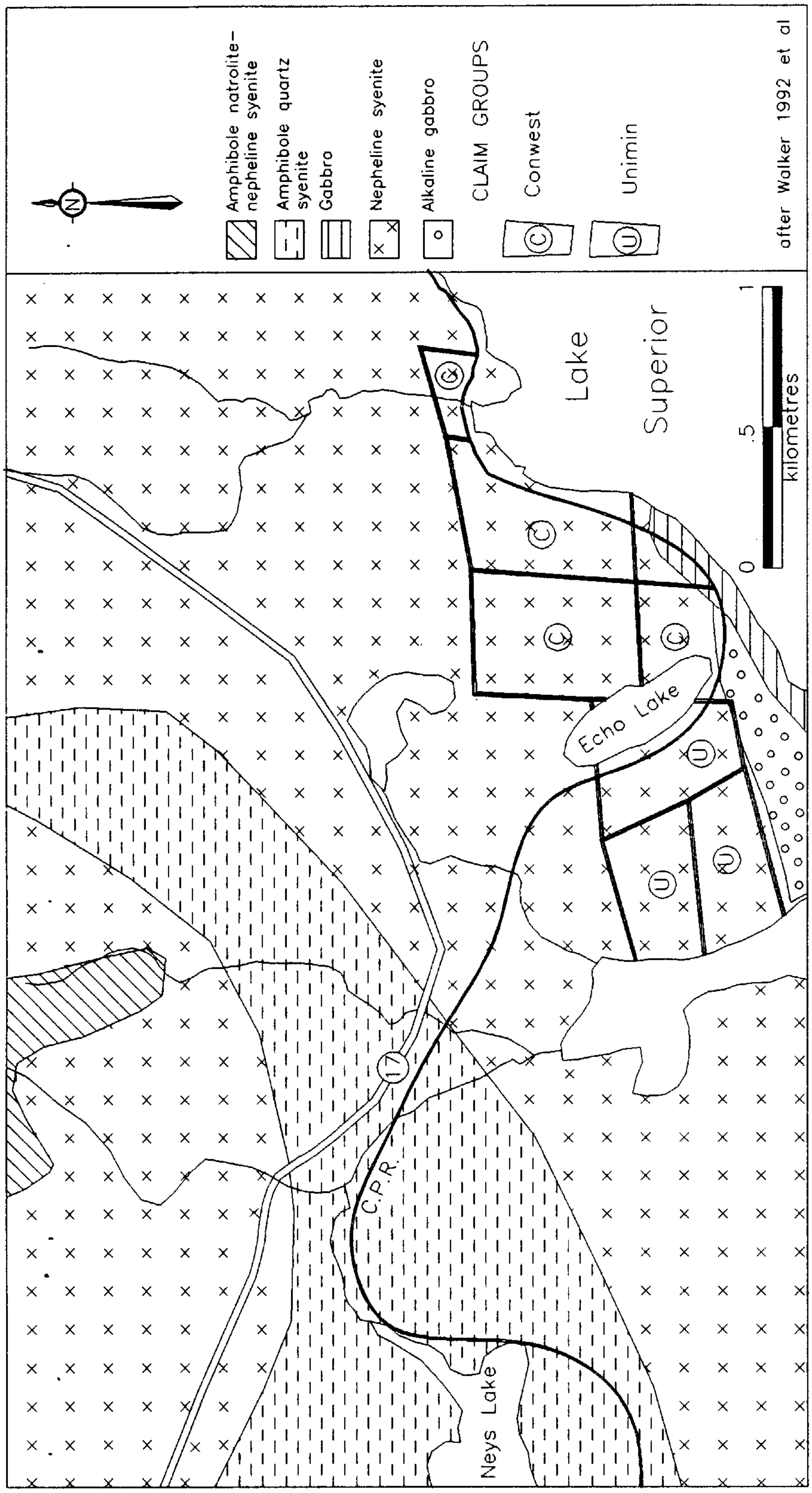

Figure 15: Port Coldwell Nepheline Syenite, location and general geology

1) **PROPERTY NAME**: Prairie Lake Carbonatite

DATE(S) VISITED:
July 1990
August 1993

2) **ALTERNATE NAME(S)**: Jim's Showing
Newmont Mining Corp. of Canada Ltd.
International Minerals and Chemical Corp. (Canada) Ltd.
Nuinsco Resources Ltd. (New Insco Mines Ltd.)

3) **COMMODITY**: **Main**: U, Nb **Secondary**: Wollastonite, apatite

4) **DEVELOPMENT HISTORY AND OWNERSHIP**:

PAST: Prior to 1968 staking was undertaken which was unrelated to the current exploration activity in the area.

1968 J. Gareau staked a portion of the complex and subsequently transferred the claims to Newmont Mining Corporation of Canada Ltd.

1969 Geophysical and geological surveys were conducted along with trenching and 16 winkie diamond drill holes.

1970 Claims returned to J. Gareau.

1975 New Insco Mines optioned two claims from J. Gareau. Thirty-nine additional claims were staked by I. Burns and transferred to International Minerals and Chemical Corp. (Canada) Ltd.

1976 New Insco Mines Ltd. optioned the 39 claims from I.M.C.C. Ltd. New Insco conducted a geophysical survey, diamond drilling and assaying.

1978 New Insco Mines Ltd. purchased the property from International Minerals and Chemical Corp. Prospecting, trenching, geophysical and geological surveys were conducted.

1979 Company name changed to Nuinsco Resources Ltd.

	1983	Nuinsco conducted diamond drilling and an assessment of the economic potential of the carbonatite including wollastonite.
	1984	Claims brought to lease by Nuinsco.
	1986	Echo Bay Mines Ltd. conducted a preliminary feasibility study for Nuinsco Resources to examine the potential for a cement production facility located at Prairie Lake.
	1987	Nuinsco transferred all its interests to Seadrift International Exploration Ltd.
	1988	Seadrift International amalgamated with Wilco Management Co. Ltd. and Deak Ariadne Ltd. to form Deak International Resources Corp.
	1989	Company's name changed to Deak Resources Corporation.
CURRENT:	1994	Deak Resources Corporation of Vancouver continues to hold the 39 claims over the carbonatite complex.

5) **LOCATION AND ACCESS:**

N.T.S.	42 E/02SE		
Latitude:	49· 02' 20"	**Northing:**	5431601
Longitude:	86· 42' 30"	**Easting:**	0521317

GENERAL LOCATION:

The Prairie Lake Carbonatite complex is located on the north shore of Prairie Lake, approximately 39 km northeast of Terrace Bay and 40 km northwest of Marathon.

ACCESS:

Access to the complex is gained by using the all-weather Deadhorse Creek road which intersects Highway 17 at Deadhorse Creek in Walsh Township. The road crosses the complex approximately 32 km from the highway.

MAP REFERENCES:

Claim Map G-596, Killala Lake Area, Thunder Bay Mining Division
Map P.1070, Prairie Lake Carbonatite, District of Thunder Bay (Sage et al. 1976)
Map 2232, Nipigon-Schreiber Sheet (Carter, McIlwaine and Wisbey 1973)

REFERENCES:

Assessment Files, Thunder Bay
Fenwick and Scott (1978)
Ferguson (1971)
Industrial Minerals Geologist's Files, Thunder Bay
Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay
Sage (1976, 1987)
Scott (1987)
Watkinson (1973)

6) GENERAL GEOLOGY AND STRUCTURE:

Sage (1987) described the geology of the Prairie Lake Carbonatite complex:

> The Prairie Lake Carbonatite Complex lies within the Wawa Subprovince of the Superior Province and has been dated at 1033 +/- 59 Ma by the Rb-Sr isochron method.
>
> The Prairie Lake complex forms a circular topographic high west of Prairie Lake. the complex consists of a complexly interfingered sequence of arcuate to curvilinear bands of carbonatite and of pyroxene-nepheline rocks of the melteigite-urtite series collectively referred to as ijolite. The ijolitic rocks are, by far, the dominant rock in the core of Prairie Lake complex. The carbonatite rocks are more abundant towards the periphery of the intrusion.
>
> The carbonatite rocks are predominately composed of calcite but minor amounts of dolomite are locally present. The age relationships between the calcitic and dolomitic phases are uncertain. The calcite carbonatite rocks are medium grained and contain minor quantities of fine-grained accessory magnetite, pyrite-pyrrhotite, amphibole and biotite-phlogopite. Locally the calcite is coarse grained and visually appears to be nearly pure, probably having formed during a later pegmatitic phase of development.
>
> In some areas of the complex, a rusty weathering, ferruginous carbonatite locally appears to be younger than the non-ferruginous carbonatite. The ferruginous carbonatite is generally medium to coarse-grained and, in the field, is

characterised by the presence of a limonitic coating on the weathered surface. This ferruginous carbonatite may be ankeritic to ferruginous dolomite in composition.

Trace amounts of dolomite are not uncommon within the sovites and ijolitic rocks. At "Jim's Showing" dolomite is the dominant carbonate phase in the mineralized zone and contains xenolithic fragments of other rocks found within the complex.

The ijolitic rocks make up most of the Prairie lake complex and visually can be roughly divided into three phases. Contact relationships between the various phases were not observed in the field.

Along the margins of the complex, one phase consists of fine-grained ijolite to silicocarbonatite composed predominantly of biotite-phlogopite, calcite, magnetite and minor nepheline (map-unit 2c). This phase is intimately associated with the carbonatite rocks. The carbonatite and ijolitic phases display both gradational and crosscutting relationships. Where crosscutting relations exist, the carbonatite phase is always younger.

In the north-central area of the intrusion, a second phase of ijolitic rock consists of a number of small exposures of medium- to coarse-grained ijolite containing abundant interstitial wollastonite (map-unit 2a). Wollastonite is also abundant in nepheline-rich, coarse-grained pegmatitic segregations found within finer-grained phases. The pegmatitic segregations may contain up to 50 percent wollastonite and are composed almost exclusively of nepheline plus wollastonite. Black garnet, biotite, and calcite are common accessory minerals in this ijolitic group.

In the south to southeast corner of the complex and enclosing the wollastonite ijolite are exposures of generally medium- to coarse-grained ijolite with minor or no wollastonite. These rocks compose a third ijolitic phase (map-unite 2b). Pegmatitic phases are common and there are local coarse-grained pegmatites of nearly pure nepheline (urtite). Black garnet, biotite, and calcite are common accessory minerals.

> The relationship between the wollastonite-poor and wollastonite-rich ijolitic rocks is unknown due to lack of critical outcrop exposure, but they may be gradational into each other.

Sage (1987) goes on to describe the structural geology of the complex:

> The complex displays a prominent circular magnetic anomaly on aeromagnetic map 2189G of approximately 1400 gammas absolute total field above background of approximately 60,500 gammas.
>
> On topographic maps and ERTS photographs, the Prairie Lake carbonatite is seen to be located at the intersection of two lineaments. One, defined by the Steel River, trends north, and the other, defined by a series of lakes between Prairie Lake and Killala Lake trends northeast.
>
> The Killala Lake complex lies along a north-trending crustal fracture which is the site of several alkalic rock-carbonatite intrusions: Port Coldwell, Chipman Lake (carbonatite dikes and fenites), and Killala Lake. The importance of this fracture to the localisation of alkaline magmatism was recognised by Sage (1978, 1983b) after mapping of the Slate Islands. This crustal fracture is the northern extension of the Big Bay - Ashburton Bay Fault which crosses the Lake Superior basin and has been defined from aeromagnetic studies by Hinze et al. (1966).
>
> The Prairie lake complex, therefore, occurs on fractures parallel and subsidiary to the Big Bay - Ashburton Bay Fault which has served as a major site of alkalic rock - carbonatite intrusive activity northeast of the Lake Superior basin.
>
> The Prairie Lake carbonatite is located in a fractured or faulted continental shield environment characteristic for this type of complex.

7) MINERALOGY:

See General Geology and Structure.

OTHER FEATURES:

8) **ECONOMIC FEATURES**:

Reserves for U_3O_8 and Nb_2O_5 were reported in the Canadian Mines Handbook (1978-79, p.201):

> ...part of zone 300 ft long avers true width 22 ft & grade 1.8 lbs U2O8 & 5 lbs Nb2O5; est. over 200,000 tons ore to 275-ft elevation.

Kretschmar (Assessment Files, Thunder Bay) commented on the economic potential of phosphorus and wollastonite:

> According to Delisle (1981) the St. Honore carbonatite assays 5-7% apatite (2-2.9% P_2O_5, since apatite contains about 41% P_2O_5) and the No. 1 zone contains about 8% apatite (3.3% P_2O_5). Based on pilot tests and a preliminary feasibility study, he concluded that a by-product apatite concentrate could be produced at a profit from the St. Honore niobium ore. At Prairie Lake, assays of 4-6% P_2O_5 were commonly obtained in the high grade niobium intersections and 6-10% P_2O_5 (without significant Nb_2O_5) was found in hole P39.
>
> No wollastonite is being mined from carbonatite anywhere in the world (A.N. Mariano, personal communication, 1983). At the same time the Prairie Lake carbonatite is unique in North America in its high wollastonite content (Sage, 1983, p.41). Rocks containing between 40 and 80% wollastonite have been encountered in drill core and in outcrop on the south west shore of Centre Lake and wollastonite may well occur in economic concentrations in the vicinity of hole P35 and P36.

9) **CHEMICAL ANALYSIS**:

The following results were obtained from diamond drilling conducted by Newmont Mining Corporation of Canada Ltd. (Assessment Files, Thunder Bay):

Hole	**Width**	**Nb2O5**
P5	1.60	0.43
	1.20	0.37
P6	1.90	0.32
P7	1.0	0.25
P12	5.0	0.31
P14A	6.0	0.44

The following analyses from reverse circulation drilling were reported by International Minerals and Chemical Corporation (Canada) Ltd. (Assessment Files, Thunder Bay):

Sample No.	Footage	P_2O_5	Insolubles
064234	35-40	2.4	10.2
064235	65-70	2.0	3.95
064236	115-120	2.3	15.3
064237	115-120	3.8	5.88
064238	85-90	0.3	55.7

Nuinsco Resources Ltd. obtained the following significant results from their 1977 and 1983 drill programs (Assessment Files, Thunder Bay):

Hole	Footage	U3O8	Nb2O5	P2O5
1977				
P16	291-336	1.98		
P17	576-611	0.90		
P22	77-78	1.20		
P25	154-164	0.95		
P29	159-164	1.00		
1983				
P31	28-33		1.01	4.04
	42.3-47		0.122	6.36
	100-105		0.018	6.08
	244-274		0.503	4.36
	286.5-335.5		0.605	5.26
	446-460.5		0.563	5.48
	469.5-508		0.684	4.46
P33	30.5-35.5		0.025	6.93
	69-74		0.026	6.51
	188.5-193.5		0.050	6.30
	251-256		0.061	7.69
	316.5-321.5		0.037	8.33
P39	133-138		0.060	6.43
	143-148		0.030	8.82
	161-166		0.040	9.85
	189.5-194.5		0.070	6.89
	213.4-218.4		0.050	10.10

10) <u>COMMENTS/RECOMMENDATIONS</u>:

1) **PROPERTY NAME:** Quarry Island Silica Deposit

DATE(S) VISITED: 1985 and 1988

2) **ALTERNATE NAME(S):** Rossport Sandstone
McKay Harbour Freestone

3) **COMMODITY:** **Main:** Quartzite, silica

4) **DEVELOPMENT HISTORY AND OWNERSHIP:**

PAST:

There is very little information available that discusses the development of this sandstone quarry. The available references indicate that the quarry operated in the late 1800s. The extracted stone was used in the Thunder Bay area in bridges, foundations, and some buildings (Terrace Bay-Schreiber News, Oct. 19, 1983; Feb. 8, 1983).

1985 — W. Seeber staked claims covering the former quarry as a possible source of building stone. Since then, Mr. Seeber has been also assessing the formation's potential as a silica source.

1986 — W. Seeber hired a consultant and conducted a sampling, beneficiation and market study.

1988 — W. Seeber transferred a 50% interest to S. Digregorio and retained 50%. Two claims, TB 834909 and 911, were surveyed.

1989 — Two diamond drill holes for a total of 204' were recorded by Seeber and Digregorio.

1990 — Claims TB 834909 and 911 were brought to lease.

CURRENT: 1994 — The southern portion of the island is covered by two leased claims held by S. Digregorio and the estate of W. Seeber. The rest of the island is currently open.

5) LOCATION AND ACCESS:

N.T.S.	42 D/13		
Latitude:	48· 48' 50"	**Northing:**	5406675
Longitude:	87· 30' 45"	**Easting:**	0462374

GENERAL LOCATION:

Southwest corner of Quarry Island, Nipigon Bay Lake Superior; approximately 2.5 km (1.5 mi.) south of Rossport (Figure 16).

ACCESS:

The island can be reached by boat launched at Rossport.

MAP REFERENCES:

Claim Map G-610, Rossport, Thunder Bay Mining Division
Map 2285, St. Ignace Island and Adjacent Islands (Giguere 1975)

REFERENCES:

Assessment Files, Thunder Bay
Cheadle (1987)
Franklin et al. (1982)
Giguere (1975)
Industrial Minerals Geologist's Files, Thunder Bay
Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay

6) GENERAL GEOLOGY AND STRUCTURE:

The deposit is located within Proterozoic sandstones of the Sibley Group. This Group unconformably overlies the Animikie Rove Formation which also outcrops on the island. Both of these Groups are intruded by a Keweenawan diabase sill. The only evidence of quarrying on the island is the rubble piles found in the vicinity of the quarry face.

7) MINERALOGY:

In thin section, the sample is composed of 90 to 95% quartz and 5 to 10% sericite and chlorite. The quartz occurs as cement (15 to 20% of total quartz). The quartz grains are well sorted and are subangular to subrounded in shape. The grains have tangential and planar contacts. Some of these contacts are the result of quartz overgrowths, which are marked by the presence of fine micas between the grain and overgrowth. The sericite and chlorite are more commonly found as masses with the same shape and size as the quartz grains. This similarity may infer that the sericite and micas may originally have been feldspar grains.

OTHER FEATURES:

8) **ECONOMIC FEATURES:**

Bernatchez (Assessment Files, Thunder Bay) estimated the grade and reserves for the Quarry Island Silica Deposit:

> Assay results have returned grades of silica from 92.8% to 99% from the Quarry Island orthoquartzites.
>
> Some tonnage estimates were calculated based on a uniform later of 13.6 metres thick, 400 metres wide and 800 metres long. A total of 11.4 million tonnes (or 12.5 million tons) was calculated at Quarry Island. Some of it, however, is capped by Keweenawan diabase.

9) **CHEMICAL ANALYSIS:**

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	MnO	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5
85MCK-0005	98.32	1.34	0.00	0.01	0.01	0.06	0.07	0.10	0.08	0.00
89MCK-0008	96.57	2.53	0.12	0.00	0.13	0.03	0.00	0.53	0.06	0.02
58176	98.3	0.42	0.05	<0.01	0.03	0.02	<0.01	0.10	0.02	0.02
58177	98.7	0.39	0.04	<0.01	0.01	0.02	<0.01	0.09	0.02	0.02
58178	99.0	0.40	0.03	<0.01	0.01	0.02	<0.01	0.11	0.02	0.02
58179	97.2	0.65	0.04	<0.01	0.03	<0.01	<0.01	0.15	0.04	0.02
58180	92.8	1.61	0.11	0.01	0.09	2.11	<0.01	0.44	0.07	0.03

Analyses for MCK samples by Geoscience Laboratory, Ontario Geological Survey, Toronto

Analyses for samples 58176-80 by X-Ray Assay Laboratories Ltd., Don Mills, Ontario

10) **COMMENTS/RECOMMENDATIONS:**

This deposit represents a significant silica resource in northwest Ontario. Any attempt to develop this site would have to take special care to assess any environmental concerns associated with development on islands in Lake Superior. The Ministry of Natural Resources, Ministry of the Environment and the Rossport Islands Advisory Board would have to be consulted.

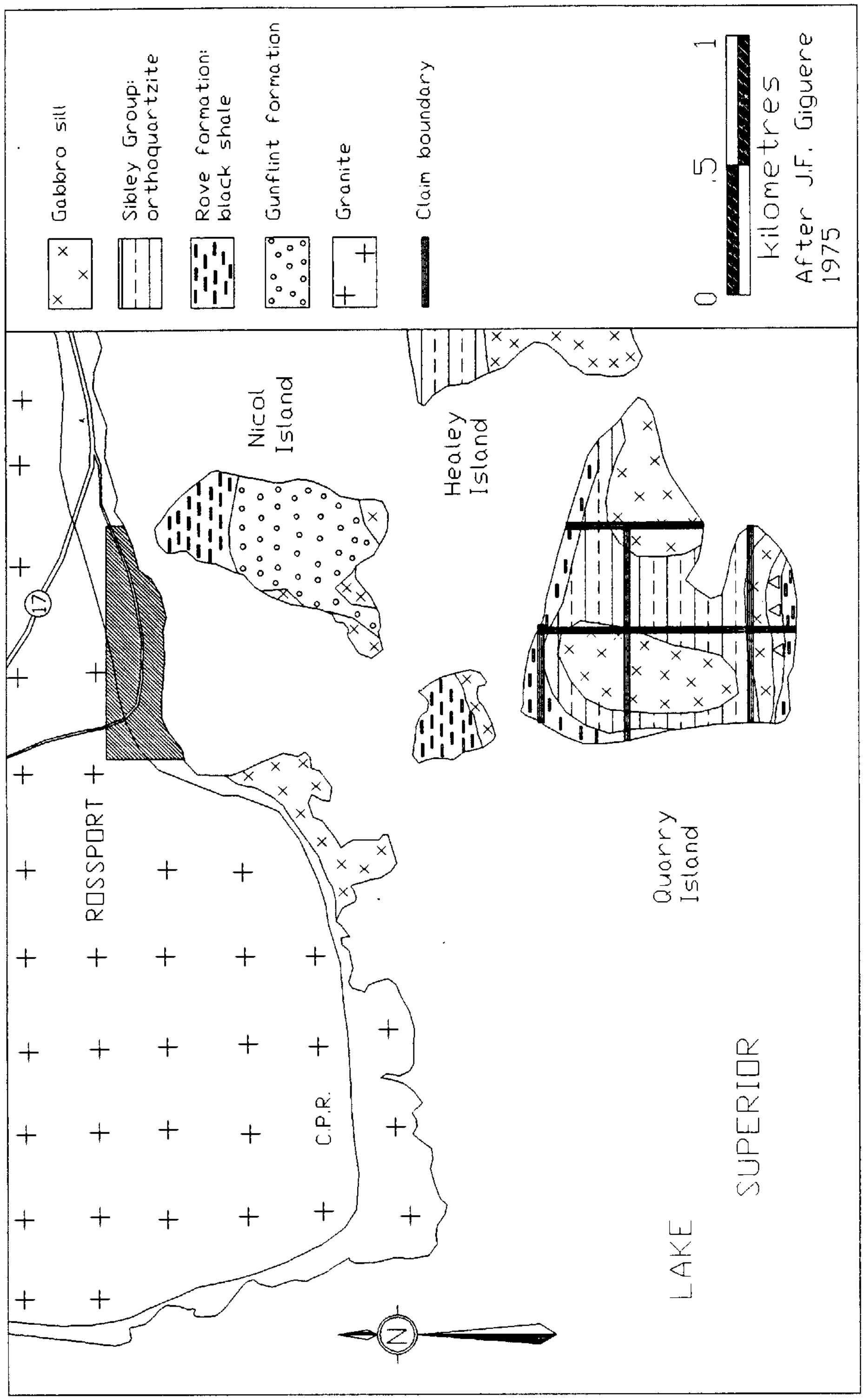

Figure 16: Quarry Island Silica Deposit, location and general geology

1) **PROPERTY NAME**: Renshaw-Tripp Occurrence

DATE(S) VISITED: August 1992

2) **ALTERNATE NAME(S)**: Middleton Occurrence

3) **COMMODITY**: **Main**: TiO_2 **Secondary**:

4) **DEVELOPMENT HISTORY AND OWNERSHIP**:

PAST:	1949	Claims staked by B. Renshaw of Cloud Bay, Ont.
	1954	All interests transferred to Z. Renshaw.
	1955	All interests transferred to Kinasco Expl. and Mining Ltd.
	1957	Claims restaked by I.F. Smith of Port Arthur, Ont.
	1958	All interests transferred to Ben-Ren Mining and Expl. Co. Ltd.
	1964	Claims restaked by C.S. Downey of Schreiber, Ont.
	1967	Claims restaked by K.C. Kuhner of Port Arthur, Ont. All interest transferred to R.D. Bell.
	1971	Claims restaked by K.C. Kuhner.
	1975	Claims restaked by A. Moses.
	1976	All interests transferred to D. Fairbairn.
CURRENT:	1994	The property is currently open.

5) **LOCATION AND ACCESS**:

N.T.S.	42 D/15SE		
Latitude:	48· 47' 47"	**Northing**:	5404665
Longitude:	86· 38' 32"	**Easting**:	0526276

GENERAL LOCATION:

The showing occurs in the southeast corner of Walsh Township just north of Highway 17.

ACCESS:

The showing is accessible directly from Highway 17.

MAP REFERENCES:

Map 2232, Schreiber-Hemlo Sheet (Carter et al. 1973)
Map 2107, Jackfish-Middleton Area (Walker 1967)
Map P.3232, Port Coldwell Complex, West Half (Walker et al. 1993)

REFERENCES:

Industrial Minerals Geologist Files, Thunder Bay
Resident Geologist Files, Schreiber-Hemlo District, Thunder Bay
Walker (1967)
Walker et al. (1991, 1992, 1993)

6) GENERAL GEOLOGY AND STRUCTURE:

Walker (1967) describes the occurrence:

> Flat-dipping lenses of titaniferous magnetite are found in the gabbro and syenite between Middleton and the Little Pic River. Rockcuts on Highway 17 expose some of the veins (property 5 on Map 2107). Thicknesses range from less than 1 to 20 feet.

Walker et al. (1993) mapped the rocks in the area as iron-rich augite syenite which are described as follows:

> The iron-rich augite syenite appears to be a low angle sheet-like intrusion, which dips approximately 15° toward the centre of the complex. It intrudes the basaltic xenoliths of the roof pendant and the Eastern and Western Gabbro, and it has inclusions of recrystallized amphibole quartz syenite. A variation in mineralogy from the bottom to the top throughout the sheet is present and consists of: fayalite-iron-rich, augite-magnetite syenite; iron-rich augite syenite; fayalite-iron-rich augite syenite; and amphibole syenite.

7) MINERALOGY:

Page (1951) described the mineralogy:

> Five occurrences of titaniferous magnetite veins have been noted. Two of these have been mapped in part and show considerable persistance and continuity and two others have been located but not traced out.
>
> The westerly exposure may be seen in a rock cut in the southeastern corner of claim TB 41388 where the vein strikes N.E. and dips 42·S. At this point there is 6 feet of relatively pure magnetite (titaniferous) in the footwall side of the vein. A fine grained diabasic intrusive separates this section from lower grade material that occupies the hanging wall side and extends for 12 feet or more in width. The true width of this section is hard to determine due to overburden. A picket line was run for 1700 feet northward approximately parallel to this vein. Exposures of vein matter were observed at intervals along this length and continued on for an unknown distance. At the far end of the picket line quite pure titaniferous magnetite is exposed across a width of approximately 20 feet while lower grade material extends for 75 feet or more to the hanging wall side of the vein. Actual true widths of the higher-grade material cannot be determined at present as a light mantle of overburden and small trees cover the greater part of the vein width.

OTHER FEATURES:

8) ECONOMIC FEATURES:

Walker (1967) stated that:

> The titanium content is apparently too high for an iron ore and too low for a titanium ore, and tonnage potential seems relatively small.

9) CHEMICAL ANALYSIS:

Total Iron	Titanium	Manganese	Silica	Phosphorus
43.03	4.50	1.21	29.00	0.082
35.13	4.65	1.23	31.70	0.123
33.35	5.35	0.71	29.85	0.371
33.19	5.45	0.73	27.10	0.304
36.90	4.84	0.92	29.20	0.262
43.56	13.55	0.42	13.75	0.118
45.17	8.65	0.44	17.75	0.177

Analyses by T.W. Page (1951)

10) COMMENTS/RECOMMENDATIONS:

The small tonnage potential and poor titanium values make this a poor economic target at present.

1) PROPERTY NAME: Shack Lake Spectrolite

DATE(S) VISITED: 1990-1993 to present

2) ALTERNATE NAME(S): C.S. Downey Occurrence

3) COMMODITY: **Main:** Spectrolite **Secondary:**

4) DEVELOPMENT HISTORY AND OWNERSHIP:

PAST:	1963	C.S. Downey staked a single claim over a schiller feldspar occurrence.
	1964	A face was stripped and blasted at the showing.
	1965	A pit was blasted and three holes drilled into the showing. Coarse-grained "labradorite" was intersected in all the holes.
	1975	The claim was sent to lease under the name of C.S. Downey.
		Jon and Audrey Ferguson obtained ownership of claim from Clem Downey
	1992	The Ferguson's and Secobel Explorations Inc. form a working agreement to develop the site. Three holes drilled around the showing, spectrolite was intersected in all three.
CURRENT:	1994	Jon and Audrey Ferguson currently hold ownership on the property and have a working agreement with Secobel Explorations Inc.

5) LOCATION AND ACCESS:

N.T.S.	42 D/09NW		
Latitude:	48· 45' 00"	**Northing:**	5399640
Longitude:	86· 22' 00"	**Easting:**	0546556

GENERAL LOCATION:

The occurrence consists of a single patented claim, TB 109470 (NE 1/4, N1/2, Lot 19, Conc. 11), in north-central Pic Township. It is located north of the town of Marathon and can be accessed by road.

ACCESS:

From Highway 17 drive towards Marathon approximately 1.6 km, take the bush road which leads to the west. Follow the bush road until it ends at the point where Shack Creek exits Shack Lake. The southern boundary of the claim crosses the creek.

MAP REFERENCES:

Claim Map G-630, Pic Township, Thunder Bay Mining Division
Map P.114, Port Coldwell Area, Puskas
Map P.3233, Port Coldwell Complex, Walker, Sutcliffe, Shaw, Shore and Penczak 1993

REFERENCES:

Hinz (1992)
Industrial Minerals Geologist's Files, Thunder Bay
Kustra (1968)
Puskas (1967)
Resident Geologist's Files, Schreiber-Hemlo District
Walker et al. (1991, 1992 and 1993)

6) GENERAL GEOLOGY AND STRUCTURE:

The occurrence is underlain by Fe-rich augite syenite (Walker et al. 1992) of the Proterozoic Coldwell Alkalic complex. Geological mapping over the area was done by Puskas (1967) and recently by Walker et al. (1991, 1992). The property was last described in detail by Kustra (1968) and Schnieders et al. (1991). The spectrolite occurs within the syenite as two phases: large crystals up to 10 cm across in pegmatite dikes cross-cutting the syenite; and smaller crystals within the contact zone between the pegmatite and medium-grained host syenite (Figure 17). In both cases the spectrolite displays bluish to yellow-gold schilleresccence. Ribbe (1983) states, ""Schiller" may be used to refer to diffuse, often silvery reflections from mutually oriented, platy inclusions, especially common in labradorite parallel to (010) (Rayleigh 1923)."

7) MINERALOGY:

In 1990 M.C. Smyk, Staff Geologist, Schreiber-Hemlo District, sent a sample for XRD analysis to H. de Souza of the Geoscience Laboratories in Toronto. It was reported, "X-ray diffraction analysis of the "spectrolite" shows the presence of plagioclase and minor K-feldspar (anti-perthite). The schiller effects may be brought about by diffraction that occurs at the boundary of exsolution lamellae" (Schnieders et al. 1991).

OTHER FEATURES:

8) **ECONOMIC FEATURES:**

9) **CHEMICAL ANALYSIS:**

10) **COMMENTS/RECOMMENDATIONS:**

Advice was sought by the Ferguson's, in regards to developing their spectrolite property. They are evaluating the property's potential as a pick-your-own tourist operation similar to the amethyst mines near Thunder Bay. A meeting was held with representatives of the Town of Marathon, Secobel Explorations Inc. (potential developers), the Ferguson's, M.C. Smyk (Staff Geologist, Schreiber-Hemlo District) and P. Hinz. Advice was provided on geology, further exploration of the site's potential, marketing, permitting requirements and available funding vehicles for development.

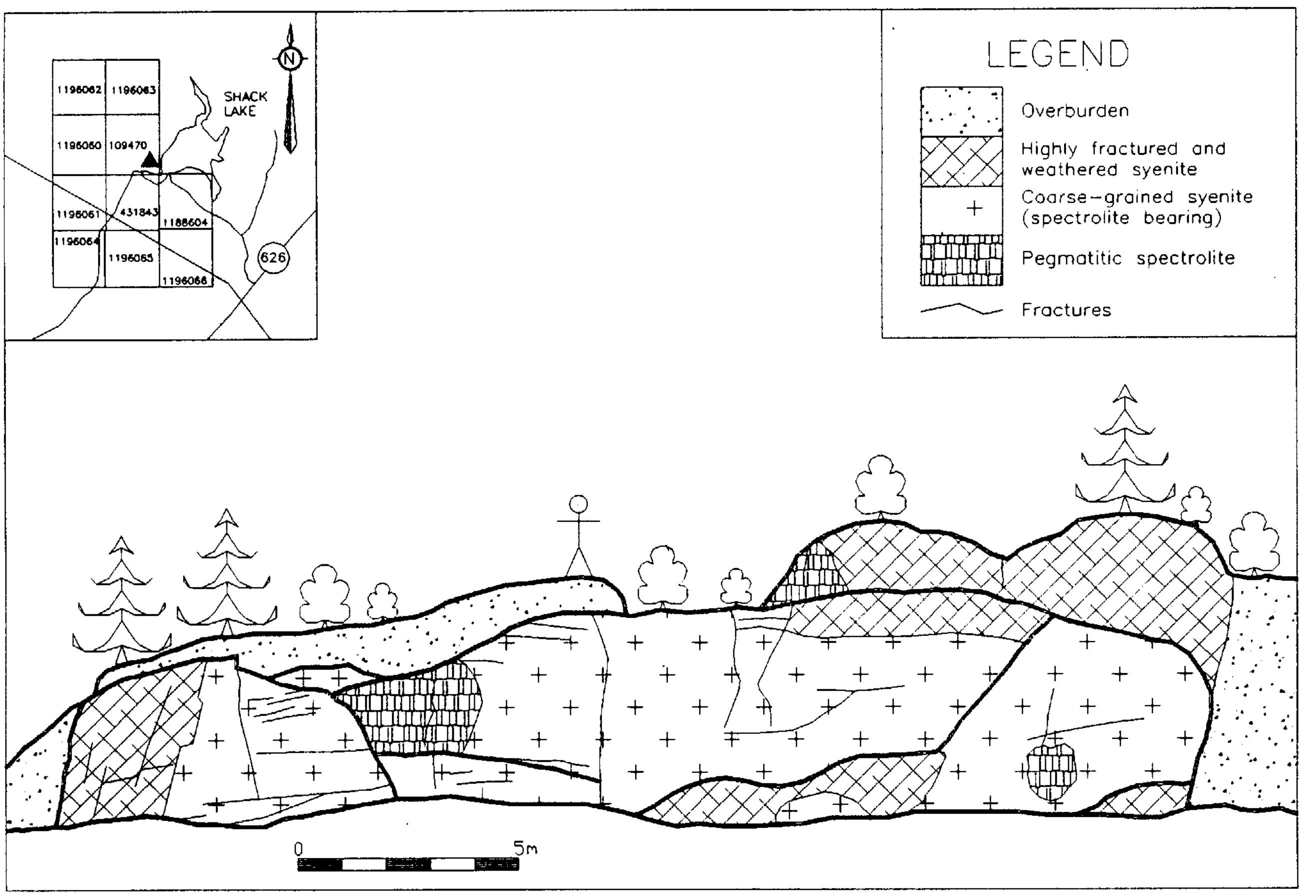

Figure 17: Shack Lake Spectrolite, location and geology

1) **PROPERTY NAME**: Sunrise Vein

DATE(S) VISITED: July 1991

2) **ALTERNATE NAME(S)**: Asarco Exploration Co. of Canada Limited

3) **COMMODITY**: **Main**: fl, ba **Secondary**: amy

4) **DEVELOPMENT HISTORY AND OWNERSHIP**:

PAST:	1972 to 1974	Property staked by P. Proulx, U. Abolins and R. Kervin. Transferred to Asarco Explorations.
		Geological reconnaissance mapping, silt and water sampling by Asarco Exploration Company.
		Claims cancelled.
	1986 to present	E. Fournier re-staked the property. Diamond drilling, stripping and manual work was completed.
CURRENT:	1994	E. Fournier still holds the property.

5) **LOCATION AND ACCESS**:

N.T.S.	42D/13NE		
Latitude:	48· 53' 00"	**Northing**:	5414452
Longitude:	87· 37' 00"	**Easting**:	0454789

GENERAL LOCATION:

The occurrence is located in Yesno Township approximately 4 km west of Pays Plat Indian Reserve on Highway 17.

ACCESS:

The veins outcrop on Highway 17, 4 km west of Pays Plat Indian Reserve near Wabasta Lake (Figure 18).

MAP REFERENCES:

Claim Map G-85, Middle Fox Lake Area, Thunder Bay Mining Division
2232, Nipigon-Schreiber Sheet (Carter et al. 1971)

REFERENCES:

Assessment Files, Thunder Bay
Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay

6) **GENERAL GEOLOGY AND STRUCTURE:**

The Sunrise Vein is 18 m wide in the Highway 17 roadcut. It strikes approximately northeast-southwest and dips vertically with very sharp contacts. Detailed mapping has not been successful in tracing this fluorite-bearing zone along strike.

To the northeast it is covered by alder swamp and glacial till.
To the southwest there is no outcrop along the strike of the vein.

The Midday vein is about 5.8 m wide, strikes 74· and dips 68· northwest. It is located to the west of the Sunrise vein, within the same roadcut. It runs into a swampy area to the west and pinches out 61 m east of the road-cut. It has a possible maximum strike length of 305 m.

(Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay)

7) **MINERALOGY:**

Both the Sunrise Vein and Midday Vein contain barite and fluorite, but very little amethyst. Brecciation is not as apparent as in the Sunset Vein although epidotization is very strong, giving the zones a greenish-yellow colour on fresh surfaces. The fluorite and barite occur as narrow veinlets along irregular fractures within these zones. Assay values are erratic due to the irregular nature of the mineralization.

(Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay)

8) **ECONOMIC FEATURES:**

9) **CHEMICAL ANALYSES:**

One section assayed up to 23.11% CaF_2 over 3 m across the veins.

(Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay)

The following assays were obtained by Asarco on the Sunrise Vein:

Sample No.	Assay Width	% CaF_2	Location
7136	3 m (10')	0.31	N side highway
7137	3 m (10')	<0.10	N side highway
7138	3 m (10')	<0.10	N side highway
7139	3 m (10')	7.03	N side highway
7140	3 m (10')	0.99	N side highway
7141	3 m (10')	23.11	N side highway
7145	3 m (10')	3.55	S side highway
7146	3 m (10')	0.97	S side highway
7147	3 m (10')	5.00	S side highway
7148	3 m (10')	0.32	S side highway
7149	3 m (10')	10.64	S side highway
7150	3 m (10')	16.13	S side highway

(Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay).

The following assays were obtained by Asarco on the Midday Vein:

Sample No.	Sample Width	% CaF_2
7135	5.8 m (19')	10.44
7143	3 m (10')	13.54
7144	2.7 m (9')	5.32

(Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay).

10) COMMENTS/RECOMMENDATIONS:

The Sunrise and Sunset Veins are narrow and contain erratic fluorite values. For these reasons, the veins will probably only be of interest to rock hounds and mineral collectors.

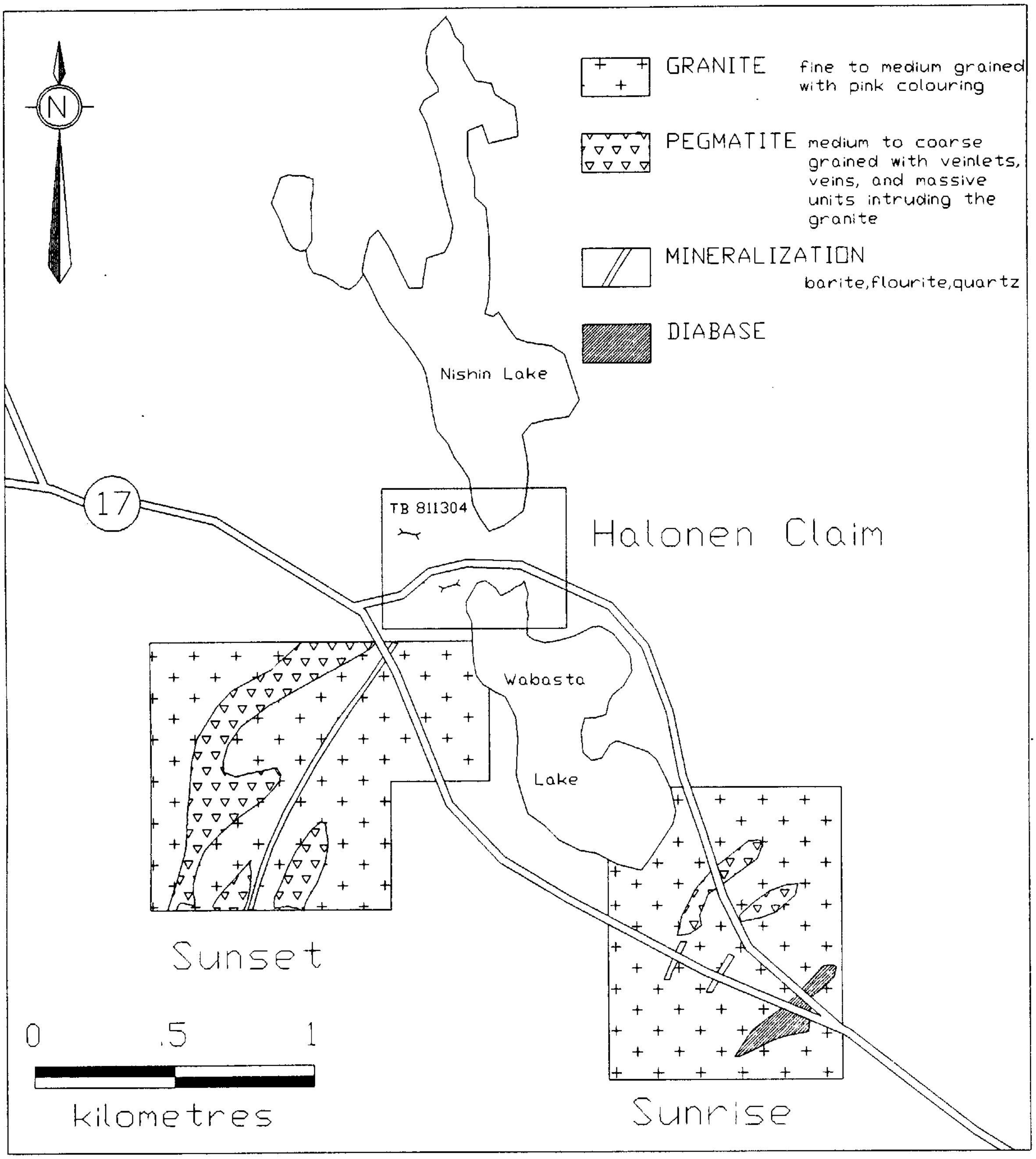

Figure 18: Sunrise, Sunset and Halonen Occurrences, location and geology

1) **PROPERTY NAME:** Sunset Vein

DATE(S) VISITED: July 1991

2) **ALTERNATE NAME(S):** Asarco Exploration Co. of Canada Ltd.

3) **COMMODITY:** **Main:** fl, ba **Secondary:** amy

4) **DEVELOPMENT HISTORY AND OWNERSHIP:**

PAST:	1972	The property was staked by P. Proulx and transferred to Asarco Explorations.
	1973	Geological reconnaissance mapping, silt and water sampling by Asarco Explorations.
	1991	Elwood Fournier held a claim block covering the vein. Diamond drilling, trenching and manual work was completed.
	1992	Property was re-staked by A. Eveleigh and transferred to A. Traverse.
CURRENT:	1994	A. Traverse still holds the claims.

5) **LOCATION AND ACCESS:**

N.T.S.	42D/13NE		
Latitude:	48· 54' 00"	**Northing:**	5416314
Longitude:	87· 38' 00"	**Easting:**	0453583

GENERAL LOCATION:

The occurrence is located in Yesno Township approximately 4 km west of the Pays Plat Indian Reserve on Trans-Canada Highway 17 (Figure 18).

ACCESS:

Access is available via Highway 17, about 4 km west of the Pays Plat Indian Reserve. The vein system crosses the highway and further access is provided by a communication tower access road branching off from the main highway.

MAP REFERENCES:

Claim Map G-85, Middle Fox Lake Area, Thunder Bay Mining Division
Map 2232, Nipigon-Schreiber Sheet (Carter et al. 1973)

REFERENCES:

Assessment Files, Thunder Bay
Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay

6) **GENERAL GEOLOGY AND STRUCTURE:**

The area is underlain by an igneous complex of two major rock types, granite and pegmatite. This complex is cut by two major structures. The earlier recognizable structure is represented by a quartz-epidote vein system and the later structure represents a system of mafic dikes.

The granitic rock is fine to medium grained and pink in colour, and ranges in composition from a high silica-potassium granite to a granodiorite.

Many portions of the granite contain inclusions or xenoliths of mafic material that have been altered by the intruding granite. Inclusions vary in size from 5 cm up to many metres in diameter.

Some inclusions show sharp contacts whereas others show gradational contacts.

The granite is cut by numerous narrow pegmatite veins composed of quartz and coarse-grained feldspar. The veins vary in width from 5 cm to 0.6 or 1 meter and strike N 70·E.

There are numerous fluorite veins in the vicinity. The majority of these are found in the surfaces of the joint planes, as seams of purple fluorite cubes.

(Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay)

7) **MINERALOGY:**

Mapping by Asarco Exploration Co. indicated a continuous mineralized fluorite zone extending for more than 915 m. The zone varies in width from 1.2 m to 13.5 m. It is made up of a milky quartz vein which dips vertically and strikes northeast-southwest. The vein is flanked on the northwest by a breccia, the matrix of which is made up of fluorite, milky-white quartz, amethyst, and barite. Breccia fragments are derived from the surrounding granites and have been altered by silicification and epidotization. Fluorite mineralization is erratic throughout the vein.

Three major fluorite bearing veins, and a few minor ones have been located. They contain large granitic fragments cemented together by quartz, barite, and fluorite. The quartz is usually a white milky colour although some cavities are lined with amethyst crystals. The breccia fragments contain epidote, giving the breccia zones a greenish-yellow colouration on fresh surfaces.

(Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay)

8) ECONOMIC FEATURES:

9) CHEMICAL ANALYSES:

The following assay values were obtained by Asarco on the Sunset Vein:

Sample No.	Assay Width	% CaF_2
7157	7.6 m (25')	5.48
7158	1.8 m (6')	11.13
7159	0.5 m (1.7')	1.25
7160	2.1 m (7')	3.94
7161	3 m (10')	0.72
7162	2.7 m (9')	0.54
7163	1.2 m (4')	0.60
7164	character sample	0.43
7165	1.2 m (4')	0.35
7142	character sample	20.48

(Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay)

10) COMMENTS/RECOMMENDATIONS:

The Sunrise and Sunset Veins are narrow and contain erratic fluorite values. For these reasons, the veins will probably only be of interest to rock hounds and mineral collectors.

1) PROPERTY NAME: Thomas Lake Road Graphite Occurrence

DATE(S) VISITED: July 1992

2) ALTERNATE NAME(S):

3) COMMODITY: **Main:** Graphite flake **Secondary:**

4) DEVELOPMENT HISTORY AND OWNERSHIP:

PAST: This area has undergone previous exploration for base and precious metal commodities.

CURRENT: 1992 This new graphite occurrence was located by L. Brinklow and P. Nivens. Claims were staked and stripping and trenching conducted. Samples were sent out by the prospectors to evaluate the potential for base metal mineralization. Results were not favourable.

5) LOCATION AND ACCESS:

N.T.S.	42 F/5 SE		
Latitude:	48° 20' 45"	**Northing:**	5355401
Longitude:	85° 39' 00"	**Easting:**	0600031

GENERAL LOCATION:

The property is approximately 28 km NE of the town of Manitouwadge and 1 km north of the northwestern tip of Pearly Lake on the Thomas Lake Road.

ACCESS:

Depart from the Geco road east on the Camp 70 road for 24.0 km to the Jim Lake road. West on the Jim Lake Road for 6.0 km. Turn right (north) on Jim Lake road for 10.0 km. Turn left (west) on the Husak road, drive 2.5 km, turn right (north) on the Thomas Lake road. Drive 1.5 km, two blasted pits are on the right (east) side of the road.

MAP REFERENCES:

Map P.362, Stevens-Kagiano Lake area (Coates 1966)
Claim Map G-605, Olie Lake Sheet
Map 2220, Manitouwadge-Wawa Sheet (Milne et al. 1972)

REFERENCES:

Assessment Files, Thunder Bay
Industrial Minerals Geologist's Files, Thunder Bay
Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay
Williams and Breaks (1990)

6) GENERAL GEOLOGY AND STRUCTURE:

The area is underlain by migmatites and gneisses of the Quetico Metasedimentary Subprovince. The country rock strikes generally east-west and is composed of primarily granulite facies paragneiss and biotite migmatite. Williams and Breaks (1990) located an orthopyroxene isograd in which the occurrence is located. The occurrences of the isograd would confirm the level of metamorphism as being granulite.

7) MINERALOGY:

Flake graphite is present within a shear zone as a graphitic schist (Figure 19). Graphite generally comprises up to 5% (locally up to 20%) of the rock with trace amounts of chalcopyrite, pyrite, magnetite and pyrrhotite. There is an abundance of biotite within the schist, this is detrimental to the potential of the occurrence as biotite is difficult to separate from flake graphite. Graphite is highly concentrated along the shear faces.

8) ECONOMIC FEATURES:

The occurrence is hosted within a 4 m wide shear zone within Quetico paragneiss. Dominant foliation within the paragneiss strikes 110· and dips 85· to the south, the shear zone is subparallel to the foliation. On the south side of the shear zone a pegmatite dike is observed. The width of the dyke is unknown as it is covered by extensive overburden. The pegmatite is composed of quartz, feldspar and biotite.

Two samples were collected by the authors. One small hand specimen was taken to produce a polished thin section. The second was a large (40 kg.), high-grade sample of graphitic schist which was sent for a flotation test. Examination of the thin section revealed: quartz, plagioclase feldspar, biotite, flake graphite, minor alkali feldspar, trace pyrite (<1%) and possibly some remnant orthopyroxene. Biotite and flake graphite are intimately associated and occur as tabular and lath-like intergrowths. Plagioclase displays myrmekitic intergrowths with quartz and albite and Carlsbad twinning. Alkali feldspar is identified by microcline twinning. A minor saussuritization appears to have occurred and is evidenced by altered plagioclase and resultant epidote masses.

9) **CHEMICAL ANALYSES:**

Assay	% graphitic C	% total C	% recovery
Head assay	4.46	4.68	----
3rd cleaner concentrate	40.1	40.8	68.2

Flotation test conducted by Lakefield Research.

A report on the results of the flotation test provided by Lakefield Research (1993) states that:

> This test has shown that graphite can be readily recovered by conventional flotation techniques from this ore. However, because of intimate mineral associations between graphite and biotite, this does not seem to be a good ore to produce high grade +49 mesh graphite flake.

10) **COMMENTS:**

This occurrence is of interest as it is the third and largest such occurrence, north of Manitouwadge. The potential for economic flake graphite deposits within the Quetico Metasedimentary Subprovince is considered to be quite good.

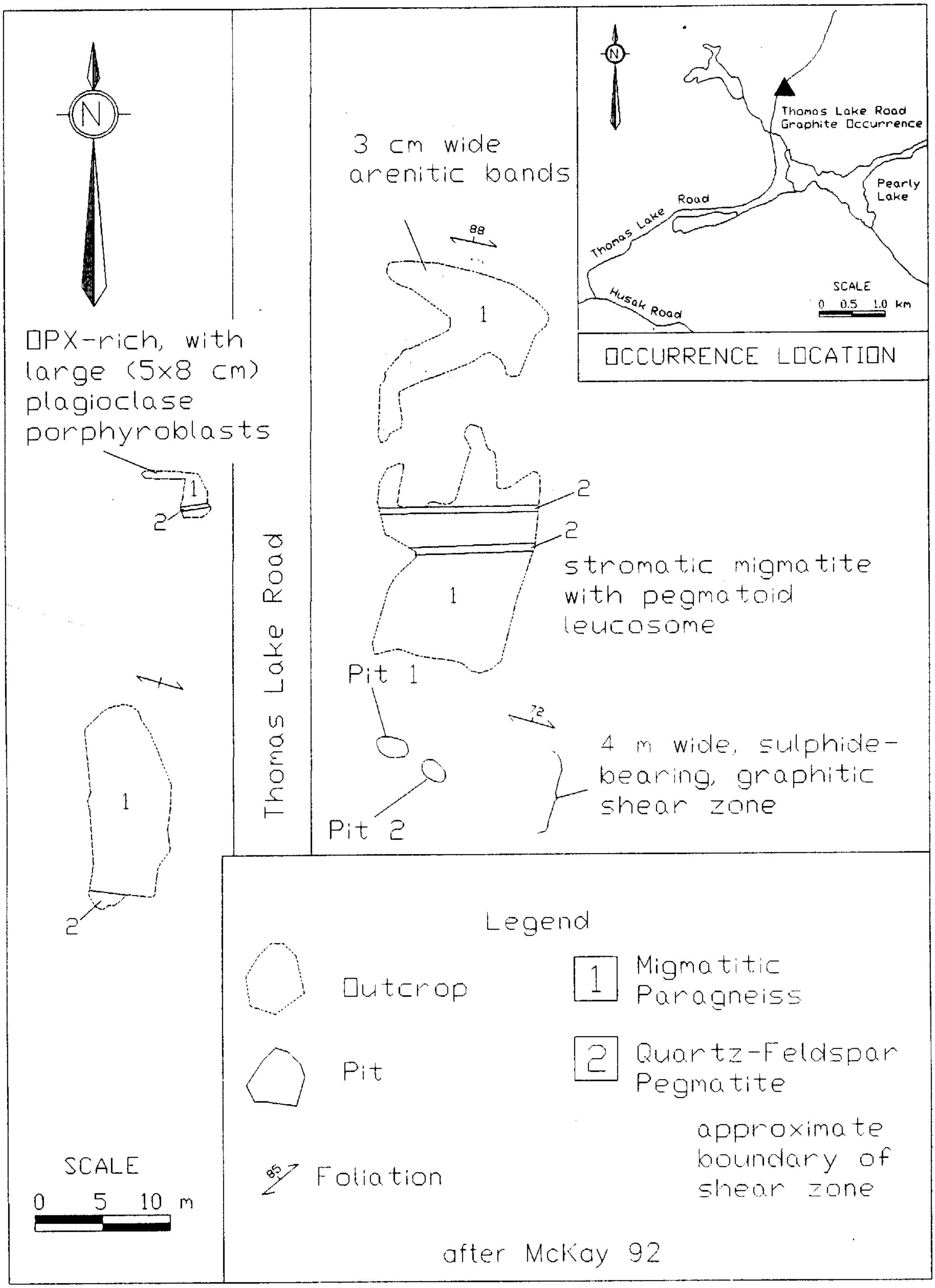

Figure 19: Thomas Lake Road Graphite Occurrence, location and geology

APPENDIX A

This list contains all the industrial mineral files housed in the Thunder Bay Resident Geologist's Office in Thunder Bay. Not included in this list are: the properties documented in this report; general industrial minerals commodity files; and dimension, monument and ornamental stone property files.

COMMODITY	FILE NAME	NTS AREA
Agate	Black Bay Peninsula	52 A/08
	Current River Agate	52 A/07
	Herron Point	52 A/09
	Fluor Island	52 A/09
Aggregate	Crooks Township	52 A/07
	Lukinto Lake - Barino Construction	42 L/06
Anorthosite	Bad Vermilion Lake Anorthosite	52 C/10
	Black Bay Peninsula	52 A/09
	Essox Lake Anorthosite	52 F/04
	Lac des Iles	52 H/04
	Manitouwadge Occurrence	42 F/04
	Ogoki Reservoir	52 I/16
	Pickle Lake	52 O/08
	St. Ignace Island	42 D/13
	Seine Bay Anorthosite	52 C/10
	Shebandowan Lake Anorthosite	52 B/08
	Sturgeon Lake Anorthosite	52 G/15
	Sucker Lake - Kenora	52 N/05
	Tib Lake Gabbro	52 H/04
	Toronto Lake Area	42 L/05
Apatite	Nuinsco Resources	42 E/02
Arsenic	Edward Island Occurrences	52 A/07
Asbestos	Canadian Johns-Manville Co. Ltd.	42 D/16
	Cawanogami Lake Occurrence	42 D/16
	Conmee Township Occurrence	52 A/05
	Goodall Township	52 N/02
	Toronto Lake Area	42 L/05
Barite	Bowker Occurrence	52 A/10
	Cooper Barite Occurrence	52 A/06
	Crooks Township	52 A/03
	Halonen Occurrence	42 D/13
	Hymers Barite Deposit	52 A/05
	Karies Occurrence	52 A/10
	Lofquist-Maata Barite Deposit	52 A/16
	McKellar Point Deposit	52 A/03

Barite	Millrock Resources Inc.	52 A/05
	Mining Locations T143-T144	52 A/05
	Northern Eagle Mines Ltd.	42 C/12
	Padre Resources	42 D/09
	Scriptures Vein	52 A/04
	South McKellar Island Deposit	52 A/03
	Spar Island Occurrence	52 A/03
	Thompson Island Deposit	52 A/03
	Thunder Bay Area Occurrences	52 A/15
	Victoria Island Deposit	52 A/03
	Westfield Minerals Ltd.	52 A/03
Beryl	Aldor Exploration & Development	42 L/10
	Eayrs Lake Occurrence	52 A/13
	Linklater Lake Occurrence	52 I/10
	Saga Lake Beryl Deposit	42 L/10
Black sand	Black Bay Peninsula	52 A/09
	Black Sturgeon Lake	52 H/07
	Freeborn Township	52 B/13
	Lake Nipigon	52 H/08
	Leckie Lake	52 H/02
	Peninsula Black Sand	42 D/09
	Pic River/Township	42 D/09
	Steel River Occurrence	42 D/15
	Whitefish Valley	52 A/09
Calcite	Crooks Township	52 A/03
	Edward Island Occurrence	52 A/07
	Fluor Island	52 A/09
	Morehouse Occurrence	52 A/04
	Neepatyre Mine	52 A/06
	Prince Location	52 A/03
	Sibley Township	52 A/07
	South McKellar Island Deposit	52 A/03
	Spar Island Occurrence	52 A/03
	Thompson Island Deposit	52 A/03
	Victoria Island Deposit	52 A/03
	Westfield Minerals Ltd.	52 A/03
Chromite	Cirrus Creek Occurrence	42 D/16
	Fisher Occurrence	42 D/16
	Great Lakes Nickel	52 A/04
Clay	Berin Creek Deposit	42 D/16
	Finmark Clay Occurrence	52 A/12
	Mile 16 Pic River	42 D/16
	Pic River Deposits	42 D/09
	Pine Bay Clay Deposit	52 A/04
	Thunderbrick Ltd.	52 A/06

Diabase	Biloski Brothers	52 A/07
	Caribou Island	52 A/10
	Hymers-Stanley Road Metal Quarry	52 A/05
	Thunder Bay Area Diabase Quarries	52 A/07
Dolomitic marble	Steeprock Lake	52 B/13
Feldspar	Kingfisher Lake	52 A/11
	Spruce River Road White Pegmatite	52 A/07
Flagstone	Rush Bay, Lake of the Woods	52 E/10
	Zebruck Black Flagstone	52 F/13
Fluorite	Killraine Township Fluorite	42 D/14
	Pays Plat Fluorite	42 D/13
	Ross Fluorite Prospect	42 D/13
	Springpole Lake Occurrence	52 N/08
	Yesno Township	42 D/13
Garnet	Swill Lake Occurrence	42 F/04
General	Industrial Minerals in the Manitouwadge Synform	42 F/04
	Obonga Lake Occurrences	52 H/14
	Prairie Lake Carbonatite	42 E/02
	Red Lake Area	52 L/01
Graphite	Jellicoe Area Occurrences	42 L/03
	Little Charon Lake Occurrence	42 E/09
	Taradale Graphite Occurrence	42 F/12
Lime	Nuinsco Resources	42 E/02
Limestone	Oliver Township Limestone	52 A/05
Lithium	Armeno Resources Ltd.	42 E/05
	Aumacho River Mines Ltd.	42 E/05
	Camp Lithium Deposit	42 E/05
	Canadian Radium Corp. Ltd.	42 E/05
	Carrot Lake Lithium Deposit	42 E/05
	Conway Prospect	42 E/05
	Costy Bumbu Occurrence	42 E/05
	Crescent Lake Occurrence	52 I/08
	Dunning Lithium Deposit	42 E/05
	Esker Bay Occurrence	42 E/05
	Foster Lithium Deposit	42 E/05
	Georgia Lake Lithium Deposit	42 E/05
	Georgia Lake Occurrences	42 E/05
	Giles Lithium Deposit	42 E/05
	Jean Lake Lithium Mines Ltd.	42 E/05

Lithium	Koshman Lithium Property	42 E/06
	LFW Lithium Deposit	42 E/05
	Lilypad Lake Pegmatite	52 P/09
	M.N.W. Occurrence	52 H/08
	Nama Creek Mines	52 H/08
	Newkirk Lithium Deposit	42 E/05
	Niemi Lithium Deposit	42 E/05
	O'Sullivan Lake Occurrence	42 L/06
	Ontario Lithium Company Ltd.	42 E/05
	Pluton Uranium Mines Ltd.	42 E/05
	Powerline Lithium Deposit	42 E/05
	Standard Lithium Corp.	42 E/06
	Vegan Lithium Mines Ltd.	42 E/05
Magnesium	Halverson, R.	52 H/02
Marl	Blue Lake Marl Deposit	42 L/03
	Chara Lake Marl Deposit	42 L/06
	Marl in the Beardmore-Geraldton Area	42 E/12
	McIntyre Marl Occurrence	52 A/11
	Red Paint Lake Marl Deposit	42 L/03
	Shillabeer Lake Marl	52 H/02
	Surprise Lake Marl	52 G/11
	Tashota Marl Deposit	42 L/04
	Tri-Ven Minerals Corp.	52 H/02
	Wawong Marl Deposit	42 L/07
Mica	Mica Point, Lake of the Woods	52 E/07
	Dog Lake Occurrences	52 A/12
Nepheline	Nepheline Northshore Occurrences	42 D/15
Niobium	Kentron Lake - Blank Lake Deposit	42 E/01
	Killala Lake Complex	42 E/01
	Nuinsco Resources	42 E/02
Pyrite	Alvey Occurrence	42 D/15
	Foch River Occurrence	42 F/03
	Fort Hope Area Occurrences	42 M/03
	Headway-Coulee Deposit	42 L/03
	Lake Ste. Marie Deposit	42 L/04
	Louis Lake Deposit	42 L/03
	Moshkinabi Deposit	42 F/04
	Oboshkegan Township	42 L/04
	Phelps Dodge Occurrence	42 L/04
Quartz	Hay Lake Quartz Occurrence	52 G/02
Serpentine	Beaver Mine	52 A/12
	Black River Area	42 D/09
	Conmee Township Occurrence	52 A/05
	Mattawin River	52 A/12

Shale	Bish Bay-West Bay Occurrence	52 H/09
	Hoorigan Bay	52 A/07
Slate	Thunder Bay Area Slate Quarries	52 A/10
	Thunder Cape	52 A/07
Soapstone	Adrian Township Occurrence	52 A/05
	Ball Township	52 M/01
	Claxton Township Occurrence	52 E/04
	Coste Island, Lake of the Woods	52 E/07
	Eagle Lake Soapstone Occurrence	52 F/10
	Goodchild Lake Occurrence	42 D/16
	Kakagi Lake Occurrence	52 F/14
	Labyrinth Bay, Lake of the Woods	52 E/10
	Lac des Mille Lake Area	52 B/16
	Leo Lake Soapstone Occurrence	52 G/03
	Line Lake Occurrence	52 F/10
	Little Turtle Lake	52 C/15
	Mile Lake No. 1 and No. 2	52 F/10
	Milk Lake Deposit	52 B/13
	Phillips Township Occurrence	52 E/04
	Pipestone Peninsula, Lake of the Woods	52 E/09
	Preachers Lake	52 C/13
	Puddy Lake Soapstone	52 H/13
	Quest Lake Soapstone	52 G/15
	Rocky Islet Bay	52 C/11
	Ross Island	52 E/04
	Sucan Lake Occurrence	52 F/03
	Trap Lake Occurrence	52 F/10
	Wabigoon Resources	52 F/10
	Witch Bay Deposit, Lake of the Woods	52 E/09
Spectrolite	Bamoos Lake - Lundmark	42 D/16
	Wilkinson Occurrence	42 D/09
Talc	Greenwater Lake Occurrence	52 B/09
	Madsen Mine	52 K/13
	Miner Lake - Fallis Lake Occurrence	52 A/15
	Mussey Lake	42 D/09
	Shebandowan Lake Occurrence	52 B/09
Titanium	Ameranium Mines Ltd.	42 D/16
	Anaconda Company of Canada Ltd.	42 D/16
	Butler Brothers	52 C/10
	Coubran Lake Prospect	42 D/16
	Fryberger Claims	42 D/16
	Seine Bay Titanium Occurrence	52 C/10
	Stratmat Ltd.	42 D/15
	Titan Titanium	52 C/10

Tourmaline	Downer and Clavet Townships	42 F/11
Uranium	Carmette Occurrence	42 D/16
	Herrick Uranium Occurrence	42 C/12
	Punkari, A.	42 C/12
	Pic Bamoos	42 D/09
Vanadium	Foch River Occurrence	42 F/03
Wollastonite	Nuinsco Resources	42 E/02

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CONVERSION FACTORS FOR MEASUREMENTS IN ONTARIO GEOLOGICAL SURVEY PUBLICATIONS

Conversion from SI to Imperial			Conversion from Imperial to SI		
SI Unit	*Multiplied by*	*Gives*	*Imperial Unit*	*Multiplied by*	*Gives*
			LENGTH		
1 mm	0.039 37	inches	1 inch	**25.4**	mm
1 cm	0.393 70	inches	1 inch	**2.54**	cm
1 m	3.280 84	feet	1 foot	**0.304 8**	m
1 m	0.049 709 7	chains	1 chain	20.116 8	m
1 km	0.621 371	miles (statute)	1 mile (statute)	**1.609 344**	km
			AREA		
1 cm@	0.155 0	square inches	1 square inch	**6.451 6**	cm@
1 m@	10.763 9	square feet	1 square foot	**0.092 903 04**	m@
1 km@	0.386 10	square miles	1 square mile	2.589 988	km@
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
			VOLUME		
1 cm#	0.061 02	cubic inches	1 cubic inch	**16.387 064**	cm#
1 m#	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m#
1 m#	1.308 0	cubic yards	1 cubic yard	0.764 555	m#
			CAPACITY		
1 L	1.759 755	pints	1 pint	0.568 261	L
1 L	0.879 877	quarts	1 quart	1.136 522	L
1 L	0.219 969	gallons	1 gallon	**4.546 090**	L
			MASS		
1 g	0.035 273 96	ounces (avdp)	1 ounce (avdp)	28.349 523	g
1 g	0.032 150 75	ounces (troy)	1 ounce (troy)	**31.103 476 8**	g
1 kg	2.204 62	pounds (avdp)	1 pound (avdp)	**0.453 592 37**	kg
1 kg	0.001 102 3	tons (short)	1 ton (short)	**907.184 74**	kg
1 t	1.102 311	tons (short)	1 ton (short)	**0.907 184 74**	t
1 kg	0.000 984 21	tons (long)	1 ton (long)	**1016.046 908 8**	kg
1 t	0.984 206 5	tons (long)	1 ton (long)	**1.016 046 908 8**	t
			CONCENTRATION		
1 g/t	0.029 166 6	ounce (troy)/ ton (short)	1 ounce (troy)/ ton (short)	34.285 714 2	g/t
1 g/t	0.583 333 33	pennyweights/ ton (short)	1 pennyweight/ ton (short)	1.714 285 7	g/t

OTHER USEFUL CONVERSION FACTORS

	Multiplied by	
1 ounce (troy) per ton (short)	20.0	pennyweights per ton (short)
1 pennyweight per ton (short)	0.05	ounces (troy) per ton (short)

Note: Conversion factors which are in bold type are exact. The conversion factors have been taken from or have been derived from factors given in the Metric Practice Guide for the Canadian Mining and Metallurgical Industries, published by the Mining Association of Canada in co-operation with the Coal Association of Canada.

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