

### AIRBORNE MAGNETIC SURVEY

ON THE

FRIENDLY LAKE PROPERTY,

(FL 1-4, FL 9-14, FRI 1-22, RO #15-18 CLAIMS)

### LITTLE FORT AREA, BRITISH COLUMBIA

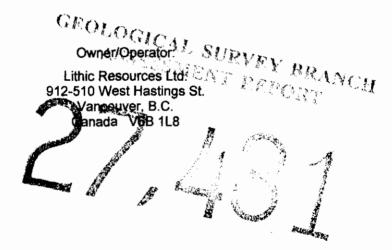
### CANADA

Latitude 51° 34.5' - 38' N

Longitude 120° 25' - 34'W

NTS 92P/9,10

**Clinton and Kamloops Mining Divisions** 



by

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#### INTRODUCTION AND TERMS OF REFERENCE

In December, 2003, Lithic Resources Ltd. ("Lithic") acquired the right to earn a 100% interest in the Friendly Lake property located in the Little Fort area of British Columbia, Canada. In May 2004, Lithic commissioned Fugro Airborne Surveys to carry out a detailed airborne magnetic survey over the property, mainly to aid in mapping the geology of the property as it is largely drift-covered. This report presents the data and briefly discusses the results of the survey. It is based on Fugro's report to Lithic, data and information available in the public record, such as assessment reports, news releases, government publications and so on, as well as the writer's personal observations on the property.

#### PROPERTY DESCRIPTION AND LOCATION

The Friendly Lake property includes a single block of 37 claims totalling 285 units for a total of about 7,125 hectares. It is centred about 29 kilometres northwest of the town of Little Fort, British Columbia or about 105 kilometres north of the city of Kamloops and lies within the area bounded by Latitude 51° 34.5' – 38' N and Longitude 120° 25' - 34'W (Fig. 1). The claims' disposition is illustrated in Figure 2 and their particulars are listed in Table One.

A variety of physical disturbances already exist on the property, including various logging roads and clearcuts as well as numerous and large exploration trenches excavated in previous exploration campaigns over at least the last forty years. The area is not sensitive in terms of social, political or environmental issues.

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

The property is easily accessable by road from Little Fort. A logging road heads north to the property from a point on Highway 24 about 38 kilometres west of Little Fort. The property boundary is situated about 14 kilometres from Highway 24 and from here, a number of roads and trails extend throughout most of the central and eastern parts of the property. Alternatively, several other logging roads approach the property boundary from the northeast and northwest.

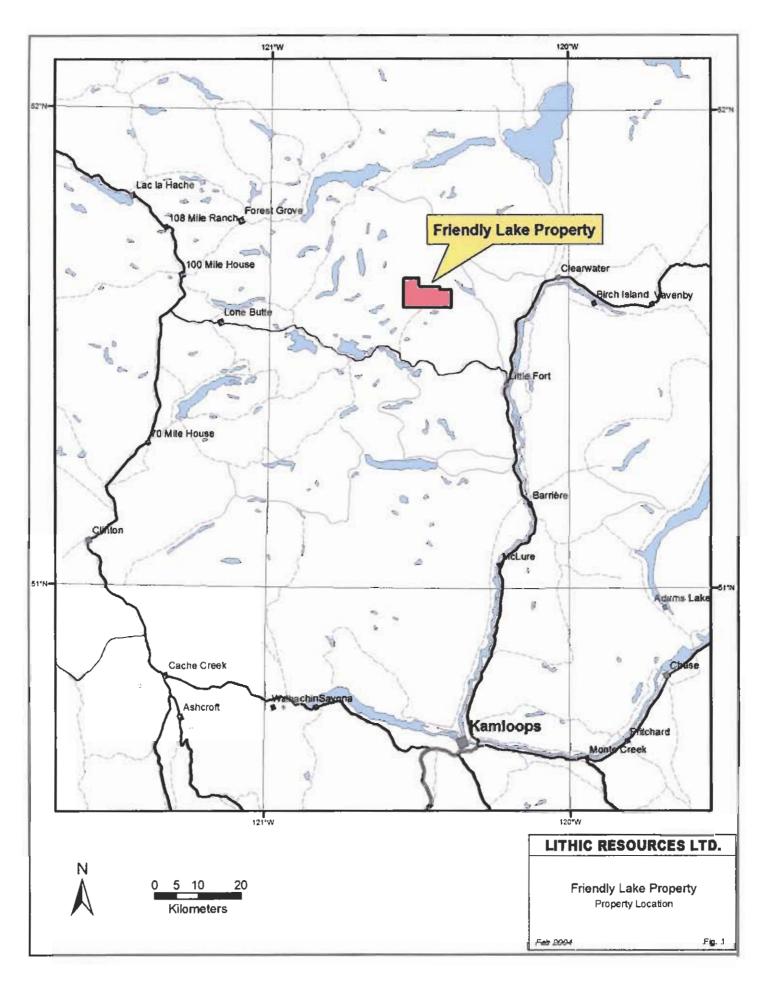
Numerous small towns with land lines and basic supplies are situated within easy driving distance of the claims while the nearest large population centre is Kamloops. Major hydroelectric transmission lines and railways follow Highways 5 and 97 through Little Fort and 100 Mile House respectively.

Physiographically, the property is situated in the Nehalliston Plateau and is typified by rolling hills and plateaus. Elevations range between 1,260 and 1,740 metres A.S.L. although most of the ground is

below 1,500 metres. The climate is cool temperate with snow between late November and March. Except at the highest elevations, field work is generally possible from April through November.

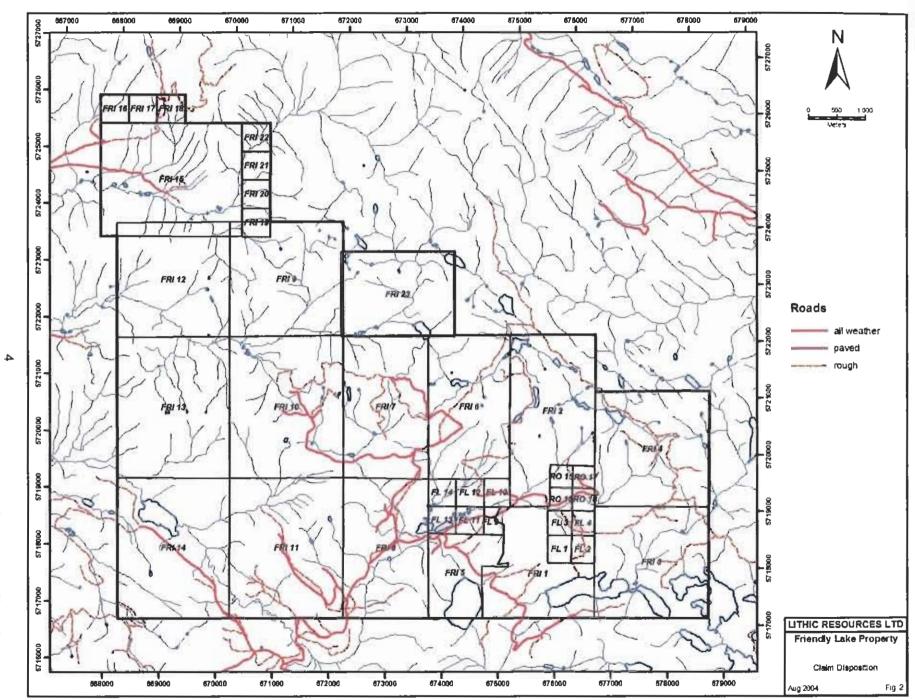
Table One Friendly Lake Property Claims							
Claim	Tenure No.	Tag No.	Ownership	Due Date	Mining Div	Units	Hectares
FL 1	350558	625921M	Lithic	2005.05.27	Kamloops	1	25
FL 2	331247	636205M	Lithic	2005.05.27	Kamloops	1	25
FL 3	331248	636206M	Lithic	2005.05.27	Kamioops	1	25
FL 4	331249	636207M	Lithic	2005.05.27	Kamloops	1	25
FL 9	350559	625922M	Lithic	2005.05.27	Kamloops	1	25
FL 10	350560	625923M	Lithic	2005.05.27	Kamloops	1	25
FL 11	350561	625924M	Lithic	2005.05.27	Kamloops	1	25
FL 12	350562	625925M	Lithic	2005.05.27	Kamloops	1	25
FL 13	350563	625926M	Lithic	2005.05.27	Kamloops	1	25
FL 14	350564	625927M	Lithic	2005.05.27	Kamloops	1	25
FRI 1	324810	230047	Lithic	2004.05.27	Kamloops	16	400
FRI 2	324811	230048	Lithic	2004.05.27	Kamloops	18	450
FRI 3	324274	230045	Lithic	2004.05.27	Kamloops	16	400
FRI 4	344527	215611	Lithic	2004.05.27	Kamloops	16	400
FRI 5	357259	215165	Lithic	2005.05.27	Kamloops	9	225
FRI 6	357260	215166	Lithic	2005.05.27	Kamloops	15	375
FRI 7	357261	215167	Lithic	2004.05.27	Kamloops	15	375
FRI 8	357262	215168	Lithic	2004.05.27	Kamloops	15	375
FRI 9	357263	215169	Lithic	2004.05.27	Kamloops	16	400
FRI 10	357264	215170	Lithic	2004.05.27	Kamloops	20	500
FRI 11	357265	215171	Lithic	2004.05.27	Kamloops	20	500
FRI 12	357266	215172	Lithic	2004.05.27	Kamloops	16	400
FRI 13	357267	215173	Lithic	2004.05.27	Kamloops	20	500
FRI 14	357268	215174	Lithic	2004.05.27	Kamloops	20	500
FRI 15	408694	231767	Lithic	2005.03.11	Clinton	20	500
FRI 16	408702	726037M	Lithic	2005.03.10	Clinton	1	25
FRI 17	408702	726038M	Lithic	2005.03.10	Clinton	1	25
FRI 18	408704	726039M	Lithic	2005.03.10	Clinton	1	25
FRI 19	408705	726040M	Lithic	2005.03.11	Kamloops		25
FRI 20	408705	726040M	Lithic	2005.03.11	Kamloops		25
FRI 21	408700	726042M	Lithic	2005.03.11	Kamloops		25
FRI 22	408707	726043M	Lithic	2005.03.11	Kamloops	1	25
FRI 23	411200	206858	Lithic	2006.06.14	Kamloops	12	300
RO #15	220746	581515	Lithic	2005.05.27	Kamloops	1	25
RO #15 RO #16	220740	581516	Lithic	2005.05.27	Kamloops	1	25
RO #16	220747	581517	Lithic	2005.05.27	Kamioops		25
RO #17 RO #18	220748	581517	Lithic	2005.05.27	Kamloops	1	25
10 #10	440140	1 001010		£000.00.21		285	7 125

285 7,125









#### HISTORY OF WORK

Available records show that parts of the property have been explored by various companies, sometimes concurrently, since 1965. The more substantive programs are listed below:

- 1965-70 Anaconda American Brass staked a large area around Friendly Lake and carried out biogeochemical and stream sediment sampling, an extensive geochemical soil survey (Cu,Pb,Mo), a ground magnetic survey, minor IP, bulldozer trenching and 999 metres of core drilling in 19 holes (Hirst, 1965; Hirst, 1966; Wilmott, 1970; Lammle and Waterman, 1970).
- 1971-74 Vangulf Exploration Company staked claims and then in 1972, optioned the property to Imperial Oil. Imperial carried out geological mapping, geochemical soil sampling (Cu,Pb,Ag,Mo), a ground magnetic survey and then drilled 24 percussion holes totalling 1,002 metres (Aird, 1974).
- **1971-72** G.H. Rayner staked the Bogg claims to the west of Vangulf/Imperial Oil and optioned the property to Prism Resources, who carried out geological mapping (Sinclair, 1972).
- 1973-75 Cities Service Minerals Corporation optioned the Bogg claims and carried out geological mapping, geochemical soil sampling, prospecting, 87 kilometres of IP survey, 537 metres of core drilling in four holes and 673 metres of percussion drilling in 15 holes (Hawkins, 1974; Jorgensen, 1975; Murton, 1973; Murton, 1974; Murton and Depaoli, 1974).
- 1978-83 Commonwealth Minerals Limited optioned the Bogg claims and collected 656 soil samples (Cu,Pb,Ag) and completed 18.3 kilometres of VLF-EM (Giroux, 1978).
- 1987-90 Geotech Capital Corporation optioned the Bogg claims and carried out an extensive geochemical survey, minor IP and 810 metres of core drilling in six holes to test a gold-in-soil anomaly (Archer, 1987; Archer, 1989; Mark and Cruickshank, 1988).
- 1981-82 SMD Mining Co. Ltd. optioned Anaconda's property and staked some claims of their own. They carried out a geochemical soil survey (Cu,Mo,As,Ag,Pb,Zn), rock sampling, ground magnetometer and VLF surveys, IP, geological mapping and 631 metres of trenching (Ruck, 1982).
- 1983 Lornex Mining Corporation optioned the claims from SMD and Anaconda and appear to have drilled 21 vertical percussion holes totalling 1,273 metres on the property (Serack, 1983).
- 1984-85 BP Resources Canada Ltd.(Selco Division) optioned the property from SMD/Anaconda. Most of their work, however, which included a geochemical soil survey, rock sampling,

geological mapping, IP and trenching, was carried out to the southeast of the present property (Gamble and Farmer, 1986).

- **1987** Rat Resources Ltd. optioned the claims from SMD/Anaconda and drilled three core holes totalling 310 metres on the present property (Rebagliati, 1987).
- **1990-91** Placer Dome Inc. optioned the Bogg claims and carried out geochemical soil sampling and trenching (Warner et al, 1990; Edwards, 1991).
- **1996-97** Electrum Resource Corp. acquired some claims in the area and optioned them to Midland Exploration Corporation who carried out limited IP, EM and magnetic surveys as well as geochemical soil sampling, stream sediment sampling and some rock sampling (Ronning, 1997; Ray, 2002; Pezzot and Delane, 1997; Montgomery, 2001)

#### **GEOLOGICAL SETTING**

#### **Regional Geology**

The regional geology in the Friendly Lake area has only recently been mapped by government geologists (Schiarizza and Israel, 2001; Schiarizza, Heffernan and Zuber, 2002). Their interpretation differs markedly from the previous one and the following descriptions of the regional and property geology are taken essentially directly from their work.

The Friendly Lake property is situated in the Quesnel Terrane which in turn forms part of the Intermontane Belt of the Canadian Cordillera (Fig. 3). The Quesnel Terrane is characterized by an Upper Triassic to Lower Jurassic magmatic arc complex that formed above an east-dipping subduction zone. In southern and central British Columbia, these Mesozoic arc rocks are represented mainly by Upper Triassic volcanic and associated sedimentary rocks of the Nicola Group, together with abundant Late Triassic to Early Jurassic calc-alkaline to alkaline intrusions. The Nicola Group in the Friendly Lake region includes a central, fault-bounded belt of Upper Triassic volcanic and volcaniclastic rocks flanked by underlying Middle to Upper Triassic sedimentary rocks of the Lemieux Creek succession to the east and the Meridian Lake succession to the west. The Wavey Lake succession is an undated assemblage of mainly cherts and volcaniclastic sandstones that occurs west of and structurally beneath the Meridian Lake succession. It is interpreted as a western facies of the Nicola Group. The Meridian Lake succession is underlain by Upper Paleozoic carbonate, chert and siltstone of the Harper Ranch Group.

The Thuya batholith intrudes the Nicola Group in the south part of the area and is one of five large calc-alkaline batholiths, also including the Takomkane Batholith to the north, and the Wild Horse, Pennask and Bromley batholiths to the south, that define a linear north-northwest trending belt of

Early Jurassic magmatism that extends for 300 kilometres within the central to eastern part of the Quesnel Terrane. Calc-alkaline and alkaline plutons of this Early Jurassic age are a prominent feature of the Quesnel Terrane and can host important porphyry Cu (±Au) and skarn deposits.

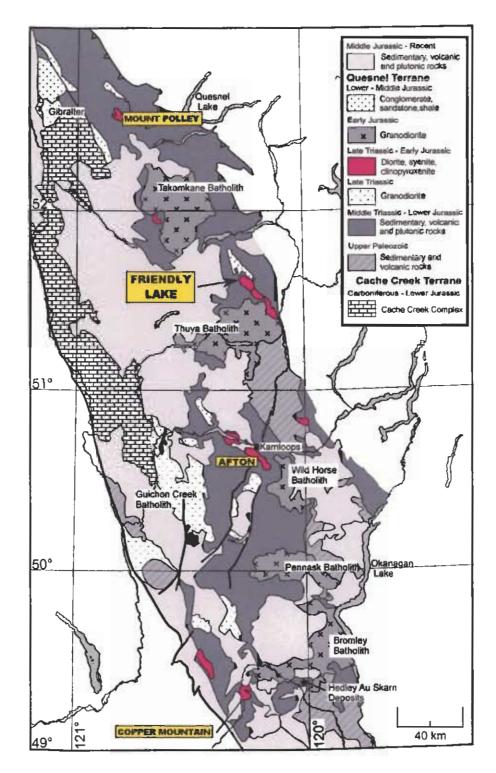
A prominent belt of Late Triassic(?) to Early Jurassic ultramafic-mafic-syenitic plutonic rocks, including the Friendly Lake diorite-syenite intrusive complex (FLIC), diorite near Deer Lake and the Dum Lake ultramafic-mafic intrusive complex extends northwestward from the northeast margin of the Thuya batholith. These rocks intrude the west side of the central, predominantly volcanic belt of the Nicola Group, are thought to be approximately coeval with the Nicola Group rocks and are considered to be correlative with the intrusive complexes hosting the Mt. Polley, Afton and Copper Mountain copper±gold deposits.

The Nicola Group is stratigraphically overlain by a succession of Lower Jurassic sedimentary rocks that includes distinctive granitoid-bearing conglomerates in its lower part. These sedimentary rocks are correlated with the Lower to Middle Jurassic Ashcroft Formation, which overlies the Nicola Group in the western part of the Quesnel Terrane to the south.

The regional structure is characterized by panels of steeply-dipping strata bounded by systems of mainly northwest-striking Eocene faults. Epithermal-style alteration and mineralization occurs along or adjacent to some of these faults. The Eocene structures include a network of dextral strike-slip faults referred to as the Rock Island Lake fault system. The main strands of this system, the Rock Island Lake faults, have been traced well to the north and may be part of a significant dextral strike-slip system.

#### Property Geology

The property covers the Friendly Lake intrusive complex which comprises two distinct stocks of monzonite, syenite and granite, together with a broad area between and south of these stocks that consists largely of microdiorite, diorite, gabbro, related intrusion breccias, skarn and pyrite-silica alteration (Fig. 4). The discrete stocks in the northern part of the Friendly Lake complex form resistant pinkish outcrops of medium-grained, leucocratic, porphyritic quartz monzonite to monzonite, locally grading to granite, quartz syenite and syenite. Their contacts are sharp, but dikes and veins of similar composition occur locally in adjacent rocks. Commonly, diorite and greenstone along the margins of the stocks are cut by coarse-grained, monomineralic amphibole veins, or by veins with amphibole rims and orthoclase-rich cores. Skarny greenstone along the western margin of the smallest stock is strongly foliated in part,. Veins of nonfoliated monzonite typically cut across the foliation, but some are foliation-parallel and slightly boudinaged.



(after Schiarizza, Heffernan and Zuber (2002))

### Figure 3 - Regional Geology

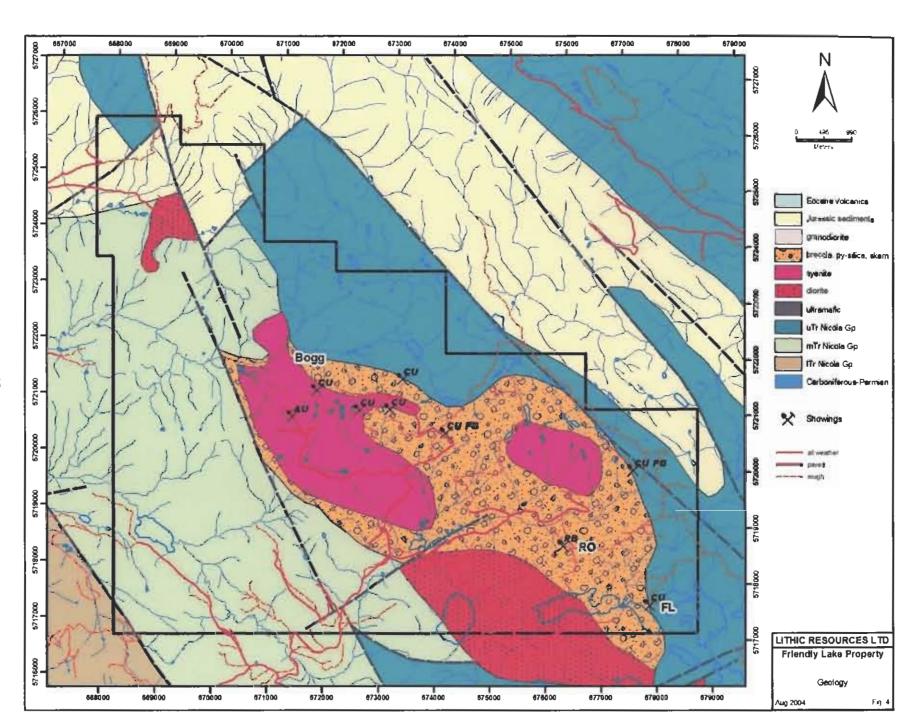
Although parts of the monzonitic stocks were recognized by previous workers (Preto, 1970), they included the associated dioritic rocks in the Nicola Group. This was probably because they consist mainly of fine-grained microdiorite that is not readily distinguished from an andesitic volcanic rock in isolated exposures. However, the intrusive nature of most of the complex is apparent in several recent logging cuts around Friendly Lake. Scattered outcrops suggest that the same suite of rocks in large part encompasses the monzonitic stocks.

Exposures south, west and northwest of Friendly Lake are dominated by medium green, grey brown to rusty brown weathered microdiorite. The most definitive evidence of an intrusive origin for these finegrained green rocks comes from several good exposures south of Friendly Lake, where they comprise distinct dikes, some with chilled margins, that cut through medium-grained diorite and microdiorite-hosted intrusion breccia. Dikes of feldspar porphyry and hornblende-feldspar porphyry also cut diorite here. Other rock types observed around Friendly Lake include medium to coarse-grained pyroxene gabbro, dark grey pyroxene-feldspar porphyry and intrusion breccia. The pyroxene-feldspar porphyry units typically form tabular bodies, up to a few metres wide, within dioritic rocks and are probably dykes.

Intrusion breccia is present in several outcrops south of the west end of Friendly Lake. It comprises tightly packed fragments of diorite, monzodiorite, microdiorite and pyroxene-feldspar porphyry in a sparse matrix of fine-grained microdiorite. Exposures north of Friendly Lake, around, and directly south of, the monzonitic stocks, include diorite, microdiorite and intrusion breccia that are similar to rocks found in the area south of Friendly Lake. Other exposures in this area, however, comprise fine-grained greenstone, chloritic schist and skarnified rock of uncertain protolith. Some intrusion breccias, particularly those near the margins of the largest monzonitic stock, include fragments of siltstone and chert, together with dioritic rocks. In one locality, Ray (2002) observed chalcedony rimming fragments in intrusion breccia.

Reports from previous exploration campaigns suggest, on the basis of glacial striae, that glacial movement was from NNW to SSE (Warner, Edwards and Cannon, 1990). Although the property has extensive glacial drift cover and outcrop is rare, glacial deposits are relatively thin, consisting of a lodgement till less than 10 metres thick. Some areas have overlying outwash sediments and un-glaciated residual soils were noted in places by Anaconda geologists. They also observed that syenite float on the property is generally located within 100-200 metres of relevant contacts, from which they concluded that glacial transport distances are not large (Waterman, 1969).





#### DEPOSIT TYPES

Various base and precious metal mineral occurrences are concentrated within and adjacent to the Friendly Lake – Deer Lake – Dum Lake belt of ultramafic-mafic-syenitic plutonic rocks. Schiarizza and Israel (2001) note that these include copper-gold skarns associated with the Deer Lake diorite stocks, porphyry-style copper mineralization within the Friendly Lake complex and platinum mineralization within the Dum Lake ultramafic complex to the south. Correlative rocks elsewhere within this part of the Quesnel Terrane host economic copper-gold porphyry deposits at Mount Polley, Afton and Copper Mountain, and potentially correlative dioritic rocks are associated with the gold skarns at Hedley (Schiarizza and Israel, 2001). Numerous vein and shear-related gold showings are found in the area and may be considerably younger than the intrusive rocks. Other mineral deposit types found in the region include the molybdenum-tungsten mineralization (Anticlimax prospect) within the Early Cretaceous Tintihohtan Lake stock and polymetallic sulphide lenses within sedimentary rocks of the Middle to Upper Triassic portion of the Nicola Group.

Exploration on the Friendly Lake property will focus on porphyry and Mt. Polley style copper-gold mineralization but will also take into account other possibilities.

#### MINERALIZATION

A large number of mineral occurrences are known on the Friendly Lake property, only a few of which have been explored and are documented to any extent (Fig. 4). The most well known include the Bogg porphyry-style copper occurrence and the RO skarn type lead-silver occurrence. The following descriptions are taken largely from the BC MINFILE.

#### Bogg Copper Occurrence (MINFILE 092P 007)

The Bogg occurrence consists of porphyry-style copper mineralization within and along the northeast margin of the largest syenite stock within the Friendly Lake Intrusive Complex. Disseminated and fracture-controlled pyrite, chalcopyrite and bornite occur within both the syenitic rocks and adjacent greenstone, microdiorite and intrusion breccia. The intrusive rocks are generally silicified, chloritized and potassically (K feldspar) altered. Pyroxene-potassium feldspar-calcite veinlets, interpreted to have formed in the late stages of intrusion of the syenite body, locally contain chalcopyrite and galena. A sample collected by the B.C. Geological Survey from a pyrite-chalcopyrite-bornite rich intrusion breccia in the main part of the Bogg occurrence yielded values of 3.3% Cu, 25 grams per tonne (gpt) Ag, 208 ppb Pt and 149 ppb Pd (Schiarizza and Israel, 2001). Another sample collected by G. Ray in 2002 returned values of 2.64% Cu, >200 gpt Ag, 136 ppb Au, 560 ppb Pt and 42 ppb Pd (Ray, 2002).

West of the Bogg occurrence proper, in the southwestern part of the same syenite stock, disseminated and fracture-controlled pyrite-chalcopyrite mineralization occurs within a 300 metre wide steeply dipping, northwest striking guartz-carbonate altered fault zone. The fault zone is characterized by silicified fragments of syenite, microdiorite, greenstone, and altered sedimentary rocks cut by several episodes of guartz and carbonate veins.

#### RO Lead Silver Occurrence (MINFILE 92P 006)

The RO occurrence is situated to the north of Friendly Lake and consists of disseminated galena, pyrite and chalcopyrite in fine-grained andesitic rock or microdiorite that is strongly altered to bluish richterite, pyroxene, chlorite and calcite. Chalcedony occurs in veins and as small. Irregular masses in skarn rocks. Similar mineralization and alteration occurs to the east, near the eastern margin of the Friendly Lake complex and to the northwest, between the two main monzonite-syenite stocks (Gamble and Farmer, 1986).

#### FL Copper Lead Zinc Arsenic Occurrence (MINFILE 092P 134)

The FL occurrence is located near the northeast shore of Friendly Lake, along the eastern margin of the Friendly Lake Intrusive Complex. Mineralization consists of disseminated fine-grained pyrite with traces of chalcopyrite, galena, sphalerite, molybdenite and arsenopyrite in a brecciated and carbonate-sericite-chlorite altered biotite hornfels derived from a mafic volcanic protolith, probably Nicola Group rocks. Breccia fragments are more strongly mineralized than the matrix.

#### Other Occurrences

A few hundred metres south of the Bogg occurrence, elevated gold values are associated with quartz veins and K-feldspar alteration in syenite. Only trace amounts of sulphide are present and a 1.4 metre chip sample collected by Placer contained 2.71 gpt Au (Edwards, 1991). A number of other copper and/lead-silver mineral occurrences have been located on the property but little information concerning them is available in the records.

#### AIRBORNE GEOPHYSICAL SURVEY

On May 18, 2004, Fugro Airborne Surveys completed an helicopter-borne magnetic survey of the Friendly Lake property for Lithic. Flight lines were oriented along a due E-W direction and were spaced 100 metres apart. The survey comprised a total of 756 kilometres, including 73 kilometres of tie-lines. The logistics, parameters and data processing for the survey are described in Fugro's report, attached to this report as Appendix A. Figures Five and Six illustrate total magnetic field (reduced to the pole) and calculated vertical magnetic gradient respectively. The total field map shows a number of interesting features. In the central part of the property, a relatively strong positive region roughly corresponds with a large syenitic intrusive mapped by Schiarizza and Israel (2001) although it is somewhat displaced and suggests a more complex margin. A second syenite body mapped by them immediately to the north of the RO occurrence is reflected by a negative rather than a positive region, suggesting that it is in fact a different type of intrusive.

Various positive responses in the northwestern part of the property are probably related to volcanic units in the Nicola Group and the mainly sedimentary Nicola Group units in the southwest do not have a magnetic expression. Finally, a strong positive region in the southeast corner of the claims probably reflects the presence of a younger basalt noted here by previous workers.

#### CONCLUSIONS AND RECOMMENDATIONS

Recent regional mapping by the BC Geological Survey resulted in an entirely new geological interpretation of the Friendly Lake area, revealing the property to be underlain by a large complex of syenitic to microdioritic intrusives and related intrusion breccias, skarn and pyrite-silica alteration. The presence of a large alkalic intrusive/hydrothermal system together with numerous mineral occurrences, extensive previously established and untested soil anomalies in copper and lead and the presence of gold and PGE suggest excellent potential for Mt. Polley or Afton style copper-gold±PGE deposits at Friendly Lake.

In May 2004, Lithic Resources Ltd. commissioned Fugro Airborne Surveys to carry out a detailed airborne magnetic survey over the Friendly Lake property as part of a \$400,000 program of exploration including geological mapping, prospecting, soil sampling and an induced polarization survey. The airborne survey was intended to aid in detailed geological mapping which would otherwise be hindered by extensive drift cover.

A total of 756 kilometres of survey were flown along E-W lines spaced 100 metres apart. The results of the survey suggest the presence of a number of features that were not revealed by regional geological mapping and particularly that the distribution of intrusives on the property is different than mapped. A thorough interpretation of the airborne data will form part of the detailed geological mapping exercise.

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#### CERTIFICATE

- I, C.F. Staargaard, of 5650 Ptarmigan Place, North Vancouver, B.C., hereby certify that:
  - a) I am the President of Lithic Resources Ltd. with offices at 912-510 West Hastings St., Vancouver, B.C.
  - b) I have the following degrees:

1977	B.Sc.	Geology	The Pennsylvania State University
1981	M.Sc.	Geochemistry	Queen's University, Kingston, Ontario

- c) I am a member in good standing of the Association of Professional Engineers and Geoscientists of British Columbia, a Fellow of the Society of Economic Geologists and a Member of the Society for Geology Applied to Mineral Deposits.
- d) I have been continuously employed in mineral exploration in Canada and elsewhere in the world since 1979 and seasonally since 1975.
- e) This report is based on information available in the public record, certain unpublished private reports from previous operators and my personal observations on the property.

Dated this 17th day of August, 2004 in Vancouver, B.C.

C.F. Staargaard, M.Sc., P.Geo.

### APPENDIX A

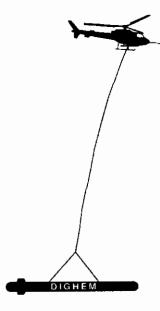
FUGRO REPORT ON AIRBORNE MAGNETIC SURVEY

### FUGRO AIRBORNE SURVEYS



Report #04043

### FUGRO SURVEY FOR LITHIC RESOURCES LTD FRIENDLY LAKE PROPERTY BRITISH COLUMBIA



Fugro Airborne Surveys Corp. Mississauga, Ontario Amir H. Soltanzadeh Geophysicist

June 14, 2004

Fugro Airborne Surveys, 2270 Argentia Road, Unit 2, Mississauga, Ontario, Canada, L5N 6A6 Phone: 1 905 812 0212, Fax: 1 905 812 1504

### 1. INTRODUCTION

This report describes the logistics and processing of an airborne magnetic survey carried out for Lithic Resources Ltd., over the Friendly Lake Property in south-central British Columbia. On April 6, 2002 Fugro Airborne Surveys was contracted to provide helicopter borne survey coverage of the Friendly Lake Property. Survey flying commenced on May 12, 2004 and was concluded on May 18, in a total of 6 production flights. Total coverage of the survey block amounted to 756 km, including 73 km of tie lines

The survey employed a magnetometer, radar, laser, and barometric altimeters, video camera, analog and digital recorders, and an electronic navigation system. The instrumentation was installed in an AS350B2 turbine helicopter (Registration C-FAHE) which was provided by Northern Air Support Helicopters. The helicopter flew at an average airspeed of 100 km/h with a magnetometer sensor suspended 27.7 metres below giving the magnetic sensor an average terrain clearance of 50 metres.

Section 2 provides details on the survey equipment, the data channels, their respective sensitivities, and the navigation/flight path recovery procedure.

# Location

A single area, designated the Friendly Lake Property, was defined for the survey. Coordinates for the survey block, expressed in both local UTM (NAD83, Zone 10 N) and WGS84 LAT-LONG coordinates are listed below:

CORNER	X			LATITUDE
1	667919	5726162	-120° 34' 20"	51° 39' 41"
2	670912	5726266	-120° 31' 44"	51° 39' 41″
3	670924	5725811	-120° 31' 44"	51° 39' 26"
4	671424	5725825	-120° 31' 18"	51° 39' 26"
5	671481	5724308	-120° 31' 18"	51° 38' 37"
6	672505	5724337	-120° 30' 24"	51° 38′ 37″
7	672569	5721831	-120° 30' 26"	51° 37' 16"
8	676505	5721949	-120° 27' 01"	51° 37' 15"
9	676556	5720987	-120° 27' 00"	51° 36' 44"
10	678537	5721033	-120° 25' 17"	51° 36' 43"
11	678671	5717070	-120° 25' 17"	51° 34' 35"
12	668223	5716714	-120° 34' 20"	51°34' 35"

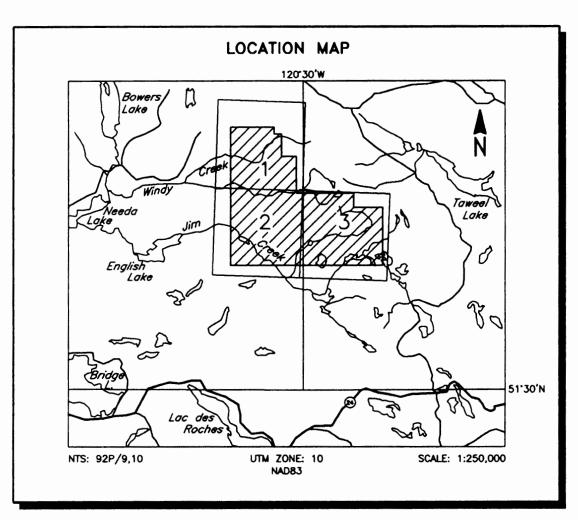


Figure 1. Location Map

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# 2. SURVEY EQUIPMENT

# **Survey Parameters**

Navigation:	Global Positioning System
Measurement Interval:	0.1 second magnetic
Airspeed (nominal):	50 knots
Measurement spacing:	2.8 metres (Magnetics)
Airborne Digital Record:	Radar Altimeter Laser Altimeter Total Magnetic Field Time (local and GPS) Global Positioning (GPS) data Barometric Altimeter Temperature
Base Station Record:	Ambient Total Magnetic Field Global Positioning (GPS) data Time (local and GPS)
Traverse Line Spacing:	100 metres
Control Line Spacing:	1000 metres
Nominal Terrain Clearance:	50 meters (20 metres above canopy)
Traverse Line Direction:	East-West (88°/268°)
Control Line Direction:	North-South (358°/168°)

This section provides a brief description of the geophysical instruments used to acquire

the survey data.

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# - 2.2 -

# Magnetometer

Model:	Fugro AM102 counter with Geometrics G-822 sensor
Туре:	Optically pumped cesium vapour
Sensitivity:	0.01 nT
Sample rate:	10 per second

The magnetometer sensor is housed in the mag bird, 27.7 m below the helicopter.

# **Magnetic Base Stations**

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Model:	Fugro CF-1 processor with built-in Marconi GPS receiver, with Scintrex CS-2 sensor
Туре:	Digital recording cesium vapour
Sensitivity:	0.01 nT
Sample rate:	1 per second

A digital recorder is operated in conjunction with the base station magnetometer to record the diurnal variations of the earth's magnetic field. The clock of the base station is synchronized with that of the airborne system to permit subsequent removal of diurnal variations.

### - 2.3 -

## Radar Altimeter

Manufacturer: Honeywell/Sperry Model: RT330 Type: Short pulse modulation, 4.3 GHz Sensitivity: 0.3 m

The radar altimeter measures the vertical distance between the helicopter and the ground. Distance of 27.7m can be subtracted from this height to give the terrain clearance of the magnetic bird.

# **Barometric Pressure and Temperature Sensors**

Model: DIGHEM D 1300

Type: Motorola MPX4115AP analog pressure sensor AD592AN high-impedance remote temperature sensors

Sensitivity: Pressure: 150 mV/kPa Temperature: 100 mV/°C or 10 mV/°C (selectable)

Sample rate: 10 per second

The D1300 circuit is used in conjunction with one barometric sensor and up to three temperature sensors. Two sensors (baro and temp) are installed in the mag console in the aircraft, to monitor pressure and internal operating temperatures. A third sensor is used to monitor temperature changes outside the helicopter.

### Laser Altimeter

Manufacturer:	Optech
Model:	G150
Туре:	Fixed pulse repetition rate of 2 kHz
Sensitivity:	±5 cm from 10ºC to 30ºC ±10 cm from -20ºC to +50ºC

The laser altimeter is housed on the helicopter skid gear, and measures the distance from the aircraft to the ground, except in areas of dense tree cover. Distance of 27.7m can be subtracted from this height to give the terrain clearance of the magnetic bird.

# **Digital Data Acquisition System**

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Manufacturer:	Fugro Airborne Surveys
Model:	PDAS
Recorder:	64 Mbyte flash card

The output of the magnetometer, altimeters and ancillary sensors, together with GPS coordinates were recorded digitally on a 64 Mbyte flash card and are downloaded to the field workstation PC at the survey base for verification, backup and preparation of in-field products.

# Video Flight Path Recording System

Camera Type:	Panasonic VHS Colour Video Camera
Model:	WV-CL322
VCR Type:	Panasonic VHS
Model:	AG-720

Fiducial numbers are recorded continuously and are displayed on the margin of each image. This procedure ensures accurate correlation of analog and digital data with respect to visible features on the ground.

# Navigation (Global Positioning System)

Airborne Receiver

Model:	Novatel GPSCard 3152
Туре:	SPS (L1 band), 12-channel, C/A code at 1575.42 MHz,
Sensitivity:	-132 dBm, 0.5 second update

GPS data was collected in WGS 84 Lat/Lon format and converted to NAD83 UTM (Zone 10 North) Easting and Northing, using the following parameters:

### Projection Description:

Datum:	NAD83
Ellipsoid:	NAD83
Projection:	UTM Zone 10N
Central Meridian:	123° W
False Northing:	0.0
False Easting:	500000.0
Scale Factor:	0.9996
WGS84 to Local Conversion:	Molodensky
Datum Shifts:	DX: 0 DY: 0 DZ: 0

### **Field Workstation**

A PC is used at the survey base to verify data quality and completeness. Flight data are transferred to Geosoft databases and the data are calibrated and inspected on flight by flight basis, to confirm that data recording took place within survey specifications. Digital data were duplicated on-site to help prevent data loss.

## Personnel

#### Field operations

Troy Will Dilip Balachandran Trevor Mitchel Geophysical System Operator Geophysical System Operator Pilot (Northern Air Support)

#### Fugro Airborne Surveys Mississauga Office

David Miles Emily Farquhar Amir H. Soltanzadeh Mike Cain Duane Griffith Lyn Vanderstarren Albina Tonello Manager, Helicopter Operations Manager, Data Processing and Interpretation Geophysical Data Processor Supervisor Field Processing Supervisor Field Operations Drafting Supervisor Secretary/Expeditor

### 3. DATA PROCESSING

### Base Maps

Base maps of the survey area have been produced from the TRIM dataset provided by Lithic at 1:20 000 scale.

### **Total Magnetic Field**

A fourth difference was calculated from the raw total magnetic intensity data (TMI). The raw TMI was examined in profile form along with the fourth difference. Spikes and duplicate points were manually defaulted and interpolated with an Akima spline. None of the defaulted areas exceeded one second in length. The diurnal variations recorded by the base station were edited for any cultural contamination and filtered to remove high-frequency noise. This diurnal magnetic data was then subtracted from the despiked TMI to provide a first order diurnal correction. An average base value of 56760 nT was added back to the diurnal corrected airborne total magnetic field records. The diurnal removed magnetic field data was then gridded and compared to a grid of the despiked magnetic data to ensure that the data quality was improved by diurnal removal.

The lag in the magnetic data was calculated from observing the diurnally corrected grid and applied to the survey data. A vertical gradient was calculated from the lagged magnetic data and examined for evidence of lag and leveling problems. The lag of -1.6 seconds seemed appropriate for the survey data and few leveling errors were noted. Tie line leveling was only used on lines which had two intersections with tie lines. Manual adjustments were applied to any lines that required additional leveling, as indicated by shadowed images of the gridded vertical gradient. To remove any short wavelength residual line to line discrepancies in the total field magnetics, a micro leveling technique was used to remove errors of less than 2 nT striking parallel to the line direction.

### Pole Reduction of Total Magnetic Field

The Total Field magnetic grid was 'Reduced to the Pole' by applying frequency domain operations using a two-dimensional Fourier Transform. The magnetics were reduced from the local magnetic environment as characterized by the following parameters: Local magnetic inclination: 72.8 degrees

Local magnetic declination: 19.4 degrees

### **Calculated Vertical Magnetic Gradient**

The Pole Reduced Total Magnetic Field data is subject to a processing algorithm which enhances the response of magnetic bodies in the upper 500 m and attenuates the response of deeper bodies. The resulting vertical gradient map provides better definition and resolution of near-surface magnetic units. It also identifies weak magnetic features which may not be evident on the total field map. However, regional magnetic variations and changes in lithology may be better defined on the total magnetic field map.

### **Contour & Colour Map Displays**

The geophysical data are interpolated onto a regular grid using a bidirectional spline technique. The resulting grid is suitable for generating contour maps of excellent quality. The grid cell size is 20 m, one fifth of the traverse line spacing. A 3 point hanning filter is applied to all the grid products to smooth them for presentation.

Colour maps are produced by interpolating the grid down to the pixel size. The parameter is then incremented with respect to specific amplitude ranges to provide colour "contour" maps. Colour maps of the total magnetic field are particularly useful in defining the lithology of the survey area.

### 4. PRODUCTS

This section lists the final maps and products that have been provided under the terms of the survey agreement. Other products can be prepared from the existing dataset, if requested. Most parameters can be displayed as contours, profiles, or in colour.

### **Final Products**

Table 4-1 lists the maps and products which have been provided under the terms of the survey agreement.

## Table 4-1 Survey Products

1. <u>Colour Maps</u> (2 sets) @ 1:10,000

Total magnetic field Reduced to the Pole Calculated vertical magnetic gradient of Pole Reduced magnetics

#### 2. Additional Products

Digital Geosoft XYZ formatted ASCII data (CD-ROM) Digital grid archives in Geosoft GRD format (CD-ROM) Survey report (2 copies)

All maps were presented with appropriate title block, colour bar definitions, base map underlay, superposed flight path and UTM/Lat-Long reference grid.

# 5. CONCLUSION

This report provides a very brief description of the survey results and describes the equipment, data processing procedures and logistics of the survey.

It is recommended that additional processing of existing geophysical data be considered, in order to extract the maximum amount of information from the survey results. Current software and imaging techniques often provide valuable information on structure and lithology, which may not be clearly evident on the current colour maps. These techniques can yield images that define subtle, but significant, structural details.

Respectfully submitted,

### FUGRO AIRBORNE SURVEYS CORP.

Amir H. Soltanzadeh, P.Eng Geophysicist

# APPENDIX A

## **BACKGROUND INFORMATION**

# Magnetic Responses

The measured total magnetic field provides information on the magnetic properties of the earth materials in the survey area. The information can be used to locate magnetic bodies of direct interest for exploration, and for structural and lithological mapping.

The total magnetic field response reflects the abundance of magnetic material in the source. Magnetite is the most common magnetic mineral. Other minerals such as ilmenite, pyrrhotite, franklinite, chromite, hematite, arsenopyrite, limonite and pyrite are also magnetic, but to a lesser extent than magnetite on average.

In some geological environments, an EM anomaly with magnetic correlation has a greater likelihood of being produced by sulphides than one which is non-magnetic. However, sulphide ore bodies may be non-magnetic (e.g., the Kidd Creek deposit near Timmins, Canada) as well as magnetic (e.g., the Mattabi deposit near Sturgeon Lake, Canada).

Iron ore deposits will be anomalously magnetic in comparison to surrounding rock due to the concentration of iron minerals such as magnetite, ilmenite and hematite.

Changes in magnetic susceptibility often allow rock units to be differentiated based on the total field magnetic response. Geophysical classifications may differ from geological classifications if various magnetite levels exist within one general geological classification. Geometric considerations of the source such as shape, dip and depth, inclination of the earth's field and remanent magnetization will complicate such an analysis.

In general, mafic lithologies contain more magnetite and are therefore more magnetic than many sediments which tend to be weakly magnetic. Metamorphism and alteration can also increase or decrease the magnetization of a rock unit.

Textural differences on a total field magnetic contour, colour or shadow map due to the frequency of activity of the magnetic parameter resulting from inhomogeneities in the distribution of magnetite within the rock, may define certain lithologies. For example, near surface volcanics may display highly complex contour patterns with little line-to-line correlation.

Rock units may be differentiated based on the plan shapes of their total field magnetic responses. Mafic intrusive plugs can appear as isolated "bulls-eye" anomalies. Granitic intrusives appear as sub-circular zones, and may have contrasting rings due to contact metamorphism. Generally, granitic terrain will lack a pronounced strike direction, although granite gneiss may display strike.

Linear north-south units are theoretically not well-defined on total field magnetic maps in equatorial regions due to the low inclination of the earth's magnetic field. However, most

stratigraphic units will have variations in composition along strike that will cause the units to appear as a series of alternating magnetic highs and lows.

Faults and shear zones may be characterized by alteration that causes destruction of magnetite (e.g., weathering) that produces a contrast with surrounding rock. Structural breaks may be filled by magnetite-rich, fracture filling material as is the case with diabase dikes, or by non-magnetic felsic material.

Faulting can also be identified by patterns in the magnetic total field contours or colours. Faults and dikes tend to appear as lineaments and often have strike lengths of several kilometres. Offsets in narrow, magnetic, stratigraphic trends also delineate structure. Sharp contrasts in magnetic lithologies may arise due to large displacements along strike-slip or dip-slip faults.

## APPENDIX B

# **ARCHIVE DESCRIPTION**

Geosoft XYZ and GDB ARCHIVE SUMMARY -----

JOB #:04043TYPE OF SURVEY:MAGNETICSAREA:Friendly Lake Property, British ColumbiaCLIENT:Lithic Resources Ltd. JOB #

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SURVEY DATA FORMAT: 

NUMBER OF DATA FIELDS : 16

	CHANNEL	SAMPLE RATE	UNITS	DESCRIPTION
1	Х	10	meters	UTM Easting, NAD 83 Zone 10
2	Y	10	meters	UTM Northing, NAD 83 Zone 10
3	FID	10	S	fiducial
4	ALTLASER	10	meters	laser altimeter
5	Baro	10	meters	barometric altimeter
6	Z	10	meters	GPS altimeter
7	RADALT	10	feet	radar altimeter
8	GPS_LAT	5	Dec. Degrees	GPS Latitude WGS84
9	GPS_LON	5	Dec. Degrees	GPS Longitude WGS84
10	GPS_SSM	1	seconds	GPS seconds of the day
11	MAG	10	nT	Raw TMI
12	MAG_4TH	10	nT	Fourth difference of the TMI
13	DIURNAL	10	nT	base station diurnal monitor
14	MAGD_LAG	10	nT	TMI, diurnal corrected and lagged
15	MAGD_FINAL	10	nT	TMI Final
16	LINE	10		line number

ISSUE DATE :June 15, 2004 FOR WHOM :Lithic Resources Ltd. BY WHOM :Fugro Airborne Surveys Corp. 2270 Argentia Road, Unit 2 Mississauga, Ontario, Canada L5N 6A6 TEL. (905) 812-0212 FAX (905) 812-1504

### APPENDIX B

## STATEMENT OF COSTS

May 12-18, 2004

helicopter-borne magnetic survey 756 line-km @ \$100.53/line-km

\$76,000.00

