



**Ontario Geological Survey
Open File Report 5946**

**New Discovery of
Rare-Element Pegmatite
Mineralization, Separation
Lake Area, Northwestern
Ontario**

1996



ONTARIO GEOLOGICAL SURVEY

Open File Report 5946

New Discovery of Rare-Element Pegmatite Mineralization,
Separation Lake Area, Northwestern Ontario

by

F.W. Breaks and A.G. Tindle

1996

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Breaks, F.W. and Tindle, A.G. 1996. New discovery of rare-element pegmatite mineralization, Separation Lake area, northwestern Ontario; Ontario Geological Survey, Open File Report 5946, 9p.

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ABSTRACT

During the course of follow-up field work by the Ontario Geological Survey in June, 1996, seventeen new occurrences of rare-element pegmatite mineralization were discovered in the Separation Lake area, adjacent to the Separation Rapids pluton. A preliminary description of the pegmatites, based on field observations, is provided in this report. This second zone of rare-element mineralization further enhances the high potential for the Separation Lake area to host large, mineralised pegmatites of the Tanco-type, found in Manitoba.

The seventeen new rare-element mineral occurrences lie within a 0.6 by 1.5 km area. Individual occurrences may contain any or all of: cassiterite, beryl, petalite, wodginite, Fe-columbite, and Mn-tantalite. The largest new discovery is a petalite-rich pegmatite that is up to 80 metres in thickness and possibly up to 450 metres in strike length. This pegmatite also contains local concentrations of oxide minerals. This could be the largest petalite-bearing pegmatite thus far found in Ontario. It is recommended that careful prospecting be undertaken over that part of the Separation Lake metavolcanic belt situated between the English River and Patterson Lake.

INTRODUCTION

In 1993, the Ontario Geological Survey (OGS) initiated a study of rare-element mineralisation in Ontario in order to document and inventory known occurrences. Such documentation and inventory is necessary to ensure that Ontario possesses resources of the space-age elements beryllium, lithium, niobium and tantalum that are contained in these deposits. These exotic metals are used in electronics, steel alloys, computer batteries, drugs, and have many other uses.

In June of 1996, a series of new mineralised rare-element pegmatite occurrences were discovered during the course of conducting field work in the Separation Lake area about 60 km north of Kenora, northwestern Ontario (Figure 1). This new area of rare-element mineralization represents a second area of mineralised pegmatites (Breaks and Tindle 1994, 1996) that occurs adjacent to the Separation Rapids pluton (Figure 2). This pluton is a fertile, peraluminous pegmatitic granite (Blackburn and Young 1994a,b; Breaks and Tindle 1994, 1996). Based on field observations, the pegmatites are zoned with respect to their contained silicate and oxide minerals and define a new pegmatite group. The recent field work in this area adds a further 17 new occurrences to the Separation Lake area rare-element mineral inventory, which stands at a total of 55 known occurrences. The number of pegmatite occurrences and their contained mineralogy is indicative of a strongly-mineralized rare-element pegmatite system.

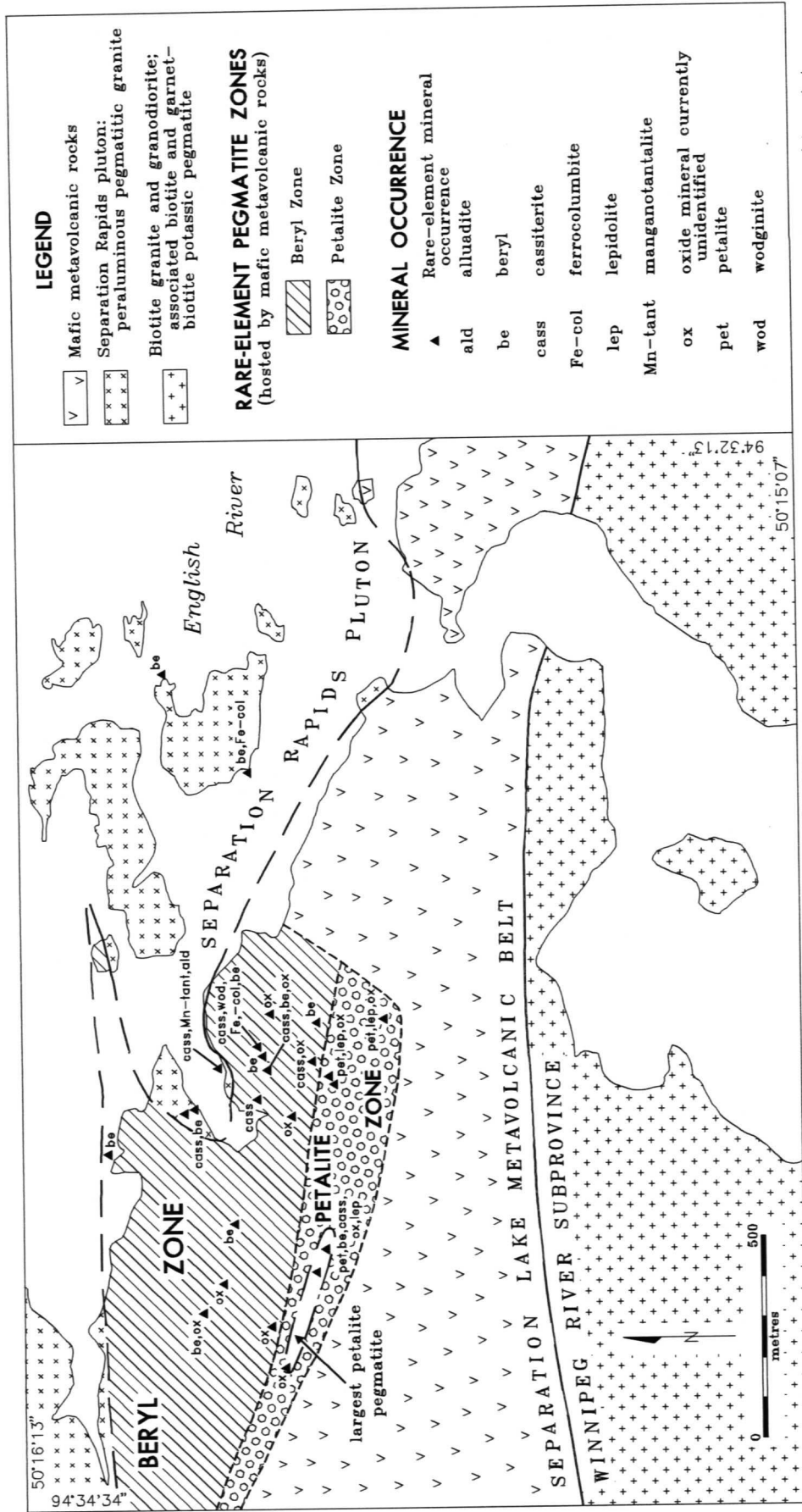


Figure 1: Location of new occurrences of rare-element mineralization adjacent to southwest end of separation rapids pluton.

Location of Separation Rapids Pegmatite Group

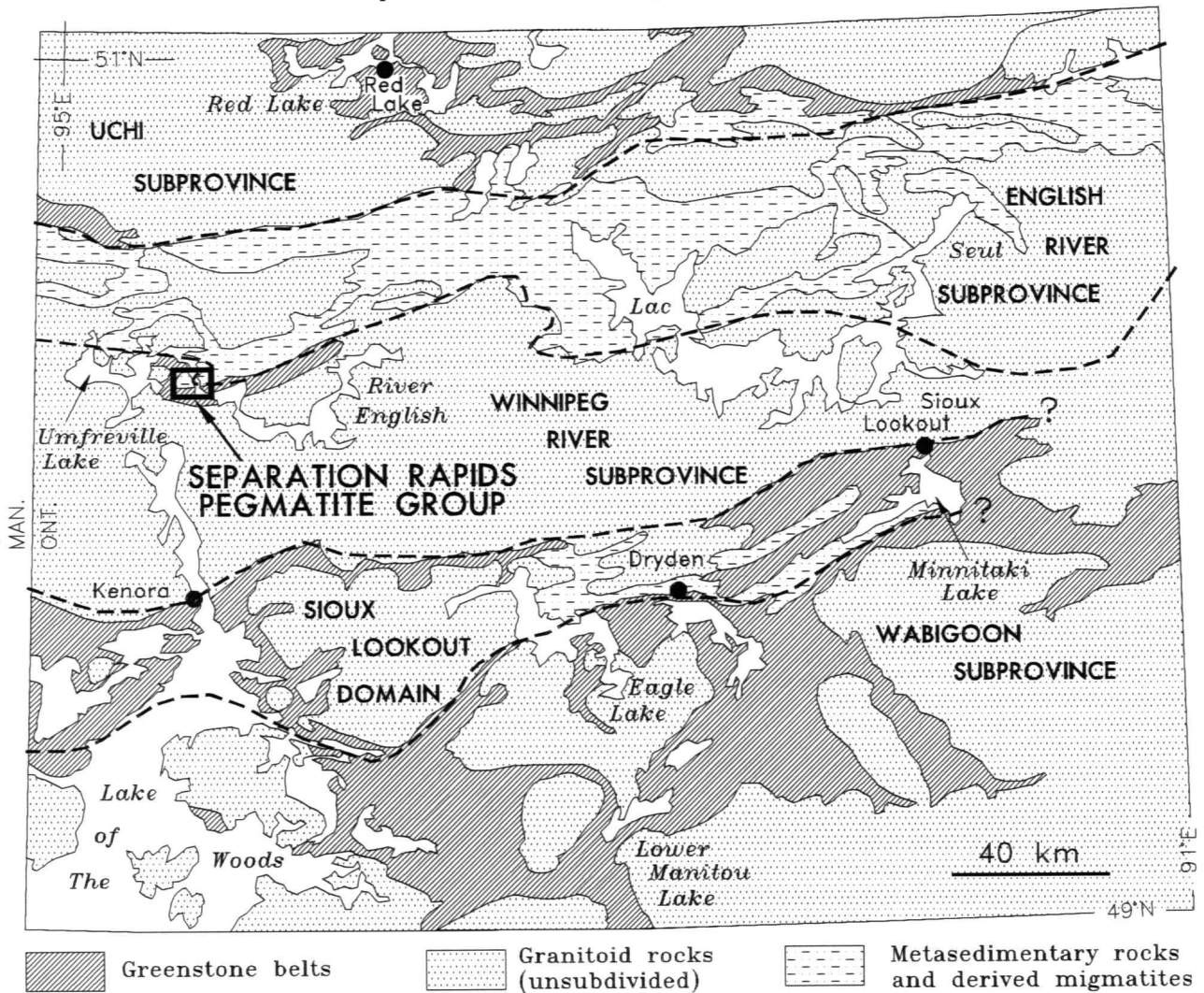


Figure 2: Location of Separation Rapids Pegmatite Group, District of Kenora

This brief report summarises the characteristics of the new rare-element pegmatite occurrences, based only on field observations made in June, 1996. Follow-up laboratory investigations are planned, in collaboration with Dr. Andy Tindle of The Open University in The United Kingdom, to confirm the nature of silicate and oxide mineralogy and to characterise the degree to which the pegmatite formed from highly evolved fluids. Such fluids are known to have formed the mineralised pegmatites of the Tanco pegmatite, which occurs immediately across the Ontario boarder in Manitoba. The Tanco mine in Manitoba produced beryllium, lithium, niobium and tantalum metals over a period of 30 years.

GEOLOGICAL SETTING

The new area of rare-element pegmatite occurrences is at least 0.5 km by 1.5 km. The area is situated near the southwestern end of the Separation Rapids pluton (Figure 2).

This new area does not appear to be connected to the larger area of previously documented mineralization lying to the east-northeast of the parent granite (Breaks and Tindle 1994, 1996).

MINERALIZATION

The area of mineralization discovered in 1996 is devisable into **beryl** and **petalite** zones (Figure 2). The zonation indicates increasing mineralogical evolution from north to south, away from the Separation Rapids pluton. Oxide minerals of potential economic

importance are widespread within both the petalite and the beryl zones and particularly are most abundant in aplite units. Very little definitive electron microprobe work has been yet undertaken on oxide minerals from the new area of mineralization. Work by Dr. Andy Tindle has documented cassiterite, Mn-tantalite, Fe-columbite and Fe-wodginite (55% Ta₂O₅) on two pegmatites in the area sampled in 1994-95. Presence of the highly-evolved oxide minerals wodginite and Mn-tantalite together with petalite indicate a high potential for tantalum. More complete work on the analysis of the oxide minerals will be shortly undertaken by Dr. Tindle. Representative samples of mineralized material from the various pegmatite and aplite units, upon which bulk analyses of Sn, Ta, Nb, Cs, and Rb will be conducted, have been recently submitted to Geoscience Laboratories of the Ontario Geological Survey.

RECOMMENDATIONS

The following exploration recommendations derive from the work done in the Separation Lake area:

- 1. the Separation Rapids pegmatite group represents a previously unrealized, easterly extension of the Cat Lake-Winnipeg River pegmatite field from Manitoba into Ontario** (Breaks et al. 1996) on the basis of a striking similarity in pegmatite mineralogy, geological setting and age of emplacement. This inference greatly enhances the mineral potential for Tanco-style pegmatite mineralization within the essentially

unexplored Ontario portion of this field.

2. **careful examination of all muscovite-rich pegmatites** is strongly warranted in the rest of the Separation Lake metavolcanic belt to the west of the English River as further undiscovered pegmatite groups may be present. The absence of credible parent granite intrusions, similar to the Separation Rapids pluton, in other parts of the Separation Lake metavolcanic belt should not be a criterion for disregarding its rare-element pegmatite potential as such intrusions may lie unexposed beneath an exposed rare-element pegmatite swarm. It should be noted that several pegmatite groups in the Cat Lake - Winnipeg River pegmatite field in Manitoba do not have an exposed parent granite intrusion, the most notable case being the Bernic Lake pegmatite group with its world famous Tanco Pegmatite.

3. **examine all aplite dykes and aplite units within layered pegmatite/aplite dykes**, as aplite is a prime host for fine-grained tin- (Sn), tantalum (Ta), and niobium- (Nb) bearing oxide minerals.

4. **holmquistite, an amphibole with a bluish tint, is a valuable exploration indicator mineral for Li-rich rare-element pegmatite mineralization.** It is generally found in mafic metavolcanic host-rocks within 10 meters of such pegmatites. Two petalite

pegmatites in the new area of pegmatite mineralization were, in fact, discovered using holmquistite as an indicator mineral. Please consult C.E. Blackburn, MNDM Resident Geologist, Kenora, for specimens of representative holmquistite from Separation Lake area.

REFERENCES

- Blackburn, C.E. and Young, J.B. 1994a. Precambrian geology, Separation Lake greenstone belt, west part; Ontario Geological Survey, Open File Map 241.
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**CONVERSION FACTORS FOR MEASUREMENTS IN ONTARIO
GEOLOGICAL SURVEY PUBLICATIONS**

Conversion from SI to Imperial			Conversion from Imperial to SI		
<i>SI Unit</i>	<i>Multiplied by</i>	<i>Gives</i>	<i>Imperial Unit</i>	<i>Multiplied by</i>	<i>Gives</i>
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 ²	0.155 0	square inches	1 square inch	6.451 6	cm ²
1 m ²	10.763 9	square feet	1 square foot	0.092 903 04	m ²
1 km ²	0.386 10	square miles	1 square mile	2.589 988	km ²
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
VOLUME					
1 cm ³	0.061 02	cubic inches	1 cubic inch	16.387 064	cm ³
1 m ³	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m ³
1 m ³	1.308 0	cubic yards	1 cubic yard	0.764 555	m ³
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

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.

ISSN 0826-9580
ISBN 0-7778-5453-8