# GEOLOGY AND SUMMARY REPORT OF THE LITTLE NAHANNI PEGMATITE PROSPECT

Map sheet 105I-2, Northwest Territory

62° 10'N, 128° 53'W

Equitorial Exploration Corp. 1400-1111 West Georgia Street,

Vancouver, B.C., V6E 4M3.

By:

T. Liverton PhD, C.Geol, FGS

Technical Report titled:

"Geology and Summary Report of the Little Nahanni Pegmatite prospect"

Signed this 20th day of March 2017.

Timothy Liverton

Timothy Liverton PhD, C.Geol., FGS

T. Liverton, Ph.D., C.Geol., F.G.S.

P.O. Box 393, Watson Lake, Yukon, Y0A 1C0

### **CONSENT OF QUALIFIED PERSON**

I, Timothy Liverton, consent to the public filing of the technical report titled "Geology and Summary Report of the Little Nahanni Pegmatite prospect" and dated 20<sup>th</sup>. March 2017 (the "Summary report") by Equitorial Exploration Corp.

I also consent to any extracts from or a summary of the Technical Report to be used in any news release or prospectus issued by Equitorial Exploration Corp.

Dated this 20<sup>th</sup>. March 2017

Timothy Liverton

Timothy Liverton

# CONTENTS

1.	SUMMARY	1
2.	INTRODUCTION	2
3.	RELIANCE ON OTHER EXPERTS	2
4.	PROPERTY DESCRIPTION AND LOCATION	3
5. PH	ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND YSIOGRAPHY	4
6.	HISTORY	5
7.	GEOLOGICAL SETTING AND MINERALIZATION	6
8.	DEPOSIT TYPES	9
9.	EXPLORATION	19
10.	DRILLING	25
11.	SAMPLE PREPARATION, ANALYSES AND SECURITY	26
12.	DATA VERIFICATION	26
13.	MINERAL PROCESSING AND METALLURGICAL TESTING	27
14.	MINERAL RESOURCE ESTIMATES	27
15.	MINERAL RESERVE ESTIMATES	27
16.	MINING METHODS	27
17.	RECOVERY METHODS	27
18.	PROJECT INFRASTRUCTURE	27
19.	MARKET STUDIES AND CONTRACTS	27
20.	ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT	Г28
21.	CAPITAL AND OPERATING COSTS	28
22.	ECONOMIC ANALYSIS	28
23.	ADJACENT PROPERTIES	28
24.	OTHER RELEVANT DATA	28
25.	INTERPRETATION AND CONCLUSIONS	29
26.	RECOMMENDATIONS	30
27.	REFERENCES	32

# **ILLUSTRATIONS**

Figure 1.	Property Location – LNPG Property	p.	3
Figure 2.	Mineral Tenure Map - NWT claim map 105I-2	p.	3
Figure 3.	Historical MAC claims and present Li claims	p.	5
Figure 4.	Regional geology	p.	6
Figure 5.	Pegmatites (from London, 2008)	p.	14
Figure 6.	Cominco 1979 Stream & Soil Sampling	p.	21
Figure 7.	Soil Geochemistry of Selected Elements – Mac Property – 2006 Field Program	p.	22
Figure 8.	Silt Geochemistry of Selected Elements – Mac Property – 2006 Field Program	p.	22
Figure 9.	Channel Sample Locations	p.	22
Figure 10.	2007 Drill Hole Locations & Soil Grid Sampling	p.	25
Figure 11.	MAC001 Drill Hole Location and Cross Section	p.	25
Figure 12.	MAC003 and MAC004 Drill Hole Locations and Cross Section	p.	25
Figure 13.	MAC005 Drill Hole Location and Cross Section	p.	25
Figure 14.	MAC006 and MAC007 Drill Hole Locations and Cross Section	p.	25
Figure 15.	MAC008 Drill Hole Location and Cross Section	p.	25
Figure 16.	Graphical Logs of Pegmatite Intersections in Drill Holes	p.	25

#### 1. SUMMARY

The Little Nahanni Pegmatite property is in the NWT, adjacent to the Yukon border and some 39km WNW of the Canada Tungsten mine. The prospect consists of a system of branching swarms of dykes that extend over 13km exposed strike length and up to 500m width. Individual dykes within these `swarms`are mostly 1-10m thickness. Natural exposure and drilling has demonstrated a vertical extent of 300m. Minerals of interest are spodumene, lithium micas, tantalite-columbite and cassiterite. Grades of up to 2% Li<sub>2</sub>O and 500g/t Ta<sub>2</sub>O<sub>5</sub> are reported for individual dykes. The property has been explored sporadically since 1979. This work included soil and stream sediment geochemistry, chip and channel sampling of cliff faces and 1798m of diamond drilling. With the current increase in the demand of Li and Ta the property has become a significant prospect. Equitorial Exploration Corp. optioned the claims in 2016 and commenced exploration with a carefully executed channel sampling programme that was performed by Archer Cathro and Associates (1981) Limited (Archer Cathro).

To date no estimate of reserves that would be NI 43-101 compliant has been made. Future work would be best aimed at developing adequate grade data. The 2016 channel sampling is adequate for inclusion in a database of dimensions and grade. Further sampling using accurate surveying and documentation is needed. The property is large enough that many diamond or percussion drill holes will be required to build up a compliant resource. These may best be sited according to results of surface channel sampling. Testing of the mineralization at depth is also an obvious target.

#### 2. INTRODUCTION

This report has been prepared at the behest of Archer Cathro and Associates (1981) Limited for Equitorial Exploration Corp. of 1400-1111 West Georgia Street, Vancouver, B.C., V6E 4M3. The purpose of this report is to summarize exploration work performed on the property to date.

The current claim block was staked in two phases in March and July 2016 by Strategic Metals Ltd. An agreement to purchase 100% ownership of the claims was made on the 25<sup>th</sup>. July 2016 by Equitorial Exploration Corp. (Equitorial). Under the terms of the agreement, Strategic Metals Ltd. retains a 2% Net Smelter Return. Equitorial has the right to buy down half of the NSR in consideration for a payment of \$2,000,000. Details of the terms of agreement can be found in the Company's news release dated July 27, 2016, which is available on SEDAR.

An inspection of the property was made by the author and an assistant on November 15th. 2016 by means of helicopter. Being well and truly winter, the property was covered with snow but some of the high ridges had some of that cover blown clear. The spur chosen for inspection showed some bare rock and there snow depth was less than 60cm over the remainder. Exposure of pegmatite was examined and sampled. The northern cliff face of the spur to the south (above historical drill hole 6 and 7) was largely clear of snow and the pegmatite swarm was quite visible. Elsewhere snow depth precluded any useful work, especially in the cirques.

#### **3. RELIANCE ON OTHER EXPERTS**

The data used to compile this report is derived from assessment, company and NI-43-101 reports as listed in the bibliography. Technical data has been obtained from files held by Archer Cathro, published scientific papers, plus MSc and PhD theses as listed. The standard of fieldwork and reporting of this historical data is considered by the present author to be adequate for a geological report.

# 4. PROPERTY DESCRIPTION AND LOCATION

The Little Nahanni Pegmatite prospect consists of a block of nine claims located in the Northwest Territory, on map sheet 105I-2, as follows:

LI 1	K05626	expiry date	13/3/2018
LI 2	K05627	expiry date	13/3/2018
LI 3	K05628	expiry date	13/3/2018
LI 4	K07691	expiry date	21/7/2018
LI 5	K07692	expiry date	21/7/2018
LI 6	K07693	expiry date	21/7/2018
LI 7	K07694	expiry date	21/7/2018
LI 8	K07695	expiry date	21/7/2018
LI 9	K07696	expiry date	21/7/2018

The legal owner of the claims is Archer Cathro and Associates (1981) Limited. The property covers a large northwest trending ridge in the Logan Mountains between approximately 62° 14'N, 128° 56'W and 62° 06'N, 128° 51'W. This present claim block supercedes the MAC 1-10 claims that were in existance during the 2007 drilling programme. The property covers an area of approximately 5393 ha (53.93 km2).

A location map is shown as Figure 1 and the relevant NWT claim sheet as Figure 2.





# 5. ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

Much of the property is on a ridge system above tree line, which is at around 1500m elevation. On the east side of the range circues are deeply eroded, rising sharply from 1600m to the crest of the range at 1900-2000m. This topographic relief provides excellent exposure of the pegmatite dykes, which strike parallel to the main range. Somewhat gentler gradients are found in the creeks on the SW side of the range, falling to 1200m along Mac Creek. The lower valleys are quite heavily timbered. The property is between two roads. The original winter ('cat') trail to the Howard's Pass deposit follows Mac Creek and the Little Hyland River, joining the Nahanni Range road south of the pass at the NWT border. The SW tip of the claim block reaches this trail. The presently used summer road to Howard's Pass follows the valley of the Little Nahanni River and passes 5-6km NE of the pegmatites. The Howard's Pass road joins the all-season Nahanni Range gravel road to the Canada Tungsten mine just above Flat Lake, some 32km SE of the centre of the property. The Nahanni Range road joins the Campbell Highway then the Alaska Highway at Watson Lake, Yukon, some 310km from Flat Lake. No services are found on this highway. Watson Lake provides services such as hotels, food stores, fuel supply, engineering supplies, an expediting service and a welding/machine shop. The airport is capable of handling Boeing 737 aircraft. Float plane charter is also available and two helicopter charter companies have bases in Watson Lake. The gravel airstrip at the Cantung mine handles large turboprop aircraft. Currently the most convenient method of transport to the Little Nahanni property is by helicopter.

Climate is sub-arctic with relatively low precipitation. Winter can see temperatures falling to -45°C for up to six weeks, but this has not been encountered for the last 15 years. A couple of weeks cold in January is now normal. During winter snow remains as unconsolidated fine powder which may be 1.5m deep. Summers are cool in the mountains and brief snow fall may be encountered at high elevation during any month. Most summers result in the snow pack melting completely by the end of July, save for very sheltered gullies. June through the first week of September is the normal field season.

#### 6. HISTORY

The existence of Li-bearing pegmatites was first reported following prospecting and some grab sampling by Rotherham in 1962 for the Canada tungsten Mining Corporation Ltd. Re-interest in the property occurred during 1977 to 1980. Canadian Superior Exploration Limited and Cominco Limited staked the Cali and Lica claim blocks. Sampling and geochemical surveys were peformed to test Li potential of the property.

Between 1992 and 1996 a collaborative project beween the University of British Columbia (Professor Lee Groat) and the Canadian Museum of Nature investigated the mineralogy of the pegmatites and gave an indication of their extent. This work defined zonation and indicated that significant potential for tantalum and tin existed. A Masters thesis by Mauthner (1996) resulted. Canamera Geological Limited then conducted work on the Tun claims.

In 2000 Nordac Resources Limited carried out a limited prospecting and sampling programme over a 2 x2 km area in the central portion of the pegmatite swarm. Further sampling continued in 2001 and 2002. Strategic Metals Ltd. held the MAC claims and optioned the property to War Eagle Mining Company Inc. in February 2005. In 2005 War Eagle Mining continued mapping and sampling. Silt and soil sampling over a larger area and on strike to the south was done in 2006. A programme of surveying of the exposed dykes and diamond drilling was performed during the 2007 season. Eight drill holes from six sites were achieved, for a total of 1798 metres. A geological estimate of the tonnage of the dykes was made (Young, 2011), but this was far from being 43-101 compliant. The drilling confirmed that the outcropping dyke systems persisted at depth with grades of Li and Ta at least comparable to those found in surface sampling. The property then languished until 2016, when the present Li claim block was staked by Strategic Metals Ltd.. A short field programme collected some 81 further rock samples for analysis. The current operation is by Equitorial Exploration Corp. The relationship between the original MAC claim group and the present Li claims is shown in Figure 3 (together with the region visited during the November property visit).



#### 7. GEOLOGICAL SETTING AND MINERALIZATION

#### Host Rocks

The country rocks to the pegmatites are the Hyland Group of Precambrian to Lower Cambrian age: the Yusezyu and Narchilla Formations. These units represent a deepwater basin formed by rifting of the Rodinia supercontinent (Precambrian to M. Devonian). Eastward migration of the basin resulted in onlap of deep water strata over shallow shelf sediments. The Yusezyu Fm. consists of kilometres of shallow water submarine fan deposits. The Narchilla Fm. is deep-water carbonate-rich shales. The eastern margin of the property is bounded by the March fault – a long-lived structure separating the Narchilla Fm. and Lower Cambrian Gull Fm. (slates and siltstones) from the Lower Cambrian Vampire Fm. During Late Permian to Triassic orogeny with accretion of the Yukon Tanana terrane from the west the compression formed the Fork anticlinorium. Major fold structures are of the first (D<sub>1</sub>) generation which produced a strong axial-planar cleavage. Second generation folding (D<sub>2</sub>) formed a crenulation cleavage. At approximately 100 Ma the March fault was reactivated in an extensional/transcurrent sense.

The nearest Cretaceous granitic plutons are the Lened, Cac and Rudy intrusions (Map sheet 1-1992, Gordey and Anderson (1993). Figure 4 shows regional geology.

#### Little Nahanni Pegmatites

Groat et al., (1995, 2003) describe the geology of the immediate vicinity of the dyke swarms. Country rocks are at subgreenschist facies. Andalusite, biotite, chloritoid, and staurolite porphyroblasts are developed near to the pegmatites, defining a contact metamorphic aureole that has presumably been developed by a buried granitic pluton beneath the pegmatite swarm. Exocontact zones contain biotite, tourmaline, muscovite and quartz. Rarer allanite and monazite minerals, zircon and titanite are present.

Individual dykes are up to 10m wide and may be in swarms of up to 25 individuals. Attitudes vary from concordant to country rock following folding to subvertical and crosscutting. Interpretation is that emplacement was either during or post-last deformation. Both spodumene-bearing and spodumene-free types are found. General mineralogy is [K-feldspar,



Scale, km

Rabbitkettle Fm.

Narchilla Fm.

Cambrian - Ordovician	$\mathrm{CO}_{\mathrm{R1}}$
Proterozoic & Cambrian	$P \cdot C_N$
Proterozoic & Cambrian	P€∨

U. Proterozoic

Рv

Vampire Fm. Yusezyu Fm.

REGIONAL GEOLOGY From G.S.C. Memoir 428 Map 1762A

Figure 4.

plagioclase, quartz, muscovite to lepidolite, columbite-group, cassiterite, tourmaline, beryl, lithiophilite, garnet]. Spodumene-free types have more lepidolite. Spodumene-bearing dykes may be homogeneous or banded. Where zoning is distinct it follows the following mineralogy:

Border zone:	1-5-2.5cm of v. fine-grained albite-quartz-mica, shows some
	tourmaline/columbite-tantalite.
Wall zone:	medium to coarse-grained plagioclase and quartz. Locally K-feldspar is predominant.
Intermediate zone:	minerals are coarser (to 70cm). Spodumene indicates the start of this zone. K-feldspar, plagioclase, quartz and spodumene.
Core zone:	A distinct zone is rarely developed. 2-20cm of discontinuous quartz or quartz-albite in lepidolite pegmatite; in the spodumene pegmatite it shows spodumene-quartz-albite.

Wengzynowski (2002) describes the dyke swarms as being from 40-500 m wide and traceable for up to 5 km strike length, with individuals bifurcating or merging along strike. The topographic relief of up to 300 m allows observation of some dykes for this vertical extent. A thickening of 600% over 100 metres vertical is noted by him.

#### Dyke emplacement

The pre-existing deformation of the host rocks produced a strong axial-planar cleavage. This cleavage, together with the steeply-dipping bedding of the east limb of the asymmetric anticlinorium controlled emplacement of the pegmatite dykes in a brittle regime i.e., at <10 km depth. Timing of pegmatite intrusion is at late- to post-D<sub>2</sub> folding given as 81.6 Ma by U-Pb dating on columbite (Groat et al., 1995). K-Ar ages on micas are much younger: 65.4 - 65.8Ma. These are interpreted as cooling ages when the rock passed below 350°C. An unexposed intrusion at depth beneath the pegmatites is postulated to have been the magma source of these dikes, as well as being the cause of the contact metamorphism and elevation of the overall geothermal gradient in the immediate area. Contact metamorphism occurred late to post D<sub>2</sub>, as

indicated by S<sub>2</sub> fabrics incorporated in porphyroblasts of staurolite and cordierite. No other intrusion of the  $\approx$ 85Ma age occurs nearby, so the significance of this magmatic event is enigmatic.

Barnes, (2010) concludes: "The LNPG dikes originate from a single magmatic source with each dike essentially behaving as a closed system during propagation of the magma through to its eventual consolidation. The dikes show a wide range of magmatic fractionation up to levels comparable with highly evolved and mineralised granites and pegmatites from the Variscan orogeny in France and Germany (e.g., Raimbault et al. 1995 and Webster et al. 1997) the Khangilay Li-F granites of Transbaikalia, Russia and the Tin Mountain pegmatite in South Dakota (Walker et al. 1986)."

"An upper level progenitor magma chamber for the dikes is, so far undetected in the area, but was probably the heat source responsible for the zone of contact metamorphism. The chamber is expected to be located within the core of the Fork anticlinorium --- such structures are typical traps for the 'fertile' granite magma associated with rare element pegmatites. An elevated geothermal gradient (~60 °C/km), interpreted to have been caused by the emplacement of the magma chamber, is implied from the variation in 40Ar/39Ar cooling dates from different minerals, and this regional increase in temperature will have assisted propagation of the magma into the country rock."

"Dike propagation was driven by buoyancy, derived from the high volatile content of the melt, to a depth of ~7-8 km depth (determined by fluid inclusion microthermometry). The passage of the magma was focused by pre-existing planar, subvertical strength anisotropies in the deformed host rock (bedding planes and axial planar foliations). In the absence of steeply dipping foliations the upward force of the magma was sufficient to cut across planes. Dike emplacement is not expected to have strongly influenced the regional geothermal gradient due to their relatively low temperature (~400-500 °C) and rapid rate of cooling; their consolidation was probably complete within days to weeks (suggested by cooling model calculations of similar dikes by Webber et al. 1999 and London 2008)."

## 8. DEPOSIT TYPES

#### A. CLASSIFICATION

Pegmatites are found within a wide range of metamorphic grade host rocks from deepcrustal anatectic settings to near surface environments.

Recent classification has been arranged according to relative level of emplacement and mineralogy. Černý and Ercit (2005) have considered both these parameters as follows:

Pegmatites have been classified according to five classes:

CLASS	MINOR	METAMORPHIC	GRANITES
	ELEMENTS	ENVIRONMENT	
<u>Abyssal (AB)</u>			
AB-HREE	HREE, Y, Nb	U. amphibolite to	none
	Zr, U, Ti	L or H-P granulite	anatectic leucosome?
		4-9 kbar, 700-800°C	
<u>Muscovite (MS)</u>			
	No REE minerals	high-P Barrovian	none
	Micas & ceramic	amphibolite facies	anatectic bodies to
	minerals	kyanite-sillimanite	marginal & exterior
		5-8 kbar, ≈650-580°C	
Muscovite-Rare-e	lement (MSREL)		
MSREL-REE	Be, Y, REE, Ti	Moderate to high P, (T)	interior to exterior
	U, Th, Nb-Ta	amphibolite facies	locally poorly defined
		3-7 kbar, ≈650-520°C	
MSREL-Li	Li, Rb, Nb		
Rare element (RE	<u>L)</u>		
REL-REE	Be, Y, REE, U	variable, largely shallow	interior to marginal
	Th, Nb>Ta, F	& postdating regional events	(rarely exterior)
		affecting host rocks	

REL-Li	Li, Rb, Cs, Be,	low- P	(interior to marginal
	Ga, Sn, Hf,	amphibolite	to) exterior
	Nb-Ta, B, P, F	(andalusite-sillimanite)	
		To U. greenschist facies	
		≈2-4 kbar, ≈650-450°C	
<u>Miarolitic (MI)</u>			
MI-REE	Y, REE, Ti,	very low P, postdating	interior to marginal
	U, Th, Zr	regional events that	
	Nb, F	affect host rocks	
MI-Li	Li, Be, B,	low-P amphibolite	
	F, Ta>Nb	to greenschist facies	(interior to) marginal
		3-1.5 kbar	to exterior
		500-400°C	

REL-Li types are also subdivided into subtypes beryl-columbite / beryl-columbite-phosphate / spodumene / petalite / lepidolite.

The large Tanco (Manitoba) and Londonderry (WA) pegmatites are classified as REL-Li petalite subtype. Petalite is not reported from the Little Nahanni.

#### B. DERIVATION OF PEGMATITES

A discussion of current ideas concerning pegmatite derivation follows for those interested in geochemistry (sections B and C):

Pegmatites are envisaged as being derived by extreme fractionation of granitic magma producing relatively low volumes of melt and and associated aqueous fluid that are enriched in 'incompatible' elements (notably alkalies, halogens, and the 'high field strength' elements e.g., Nb, Ta, Sn, U, Zr. The chemistry of pegmatites may be used to deduce possible source rocks for their parental magmas. Granites have been recognized as being derived from three ideal sources, hence S, I and A types (e.g., Chappell and White, 1992). (S refers to a meta-sedimentary source rock, I, igneous source and A-type as being derived in a setting other than orogenesis (mountain-building) i.e., anorogenic or extensional tectonics). Certain chemical characteristics of these different melting environments should be distinctive. London (2008) has given a clear discussion of the types of granitic magma as a source of pegmatite based on both field study and experimental petrology. A summary is as follows:

#### S-type magmas vs. I-type: chemistry

If marine black shales (metamorphosed to muscovite- and biotite schists) are a source for S-type granite magmas then any organic carbon content would persist as graphite into granulite facies metamorphism, leading to a tendency for magmas generated to be reduced compared to I-type granite magmas. Rare metals and fluxing elements (B and F, in micas) for pegmatite generation would be available from this source. Marine shales are enriched in P, so this component for pegmatite is also available from S-type magma.

Granitic melts formed after water-saturated breakdown of muscovite will be enriched in Li and Cs and to a lesser extent in Rb, this latter alkali being also compatible in restitic orthoclase (i.e., restite being the unmelted remainder after magma generation) – such being associated with the LCT pegmatites. Ta and Nb are compatible in ilmenite (FeO. TiO<sub>2</sub>), which is the oxide phase in reduced granites. Low temperature melts are poor in Fe and Ti, hence mechanisms that release Ta to melts are not obvious. Whether Be is enriched or depleted in granitic melt would depend on whether the source region has cordierite  $\pm$  andalusite or garnet-sillimanite or kyanite mineralogies. Be is highly compatible in cordierite, so that element would remain in restite in a lower-pressure regime (source region for the magma). The higher pressure assemblage containing garnet and sillimanite would release Be to the partial melt. B occurs in marine shales and is held in authigenic tourmaline. That mineral will melt incongruently to a melt containing the B with Fe-Mg-Al being in restitic spinel and corundum. B content, however, may not be obvious in an accessory mineral phase in exposed granites as it is likely to be released into the aureole of the granitic intrusion. (Note: boron content in the Tombstone suite

granites is seen as the mineral axinite wherever calcareous rocks are present in the aureole (T.L., unpublished mapping during the 1970s).

I-type magmas are also capable of producing pegmatites. B is found in serpentinite of accretionary prisms, so those pegmatites derived from I-type magmas are able to contain concentrations of that element. Highly fractionated I-type magmas may become peraluminous and enriched in Li, Rb, Be and Ta, but will not show the P contents of 'LCT' pegmatite. The contrasting higher Cs and P contents of S-type magmas are reflected in the mineralogy of the LCT pegmatites.

	GRANITE TYPE							
ELEMENT	S	Ι	Α					
K*	0.53	0.47	0.46					
ASI	1.15	1.03	1.02					
Rb	221	219	188					
		212	242					
		160	167					
	277	194	169					
		219	197					
Average	249	201	193					
1σ	40	25	30					
Cs			9					
			6					
			8					
Average			8					
1σ			2					
Sr	114	147	96					
		67	43					
		165	148					
	81	143	48					
		147	90					
Average	98	134	85					
1σ	23	38	43					
Ba	512	488	547					
		331	575					
		577	767					
	388	510	352					
		488	480					
Average	450	479	544					
1σ	88	90	151					

Source: a= Chappell & White (1992), b= Collins et al. (1982),

c= Whalen et al. (1987), d= King et al. (1997) K\* = mol K / (K+Na), ASI (Aluminium Saturation Index) = mol Al<sub>2</sub>O<sub>3</sub> / (Na<sub>2</sub>O + K<sub>2</sub>O + CaO)

#### TABLE OF REPRESENTATIVE AVERAGE ABUNDANCES OF ALKALIS AND ALKALINE

EARTHS (ppm) FOR VARIOUS GRANITE TYPES. (From London, 2008)

A-type magmas will have chemistry similar to that of I-types, will be very low in P and may be high in F. Those magmas that have evolved to quartz-rich compositions will give rise to the 'NYF' pegmatites.



Model melting relations on the liquidus of the system Fo (Mg<sub>2</sub>SiO<sub>4</sub>) - Qtz (SiO<sub>2</sub>) - Ca-Tschermak component (CaAl<sub>2</sub>SiO<sub>6</sub>) with excess diopside, Di (CaMgSi<sub>2</sub>O<sub>6</sub>) at 3GPa pressure. Liquidus fields shown are olivine (Ol), orthopyroxene (Opx), quartz and garnet (Grt). The garnet - enstatite, En, (MgSiO<sub>3</sub>) join is a thermal ridge that divides the system. One minimum of silicic composition (G) is a suitable source for an A-type granite, the other is suitable for ultrabasic alkaline melts. (after London, 2008).

Figure 5.

The recognition of these two broad 'families' of pegmatite: LCT and NYF (LCT = 'Lithium-Caesium-Tantalum'; NYF = 'Niobium-Yttrium-Fluorine') is based on the following:

<u>LCT 'family'</u>: these are enriched in Be, B, F, P, Mn, Ga, Rb, Nb, Sn and Hf. Peraluminous nature is shown by muscovite-tourmaline-spessartine and rarely gahnite, topaz or andalusite. Highly evolved I-type granite *can* produce these enrichments, but those lack Cs. Li enrichment appears as spodumene or petalite and less commonly lepidolite, amblygonite-montebrasite, or elbaite. Cs is the most incompatible element, derived from melting of muscovite and biotite. It is incorporated in beryl and micas, eventually forming pollucite with extreme fractonation. P abundance indicates derivation by melting of marine black shales, hence derivation from S-type magma.

<u>NYF 'family'</u>: In addition to the Nb, Y, and F enrichment, these pegmatites are also enriched in heavy rare-earths (HREE), Be, Ti, Sc, and Zr. Amazonite feldspar is a common occurrence. NYF pegmatites are associated with rift-related plutonism and are very low in P. Nb predominates over Ta. A-type or highly fractionated I-type magmas are considered the source for these.

#### TO SUMMARIZE:

The <u>L</u>ithium-<u>C</u>aesium-<u>T</u>antalum group of pegmatites are derived from magma fractionated from a granitic batholith derived by melting a largely sedimentary source containing metamorphosed marine shales. These are expected to have tantalum contents greater than niobium (these being the metals contained in the columbite-tantalite group of minerals).

#### C. PEGMATITE FORMATION FROM GRANITIC MAGMA

A summary of fairly recent published data on mechanisms of pegmatite formation follows:

One of the problems of considering pegmatite formation is that of the coarse grain size of many crystals. Thomas et al., (2006) present experimental data that indicate for the system Quartz-Albite-Orthoclase-H<sub>2</sub>O at 2 kbar ( $\equiv 200$  MPa) and 680°C the water content at the eutectic point is 6.4 wt % H<sub>2</sub>O and viscosity is 10<sup>5.5</sup> Pa.s. This is far too viscous (somewhat more than bitumen at room temperature) for coarse-grained crystals to form. However, peralkaline melts may dissolve much higher amounts of water and the presence of CO<sub>2</sub>, F, Cl, B<sub>2</sub>O<sub>3</sub>, P<sub>2</sub>O<sub>5</sub> and alkalies Li, Rb and Cs will allow the water content to be above 20%. Volatile-rich melt inclusions in pegmatites may have >40 wt% H<sub>2</sub>O. Fluid inclusions also contain Na, K, Mg and Ca chlorides.

Processes important in pegmatite formation from granitic magmas are:

- 1. formation of extremely volatile-rich aluminosilicate melts
- 2. multi-stage, melt-melt immiscibility
- 3. generation of peralkaline, residual melt fractions
- 4. the transition from melt-dominated to fluid-dominated systems and subsequent metasomatic recrystallisation.

Melt-dominated conditions start at about 700°C.

Thomas et al., (1988) present fluid inclusion data for Tanco, giving the range of temperatures during formation of that pegmatite. An intrusion temperature of 720°C is indicated. Initial fluid phase composition was  $\approx$ 98 mol% H<sub>2</sub>O with 2 mol% NaCl equivalent and  $\leq$ 2 mol% CO<sub>2</sub>. This fluid phase remained at this composition to  $\approx$ 450°C. The upper intermediate zone

crystallized at  $\approx$ 475°C. Final crystallization of the quartz zone was at  $\approx$ 262°C. [A comparable range of temperatures may be envisaged for the Nahanni pegmatites.]

Rickers et al., (2006) have investigated melt and aqueous fluid compositions formed during pegmatite formation at Ehrenfriedersdorf, Germany, through micro-analysis of inclusions representing a temperature range of from 720 °C to 380 °C. They conclude that two melts coexisted: a peraluminous one and a peralkaline melt that separated at the upper temperature. During the pegmatite stage high-salinity brines were exsolved. Using Sn as the example, they found that it is preferentially fractionated into the peralkaline melt at the upper temperatures. Brines at 500 °C were low in Sn (64ppm), but this metal was enriched during a boiling stage, producing precipitation at 400 – 370 °C. Ta contents of 1033 ppm for hydrous melt inclusions at 650 °C and 1559 ppm for water-poor melt inclusions at 600 °C are reported, which decrease below 600 °C.

London (1990) makes these comments:

'Two important aspects of this model are that early monomineralic quartz or quartz-lithium aluminosilicate pegmatite "cores" can now be explained as part of the igneous differentiation process in essentially closed systems and that late-stage, rare-element-rich bodies of albite-mica  $\pm$  quartz can be shown to evolve from melt by fractional crystallization.'

'--- vapor-undersaturated crystallization yields results that more closely resemble natural pegmatites than do initially vapor-saturated experiments. Whether vapor saturated or not, the role of an aqueous fluid phase appears to be of secondary importance in the genesis of these pegmatites.'

'In total, the characteristics of rare-element pegmatite fields suggest a single pulse of magma injection from near the cupolas of parental granites, followed by sporadic closure of dike conduits and subsequent internal (quasi-closed system) differentiation of restricted pegmatite bodies.'

London (1996):

The London model for pegmatite crystallisation is that 'mineral zoning patterns, sharp changes in grain size, a multitude of mineral textures and oriented fabrics that typify pegmatites all resulted from the slow crystallisation response of volatile-bearing granitic melts to cooling. The further the melt was cooled below its equilibrium liquidus before crystallisation commenced, the greater was the tendency to form pegmatite as opposed to granitic fabrics.'

Tourmaline is present in the wall zones of many pegmatites. A concentration of >2% B<sub>2</sub>O<sub>3</sub> in melt is required to stabilise tourmaline at 750°C and 200 MPa pressure. Tourmaline may form by the B being supplied by the pegmatite with wallrocks being the source of Mg and Fe. [This would be a 'bimetasomatic' process, not unlike that found in contact metasomatism].

#### TO SUMMARIZE:

Large pegmatite formation requires the separation of very 'specialized' granitic magma from a batholith-sized granitic intrusion that has undergone extensive fractionation through crystallization and separation of aqueous phases. Further fractionation upon emplacement of the pegmatite melt is expected through separation of various silicate melt and hydrous fluid phases. Concentration of alkalies (including notably Li, Rb and Cs), and 'fluxing' elements P, B, and F ensures that pegmatite magma will remain as a melt at temperatures of 700 °C and lower. A complex process of silicate melt unmixing and fluid phase evolution is required to concentrate metal to economic levels. The fractionation of those elements incompatible in crystallizing rock-forming minerals into hydrous phases will allow the rare element metals (Ta, Nb, Sn) to be concentrated to potentially economic levels.

#### D. LITTLE NAHANNI

The mineralogy of the Little Nahanni pegmatites is clearly of the LCT type and REL-Li class. Since a very large volume of granitic magma is required to produce the extremely fractionated late-stage magma for these pegmatites, an unexposed S-type batholith is expected. As an example of scale, in the study of the Tanco pegmatite London (2008) comments that a volume of 18,000 km<sup>3</sup> of rock is estimated to be involved in the melting event. "*It is easier to squeeze blood out of a rock than to squeeze a Tanco pegmatite out of the earth's crust.*" The

Little Nahanni pegmatites (at perhaps  $\leq 1$ km<sup>3</sup>) are not quite on the same scale as Tanco, but they still required fractionation of a specialized melt/hydrothermal fluid from a very large volume of granitic magma. Other pegmatites are known from the Nahanni region (eg., those associated with the large O'Grady batholith), but the Little Nahanni system is the one group of obvious extent, quite possibly due to its source granite being still well below the present level of erosion.

#### E. COMPARISON WITH OTHER PEGMATITES

A similar zonation and mineralogy to Little Nahanni is reported from Black Hills, South Dakota. Spilde and Shearer (1992) describe two distinct types of pegmatite: lepidolite-bearing and spodumene-bearing types. Ta is enriched from wall to core in both types. The Tin Mountain pegmatite, also in the Black hills (Walker et al., 1986) shows zonation from an albite-quartz-muscovite wall zone, perthite-quartz-albite and perthite, then albite-quartz-spodumene intermediate zones to a core of quartz-spodumene-mica-beryl-amblygonite. The highest temperature for the intermediate zones is estimated at 580 °C. Aqueous fluid transport of Rb, Cs and Li is invoked to explain formation of the core zone.

Wengzynowski (2002) makes comparison between the Little Nahanni and Greenbushes (W.A.) pegmatites. Greenbushes was formed as a series of dykes, from hundreds of metres to kilometres in length (Partington et al., 1995). These were formed likely during the second deformation of the region, which has received two more events associated with major strike-slip faults that bound the major N-S shear zone. Consequently the pegmatites are quite deformed locally. Wall zones of albite-quartz-biotite-tourmaline-cassiterite-garnet etc. and the main pegmatite contains the spodumene (up to 5% Li<sub>2</sub>O in the hanging wall) with quartz and albite  $\pm$  apatite, tourmaline, muscovite, beryl and tantalite. A K-feldspar zone up to 75 m thick is formed in the upper part of the main pegmatite. The lower (footwall) part of the main pegmatite consists of albite-quartz-albite  $\pm$  microcline  $\pm$  muscovite. These contain significant quantites of tantalite and cassiterite. The occurrence of the lithium zones as footwall and hanging-wall zones is possibly unique. This is ascribed to intrusion during the D<sub>2</sub> deformation, with newly-crystallized material being concentrated along vein walls c.f., antitaxial veins. Despite the Greenbushes deposit being formed during active deformation (and the Little Nahanni being very

late to post deformation) there is similarity in pegmatite composition, if not in sequence of zoning. Partington et al., (1995) show that there is no evidence for a buried granite beneath Greenbushes. This is a real enigma! There is ample evidence for a relatively shallow granite batholith below Little Nahanni since a metamorphic aureole may be demonstrated by the presence of aluminosilicate porphyroblasts that post-date the main  $D_1$  deformation. Both pegmatites are on the scale of the same order of magnitude.

#### 9. EXPLORATION

Available reports document exploration activity since the 1979 field season.

During the <u>1979-80</u> field seasons Canadian Superior Exploration Ltd. and Cominco Limited held the small Cali and Lica claim blocks in the centre of the present property. They carried out stream sediment and soil geochemical sampling (Figure 6) which indicated elevated Li values in the lower topography to the NE of the obvious outcropping vein swarms (Ahlborn, 1980). Von Einsiedel (2001) noted that no follow-up work was reported.

Between <u>1992 and 1995</u> a collaborative research project between the University of British Columbia and the Canadian Museum of Nature investigated the pegmatites and most importantly showed that both tantalite-columbite and cassiterite are found in those dykes. The total northwest-trending zone of outcropping pegmatite is estimated as being 2.5 km x 12 km (Groat et., 1995, 2003). That fieldwork resulted in an MSc thesis (Mauthner, 1996) and later research on geochemistry and isotope systematics was the subject of a PhD (Barnes, 2010). Results of this research have been summarized above in section (7).

Some fieldwork was attempted by Canamera Geological Ltd. during <u>1995-1996</u> on a group of claims named the Tun 1-7 that covered the central part of the pegmatite swarm. Mapping and rock geochemistry from 25 samples was presented for assessment (Mauthner, 1996).

Exploration work on the property continued in <u>2001</u> by Archer Cathro and Associates for Strategic Metals Ltd. and War Eagle Mining Inc. A very careful sawn channel and chip sampling programme was undertaken across cliff faces in the various cirques on the east side of the range (Wengzynowski, 2002). Five mineralogical variants of the pegmatite are recognized: Spodumene-quartz feldspar (SQF), Spodumene-quartz feldspar-lepidolite (SQFL), quartz-albite (QA), quartz-feldspar-lepidolite (QFL), and quartz-silver mica (QM). Spodumene is reported to be in crystals up to 35cm length, but more commonly in the 5-15cm range. These crystals are oriented normal to the walls of the dykes. Mica-rich pegmatites (spodumene poor) were observed mostly in the northern and southern extent of the swarm. Tantalite is reported to be in 1mm to 5cm crystals which are generally intergrown with albite or interstitial to K-feldspar and quartz. Rare wodginite (MnSnTa<sub>2</sub>O<sub>8</sub>) and columbite were also noted. Cassiterite is noted as occurring in wall and intermediate zones, in up to 1.5cm crystals. The only phosphate mineral noted was apatite. Minor minerals are tourmaline, garnet, beryl and zeolites.

Sampling using a chainsaw engine-powered diamond saw obtained channel samples 6cm wide by 5cm deep (approximately 8kg / metre length). Chip samples were 40-60% smaller. Wengzynowski reports 147 channel, 62 chip and 34 specimen (grab) samples.

The following summary of analytical results is extracted from his report:

#### Arithmetic Average Tantalum Pentoxide and Tin Oxide Assays For All Rock Samples

Sample Type - Class	# Samples	Average	Average
	-	$Ta_2O_5$	$SnO_2$
Channel/Chip-all	208	95	0.06
Channel/Chip-SQF	158	81	0.04
Channel/Chip-SQFL	19	129	0.06
Channel/Chip-QA	17	114	0.06
Channel/Chip-QFL	4	128	0.04
Channel/Chip-QM	10	223	0.46
Specimens-all	34	441	1.72
Specimens-QA	18	247	0.38
Specimens-QM	16	659	3.22

Wengzynowski reports that sampling of dykes in cirques 300m lower in elevation than the ridge crest returned values of up to 2170g/t Ta<sub>2</sub>O<sub>5</sub> with 12.83% SnO<sub>2</sub> and 684 g/t Ta<sub>2</sub>O<sub>5</sub> with 2.25% SnO<sub>2</sub>. These results indicate that there is good potential for increase in grade of the pegmatite below the elevation of the cirque floors.

Wengzynowski has made comparison between grades of pegmatite at the Greebushes deposit (W.A.), historically the world's largest producer of Ta and Li, and Little Nahanni. His table of analyses is reproduced below:

Greenbushes Zones					Mac Zones					
Trace Element	ts									
<u>(ppm)</u>	1	2	3	4	5	А	B			
Li	2235	2873	907	1008	12734	2415	6642			
Ta <sub>2</sub> O <sub>5</sub>	183	158	88	233	86	145	80			
Nb <sub>2</sub> O <sub>5</sub>	132	107	33	178	61	125	99			
Sn	707	444	12	1000	179	1137	326			
Cs	501	613	1119	308	374	106	83			
Rb	4159	5358	11999	1693	2656	1445	1528			
Sr	65	69	131	47	34	61	67			
Be	125	123	31	146	74					
Zr	27	20	8	36	11.5	31	11.5			
U	12.6	10	6.6	16.3	6.2	5.6	5.1			
Th	11.3	7.2	2.3	16.5	3.1	1.7	1.6			

#### Chemical Comparison of Various Pegmatite Zones and Facies At The Greenbushes Deposit and The Mac Property

Data for 1,2,3,4, and 5 adapted from Partington and McNaughton, 1995 **Greenbushes Deposit** Zones: 1. average for Greenbushes pegmatite 2. main pegmatite 3. K feldspar zone 4. albite zone; 5. lithium zone. **Mac Property** (equivalent zones) Facies: A. albite zone B. lithium zone. Spodumene-quartz-feldspar (equivalent to Greenbushes lithium zone) Spodumene-quartz-feldspar-lepidolite Quartz-albite and aplite Quartz-feldspar-lepidolite Quartz-silver mica (facies equivalents to Greenbushes albite zone)

In <u>2005</u> War Eagle Mining commenced exploration on the property. Through 2006 a programme of soil and stream sediment sampling was carried out. Silts from the SE end of the main ridge returned anomalous values, as did soils from grid sampling (Li, Cs, Ta Sn).

In <u>2006</u> both soil and silt sampling was done. Soil sampling consisted of extension of the soil grid in the south (Young, 2007). Three sample lines were cut at low elevation in the SW extremity of the claim block. Elevated Li, Cs, Ta and Sn values were encountered at the extreme



north end of one sample line, below tree line (Figure 7), probably indicating the presence of a pegmatite dyke. Stream sediment (silt) samples were mostly obtained from the west side of the main ridge, with a few to the east and several in the southern part of the claim block below the soil grid. Those in the south returned elevated values in the abovementioned elements, confirming the soil anomaly (Figure 8). Follow-up work was not performed.

A drill programme consisting of eight diamond drill holes from six sites was carried out during the 2007 season (see below under `Drilling`).

<u>In 2016</u> Archer Cathro carried out further channel sampling across the various main pegmatite zones on behalf of Equitorial Exploration (Figure 9). The following description is copied from Equitorial's September 6<sup>th</sup> news release.

"During the 2016 field program, a total of 81 channel samples were cut across dyke swarms in two cirques (3 and 4) on the LNPG property (see attached map). The samples were cut using a hand-held rock saw. Channel samples are considered the most representative way to test surface exposures and are akin to diamond drill core in size and purpose. Channel samples were collected from the Prison Wall, Berlin Wall, Great Wall of China and Hadrian's Wall dyke swarms within cirques 3 and 4. Highlights from individual dykes within and adjacent to dyke swarms include:

- 1.57 % Li<sub>2</sub>O, 250.3 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.95% SnO<sub>2</sub> across 1.70 m;
- 2.04% Li<sub>2</sub>O, 57.8 g/t Ta<sub>2</sub>O<sub>5</sub>, 0.05% SnO<sub>2</sub> across 4.00 m;
- 3.10% Li<sub>2</sub>O, 53.6 g/t Ta<sub>2</sub>O<sub>5</sub>, 0.03% SnO<sub>2</sub> across 0.95 m;
- 2.33% Li<sub>2</sub>O, 59.0 g/t Ta<sub>2</sub>O<sub>5</sub>, 0.05% SnO<sub>2</sub> across 1.20 m;
- 1.67% Li<sub>2</sub>O, 41.4 g/t Ta<sub>2</sub>O<sub>5</sub>, 0.03% SnO<sub>2</sub> across 3.75 m;
- 1.83% Li<sub>2</sub>O, 67.3 g/t Ta<sub>2</sub>O<sub>5</sub>, 0.05% SnO<sub>2</sub> across 1.25 m; and,
- 1.63% Li<sub>2</sub>O, 52.9 g/t Ta<sub>2</sub>O<sub>5</sub>, 0.01% SnO<sub>2</sub> across 5.15 m.

The dykes are separated by sedimentary wallrocks including quartz sandstone, limestone and shale, which do not contain significant amounts of any elements of interest. Weighted average grade calculations for channel sampled intervals are reported in the following paragraphs and on Table I (attached). Wallrock separating individual dykes within dyke swarms was sampled in



Soil Geochemistry of Selected Elements - Mac Property - 2006 Field Program

From Young (2007)



Silt Geochemistry of Selected Elements - Mac Property - 2006 Field Program

From Young (2007)



Cirque 4, and the values reported were uniformly low. When calculating weighted average grades for the dyke swarms, the wallrocks were assigned zero values for all elements. Weighted averages reported for dyke material within the dyke swarms omitted wallrock dilution.

### Prison Wall

A 16.80 m interval was channel sampled across an exposed portion of the Prison Wall on the north side of Cirque 4. The weighted average grade across this interval was 0.29% Li<sub>2</sub>O, 14.4 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.01% SnO<sub>2</sub> over 16.80 m, including a total of 4.4 m of dyke material that graded 1.12% Li<sub>2</sub>O, 55.0 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.05% SnO<sub>2</sub>.

Two individual dykes located 13 m and 27 m northeast of the dyke swarm were also sampled, and they returned 0.87% Li<sub>2</sub>O, 56.4 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.03% SnO<sub>2</sub> across 1.90 m and 1.57% Li<sub>2</sub>O, 250.3 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.95% SnO<sub>2</sub> across 1.70 m, respectively.

## Berlin Wall

A 35.80 m interval was channel sampled across part of the Berlin Wall on the north side of Cirque 4. This interval yielded 0.29% Li<sub>2</sub>O, 12.3 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.01% SnO<sub>2</sub> across 35.80 m, with dykes within it averaging 1.50% Li<sub>2</sub>O, 63.9 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.05% SnO<sub>2</sub> across a total of 6.90 m. The best individual dyke within the dyke swarm returned 2.04% Li<sub>2</sub>O, 57.8 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.05% SnO<sub>2</sub> over 4.00 m.

On the south side of Cirque 3, a portions of the Berlin Wall swarm returned 1.00% Li<sub>2</sub>O, 21.3 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.01% SnO<sub>2</sub> across 4.45 m, including 1.95 m of dyke material that graded 2.29% Li<sub>2</sub>O, 48.7 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.01% SnO<sub>2</sub>.

## Great Wall of China

A 52.60 m interval across the Great Wall of China on the north side of Cirque 3 returned a weighted average grade of 0.38% Li<sub>2</sub>O, 20.7 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.01% SnO<sub>2</sub>. Within the 52.60 m interval, fourteen individual dykes were sampled for a total thickness of 16.65 m. The combined thickness of the dykes graded 1.21% Li<sub>2</sub>O, 65.4 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.03% SnO<sub>2</sub>.

A 19.70 m interval across a portion of the Great Wall of China on the south side of Cirque 3 averaged 0.50% Li<sub>2</sub>O, 21.3 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.01% SnO<sub>2</sub> over 19.70 m, including four dykes totaling 7.00 m that graded 1.41% Li<sub>2</sub>O, 59.9 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.04% SnO<sub>2</sub>.

An individual dyke located 77 m east of the Great Wall of China dyke swarm on the south side of Cirque 3 returned 1.63% Li<sub>2</sub>O, 52.9 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.01% SnO<sub>2</sub> over 5.15 m.

#### Hadrian's Wall

A 10.35 m wide portion of Hadrian's Wall was sampled on the south side of Cirque 3. This interval returned 1.13% Li<sub>2</sub>O, 71.1 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.03% SnO<sub>2</sub> over 10.35 m. Within that interval, dyke material graded 1.86% Li<sub>2</sub>O, 116.7 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.05% SnO<sub>2</sub> across 6.30 m.

Twenty-five metres west of the 10.35 m exposure of the Hadrian's Wall dyke swarm, two additional dykes returned 0.85% Li<sub>2</sub>O, 80.9 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.05% SnO<sub>2</sub> over 1.05 m.

# **10. DRILLING**

Equitorial Exploration Corp. has not conducted any drilling on the property. The following is a description of historic work completed by other companies.

<u>The 2007</u> field programme, conducted by War Eagle Mining drilled eight diamond holes (total 1798m) from six sites, together with a survey of the dyke system. This was aimed at testing dyke grade at depth and to see whether dykes tended to coalesce at lower elevation. Location of holes is shown on Figure 10. Cross sections are shown on Figures 11-15 and a graphical log of holes is shown in Figure 16.

Continuation of the dykes to depth was demonstrated, but no massive thickening found at the level penetrated. A summary of significant grade intercepts is as follows:

	DDH	From (m)	To (m)	Interval Width (m)	Collective Pegmatite Width (m)	Li (ppm)	Li2O (%)	% Spod.	Ta (ppm)	Ta2O5 (g/t)	Sn (ppm)	SnO2 (g/t)
	MAC001	62.50	63.60	1.10	1.10	222	0.05	0.60	592	722.4	550	697.9
	MAC001	68.80	70.10	1.30	1.30	1386	0.30	3.74	156	190.5	447	568.3
	MAC001	86.00	89.20	3.20	2.10	2497	0.54	6.74	63	76.9	303	384.8
	MAC001	102.80	105.94	3.14	1.74	2910	0.63	7.86	115	140.4	149	189.2
	MAC001	121.60	122.10	0.50	0.50	328	0.07	0.89	500	610.5	316	401.3
	MAC006	61.88	66.86	4.98	2.18	1186	0.26	3.20	63	76.9	182	231.1
Individual	MAC006	85.60	87.00	1.40	1.40	3041	0.65	8.21	259	316.6	419	531.9
Intervals	MAC006	172.37	190.64	18.27	13.00	4294	0.92	11.59	27	33.0	118	149.9
	MAC007	30.22	33.62	3.40	0.98	911	0.20	2.46	47	57.4	135	171.5
	MAC007	105.84	116.78	10.94	9.86	5581	1.20	15.07	29	35.4	173	219.7
	MAC007	143.73	149.20	5.47	1.69	1536	0.33	4.15	22	26.9	82	104.1
	MAC008	37.58	38.73	1.15	1.15	2703	0.58	7.30	141	172.1	415	526.9
	MAC008	156.63	158.45	1.82	1.82	2199	0.47	5.94	67	82.0	148	188.2
	Averages f	or widths of g	reater than :	50 metres:								
"Bulk"	MAC001	62.50	122.10	59.60	8.93	345	0.07	0.93	32	39.1	54	68.6
Intervals	MAC006	61.88	190.64	128.76	30.16	735	0.16	1.98	11	13.4	32	40.6
	MAC007	100.85	179.10	78.25	15.25	977	0.21	2.64	8	9.8	43	54.6

The results from DDH 1 demonstrate comments by Lee Groat that the northern part of the dyke system is of higher grade in Ta and Sn, the quartz-mica (QM) pegmatite being more prevalent



Figure 10. 2007 Drill hole locations & soil grid sampling



Figure 11. MAC001 Drill Hole Location and Cross Section

Figure 1 2 . MAC003 and MAC004 Drill Hole Locations and Cross Section



Figure 1 3 . MAC005 Drill Hole Location and Cross Section



# Figure 14. MAC006 and MAC007 Drill Hole Locations and Cross Section



Figure 15. MAC008 Drill Hole Location and Cross Section





there. This drill site is off of the present claim block, the northernmost part of the original MAC property having been absorbed by the Naats`ihch`oh Park Reserve.

As stated before, the significant result of this historical drilling is that it demonstrated that pegmatite dykes are continuous to depth. Of the eight holes the obviously economically interesting results were obtained from numbers 6 and 7, where intersections of pegmatite were encountered over the entire hole and one thick dyke was correlable between the two (from 172.37m-183.13m in hole 6 and from 105.84-116.63m in hole 7).

The 2007 drilling programme was by no means an exhaustive test of the property. Young (2007) recommended a further ten diamond drill holes. Eight of those proposed holes would still be valid targets. Consideration should be given to siting several holes at the bottom of the cirques and targeting deep extension of the pegmatite system (or also perhaps a greisen zone in the uppermost part of a granite intrusion).

#### **11. SAMPLE PREPARATION, ANALYSES AND SECURITY**

Wengzynowski (2002) has documented the process of sampling and handling of channel samples from the 2001 season's work, together with analytical techniques used. That work had been adequately performed. Similarly Young (2007) has documented handling of geochemical samples and diamond drill core.

## **12. DATA VERIFICATION**

Exact details of sampling of the diamond drill core were not given in the available company reports. Handling and security of the material is documented. No standard or blank samples were submitted with the drill core in 2007, that procedure not being usual at that date, especially for these metals. The assay laboratory (now ALS) certified their analyses in the usual manner. The 2007 drill core has been stored in a locked yard since being removed from the property. Equitorial Exploration intend to re-examine that core in 2017 to investigate the sampling of pegmatite intervals compared to that of country rock with the aim of verifying 2007 grade calculations.

# **13. MINERAL PROCESSING AND METALLURGICAL TESTING**

No testing has been reported.

# **14. MINERAL RESOURCE ESTIMATES**

There is no mineral resource estimate on the property.

# **15. MINERAL RESERVE ESTIMATES**

The present data is insufficient to make an estimate.

## **16. MINING METHODS**

The project is still at the early exploration stage: this is not applicable.

# **17. RECOVERY METHODS**

Not applicable.

# **18. PROJECT INFRASTRUCTURE**

No infrastructure exists on the property. A limited access gravel road is located alongside the Property's northern boundary and passes within 7 km of the 2016 work area.

# **19. MARKET STUDIES AND CONTRACTS**

No studies have yet been undertaken.

# 20. ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

Environmental studies have not yet commenced on the Property. The Property lies within the traditional territories of the Dehcho First Nations ("Dehcho"). The Nahanni Butte Dene Band is one of the ten first nations that comprise the Dehcho. It will be necessary to apply for the relevant permits in order to carry out drilling in 2017.

### 21. CAPITAL AND OPERATING COSTS

Capital costs have not been estimated.

### **22. ECONOMIC ANALYSIS**

As a 'grassroots' exploration project economic studies have not been attempted.

# **23. ADJACENT PROPERTIES**

The Howards Pass SEDEX base metal deposit is being developed by Selwyn Chihong. Access to Howards Pass is via a limited access gravel road located alongside the Property's northern boundary. Future upgrading of the road access. Future upgrading of the road access would be very beneficial for the property.

## 24. OTHER RELEVANT DATA

None is submitted.

## **25. INTERPRETATION AND CONCLUSIONS**

The Little Nahanni pegmatite prospect contains a system of Lithium-Caesium-Tantalumtype pegmatite dykes that crop out over a strike length of 13km in seven separate groups within the present property boundary. Spodumene and to a lesser extent the micas are potential lithium sources. Accessory tantalite-columbite and cassiterite contents have sufficient grades to bring the rock to within potentially economic values. Continuity of the dykes over a vertical range of 300+ metres is demonstrated by natural exposure and past drilling. So far the greatest thickness of a single dyke encountered is  $\approx$ 10m, encountered in drill holes 6 and 7. The thickness of each `swarm`of dykes is up to 300m. The most reliable channel sampling has been that performed in 2016. Careful measurement of dyke width and host rock intervals have enabled bulk grades to be calculated. Such results as 10.35m at 1.13% Li<sub>2</sub>O, 71.1 g/t Ta<sub>2</sub>O<sub>5</sub> and 0.03% SnO<sub>2</sub> are highly encouraging.

The pegmatite system has not been investigated to depth. The potential exists for dykes to coalesce below the level of the lowest cirque and grade could well be different. Closer to the postulated buried intrusive source for the pegmatite beryl could become significant. There is also the possibility that greisen has been developed in the upper portion of the granite, with potential for Sn and W. Drilling of several deep holes along the extent of the system is desirable.

## **26. RECOMMENDATIONS**

The following recommendations, made by Heather Burrell of Archer Cathro to the Company in September 2016 are considered very pertinent and still relevant:

``The following steps would be beneficial for the advancement of the LNPG property:

- 1) Transportation of the 2007 diamond drill core from its current storage location near Finlayson Lake to Whitehorse;
- 2) Re-logging of the diamond drill core to determine if dyke material was blended with sedimentary wallrock material or if some dykes were not sampled. This would allow us to confirm how the previously reported drill results compare to the channel sampling completed in 2016;
- 3) Data input and interpretation of the 3D survey information that was collected by the previous operator;
- 4) Systematic prospecting and channel sampling throughout the property;
- 5) Investigation of pre-sorting technologies to separate mineralized dyke material from wallrock waste;
- 6) Relationship building with the Nahanni Butte First Nation;
- 7) Permitting the land use application for advanced exploration activities on the LNPG property; and,
- 8) Diamond drilling near previous holes and the best channel sample locations.

The present author concurs with all of these recommendations. Before specific drill sites can be chosen organization of all historical data is necessary, together with further channel sampling where the data is sparse. The work of Wengzynowski (2002) is probably capable of verification for inclusion in a resource estimate.

It is also recommended that future surface channel sampling be accompanied by surveying of sufficient precision to be able to calculate dilution of pegmatite by intervening country rock and to arrive at reliable bulk grades. Modern instrumentation (EDM and differential GPS) allows quick, precise measurement with good vertical control. Digital results from such work are

amenable to use in whatever computer plotting programme is desired or even for some oldfashioned manual profile preparation.

The 1979 soil sampling and boulder mapping carried out by Cominco (Fig. 6) defined soil anomalies and boulder trains that are to the east of the outcropping mineralization and which are still contained in the present claim block. This may indicate the presence of a further pegmatite swarm. This should be investigated.

In addition, the historical (see Mackevoy, 2007) soil and stream sediment survey (Figs. 7 & 8) at the southern limit of the property identified an anomaly that is consistent with continuation of pegmatite in this region of timber cover. It was never followed up. This anomaly should be prospected either by trenching or drilling. Inspection of that part of the valley may give an indication of the amount of cover present to determine which method is best. Consideration could be given to the use of a miniature self-propelled rotary percussion drill, such as has been very effective in the work in the Klondike over the past couple of years.

### **27. REFERENCES**

Ahlborn, V.H. 1980. Cominco Limited, assessment report – Prospecting and Geochemical survey on Lica claims, selwyn Mountains, NWT, Nahanni Mining Division.

Barnes, E.M. 2010. The rare element Little Nahanni Pegmatite group, N.W.T: studies of emplacement, and magmatic evolution from geochemical and Li isotopic evidence. PhD thesis, University of British Columbia. pp. 262.

Burrell, H. September 6, 2016 news release for Equitorial Exploration Corp. from: www.sedar.com

Černý, P. and Ercit, T.S. 2005. The classification of granitic pegmatites revisited. The Canadian Mineralogist **43**: 2005-206.

Chappell, B.W., and White, A.J.R. 1992. I- and S-type granites in the Lachlan Fold Belt. Transactions of the Royal Society of Edinburgh, Earth Sciences, **83:** 1-26

Deer, W.A., Howie, R.A. and Zussman, J. 1997. Rock-forming minerals, Vol 2A. The Geological Society, London.

Deer, W.A., Howie, R.A. and Zussman, J. 2003. Rock-forming minerals, Vol 3A. (By M.A. Fleet) The Geological Society, London.

Gordey, S P. 1992. South Nahanni River area, Northwest Territories-Yukon Territory Geological Survey of Canada, Preliminary Map 1-1992,

Gordey, S.P. and Anderson, R.G. 1993. Evolution of the northern Cordilleran miogeocline, Nahanni map area (105I), Yukon and Northwest Territories. Geological Survey of Canada Memoir 428.

Green, L.H., Roddick, J.A. and Blusson, S.L. 1968. Geological survey of Canada Map 8-1967 Nahanni 1:253,440 scale.

Groat, L., Ercit, T.S., Mortensen, J.K. and Mauthner, M.H.F. 1995. Granitic pegmatties in the Canadian Cordillera: Yukon and Northwest Territories. INAC Canada Yukon region, Open File 1995-14 (G), pp.40.

Groat, L., Mulja, T., Mauthner, M.H.F., Ercit, T.S., Raudsepp, M., Gault, R.A. and Rollo, H.A. 2003. Geology and mineralogy of the Little Nahanni rare-element granitic pegmatites, Northwest Territories. The Canadian Mineralogist **41**: 139-160.

London, D. 1990. Internal differentiation of rare-element pegmatites; a synthesis of recent research. In: H.J. Stein and J.L. Hannah (eds.): Ore-bearing granite systems; petrogenesis and mineralizing processes. Geological Society of America Special Paper 246, p. 35-50.

London, D. 1996. Granitic pegmatites. Transactions of the Royal Society of Edinburgh: Earth Sciences, 87: 305-319

London, D. 2008. Pegmatites. Canadian Mineralogist Special Publication 10.

Lumpkin, G.R. 1998. Rare-element mineralogy and internal evolution of the Rutherford #2 pegmatite, Amelia County, Virginia: a classic locality revisited. Canadian Mineralogist **36**: 339-353.

Mackevoy Geosciences Ltd. The Little Nahanni pegmatite group Ta-Sn-Li LCT-Type pegmatite dyke swarm. Unpublished company report.

Mauthner, M.H.F. 1996. Mineralogy, geochemistry and geochronology of the Little Nahanni pegmatite group, Logan Mountains, Southwestern Northwest Territories. MSc thesis, University of British Columbia, pp. 202.

Mauthner, M.H.F. 1996. Geological and geochemical report on the Little Nahanni pegmatite group, Logan Mountains, NWT. Assessment report 083747.

Partington, G.A., McNaughton, N.J. and Williams, I.S.1995. A review of the geology, mineralization, and geochronology of the Greenbushes pegmatite, Western Australia. Economic Geology **90**: 616-635.

Pedersen, J.C., Trueman, D.L. and Mariano, A.N. 2007. The Thor Lake rare-earths metal deposits, Northwest territories, Canada. GAC/MAC notes for field trip B1.

Rickers, K., Thomas, R. and Heinrich, W. 2006. The behavior of trace elements during the chemical evolution of the  $H_2O$ -, B-, and F-rich granite-pegmatite-hydrothermal system at Ehrenfriedersdorf, Germany: a SXRF study of melt and fluid inclusions. Mineralium Deposita, **41**: 229-245.

Spilde, M.N. and Shearer, C.K. 1992. A comparison of tantalum-niobium oxide assemblages in two mineralogically distinct rare-element granitic pegmatites, Black Hills, South Dakota. Canadian mineralogist **30**: 719-737.

Thomas, A.V., Bray, C.J. and Spooner, E.T.C. 1988. A discussion of the Jahns-Burnham proposal for the formation of zoned granitic pegmatite using solid-liquid-vapour inclusions from the Tanco pegmatite, SE Manitoba, Canada. Transactions of the Royal Society of Edinburgh: Earth Sciences **79**: 299-315.

Thomas, R., Webster, J.D. and Davidson, P. 2006. Understanding pegmatite formation: the melt and fluid inclusion approach. In: J.D.Webster (ed.) Melt inclusions in plutonic rocks. Mineralogical Association of Canada short course series 36. P. 189-210.

Von Einsiedel, C. 2001. Geological report on the MAC property. Prepared for War Eagle Mining company Inc. Unpublished company report.

Walker, R.J., Hanson, G.N., Papike, J.J., O'Neil, J.R. & Laul, J.C. (1986): Internal evolution of the Tin Mountain pegmatite, Black Hills, South Dakota. American Mineralogist **71**, 440-459.

Webber, K.L., Simmons, W.B., Falster, A.U. & Foord, E.E. (1999): Cooling rates and crystallisation dynamics of shallow level pegmatite-aplite dikes, San Diego County, California. American Mineralogist **84**, 708-717.

Wengzynowski, W.A. 2002. Assessment report describing geological mapping and trenching on the MAC 1-7 claims for Strategic Metals Ltd. and War Eagle Mining Company Inc.

Young, I. 2007. Technical report on the MAC property -2. Prepared for War Eagle Mining Company Inc.

# CERTIFICATE

I, Timothy Liverton, geologist of 102 Komish Court, (Box 393), Watson Lake, Yukon, state that:

With reference to the report: "Geology and Summary Report of the Little Nahanni Pegmatite prospect" dated 20<sup>th</sup>. March 2017.

That I have the following qualifications: BSc in geology and geophysics from the University of Sydney 1965, BSc (honours) in economic geology from the University of Adelaide 1968 and PhD from Royal Holloway, University of London 1992. I have 52 years' experience in mineral exploration and mining of lode tin, pegmatite Li-Ta-Sn, skarn and porphyry tungsten, porphyry copper, VMS base metals, lode and skarn gold, industrial minerals and placer tin, tantalum and gold. I am a member of the Geological Association of Canada, Geological Society of America, Society of Economic Geologists and the Geological Society of London. By virtue of my validation as a Chartered Geologist I am a qualified person under N.I. 43-101 rules.

I visited the Li claims on the 15th of November 2016 and made a visual inspection of pegmatite exposures.

This report is derived from data in company reports, Archer Cathro company files, published scientific papers and theses as identified in the bibliography of this document.

I hold no shares or interest in Equitorial Exploration.

I have had no prior involvement with the property.

I have read this report and find its content to be correct.

It contains all data required to be disclosed and that data has not been presented in any form that may be misleading.

Timothy Liverton

Timothy Liverton PhD, C.Geol. FGS