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REPORT ON GEOLOGICAL MAPPING AND SAMPLING OF GOLD OCCURRENCES

Laird Lake Property
Red Lake Mining Division, Ontario

N T S 52 L/16

for

Black Cliff Mines Limited

Toronto, Ontario
November 1988

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Introduction

Black Cliff Mines Limited of Toronto, Ontario, carried out an exploration program on the Laird Lake property near Red Lake, Ontario, during the 1988 field season.

This report describes the results of geological mapping and sampling. The work was completed by a three man field party which included the writer and two junior geologists.

Property Location and Access

The property is located about 16 miles southwest of the town of Red Lake within Killala Township. Access to the property is via Highway 618 and the Flat Lake - Suffel Lake gravel road (Figure 1). The gravel road connects to Highway 618 about 2 km south of the town of Madsen. From the paved highway to the north-central part of the claim block, the distance is about 12 km along the gravel roads. Access to the south part of the property can also be gained by boat via Medicine Stone Lake.

Aircraft charters, supplies and services are available in Red Lake, a mining town with about 2000 inhabitants.

Property

The Laird Lake property consists of 68 contiguous unpatented mining claims in Killala Township, District of Kenora, Red Lake Mining division. The claim map is shown in Figure 2. The claims have a total area of 2,720 acres. The claim numbers, recording dates and due dates are listed below.

Claim No.	Acres	Recording Date	Due Date
KRL 903703-720 incl.	40 each	Aug 18/86	Aug 18/89
KRL 976955-958 incl.	40 each	July 6/87	July 6/90
KRL 976960-988 incl.	40 each	July 6/87	July 6/90
KRL 976998-977 incl.	40 each	July 6/87	July 6/90
KRL 977002-004 incl.	40 each	July 6/87	July 6/90
Total	2,720 acres		

Previous Work

The Laird Lake property has been intermittently explored for gold since 1936. A good summary of early exploration work is given by N. Willoughby's 1988 company report for Black Cliff Mines. The early exploration work included trenching, sampling and diamond drilling. A total of about 13,000 feet was drilled between the

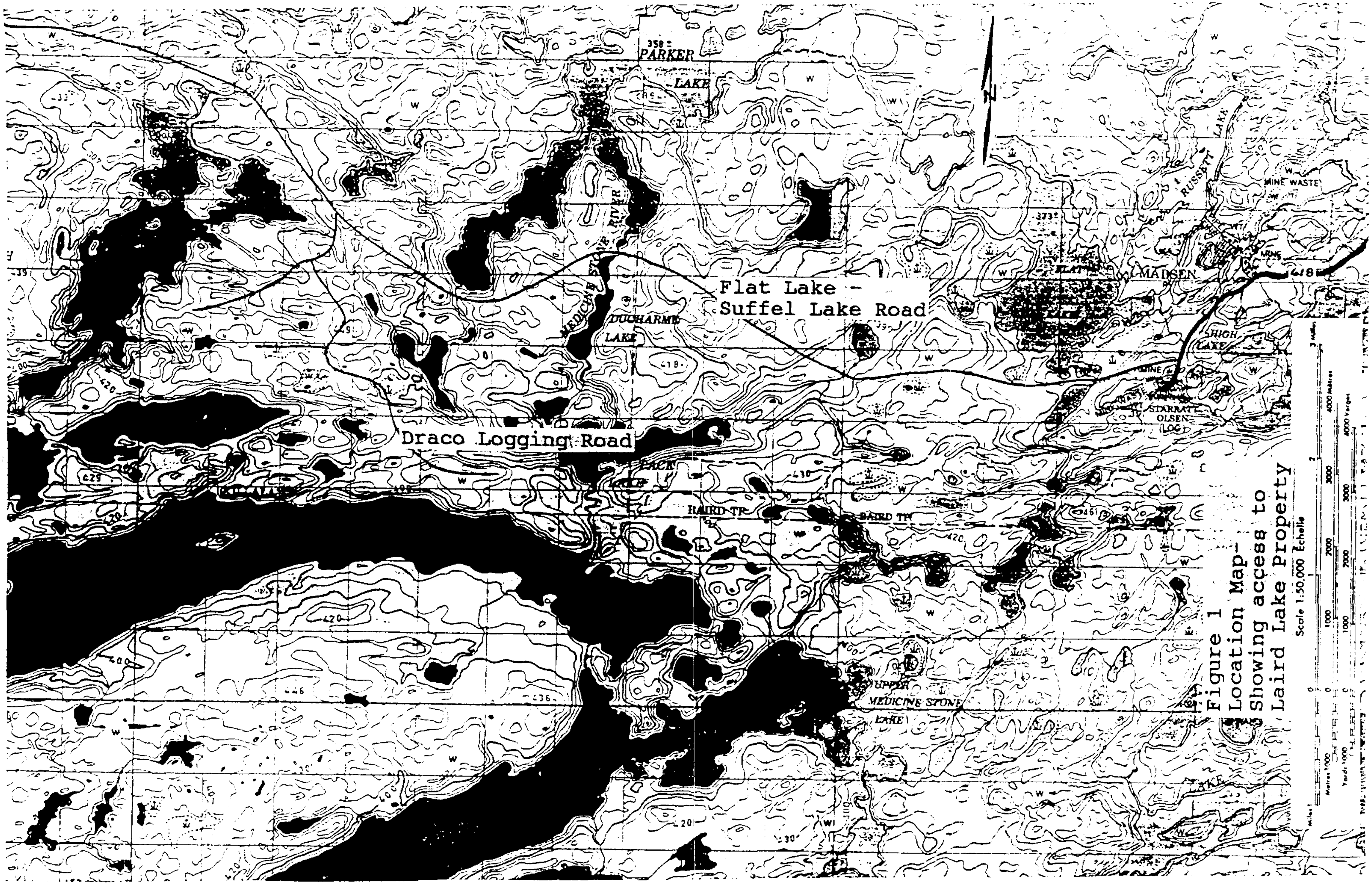
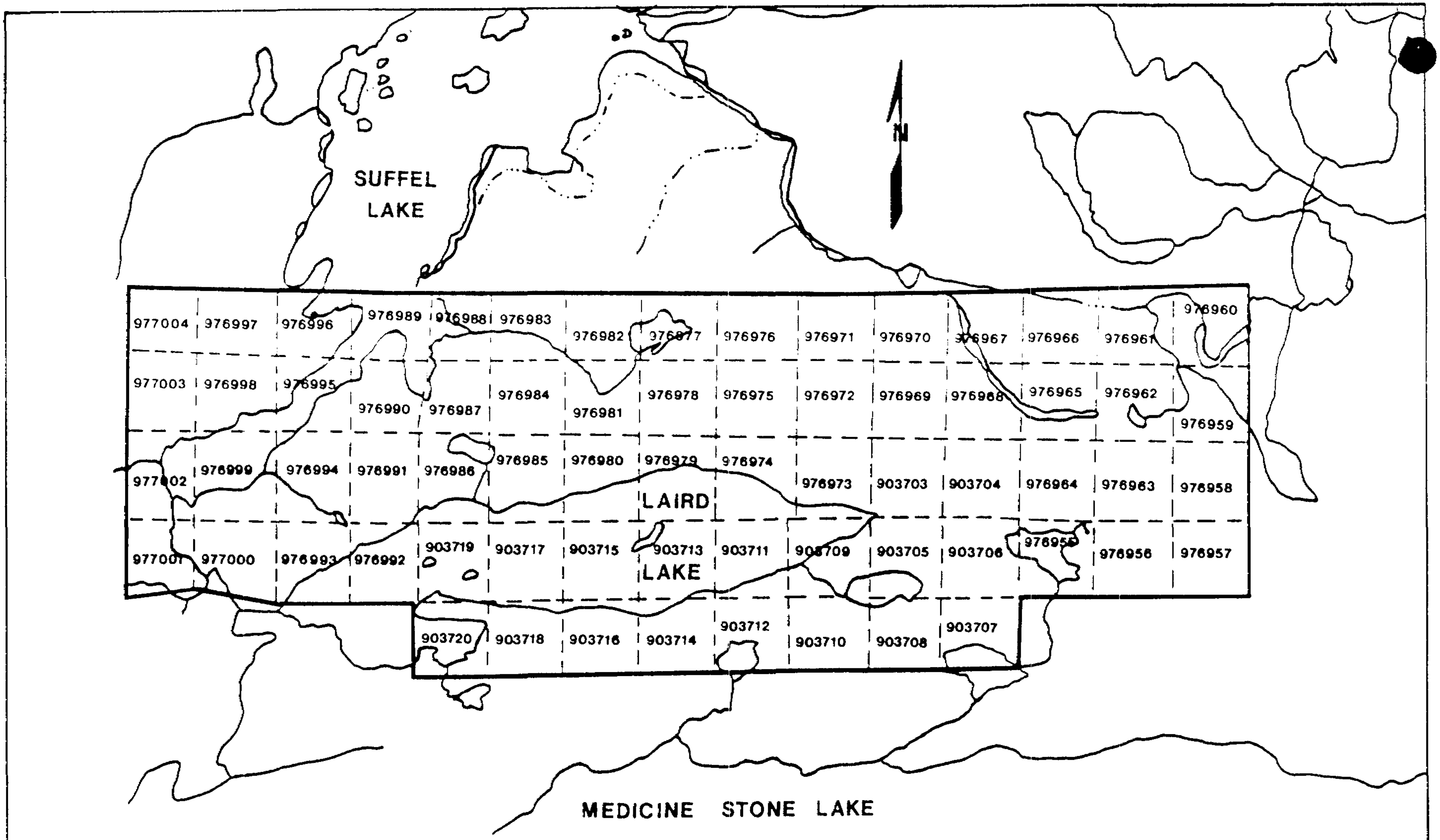


Figure 1
Location Map-
Showing access to
Laird Lake Property



PORTION OF CLAIM MAP OF KILLALA TWP.

scale 1" = 1/2 mile

figure 2

years 1937 to 1964. Most of the drill holes were short, about 100 feet or so.

The diamond drilling was concentrated in three areas:

1. Near the south shore of Laird Lake. These drill holes fall approximately between lines 24+00W and 40+00W of the present grid.
2. At the southeast tip of Laird Lake.
3. Between "Small Lake" and "Arrowhead Lake" (see geological map of this report for location of lakes).

Although the exact drill hole locations are not known, it appears that three types of targets were drilled:

a. Quartz veins in sheared volcanics
b. Sheared sulfide-rich mafic volcanics or possibly iron formation
c. Sheared feldspar porphyries with sulfides.

Assay results are not available for most of the drill holes.

The best samples from trenches assayed 0.1 to 0.2 oz/t Au.

In 1978 the Ontario Geological Survey completed airborne electromagnetic and magnetic surveys. No Input EM anomalies were detected over the area of the property. The airborne magnetic survey (Map No. P 1578) revealed a large elliptical shaped magnetic high over Laird Lake.

In 1987 Black Cliff Mines undertook line cutting, geological mapping and sampling (Willoughby 1987, internal company report). The geological mapping broadly outlined the distribution of mylonites and mafic volcanics. Sampling of old trenches revealed gold bearing zones of 1 to 3 feet width. The best assays obtained on samples from trenches were in the order of 0.1 to 0.2 oz/t Au.

In 1988 VLF EM and ground magnetometer surveys were completed over the area of the property (Hlava 1988). The VLF survey detected several EW to ENE trending EM anomalies. The magnetic survey outlined the distribution of mafic volcanics on the property.

During the summer of 1988 an IP survey was completed over part of the property. The area covered was N and S and E of Laird Lake. Some of the IP anomalies are linear in nature and have an E-W trend.

Regional Geology and Gold Mineralization

The Red Lake greenstone belt belongs to the Uchi Subprovince which is part of the Archean Superior Structural Province. Both tholeiitic and calc-alkaline volcanic rocks are present. Few ultramafic flows are associated with the tholeiitic basalts. Few meters wide ferruginous sedimentary rocks and cherts are interlayered with the mafic and felsic volcanics. Conglomerates, wackes and slates overlie the mafic volcanics. Late felsic intrusives intrude the volcanic rocks. Apart from three batholiths, the Killala-Baird batholith, the Trout Lake batholith and the Gullrock Lake batholith, several smaller stocks of granodiorite, diorite and gabbro are scattered throughout the area.

Several NE to NW trending zones of ductile deformation were recognized in the Red Lake area. The present and past producing gold mines are located along these deformation zones. Gold mineralization at the past producing Madsen and Starratt-Olsen mines is controlled by the Flat Lake - Howey Bay shear zone. These mines are located about 10 km ENE of the Laird Lake property. It is likely that the Flat Lake - Howey Bay deformation zone continues further SW and W of the Starratt-Olsen mine and cuts through the Laird Lake property.

In the Red Lake mining camp gold was found in a variety of rock types:

a. Sheared, biotitized mafic volcanics (e.g. Madsen Mine)
b. Silicified shears within granitic rocks (e.g. MacKenzie, Gold Eagle and Gold Shore Mines)
c. Auriferous quartz veins hosted by iron formation (e.g. MacFinley deposit and Redaurum Red Lake Prospect; Willoughby 1988).

Sheared mafic volcanics and mylonitic felsic intrusives as well as iron formations occur on the Laird Lake property.

Exploration Program

Geological mapping was carried out at a scale of 1:2,500. A metric grid with 100 m spaced lines and 25 m stations was used for topographic control. The mapping was completed during the periods July 25 to Sept. 1 and Sept. 13 to Sept. 17.

A total of 129 rock samples were collected and analyzed for gold.

The following persons carried out the work:

Arpad Farkas, PhD	Toronto
Viera Kovac, BSc	Windsor
Paul Caraccio, BSc	Ottawa

In addition to geological mapping, the writer also supervised the program.

Description of Map Units

Basalts and their sheared equivalents.

Dark green colored massive to pillowed basalts outcrop along the north and south shores of Laird Lake (Map unit 1a). In general, due to the deformation which took place during regional metamorphism, the pillows are poorly preserved. As a consequence, the facing of the basalt flows cannot be determined. The strike of the flows is ENE. The basalts are fine grained, less commonly medium grained, dark green colored. Rare gabbroic textured basalts with 1/2 mm grain size can be seen on the south shore of Laird Lake (23+00W, 6+50S). At a few places, adjacent to the contact of basalt and granodiorite, weak to moderate intensity hornfelsic textures developed. The hornfelsed basalts are characterized by coarser grain size or by the development of hornblende porphyroblasts (Map unit 1d).

The sheared basalts (Map unit 1am) are well foliated, schistose less commonly, phyllitic rocks. In general, they are dark green colored, chloritized. Biotite altered, brownish grey to greenish brown sheared basalts outcrop at a few places. The high density of foliation planes (1 to 10 C surfaces or to use an equivalent term mylonite foliation planes per 1 cm of thickness of rock) indicate the presence of ductile (mylonitic) shear. (See Berthe et al 1978 and White et al 1980). In general, compositional layering in the sheared, chloritized basalts did not develop. The more deformed, biotite altered sheared basalts are locally characterized by incipient compositional layering. Biotite-chlorite-rich bands alternate with feldspar-rich bands. The biotite alteration develops along the foliation planes via replacement of chlorite. At a few places, due to intensive alteration and shearing biotite schists develop (e.g. old trench located at 39+00W, 11+00S). The biotite schist occurs as lense-like bodies of 1 m by 5 m dimensions within less sheared rocks (phyllonites). The intensive shearing and biotitic alteration is accompanied by quartz stringers and veinlets of 2 to 20 cm width. The pinching and swelling quartz veins are emplaced parallel to the mylonite foliation. The total volume of quartz veins is only 10%

or so within the shear zone. Apart from this locality (39+00W, 11+00S) no significant quartz veining was noted. As the boundaries of the shear zones are approached, the greyish brown colored, biotite altered basalts give way to greenish grey to green colored chloritized basalts.

Pillowed amygdoloidal basalt flows outcrop on the north shore of Laird Lake. Intensive mylonitic shearing resulted in the development of phyllonites. The phyllitic zones are 1/2 m to few meters wide. They are characterized by pale green, chloritic alteration. At places, the basalts along the north shore of Laird Lake are characterized by weak to moderate silicification. The silicification is either confined to pillow selvages or to patches of 1 by 5 m dimensions. These silicified patches are lighter colored, beige weathering. The silicification is probably the result of seafloor fumarolic activity. The silicification did not affect the phyllonites.

Mafic lapilli tuff (Map unit 1b) outcrops only at one locality (31+00W, 9+80S). Nearly all the fragments appear to be from mafic volcanics. There are a few beige weathering felsic pumice-like fragments which are highly vesicular. Fine grained, dark green colored mafic tuffs associated with exhalative cherts outcrop at a few localities.

Intrusive rocks and their sheared equivalents.

Gabbro (Map unit 2a)

Small stocks and elongate sheet-like bodies of weakly to fairly foliated equigranular gabbro intrude the basalts and granodiorites south and east of Laird Lake. The latest geological map of the area published by the O.G.S. in 1966 (Map No. 338) classifies these rocks as gabbroic greenstones (i.e. coarse grained, massive basalt flows). Field observations made during the present mapping program supply evidence for the intrusive nature of these rocks. In addition to intruding into the basalts, the gabbro also intrudes granodiorite and mylonitic granodiorite. In many cases when the gabbro intrudes into the mylonitic granodiorite, the gabbro itself is not sheared. Locally late shearing also affects the gabbro. These age relationships prove that the gabbro is much younger than the mafic volcanics and rule out the possibility that the gabbro is a high level intrusive associated with mafic volcanism.

The gabbro is black to greenish black colored medium grained, equigranular rock. The texture and grain size are fairly uniform. Commonly the chilled margins are thin, poorly developed. The sheared gabbros are characterized by good preferred orientation of amphibole prisms. Texturally the sheared gabbro resembles amphibolites. In nearly all the sheared rocks the amphiboles are stable phases. Rarely, chloritic or epidotic alteration of the sheared gabbro was noted. At one locality (18+60W, 9+85S), discontinuous quartz veins of 2 to 20 cm width occur in the sheared gabbro. In a 20 cm wide zone around this quartz vein, the gabbro contains 1 to 5% disseminated pyrite.

The larger gabbro bodies form prominent outcrops south of Laird Lake. The sheetlike bodies have an ENE trend.

The porphyritic gabbro (Map unit 2b) forms dykes of few meters width and sheet-like bodies of 25 to 50 m width. The rock is characterized by 20 to 50% feldspar phenocrysts which are 1 mm to 1 cm long. The feldspars occur in a fine to very fine grained black colored matrix which is rich in mafic minerals. The feldspars have a moderate to fairly developed preferred orientation. This is the result of regional metamorphism. The porphyritic gabbro intrudes basalts, granodiorites, felsic mylonites and at places it appears to truncate bodies of equigranular gabbro. Locally late shearing affects the porphyritic gabbro. When the shearing is intensive, the porphyritic texture is destroyed. In the sheared rocks amphiboles are stable minerals.

Ultramafic rocks

Two types of ultramafic rocks occur in the map area: a fine grained peridotite or komatiitic flow and a coarse grained equigranular hornblendite (Map units 3a and 3b). A fine grained, greyish brown to buff weathering partially serpentinized ultramafic rock outcrops only at one locality on the south shore of a peninsula in Laird Lake (43+00W, 10+70S). Due to the fine grain size and the serpentinization, diagnostic textures which would indicate an intrusive or a komatiitic flow, were not seen. Since komatiitic flows are known to be associated with the Red Lake area mafic volcanics (Wallace et al 1986), the fine grained ultramafic is possibly a flow rock. Although the contact of the ultramafic rock with the adjacent granodiorite is not exposed, it is likely that the granodiorite intrudes into the peridotite or komatiite.

Larger bodies of coarse grained, granular textured dark green colored hornblendite occurs at several places both south and east of Laird Lake. Smaller sheet-like bodies of hornblendite which are elongated in a NE to E direction are only a few meters wide. The largest body of hornblendite centered around 19+00W, 6+50S has dimensions of 100 by 400 m. The mineralogical composition is: 90 to 95% hornblende and 5 to 10% of pink feldspars. Although it is certain that the hornblendite is older than the granodiorite, its relative age compared to other intrusives is less certain. Locally, the hornblendite is cut by veinlets and narrow dykes of granodiorite. At a few places agmatitic breccias develop: the brecciated hornblendite is cemented by granodiorite. Around the margin of the larger hornblendite bodies diffuse dioritic to gabbroic patches can be seen. There are two possibilities for the origin of the dioritic patches:

1. They are partially digested xenoliths.
2. They are produced by a reaction of the granodiorite magma with the hornblendite.

The weakly foliated nature of the hornblendite would suggest a late stage intrusive. The granular texture of the rock could be inherited from a precursor pyroxenite.

Diorite

Fine grained diorite dykes which have a width of a few tens of cm to a few meters intrude the felsic mylonites as well as the gabbros and porphyritic gabbros (Map unit 2c). The dykes strike EW to NE. The rocks are medium grained with a subophitic to dioritic texture. Chilled margins are relatively well developed. These dykes are one of the latest intrusives in the map area. The mafic minerals, hornblende and minor amount of chlorite amount to 40 to 60%. The remainder of the rock is fine to medium grained light grey colored plagioclase. At a few localities the diorites contain xenoliths of basalt.

Other types of dioritic rocks which generally occur near gabbros have a gabbroic to dioritic texture. They may be border phases of gabbro sills or stocks.

Pyroxene porphyry

A weakly deformed, medium grained pyroxene porphyry forms small plugs and dykes in the map area. The rock contains 30 to 60% pyroxene phenocrysts which are 1 to 2 mm in diameter. The short stubby pyroxenes are subhedral to anhedral black colored crystals. The pyroxene is probably augite. Although the mafic mineral content is often less than 50%, the presence of abundant pyroxene suggests that the rock is gabbroic rather than dioritic in composition. (Since alkali rocks are not known in the Red Lake area, the rock is unlikely to be a lamprophyre.)

The lack of intensive deformation and the presence of well preserved pyroxenes suggest that these intrusives were emplaced late in the tectonic history. During greenschist facies regional metamorphism, the pyroxenes are expected to react to form amphiboles. The lack of retrograde metamorphism is quite unexpected. Possibly the dyke is post-tectonic. The dykes were probably emplaced during the last stages of mylonitic shearing. Accordingly, it is unlikely that they are subvolcanic rocks which are related to the basalt flows. It is most likely that the pyroxene porphyry is related to the gabbros.

Felsic intrusive rocks and their sheared equivalents

Three different granodiorites can be distinguished on a mineralogical basis:

1. Biotitic granodiorite (Map unit 4a)
2. Leuco-granodiorite (Map unit 4b)
3. Hornblende bearing granodiorite (Map unit 4c)

In addition, there are a few outcrops of a transitional type of granodiorite which contains both biotite and amphibole. On a textural basis one can distinguish medium grained, fine grained and porphyritic granodiorites. Porphyritic granodiorites are much less common than the equigranular ones. Fine grained, dark grey colored biotitic granodiorites and porphyritic granodiorites are confined to an area south and east of Laird Lake. These rocks probably belong to the Medicine Stone Lake intrusive complex. The fine grained, dark grey colored granodiorites occur in NE trending linear belts which are characterized by various degrees of mylonitic shearing. North of Laird Lake the granodiorites are medium to coarse grained; they contain biotite or hornblende or both biotite and hornblende. These coarser grained equigranular granodiorites belong to the Killala-Baird batholith. Within the map area, the latter rocks do not exhibit mylonitic shearing.

The biotitic granodiorites contain about 10% biotite. The fine grained dark grey varieties are locally quartz porphyritic. The 1 mm diameter quartz phenocrysts occur in a fine grained (1/4 to 1/2 mm grain size) quartzo-feldspathic-biotitic groundmass. The quartz phenocrysts are round to eye-shaped. Similar rocks mapped as quartz porphyry dykes (see the following section) differ in two respects from the quartz porphyritic granodiorite:

1. The groundmass is much finer grained (in some cases it is aphanitic).
2. Lack of biotite.

The feldspar and quartz-feldspar porphyritic granodiorites are characterized by abundant feldspar phenocrysts which are up to 1 cm long. When these rocks are sheared, porphyroclastic textures develop.

The granodiorites of the Medicine Stone Lake intrusive are often intruded by gabbro and porphyritic gabbro. Most of the granodiorites predate the mylonitic shearing. A few late granodiorite dykes, which have medium to fine grained equigranular textures, intrude the gabbros. Consequently these dykes postdate the main stage of mylonitic shearing. The Medicine Stone Lake intrusive is probably the result of a multiple stage of magmatism. The fine grained, dark grey colored granodiorite and the quartz porphyritic granodiorite which are common in and around mylonite zones, may have been intruded fairly late, just prior to the main stage of mylonitic shearing.

Leuco-granodiorites which contain only about 1% of mafic minerals are common on a peninsula in Laird Lake (Lines 40+00W to 44+00W, 10+00S). The texture of these rocks varies from medium to coarse grained, equigranular to porphyritic. Pegmatitic patches occur in the coarser grained rocks.

Few small outcrops of hybrid intrusives ranging in composition from granodiorite to diorite can be seen south and east of Laird Lake (Map unit 4c). These rocks contain 20 to 40% hornblende. The variation in mafic mineral content and texture can be seen on individual outcrops. It is likely that these rocks were derived from granitization of mafic volcanics.

Weak mylonitic shearing of dark grey colored fine grained granodiorite and porphyritic granodiorite resulting in the development of protomylonites can be observed on some outcrops. There is also sufficient field evidence to support the geological interpretation that the felsic mylonites and ultramylonites were also derived from granodiorites. The field evidences include observations of relict textures and of less sheared blocks within highly deformed mylonite zones. In the rare cases where outcrop conditions permit, at the boundaries of the shear zone, the felsic mylonites can be traced into less deformed granodiorite. The relict textures which were used as indicators of parent rocks for the felsic mylonites include the presence of quartz and feldspar porphyroclasts. The color and size of quartz porphyroclasts in the felsic mylonites is similar to that of the quartz phenocrysts which occur in some granodiorite. Some of the dark green colored chloritic mylonites contain 1 to 2 cm long porphyroclasts of plagioclase. Without doubt, the parent rock was a highly porphyritic granodiorite which probably contained 20 to 30% amphiboles.

The mineralogical composition of the felsic mylonites is similar to that of the biotitic granodiorite. Most often, the mylonites contain only a minor amount of phyllosilicates (probably not more than what was inherited from the granodiorite). At a few localities, due to newly formed biotite and sericite, more fissile and schistose phyllonites develop. The phyllonite zones are only a few meters wide and appear to be discontinuous along strike. In some of the more intensively sheared mylonites, compositional layering developed. These rocks are characterized by mm to cm wide quartz-rich and feldspar-rich layers. The mylonites including the protomylonitic granodiorites and quartz feldspar porphyries were mapped as felsic tuffs by the O.G.S. (Map No. P 338). Field observations made during the course of the present mapping program negate the presence of any felsic volcanic flows or tuffs in the map area. As it will be seen in the following discussion, most of the undeformed aphanitic felsic rocks which could be mistaken for felsic volcanics are high level late-stage intrusives.

In general, the felsic mylonites contain only minor amounts of disseminated pyrite. The average pyrite content is estimated to be less than 1%. At places, particularly where the mylonitic deformation is more intensive or phyllonites developed, very fine grained disseminated pyrite occurs in 2 to 3% amount. The most prominent pyrite mineralization in felsic mylonites were observed north of "Arrowhead Lake" (Lines 10+00W to 11+00W, 4+00S to 5+00S). At this locality, several moderately phyllonitic zones characterized by the presence of very fine grained biotite and sericite can be seen. The phyllonitic zones are discontinuous and up to 1 m wide. The pyritized zones also appear to be discontinuous.

NE to E striking quartz-porphyry dykes intrude the granodiorites and at places the equigranular gabbro. At 25+65W, 8+60S an Az 95 striking quartz-porphyry dyke with well defined chilled margins intrudes the equigranular gabbro. The larger dykes are over 10 meters wide. Despite their reasonable width, the dykes appear to have a short strike length. The massive to weakly foliated pink to grey colored rocks contain about 5 to 10% of 1 to 3 mm diameter blue or smoky quartz phenocrysts. The quartz grains are round to moderately elongate. In a few dykes, 1 to 2% of feldspar phenocrysts are also present. The phenocrysts occur in a fine grained to aphanitic groundmass. Mylonitic quartz porphyries are often characterized by smoky or blue porphyroclasts of quartz. Since the quartz porphyry is younger than the gabbro, it also must be younger than the mafic volcanism. Whole rock chemical analysis indicates a composition closer to rhyolite than granodiorite. Therefore it is possible that the quartz porphyry is a subvolcanic dyke associated with rhyolitic volcanism. In the Red Lake area, the rhyolitic volcanism postdates the Lower Mafic Sequence. More whole rock chemical data and petrographic study of quartz porphyries would provide a definitive answer.

Rare easterly trending quartz feldspar porphyry dykes intrude the granodiorite. Feldspar porphyry dykes locally intrude the porphyritic gabbro. SE of Laird Lake 100 by 200 m stocks of feldspar porphyry intrude the felsic mylonites. The feldspar porphyry stocks are cut by late shears. Very fine grained to aphanitic pink to grey colored aplite dykes are one of the youngest intrusives in the map area. It is possible that rather than being related to granitic magmatism, these dykes are subvolcanic in nature.

Metasedimentary rocks

Exhalative cherts and ferruginous metasediments outcrop south of Laird Lake. One exhalate unit which strikes about Az 70 is exposed in trenches at 29+60W, 9+00S and at 25+00W, 7+60S. Other exhalite occurrences located at 23+00W, 7+40S and at 19+20W, 7+80S probably represent separate stratigraphic horizons within the mafic volcanics. The cherts are dark grey colored, vaguely banded and contain disseminated or banded pyrite. Pyrite content varies from trace to 3 to 4%. A dark green (bottle green colored) highly siliceous exhalite is more common than the cherts described above. The bottle green colored siliceous exhalite contains a few relict fragments of chert. The dark green color is probably the result of very fine grained iron silicates which are disseminated in a quartz matrix. There are two possible interpretations for the textures observed:

1. Replacement of chert during hydrothermal recrystallization.
2. The chert fragments are a component of a sedimentary breccia. The latter case would assume that the bottle green siliceous exhalite is simply a silicate iron formation without significant recrystallization.

Locally abundant disseminated pyrrhotite (5 to 10%) occurs in the bottle green siliceous exhalite (e.g. at 25+00W, 7+60S). The localized magnetic highs detected by the ground magnetic surveys can be attributed to the presence of pyrrhotite. The pyrrhotite may be epigenetic rather than syngenetic (exhalative). This would explain the short strike extent of the pyrrhotite-rich zones.

The banded cherts are interbedded with 10 to 20 cm wide beds of garnet-rich metasediments. The garnet-rich rocks contain over 80% almandine and minor amounts of disseminated pyrite. They are derived from a lean silicate iron formation. The 1 to 2 mm diameter garnets do not show any sign of cataclastic or mylonitic deformation. This can be taken as indirect evidence that the associated cherts are not related to tectonism. (Because of the abundant mylonites in the map area, it is important to emphasize this point.) The width of the chert and green siliceous exhalite unit ranges from about 0.5 m to possibly 3 m.

Fine grained, dark green colored chlorite-rich mafic tuffs and well foliated biotite-chlorite-rich rocks possibly derived from semi-pelitic sediments are associated with the exhalative chert and silicate iron formation. Within these tuffs and interflow sediments, a 20 cm wide dark green colored exhalative carbonate bed was observed at two localities. The carbonate is massive to banded; it is probably a mixture of ferrous dolomite and calcite. Minor amount of disseminated pyrite occurs in the tuffs and sediments. The pyrite content locally reaches 1 to 2%.

The poor outcrop conditions hinder one from making a reliable estimate of the total thickness of exhalites and tuffs and sediments. A likely thickness could be in the order of 10 meters.

Apart from the garnet-rich beds, no outcrops of sulfide or oxide iron formation were seen. Nevertheless, the following observations suggest the possible presence of iron formations of significant thickness on the property.

1. At 23+25W, 7+50S an angular float of iron formation was found, characterized by fine grained white quartz with 1 cm wide bands of hematite after magnetite.

2. At 29+75W, 12+87S a well rounded massive pyrite boulder with 1/2 m diameter was found. The boulder could have originated from the NE. (SW is the down ice direction during glaciation.)

3. Significant magnetic highs were detected by ground magnetic survey over the ice of Laird Lake.

Gold Mineralization on the Laird Lake Property

Associated with mylonitic shearing

A. In mafic volcanics

At line 39+00W 11+00S, an Az 60 to Az 70 striking shear zone characterized by biotitic alteration and quartz veining can be seen. Old trenches expose the shear zone 15-20 m along the strike. Across the width of the shear, the trench exposes the zone for 2 meters. The degree of biotitic alteration varies from moderate to strong. Intensive alteration results in the local development of biotite schist. The biotite schist is lens-like, discontinuous along strike. The quartz veins are emplaced parallel to the mylonitic foliation. The veins pinch and swell. Their width varies from 2 cm to 20 cm. The dark grey quartz has a minor amount (1/2 to 1%) of pyrite and rarely fine grained visible gold. The assay results indicate that gold also occurs in pyritized wallrocks adjacent to the quartz veins. The pyrite content of the sheared wallrocks can range from 1 to 10%. The total width of the gold bearing zones within the shear varies from a few cm to about 50 cm. Three chip samples over 1/2 m width (approximately the true width) gave the following assay results:

Sample No.	Au (ppb)
18405	5416 (reassay 5319)
18409	1198 (reassay 626)
18410	717

Several grab samples assayed in the 100 to 1700 ppb range.

The smoky quartz veins (averaging 5 cm width) assayed as follows:

Sample No.	Au (ppb)
18315	1620 (reassay 1545)
18317	23192 (reassay 24217)
18318	20163 (reassay 19293)
18320	2686 (reassay 1708)

At 30+05W 9+35S a 40 cm wide rusty weathering shear zone occurs in mafic volcanics. The wallrock of the shear zone appears to be only weakly altered or unaltered. The alteration is a minor amount of chlorite. Due to the extensive limonitic weathering, the nature of alteration cannot be established. The following gold assays were obtained from samples within this zone:

Sample No.	Au (ppb)
18322 (grab)	3499 (reassay 3125)
18314 (chip sample over 40 cm)	8151 (reassay 7918)

A grab sample collected from here in 1987 assayed 0.176 oz/t Au. The fact that each sample had significant gold content is encouraging. Although the zone is narrow, perhaps it becomes wider some distance along strike or at depth.

At 24+85W 7+50S a fine grained, biotite-rich, well foliated mafic rock occurs in a NE trending 1 m wide zone within the mafic volcanics. Possibly this is a shear zone. The poor exposure provided by the old trench makes the positive identification as a shear rather difficult. In this general area cherty exhalites, ferruginous metasediments and mafic tuffs also occur. Therefore an alternative explanation would be that these rocks are mafic tuffs rather than mylonites.

A total of six grab samples (samples 18305, 18306, 18307 and 18333, 18334, 18335) were taken from this unit. The samples contained about 1% disseminated pyrite. Only samples 18334 and 18335 contained significant amount of gold (1546 and 344 ppb respectively).

In 1987 a bluish green quartz vein (possibly a recrystallized cherty exhalite?) was located near the present sample site. The quartz vein assayed 2639 ppb Au (see sample no. 14068 in N. Willoughby's 1988 company report). Apart from the quartz vein which is possibly exposed by another trench nearby, this shear zone is less mineralized than the zones described above.

At 37+15W 10+15S a new mineralized shear was discovered. The mineralization occurs in sheared, silicified mafic volcanics. Intensive silicification and the presence of 2 to 5% disseminated pyrite characterize the zone. The poorly exposed shear is probably narrow; it is estimated to be 1/2 to 1 m wide. Since it is very close to the greenstone-granodiorite contact, it may be cut off towards the west by the granodiorite.

Two grab samples taken from this zone gave the following assay results:

Sample No.	Au (ppb)
18415	1641 (reassay 720)
18416	250

B. In felsic mylonites

At 21+30W 8+25S felsic mylonites derived from quartz-porphyry and granodiorite contain a minor amount of disseminated sulfides. The mylonitic foliation strikes Az 65 to Az 75. The sulfides are very fine grained pyrite and less commonly arsenopyrite. The best gold values were obtained from samples with relatively abundant (1-2%) arsenopyrite. The total sulfide content is 2-3%. The arsenopyrite-rich band is 20 to 30 cm wide. The alteration in these bands appears to be silicification. The less deformed mylonites contain 1 mm diameter porphyroclasts of blue quartz. These rocks were derived from quartz-porphyry dykes. The ultramylonites are very fine grained without any trace of relict textures. On weathered surface, the mineralized mylonites have a brownish to rusty color.

The grab samples taken at this locality assayed as follows:

Sample No.	Au (ppb)
18419	652
18420	708
18421	90
18422	1760 (reassay 1711)

In 1987 sample 14034 taken from this locality assayed 1154 ppb Au.

At 11+25W 4+95S a pyritized, dark grey colored, weakly sericitized siliceous felsic mylonite assayed 394 ppb Au. In this general area (north of "Arrowhead Lake") pyrite is much more common than elsewhere.

C. In exhalative cherts, interflow sediments and tuffs

Cherts and bottle green colored siliceous exhalites which are either silicate iron formations or recrystallized cherts are exposed by old trenches which are located along the south shore of Laird Lake. In addition, new occurrences of bottle green exhalite and chert were found in the present exploration program. These are located in the 23+00W 7+50S area. Relict fragments of partially replaced micro-crystalline chert occur in the bottle green siliceous exhalite. Locally well banded sulfide bearing chert beds are in contact with the green siliceous exhalite. The width of the whole exhalative unit varies from 1/2 to 2 or 3 meters. The sulfide content of the green siliceous exhalite varies from 1 to 10%. Both pyrite and pyrrhotite were observed. At 25+00W 7+50S abundant pyrrhotite is present. This is the explanation for the intensive magnetic high. The green siliceous exhalite contains anomalous concentrations of gold at all the localities sampled. The anomalous values (excluding one ore grade occurrence which will be described below) range from 100 to 600 ppb Au.

At 29+70W 8+85S a composite sample of pyrite bearing chert and green siliceous exhalite assayed as follows:

Sample No.	Au (ppb)
18309 (chip sample over 1 m width)	3074 (reassay 5076 ppb)
18324 (grab sample)	2711

The pyrite content of gold bearing green siliceous exhalite varies from 1 to 5%.

Two samples collected from this locality in 1987 assayed 5970 ppb Au and 0.06 oz/t Au respectively (see samples 14074 and 167 in N. Willoughby's 1987 company report).

About 7 meters SW from the above sample site a fine grained, well foliated biotitic mafic rock, which is interpreted to be an interflow sediment, assayed 670 ppb Au over 1 meter of true width (see sample 18310 in the Appendix). The semi-pelitic or pelitic sediment contains about 1% disseminated pyrite.

At 29+65W 9+15S a chloritic, fine grained well foliated mafic rock, interpreted to be a mafic tuff, contains a 20 cm wide band of green colored exhalative carbonate. Although the carbonate is not gold bearing, a one meter wide chip sample which included the carbonate zone assayed 500 ppb Au (sample 18311 in the Appendix). The tuff contains about 2% disseminated pyrite. The carbonate is either calcite or a mixture of calcite and ankerite. The dark green color of the carbonate may in part be due to finely disseminated chlorite. Sample No. 166 collected from this area during the 1987 exploration program assayed 0.042 oz/t Au (N. Willoughby, internal company report, 1987).

At 29+60W 9+00S over 1 meter wide bed of exhalative chert is exposed in an old trench. The chert contains both disseminated and fracture controlled pyrite. The pyrite content ranges from 1 to 5%. A chip sample of chert over 1 meter width assayed 403 ppb Au (sample 18308 in the Appendix).

At 25+00W 7+64S anomalous concentrations of gold occurs in bottle green siliceous exhalite which contains 1 to 5% disseminated pyrite. A chip sample over 1 meter width (sample 18304) assayed 510 ppb Au (average of two measurements).

Structural Geology

Stratigraphy

In the Red Lake area, the volcanic stratigraphy is subdivided into a Lower Mafic Sequence and an Upper Calc-alkalic sequence. The lower mafic sequence is characterized by tholeiitic to komatiitic volcanic rocks. The calc-alkalic rocks are intermediate in composition. Recent geochemical data revealed that some of the rocks mapped as intermediate volcanics are in fact tholeiitic basalts (e.g. the Ball calc-alkaline sequence. See Wallace et al 1986). The Heyson calc-alkalic sequence which extends along an E-W belt and ends beyond the western end of Medicine Stone Lake is assumed to be present on the Laird Lake property (Figure 6.7 in Wallace et al 1986). South of the Starratt-Olsen Mine the lower tholeiitic to komatiitic sequence is either pinched out or cut off by the Killala-Baird Batholith (Figure 6.7 in Wallace et al 1986). The high color index of volcanic rocks which occur south of Laird Lake as well as the presence of ultramafics (possibly komatiite) suggest that these volcanics belong to the lower tholeiitic to komatiitic sequence. South of Madsen two tholeiitic sequences are recognized (Wallace et al 1986). These are:

1. Tholeiitic basalts and komatiitic flows
2. Variolitic basalt and andesite.

In comparison, variolitic rocks are not present on the Laird Lake property. Geochronological data indicate that the Lower Mafic Sequence (subdivided as Cycle I and Cycle II volcanics) is at least 100 million years older than the intermediate volcanics (Cycle III calc-alkaline rocks).

Chemical metasediments within Cycle II volcanics extend in a NE-SW direction along the northern shore of Red Lake (Wallace et al 1986). The chert beds and associated tuffs and sediments mapped on the Laird Lake property are not along strike of the above mentioned exhalite horizons. The two are about 10 km apart in a N-S direction. If the Laird Lake exhalites would represent the same stratigraphic horizon, a repetition of the exhalites by large scale folding would be a reasonable explanation. If this were indeed the case, it would support the generally held idea that the major structure in the Red Lake area is an anticline.

Structure

Only a few outcrops were suitable for the determination of bedding. Pillow lavas and exhalites south of Laird Lake strike Az 60° to Az 80°. The dip of the bedding is 60° to 70° to south. North of Laird Lake the highly deformed pillows have a much shallower dip of 50° (e.g. at 40+00W 4+30S).

The penetrative planar fabric which is defined by the preferred orientation of minerals strikes about Az 80° to Az 90°. The dip of the foliation is 65° to 90° to the south. Berger and Helmstaedt (1984) demonstrated that around Dome and McDonough townships, the penetrative planar fabric is parallel to the axial planes of folds. South of Laird Lake, the rare small scale folds (1/2 m to 1 m) have approximately E-W striking axial planes.

The penetrative planar fabric is cut by ductile shear zones. The mylonite foliation strikes Az 60° to Az 90°. The most common strike direction is about Az 75°. The dip is 70° to 90° to the south. In a few shear zones, the mylonite foliation steeply dips towards north. Field observations indicate that at least two different ages of brittle-ductile shearing took place. At 37+00W 11+00S an Az 75° striking mylonite foliation is truncated by a younger Az 95° striking foliation. At 23+00W 9+10S, the opposite appears to be the case: the older Az 90° to Az 100° striking mylonite foliation is cut by an Az 70° striking foliation. Perhaps repeated cycles of deformation took place along both directions. Most of the ductile-brittle deformation took place before the intrusion of gabbro. Late shearing of lesser intensity has affected the gabbro. Minor biotite and chlorite developed along the mylonite foliation of more intensively sheared gabbro.

Individual shear zones within the felsic intrusives have widths ranging from about 1 m to 100 m. The mylonite zones within the felsic intrusives are much wider than those in the mafic volcanics. Shear zones within the mafic volcanics are few cm to few m wide. These shears have parallel or perhaps an enechelon arrangement. Overall, the width of the intensively sheared zone, which encompasses many individual shears, is in the order of 500 meters. However, smaller shears of 1 to 2 m width can be seen outside of this zone as far south as the north shore of Medicine Stone Lake.

The magnitude of the deformation zone suggests the presence of a regional shear zone. It is likely that the Laird Lake deformation zone is the continuation of the Az 45° striking 1 km wide Flat Lake-Howey Bay deformation zone. It is assumed that south of the Starratt-Olsen Mine, the Flat Lake-Howey Bay deformation zone changed its strike direction to ENE or E. The change in the direction of the deformation zone could be attributed to the presence of Killala-Baird batholith and the Medicine Stone Lake felsic intrusives. Wilson et al (1986) pointed out that in the Red Lake area, the mylonite foliation is roughly parallel to the contacts between the supracrustal rocks and granitic rocks. Hugon (1986) suggests that the mylonitic deformation zones in the Red Lake area developed at about the same time as the diapiric emplacement of felsic intrusives. The shearing is assumed to be the direct result of compression which acted perpendicular to the granite-greenstone contact (Berger and Helmstaedt 1986).

In the Laird Lake area, due to the presence of numerous late intrusives which intruded into the mylonites, the boundaries of the large scale shear zone cannot be accurately established. The trend of the mylonite foliation and layering indicate that the general trend of the deformation zone is Az 70° to 90° . The idea of an overall Az 40° to 50° trending deformation zone as suggested by preliminary geological mapping (Willoughby 1988) is not tenable. Magnetic data from ground survey (Hlava 1988) which could be interpreted in this manner is primarily the reflection of the distribution of felsic mylonite and late mafic intrusives.

The belt of most extensive ductile deformation is also a linear belt characterized by the intrusions of numerous late stage felsic and mafic dykes and stocks. The dykes were intruded along Az70 to 90 trending dilatant zones and into northerly trending tension fractures. The field observations indicate repeated cycles of ductile deformation and intrusion. The emplacement of late intrusives must have also influenced the direction of shearing. Small scale shear zones within the late intrusives have an E-W strike.

The VLF EM survey detected numerous E-W striking anomalies (Hlava 1988). There are no NE trending VLF anomaliles. The IP survey (Belanger 1988) revealed sulfide bearing zones which are also approximately E-W trending. Both the VLF EM and IP anomalies are probably related to zones of more intensive shearing.

Only a few outcrops are suitable for the determination of the sense of shearing. These determinations primarily concern narrow zones of late shears. Therefore, the same may not apply to large scale shears. Microfolded quartz stringers south of Laird Lake suggest the presence of sinistral shears. The Flat Lake-Howey Bay western end of the property. As it was previously mentioned, rocks mapped earlier as felsic tuffs by the ODM (Map No. P 338, Ferguson 1966), are probably felsic mylonites. Accordingly, the Laird Lake shear zone would extend as far west as the west end of Medicine Stone Lake.

Quartz veins and quartz stringers are not common in mylonites around Laird Lake. The quartz veins and stringers found in trenches and outcrops are emplaced parallel to the mylonite foliation. Quartz veins localized along shear fractures or shear band foliation were not seen. South of Laird Lake, a few felsic dykes were emplaced in fractures which are approximately perpendicular to the trend of shear zones and to the trend of penetrative foliation outside the boundaries of shears. The best examples of this are the aplite and feldspar porphyry dykes at 34+00W 13+75S. These dykes were probably emplaced in extension fractures.

There is no direct evidence for large scale faulting within the map area. Microfaults with Az 20° to Az 40° strike were noted on a few outcrops. The results of a preliminary geological mapping carried out by Black Cliff Mines Ltd. in 1987 (Willoughby, internal company report 1987) suggested the presence of a large scale fault which would run along the contact of the Killala-Baird Batholith with the mafic volcanics. This interpretation was primarily based on magnetic data obtained from a ground magnetometer survey. Although the magnetic contact is linear over a 2 km length, at the east end of the property (e.g. lines 0+00W to 5+00W), it is not linear. The airborne magnetic survey, which is more regional in nature, does not show a distinct magnetic lineament. The granodiorite forms a scarp near the assumed contact with the mafic volcanics. Minor epidote-filled fractures can be seen along the scarp. More extensive brecciation, fracturing or shearing indicative of a large scale fault, was not seen in outcrop. The granodiorite-basalt contact can be seen near the NW end of Laird Lake. There is no sign of brecciation or intensive shearing along the contact.

The field observations mentioned above as well as the results of studies in structural geology of the Red Lake area (e.g. Hugon 1986) suggest that the granodiorite-basalt contact is an intrusive contact modified by the diapiric rise of the batholith.

Exhalite beds found at 25+00W 7+50S and at 23+00W 7+50S are quite similar in character (the only difference is the much higher pyrrhotite content at the former locality). Despite this, in the geological interpretation, it is assumed that these exhalites were formed along separate stratigraphic horizons. If the same exhalite horizon was repeated by a N-S or N-E trending fault, there would be at least 75 m of horizontal displacement along the fault. Although there is a N-S trending magnetic break along line 24+00W

(Magnetic survey completed by Laforest-Hlava Exploration Services Ltd. in 1987), along this magnetic discontinuity there is essentially no horizontal displacement of the mafic volcanics. Possibly the magnetic discontinuity is related to the intrusion of a weakly magnetic dyke or alternatively it can be attributed to faulting along which only vertical displacement took place.

Results of Whole Rock Analysis

Twelve rock samples were sent for whole rock analysis to Barringer Magenta Ltd. in Rexdale, Ontario. The sample descriptions and the analytical data are listed in the Appendix. Sample No. 18129 is a dark grey colored fine grained biotitic granodiorite. The whole rock composition of this sample is very close to that of the average granodiorite (Hyndman, 1985 p. 46).

The quartz-porphyries (samples 18124 and 18133) have higher silica content and lower MgO content than granodiorites or granites. As a consequence, the composition of these rocks is somewhat similar to that of rhyolites. The felsic mylonites have similar silica and MgO content as the granodiorite (Samples 18122 and 18130 in the Appendix). The high potassium and low sodium content of the mylonitic rocks is either due to sericitization or it is inherited from the parent rock. In the hand specimen, alteration was estimated to be weak to nil.

The equigranular gabbro (sample 18127 in the Appendix) has a chemical composition which is very similar to that of the average gabbro (see Hyndman 1987 p. 47). The feldspar porphyritic gabbro has a low silica content which is characteristic of gabbros (48.8%) but has too low magnesium and too high potassium content for a typical gabbro (sample 18126 in the Appendix). For a proper identification of this rock, petrographic study would be necessary.

The pyroxene porphyry dyke (sample 18131 in the Appendix) has a chemical composition which is more similar to diorite than gabbro.

As it can be expected, the hornblendite has high Ca, Fe, and Mg content and low silica content (sample 18128 in the Appendix). Since the MgO content of hornblendite (12.9%) is not as high as that of a pyroxenite, it is unlikely to be derived from a pyroxenite. The weakly altered mafic volcanic (sample 18132) has a composition similar to a tholeiitic basalt.

The garnet-rich metasedimentary rock has a high iron oxide content (16.5%) and relatively high Ca and Mg content (sample 18123 in the Appendix). The high iron content allows one to classify the rock as a silicate iron formation. The almandine-rich silicate iron formation contains an appreciable amount of potassium (2.4%).

The latter may be attributed to the presence of biotite which was derived from the pelitic component of the exhalite.

The bottle green colored siliceous exhalite (sample 18125 in the Appendix) contains 74% silica and 18% iron oxide. Due to the high iron content, the rock can be classified as an iron formation. Since the ignition loss of the exhalite is only 0.8%, most of the iron must be contained in silicates rather than in sulfides (e.g. 10% of pyrrhotite would result in about 3.8% of ignition loss). The relatively high calcium (4.8%) and moderate magnesium content of the exhalite (1.8%) suggest that Ca-Mg-Fe silicates are present in the rock.

Conclusions and Recommendations

1. The central part of the property is underlain by NE striking mafic volcanics. The mafic character of the volcanics as well as the presence of ultramafic rocks which are probably komatiitic flows, suggest that these rocks belong to the Lower Mafic Sequence.

2. Exhalative chert beds and silicate iron formation which strike Az 60 to 70 outcrop south of Laird Lake. The exhalites occur at 2 to 3 stratigraphic horizons within a 100 to 200 m thick sequence of mafic volcanics.

3. In the southern part of the property, EW to ENE striking mylonitic and cataclastic zones were outlined by geological mapping. The combined width of the mylonite zones is in the order of 500 meters. The deformation zone is regional in nature. The mylonites were derived from felsic intrusives. Minor sericitic alteration and locally silicification has affected the mylonites.

4. The felsic mylonites were intruded by late mafic and felsic intrusives. Repeated cycles of intrusion and ductile deformation took place.

5. Narrower mylonitic shear zones of 1 to few meters width cut the mafic volcanics. Moderate to fair intensity biotitic alteration is present along some of the shears.

6. It is likely that the Laird Lake shear zone is the continuation of the Flat Lake - Howey Bay deformation zone. There is no indication for large scale faulting along the contact of the Killala-Baird Batholith.

7. The large oval shaped magnetic high centered over Laird Lake can be attributed to the presence of mafic volcanics. Local magnetic highs which are over 2,500 gamma in intensity are probably due to iron formations.

8. The EW trending VLF EM anomalies and the E to ENE trending IP anomalies are probably related to shear zones. Some IP anomalies occur over areas with known gold mineralization. One IP anomaly occurs over a feldspar porphyry stock which is cut by narrow late shears.

9. Gold mineralization occurs in the following rock types:

   a. sheared, biotite altered mafic volcanics
   b. sheared or fractured rusty weathering mafic volcanics
   c. sheared and silicified mafic volcanics
   d. fractured, pyritic exhalative chert
   e. recrystallized exhalites or silicate iron formation with late hydrothermal pyrite and pyrrhotite
   f. interflow sediments or tuffs with disseminated pyrite and minor exhalative carbonate
   g. pyritized felsic mylonites with or without sericite and arsenopyrite.

10. The geology and structure of the Laird Lake property is similar to that of present or past gold producing areas in the Red Lake mining camp. The property has good potential for finding economic concentrations of gold.

The recommended exploration program consists of the testing of IP anomalies and known gold occurrences by diamond drilling and additional IP survey over the remainder of the property. Since some of the mineralization is not sulfide-rich, weaker IP anomalies may also be drill targets.

The IP survey over the ice of Laird Lake should be completed.

Diamond drilling is recommended to be carried out in two stages:

1(a)	Drill IP anomalies on land	5000 feet of drilling
(b)	Test old showings	5000 feet of drilling
2.	Test IP anomalies which underlie Laird Lake	5000 feet of drilling
	Total	15,000 feet

The cost of the program would be:

IP surveying	$25,000
15,000 feet of diamond drilling at $30 per foot	450,000
TOTAL	$475,000

The $30 per foot drilling cost includes the use of helicopter for drill moves.

Toronto, Ontario
November 1988

Arpad Farkas, Ph.D.
Consulting Geologist

CERTIFICATE OF QUALIFICATION

I, Arpad Farkas of the City of Toronto, in the Province of Ontario, Canada, hereby certify:

1. That I am a consulting geologist and have been engaged in my profession for approximately ten years full-time and five years part-time.

2. That I am a graduate of the Eotvos Lorand University, Budapest, Hungary, with a B.Sc. degree in geology (1968); of the University of Alberta, with an M.Sc. degree in geology (1973); and of the University of Toronto, with a Ph.D. degree in geology (1980).

3. That my knowledge of the property described was acquired during visits to the property in 1988 and from the study of the publications and reports cited in the present document.

4. That I have no interest, either direct or indirect, nor do I expect to receive any interest, in the properties or securities of Black Cliff Mines Limited.

5. That I hereby consent to the use of this report by Black Cliff Mines Limited for its corporate purposes.

Dated at Toronto, Ontario, this 15th day of November, 1988.

Arpad Farkas
Arpad Farkas

LAIRD LAKE PROPERTY

Sample	Location	Description	Au Assay Results
18101	50+00W; 5+65S	Grab; mafic volcanic with 1% quartz-carbonate stringers 1-3 cm wide.	3 ppb
18102	50+00W; 5+90S	Grab; mafic volcanic	6 ppb
18103	50+00W; 6+90S	Grab; 10-30 cm wide quartz veinlet in mafic volcanic	16 ppb
18104	49+00W; 6+50S	Grab; mafic volcanic	8 ppb
18105	47+00W; 4+00S	Grab; contact between granite and mafic volcanic- Granite	<5 ppb
18106	47+00W; 4+00S	Grab; contact between granite and mafic volcanic-Mafic volcanic 1% pyrite	5 ppb
18107	49+00W; 5+50S	Grab; mafic volcanic with minor sericite	<5 ppb
18108	47+00W; 5+60S	Grab; mafic volcanic	6 ppb
18109	50+00W; 4+75S	Grab; fine grained mafic volcanic with carbonate filled fractures and trace pyrite.	7 ppb
18110	48+00W; 5+25S	Fine grained mafic volcanic with carbonate veining and trace to 1% pyrite (Region of I.P. Anomaly).	13 ppb (16)check
18111	12+25W; 4+75S	Grab; felsic mylonite moderately phyllitic; rusty weathering	26 ppb
18112	11+75W; 4+75S	Grab; siliceous-aphanitic felsic mylonite; rusty weathering	<5 ppb
18113	11+20W; 5+00S	Grab; siliceous felsic mylonite with 1% very fine grained to 1/4 mm diameter pyrite	<5 ppb
18114	10+25W; 5+20S	Grab; felsic mylonite moderately phyllitic rusty weathering	6 ppb

Sample	Location	Description	Au Assay Results
18115	10+80W; 5+00S	Sheared porphyritic gabbro, minor disseminated pyrite	14 ppb
18116	11+00W; 5+00S	Felsic mylonite, hard siliceous dark grey colored, trace pyrite	7 ppb
18117	10+25W; 5+25S	Felsic mylonite	23 ppb
18118	11+25W; 4+95S	Felsic mylonite; dark grey very fine grained, siliceous	394 ppb
18119	12+75W; 4+90S	Phyllitic felsic mylonite (phyllonite)	6 ppb (10)check
18120	10+50W; 5+00S	Felsic mylonite rusty weathering	10 ppb
18121	11+90W; 4+70S	Felsic mylonite with 1% fine grained disseminated pyrite	10 ppb (10)check

Sample	Location	Description	Au Assay Results
18301	25+14W; 7+65S	Well foliated, chloritized mafic volcanic. Possibly a mafic tuff. Contains 5 to 10% pyrrhotite and pyrite. Adjacent to bottle green siliceous exhalite which is derived from exhalative chert. Grab sample 14071 was collected from here in 1987.	81 ppb
18302	25+15W; 7+65S	Exhalative chert. Finely banded, grey colored. Contains 2% pyrite + pyrrhotite. Grab sample	69 ppb
18303	25+00W; 7+65S	Bottle green siliceous exhalite with relict chert bands and chert fragments. Probably replaces exhalative chert. Contains 1 to 5% (disseminated) pyrite + pyrrhotite. Chip sample over 1 m length, true width 1/2 m.	303 ppb
18304	25+00W; 7+64S	Same as above. Chip sample over 1 m length. True width is about 1/2 m.	384 ppb (636) check
18305	24+85W; 7+50S	Fine grained, biotite-rich, well-foliated mafic rock. Either a sheared altered basalt or an interflow sediment. Contains 1% pyrite. Grab sample (old samples 14067 to 14069).	80 ppb
18306	24+85W; 7+50S	Fine grained, biotite-rich, well foliated mafic rock. Probably a mylonitized, biotite altered greenstone. Contains 2% pyrite and pyrrhotite. Grab sample.	115 ppb
18307	24+85W; 7+50S	Same as above. Contains less than 1% pyrite. Grab sample.	19 ppb
18308	29+60W; 9+00S Trench #11	Cherty exhalite. Contains 5% to 10% pyrite. Both disseminated and fracture-filling pyrite. Grab sample.	403 ppb

Sample	Location	Description	Au Assay Results
18309	29+70W; 8+85S Trench #12	Chert + bottle green siliceous exhalite. The quartz probably contains very fine disseminated chlorite. Contains 1 to 5% pyrite. Chip sample over 1 m of true width.	3074 ppb (5076) check
18310	29+70W; 8+84S	Fine grained, biotitic well foliated mafic rock. Its association with exhalative chert suggests that it is an interflow sediment. Contains about 1% fine grained pyrite. Chip sample over 1 m of true width.	670 ppb
18311	29+65W; 8+80S Trench #12	Fine grained, (dark green colored, chloritic) well foliated mafic rock. Contains minor amounts biotite. Probably a sheared mafic volcanic. Contains up to 2% pyrite. Chip sample over 1 m in length. Old sample #166 was collected from here.	500 ppb
18312	29+65W; 8+80S	Massive dark green colored carbonate. Width is 15-30 cm. Contains 60 to 80% carbonate and 20 to 40% chlorite. Pyrite content is up to 1%. Is this an exhalite or an alteration product? The sample above includes this carbonate zone. Grab sample.	44 ppb
18313	29+65W; 8+81S	Sheared mafic volcanic? Fine grained,well foliated, dark green colored ,chloritic. Chip sample over 1 m true width.	155 ppb
18314	30+05W; 9+35S	30 cm wide rusty pyritic shear in mylonitized mafic volcanics. Chip sample over 40 cm length. Old sample #168 was collected from here.	8151 ppb (7918)check
18315	39+00W; 11+00S "Shaft"	Five cm wide smoky quartz vein. Contains about 1% pyrite. Disseminated and fracture-filling pyrite. Grab sample.	1620 ppb (1545)check

Sample	Location	Description	Au Assay Results
18316	39+00W; 11+00S	Sheared, pyritized, somewhat chloritized mafic volcanic. It is the hanging wall of the quartz vein sampled above. Contains 5% disseminated pyrite. Chip sample over 10 cm width.	1639 ppb (1747)check
18317	39+00W; 11+00S	Five cm wide smoky quartz vein. Contains rare specks of visible gold. Less than 1% pyrite. The hanging wall is biotite-chlorite schist. Grab sample.	23192 ppb (24217)check
18318	39+00W; 11+00S	Same as above	20163 ppb (19293) check
18319	39+00W; 11+00S	Same as above	165 ppb
18320	39+00W; 11+00S	Same as above	2686 ppb (1908)check
18321	39+00W; 11+00S	Sheared, pyritized, chloritized mafic volcanic. Contains 5% pyrite. Forms hanging wall of the quartz vein above.	248 ppb
18322	30+05W; 9+35S	30 cm wide rusty shear zone in mafic volcanics. See also sample 18314 above. Old sample #168 was also collected from here. Grab sample.	3499 ppb (3125)check
18323	29+70W; 8+45S	Interflow sediment or tuff. See also sample 18310 above. Old sample #167 was collected from here. Grab sample.	77 ppb
18324	29+70W; 8+84S	Banded chert + bottle green siliceous exhalite. See also sample #18309 above. Old samples #14074 and 167 were also collected from here. Grab sample.	2711 ppb (3687)check
18325	29+65W; 8+81S Trench #12	Fine grained mafic tuff or interflow sediment. Grab sample. See also sample #18313 above. Old sample #166 was collected from this area in 1987.	93 ppb

Sample	Location	Description	Au Assay Results
18326	29+65W; 8+80S	Same as above. Contains up to 2% pyrite. Minor amount of fine grained biotite. Grab sample.	277 ppb
18327	29+65W; 8+80S	Exhalative carbonate? Dark green colored. See sample 18312 above. Grab sample.	54 ppb (68)check
18328	29+60W; 9+00S	Chert + bottle green quartz Contains about 5% pyrite. See sample 18308 above. Grab sample.	777 ppb
18329	25+00W; 7+65S	Bottle green quartz with few relict chert fragments. See sample 18303 above. Grab sample.	163 ppb
18330	25+00W; 7+64S	Same as above. Grab sample.	503 ppb
18331	25+14W; 7+65S	Mafic tuff or interflow sediment. Grab sample. See sample 18301 above.	73 ppb
18332	25+15W; 7+65S	Exhalative chert. See sample 18302 above. Grab sample.	188 ppb
18333	24+85W; 7+50S	Sheared biotitized greenstone? See sample 18306 above. Grab sample.	1546 ppb (1567)check
18334	24+85W; 7+50S	Same as sample 18305 above. Grab sample.	344 ppb
18335	24+85W; 7+50S	Sheared biotitized greenstone? See sample 18307 above. Grab sample.	34 ppb
18336	24+83W; 7+50S	Bottle green siliceous exhalite. Grab sample.	162 ppb
18337	22+90W; 7+48S	Bottle green quartz with very fine grained disseminated pyrrhotite and pyrite. Few relict chert fragments. Probably derived from an exhalative chert. A new showing. Chip sample over 1 m length. True width is about 0.7 m.	64 ppb

Sample	Location	Description	Au Assay Results
18338	22+93W; 7+48S	Bottle green quartz with 1 to 5% disseminated pyrrhotite and minor pyrite. Trace chalco-pyrite. Grab sample.	63 ppb
18339	22+95W; 7+48S	Bottle green siliceous exhalite with fracture controlled pyrite. Pyrite content is less than 1%. Grab sample. Associated with garnet-rich silicate iron formation.	72 ppb
18340	40+00W; 4+50S	Fine grained, compositionally banded mafic rock. Possibly mylonitic. Grab sample.	25 ppb
18341	38+00W; 2+75S	Mylonitized granodiorite with 1-2% sulphide stretched plagioclase crystals up to 1/2 cm long	28 ppb
18342	38+00W; 2+50S	Sheared mafic volcanic with biotite alteration and trace sulphide.	86 ppb
18343	35+25W; 3+60S	Diorite (silicified slightly) fine grained, massive.	1770 ppb

Sample	Location	Description	Au Assay Results
18401	36+80W; 11+00S	Grab - mafic volcanic with minor epidote veinlets, trace pyrite and local carbonate.	10 ppb
18402	39+00W; 11+00S Shaft	Chip 1/2 m. Sheared basalt with biotite-sericite alteration	475 ppb
18403	39+00W; 11+00S	Grab. Quartz grab sample from muck pile.	920 ppb
18404	39+00W; 11+00S	Chip 1/2 m. Biotite sericite schist with sheared basalt	<5 ppb
18405	39+00W; 11+00S	Chip 1/2 m sheared basalt with quartz veining (15 cm wide)	5319 ppb (5416)check
18406	39+00W; 11+00S Pit	Chip 1/2 m sheared basalt.	267 ppb
18407	39+00W; 11+00S	Chip 1/2 m sheared basalt.	158 ppb
18408	36+25W; 11+00S	Grab sample. Rusty zone in granodiorite in contact with diorite.	109 ppb
18409	39+00W; 11+10S	Chip 1/2 m. sheared basalt with biotite and quartz veining	1198 ppb (693)check
18410	39+00W; 11+10S	Chip 1/2 m. Sheared basalt with smoky quartz veining.	717 ppb
18411	39+00W; 11+10S	Chip 1/2 m. Sheared basalt.	29 ppb
18412	39+00W; 11+10S	Grab. Fine grained sheared basalt with disseminated sulphides.	738 ppb
18413	39+00W; 11+10S	Grab. Siliceous band in sheared basalt 50 mm thick.	418 ppb
18414	39+00W; 11+10S	Quartz vein in biotite schist.	749 ppb
18415	37+15W; 10+15S	Silicified volcanic with grey quartz and disseminated pyrite.	1641 ppb (720)check
18416	37+15W; 10+15S	Grab. Silicified mafic volcanic with disseminated pyrite.	258 ppb

Sample	Location	Description	Au Assay Results
18417	36+12W; 12+35S	Grab. Quartz vein in gabbro with very minor sulphides.	25 ppb
18418	21+00W; 8+25S	See #14133. Grab. Quartz porphyry sheared and silicified. Minor disseminated pyrite.	49 ppb (38)check
18419	21+30W; 8+25S	See #14039. Siliceous mylonite brownish weathering, minor pyrite + arsenopyrite, blue quartz eyes.	652 ppb
18420	21+30W; 8+25S	See 18419.	708 ppb
18421	21+30W; 8+25S	Siliceous mylonite with very fine disseminated sulphides	90 ppb
18422	21+30W; 8+25S	See #14034. Siliceous mylonite with disseminated pyrite and arsenopyrite.	1761 ppb (1711) check
18423	19+15W; 5+05S Trench 6C	Grab mafic volcanic with 1% (fine grained) disseminated sulphides.	86 ppb (83)check
18424	19+15W: 5+04S Trench 6D	Grab. Mafic volcanic 1-2% sulphides Pyrite in a 20 cm wide shear zone.	125 ppb
18425	19+15W; 5+03S Trench 6E Old sample #165	Grab. Mafic volcanic cross cut by felsic dykes 10-15% biotite, up to 1% pyrite.	29 ppb
18426	18+85W; 5+00S Trench 6F	Grab. Mafic volcanic, 30 cm wide quartz vein. Strong biotite and chlorite alteration, up to 2% pyrite.	106 ppb
18427	18+65W; 5+00S Trench 6G	Grab. Mafic volcanic up to 1% disseminated pyrite.	39 ppb
18428	19+15W; 4+90S Trench 6H	Grab. Mafic volcanic with cross cutting quartz veinlets, minor carbonate, 1% pyrite.	19 ppb
18429	11+00W; 4+10S	Grab. Mafic volcanic 1% pyrite.	125 ppb
18430	10+90W; 5+25S 7D	Grab. Quartz porphyry up to 1% pyrite. (Siliceous) pyrite associated with quartz veinlets.	24 ppb
18431	11+00W; 5+25S 7E	Grab. Mylonite (mafic volcanic) Very fine grained, weak local carbonate, 1% diss pyrite.	20 ppb

Sample	Location	Description	Au Assay Results
18432	29+10W; 12+75S	Mylonitic granodiorite. Epidote + pyrite, minor chlorite 1-2% pyrite.	24 ppb (20)check
18433	28+70W; 9+55S	Mylonitic basalt. Green carbonate and biotite alteration 1-3% pyrite. Minor silicification.	24 ppb
18434	28+70W; 9+55S	Mylonitic basalt with intensive biotite alteration.	25 ppb
18435	29+75W; 12+87S	Massive pyrite boulder, 1/2 meter diameter, about 90% pyrite and 10% quartz.	88 ppb (153)check
18436	29+75W; 12+87S	Quartz rich part of massive pyrite boulder. 30-40% pyrite, 60-70% quartz.	124 ppb
18437	1+30W; 6+00S	Grab. Blue-grey siliceous mylonite with disseminated pyrite (possible origin: quartz porphyry)	183 ppb
18438	1+10W; 7+00S	Grab. Gabbro in contact with quartz porphyry, disseminated sulphide present	38 ppb
18439	22+60W; 7+35S	Banded exhalative carbonate 50% carbonate/ 50% silicate bands.	72 ppb
18440	22+60W; 7+35S	Mafic tuff with 2% disseminated pyrrhotite.	43 ppb
18441	22+70W; 7+40S	Exhalative carbonate. 80% carbonate/ 20% chlorite, etc.	51 ppb (39)check
18442	22+70W; 7+40S	Very limonitic chlorite or biotite schist. Some oxidized pyrite.	287 ppb
18443	22+70W; 7+40S	Mafic tuff? With disseminated sulphides. Fractured, limonitic.	853 ppb (1694)check
18444	19+15W; 7+80S (outcrop on lakeshore)	Garnet bearing metasediment (lean iron formation) minor pyrite.	95 ppb
18445	19+15W; 7+80S (outcrop adjacent to lean iron formation)	Mafic metavolcanics cut by granodiorite stringers, 1-2% pyrite.	49 ppb

Sample	Location	Description	Au Assay Results
18446	22+85W; 7+48S	Grey to bottle green quartz derived from exhalative chert 2-3% sulphides.	23 ppb
18447	31+00W; 10+10S	Mylonitic basalt. Minor to fair biotite alteration, 1-2% pyrite.	87 ppb
18448	37+56W; 11+06S	Mylonitic intrusive with 2 cm diameter plagioclase porphyroclasts, intensively chloritized.	51 ppb
18449	37+20W; 11+08S	Felsic mylonite with disseminated sulphides (1%?).	24 ppb
18450	28+70W; 9+60S	Mylonitic basalt, chloritized weakly biotitized, quartz stringers parallel to foliation, minor pyrite.	20 ppb
18451	44+00W; 4+45S	Silicate iron formation and exhalative chert, 2-5% pyrite, carbonate.	33 ppb
18452	44+30W; 4+40S	Mafic volcanic with trace sulphide.	29 ppb
18453	44+10W; 4+45S	Silicate iron formation and exhalative chert with 3-5% fine, disseminated sulphides.	28 ppb (15)check

Whole Rock Analysis Samples

Sample	Location	Description
18122	10+50W; 5+00S	Felsic mylonite
18123	22+90W; 7+48S	Garnet rich ferruginous metasediment
18124	25+60W; 8+60S	Quartz porphyry; 5% quartz phenocrysts
18125	25+00W; 7+55S	Bottle green quartz (recrystallized chert or silicate iron formation) 1-2% disseminated sulphides
18126	23+00W; 9+75S	Porphyritic gabbro or diorite; contains 40% feldspar phenocrysts
18127	27+00W; 10+05S	Gabbro, medium grained, massive
18128	20+00W; 7+00S	Hornblendite
18129	27+00W; 9+50S	Granodiorite, dark grey fine grained 1/4 to 1/2 cm diameter
18130	40+00W; 13+25S	Felsic mylonite
18131	37+96W; 10+88S	Pyroxene porphyry dyke
18132	28+70W; 9+55S	Basalt with moderate green carbonate alteration
18133	39+00W; 12+18S	Quartz porphyry

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22975 Suite 2205, 1 Yonge Street
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M5E 1E5

Date: September 23 1988

Work Order # : 181054
Project :

SAMPLE NUMBERS Accurassay	Customer	Gold ppb	
251171	18101	3	
251172	18102	6	
251173	18103	16	
251174	18104	8	
251175	18105	<5	
251176	18106	5	
251177	18107	<5	
251178	18108	6	
251179	18109	7	
251180	18110	13	
251180	18110	16	Check
251181	18111	26	
251182	18112	<5	
251183	18113	<5	
251184	18114	6	
251185	18115	14	
251186	18116	7	
251187	18117	23	
251188	18118	394	
251189	18119	6	
251189	18119	10	Check
251190	18120	10	
251191	18121	10	
251191	18121	10	Check

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Suite 2205, 1 Yonge Street
Toronto, Ontario
M5E 1E5

Date: August 4 19 88

Work Order # : 180942
Project :

SAMPLE NUMBERS Accurassay	Customer	Gold ppb	
248340	18042	20	
248341	18043	10	
248342	18221	15	
248343	18222	<5	
248344	18223	10	
248345	18224	15	
248346	18301	81	
248347	18302	69	
248348	18303	303	
248349	18304	384	
248349	18304	636	Check
248350	18305	80	
248351	18306	115	
248352	18307	19	
248353	18308	403	
248354	18309	3074	
248355	18310	670	
248356	18311	500	
248357	18312	44	
248358	18313	155	
248358	18313	148	Check
248359	18314	8151	
248360	18315	1620	
248361	18316	1639	
248362	18317	23192	
248362	18317	24217	Check

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Date: August 15 19 88

Work Order # : 180974
Project :

SAMPLE NUMBERS Accurassay	Customer	Gold ppb	
249005	18318	20163	
249006	18319	165	
249007	18320	2686	
249008	18321	248	
249009	18322	3499	
249010	18323	77	
249011	18324	2711	
249012	18325	93	
249013	18326	277	
249014	18327	54	
249014	18327	68	Check
249015	18401	10	
249016	18402	475	
249017	18403	920	
249018	18404	<5	
249019	18405	5319	
249020	18406	267	
249021	18407	158	
249022	18408	109	
249023	18409	1198	
249023	18409	626	Check
249024	18410	717	
249025	18411	29	
249026	18412	738	
249027	18413	418	
249028	18414	749	
249029	18415	1641	
249030	18416	258	
249031	18417	25	
249032	18418	49	
249032	18418	38	Check

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Toronto, Ontario
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Date: August 18 1988

Work Order # : 180985
Project :

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SAMPLE NUMBERS Accurassay	Customer	Gold ppb	
249560	18328	777	
249561	18329	163	
249562	18330	503	
249563	18331	73	
249564	18332	188	
249565	18333	Results to be Forwarded	
249566	18334	344	
249567	18335	34	
249568	18336	162	
249569	18423	86	
249569	18423	83	Check
249570	18424	125	
249571	18425	29	
249572	18426	106	
249573	18427	39	
249574	18428	19	
249575	18429	125	
249576	18430	24	
249577	18431	20	
249578	18432	24	
249578	18432	20	Check
249579	18433	24	
249580	18434	25	
249581	18435	88	
249581	18435	153	Check

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Date: August 15 19 88

Work Order # : 180974
Project :

SAMPLE NUMBERS Accurassay	Customer	Gold ppb	
249033	18419	652	
249034	18420	708	
249035	18421	90	
249036	18422	1761	
249036	18422	1711	Check

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Date: August 5 1988 19

R E A S S A Y
Work Order # : 180942
Project :

SAMPLE NUMBERS		Original Assay	Reassay Result
Accurassay	Customer	ppb	ppb
248354	18309	3074	5076
248359	18314	8151	7918
248360	18315	1620	1545
248361	18316	1639	1747

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Page #1

Date: 08/15/88 19

Work Order 180974

R E A S S A Y

Assay results are as follows:

SAMPLE NUMBER		Original Gold	Reassay Gold
Accurassay	Customer	ppb	ppb
249005	18318	20163	19293
249007	18320	2686	1908
249009	18322	3499	3125
249011	18324	2711	3687
249019	18405	5319	5416
249029	18415	1641	720

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Page #1

Date: 08/26/88 19

REASSAY
Work Order 180985

Assay results are as follows:

SAMPLE NUMBER Accurassay	Customer	Original Gold ppb	Reassay Gold ppb	Reassay 2 Gold ppb
249565	18333	**	1546	1567

** Results to be forwarded.

Certificate #22765 containing the reassay for customer number 18333 (accurassay #249565) displayed 1546 as the original assay. The value for the original assay (certificate #22707) was two asterisks (**) representing a delayed result. The results displayed here are the correct values. Please accept our apologies.

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Page: 1

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Date: August 25 19 88

R E A S S A Y
Work Order # : 180985
Project :

SAMPLE NUMBERS		Original Assay	Reassay Result
Accurassay	Customer	ppb	ppb
249565	18333	1546	1567

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Date: August 25 19 88

R E A S S A Y
Work Order # : 180974
Project :

SAMPLE NUMBERS		Original Assay	Reassay Result
Accurassay	Customer	ppb	ppb
249023	18409	1198	693

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Date: September 6 1988

Work Order # : 181021
Project :

SAMPLE NUMBERS Accurassay	Customer	Gold ppb	
250222	18337	64	
250223	18338	63	
250224	18339	72	
250225	18340	25	
250226	18436	124	
250227	18437	183	
250228	18438	38	
250229	18439	72	
250230	18440	43	
250231	18441	51	
250231	18441	39	Check
250232	18442	287	
250233	18443	853	
250233	18443	1694	Check

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Certificate of Analysis

Page: 1

22938 Murray Rogers
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Suite 2205, 1 Yonge Street
Toronto, Ontario
M5E 1E5

Date: September 19 1988

Work Order # : 181021
Project :

SAMPLE NUMBERS		Silver
Accurassay	Customer	ppm
250222	18337	2
250223	18338	2
250224	18339	2
250225	18340	4
250226	18436	2
250227	18437	2
250228	18438	3
250229	18439	4
250230	18440	2
250231	18441	5
250232	18442	4
250233	18443	14

Per: Blaine Veitch

ORIGINAL

ACCURASSAY LABORATORIES LTD.

P.O. BOX 604
KIRKLAND LAKE, ONTARIO, CANADA P2N 3J5
TEL.: (705) 567-6343

President: Dr. GEORGE DUNCAN, M.Sc., Ph. D., C. Chem (Ont.), C. Chem (U.K.), M.C.I.C., M.R.S.C., A.R.C.S.T.

Certificate of Analysis

Page: 1

22905 Murray Rogers
Black Cliff Mines Ltd.
Suite 2205, 1 Yonge Street
Toronto, Ontario
M5E 1E5

Date: September 14 1988

Work Order # : 181030
Project :

SAMPLE NUMBERS Accurassay	Customer	Gold ppb	
250393	18341	28	
250394	18342	66	
250395	18343	1770	
250396	18444	95	
250397	18445	49	
250398	18446	23	
250399	18447	67	
250400	18448	51	
250401	18449	24	
250402	18450	20	
250402	18450	33	Check
250403	18451	29	
250404	18452	36	
250405	18453	28	
250405	18453	15	Check

Per: Blaine Veitch

ORIGINAL

BARRINGER MAGENTA
304 CARLINGVIEW DRIVE
REXDALE, ONTARIO
M9W 5G2
(416) 675-3870

FILE: T8.1202
DATE: 28/09/88
MATRIX: ROCKS

BLACK CLIFF MINES LTD (MURRAY ROGERS/A.FARKAS) WO NO: 88-1002 PAGE 1

SAMPLE ID	AL2O3 %	CAO %	FE2O3 %	K2O %	MGO %	MNO %	NA2O %	P2O5 %	SIO2 %	TIO2 %	LOI %	SR PPM
18122	14.6	2.03	3.08	3.97	1.20	.047	1.52	.07	71.0	.240	1.20	[illegible]
18123	13.3	4.50	16.5	2.44	4.63	.170	.25	.19	54.3	.829	1.30	34
18124	11.9	1.13	4.83	4.07	.339	.042	1.02	.06	75.6	.371	1.00	430
18125	.649	4.82	17.9	.09	1.76	.631	1.07	.12	73.4	.029	.80	13
18126	18.4	9.90	11.4	1.79	1.44	.258	3.33	.56	48.8	1.60	1.20	140
18127	16.1	8.93	10.5	.89	6.53	.384	2.97	.29	47.6	1.02	.70	240
18128	10.0	10.1	14.0	1.21	12.9	.153	1.54	.16	45.9	1.35	2.10	180
18129	16.2	3.49	3.41	2.82	1.68	.080	4.27	.12	68.4	.221	1.40	730
18130	14.9	2.57	2.92	4.66	1.05	.054	.59	.07	58.5	.191	2.10	338
18131	13.9	7.78	9.13	3.17	7.53	.158	2.35	.29	54.8	.834	1.80	[illegible]
18132	10.3	13.5	10.2	.63	10.5	.196	1.24	.08	50.3	.622	1.55	90
18133	11.4	3.14	4.94	2.31	.836	.071	1.39	<.06	73.8	.353	1.60	570
18134	13.1	1.36	2.04	1.53	.633	.041	1.74	<.06	76.2	.171	1.00	250
18135	16.1	4.39	4.58	2.10	2.02	.082	3.24	.11	66.3	.406	1.85	490

Northern Development and Mines
Ontario

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

Mining

52L16NE0017 2.12165 KILLALA

900

Type of Survey: Geological | Township or Area: Killala

Claim Holder(s): Black Cliff Mines Ltd.

Prospector's Licence No.: T 4836

Address:

Survey Company: Orex International

Date of Survey (from & to): 25 07 88 | 17 09 88 (Day | Mo. | Yr. | Day | Mo. | Yr.)

Total Miles of line Cut:

Name and Address of Author (of Geo-Technical report): Arpad Farkas

Credits Requested per Each Claim in Columns at right

Special Provisions		Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	Geophysical	
	- Electromagnetic	
	- Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	- Radiometric	
	- Other	
	Geological	20
	Geochemical	

Man Days		Days per Claim
Complete reverse side and enter total(s) here	Geophysical	
	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	
	Magnetometer	
	Radiometric	

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
KRL	976991	
	976992	

RECEIVED
FEB 3 1989

Total number of mining claims covered by this report of work: 48

Expenditures (excludes power stripping)

Type of Work Performed:

Performed on Claim(s):

Calculation of Expenditure Days Credits

Total Expenditures $ ÷ 15 = Total Days Credits

Instructions
Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
960	Feb 3/89	Barbara Thompson
	Date Approved as Recorded	Branch Director

Date: Nov. 30/88 | Recorded Holder or Agent (Signature): Murray C. Rogers

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying:

Date Certified: Nov. 30/88 | Certified by (Signature): Murray C. Rogers

Ministry of Northern Development and Mines
Ontario

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

Mining Act

MV 2.12165

DOCUMENT No.
W8902·014A

Instructions:
- Please type or print.
- If number of mining claims traversed exceeds space on this form, attach a list.
- Note: Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
- Do not use shaded areas below.

Type of Survey(s): Geological
Township or Area: Killala
Claim Holder(s): Black Cliff Mines Limited
Prospector's Licence No.: T 4836
Address: 2205, 1 Yonge Street, Toronto, Ontario. M5E 1E5
Survey Company: Orex International
Date of Survey (from & to): 25 07 88 (Day Mo. Yr.) – 17 09 88 (Day Mo. Yr.)
Total Miles of line Cut:
Name and Address of Author (of Geo-Technical report): Arpad Farkas; #502, 66 Pacific Avenue, Toronto, Ont. M6P 2P4

Credits Requested per Each Claim in Columns at right

Special Provisions	Geophysical	Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	- Electromagnetic	
	- Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	- Radiometric	
	- Other	
	Geological	20
	Geochemical	

Man Days	Geophysical	Days per Claim
Complete reverse side and enter total(s) here	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	
	Magnetometer	
	Radiometric	

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FEB 22 1989
MINING LANDS SECTION

Expenditures (excludes power stripping)

Type of Work Performed:

Performed on Claim(s):

RECEIVED
FEB 3 1989
RED LAKE
MINING DIV.

Calculation of Expenditure Days Credits

Total Expenditures $ ÷ 15 = Total Days Credits

Instructions
Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Date: Nov. 30/88
Recorded Holder or Agent (Signature): Murray C. Rogers

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.	Prefix	Number	Expend. Days Cr.
KRL	903703			976960	
	903704			976961	
	903705			976962	
	903706			976963	
	903707			976964	
	903708			976965	
	903709			976966	
	903710			976967	
	903711			976968	
	903712			976969	
	903713			976970	
	903714			976971	
	903715			976972	
	903716			976973	
	903717			976974	
	903718			976975	
	903719			976976	
	903720			976977	
	976955			976978	
	976956			976979	
	976957			976980	
	976958			976985	
	976959			976986	

Total number of mining claims covered by this report of work: 48

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
960	Feb 3/89	Barbara Thompson
	Date Approved as Recorded	Branch Director
		See revised work statements

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying
[illegible]

Ministry of Northern Development and Mines
Ontario

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

Mining Act

DOCUMENT NO. W8902·013

2.12165

Instructions: – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.
Note: – Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

Type of Survey: Rock assays
Township or Area: Killala
Claim Holder(s): Black Cliff Mines Limited
Prospector's Licence No.: T4836
Address: 2205, 1 Yonge Street, Toronto, Ontario. M5E 1E5
Survey Company: Orex International
Date of Survey (from & to): 25 07 88 (Day Mo. Yr.) – 17 09 88 (Day Mo. Yr.)
Total Miles of line Cut:
Name and Address of Author (of Geo-Technical report): Arpad Farkas; #502, 66 Pacific Ave., Toronto, Ontario. M6P 2P4

Credits Requested per Each Claim in Columns at right

Special Provisions		Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	Geophysical	
	· Electromagnetic	
	· Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	· Radiometric	
	· Other	
	Geological	
	Geochemical	

Man Days		Days per Claim
Complete reverse side and enter total(s) here	Geophysical	
	· Electromagnetic	
	· Magnetometer	
	· Radiometric	
	· Other	
	Geological	
	Geochemical	

RECEIVED
FEB 22 1989
MINING LANDS SECTION

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	
	Magnetometer	
	Radiometric	

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
KRL	903713	40
	903715	40
	903717	40
	903719	3

Total number of mining claims covered by this report of work: 4

RECEIVED FEB 3 1989

Expenditures (excludes power stripping)

Type of Work Performed: Rock sample assays
Performed on Claim(s): 903713, 903715, 903717, 903719

Calculation of Expenditure Days Credits

Total Expenditures				Total Days Credits
$ 1853.95	÷	15	=	123

Instructions
Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

For Office Use Only		
Total Days Cr. Recorded: 123	Date Recorded: Feb 3/89	Mining Recorder: Barbara Thompson
	Date Approved as Recorded	Branch Director: See revised work statement

Date: Dec. 2/88
Recorded Holder or Agent (Signature): Murray C. Rogers

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying: Murray C. Rogers - 203, 90 James Street, Toronto, Ont. M8W 1L7

Date Certified | Certified by (Signature)

Ontario — Northern Development and Mines

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

Mining Act 0778 CONT'D

Note: – If number of mining claims traversed exceeds space on this form, attach a list.
– Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns. Do not use shaded areas below.

Type of Survey: Geological	Township or Area: Killala
Claim Holder(s): Black Cliff Mines Ltd.	Prospector's Licence No.: T 4836
Address:	
Survey Company: Orex International	Date of Survey (from & to): 25 07 88 (Day Mo. Yr.) – 17 09 88 (Day Mo. Yr.); Total Miles of line Cut:
Name and Address of Author (of Geo-Technical report): Arpad Farkas	

Credits Requested per Each Claim in Columns at right

Special Provisions	Geophysical	Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	- Electromagnetic	
	- Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	- Radiometric	
	- Other	
	Geological	20
	Geochemical	

Man Days	Geophysical	Days per Claim
Complete reverse side and enter total(s) here	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	
	Magnetometer	
	Radiometric	

Expenditures (excludes power stripping)

Type of Work Performed:

Performed on Claim(s):

Calculation of Expenditure Days Credits

Total Expenditures $ ÷ 15 = Total Days Credits

Instructions: Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
KRL	976991	
	976992	

RECEIVED FEB 6 1989

Total number of mining claims covered by this report of work: 48

For Office Use Only		
Total Days Cr. Recorded: 960	Date Recorded: Feb 3/89	Mining Recorder: [signature]
	Date Approved as Recorded:	Branch Director:

Date: Nov. 30/88 — Recorded Holder or Agent (Signature): Murray C. Rogers

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying:

Date Certified: Nov. 30/88 — Certified by (Signature): Murray C. Rogers

Ministry of Northern Development and Mines

Ontario

Report of Work

(Geophysical, Geological, Geochemical and Expenditures)

Mining Act

DOCUMENT NO. W8901-022A

Instructions: – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.

Note: – Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

Type of Survey: Geological

Township or Area: Killala

Claim Holder(s): Black Cliff Mines Limited

Prospector's Licence No.: T 4836

Address: 2205, 1 Yonge Street, Toronto, Ontario. M5E 1E5

Survey Company: Orex International

Date of Survey (from & to): 25 07 88 | 17 09 88 (Day Mo. Yr. | Day Mo. Yr.)

Total Miles of line Cut:

Name and Address of Author (of Geo-Technical report): Arpad Farkas; #502, 66 Pacific Avenue, Toronto, Ont. M6P 2P4

Credits Requested per Each Claim in Columns at right

Special Provisions	Geophysical	Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	- Electromagnetic	
	- Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	- Radiometric	
	- Other	
	Geological	20
	Geochemical	

Man Days	Geophysical	Days per Claim
Complete reverse side and enter total(s) here	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	

RECEIVED
MAY 16 1989
MINING LANDS SECTION

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	
	Magnetometer	
	Radiometric	

Expenditures (excludes power stripping)

Type of Work Performed:

Performed on Claim(s):

Calculation of Expenditure Days Credits

Total Expenditures: $ ÷ 15 = Total Days Credits:

Instructions: Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.	Prefix	Number	Expend. Days Cr.
KRL	903703			976960	
	903704			976961	
	903705			976962	
	903706			976963	
	903707			976964	
	903708			976965	
	903709			976966	
	903710			976967	
	903711			976968	
	903712			976969	
	903713			976970	
	903714			976971	
	903715			976972	
	903716			976973	
	903717			976974	
	903718			976975	
	903719			976976	
	903720			976977	
	976955			976978	
	976956			976979	
	976957			976980	
	976958			976985	
	976959			976986	

Total number of mining claims covered by this report of work: 48

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
960	Mch 3/89	[signature]
	Date Approved as Recorded	Branch Director
		See survey and work statements

Date: Nov. 30/88

Recorded Holder or Agent (Signature): Murray C. Rogers

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying: Murray C. Rogers – 203, 90 James St., Toronto, Ontario

Date Certified:

Certified by (Signature):

Ministry of Northern Development and Mines

Ontario

Geophysical-Geological-Geochemical Technical Data Statement

File ____________

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Geological

Township or Area Killala

Claim Holder(s) Black Cliff Mines Ltd.

Survey Company Orex International

Author of Report Arpad Farkas 2-11950

Address of Author #502, 66 Pacific Ave., Toronto, Ont.

Covering Dates of Survey July 25 - Sept. 17, 1988 (linecutting to office)

Total Miles of Line Cut ____________

MINING CLAIMS TRAVERSED
List numerically

(prefix) (number)

See attached list

If space insufficient, attach list

TOTAL CLAIMS 48

SPECIAL PROVISIONS CREDITS REQUESTED

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

	DAYS per claim
Geophysical	
--Electromagnetic	
--Magnetometer	
--Radiometric	
--Other	
Geological	20
Geochemical	

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer ______ Electromagnetic ______ Radiometric ______
(enter days per claim)

DATE: Nov. 30/88 SIGNATURE: Murray C. Rogers
Author of Report or Agent

OFFICE USE ONLY

Res. Geol. ____________ Qualifications 2-6355

Previous Surveys

File No.	Type	Date	Claim Holder

837 (85/12)

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS - If more than one survey, specify data for each type of survey

Number of Stations ______ Number of Readings ______
Station interval ______ Line spacing ______
Profile scale ______
Contour interval ______

MAGNETIC

Instrument ______
Accuracy – Scale constant ______
Diurnal correction method ______
Base Station check-in interval (hours) ______
Base Station location and value ______

ELECTROMAGNETIC

Instrument ______
Coil configuration ______
Coil separation ______
Accuracy ______
Method: ☐ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line
Frequency ______ (specify V.L.F. station)
Parameters measured ______

GRAVITY

Instrument ______
Scale constant ______
Corrections made ______
Base station value and location ______
Elevation accuracy ______

INDUCED POLARIZATION
RESISTIVITY

Instrument ______
Method ☐ Time Domain ☐ Frequency Domain
Parameters – On time ______ Frequency ______
– Off time ______ Range ______
– Delay time ______
– Integration time ______
Power ______
Electrode array ______
Electrode spacing ______
Type of electrode ______

SELF POTENTIAL

Instrument ____________________ Range ____________

Survey Method ____________________

____

Corrections made ____________________

____

RADIOMETRIC

Instrument ____________________

Values measured ____________________

Energy windows (levels) ____________________

Height of instrument ____________________ Background Count ____________

Size of detector ____________________

Overburden ____________________

(type, depth – include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey ____________________

Instrument ____________________

Accuracy ____________________

Parameters measured ____________________

____

Additional information (for understanding results) ____________________

____

____

AIRBORNE SURVEYS

Type of survey(s) ____________________

Instrument(s) ____________________

(specify for each type of survey)

Accuracy ____________________

(specify for each type of survey)

Aircraft used ____________________

Sensor altitude ____________________

Navigation and flight path recovery method ____________________

____

Aircraft altitude ____________________ Line Spacing ____________

Miles flown over total area ____________________ Over claims only ____________

GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken ______

______

______

Total Number of Samples ______

Type of Sample ______
(Nature of Material)

Average Sample Weight ______

Method of Collection ______

______

Soil Horizon Sampled ______

Horizon Development ______

Sample Depth ______

Terrain ______

______

Drainage Development ______

Estimated Range of Overburden Thickness ______

______

______

SAMPLE PREPARATION
(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis ______

______

______

______

General ______

______

______

______

______

______

______

______

______

______

ANALYTICAL METHODS

Values expressed in: per cent ☐ p. p. m. ☐ p. p. b. ☐

Cu, Pb, Zn, Ni, Co, Ag, Mo, As,-(circle)

Others ______

Field Analysis (______ tests)

Extraction Method ______

Analytical Method ______

Reagents Used ______

Field Laboratory Analysis

No. (______ tests)

Extraction Method ______

Analytical Method ______

Reagents Used ______

Commercial Laboratory (______ tests)

Name of Laboratory ______

Extraction Method ______

Analytical Method ______

Reagents Used ______

General ______

______

______

______

______

______

______

______

______

______

Mining Claims Traversed

KRL 903703
903704
903705
903706
903707
903708
903709
903710
903711
903712
903713
903714
903715
903716
903717
903718
903719
903720
976955
976956
976957
976958
976959
976960
976961
976962
976963
976964
976965

KRL 976966
976967
976968
976969
976970
976971
976972
976973
976974
976975
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976978
976979
976980
976985
976986
976991
976992

2.12165

Ontario

Ministry of
Northern Development
and Mines

Ministère du
Développement du Nord
et des Mines

Mining Lands Section
3rd Floor, 880 Bay Street
Toronto, Ontario
M5S 1Z8

Telephone: (416) 965-4888

June 21, 1989

Your file: W8902-13,14,77
Our file: 2.12165

Mining Recorder
Ministry of Northern Development and Mines
P.O. Box 324
Red Lake, Ontario
POV 2MO

Dear Sir:

Re: Notice of Intent dated May 18, 1989 for Geological Survey and Assaying submitted on Mining Claims KRL 903703 et al in Killala Township.

The assessment work credits, as listed with the above-mentioned Notice of Intent, have been approved as of the above date.

Please inform the recorded holder of these mining claims and so indicate on your records.

Yours sincerely,

W.R. Cowan
Provincial Manager, Mining Lands
Mines & Minerals Division

D.K.DK:eb
Enclosure

cc: Mr. G.H. Ferguson
Mining and Lands Commissioner
Toronto, Ontario

Orex International
Toronto, Ontario

Murray C. Rogers
Toronto, Ontario

Resident Geologist
Red Lake, Ontario

Black cliff Mines Ltd.
Toronto, Ontario

Ministry of Northern Development and Mines

Ontario

Technical Assessment
Work Credits

File: 2.12165

Date: May 18, 1989

Mining Recorder's Report of Work No. W8902-13

Recorded Holder: BLACK CLIFF MINES LIMITED

Township or Area: KILLALA TOWNSHIP

Type of survey and number of Assessment days credit per claim	Mining Claims Assessed
Geophysical	$1853.95 spent on analyses of Samples taken from Mining Claims:
Electromagnetic ______ days	
Magnetometer ______ days	KRL 903703
Radiometric ______ days	903705-06
Induced polarization ______ days	903709
Other ______ days	903711-12
Section 77 (19) See "Mining Claims Assessed" column	903714
Geological ______ days	903716 to 18 incl.
Geochemical ______ days	976955
Man days [ ] Airborne [ ]	976985
Special provision [ ] Ground [ ]	976992-93
[ ] Credits have been reduced because of partial coverage of claims.	123 days credit allowed which may be grouped in accordance with Section 76(6) of the Mining Act.
[ ] Credits have been reduced because of corrections to work dates and figures of applicant.	

Special credits under section 77 (16) for the following mining claims

No credits have been allowed for the following mining claims

[ ] not sufficiently covered by the survey [ ] insufficient technical data filed

The Mining Recorder may reduce the above credits if necessary in order that the total number of approved assessment days recorded on each claim does not exceed the maximum allowed as follows: Geophysical - 80; Geologocal - 40; Geochemical - 40; Section 77(19) - 60.

828 (85/12)

Ministry of Northern Development and Mines
Ontario

Technical Assessment Work Credits

File: 2.12165

Date: May 18, 1989

Mining Recorder's Report of Work No.: W8902-14 ,77

Recorded Holder: BLACK CLIFF MINES LIMITED

Township or Area: KILLALA TOWNSHIP

Type of survey and number of Assessment days credit per claim	Mining Claims Assessed
Geophysical	KRL 903703 to 06 incl.
Electromagnetic ____ days	903708
Magnetometer ____ days	903710
Radiometric ____ days	903712
Induced polarization ____ days	903714
Other ____ days	903716
Section 77 (19) See "Mining Claims Assessed" column	903718
Geological 20 days	976956 to 59 incl.
Geochemical ____ days	976961 to 73 incl.
Man days [ ] Airborne [ ]	976975 to 78 incl.
Special provision [X] Ground [X]	976985-86
[ ] Credits have been reduced because of partial coverage of claims.	976991
[ ] Credits have been reduced because of corrections to work dates and figures of applicant.	

Special credits under section 77 (16) for the following mining claims

15 days Geological	10 days Geological	5 days Geological
KRL 903707	KRL 903709	KRL 903711
976955	903720	903719
	976974	976980
	976979	976992

No credits have been allowed for the following mining claims

[X] not sufficiently covered by the survey [ ] insufficient technical data filed

KRL 903713
903715
903717
976960

The Mining Recorder may reduce the above credits if necessary in order that the total number of approved assessment days recorded on each claim does not exceed the maximum allowed as follows: Geophysical - 80; Geologocal - 40; Geochemical - 40; Section 77(19) - 60.

828 (85/12)

LEGEND

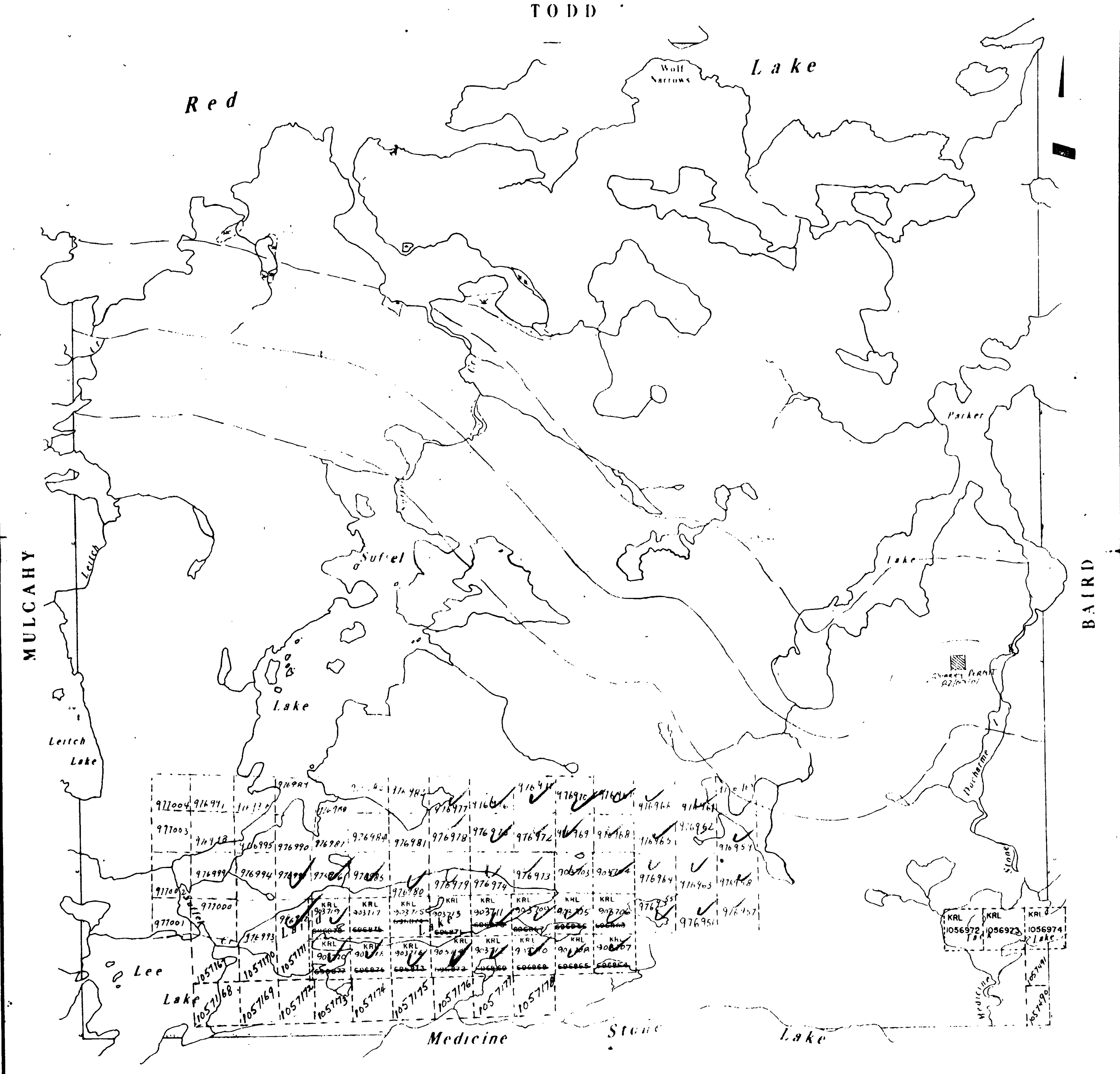
HIGHWAY AND ROUTE No
OTHER ROADS
TRAILS
SURVEYED LINES
TOWNSHIPS, BASE LINES ETC
LOTS, MINING CLAIMS, PARCELS ETC
UNSURVEYED LINES
LOT LINES
PARCEL BOUNDARY
MINING CLAIMS ETC
RAILWAY AND RIGHT OF WAY
UTILITY LINES
NON PERENNIAL STREAM
FLOODING OR FLOODING RIGHTS
SUBDIVISION OR COMPOSITE PLAN
RESERVATIONS
ORIGINAL SHORELINE
MARSH OR MUSKEG
MINES
TRAVERSE MONUMENT

AREAS WITHDRAWN FROM DISPOSITION

S.R. – SURFACE RIGHTS M.R. – MINING RIGHTS

Description	Order No.	Date	Disposition	File

52L16NE0017 2.12165 KILLALA 200



DISPOSITION OF CROWN LANDS

TYPE OF DOCUMENT	SYMBOL
PATENT, SURFACE & MINING RIGHTS	●
SURFACE RIGHTS ONLY	◐
MINING RIGHTS ONLY	○
LEASE, SURFACE & MINING RIGHTS	■
SURFACE RIGHTS ONLY	◧
MINING RIGHTS ONLY	□
LICENCE OF OCCUPATION	▼
ORDER IN COUNCIL	OC
RESERVATION	®
CANCELLED	⊗
SAND & GRAVEL	ⓢ

NOTE MINING RIGHTS IN PARCELS PATENTED PRIOR TO MAY 6, 1913, VESTED IN ORIGINAL PATENTEE BY THE PUBLIC LANDS ACT, R.S.O. 1970, CHAP. 380, SEC. 63, SUBSEC. 1

RED LAKE MINING DIVISION
MAY 4 1989
RED LAKE, ONTARIO

400' surface rights reservation along the shores of all lakes and rivers

SCALE: 1 INCH = 40 CHAINS

FEET 0 1000 2000 4000 6000 8000
METRES 0 200 1000 (1 KM) 2000 (2 KM)

ACRES 40 HECTARES 16

TOWNSHIP OF KILLALA

DISTRICT **KENORA**

PATRICIA PORTION

MINING DIVISION **RED LAKE**

Ministry of Natural Resources Surveys and Mapping Branch
Ontario

Date 7 FEB /1980 Plan No. M.2

2.12165

0 100 200 300 400 500

1:5000

BLACK CLIFF MINES LIMITED

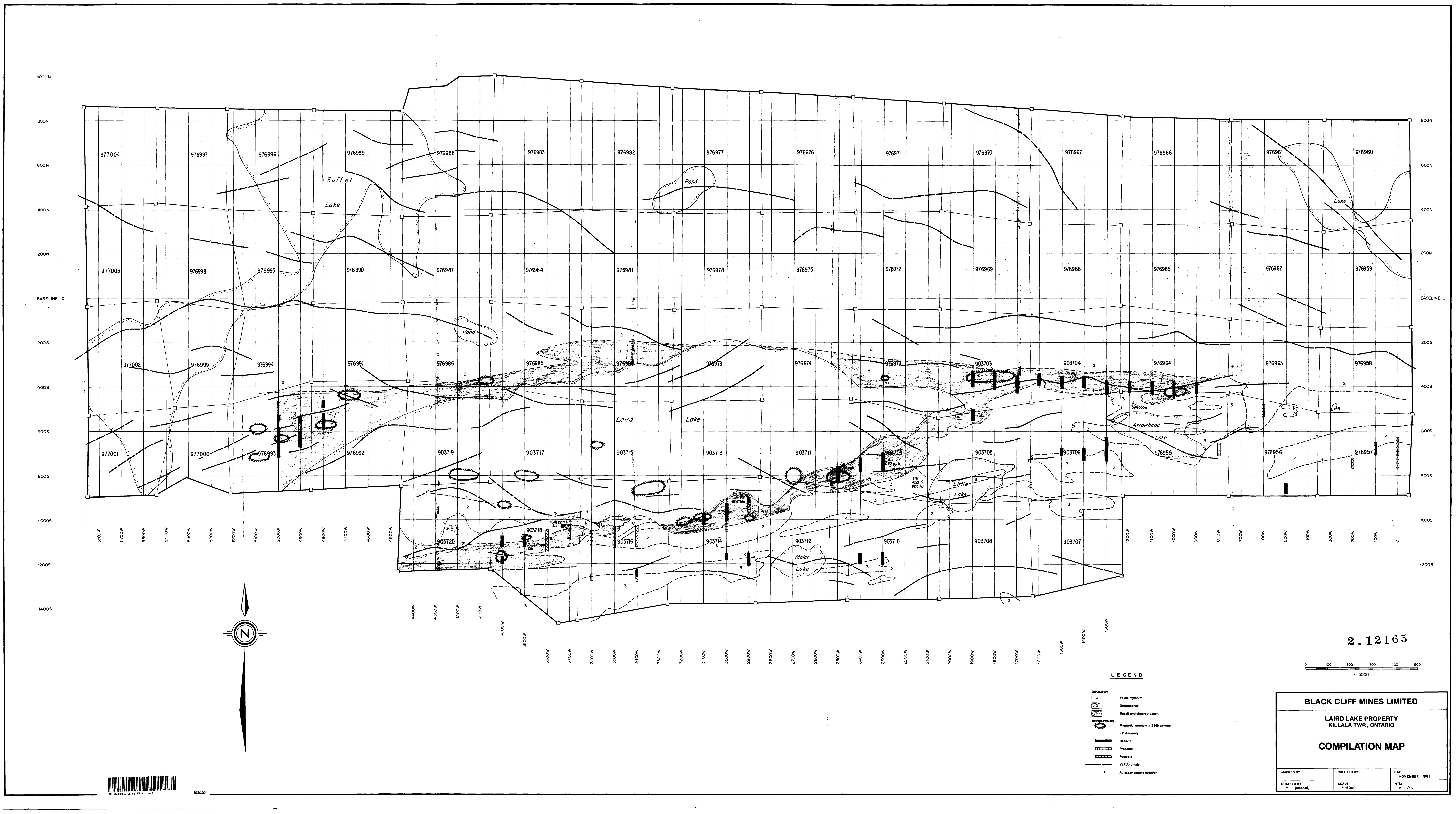
LAIRD LAKE PROPERTY
KILLALA TWP., ONTARIO

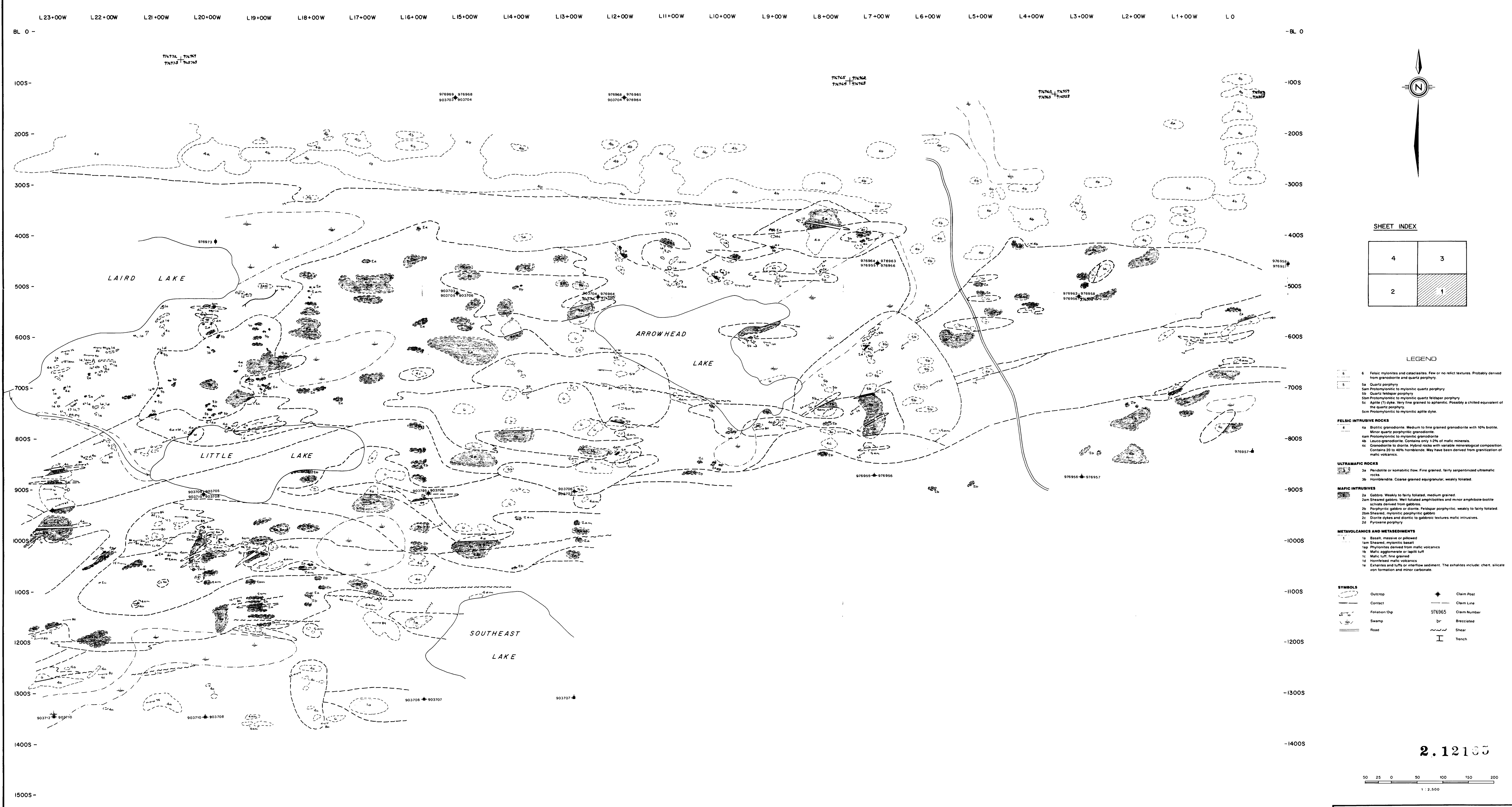
CLAIM MAP

MAPPED BY:	CHECKED BY:	DATE: NOVEMBER 1988
DRAFTED BY: m j jomshedji	SCALE: 1:5000	NTS: 52L/16

52L16NE0017 2.12165 KILLALA

210


Suffel Lake
Pond
Laird Lake
Arrowhead Lake
Little Lake
Molar Lake
Lake
BASELINE 0
2.12165
1:5000
LEGEND
GEOLOGY
3 Felsic mylonite
2 Granodiorite
1 Basalt and sheared basalt
GEOPHYSICS
Magnetic anomaly > 2500 gamma
I.P. Anomaly
Definite
Probable
Possible
VLF Anomaly
X Au assay sample location
BLACK CLIFF MINES LIMITED
LAIRD LAKE PROPERTY
KILLALA TWP., ONTARIO
COMPILATION MAP
MAPPED BY:
CHECKED BY:
DATE: NOVEMBER 1988
DRAFTED BY: m j jamshedji
SCALE: 1:5000
NTS: 52L/16



LEGEND

6 Felsic mylonites and cataclasites. Few or no relict textures. Probably derived from granodiorite and quartz porphyry.

5a Quartz porphyry
5am Protomylonitic to mylonitic quartz porphyry
5b Quartz feldspar porphyry
5bm Protomylonitic to mylonitic quartz feldspar porphyry
5c Aplite (?) dyke. Very fine grained to aphanitic. Possibly a chilled equivalent of the quartz porphyry.
5cm Protomylonitic to mylonitic aplite dyke.

FELSIC INTRUSIVE ROCKS

4a Biotitic granodiorite. Medium to fine grained granodiorite with 10% biotite. Minor quartz porphyritic granodiorite.
4am Protomylonitic to mylonitic granodiorite
4b Leuco-granodiorite. Contains only 1-2% of mafic minerals.
4c Granodiorite to diorite. Hybrid rocks with variable mineralogical composition. Contains 20 to 40% hornblende. May have been derived from granitization of mafic volcanics.

ULTRAMAFIC ROCKS

3a Peridotite or komatiitic flow. Fine grained, fairly serpentinized ultramafic rocks.
3b Hornblendite. Coarse grained equigranular, weakly foliated.

MAFIC INTRUSIVES

2a Gabbro. Weakly to fairly foliated, medium grained.
2am Sheared gabbro. Well foliated amphibolites and minor amphibole-biotite schists derived from gabbros.
2b Porphyritic gabbro or diorite. Feldspar porphyritic, weakly to fairly foliated.
2bm Sheared, mylonitic porphyritic gabbro
2c Diorite dykes and dioritic to gabbroic textures mafic intrusives.
2d Pyroxene porphyry

METAVOLCANICS AND METASEDIMENTS

1a Basalt, massive or pillowed
1am Sheared, mylonitic basalt
1ap Phyllonites derived from mafic volcanics
1b Mafic agglomerate or lapilli tuff
1c Mafic tuff, fine grained
1d Hornfelsed mafic volcanics
1e Exhalites and tuffs or interflow sediment. The exhalites include: chert, silicate iron formation and minor carbonate.

SYMBOLS

Outcrop	Claim Post
Contact	Claim Line
Foliation/Dip	976965 Claim Number
Swamp	br Brecciated
Road	Shear
	Trench

2.121[illegible]

50 25 0 50 100 150 200

1 : 2,500

BLACK CLIFF MINES LIMITED

LAIRD LAKE PROPERTY
KILLALA TWP., ONTARIO

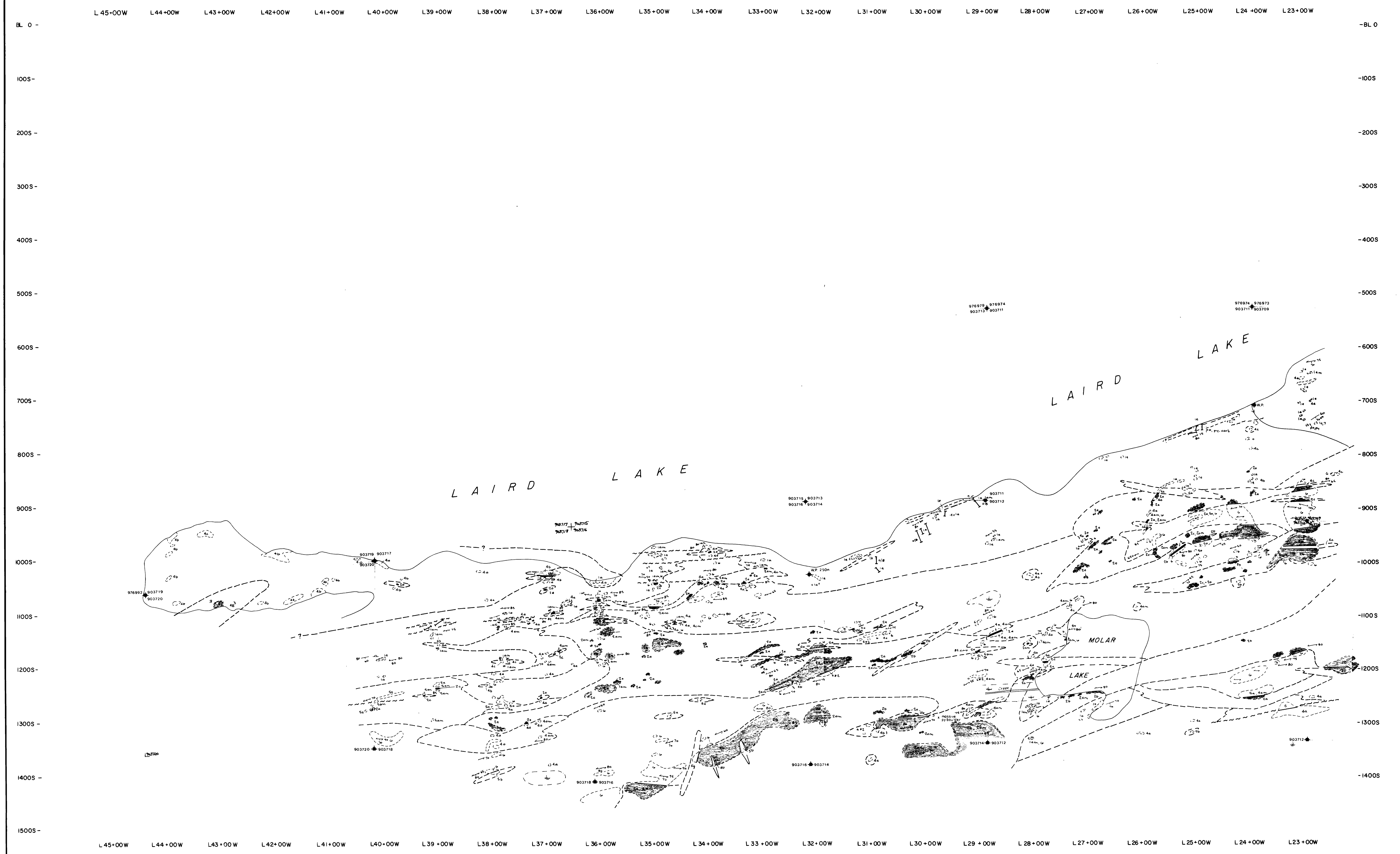
GEOLOGICAL MAP

EAST SHEET

SHEET 1 of 4

MAPPED BY:	CHECKED BY:	DATE: NOVEMBER 1988
DRAFTED BY: m j jamshedji	SCALE: 1: 2.500	NTS: 52L/16

230



SHEET INDEX

4	3
2	1

LEGEND

6 — 6 Felsic mylonites and cataclasites. Few or no relict textures. Probably derived from granodiorite and quartz porphyry.

5 — 5a Quartz porphyry
5am Protomylonitic to mylonitic quartz porphyry
5b Quartz feldspar porphyry
5bm Protomylonitic to mylonitic quartz feldspar porphyry
5c Aplite (?) dyke. Very fine grained to aphanitic. Possibly a chilled equivalent of the quartz porphyry.
5cm Protomylonitic to mylonitic aplite dyke.

FELSIC INTRUSIVE ROCKS

4 — 4a Biotitic granodiorite. Medium to fine grained granodiorite with 10% biotite. Minor quartz porphyritic granodiorite.
4am Protomylonitic to mylonitic granodiorite
4b Leuco-granodiorite. Contains only 1-2% of mafic minerals.
4c Granodiorite to diorite. Hybrid rocks with variable mineralogical composition. Contains 20 to 40% hornblende. May have been derived from granitization of mafic volcanics.

ULTRAMAFIC ROCKS

3 — 3a Peridotite or komatiitic flow. Fine grained, fairly serpentinized ultramafic rocks.
3b Hornblendite. Coarse grained equigranular, weakly foliated.

MAFIC INTRUSIVES

2a Gabbro. Weakly to fairly foliated, medium grained.
2am Sheared gabbro. Well foliated amphibolites and minor amphibole-biotite schists derived from gabbros.
2b Porphyritic gabbro or diorite. Feldspar porphyritic, weakly to fairly foliated.
2bm Sheared, mylonitic porphyritic gabbro
2c Diorite dykes and dioritic to gabbroic textures mafic intrusives.
2d Pyroxene porphyry

METAVOLCANICS AND METASEDIMENTS

1 — 1a Basalt, massive or pillowed
1am Sheared, mylonitic basalt
1ap Phyllonites derived from mafic volcanics
1b Mafic agglomerate or lapilli tuff
1c Mafic tuff, fine grained
1d Hornfelsed mafic volcanics
1e Exhalites and tuffs or interflow sediment. The exhalites include: chert, silicate iron formation and minor carbonate.

SYMBOLS

Outcrop	Claim Post
Contact	Claim Line
Foliation/Dip	976965 Claim Number
Swamp	br Brecciated
Road	Shear
	Trench

2.12165

50 25 0 50 100 150 200

1 2,500

BLACK CLIFF MINES LIMITED

LAIRD LAKE PROPERTY
KILLALA TWP., ONTARIO

GEOLOGICAL MAP
WEST SHEET
SHEET 2 of 4

MAPPED BY:	CHECKED BY:	DATE: NOVEMBER 1988
DRAFTED BY: m j jamshedji	SCALE: 1 2,500	NTS: 52L/16

240


L 23+00W
L22+00W
L21+00W
L20+00W
L19+00W
L18+00W
L17+00W
L16+00W
L15+00W
L14+00W
L13+00W
L12+00W
L11+00W
L10+00W
L9+00W
L8+00W
L7+00W
L6+00W
L5+00W
L4+00W
L3+00W
L2+00W
L1+00W
L0
900N
800N
700N
600N
500N
400N
300N
200N
100N
BL 0
100S
200S
300S
400S
500S
600S
700S
LAKE
LAKE
POND
POND
N
SHEET INDEX
4
3
2
1
LEGEND
6 Felsic mylonites and cataclasites. Few or no relict textures. Probably derived from granodiorite and quartz porphyry.
5a Quartz porphyry
5am Protomylonitic to mylonitic quartz porphyry
5b Quartz feldspar porphyry
5bm Protomylonitic to mylonitic quartz feldspar porphyry
5c Aplite (?) dyke. Very fine grained to aphanitic. Possibly a chilled equivalent of the quartz porphyry.
5cm Protomylonitic to mylonitic aplite dyke.
FELSIC INTRUSIVE ROCKS
4a Biotitic granodiorite. Medium to fine grained granodiorite with 10% biotite. Minor quartz porphyritic granodiorite.
4am Protomylonitic to mylonitic granodiorite
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ULTRAMAFIC ROCKS
3a Peridotite or komatiitic flow. Fine grained. fairly serpentinized ultramafic rocks.
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2a Gabbro. Weakly to fairly foliated. medium grained.
2am Sheared gabbro. Well foliated amphibolites and minor amphibole-biotite schists derived from gabbros.
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2bm Sheared, mylonitic porphyritic gabbro
2c Diorite dykes and dioritic to gabbroic textures mafic intrusives.
2d Pyroxene porphyry
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1a Basalt, massive or pillowed
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1c Mafic tuff, fine grained
1d Hornfelsed mafic volcanics
1e Exhalites and tuffs or interflow sediment. The exhalites include: chert, silicate iron formation and minor carbonate.
SYMBOLS
Outcrop
Contact
Foliation/Dip
Swamp
Road
Claim Post
Claim Line
976965 Claim Number
br Brecciated
Shear
Trench
2.12165
50 25 0 50 100 150 200
1 : 2,500
BLACK CLIFF MINES LIMITED
LAIRD LAKE PROPERTY
KILLALA TWP., ONTARIO
GEOLOGICAL MAP
NORTH-EAST SHEET
SHEET 3 of 4
MAPPED BY:
CHECKED BY:
DATE: NOVEMBER 1988
DRAFTED BY: m j jamshedji
SCALE: 1 : 2,500
NTS: 52L/16

250


LEGEND
6 Felsic mylonites and cataclasites. Few or no relict textures. Probably derived from granodiorite and quartz porphyry.
5a Quartz porphyry
5am Protomylonitic to mylonitic quartz porphyry
5b Quartz feldspar porphyry
5bm Protomylonitic to mylonitic quartz feldspar porphyry
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1c Mafic tuff, fine grained
1d Hornfelsed mafic volcanics
1e Exhalites and tuffs or interflow sediment. The exhalites include: chert, silicate iron formation and minor carbonate.
SYMBOLS
Outcrop
Contact
Foliation/Dip
Swamp
Road
Claim Post
Claim Line
903719 Claim Number
br Brecciated
Shear
Trench
SHEET INDEX
4 3
2 1
LAKE
SUFFEL LAKE
POND
LAIRD LAKE
2.12165
50 25 0 50 100 150 200
1 2,500
BLACK CLIFF MINES LIMITED
LAIRD LAKE PROPERTY
KILLALA TWP., ONTARIO
GEOLOGICAL MAP
NORTH-WEST SHEET
SHEET 4 of 4
MAPPED BY:
CHECKED BY:
DATE: NOVEMBER 1988
DRAFTED BY: m j jamshedji
SCALE: 1 2,500
NTS: 52L/16