

**REPORT ON GEOLOGICAL MAPPING  
PROSPECTING AND MINERALIZATION  
OF THE  
LEMON LAKE PROPERTY**

**CARIBOO MINING DISTRICT**

**NTS 93A/06  
52° 21' 00" N  
121° 16' 00" W**

**GEOLOGICAL SURVEY BRANCH  
ASSESSMENT REPORT**

**H.P. Salat, P.Eng.**

**February 06, 1997**

**24,881**

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## PROPERTY, LOCATION AND ACCESS

The Lemon Lake property consists of 22 two-post claims and one MGS - four cornered claim containing four units. List of the claims is presented in Table 1 and their lay-out shown in Figure 1.

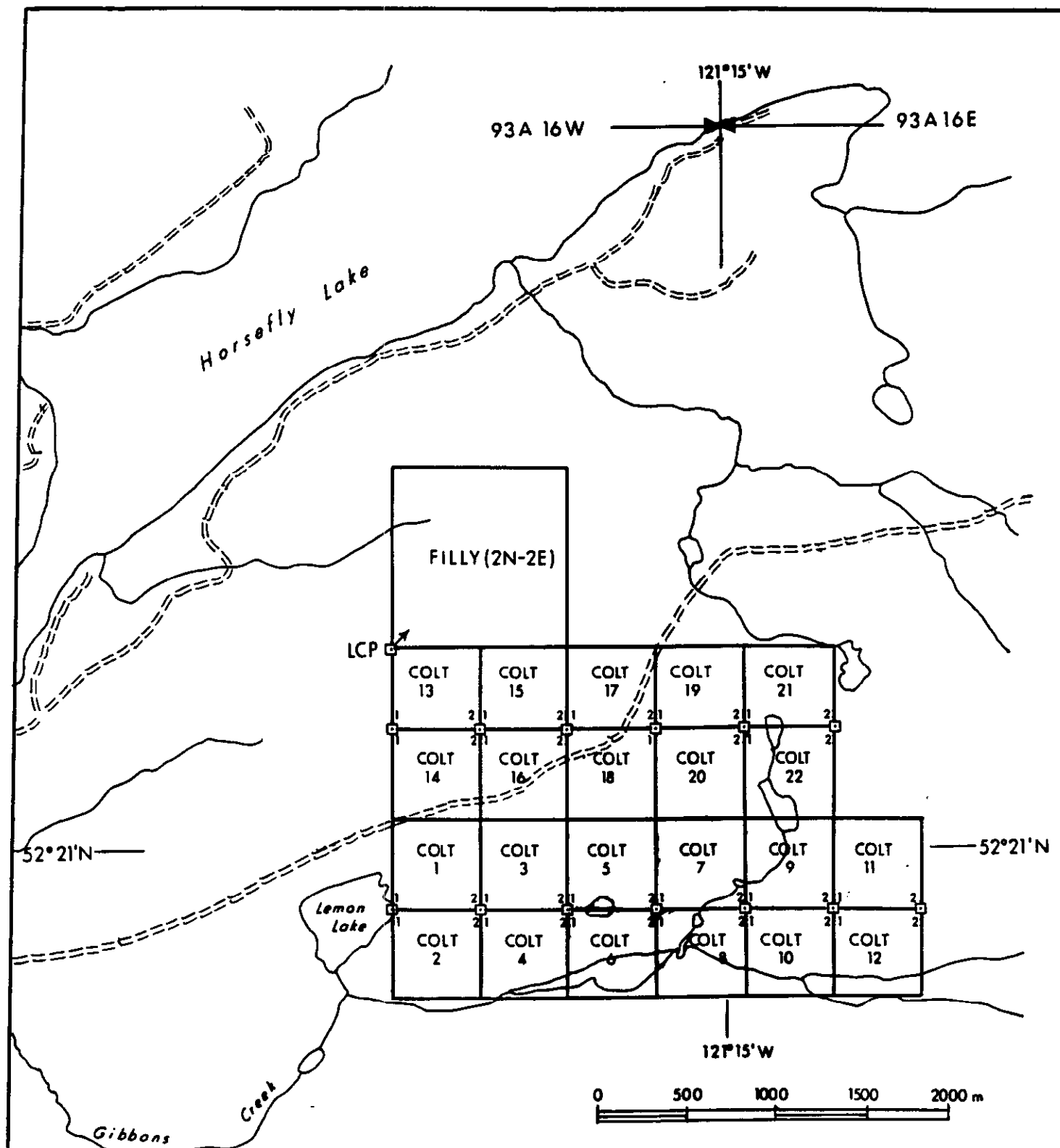
Table 1  
Lemon Lake Property: Land and Tenure

Claim Name	No Units	Record Number	Expiry date *
COLT 1 to 12	1 each	343224 to 343235	16 January 2000
COLT 13 to 20	1 each	343236 to 343243	15 January 2000
COLT 21 to 22	1 each	350440 & 350441	23 August 2000
FILLY	4	399879	8 August 2000

(\* assumes that assessment work herein reported has been accepted)

The claims are located 2 kilometres south of Horsefly Lake and 75 kilometres east of the town of Williams Lake, in the Cariboo country. Approximate coordinates in the centre of the property are 52°21'N of latitude and 121°16'W of longitude.

The area is hilly and heavily wooded with mixed poplar and spruce. Some parts have been logged off or have been cleared for grazing. Average elevation is around 910 metres above sea-level and hills are only 50 to 100 metres in elevation. Access is excellent by mean of a good logging road which crosses the entire length of the property. New timbered off clear cuts provide additional access and improves rock exposures which tend to be masked by residual forest soils elsewhere.



<b>JORANEX RESOURCES INC</b>	
<b>LEMON LAKE PROPERTY</b>	
<b>LOCATION MAP</b>	
<b>NTS 93A 6</b>	
Date: Feb. 10, 1997	Drawn by: Keith Kemper
Scale: 1: 31,680	Fig: 1

## PREVIOUS WORK

The area has received some exploration after discovery of mineralization in the southeast of the Lemon Lake property. It followed much activities in the district on the steps of large mineral discoveries near Mount Polley and Quesnel River (QR deposit). Past work be summarized as follow:

1966-	Helicon Exploration	soil geochemistry and trenching of main showing
1970-	Silver Standard Mines	I.P. Resistivity survey
1974-	HBOG	Percussion drilling (11 holes)
1984-	Ortec Geological Services	Geochemistry and drilling (7 holes)
1987-	Orbex Industries	Soil geochemistry

Work has been sporadic and badly designed with little follow-up. Since 1987, no significant exploration has been carried out on the area. The property was restaked by present owner in 1996 as previous claims came opened.

## REGIONAL GEOLOGY

The Lemon Lake property is situated on the eastern margin of the Lower Mesozoic Quesnellia Terrane which consists of Triassic and Jurassic volcanic and sedimentary formations characteristic of back-arc deposition near a continental margin. Quesnellia has been accreted to the Lower Palezoic Cariboo domain lying to the east and at the time was intruded by many plutonic stocks of calc-alkaline to alkaline affinity.

Some of these stocks were mineralized such as at Gibraltar mine (a Cu-Mo porphyry of calc-alkaline affinity) or Mount Polley of alkaline affinity. The alkaline intrusive tends to be gold enriched deposits associated with Copper.

## LOCAL GEOLOGY AND GEOLOGICAL MAPPING

**1 - Rock exposure.** The property covers the first hills arising above the Horsefly River and Horsefly Lake fluvio-glacial plain, before the Cariboo mountains. Rock exposure is rather poor on most of the area and only improves towards the eastern boundary of the claims, where higher ridges are topped by massive basaltic agglomerate and flows.

Most of the claims area is covered with some glacial debris in low areas and good forest residual soils over the rest. However, near the top of hills and good forest slopes, many boulders, sometimes in boulderfields are angular enough to suggest proximity to bedrock.

**2 - Layered rock-units.** Outside some rusty sandstone, grits and pebble conglomerate of probable Tertiary age encountered at the southern outlet of Lemon Lake, layered units consists of volcanic rocks, and agglomerates. Only a few large erratics of local origin are encountered on slopes north of Gibbons creek and consist of polygenic grain-supported conglomerates. All types of grains can be observed from chert, argillite, volcanic debris, and granite or diorite. No contact has been found and stratigraphy can not be sorted out.

The volcanic rocks outcrop widely to the east of the claims and underlie the northern part of COLT 13 to 19 and FILLY claims. To the east, trachyte (shonkinite) flows, augite-phyric basalt and aquagene autobrecciated basalt flows dominate the highest hills. To the west and south, alkali-basalt flows, andesitic pyroclastics and andesite are found. Closer to the center of the property, mainly massive andesite are present.

All these rock-units are classified as equivalent to the Nicola Group formation of Triassic age.

**3 - Intrusive rock units.** For the most part, the property overlies a series of intrusive rocks, related to the Lemon Lake stock, a multiphase dioritic body of alkaline affinity. The intrusive phases range from light tan syenite to the east to pegmatitic gabbro to the south. Some nepheline syenite blocks were uncovered near Lemon Lake, however in the rest of the property, the poorly exposed stocks seems to be composed mainly of augite diorite to microdiorite (see Appendix I, petrological study of thin sections).

The diorite and microdiorite in the central part of the claims shows much brecciation by syenitic material. The potassic (K-feldspar and biotite) vein-like material can be so predominant as to replace the original diorite. The syenite found in the eastern claims also contain secondary addition of potassic material (see Alteration).

Petrographical study interestingly shows that the original diorite was mainly pyroxene (augite?) bearing; However the anorthite content of plagioclase is fairly low and it does not seem that plagioclase composition has changed much through the different phases, outside later alteration. It reflects the albitic content of the rock which can be considered alkaline although there is no whole-rock analysis data to support such statement.

**4 - Alteration.** The volcanic rocks surrounding and overlapping the Lemon Lake stock have been propylitized to some extent. Calcite, chlorite and minor quartz are noted in outcrops found on the northern part of the property, where local and strong albitization was also recognized.

Epidote replacement and infilling of veinlets or fracture is widespread. However, epidotization shows a regional alteration pattern typical of the Nicola Group Triassic volcanics in the Quesnellia Terrane and therefore can not be considered an alteration product directly linked to porphyry mineralization.

However biotite, sericite and K-feldspar flooding are prominent in the property; this alteration affects the local volcanic rocks, andesite and basalt alike, to some degree at their contact with diorite stock and intensifies toward the centre of the dioritic intrusive. All phases of the intrusion are affected and augite or later hornblende are replaced by biotite or biotite-muscovite/sericite material. Then, potassic feldspars invade the intrusives to such a point that all original components disappear after much brecciation or infiltration by potassic rich fluids.

Magnetite is frequent in most intrusive phases; it is more intense in the diorite and seems to bear some relationship to mineralization. Accounting in some cases (see Appendix I) for several percentage points, magnetite is in part secondary and accompanies the potassic alteration. It is also in massive patches and veinlets throughout the diorite.

## **MINERALIZATION**

The original Copper mineral occurrence was discovered in the 1960's in the southeastern corner of the property. At this time it was stripped and trenched; the best trench returned assays of 25% copper over 21.3 metres. Those values are confirmed by one large grab sample weighing 8 kg and assaying 0.23% Cu (see Table 2, sample location LL-96 Trench - S).

Also some thin chalcopyrite veinlets were seen associated with the syenite-andesite contact, 250 metres northwest of the main showing. The overburden situation on the property did not allow much rock-exposure. However, recent (1996) logging activity in the area (see figure 2) has cleared some good patches of land and removed much soil and surficial deposits. Many new outcrops have been exposed, many new mineralized zones have been brought to daylight. A few have been sampled and main results are presented in Table 2.

**TABLE 2**  
**Main assay results**

Sample No	Cu ppm	Au ppb	Pb ppm	Zn ppm	Cr ppm
LL96 - M1	229	10	1545	156	62
LL96 - M2	559	27	37	84	56
LL96 - M3	961	20	23	111	38
LL96 - M4	378	<5	740	132	57
LL96 - M6	296	12	66	187	35
LL96 - M7	661	26	7	54	43
LL96 - 4	2081	300	17	84	283
LL96 - W - LAKE	8298	80	72	257	137
LL96-Tr-N	32	18	14	132	97
LL96-Trench S	2347	190	14	726	46

The mineral showings consist mostly of oxidized andesite with vugged-out pockets or rusty pyritic veinlets. They all show anomalous Cu and Au values. However, the most interesting occurrence consists of diorite including a network of pyrite and chalcopyrite seams and later cut by magnetite veinlets; a hand grab sample returned 0.20% Cu and 300 ppb Au.

Also a large very angular boulder was found near Lemon Lake (LL96 - W - Lake), it weighed 20 kg and consists of green aphanitic andesite cross-cut by several seams of massive chalcopyrite. It assays 0.83% Cu, 80 ppb Au and 2 ppm Ag.

To the north, an old overgrown trench was found which cuts through basaltic andesite. The volcanic rocks are criss-crossed by thick (0.5 to 1 cm) veins and lenses of massive well crystallized pyrite. Although a small grab sample (LL96 - TrN) did not assay much (32 ppm Cu, 18 ppb Au), it indicates the wide extension of the mineralizing system associated with the Lemon Lake intrusion.

All the mineral occurrences found so far are located either in the overlying volcanics or at the top of the intrusive diorite. It clearly shows that the mineralized hydrothermal fluids did not break through the impervious volcanic barrier which was only sparingly mineralized. Based on the alteration pattern, especially the potassic influx, it can be surmised that the bulk of the Cu-Au mineralization is to be searched within the intrusive stock.



## CONCLUSION AND RECOMMENDATION

Mapping of the Lemon Lake property has shown a sizeable dioritic intrusion including rocks ranging in composition from gabbro to syenite, (volcanics as well as intrusives) and intruding within andesite and basaltic agglomerate cover. Both lines of rock appears to be of alkaline descent. In and around the property, the rock units are variably affected by alteration with a large propylitic halo and very strong potassic flooding in the centre mainly affecting the intrusive units.

New outcrops and mineral occurrences discovered after recent logging operation in the area, show clearly that the enclosing volcanic rocks are sporadically mineralized in copper and gold with locally good grades to 0.83% Cu. However the more interesting mineralization of porphyry type (dense net-texture sulphides) are encountered within the potassive altered diorite.

A follow-up program of exploration is strongly recommended. It consists of additional prospecting and rock sampling which should include some large rock sampling for whole rock analysis. The bulk of the initial work should consist of line cutting, soil geochemistry and Magnetometry/Induced Polarization - Resistivity survey along the cut lines. It follows that the best targets within the extensive mineralized system should be drilled.

### Budget for recommended exploration program.

1. Line cutting: 50 kilometres @ \$ 350/line	\$ 17,500
2. Prospecting, mapping, petrographical study	\$ 10,000
3. Geochemistry, soils and rocks (2000 samples & statistical analysis)	\$ 45,000
4. Geophysics: Magnetometry/IP-Resistivity, 50 km @ \$ 1,000/ km including interpretation	\$ 50,000
5. First-phase drilling: 3 000 metres of NQ coring @ \$ 125/ metre, all inclusive	\$ 375,000
	<hr/>
	\$ 497,500
15% Contingencies and overheads	\$ 74,500
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<b>Total</b>	<b>\$ 572,000</b>

## CERTIFICATE

I, HUGHES SALAT, of the City of Calgary, certify that:

1) My present address is 5904 Dalhousie Drive NW Calgary, Alberta T3A 1T1 and my occupation is that of a consulting geologist.

2) I am a holder of the French Baccalauréat in Mathematics, Physics, Latin and Greek.

3) After three years of general sciences and successfully being admitted to the Ecole Nationale Supérieure de Géologie Appliquée de Nancy, I graduated from that school with a degree in Geological Engineering and with the diploma of Licence-es-Sciences from the Faculty of Earth Sciences, University of Nancy (France). I have also obtained an M.sc. equivalence and completed all credit and research requirements for a degree of Ph.D at the University of Southern California in Los Angeles (unwritten thesis due to military recall).

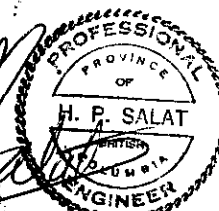
4) I have been practicing continuously my profession of geologist since 1968 in Canada and Europe in mineral exploration, first with Aquitaine Company of Canada then with SNEAP (Elf-Aquitaine).

Concomitantly, from 1983 to 1987, I have also worked for the latter, as petroleum geologist on international projects dealing with Central Africa, Indonesia and South America.

Since 1988, I operate as an independent consultant in mineral exploration from the above-mentioned address.

5) I am a fellow member of the Society of Economic Geology, of the Geological Association of Canada, of the Canadian Institute of Mining and metallurgy, of the Association of Professional Engineers, Geologists and geophysicists of the Province of Alberta and the Association of Professional Engineers and Geologists of the province of British Columbia.

This day February 6, 1997

  
Hughes P. SALAT  
Consulting Geologist.

# LEMON LAKE PROPERTY

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## STATEMENTS OF EXPENDITURES, 1996

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### Labour cost

Consulting geologist	6 days @	\$ 400/d	\$ 2,400.00
Field assistant	6 days @	\$ 150/d	\$ 900.00
Petrographical study & report	4 days	\$ 400/d	\$ 1,600.00

### Field costs

Food & lodging:	2 men x 6 days @	\$ 75.00	\$ 900.00
Truck rental:	2.500 kms @	0.30\$/km	\$ 750.00
Thin section preparation ( 9x20)			\$ 180.00
Chemical analysis (Loring Lab)			\$ 230.00
Drafting & reproduction			\$ 200.00

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Sub Total	\$ 7,160.00
Administration & overheads (10%)	\$ 716.00

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<b>TOTAL</b>	<b>\$ 7,876.00</b>
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**APPENDIX -I-**

**THIN SECTION STUDY**

**(for location of rock samples, refer to 1:5,000 scale geological map)**

## LL96 - 1

**Hand specimen:** Medium grained (0.5 to 1 mm) crystalline rock, beige to pinkish tan with large black needles of amphibole-magnetic.

### **Under the Microscope:**

**Texture:** Porphyritic

<b>Modal composition:</b>	15 - 20% Hornblende	3% Quartz
	55 - 65% Feldspars	10% Magnetite
	5 - 10% Chlorite	Apatite (rare)

**Hornblende** in 0.5 to 1.5 mm laths, porphyritic, completely destabilized and partially replaced by chlorite and prehnite (?). Some preserved crystals show extinction angles corresponding to the actinolite series ( $N_g - c = 10 - 15^\circ$ )

**Feldspars** 0.4 to 0.8 mm phenocrysts; The larger phenocrysts shows zoning and often a corona (reaction rim) indicating a plagioclase composition. A few smaller crystals have retained ghosts of multiple twinnings; among the smaller phenocrysts only a few show a clear thin reaction rim. Without exception, the feldspars are "cloudy" by replacement with a sericite - epidote mixture.

**Matrix** of small clouded feldspar, with many tiny (0.02 - 0.04 mm) grains of magnetite and consertal, plastically deformed metastasis of silica reacting at contact with feldspar to give clear rims of same. Possible K-Feldspar material (needs staining).

**Magnetite:** in addition to the tiny grains mentioned and representing 5 to 10% of section, many large squarish grains or aggregates, 0.5 to 1 mm in size, represents 3 to 5% of section.

**Rock Name:** porphyritic ferro-andesite

## LL96 - 2

**Hand specimen:** Cut sample shows two parts separated by an irregular wavy border. On one side: dark green porphyritic volcanic rock, with lots of epidote and the other side, beige porphyritic and much pyrite. Not magnetic.

### **Under Microscope:**

**Texture:** Porphyritic / basaltic

<b>Modal composition:</b> 10 - 15% Augite	5% Pyrite
35 - 40% Plagioclase	2% Zeolite
5% Sanidine	2% Quartz
5% Epidote	30% Ground mass

**Pyroxene** Augite phenocrysts (0.5 to 2.5 mm) in part idiomorphic, often with corroded borders or broken; locally show reaction rims with ground mass. Rarely in comminuted aggregates.

**Plagioclase** in phenocrystic laths, 0.15 to 0.5 mm, always clouded (no measure possible) but outlines are well preserved.

**Sanidine** also clouded, in small laths, 0.1 to 0.25 mm, scattered among plagioclase.

**Zeolite** in small (0.5 mm) vacuoles, fibrous, probably Laumontite.

**Quartz** also filling some vacuoles.

**Pyrite** in scattered grains, 0.05 to 0.5 mm size.

**Note:** one part of section show an aggregate of epidote with some chlorite. Another larger part shows replacement of dark groundmass by clear material and development of feldspar and intermediate quartz metastasis. This represents flooding by potassium rich solution.

**Rock name:** Augite porphyritic andesite

## LL96 - 3

**Hand specimen:** grey crystalline rock with angular zone of darker more mafic rock (co-magmatic inclusions) ; invaded by white to pinkish-beige feldspathic material. Many biotite, rare muscovite flakes. Magnetic and some pyrite. Beige material tend to be along breaks or veinlets with some calcite.

**Under the microscope:**

**Texture:** equigranular 0.25 to 0.75 mm

<b>Modal composition:</b> 20% Augite	3% Sericite
10% Biotite	2% Quartz
25 - 30% Plagioclase	5% Opaques (magnetite & pyrite)
25% K-Feldspar	

**Pyroxene:** a few sub-rounded crystals (up to 1.25 mm in size) to rounded grains of augite, 0.1 to 0.7 mm. Augite have corroded borders with gulfs, often include opaques and show disruption to disaggregation into all size grain particles (granulation). Where altered, it is replaced by biotite or contains a few biotitic inclusions.

**Biotite** is typically xenomorphic, with no definite shape, and filling space between original minerals or advancing/diffusing k-feldspar, or filling vacuoles. Very pleochroic, very dark to light brown, rich in Fe. Often rims are frayed and borders are lighter in color. Many shows a lamellar structure with some lamellae being colorless and of muscovitic composition.

The muscovite lamellae are developed where rock is more "evolved", i.e. with more k-feldspar replacement. There biotite can also include some small quartz grains.

**Plagioclase**, in the less altered part of section, they form regular stubby 0.25 mm crystals and often clean, giving a An 35-40. Where K-feldspar alteration starts, the plagioclase borders get corroded and itself become cloudy.

**K-Feldspar:** in larger crystal, 0.5 to 0.7 mm, outlines badly defined and generally clouded with microscopic needles of sericite. Rarely clear except when associated with quartz. The K-feldspar are secondary.

**Quartz**, also hypidiomorphic in clear, ill-defined crystal 0.1 to 0.2 mm in size, locally coalescing into larger aggregates (0.5 mm). Also in several narrow, 0.2 mm veinlets.

**Sericite** in aggregate or bundles near quartz veinlets and expending into host-rocks. Also it completely replaces some K-feldspar.

**Opaque:** cube of pyrite, 0.3 to 0.5 mm and magnetite in equal proportion.

**Rock name:** Augite diorite, with Potassic alteration

## LL96 - 4

**Hand specimen:** Grey crystalline rock with irregular darker grey, finer grained spots, magnetic and abundant (3 to 5%) sulphides disseminated between crystal (pyrite and 1% chalcopyrite giving some green Cu staining).

**Under Microscope:**

**Texture:** sub-equigranular

<b>Modal composition:</b> 30-35% Augite	2-3% Quartz
25% Biotite	10% Sericite
30-35% Plagioclase	5% Opaque
5% Orthoclase	

**Pyroxene**, augite crystal, granulated to 2 mm size, sub-rounded, borders are corroded and crystal contain many round or lamellar inclusion of biotite (poikilitic texture) or many magnetite granules and fluid bubbles. However, the augite remains remarkably clear..

**Biotite**, occurs mostly in clusters of well formed crystals to 2 mm in size to small undefined mesostasis between other minerals. The well re-crystallized laths dominate; however, they corrode and engulf augite prisms which they often penetrate and break up.

The biotite is dark brown.. In some clusters, it twins with muscovite lamellae or thin bands of opaque minerals.

**Plagioclase** large mostly clouded (altered) crystals, 0.5 to 1 mm, with some clear patches, generally in centre, showing albite twinnings. Measurement indicate An 25 - 30. Alteration consists of strong sericitization.

**K-Feldspar**, orthoclase forming, with ill-defined shape where section contains abundant granulated augite. It is associated with quartz and biotite.

**Quartz**, in small round grains, 0.1 to 0.2 mm with or within biotite or in veinlet, 0.5 mm thick, strained, locally in radiating sheaves, with much sericite.

**Sericite**, replacing plagioclase or in aggregate in and around quartz veinlet.

**Opaque**, mainly interstitial between augite, more rarely biotite.

**Rock name: Augite diorite, with strong potassic alteration and mineralized**



## LL96 - 5

**Hand specimen:** Very fine-grained light grey rock with dark green speck set within nebulous white matrix showing nebulous patches with more pinkish -beige hues- 10% disseminated pyrite, rarely along hair-fractures; some chalcopyrite less than 1%. Also a few irregular seams of massive magnetite with bleached selvages in host rock.

**Under microscope:**

**Texture:** micro-crystalline to porphyritic.

<b>Modal composition:</b> 20-25% Augite	5-10% Pyrite
10% Biotite	2% Magnetite
55-60% Plagioclase	Chlorite (rare)
2-3% K-Feldspar	Apatite (rare)
3% Quartz	Calcite (rare)

**Pyroxene - Augite:** mainly in phenocrysts, 0.25 to 1 mm in size, the remaining is granulated. Indeed, augite crystals are rounded to sub-rounded (sub-euhedral) due to alteration of their border or corners, or corrosion from matrix. Their cleavages are enlarged with biotite, often to grain size; many tiny inclusions of magnetite. The disruption of crystal can lead to complete granulation. Augite is rarely twinned.

**Biotite.** in small sub-euhedral brown laths, 0.1 to 0.2 mm, rarely in 0.5 mm bundle. Some biotite show layered or lamellar structure with muscovitic material. Biotite is completely and uniformly dispersed throughout.

**Chlorite,** rare, after biotite or in intergranular mesostasis (late) often with quartz or tridymite.

**Plagioclase** rarely clear crystal giving minimum An<sub>30</sub>, a great majority are equant 0.25 mm grain completely replaced by sericite needles and flakes, and calcite (saussurite).

**K-Feldspar** in anhedral newly formed grains, less than 0.2 mm across, most often developed in small patches with some quartz, biotite and much less plagioclase. These patches appear lighter and clear in PPL.

**Quartz:** in tiny sub-hebral, 0.05 to 0.1 mm grain, mostly scattered.

**Pyrite** in large blebs, rarely crystalline or in discontinuous seams.

**Magnetite** tiny grain mainly in inclusion within pyroxene

**Rock name: K-altered & mineralized augite diorite.**

## LL96 - 6

**Hand specimen:** Dark grey and white largely crystalline rock with long black needles and much magnetite in in blobs.

**Under the microscope:**

**Texture:** Pegmatitic.

<b>Modal composition:</b>	40% Hornblende	1-2% Apatite
	45-50% Plagioclase	Sphene (a few crystal)
	2% Pyroxene (Augite)	Calcite (rare)
	3-5% Biotite	5% magnetite
	2% Tremolite	

**Amphibole:** Hornblende in large green pleochroic, 0.5 to 5 mm, needles. Prisms are often twinned, locally found in exsolution within a pyroxene.

**Plagioclase:** a few clear, twinned, euhedral, showing albite and Manebach-Acline twinnings. They have a high An content (An 55-70). Most show incipient to complete replacement by sericite and some epidote, calcite.

**Pyroxene** a few grain, 0.5 to 1 mm, of clino (?) - pyroxene (augite ?) , usually granulated.

**Biotite:** anhedral, often lamellar with muscovite and definitely after **tremolite.**, itself a destabilization product of some hornblende crystal. When tremolite is present, and not replaced by biotite, it occupies a well straight bordered space between hornblende; however where contact is at end of a prism, hornblende is discolored. Biotite replacement is locally complete.

**Apatite,** in well defined grain, from 0.2 mm grain to 1 mm long crystals, locally in inclusion within hornblende.

**Sphene:** some two 0.3 to 0.5 mm, of well shaped grains.

**Calcite:** one crystal found between a preserved hornblende and tremolite replaced hornblende

**Magnetite** is intergranular.

**Rock name: Pegmatitic hornblende gabbro slightly K-altered**

## LL96 - 7

**Hand specimen:** Coarse grained (pegmatite) black (color index = 95) crystalline rock with a few white crystal and many patches of magnetite. Cut by a 5 mm yellow-green veinlet of epidote.

**Under the microscope:**

**Texture:** pegmatite granular

<b>Modal composition:</b>	80% Hornblende	4 - 5% Magnetite
	10% Augite	Sphene (rare)
	5 - 7% Apatite	2 - 3% Sericite
	1% Biotite	Epidote (rare)

**Amphibole - Hornblende** in large 2 to 5 mm crystal, green to dark green often broken, euhedral. A few sections show incipient transformation into actinolite.

**Pyroxene - Augite**, lighter colored, higher relief, locally square cleavage, 1 to 2 mm crystal shape have rounded borders at contact with hornblende and tend to be granulated at its contact. Probably, augite pre-date the hornblende and appear squeezed between large hornblende. Locally, it contains small exsolution of amphibole.

**Apatite**, is 0.5 to 1 mm round to elongated well formed grains, scattered or in inclusion within hornblende.

**Biotite**, in small, less than 0.2 mm, inclusions scattered within hornblende or augite.

**Magnetite**, interstitial shapeless masses up to 2 mm to small, 0.1 mm grains or cubes scattered between or included in mafic minerals.

**Sericite** secondary and interstitial between hornblende; in masses near veinlets of same plus epidote.

**Veinlets** filled with pieces of broken hornblende or augite, set in obscured material with sericite and some epidote, often showing a lamellar structure.

**Rock name: Hornblendite**

## LL96 - Km 8506

**Hand specimen:** Spotted grey white and pinkish fine grained crystalline rock, fairly equal, with 0.5 cm veinlet of pinkish material, magnetic.

### **Under the microscope:**

**Texture:** Microgranular, inequigranular (with grain size varying from 0.1 to 2 mm)  
**Modal composition:**

35% Augite	25% Orthoclase
25% Biotite	5% Magnetite
15% Plagioclase	Apatite (rare)

**Pyroxene - Augite:** two to three very large phenocrysts to 2 mm in size, most are between 0.1 and 1 mm ; all show granulation, with a seriate texture. The phenocrysts have a zoned alteration pattern with many inclusion of small biotite flakes. often well aligned; The larger augite show also being fractured and pried open by biotite and magnetite material.

**Biotite:** scattered anhedral laths or flakes or locally in better crystallized flakes in aggregates. In this case, often biotite shows inside twinning with muscovite lamellae. Biotite is dark and pleochroic, probably Fe-rich. In a few location, the biotite takes on aspect of intergranular mesostasis, or as inclusions in larger augite or in fractures.

**Plagioclase** 0.15 to 0.5 mm stubby laths, with a An 20-30 when fresh. The plagioclase when larger have their borders rarely preserved; it is corroded by biotite, or K-feldspar or show a metamictic rim near contact. Where associated with abundant K-feldspar, plagioclase and K-feldspar are saussuritized more or less completely.

**K-Feldspar** (orthoclase?) mostly equant, 0.35 to 0.5 mm, completely saussuritized or sericitized in most instances...and especially near large veinlet of same (see below). In better preserved part of section, clear orthoclase, corroding plagioclase and augite are associated with biotite and magnetite. Often the borders of the anhedral orthoclase are fuzzy. Two large criss-crossing 5 mm veinlets of anhedral orthoclase, 0.75 to 1 mm size, with mosaic texture contains a few grains of augite and magnetite. In most place, orthoclase are clouded.

**Magnetite.** 0.1 to 0.5 mm grains or in intergranular phases, all throughout.

**Note:** a thin, 0.2 mm veinlet of sericite.

**Rock name: Potassic altered diorite**

## LL95 - TRN

**Hand specimen:** grey-green aphanitic rock with light grey -whitish mottles; the mottles sometime surround a darker grey-green patch. Cut by two, 2 mm wide massive pyrite (plus minor chalcopyrite) seams, and a few blebs of pyrite. Copper stains on edge of specimen . -  
Not magnetic.

### **Under Microscope:**

**Texture:** porphyritic; set in devitrified ground mass (felt texture)

<b>Modal composition</b>	15% Augite	1 - 2% Orthoclase
	5% Biotite	15 - 20% Pyrite
	25% Sericite	5% groundmass of sericite, chlorite
	Quartz (rare)	and epidote (propylite)

**Pyroxene - Augite** represent 100% of phenocrysts euhedral, rarely twinned or zoned. Augite shows in all instances, incipient destabilization by broken up cleavage, fuzzy borders and internal replacement by chlorite, sericite or zeolite. A few augite includes also some tiny equant flakes of biotite, or the biotite appearing in cleavage or cracked-open part of the augite crystal. Includes some pyrite as well and many tiny fluid inclusions.

**Biotite**, in mesostasis within augite. More frequently in centre of large 1.5 to 2 mm "bleached" mottles. Biotite are in radiating shapeless aggregate surrounded by sheaves of sericite. Further away to limit of mottle, randomly crystallized tiny flakes of **Sericite**

**Orthoclase (K-Feldspar)** a few clear laths of anhedral secondary orthoclase.

**Groundmass** is a mixture of sericite, some chlorite, and rare epidote. Ghosts of saussuritized plagioclase, 0.04 to 0.1 mm in size, and a few plagioclase phenocrysts 0.6 mm in size , can be observed.

**Pyrite:** in scattered numerous small, 0.05 to 0.15 mm grains throughout. On the edge of section massive pyrite seam can be seen.

**Quartz:** some crystals caught in broken parts of augite phenocrysts.

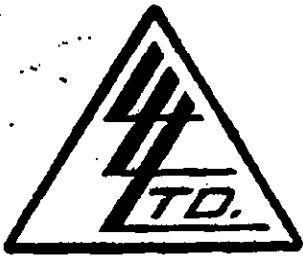
**Rock name: Pyritized and sericitized augite basalt**

**APPENDIX - II-**

**LABORATORY PROCEDURES**

**AND**

**ANALYTICAL RESULTS**



629 Beaverdam Rd. N.E.  
Calgary, Alberta T2K 4W2

# LORING LABORATORIES LTD.

Phone 274-2777

## Preparation Procedures for Geochemical Samples

### 1 - Soil And Silts:

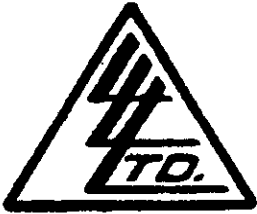
- a) The soil sample bags are placed in dryer to dry at 105°C.
- b) Each sample is passed through an 80 mesh nylon seive. The +80 mesh material is discarded.
- c) The -80 mesh sample is placed into a coin envelope and delivered to the laboratory for analysis.

### 2 - Lake Sediments:

- a) The sediment sample bags are placed into the dryer at 105°C until dry.
- b) The dried material is transferred to a ring and puck pulverizer and ground to -200 mesh.
- c) The -200 mesh pulp is then rolled for mixing, placed into a coin envelope, and taken to the laboratory for analysis.

### 3 - Rocks and Cores:

- a) The samples are dried in aluminum disposable pans at 105°C.
- b) They are then crushed to 1/8" in jaw crusher.
- c) the 1/8" material is mixed and split to sample pulp size.
- d) The sample is then pulverized to 100 mesh, using a ring and puck pulverizer.
- e) The -100 mesh material is rolled on rolling mat and transferred to sample bag. The sample is then sent to the laboratory for analysis.



## **LORING LABORATORIES LTD.**

629 Beaverdam Rd. N.E.  
Calgary, Alberta T2K 4W7

Tel: (403) 274-2777  
Fax: (403) 276-0541

### **ANALYTICAL PROCEDURES FOR 30 ELEMENTS ICP**

- A) 0.500 gm. of sample is digested with 3 ml of 3-1-2 HCL-HNO<sub>3</sub>-H<sub>2</sub>O at 95 degree C for one hour and is diluted to 10 ml with water in test-tube.
- B) The test-tubes is shaken and the solution is mixed thoroughly.
- C) The samples are loaded into auto-sampler of the ICP unit and run with standard when the setup is completed.

### **GEOCHEMICAL ANALYSIS OF GOLD BY FIRE ASSAY/AA**

- A) Weigh 10 grams of sample into a fire assay crucible with appropriate amount of fluxes and flour and mix.
- B) Add palladium in quart.
- C) Place crucible in assay furnace and fuse for 40 minutes.
- D) Pour samples, remove slag and cupel buttons.
- E) Place bead in test tubes and dissolve with aqua-regia.
- F) After dissolution is completed, make to appropriate volume and run against similarly prepared gold standards on Atomic Absorption unit.



To: JORANEX INCORPORATION  
5904 Dalhousie Drive N.W.  
Calgary, Alberta



File No : 38574  
Date : October 29, 1996  
Samples :  
Project :  
P.O.# :

ATTN: Dominique Saiat

## Certificate of Assay Loring Laboratories Ltd.

629 Beaverdam Road, NE Calgary Alberta  
Tel: (403)274-2777 Fax: (403)275-0541

Sample No.	PPB Gold
<u>"Geochemical Analysis"</u>	
LL-96 - M1	10
LL-96 - M2	27
LL-96 - M3	20
LL-96 - M4	<5
LL-96 - M6	12
LL-96 - M7	26
LL-96 - 4	300
LL-96 - Trench S	190
LL-96 - Trench N	18
LL-96 - W - Lake	80

I HEREBY CERTIFY that the above results are those assays  
made by me upon the herein described samples :

  
Assayer

Rejects and pups are retained for one month unless specific arrangements are made in advance.



## Loring Laboratories Ltd.

629 Beaverdam Road N.E.  
 Calgary Alberta T2K 4W7  
 Tel: 274-2777 Fax: 275-0541

TO: Joranex Incorporation  
 FILE # 38574

DATE: October 22, 1996

ELEMENT	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W
SAMPLES	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm
LL-96-M1	1	229	1545	156	< 3	27	28	811	5.24	6	< 5	10	< 2	130	0.9	6	< 2	224	2.58	0.169	6	62	2.14	77	0.52	22	2.70	0.15	0.69	< 2
LL-96-M2	5	559	37	84	< 3	19	40	646	6.86	< 2	< 5	27	< 2	40	0.6	8	< 2	235	1.43	0.174	8	56	1.87	55	0.39	3	2.25	0.06	0.39	< 2
LL-96-M3	< 1	961	23	111	0.4	16	84	685	6.83	< 2	< 5	20	2	40	0.9	2	< 2	283	1.21	0.148	8	38	2.10	81	0.45	< 3	2.13	0.07	0.56	< 2
LL-96-M4	7	378	740	132	< 3	14	32	750	5.98	2	< 5	< 5	< 2	78	1.1	82	< 2	288	2.75	0.155	8	57	2.30	109	0.45	8	3.14	0.07	0.54	2
LL-96-M6	1	296	66	187	0.3	13	38	1175	5.91	10	< 5	12	< 2	44	1.4	< 2	< 2	269	2.13	0.192	11	35	2.28	53	0.42	3	2.68	0.07	0.23	< 2
LL-96-M7	2	661	7	54	< 3	19	76	670	8.39	10	< 5	26	< 2	56	0.7	5	< 2	284	1.39	0.198	9	43	2.01	37	0.43	3	2.25	0.07	0.69	< 2
LL-96-4	2	2081	17	84	0.7	60	28	696	5.55	4	< 5	300	2	56	0.6	< 2	< 2	244	1.93	0.199	6	283	2.94	292	0.40	3	2.83	0.07	1.22	< 2
RE LL-96-4	2	2028	20	84	0.6	60	29	687	5.48	< 2	< 5	--	< 2	57	0.6	3	< 2	240	1.94	0.196	7	282	2.92	287	0.39	4	2.80	0.07	1.21	< 2
LL-96 W-LAKE	2	8298	72	257	2.0	63	21	787	6.37	< 2	< 5	80	3	104	2.6	8	< 2	262	2.88	0.191	9	137	2.29	92	0.41	5	2.62	0.06	0.27	< 2
LL-96 Tr-N	< 1	32	14	132	0.6	35	140	629	8.00	< 2	8	18	2	40	1.4	8	2	140	4.06	0.153	3	97	2.26	8	0.35	18	3.81	0.05	0.06	3
LL-96 Trench-S	26	2347	14	726	1.1	18	24	873	5.39	< 2	< 5	190	2	44	6.3	5	< 2	246	1.74	0.132	8	46	1.45	38	0.29	3	1.60	0.10	0.18	< 2

Note: Au by Fire Assay/Atomic Absorption 30 gm.

