# BRITISH COLUMBIA

# PROSPECTORS ASSISTANCE PROGRAM

# MINISTRY OF ENERGY AND MINES

# GEOLOGICAL SURVEY BRANCH

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| PROGRAM YEAR: | 2001/2002 |
| REPORT #: | PAP 01-34 |
| NAME: | EGIL LIVGARD |

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# GLUNDEBERY BATHOLITH
# EXPLORATION 2001

# PROSPECTOR GRANT #2001/2002 P57

Egil Livgard P. Eng.
Vancouver B.C.
January 2002

MINISTRY OF
ENERGY & MINES
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SMITHERS, B.C.

PROSPECTORS ... MEMPR

# Glundebery Batholith

# Exploration 2001.

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# INDEX

## SUMMARY AND CONCLUSIONS



Anomalous TANTALUM stream silt values were located in drainages in and from the Glundebery batholith by B.C. Regional Geochemical Survey 52 covering Map sheet 104O. This large anomaly and the geology of the batholith suggested that this was a favourable exploration area.

The Glundebery Batholith was mapped (Ref.# 1and #2) and shown to be a highly silicious, leucocratic and heterogeneous intrusive body. Occasional miarolitic cavities, graphic intergrowth and a few pegmatites indicated that this was an intrusive where late fractionation might have concentrated rare elements. An exploration program with this in mind was carried out in July 2001 with the help of a Prospectors Grant from the B.C. government.

Sixty two stream silt samples were collected and analyzed by Bondar Clegg Ltd. for thirty five elements by a multi-acid digestion (IC30). The tantalum values were high throughout and statistics gave a threshold value (95%ile) of 63ppm. One drainage system, the pass between Tahoots and Glundebery Creeks (The Pass), returned good values. The samples from the area –six- averaged 67ppm tantalum ranging from 30ppm to 147ppm. The highest value came from a tributary from the south. This southern high valley was not prospected. A few scattered single high values were also obtained.

High values were also obtained in ZINC AND LEAD and the threshold value for zinc was determined to be 752ppm and for lead 40ppm. The anomalous values came mainly from Black Lake Valley. Black Lake is a source of a tributary to the west tributary of Blackfly Creek. The highest value, 880ppm zinc and 136ppm lead, came from a small fast creek entering Black Lake from the northwest.

PROSPECTING located no pegmatites perhaps because it was concentrated within the batholith were the high tantalum values of RGS 52 were located and not in adjoining rocks or contact areas.

Considerable rock hydrothermal alteration products such as Sericite, clay and K-feldspar as well as iron and manganese oxidation was noted in the Black Lake area. Rock chip samples returned interesting zinc and lead values in Glundebery granite. The highest zinc value came from an outcrop north of the lake, which consisted of slightly schisty looking friable granite. The sample returned 4095ppm zinc and 48ppm lead. A sub-outcrop on the lower south hillside of the valley consisted of sharp black and brown rubble. Surfaces were completely covered with manganese oxide and iron and manganese oxide patches and specks were disseminated throughout. The best sample ran 1618ppm zinc and 297ppm lead. This area was staked by SHAN#3,4,5and 6 two post claims.

## SUMMARY AND CONCLUSIONS



Oxide Spur was highly fractured and coated with iron oxide, apparently associated with a contact between intrusive stocks. On the east side of Brenda Mtn. A small quartz vein returned 281ppm tantalum and 2361ppm zinc.

The Glundebery Batholith consists of very late fractionation intrusions carrying concentrations of rare elements. The scarcity of pegmatites (Ref. #1,2 and this survey) is similar to the situation at the Seagull Batholith in the Yukon 100 Km to the north, where the possible explanation has been offered (Ref#6) that pegmatites, for structural reasons formed above the batholith and have now been eroded away.

It is concluded that further tantalum exploration is warranted in The Pass and especially to the west of East Tahoots Creek. Exploration is also warranted in the Black Lake area to determine if perhaps the hydrothermal alteration, zinc, lead, iron oxide and manganese oxide are indicative of further mineralization.

## INTRODUCTION

Due to the positive indicators for Tantalum on the Regional Geochemical Survey results (B.C. RGS 52) covering the 104 O map sheet and on the geological description of the Glundebery batholith (reference# 1,2) in the Asutla Range south of the Jennings River the writer decided that an exploration program in the area was warranted.

A prospectors grant was obtained from the B.C. Government based on a proposal to take dense stream silt sampling and carry out prospecting. The primary mineral of interst was Tantalum. This report describes the work carried out under that program, discusses the results and offers some conclusions. All references are listed in the back and analysis results, statistics and claim information is found in the appendixes.

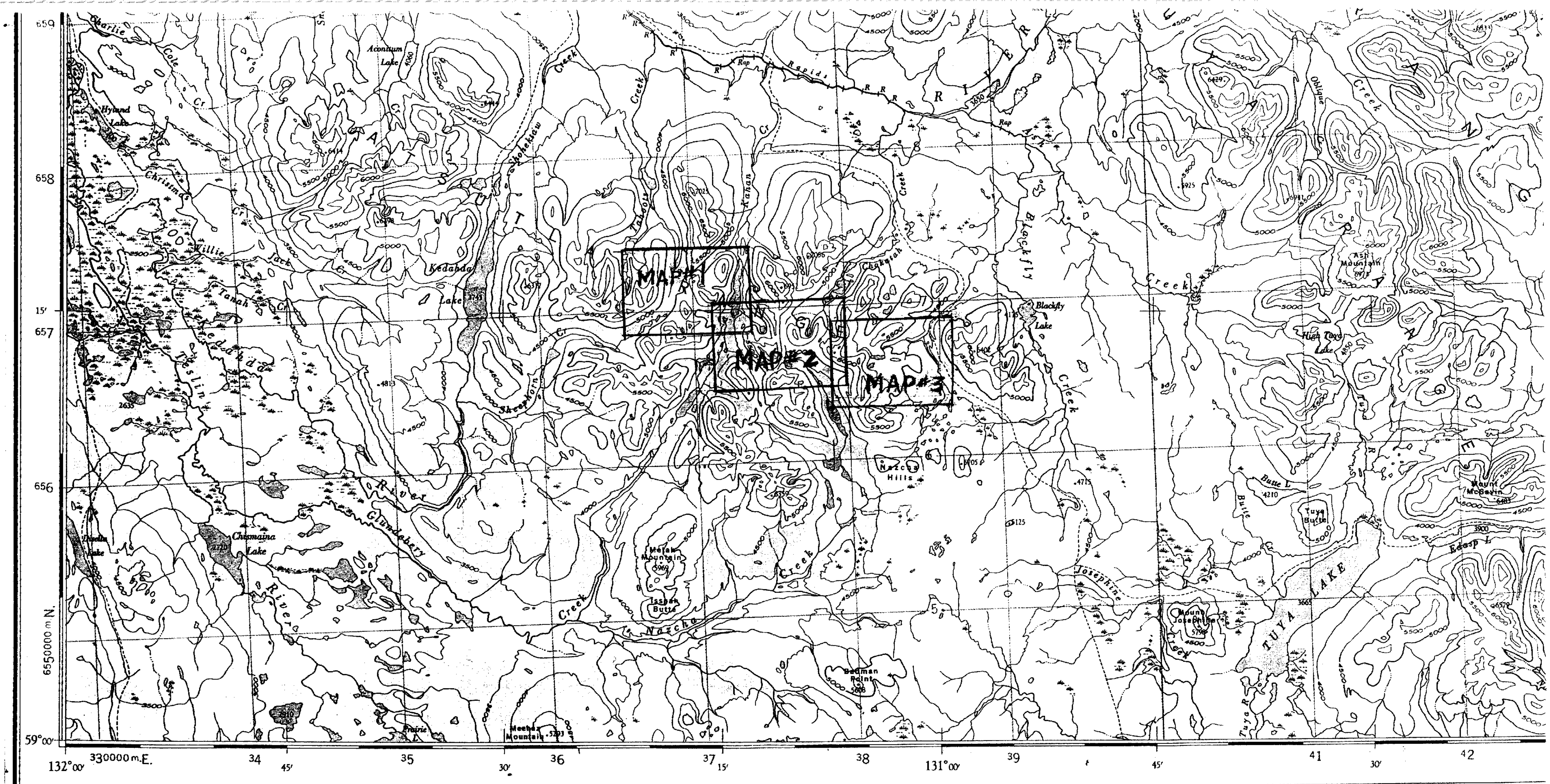
## LOCATION AND ACCESS

The area of interest is found on the south end of NTS sheet 104 O/6 and on the north end of NTS sheet 104 O/3. The prospected area covers roughly 40-50 square kilometers between 59°12' to 59°17'North and 131°00' to 131°18' West and can only be reached by use of helicopter or fixed wing aircraft. The nearest road is the Alaska highway 75 kilometers to the north.

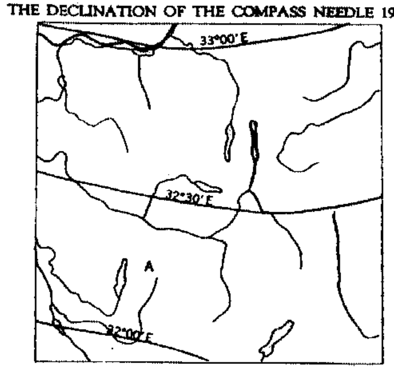
## TOPOGRAPHY

The area is mountainous. The lowest point is Kahan Lake at 1325m above sea level (A.S.L) and the highest peaks reach over 1900m A.S.L. The hillsides are always steep- the lower 2/3 being scree slope while the upper 1/3 often has cliff like outcrops. The average slope is often more than 35°. The area is mostly above tree line and the ground cover varies from open spars grass cover to dense growth of willows, buck brush and flat growing spruce shrub and short trees. Firewood is sometimes scarce. There are also a large amount of glacial boulders often in trains and extensive boulder fields. When dense growth of brush and boulder fields coincide it makes for very treacherous walking. Extensive areas of granitic rock disintegrate very rapidly into its separate crystal constituents and this GRUS and/or boulders choke all creeks. Silts therefore are not always easy to collect and have probably undergone little concentration of heavy minerals due to water action.

The silt collection suffered somewhat when it was discovered that a large percentage of subsidiary creeks, as mapped on the 1:20000 Trim maps, do not and have not at any time existed, not even in spring run-off. As an example: A traverse 2 km south from the south end of Kahan lake then 2.5 km southeast following the west and southwest facing hillside, about 1/3 way up the hillside from the creek in the valley bottom, encountered not one subsidiary creek or visible creek bed, while nine creeks are shown on the map as crossing the described traverse.




THE DECLINATION OF THE COMPASS NEEDLE 1950




The declination of the compass needle at any place along a red line is the declination given on that red line. At other places the declination is between those given on the neighbouring red lines; thus at the place marked A the declination is between 32°00′E. and 32°30′E. The declination of the compass needle is decreasing 4 minutes annually.

Surveys in 1947 and compilation in 1951 by the Topographical Survey from air photographs taken in 1948. Lithographed and printed by the Army Survey Establishment, R.C.E., Department of National Defence, 1952.

## REFERENCE

| | |
|---|---|
| Road, Hard Surface, All Weather | More than 2 Lanes / 2 Lanes Route No. / Less than 2 Lanes |
| Road, Loose Surface, All Weather | 2 Lanes or More / Less than 2 Lanes / Dry Weather |
| Wagon Road, Cart Track etc. | Trail or Portage |
| Boundary, International | Boundary Mon. |
| Boundary, Provincial | Survey Mon. |
| Boundary, County or District | Bench Mark BM 2239 |
| Boundary, Indian Reserve, Park etc. | Triangulation Sta. |
| Surveyed Line | Spot Elevation (in feet) .2915 |
| Main Electric Power Line | Telephone, Trunk Route |
| Railway, Standard Gauge: Multiple Track, Station | Abandoned / Single Track, Stop |

Universal Transverse Mercator Projection.

# JENNINGS RIVER

BRITISH COLUMBIA

Scale 1:250,000

1 Inch to 4 Miles Approximately

Miles 5 0 5 10 15 20 Miles

Kilometres 5 0 5 10 15 20 25 30 Kilometres

**GLUNDEBERY PROSPECTING**
**JULY 2001**

**LOCATION MAP**

MAPSHEET 104O

1:250,000 SCALE — E. LIVGARD, P.ENG.

...public may obtain copies of thi... ...ution Office, Dept. of Mines an... ...awa.

## REFERENCE

| | |
|---|---|
| Fire Lookout Tower | Cont... |
| Wireless Station | Cont... |
| Mine | Cont... |
| Cliff | Eske... |
| ...ed | Wooded A... |
| Stream, Intermittent | Navigable... |
| Stream, in Dry River Bed | Rapids an... |
| Braided Stream | Ferry |
| Marsh or Swamp | Dam |
| Marsh or Swamp, in water | Lighthous... |
| Glacier or Snowfield | Aerodrom... |
| Sand, Gravel or Mud (Sand, Mud) | Seaplane |

## GEOLOGY

### ROCKTYPES

The area was mapped in 1944 and 1968 (ref.#1.2) and the Upper Cretaceous Glundebery batholith was described as follows: "Much of the batholith comprises a very distinct coarse-grained hornblende granite characterized by a waxy, pale green-buff weathering of perthitic potash feldspar, an abundance of watery quartz, common occurrence of miarolitic cavities and a peculiar "aggregate" texture resulting from a predominance of subhedral feldspar crystals with a minimum of matrix". Further -- "The batholith includes phases of porphyritic granite --- in which potash feldspar phenocrysts occur in a fine-grained matrix". Several areas have numerous inclusions of diorite, such as at the headwaters of Tahoots and Sheephorn creeks where the inclusions are bounded by stock works of leucocratic granite dykes. "The dykes range from fine-grained, pink weathering granite to coarse –grained megacrystic granite and in places the central parts of dykes are coarse pegmatites".

Pegmatites have also been mapped south and west of North Nazcha Lake . Areas of miarolitic cavities and graphic granite have been noted as has syenite stocks as late intrusions into the Glundebery granite.

The batholith has intruded the Upper Triassic Shonektaw formation of augite porphyry and agglomerates to the north, the Permian (and / or Carboniferous) Kedahda formation consisting of chert, quartzite, hornfels and minor limestone and greenstone to the south and west, and it is overlain by the Tertiary (?) and Quaternary Tuya formation consisting of lava, tuff and agglomerate to the east.

### MINERALIZATION

Minfile:104 O 031, Tahoots creek
This showing is found a short distance (1,0 km ? ) east of Tahoots Lake.
It consists of veinlets of magnetite in pegmatitic granite.

Minfile: 104 O 029 Sheephorn creek
This showing is located east of Sheephorn creek at a pass to Glundebery creek
It consists of small lenses of magnetite in a silicified coarse-grained granite.

Minfile: 104 O 010 Swan (or Wind)

MINERALIZATION (cont'd)

This showing is located in the east headwater valley of Tahoots creek and the claims also extended south to the headwaters of Sheephorn creek. The property has been mapped as granite, quartz feldspar porphyry, alaskite and diorite of the Glundebery batholith. Molybdenite as coarse rosettes occurs in quartz veins and finely disseminated in brecciated quartz veins which strike northeast.

ASSESSMENT REPORTS (6012, 3971, 3212, 3211)

Magnetic and Vertical loop Electromagnetic Surveys were carried out in 1971 on the Wind claims which covered the valley which forms the Tahoots- Sheephorn creeks headwaters. The surveys indicated a northwest striking zone, (at the valley's height of land) which was interpreted as a 300m wide fault. A 250m long conductive body was located striking north from this fault. Two kilometers further north geological mapping, sampling and soil surveying located and described molybdenum mineralization in quartz veins within the Glundebery granite.

The area covered at one time by the Wind Claims was re-staked by the writer as CHAN and SHAN#1and2.

## DISCUSSION

THE GLUNDEBERY BATHOLITH, PEGMATITES AND RARE ELEMENTS.

The Glundebery batholith has many features found in " fertile granites"- that is those of extreme fractionation carrying concentrated amounts of rare elements, and rare element pegmatites are "igneous derivatives of fertile granitic intrusions" (ref #5)

A. The batholith lies at deep-seated regional structures, the Omenica-Intermontane Belts boundary- a collision environment.

B. It is of Cretaceous (Upper?) age. " Fertile granites in the Cordillera are usually of mid-Cretaceous age" (ref. #6).

C. The batholith is about 400 square kilometers in size. Most fertile stocks are smaller than this however, - on the order of 30 square kilometers.

D. Most fertile intrusions are of late to post-orogenic age as is the Glundebery Granite

## DISCUSSION (cont'd)

THE GLUNDEBERY BATHOLITH, PEGMATITES AND RARE ELEMENTS.

E. The batholith is inhomogeneous, leucocratic, silicic and peraluminus. It carries hornblende-biotite rather than the more favourable biotite-muscovite or biotite.

F. Frequent occurrences of miarolitic cavities and occasional graphic granite indicate advanced fractionation as does high traces of rare elements such as niobium, tantalum and rubidium.

G. The whole rock analysis and a calculation of the Shand index places the rocks in the peraluminus class but of course two analysis are not sufficient to reach definite conclusions. Looking at the rock forming elements (oxide) and trace elements the Glundebery granite appears to have more features of an A-type granite than of a S-type. Features such as high magnetite content, smokey quartz and a high Fe/Mg ratio indicate that this may be of NYF (niobium-yttrium-fluorite) affinity although other features such as highly siliceous peraluminus rock with low Calcium and Barium content may indicate an affinity to the LCT (lithium-cesium-tantalum) family of fertile granites. The O'Grady Batholith (NWT) and the Seagull Batholith (YT) are described as being of mixed NYF-LCT affinity (Ref.#6). Perhaps the Glundebery Batholith is of the same type.

H. Dispersion haloes of tin and copper may aid in the location of pegmatites. Such haloes have not been indicated.

I. Pegmatites have been mapped south and west of the main Nazcha Lake ( ref. #1,2), but RG.S 52 silt results were below threshold and no prospecting was carried out in these areas.

J. The Glundebery intrusion has in several places given rise to skarn and contact metamorphic alteration. In some cases minor mineralization of skarn type is found within the intrusion.

## STATISTICS

Threshold values for silt surveys (95%ile)

| Element | Ta | Nb | Zn | Pb | Cu | Mo | Ni | La | Zr | Sc | Mn | Ba |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BC RGS 52 | 8.3 | --- | 200 | 29 | 71 | 10 | 110 | 110 | 960 | 27 | 1750 | 2400 |
| This survey | 63 | 439 | 752 | 40 | 25 | 39 | 38 | 210 | 376 | 12 | 2358 | 659 |
| Mean | 13 | 78 | 151 | 12 | 6 | 8 | 8 | 40 | 73 | 6 | 555 | 148 |
| Median | 26 | 204 | 167 | 8 | 10 | 10 | 8 | 90 | 160 | 6 | 1134 | 293 |

## TANTALUM SILT SURVEY

The RGS-52 survey over map sheet 104 O gave anomalous Tantalum values in most creeks draining Glundebery granite outcrop areas. The threshold value (95%ile) was 8.3 ppm. Prospecting and denser stream silt sampling was carried out this past summer over a large part of these areas. Sixty-two samples were collected. This was short of the target (100) mainly because many creeks marked on the 1:20 000 scale maps do not in fact exist (See topography). Bondar Clegg Ltd. analyzed the samples for 35 elements using their IC30 method. This method may not give a complete digestion of tantalum. The statistics gave a threshold of 63ppm tantalum. Four samples reached this level. AN ANOMALOUS drainage area is in the low pass southwest of Kahan Lake between Glundebery and Tahoots creeks. Six silt samples were collected here (# 5-1 to 5-6) The values varied between 30 and 147ppm and averaged 67ppm Ta (see map#1. The highest value (147ppm) came from a small tributary creek from the south. This tributary valley was not prospected. The rocks in the area are Glundebery Granite, which is lightly to moderately oxidized. It is disintegrating rapidly and creating large masses and mounds of grus. The creeks are choked with it and are in part braided and have done very little sorting. One sample (# 10-3) from the west end of the pass also gave a good tantalum value- 51ppm.

Two other high tantalum values, #7-1 at 83ppm and #28-3 at 63ppm,are single highs and not as significant although both drainages are of interest because of other mineralization or alteration. Sample #7-1 came from a "hanging valley" which drains into Kahan Lake from the west. Two other samples from higher up the creek were not anomalous (one sample was lost). Some hydrothermal (?) clay alteration and some recrystallization was noted (see rock samples 97973,4,5)

Sample #28-3 came from a creek, which may drain the SHAN claims showing during run-of, or through seepage (see rock samples# 97992,3,4,5,)

Other than tantalum, zinc and lead are particularly anomalous in this survey. The anomalous values are located in the vicinity of Black Lake and Pink Mountain (map#3). The area has particularly rapidly disintegrating lightly to moderately oxidized Glundebery granite and like the area anomalous in tantalum described above, large volumes of grus cover most of the ground.

Ten silt samples in the area (4-5 square kilometers) averaged 560ppm zinc (high 1109 ppm) and 40ppm lead (high 136ppm).

## ROCK SAMPLES

Twenty-nine rock samples were collected and analyzed by Bondar Clegg Ltd. for 35 elements using their IC30 method (see lab reports). Seven of these samples were also analyzed for gold and two were given only whole rock analysis and a few trace elements. 18 rock samples came from the Black Lake area. Of these eight are anomalous in lead and zinc averaging 151ppm lead and 1258ppm zinc. Of these three samples (#97980, 83,83) from close to Black Lake averaged 168ppm lead and 1601ppm zinc. Samples from the SHAN claims (#3,4,5,6) which lie on the south flank of Black Lake valley, averaged 137ppm lead, 985ppm zinc,41ppm copper,5.9ppm cadmium and one sample gave in excess of 20 000ppm manganese. One or two kilometers to the east a quartz vein, about 35cm wide gave 281ppm tantalum and 2361ppm zinc. (This tantalum value, 281ppm, converts to 685.6ppm or grams or about 1.5 pounds$Ta_2O_5$ per tonne. Tantalum pent oxide ($Ta_2O_5$) mine concentrate is today quoted at $50,- US per contained pound)

## TRACE ELEMENT DIFFERENCES – DUE TO HETEROGENIOUS STOCKS?

NO iron oxide coating

| West Cirque | Ta | Nb | Ba | Sr | Ga | Zr |
|---|---|---|---|---|---|---|
| #97973 | <5 | 38 | 304 | 50 | 18 | 48 |
| #97974 | 12 | 36 | 462 | 78 | 13 | 46 |
| #97975 | <5 | 40 | 518 | 90 | 18 | 48 |
| Average | 4 ? | 38 | 428 | 73 | 16 | 48 |
| **East valley** | | | | | | |
| #97976 | <5 | 262 | 17 | 5 | 32 | 91 |
| #97977 | <5 | 91 | 24 | 13 | 28 | 67 |
| #97978 | 35 | 310 | 23 | 23 | 29 | 156 |
| Average | 13? | 221 | 21 | 14 | 30 | 105 |
| **Brenda Mtn.** | | | | | | |
| #97985 | 10 | 72 | 18 | 5 | 24 | 47 |
| #97986 | 9 | 30 | 24 | 3 | 34 | 52 |
| # 97998 | 15 | 74 | 15 | 10 | 39 | 122 |
| Average | 11 | 59 | 19 | 6 | 32 | 74 |

LIGHT to moderate iron oxide coating

| Spine ridge | | | | | | |
|---|---|---|---|---|---|---|
| # 97979 | 54 | 298 | 23 | 21 | 31 | 88 |

LIGHT to moderate iron oxide coating (CONT'D)

| | | | | | | |
|---|---|---|---|---|---|---|
| Black Lake | | | | | | |
| #97980 | 7 | 62 | 85 | 35 | 31 | 38 |
| # 97982 | <5 | 129 | 71 | 19 | 25 | 68 |
| # 97983 | 30 | 149 | 41 | 17 | 30 | 92 |
| Oxide Ridge | | | | | | |
| # 97988 | 25 | 163 | 91 | 156 | 27 | 115 |
| # 97989 | 34 | 214 | 69 | 10 | 32 | 51 |
| Shan Claims | | | | | | |
| # 97992 | 10 | 111 | 102 | 16 | 31 | 50 |
| # 97993 | 20 | 138 | ----- | 86 | 36 | 70 |
| # 97994 | 21 | 103 | 91 | 144 | 30 | 62 |
| #97995 | 19 | 93 | 29 | 57 | 30 | 66 |
| Average | 22 | 146 | 67 | 55 | 30 | 70 |

There is a distinct difference between generally competent granites without any iron oxide coating and lightly to moderately oxide coated easily disintegrating granite. The rock values from the West Cirque were exceptionally high in Barium-428ppm and also in Strontium-73ppm and low in Gallium-16ppm and in Zirconium-48ppm while the rocks from East Valley were high in Niobium-221ppm. The lightly to moderately oxidized rocks were more than twice as high in Tantalum-22ppm and without the above exceptions higher in Niobium-146ppm, Barium-67ppm and Strontium-50ppm.

## PROSPECTING

SHEEPHORN – TAHOOTS VALLEY

Considerable prospecting was carried out in the valley holding the headwaters of Sheephorn and Tahoots Creeks. This valley was believed to be the location of the comment in GSC paper 68-55—stock works of leucocratic granitic dykes which in places carry coarse pegmatitic centers – The valley has also returned the highest tantalum stream silt value in any government RGS silt survey in the province – 59ppm Ta.

Careful prospecting of the valley did not locate a single outcrop. Outcrops did not appear except above the scree slope in the top 1/3 of the of the hillside. The valley was therefore densely silt sampled (16 samples ) in order to perhaps focus in on an anomalous spot. None of the samples were anomalous, according to the statistics of our local survey, and the results did not confirm the 59ppm value obtained in the regional survey. It is possible that the analysis method used (IC 30) may give incomplete digestion of the mineral(s) carrying tantalum and thus give lower than true values.

## PROSPECTING (cont'd)

The writer believes that perhaps the area to the west, which holds the headwaters of the western branches of Tahoots creek may have been the location referred to regarding the dykes with pegmatitic centers.

Outcrops at the south end of the valley consisted of fresh coarse pophyritic Glundebery granite. Vertical fracturing in two directions more or less at right angles and less horizontal fracturing left large columns reminiscent of columnar basalt when seen from a distance. One outcrop near silt 10-3 consisted of fine to medium-grained granite with smokey quartz grains.

### THE PASS

The pass between Glundebery and Tahoots Creeks, at an elevation of about 1530m above sea level, is a relatively flat and broad Grus plain. The north hillside exhibits columnar fracturing. The southeast hillside consists of light oxidized granite (sample #5-5) and some like that described above at silt 10-3. Occasionally a relatively high (1%) magnetite content was noted. Hills of Grus and large boulder trains occupy the lower south end of the pass.

### THE HANGING VALLEY WEST OF KAHAN LAKE

The lower part of this creek drains straight northeast through large boulders into the lake and no silt was found. The northwest side of the creek has outcrops of a very densely fractured silicified (?) rock The fracture surfaces are coated with iron oxide. It appears to be a fine grained intrusive, perhaps diorite, with minor (1/2%) pyrite. Higher up the creek the valley is partly blocked by an endmorain, behind which there is now a small lake. A silt sample taken just above the lake gave an anomalous Ta value (83ppm). Further up an outcrop on both sides of the creek consisted of granite, which was thought to be silicified, but petrographic work (97975) identified it as very fine strongly interlocking recrystallization. Sericitic alteration was also described. Another 100m up the creek a few hillocks of grey and tan soft clay with small angular pitted rock fragments(97973)were examined. The rock fragments consisted of feldspar, in part sericitized and quartz. The clay is not thought to be glacial. It has probably been formed by hydrothermal action. Silt and rock samples from the area did not give any values of interest. The south hillside is fresh granite(#97974). According to the 1944 geological report (Ref.#2) of the area a fault, extending from East valley east of Kahan Lake, runs northwesterly through the hanging valley.

## PROSPECTING (cont'd)

EAST VALLEY EAST OF THE SOUTH END OF KAHAN LAKE

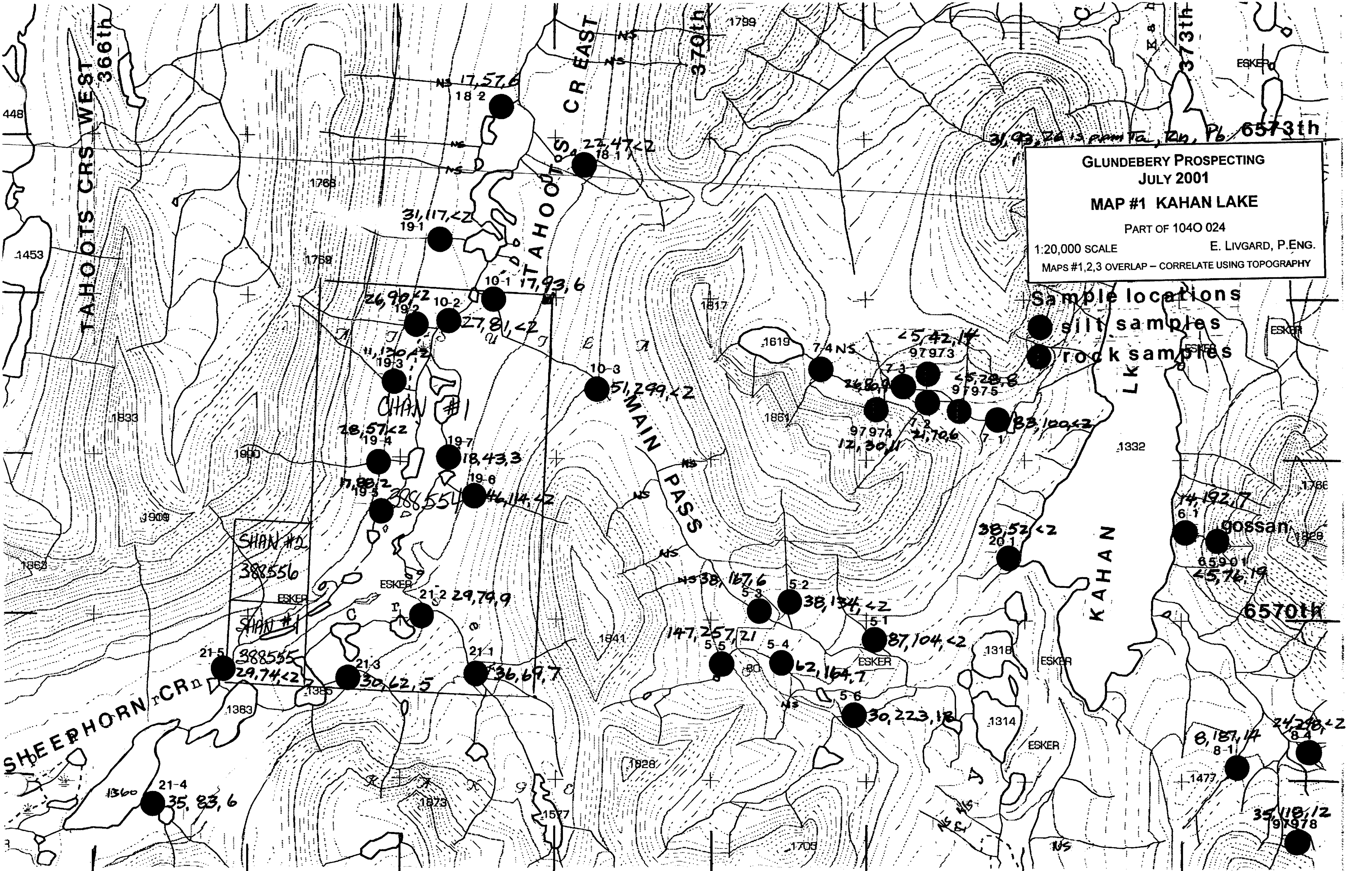
The first silt sample 8-1 was taken in a tributary creek, which occupies a deep gully. The gully was noted as a northeast striking southwest dipping structure (lineament) on aerial photos. The sample did not give good values. The hillside on the south side of the valley is generally fresh coarse-grained granite (sample 97978) with minor but more than usual magnetite. It gave a fairly good tantalum value- 35ppm. At the south lake (the valley has three small lakes) a couple (one?) of very coarse-grained (5-40mm) feldspar dykes of unknown size (poor exposure) were sampled. No values were found.
The long (1.5km) very straight high valley above the south lake could not be accessed due to a steep snow covered entrance directly above the lake. The valley may be formed along the fault, which extends northwesterly up the western Hanging Valley. It is an interesting prospecting target best reached by helicopter. Gossan Ridge forms the northeast wall of this valley. The ridge is partly heavily oxidized and manganese stained and iron oxide flecks are disseminated throughout the granitic rock. A sample (97979) gave good tantalum values—54ppm. The rocks are fractured but generally competent. Higher up at the head of the valley is found moderately oxidized, decomposing granite. Higher to the north is found porphyritic andesite (#15-1).

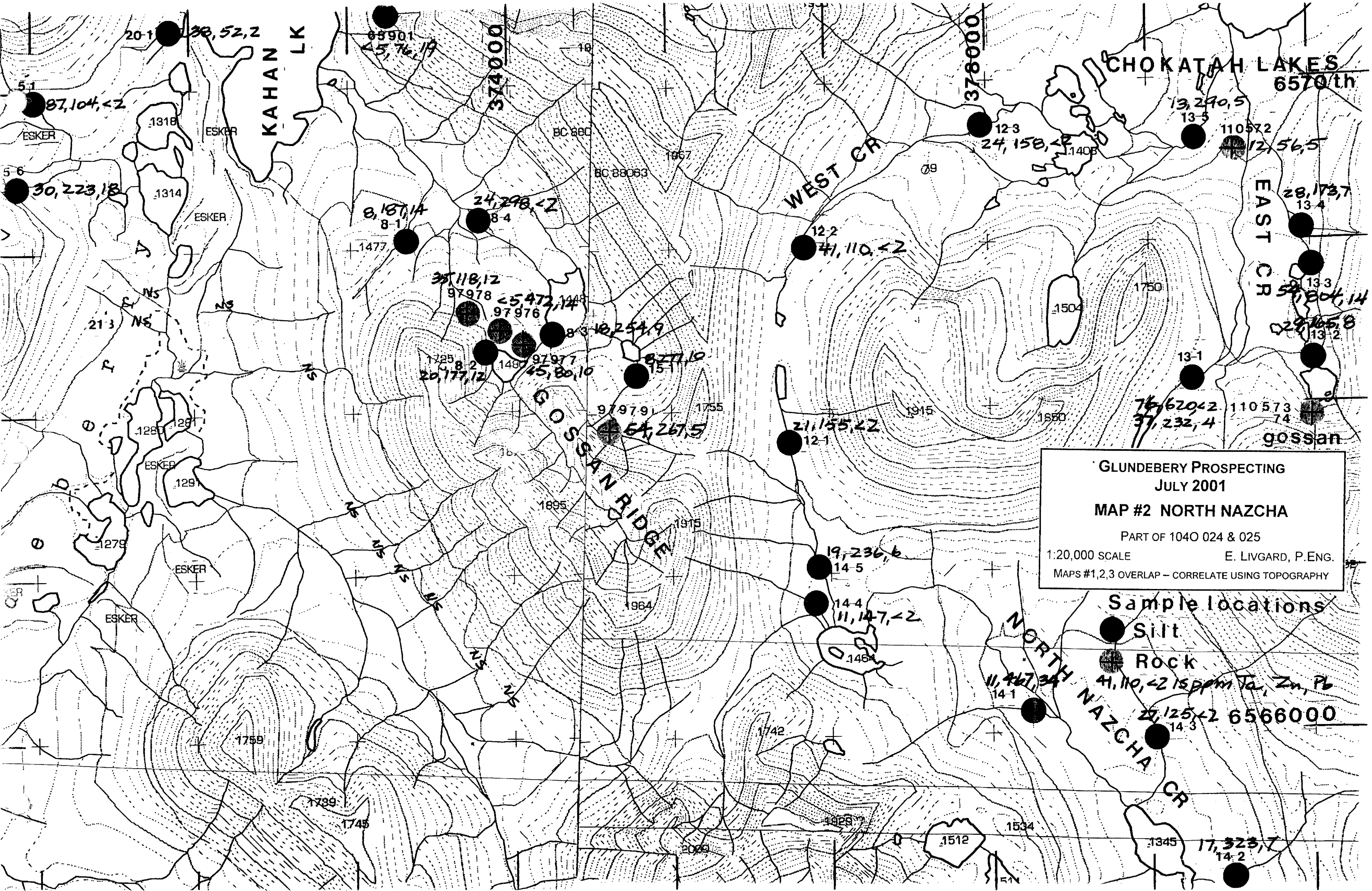
HEADWATERS AREA BETWEEN CHOKATAH AND NAZCHA LAKES:

Three creeks enter west Chokatah, one from the southwest and two from the south in the same valley. The tributary to the west end of Chokatah Lakes, one from the southwest runs in a valley full of grus in irregular hills with boulder trains in between. No silt was found partly due to snow cover in the cut occupied by the creek. Outcrops near the foot of the valley are of typical Glundebery granite high in quartz (40%). All of which is glass like and partly has a grey smokey colour. Feldspars occasionally show minor sericitic alteration. The rock has been fractured every 20-40 cm at 20 degrees azimuth with vertical to 70 degrees west dip.

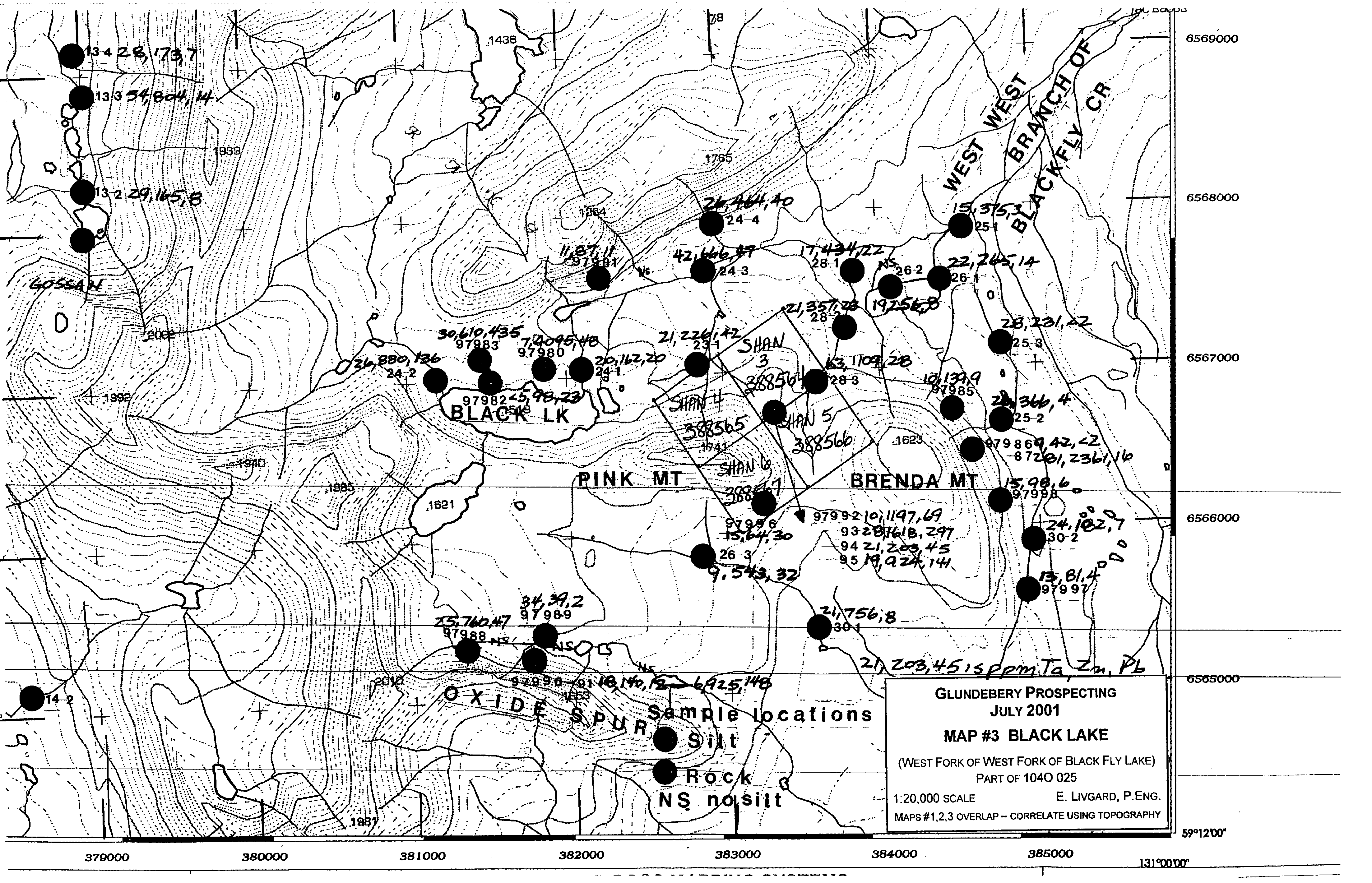
Near the foot of the tributary(s) from the south are outcrops of granite with-feldspar alteration and with small flecks of iron oxide disseminated throughout (#110572). The air photos show curved parallel lineaments, from the northwest curving to the northeast, which have their apex in this area.

The terrain is very irregular and higher up the two semi-parallel creeks here is large hills of grus and boulder trains between them. One silt sample on the eastern creek gave 54ppm Ta.


GLUNDEBERY PROSPECTING
JULY 2001
MAP #1 KAHAN LAKE
PART OF 104O 024
1:20,000 SCALE
E. LIVGARD, P.ENG.
MAPS #1,2,3 OVERLAP – CORRELATE USING TOPOGRAPHY
Sample locations
silt samples
rock samples
31,93,76 is ppm Ta, Zn, Pb
6573th
6570th
366th
370th
373th
TAHOOTS CRS WEST
TAHOOTS CREAST
MAIN PASS
KAHAN LK
SHEEPHORN CR
CHAN #1
SHAN #2
388556
SHAN #1
388555
388554
gossan
ESKER
NS
18-2 17,57,6
18-1 22,47,<2
19-1 31,117,<2
10-1 17,93,6
10-2 27,81,<2
19-2 26,90,<2
19-3 11,130,<2
10-3 51,299,<2
19-4 28,57,<2
19-7 18,43,3
19-6 46,14,<2
19-5 17,88,2
21-2 29,79,9
21-5 29,74,<2
21-3 30,62,5
21-1 36,69,7
21-4 35,83,6
7-4 NS
97973 <5,42,14
7-3 26,80,9
97975 <5,28,8
97974 12,30,11
7-2 21,70,6
7-1 83,100,<2
20-1 38,52,<2
6-1 14,192,17
65901 <5,76,19
NS 38,167,6
5-3
5-2 38,134,<2
5-1 87,104,<2
5-5 147,257,21
5-4 62,164,7
5-6 30,223,18
8-1 8,187,14
8-4 24,248,<2
97978 35,118,12
1799
1766
1769
1453
448
1833
1900
1909
1863
1817
1619
1861
1841
1332
1318
1314
1363
1385
1360
1828
1873
1577
1705
1477
1786
1829



GLUNDEBERY PROSPECTING
JULY 2001
MAP #2 NORTH NAZCHA
PART OF 104O 024 & 025
1:20,000 SCALE
E. LIVGARD, P.ENG.
MAPS #1,2,3 OVERLAP – CORRELATE USING TOPOGRAPHY
Sample locations
Silt
Rock
41,110,<2 15ppm Ta, Zn, Pb
KAHAN LK
CHOKATAH LAKES
6570 th
374000
378000
6566000
WEST CR
EAST CR
GOSSAN RIDGE
NORTH NAZCHA CR
gossan
ESKER
NS
BC 88063
20-1
38,52,2
5-1
87,104,<2
5-6
30,223,18
65901
<5,76,19
8-1
8,187,14
8-4
24,298,<2
97978
35,118,12
97976
<5,472,14
8-3
16,254,9
8-2
20,177,12
97977
45,80,10
15-1
8,277,10
97979
54,267,5
12-3
24,158,<2
12-2
41,110,<2
12-1
21,155,22
13-5
13,290,5
110572
12,56,5
13-4
28,173,7
13-3
54,804,14
13-2
29,165,8
13-1
110573
74
76,620<2
37,232,4
14-5
19,236,6
14-4
11,147,<2
14-1
11,467,34
14-3
27,125,<2
14-2
17,323,7


GLUNDEBERY PROSPECTING
JULY 2001
MAP #3 BLACK LAKE
(WEST FORK OF WEST FORK OF BLACK FLY LAKE)
PART OF 104O 025
1:20,000 SCALE
E. LIVGARD, P.ENG.
MAPS #1,2,3 OVERLAP – CORRELATE USING TOPOGRAPHY
Sample locations
Silt
Rock
NS no silt
WEST WEST BRANCH OF BLACKFLY CR
BLACK LK
PINK MT
BRENDA MT
OXIDE SPUR
GOSSAN
SHAN 3
SHAN 4
SHAN 5
SHAN 6
388564
388565
388566
21,203,45 is ppm Ta, Zn, Pb
13-4
13-3
13-2
14-2
24-4
24-3
24-2
24-1
23-1
25-1
25-2
25-3
26-1
26-2
26-3
28-1
28-2
28-3
30-1
30-2
97980
97981
97982
97983
97985
97986
97987
97988
97989
97990
97991
97992
97993
97994
97995
97996
97997
97998
6569000
6568000
6567000
6566000
6565000
379000
380000
381000
382000
383000
384000
385000
59°12'00"
131°00'00"
1436
1939
1765
1864
2022
1992
1940
1985
1621
1741
1623
2010
1853
1981

HEADWATERS AREA BETWEEN CHOKATAH AND NAZCHA LAKES (cont'd)

At the head of the eastern creek at the foot of a scree is a small tarn. The rocks in the scree are partly strongly oxidized (#110573). This sample returned 620ppm zinc, 34ppm molybdenum and 50ppm cobalt. It was also very high in iron>10% and 8454ppm manganese. The sample originated ½ to 2/3 way up the hillside as did a gabbro (#110574) which has star shaped (round) fibrous looking amphibolites 1 to 3mm in diameter. The groundmass is amorphous pale greenish with indistinct white and greenish black flecks.

The North Nazcha area consists of coarse-grained fresh hornblende granite. To the east the granite has more K-feldspar and occasional miarolitic cavities.

THE BLACK LAKE AREA

The Back Lake valley east of the lake is completely filled with hills of grus and boulders. North of the lake are a few outcrops of granite which are moderately oxidized. They are in part schisty and feldspars have a greasy look (sericite). The valley by the lake is relatively flat and, near the lake, the soil consists of soft sticky clay (hydrothermal alteration product?) and sharp angular rock fragments which have parallel fractures ½ to 2cm apart. Minor pyrite is disseminated through the rock. The steep scree slope on the south side of the lake is strongly oxidized while the hillside to the north is lightly oxidized. No dykes or pegmatites were found.

A silt sample (24-2) from the creek entering the lake returned 880ppm zinc and 136ppm lead and a sample (24-3) 1.0 km down the creek from the lake, returned 666ppm zinc and 47ppm lead. Rock samples (97980,2,3) from near the lake returned 4095, 98 and 610ppm zinc, and 48,23 and 435ppm lead. About 1.0 km east of the lake on the south hillside a sub-outcrop of manganese and iron oxide staining was sampled (#97992,3,4,5, ) and returned 1197,1618,203 and 924ppm zinc and 69,297,45 and 141ppm lead. One sample (#97993) returned more than 20, 000ppm manganese. The showing is about 10 by 20 m in size and consists of angular fragments of strongly stained highly altered granite and quartz-diorite (see petrographic description 97992 and 97993). Overburden prevents determination of the extent and nature of the zone. The showing is located at the east foot of a hill that the writer gave the descriptive name of Pink Mountain. The area was staked by two-post staking (SHAN# 3,4,5 and 6). Other black stained areas were noted but not examined, particularly a large one on the north facing slope above the scree slope which appears to be associated with horizontal fractures.
Traversing east along the north side of the valley found only the usual fresh Glundebery granite and no signs of pegmatites or quartz veins. A sample (#97981) was taken for whole rock analysis.

## THE OXIDE SPUR

This area lies 1.0 km south of Pink Mountain across a boulder strewn flat. A large area of fractured highly oxidized rock appears above the scree slope. One piece of float from higher up the hill (#97991) was completely oxidized and looks like a sponge. Sample #97989 was from what the writer believes was an outcrop (1/4 square meter) between large boulders. The outcrop was flat hard and (possibly) striated. The rock appeared pink, sheared and/or brecciated and contained about 1.0 % pyrite. No hand specimen was obtained. Sample #97990 is described in the petrographic report, as is sample #97988. This last sample came from an area about 200m further west. This latter area is believed to be the location of an intrusive contact between stocks of the Glundebery batholith. The contact appears to strike approximately northwest- southeast and the intrusive activity may be the cause of the fracturing (and attendant mineralization-oxidation) of the Oxide Spur. No silt samples were located as the creek was hidden in scree and boulders.

## THE BRENDA MOUNTAIN AREA

A traverse along the east side of Brenda Mountain identified leucocratic Glundebery granite that was partly coarse-grained and high in K-feldspar and quartz. It also contained quartz stringers and a quartz vein. The quartz vein was about 35cm wide and contained some black minerals (sample#97987). Some of the granite contained a bright crimson mineral tentatively identified as hematitic alteration (sample#97986). Traverses west and south of the mountain found the same type of granite without the excess quartz. A sample (#97997) was taken for whole rock analysis.

Respectfully submitted,

Egil Livgard P. Eng.

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3. Minfiles 104 O

010 Swan (wind ) property Molybdenite

029 Sheephorn Creek Magnetite

031 Tahoots Creek Magnetite

4. Assessment Reports

6012 Tahoots Creek property Geology and geophysical survey

3971 Swan Mineral Claims IP and Resistivity geophysical surveys

3212 " " " Geochemical soil survey

3211 " " " Magnetic and vertical loop EM surveys

5. Rare element granitic pegmatites

Petr Cerny Dept. of Geological Sciences University of Manitoba

6. Granitic pegmatite's of mixed NYF—LCT affinity from the O'Grady batholith in western Northwest Territories.

Lee A Groat, Dept. Geology at U.B.C and T. Scott Ercit, Canadian museum of Nature for DIAND.

7. Geology and Geochronometry of tin mineralization associated with the Seagull Batholith, South central Y.T.

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9. An overview of some Mesozoic and Tertiary Plutonic Suites and their associated mineralization in Northern Cordillera

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11. Exploration for rare-element granitic pegmatites

    D.L. Trueman and Petr Cerny     M.A.C. Short Course Handbook 8 1982

12. B.C. Regional geochemical Survey

    Jennings River NTS 104 O     BC RGS 52

# APPENDIX # 1

SILT SAMPLE ANALYSIS

STATISTICAL ANALYSIS EIGHT PAGES

BONDAR CLEGG

# Geochemical Lab Report

REPORT: V01-01492.0 ( COMPLETE )

REFERENCE:

CLIENT: MR. EGIL LIVGARD

SUBMITTED BY: E. LIVGARD

PROJECT: NONE GIVEN

DATE RECEIVED: 09-AUG-01 DATE PRINTED: 16-AUG-01

| DATE APPROVED | ELEMENT | | NUMBER OF ANALYSES | LOWER DETECTION | EXTRACTION | METHOD |
|---|---|---|---|---|---|---|
| 010815 | 1 Ag | Ag - IC30 | 62 | 0.5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 2 Cu | Cu - IC30 | 62 | 1 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 3 Pb | Pb - IC30 | 62 | 2 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 4 Zn | Zn - IC30 | 62 | 2 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 5 Mo | Mo - IC30 | 62 | 1 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 6 Ni | Ni - IC30 | 62 | 1 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 7 Co | Co - IC30 | 62 | 1 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 8 Cd | Cd - IC30 | 62 | 1.0 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 9 Bi | Bi - IC30 | 62 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 10 As | As - IC30 | 62 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 11 Sb | Sb - IC30 | 62 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 12 Fe Tot | Fe - IC30 | 62 | 0.01 PCT | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 13 Mn | Mn - IC30 | 62 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 14 Te | Te - IC30 | 62 | 25 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 15 Ba | Ba - IC30 | 62 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 16 Cr | Cr - IC30 | 62 | 2 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 17 V | V - IC30 | 62 | 2 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 18 Sn | Sn - IC30 | 62 | 20 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 19 W | W - IC30 | 62 | 20 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 20 La | La - IC30 | 62 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 21 Al | Al - IC30 | 62 | 0.01 PCT | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 22 Mg | Mg - IC30 | 62 | 0.01 PCT | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 23 Ca | Ca - IC30 | 62 | 0.01 PCT | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 24 Na | Na - IC30 | 62 | 0.01 PCT | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 25 K | K - IC30 | 62 | 0.01 PCT | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 26 Sr | Sr - IC30 | 62 | 1 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 27 Y | Y - IC30 | 62 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 28 Ga | Ga - IC30 | 62 | 10 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 29 Li | Li - IC30 | 62 | 2 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 30 Nb | Nb - IC30 | 62 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 31 Sc | Sc - IC30 | 62 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 32 Ta | Ta - IC30 | 62 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 33 Ti | Ti - IC30 | 62 | 0.01 PCT | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 34 Zr | Zr - IC30 | 62 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010815 | 35 S | S - IC30 | 62 | 0.002 PCT | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |

| SAMPLE TYPES | NUMBER | SIZE FRACTIONS | NUMBER | SAMPLE PREPARATIONS | NUMBER |
|---|---|---|---|---|---|
| T STREAM SED, SILT | 62 | 1 -80 | 62 | DRYING | 61 |
| | | | | DRY, SIEVE -80 | 61 |
| | | | | WEIGHING | 61 |

REMARKS: Added PREP WTTO colum per Andy.Charge $1.00 per sample.

Due to digestion limitations based upon sample mineralization, IC30 results for Al, Ba and Cr may vary.

REPORT COPIES TO: 1990 KING ALBERT AVE. INVOICE TO: 1990 KING ALBERT AVE.


************************************************************
This report must not be reproduced except in full. The data presented in this report is specific to those samples identified under "Sample Number" and is applicable only to the samples as received expressed on a dry basis unless otherwise indicated
************************************************************

CLIENT: MR. EGIL LIVGARD PROJECT: NONE GIVEN

REPORT: V01-01492.0 ( COMPLETE ) DATE RECEIVED: 09-AUG-01 DATE PRINTED: 16-AUG-01 

| SAMPLE NUMBER | ELEMENT UNITS | Ag PPM | Cu PPM | Pb PPM | Zn PPM | Mo PPM | Ni PPM | Co PPM | Cd PPM | Bi PPM | As PPM | Sb PPM | Fe Tot PCT | Mn PPM | Te PPM | Ba PPM | Cr PPM | V PPM | Sn PPM | W PPM | La PPM | Al PCT | Mg PCT | Ca PCT | Na PCT | K PCT | Sr PPM | Y PPM | Ga PPM | Li PPM | Nb PPM | Sc PPM | Ta PPM | Ti PCT | Zr PPM | S PCT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10-1 | | <.5 | 9 | 6 | 93 | 6 | 6 | 18 | <1.0 | <5 | 15 | <5 | 2.97 | 740 | <25 | 511 | 14 | 44 | <20 | 23 | 76 | 6.82 | 0.46 | 1.21 | 2.69 | 2.18 | 167 | 56 | 15 | 30 | 168 | 6 | 17 | 1.08 | 223 | 0.022 |
| 10-2 | | <.5 | 7 | <2 | 81 | 10 | 6 | 22 | <1.0 | <5 | 18 | <5 | 3.81 | 812 | <25 | 524 | 11 | 57 | <20 | <20 | 68 | 7.41 | 0.66 | 1.64 | 2.81 | 2.31 | 221 | 50 | 14 | 29 | 133 | 7 | 27 | 1.10 | 145 | 0.029 |
| 0-3 | | <.5 | 33 | <2 | 299 | 24 | 8 | 14 | 1.2 | <5 | 127 | <5 | 5.73 | 1954 | <25 | 367 | 22 | 33 | <20 | <20 | 101 | 7.92 | 0.36 | 1.04 | 2.81 | 2.32 | 76 | 270 | 25 | 63 | 597 | 8 | 51 | 0.65 | 578 | 0.075 |
| 5-1 | | <.5 | 2 | <2 | 104 | 8 | 3 | 15 | <1.0 | <5 | 15 | <5 | 3.87 | 1353 | <25 | 482 | 6 | 19 | <20 | <20 | 54 | 7.26 | 0.32 | 1.34 | 2.98 | 2.10 | 111 | 135 | 21 | 39 | 410 | 8 | 87 | 0.89 | 268 | 0.017 |
| 5-2 | | <.5 | 15 | <2 | 134 | 9 | 11 | 13 | <1.0 | <5 | 57 | <5 | 4.80 | 1374 | <25 | 431 | 23 | 29 | <20 | <20 | 100 | 7.50 | 0.49 | 1.30 | 2.86 | 2.45 | 91 | 116 | 20 | 49 | 275 | 8 | 38 | 0.63 | 227 | 0.025 |
| 5-3 | | <.5 | 14 | 6 | 167 | 17 | 10 | 11 | 1.1 | <5 | 244 | <5 | 3.94 | 932 | <25 | 424 | 21 | 31 | <20 | <20 | 47 | 8.21 | 0.38 | 0.88 | 2.45 | 1.77 | 89 | 94 | 19 | 57 | 223 | 6 | 38 | 0.50 | 197 | 0.050 |
| 5-4 | | <.5 | 9 | 7 | 164 | 3 | 6 | 10 | <1.0 | <5 | 23 | <5 | 4.85 | 1207 | <25 | 544 | 4 | 25 | <20 | <20 | 128 | 7.32 | 0.31 | 0.86 | 2.60 | 2.21 | 94 | 166 | 22 | 59 | 336 | 6 | 62 | 0.47 | 360 | 0.019 |
| 5-5 | | <.5 | 15 | 21 | 257 | 11 | 9 | 12 | <1.0 | <5 | 47 | <5 | 6.02 | 1419 | <25 | 458 | 12 | 35 | 26 | <20 | 196 | 7.61 | 0.40 | 0.95 | 2.25 | 1.86 | 91 | 225 | 26 | 73 | 472 | 9 | 147 | 0.57 | 377 | 0.065 |
| 5-6 | | <.5 | 25 | 18 | 223 | 6 | 10 | 11 | <1.0 | <5 | 47 | <5 | 5.57 | 1455 | <25 | 444 | 12 | 42 | <20 | <20 | 161 | 8.79 | 0.61 | 0.94 | 1.66 | 1.62 | 103 | 222 | 26 | 84 | 341 | 10 | 30 | 0.37 | 219 | 0.075 |
| 6-1 | | <.5 | 16 | 7 | 192 | 7 | 13 | 17 | <1.0 | <5 | 28 | <5 | 5.24 | 1341 | <25 | 273 | 15 | 49 | <20 | <20 | 83 | 7.13 | 0.43 | 0.87 | 2.95 | 2.35 | 101 | 35 | 21 | 30 | 134 | <5 | 14 | 0.75 | 129 | 0.014 |
| 7-1 | | <.5 | 4 | <2 | 100 | 11 | 2 | 20 | <1.0 | <5 | 10 | <5 | 5.18 | 1613 | <25 | 321 | 2 | 41 | <20 | 101 | 111 | 7.32 | 0.44 | 1.40 | 2.54 | 1.83 | 71 | 87 | 16 | 34 | 338 | 9 | 83 | 1.24 | 162 | 0.012 |
| 7-2 | | <.5 | 3 | 6 | 70 | 9 | 2 | 11 | <1.0 | <5 | <5 | <5 | 3.39 | 880 | <25 | 371 | <2 | 28 | <20 | <20 | 52 | 8.02 | 0.32 | 1.02 | 2.69 | 2.24 | 78 | 49 | 19 | 33 | 143 | 6 | 21 | 0.59 | 127 | 0.009 |
| 7-3 | | <.5 | 5 | 9 | 80 | 7 | 3 | 11 | <1.0 | <5 | 10 | <5 | 3.65 | 900 | <25 | 380 | <2 | 28 | <20 | <20 | 89 | 8.49 | 0.37 | 1.23 | 2.89 | 1.74 | 95 | 56 | 22 | 36 | 145 | 6 | 26 | 0.59 | 98 | 0.011 |
| 8-1 | | <.5 | 3 | 14 | 187 | 7 | 2 | 17 | <1.0 | <5 | 20 | <5 | 5.37 | 1646 | <25 | 189 | 2 | 31 | <20 | <20 | 87 | 9.01 | 0.45 | 1.10 | 3.01 | 1.97 | 74 | 29 | 15 | 37 | 195 | <5 | 8 | 1.13 | 189 | 0.020 |
| 8-2 | | <.5 | 6 | 12 | 177 | 9 | 5 | 14 | <1.0 | <5 | 34 | <5 | 4.09 | 1560 | <25 | 614 | 8 | 47 | <20 | <20 | 90 | 9.17 | 0.60 | 1.08 | 3.42 | 2.07 | 295 | 32 | 16 | 37 | 154 | <5 | 20 | 0.70 | 125 | 0.021 |
| 8-3 | | <.5 | 10 | 9 | 254 | 10 | 8 | 22 | <1.0 | <5 | 34 | <5 | 6.16 | 2183 | <25 | 283 | 11 | 60 | <20 | <20 | 124 | 8.50 | 0.78 | 1.79 | 3.06 | 2.05 | 119 | 43 | 14 | 41 | 214 | 7 | 18 | 1.18 | 246 | 0.030 |
| 8-4 | | <.5 | 10 | <2 | 298 | 11 | 11 | 24 | 1.1 | <5 | 28 | <5 | 7.40 | 3084 | <25 | 302 | 14 | 72 | <20 | <20 | 146 | 7.56 | 0.88 | 2.12 | 2.90 | 1.25 | 133 | 57 | 14 | 40 | 228 | 8 | 24 | 1.20 | 230 | 0.039 |
| 12-1 | | <.5 | 12 | <2 | 155 | 11 | 36 | 35 | <1.0 | <5 | 5 | <5 | 5.75 | 1276 | <25 | 241 | 73 | 106 | <20 | <20 | 91 | 7.16 | 1.40 | 2.09 | 2.27 | 1.32 | 133 | 91 | 11 | 19 | 219 | 12 | 21 | 1.43 | 68 | 0.037 |
| 12-2 | | <.5 | 8 | <2 | 110 | 5 | 32 | 37 | <1.0 | <5 | 7 | <5 | 5.94 | 1212 | <25 | 204 | 78 | 110 | <20 | <20 | 80 | 6.77 | 1.45 | 2.14 | 2.44 | 2.05 | 132 | 41 | <10 | 13 | 158 | 11 | 41 | 1.59 | 97 | 0.018 |
| 12-3 | | <.5 | 11 | <2 | 158 | 4 | 13 | 18 | <1.0 | <5 | 10 | <5 | 4.52 | 736 | <25 | 143 | 30 | 57 | <20 | <20 | 85 | 6.24 | 0.56 | 0.75 | 2.39 | 2.86 | 53 | 83 | 19 | 19 | 275 | <5 | 24 | 0.93 | 135 | 0.013 |
| 13-1 | | <.5 | 17 | 31 | 167 | 16 | 15 | 12 | <1.0 | <5 | 23 | <5 | 3.76 | 726 | <25 | 270 | 37 | 56 | <20 | <20 | 89 | 6.85 | 0.50 | 0.66 | 2.18 | 2.07 | 74 | 66 | 20 | 25 | 133 | 5 | 25 | 0.44 | 229 | 0.065 |
| 13-2 | | <.5 | 7 | 8 | 165 | 14 | 5 | 7 | <1.0 | <5 | 8 | <5 | 2.37 | 560 | <25 | 141 | 11 | 18 | <20 | <20 | 103 | 6.53 | 0.16 | 0.27 | 2.52 | 1.88 | 27 | 64 | 23 | 34 | 205 | <5 | 29 | 0.29 | 191 | 0.010 |
| 13-3 | | <.5 | 22 | 14 | 804 | 29 | 10 | 18 | <1.0 | <5 | 29 | <5 | *9.52 | 2192 | <25 | 157 | 22 | 43 | <20 | <20 | 330 | 7.26 | 0.64 | 1.31 | 1.73 | 1.46 | 31 | 320 | 23 | 71 | 555 | 11 | 54 | 0.83 | 448 | 0.091 |
| 13-4 | | <.5 | 11 | 7 | 173 | 13 | 8 | 16 | <1.0 | <5 | 43 | <5 | 4.30 | 870 | <25 | 171 | 16 | 36 | <20 | <20 | 135 | 8.30 | 0.31 | 0.52 | 4.22 | 1.48 | 64 | 66 | 22 | 15 | 203 | <5 | 28 | 0.53 | 168 | 0.027 |
| 13-5 | | <.5 | 21 | 5 | 200 | 13 | 29 | 27 | <1.0 | <5 | 50 | <5 | 5.63 | 1018 | <25 | 232 | 55 | 97 | <20 | <20 | 90 | 6.95 | 1.15 | 1.69 | 1.69 | 1.08 | 114 | 61 | 15 | 33 | 120 | 10 | 13 | 0.96 | 65 | 0.103 |
| 14-1 | | <.5 | 11 | 34 | 467 | 20 | 13 | 13 | <1.0 | <5 | 21 | <5 | 6.24 | 2310 | <25 | 196 | 15 | 36 | <20 | <20 | 100 | 7.02 | 0.44 | 0.54 | 2.66 | 2.03 | 53 | 53 | 26 | 45 | 165 | <5 | 11 | 0.55 | 252 | 0.030 |
| 14-2 | | <.5 | 15 | 7 | 323 | 3 | 14 | 17 | <1.0 | <5 | 20 | <5 | 7.73 | 1749 | <25 | 270 | 17 | 61 | <20 | <20 | 135 | 6.37 | 0.54 | 0.93 | 3.09 | 1.13 | 77 | 59 | 19 | 53 | 181 | 6 | 17 | 0.91 | 334 | 0.019 |
| 14-3 | | <.5 | 6 | <2 | 125 | 4 | 7 | 9 | <1.0 | <5 | 10 | <5 | 2.90 | 677 | <25 | 155 | 11 | 20 | <20 | <20 | 106 | 6.24 | 0.19 | 0.30 | 2.59 | 2.02 | 35 | 48 | 24 | 17 | 151 | <5 | 27 | 0.45 | 104 | 0.012 |
| 14-4 | | <.5 | 12 | <2 | 147 | 7 | 41 | 24 | <1.0 | <5 | 15 | <5 | 4.80 | 892 | <25 | 190 | 68 | 73 | <20 | <20 | 60 | 6.66 | 1.03 | 1.27 | 2.45 | 1.92 | 87 | 38 | 17 | 20 | 167 | 7 | 11 | 1.01 | 90 | 0.027 |
| 14-5 | | <.5 | 25 | 6 | 236 | 9 | 45 | 32 | 1.1 | <5 | 11 | <5 | 6.59 | 1708 | <25 | 191 | 85 | 111 | <20 | <20 | 77 | 6.68 | 1.55 | 2.41 | 2.28 | 1.33 | 137 | 118 | 10 | 24 | 270 | 11 | 19 | 1.17 | 94 | 0.045 |

BONDAR CLEGG

# Geochemical Lab Report

CLIENT: MR. EGIL LIVGARD

PROJECT: NONE GIVEN

REPORT: V01-01492.0 ( COMPLETE )

DATE RECEIVED: 09-AUG-01 DATE PRINTED: 16-AUG-01 

| SAMPLE NUMBER | ELEMENT UNITS | Ag PPM | Cu PPM | Pb PPM | Zn PPM | Mo PPM | Ni PPM | Co PPM | Cd PPM | Bi PPM | As PPM | Sb PPM | Fe Tot PCT | Mn PPM | Te PPM | Ba PPM | Cr PPM | V PPM | Sn PPM | W PPM | La PPM | Al PCT | Mg PCT | Ca PCT | Na PCT | K PCT | Sr PPM | Y PPM | Ga PPM | Li PPM | Nb PPM | Sc PPM | Ta PPM | Ti PCT | Zr PPM | S PCT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-1 | | <.5 | 8 | 10 | 277 | 15 | 26 | 16 | <1.0 | <5 | 17 | <5 | 6.82 | 1364 | <25 | 132 | 43 | 54 | <20 | <20 | 98 | 5.77 | 0.70 | 0.85 | 2.36 | 1.33 | 57 | 37 | 18 | 38 | 90 | 6 | 8 | 0.72 | 128 | 0.040 |
| 18-1 | | <.5 | 2 | <2 | 47 | 38 | 6 | 8 | <1.0 | <5 | 6 | <5 | 1.82 | 328 | <25 | 602 | 8 | 24 | <20 | <20 | 36 | 7.95 | 0.30 | 1.07 | 3.12 | 2.03 | 166 | 39 | 20 | 30 | 88 | <5 | 22 | 0.39 | 132 | 0.024 |
| 18-2 | | <.5 | 8 | 6 | 57 | 5 | 11 | 10 | <1.0 | <5 | 53 | <5 | 2.79 | 361 | <25 | 650 | 17 | 46 | <20 | <20 | 46 | 7.73 | 0.56 | 1.06 | 2.57 | 1.93 | 153 | 29 | 15 | 31 | 70 | <5 | 17 | 0.40 | 107 | 0.027 |
| 19-1 | | <.5 | <1 | <2 | 117 | 4 | 6 | 73 | <1.0 | <5 | 16 | <5 | 9.34 | 2989 | <25 | 488 | 10 | 123 | <20 | 38* | 98 | 7.16 | 1.39 | 3.09 | 2.64 | 1.34 | 328 | 56 | <10 | 25 | 314 | 14 | 31 | .29 | 225 | 0.031 |
| 19-2 | | <.5 | <1 | <2 | 90 | 2 | 5 | 42 | <1.0 | <5 | 18 | <5 | 6.03 | 1663 | <25 | 569 | 9 | 91 | <20 | <20 | 61 | 7.48 | 1.09 | 2.46 | 2.75 | 1.24 | 317 | 69 | 10 | 24 | 258 | 10 | 26 | .41 | 179 | 0.032 |
| 19-3 | | <.5 | 9 | <2 | 130 | 6 | 11 | 43 | <1.0 | <5 | 11 | <5 | 8.04 | 1670 | <25 | 501 | 20 | 135 | <20 | <20 | 78 | 7.59 | 1.71 | 2.98 | 2.31 | 1.02 | 322 | 42 | <10 | 36 | 146 | 14 | 11 | .88 | 104 | 0.069 |
| 19-4 | | <.5 | 4 | <2 | 57 | 10 | 4 | 18 | <1.0 | <5 | <5 | <5 | 3.29 | 668 | <25 | 503 | 15 | 58 | <20 | <20 | 41 | 6.70 | 0.68 | 1.53 | 2.81 | 1.87 | 214 | 34 | 15 | 28 | 131 | 6 | 28 | 0.91 | 133 | 0.028 |
| 19-5 | | <.5 | 10 | 2 | 88 | 7 | 8 | 21 | <1.0 | <5 | 9 | <5 | 4.42 | 899 | <25 | 713 | 13 | 75 | <20 | <20 | 48 | 8.04 | 1.13 | 2.24 | 2.92 | 1.92 | 382 | 32 | 13 | 30 | 69 | 9 | 17 | 0.74 | 42 | 0.033 |
| 19-6 | | 0.6 | 6 | <2 | 114 | 11 | 8 | 57 | <1.0 | <5 | 11 | <5 | 8.55 | 2360 | <25 | 570 | 15 | 136 | <20 | 33* | 79 | 7.13 | 1.37 | 2.60 | 2.54 | 1.67 | 326 | 52 | <10 | 27 | 281 | 13 | 46 | .18 | 142 | 0.041 |
| 19-7 | | <.5 | 9 | 3 | 43 | 4 | 2 | 9 | <1.0 | <5 | <5 | <5 | 1.54 | 358 | <25 | 662 | 8 | 29 | <20 | <20 | 43 | 7.58 | 0.31 | 1.08 | 3.03 | 2.67 | 185 | 45 | 17 | 19 | 111 | <5 | 18 | 0.53 | 158 | 0.013 |
| 20-1 | | <.5 | <1 | <2 | 52 | 2 | <1 | 13 | <1.0 | <5 | <5 | <5 | 2.33 | 924 | <25 | 511 | 5 | 14 | <20 | <20 | 36 | 7.51 | 0.19 | 1.06 | 3.28 | 2.24 | 126 | 68 | 22 | 21 | 290 | <5 | 38 | 0.93 | 292 | 0.013 |
| 21-1 | | <.5 | 6 | 7 | 69 | 9 | 4 | 7 | <1.0 | <5 | 33 | <5 | 2.87 | 404 | <25 | 526 | 7 | 35 | <20 | <20 | 86 | 7.33 | 0.22 | 0.77 | 2.63 | 2.08 | 118 | 104 | 18 | 37 | 231 | <5 | 36 | 0.32 | 170 | 0.023 |
| 21-2 | | <.5 | 6 | 9 | 79 | 4 | 5 | 9 | <1.0 | <5 | 26 | <5 | 3.95 | 598 | <25 | 520 | 7 | 48 | <20 | <20 | 72 | 7.76 | 0.30 | 0.89 | 3.01 | 2.09 | 129 | 66 | 19 | 46 | 149 | <5 | 29 | 0.39 | 209 | 0.018 |
| 21-3 | | <.5 | 5 | 5 | 62 | 8 | 3 | 7 | <1.0 | <5 | 36 | <5 | 2.12 | 491 | <25 | 497 | 6 | 27 | <20 | <20 | 39 | 7.41 | 0.24 | 0.92 | 2.77 | 1.75 | 116 | 60 | 20 | 41 | 107 | <5 | 30 | 0.28 | 121 | 0.025 |
| 21-4 | | <.5 | 15 | 6 | 83 | 7 | 5 | 8 | <1.0 | <5 | 48 | <5 | 2.89 | 720 | <25 | 306 | 8 | 30 | <20 | <20 | 68 | 7.40 | 0.37 | 0.79 | 2.98 | 2.21 | 92 | 101 | 25 | 91 | 215 | <5 | 35 | 0.32 | 237 | 0.021 |
| 21-5 | | <.5 | 5 | <2 | 74 | 6 | 8 | 23 | <1.0 | <5 | 13 | <5 | 3.94 | 980 | <25 | 553 | 22 | 69 | <20 | <20 | 61 | 7.18 | 0.84 | 1.92 | 2.71 | 2.38 | 281 | 45 | 11 | 27 | 110 | 8 | 29 | .12 | 104 | 0.034 |
| 23-1 | | <.5 | 12 | 42 | 226 | 20 | 4 | 7 | <1.0 | <5 | 6 | <5 | 2.74 | 685 | <25 | 107 | 15 | 22 | <20 | <20 | 71 | 5.90 | 0.13 | 0.19 | 2.56 | 1.59 | 29 | 58 | 26 | 13 | 226 | <5 | 21 | .36 | 177 | 0.020 |
| 24-1 | | <.5 | 8 | 20 | 162 | 14 | 3 | 5 | <1.0 | <5 | 10 | <5 | 2.08 | 341 | <25 | 106 | 8 | 15 | <20 | <20 | 59 | 5.98 | 0.08 | 0.13 | 2.25 | 1.37 | 22 | 44 | 28 | 9 | 144 | <5 | 20 | .27 | 119 | 0.066 |
| 24-2 | | <.5 | 57 | 136 | 880 | 58 | 14 | 11 | 3.1 | <5 | 16 | <5 | 4.05 | 3617 | <25 | 202 | 20 | 36 | <20 | <20 | 137 | 7.96 | 0.31 | 0.25 | 2.60 | 1.58 | 56 | 126 | 27 | 20 | 191 | <5 | 26 | .29 | 127 | 0.054 |
| 24-3 | | <.5 | 16 | 47 | 666 | 17 | 7 | 9 | <1.0 | <5 | 11 | <5 | 3.98 | 1164 | <25 | 147 | 14 | 24 | <20 | <20 | 152 | 7.29 | 0.23 | 0.35 | 2.38 | 1.60 | 42 | 135 | 23 | 23 | 327 | <5 | 42 | .37 | 84 | 0.115 |
| 24-4 | | <.5 | 9 | 40 | 464 | 11 | 3 | 8 | 2.1 | <5 | 10 | <5 | 4.08 | 1626 | <25 | 129 | 5 | 27 | <20 | <20 | 183 | 7.62 | 0.16 | 0.19 | 3.60 | 2.08 | 45 | 136 | 42 | 20 | 277 | <5 | 26 | .36 | 354 | 0.010 |
| 25-1 | | <.5 | 17 | 3 | 375 | 15 | 38 | 26 | <1.0 | <5 | 15 | <5 | 6.49 | 2095 | <25 | 259 | 47 | 99 | <20 | <20 | 114 | 8.05 | 1.12 | 1.30 | 1.84 | 1.06 | 105 | 84 | 12 | 67 | 205 | 10 | 15 | .97 | 125 | 0.078 |
| 25-2 | | <.5 | 10 | 4 | 366 | 39 | 25 | 17 | <1.0 | <5 | 18 | <5 | 6.55 | 2152 | <25 | 260 | 60 | 63 | <20 | <20 | 222 | 8.00 | 0.51 | 0.71 | 1.76 | 1.25 | 79 | 151 | 19 | 67 | 237 | 6 | 26 | .58 | 164 | 0.099 |
| 25-3 | | <.5 | 8 | <2 | 231 | 77 | 30 | 28 | <1.0 | <5 | 15 | <5 | 6.54 | 2235 | <25 | 307 | 75 | 104 | <20 | <20 | 210 | 7.99 | 0.91 | 1.10 | 2.00 | 1.74 | 121 | 116 | 16 | 52 | 185 | 10 | 28 | .88 | 128 | 0.114 |
| 26-1 | | <.5 | 6 | 14 | 265 | 16 | 16 | 13 | <1.0 | <5 | 13 | <5 | 3.50 | 851 | <25 | 161 | 33 | 47 | <20 | 41* | 91 | 6.56 | 0.43 | 0.57 | 2.54 | 2.62 | 52 | 69 | 22 | 18 | 210 | <5 | 22 | .66 | 189 | 0.021 |
| 26-2 | | <.5 | 18 | 8 | 256 | 16 | 14 | 9 | 1.0 | <5 | 15 | <5 | 2.95 | 644 | <25 | 196 | 42 | 38 | <20 | <20 | 84 | 6.42 | 0.33 | 0.56 | 2.11 | 1.73 | 61 | 56 | 20 | 35 | 143 | <5 | 19 | .46 | 133 | 0.049 |
| 26-3 | | <.5 | 29 | 32 | 543 | 6 | 30 | 15 | 1.4 | <5 | 12 | <5 | 4.72 | 910 | <25 | 347 | 63 | 86 | <20 | <20 | 124 | 7.08 | 0.61 | 0.58 | 2.12 | 2.33 | 86 | 96 | 22 | 27 | 231 | 8 | 9 | .57 | 399 | 0.032 |
| 28-1 | | <.5 | 19 | 22 | 434 | 9 | 10 | 8 | 1.2 | <5 | 28 | <5 | 3.28 | 631 | <25 | 162 | 19 | 30 | <20 | <20 | 110 | 6.58 | 0.23 | 0.34 | 2.34 | 1.52 | 45 | 93 | 23 | 17 | 206 | <5 | 17 | .41 | 141 | 0.034 |
| 28-2 | | <.5 | 12 | 23 | 357 | 8 | 8 | 8 | <1.0 | <5 | 30 | <5 | 3.14 | 643 | <25 | 143 | 15 | 25 | <20 | <20 | 99 | 6.74 | 0.19 | 0.26 | 2.46 | 1.56 | 34 | 64 | 27 | 16 | 193 | <5 | 21 | .39 | 117 | 0.027 |
| 28-3 | | <.5 | 22 | 28 | 1109 | 29 | 16 | 16 | 2.3 | <5 | 24 | <5 | 6.53 | 1411 | <25 | 248 | 35 | 59 | 23* | <20 | 263* | 7.44 | 0.54 | 0.70 | 2.14 | 2.09 | 72 | 229 | 23 | 38 | 441 | 7 | 63 | .75 | 201 | 0.061 |

CLIENT: MR. EGIL LIVGARD

PROJECT: NONE GIVEN

REPORT: V01-01492.0 ( COMPLETE )

DATE RECEIVED: 09-AUG-01 DATE PRINTED: 16-AUG-01 

| SAMPLE NUMBER | ELEMENT UNITS | Ag PPM | Cu PPM | Pb PPM | Zn PPM | Mo PPM | Ni PPM | Co PPM | Cd PPM | Bi PPM | As PPM | Sb PPM | Fe Tot PCT | Mn PPM | Te PPM | Ba PPM | Cr PPM | V PPM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-1 | | <.5 | 17 | 8 | 756 | 11 | 40 | 18 | <1.0 | <5 | 11 | <5 | 6.68 | 1103 | <25 | 261 | 42 | 72 |
| 30-2 | | <.5 | 12 | 7 | 182 | 46 | 8 | 12 | <1.0 | <5 | 36 | <5 | 3.97 | 1292 | <25 | 216 | 26 | 45 |

| SAMPLE NUMBER | Sn PPM | W PPM | La PPM | Al PCT | Mg PCT | Ca PCT | Na PCT | K PCT | Sr PPM | Y PPM | Ga PPM | Li PPM | Nb PPM | Sc PPM | Ta PPM | Ti PCT | Zr PPM | S PCT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-1 | <20 | <20 | 203 | 8.01 | 0.73 | 0.56 | 2.00 | 1.73 | 64 | 119 | 23 | 28 | 240 | 7 | 21 | 0.60 | 171 | 0.054 |
| 30-2 | <20 | <20 | 81 | 6.45 | 0.30 | 0.62 | 2.08 | 1.72 | 71 | 67 | 20 | 24 | 181 | 6 | 24 | 0.55 | 148 | 0.163 |

BONDAR CLEGG

# Geochemical Lab Report

CLIENT: MR. EGIL LIVGARD PROJECT: NONE GIVEN

REPORT: V01-01492.0 ( COMPLETE ) DATE RECEIVED: 09-AUG-01 DATE PRINTED: 16-AUG-01 

| STANDARD ELEMENT | Ag | Cu | Pb | Zn | Mo | Ni | Co | Cd | Bi | As | Sb | Fe Tot | Mn | Te | Ba | Cr | V | Sn | W | La | Al | Mg | Ca | Na | K | Sr | Y | Ga | Li | Nb | Sc | Ta | Ti | Zr | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NAME UNITS | PPM | PPM | PPM | PPM | PPM | PPM | PPM | PPM | PPM | PPM | PPM | PCT | PPM | PPM | PPM | PPM | PPM | PPM | PPM | PPM | PCT | PCT | PCT | PCT | PCT | PPM | PPM | PPM | PPM | PPM | PPM | PPM | PCT | PPM | PCT |
| CANMET LKSD-2 | <.5 | 35 | 42 | 226 | 2 | 30 | 19 | 1.3 | <5 | 11 | <5 | 4.45 | 2032 | <25 | 774 | 41 | 77 | <20 | <20 | 62 | 6.51 | 1.02 | 1.64 | 1.38 | 1.67 | 229 | 39 | <10 | 21 | 11 | 11 | <5 | 0.34 | 116 | 0.179 |
| Number of Analyses | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Mean Value | 0.3 | 35 | 42 | 226 | 2 | 30 | 19 | 1.3 | 3 | 11 | 3 | 4.45 | 2032 | 13 | 774 | 41 | 77 | 10 | 10 | 62 | 6.51 | 1.02 | 1.64 | 1.38 | 1.67 | 229 | 39 | 5 | 21 | 11 | 11 | 3 | 0.34 | 116 | 0.179 |
| Standard Deviation | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Accepted Value | 0.8 | 37 | 44 | 209 | 2 | 26 | 17 | 0.8 | - | 9 | 1 | 4.30 | 2020 | - | 780 | 57 | 77 | 5 | - | 68 | 6.50 | 1.01 | 1.57 | 1.43 | 2.19 | 220 | 44 | - | 20 | 16 | 13 | <1 | 0.40 | 128 | 0.140 |
| ANALYTICAL BLANK | <.5 | <1 | <2 | <2 | <1 | <1 | <1 | <1.0 | <5 | <5 | <5 | 0.01 | <5 | <25 | <5 | <2 | <2 | <20 | <20 | <5 | <.01 | <.01 | <.01 | <.01 | <.01 | <1 | <5 | <10 | <2 | <5 | <5 | <5 | <.01 | <5 | <.002 |
| ANALYTICAL BLANK | <.5 | <1 | <2 | <2 | <1 | <1 | <1 | <1.0 | <5 | <5 | <5 | <0.01 | <5 | <25 | <5 | <2 | <2 | <20 | <20 | <5 | 0.01 | <.01 | <.01 | <.01 | <.01 | <1 | <5 | <10 | <2 | <5 | <5 | <5 | <.01 | <5 | <.002 |
| Number of Analyses | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mean Value | 0.3 | <1 | 1 | 1 | <1 | <1 | <1 | 0.5 | 3 | 3 | 3 | 0.01 | 3 | 13 | 3 | 1 | 1 | 10 | 10 | 3 | 0.01 | <.01 | <.01 | <.01 | <.01 | <1 | 3 | 5 | 1 | 3 | 3 | 3 | <.01 | 3 | 0.001 |
| Standard Deviation | - | - | - | - | - | - | - | - | - | - | - | <0.01 | - | - | - | - | - | - | - | - | <.01 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Accepted Value | 0.2 | 1 | 2 | 1 | 1 | 1 | 1 | 0.5 | 2 | 5 | 5 | 0.05 | 1 | <1 | <1 | 1 | 1 | <1 | <1 | <1 | - | <.01 | <.01 | - | <.01 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <.01 | <1 | <.001 |
| CANMET STSD-4 | <.5 | 64 | 12 | 107 | 3 | 31 | 17 | <1.0 | <5 | 13 | <5 | 4.10 | 1542 | <25 | 1976 | 68 | 108 | <20 | <20 | 20 | 6.61 | 1.27 | 2.92 | 1.96 | 1.47 | 365 | 21 | <10 | 14 | 11 | 12 | 7 | 0.44 | 45 | 0.113 |
| Number of Analyses | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Mean Value | 0.3 | 64 | 12 | 107 | 3 | 31 | 17 | 0.5 | 3 | 13 | 3 | 4.10 | 1542 | 13 | 1976 | 68 | 108 | 10 | 10 | 20 | 6.61 | 1.27 | 2.92 | 1.96 | 1.47 | 365 | 21 | 5 | 14 | 11 | 12 | 7 | 0.44 | 45 | 0.113 |
| Standard Deviation | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Accepted Value | 0.3 | 66 | 16 | 107 | 2 | 30 | 13 | 0.6 | - | 15 | 7 | 4.10 | 1520 | - | 2000 | 66 | 106 | 2 | - | 24 | 6.40 | 1.28 | 2.86 | 2.00 | 1.33 | 350 | 24 | - | 14 | 9 | 14 | <1 | 0.46 | 53 | 0.090 |

CLIENT: MR. EGIL LIVGARD
PROJECT: NONE GIVEN
REPORT: V01-01492.0 ( COMPLETE )
DATE RECEIVED: 09-AUG-01
DATE PRINTED: 16-AUG-01


| SAMPLE NUMBER | ELEMENT UNITS | Ag PPM | Cu PPM | Pb PPM | Zn PPM | Mo PPM | Ni PPM | Co PPM | Cd PPM | Bi PPM | As PPM | Sb PPM | Fe Tot PCT | Mn PPM | Te PPM | Ba PPM | Cr PPM | V PPM | Sn PPM | W PPM | La PPM | Al PCT | Mg PCT | Ca PCT | Na PCT | K PCT | Sr PPM | Y PPM | Ga PPM | Li PPM | Nb PPM | Sc PPM | Ta PPM | Ti PCT | Zr PPM | S PCT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -3 | | <.5 | 33 | <2 | 299 | 24 | 8 | 14 | 1.2 | <5 | 127 | <5 | 5.73 | 1954 | <25 | 367 | 22 | 33 | <20 | <20 | 101 | 7.92 | 0.36 | 1.04 | 2.81 | 2.32 | 76 | 270 | 25 | 63 | 597 | 8 | 51 | 0.65 | 578 | 0.075 |
| Duplicate | | <.5 | 32 | <2 | 302 | 23 | 9 | 13 | <1.0 | <5 | 115 | <5 | 5.48 | 1829 | <25 | 363 | 13 | 31 | <20 | <20 | 80 | 7.83 | 0.34 | 0.97 | 2.81 | 2.40 | 72 | 250 | 23 | 63 | 566 | 8 | 58 | 0.62 | 591 | 0.075 |
| 12-3 | | <.5 | 11 | <2 | 158 | 4 | 13 | 18 | <1.0 | <5 | 10 | <5 | 4.52 | 736 | <25 | 143 | 30 | 57 | <20 | <20 | 85 | 6.24 | 0.56 | 0.75 | 2.39 | 2.86 | 53 | 83 | 19 | 19 | 275 | <5 | 24 | 0.93 | 135 | 0.013 |
| Duplicate | | <.5 | 12 | <2 | 160 | 5 | 14 | 20 | <1.0 | <5 | 10 | <5 | 4.97 | 777 | <25 | 150 | 29 | 62 | <20 | <20 | 86 | 6.50 | 0.57 | 0.79 | 2.44 | 2.90 | 55 | 86 | 20 | 18 | 267 | 5 | 20 | 0.98 | 179 | 0.014 |
| 19-7 | | <.5 | 9 | 3 | 43 | 4 | 2 | 9 | <1.0 | <5 | <5 | <5 | 1.54 | 358 | <25 | 662 | 8 | 29 | <20 | <20 | 43 | 7.58 | 0.31 | 1.08 | 3.03 | 2.67 | 185 | 45 | 17 | 19 | 111 | <5 | 18 | 0.53 | 158 | 0.013 |
| Duplicate | | <.5 | 6 | 2 | 45 | 5 | 2 | 10 | <1.0 | <5 | 8 | <5 | 1.50 | 366 | <25 | 647 | 10 | 27 | <20 | <20 | 49 | 7.29 | 0.31 | 1.05 | 3.07 | 2.66 | 180 | 30 | 15 | 19 | 93 | <5 | 12 | 0.53 | 147 | 0.013 |
| 26-3 | | <.5 | 29 | 32 | 543 | 6 | 30 | 15 | 1.4 | <5 | 12 | <5 | 4.72 | 910 | <25 | 347 | 63 | 86 | <20 | <20 | 124 | 7.08 | 0.61 | 0.58 | 2.12 | 2.33 | 86 | 96 | 22 | 27 | 231 | 8 | 9 | 0.57 | 399 | 0.032 |
| Duplicate | | <.5 | 29 | 34 | 559 | 10 | 32 | 17 | 1.3 | <5 | 13 | <5 | 4.96 | 951 | <25 | 372 | 61 | 89 | <20 | <20 | 141 | 7.27 | 0.66 | 0.60 | 2.04 | 2.38 | 92 | 104 | 22 | 28 | 206 | 8 | 10 | 0.60 | 338 | 0.036 |

# Egil Lievgard Statistics

CLIENT MR. EGIL LIVGARD

| Sample ID | | Ag | Cu | Pb | Zn | Mo | Ni | Co | Cd | Bi | As | Sb | Fe Tot | Mn | Te | Ba | Cr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | % | ppm | ppm | ppm | ppm |
| 14920001 | 10-1 | -0.5 | 9 | 6 | 93 | 6 | 6 | 18 | -1 | -5 | 15 | -5 | 2.97 | 740 | -25 | 511 | 14 |
| 14920002 | 10-2 | -0.5 | 7 | -2 | 81 | 10 | 6 | 22 | -1 | -5 | 18 | -5 | 3.81 | 812 | -25 | 524 | 11 |
| 14920003 | 10-3 | -0.5 | 33 | -2 | 299 | 24 | 8 | 14 | 1.2 | -5 | 127 | -5 | 5.73 | 1954 | -25 | 367 | 22 |
| 14920004 | 01-May | -0.5 | 2 | -2 | 104 | 8 | 3 | 15 | -1 | -5 | 15 | -5 | 3.87 | 1353 | -25 | 482 | 6 |
| 14920005 | 02-May | -0.5 | 15 | -2 | 134 | 9 | 11 | 13 | -1 | -5 | 57 | -5 | 4.8 | 1374 | -25 | 431 | 23 |
| 14920006 | 03-May | -0.5 | 14 | 6 | 167 | 17 | 10 | 11 | 1.1 | -5 | 244 | -5 | 3.94 | 932 | -25 | 424 | 21 |
| 14920007 | 04-May | -0.5 | 9 | 7 | 164 | 3 | 6 | 10 | -1 | -5 | 23 | -5 | 4.85 | 1207 | -25 | 544 | 4 |
| 14920008 | 05-May | -0.5 | 15 | 21 | 257 | 11 | 9 | 12 | -1 | -5 | 47 | -5 | 6.02 | 1419 | -25 | 458 | 12 |
| 14920009 | 06-May | -0.5 | 25 | 18 | 223 | 6 | 10 | 11 | -1 | -5 | 47 | -5 | 5.57 | 1455 | -25 | 444 | 12 |
| 14920010 | 01-Jun | -0.5 | 16 | 7 | 192 | 7 | 13 | 17 | -1 | -5 | 28 | -5 | 5.24 | 1341 | -25 | 273 | 15 |
| 14920011 | 01-Jul | -0.5 | 4 | -2 | 100 | 11 | 2 | 20 | -1 | -5 | 10 | -5 | 5.18 | 1613 | -25 | 321 | 2 |
| 14920012 | 02-Jul | -0.5 | 3 | 6 | 70 | 9 | 2 | 11 | -1 | -5 | -5 | -5 | 3.39 | 880 | -25 | 371 | -2 |
| 14920013 | 03-Jul | -0.5 | 5 | 9 | 80 | 7 | 3 | 11 | -1 | -5 | 10 | -5 | 3.65 | 900 | -25 | 380 | -2 |
| 14920014 | 01-Aug | -0.5 | 3 | 14 | 187 | 7 | 2 | 17 | -1 | -5 | 20 | -5 | 5.37 | 1646 | -25 | 189 | 2 |
| 14920015 | 02-Aug | -0.5 | 6 | 12 | 177 | 9 | 5 | 14 | -1 | -5 | 34 | -5 | 4.09 | 1560 | -25 | 614 | 8 |
| 14920016 | 03-Aug | -0.5 | 10 | 9 | 254 | 10 | 8 | 22 | -1 | -5 | 34 | -5 | 6.16 | 2183 | -25 | 283 | 11 |
| 14920017 | 04-Aug | -0.5 | 10 | -2 | 298 | 11 | 11 | 24 | 1.1 | -5 | 28 | -5 | 7.4 | 3084 | -25 | 302 | 14 |
| 14920018 | 01-Dec | -0.5 | 12 | -2 | 155 | 11 | 36 | 35 | -1 | -5 | 5 | -5 | 5.75 | 1276 | -25 | 241 | 73 |
| 14920019 | 02-Dec | -0.5 | 8 | -2 | 110 | 5 | 32 | 37 | -1 | -5 | 7 | -5 | 5.94 | 1212 | -25 | 204 | 78 |
| 14920022 | 03-Dec | -0.5 | 11 | -2 | 158 | 4 | 13 | 18 | -1 | -5 | 10 | -5 | 4.52 | 736 | -25 | 143 | 30 |
| 14920023 | 13-1 | -0.5 | 17 | 31 | 167 | 16 | 15 | 12 | -1 | -5 | 23 | -5 | 3.76 | 726 | -25 | 270 | 37 |
| 14920024 | 13-2 | -0.5 | 7 | 8 | 165 | 14 | 5 | 7 | -1 | -5 | 8 | -5 | 2.37 | 560 | -25 | 141 | 11 |
| 14920025 | 13-3 | -0.5 | 22 | 14 | 804 • | 29 | 10 | 18 | -1 | -5 | 29 | -5 | 9.52 | 2192 | -25 | 157 | 22 |
| 14920026 | 13-4 | -0.5 | 11 | 7 | 173 | 13 | 8 | 16 | -1 | -5 | 43 | -5 | 4.3 | 870 | -25 | 171 | 16 |
| 14920027 | 13-5 | -0.5 | 21 | 5 | 200 | 13 | 29 | 27 | -1 | -5 | 50 | -5 | 5.63 | 1018 | -25 | 232 | 55 |
| 14920028 | 14-1 | -0.5 | 11 | 34 | 467 | 20 | 13 | 13 | -1 | -5 | 21 | -5 | 6.24 | 2310 | -25 | 196 | 15 |
| 14920029 | 14-2 | -0.5 | 15 | 7 | 323 | 3 | 14 | 17 | -1 | -5 | 20 | -5 | 7.73 | 1749 | -25 | 270 | 17 |
| 14920030 | 14-3 | -0.5 | 6 | -2 | 125 | 4 | 7 | 9 | -1 | -5 | 10 | -5 | 2.9 | 677 | -25 | 155 | 11 |
| 14920031 | 14-4 | -0.5 | 12 | -2 | 147 | 7 | 41 | 24 | -1 | -5 | 15 | -5 | 4.8 | 892 | -25 | 190 | 68 |
| 14920032 | 14-5 | -0.5 | 23 | 6 | 236 | 9 | 45 | 32 | 1.1 | -5 | 11 | -5 | 6.59 | 1708 | -25 | 191 | 85 |
| 14920033 | 15-1 | -0.5 | 8 | 10 | 277 | 15 | 26 | 16 | -1 | -5 | 17 | -5 | 6.82 | 1364 | -25 | 132 | 43 |
| 14920034 | 18-1 | -0.5 | 2 | -2 | 47 | 38 • | 6 | 8 | -1 | -5 | 6 | -5 | 1.82 | 328 | -25 | 602 | 8 |
| 14920035 | 18-2 | -0.5 | 8 | 6 | 57 | 5 | 11 | 10 | -1 | -5 | 53 | -5 | 2.79 | 361 | -25 | 650 | 17 |
| 14920036 | 19-1 | -0.5 | -1 | -2 | 117 | 4 | 6 | 73 | -1 | -5 | 16 | -5 | 9.34 | 2989 | -25 | 488 | 10 |
| 14920037 | 19-2 | -0.5 | -1 | -2 | 90 | 2 | 5 | 42 | -1 | -5 | 18 | -5 | 6.03 | 1663 | -25 | 569 | 9 |
| 14920038 | 19-3 | -0.5 | 9 | -2 | 130 | 6 | 11 | 43 | -1 | -5 | 11 | -5 | 8.04 | 1670 | -25 | 501 | 20 |
| 14920045 | 19-4 | -0.5 | 4 | -2 | 57 | 10 | 4 | 18 | -1 | -5 | -5 | -5 | 3.29 | 668 | -25 | 503 | 15 |
| 14920046 | 19-5 | -0.5 | 10 | 2 | 88 | 7 | 8 | 21 | -1 | -5 | 9 | -5 | 4.42 | 899 | -25 | 713 | 13 |
| 14920047 | 19-6 | 0.6 | 6 | -2 | 114 | 11 | 8 | 57 | -1 | -5 | 11 | -5 | 8.55 | 2360 | -25 | 570 | 15 |
| 14920048 | 19-7 | -0.5 | 9 | 3 | 43 | 4 | 2 | 9 | -1 | -5 | -5 | -5 | 1.54 | 358 | -25 | 662 | 8 |
| 14920049 | 20-1 | -0.5 | -1 | -2 | 52 | 2 | -1 | 13 | -1 | -5 | -5 | -5 | 2.33 | 924 | -25 | 511 | 5 |

| Sample ID | | V | Sn | W | La | Al | Mg | Ca | Na | K | Sr | Y | Ga | Li | Nb | Sc | Ta | Ti | Zr | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ppm | ppm | ppm | ppm | % | % | % | % | % | ppm | ppm | ppm | ppm | ppm | ppm | ppm | % | ppm | % |
| 14920001 | 10-1 | 44 | -20 | 23 | 76 | 6.82 | 0.46 | 1.21 | 2.69 | 2.18 | 167 | 56 | 15 | 30 | 168 | 6 | 17 | 1.08 | 223 | 0.022 |
| 14920002 | 10-2 | 57 | -20 | -20 | 68 | 7.41 | 0.66 | 1.64 | 2.81 | 2.31 | 221 | 50 | 14 | 29 | 133 | 7 | 27 | 1.1 | 145 | 0.029 |
| 14920003 | 10-3 | 33 | -20 | -20 | 101 | 7.92 | 0.36 | 1.04 | 2.81 | 2.32 | 76 | 270 | 25 | 63 | 597 | 8 | 51 | 0.65 | 578 | 0.075 |
| 14920004 | 01-May | 19 | -20 | -20 | 54 | 7.26 | 0.32 | 1.34 | 2.98 | 2.1 | 111 | 135 | 21 | 39 | 410 | 8 | 87 • | 0.89 | 268 | 0.017 |
| 14920005 | 02-May | 29 | -20 | -20 | 100 | 7.5 | 0.49 | 1.3 | 2.86 | 2.45 | 91 | 116 | 20 | 49 | 275 | 8 | 38 | 0.63 | 227 | 0.025 |
| 14920006 | 03-May | 31 | -20 | -20 | 47 | 8.21 | 0.38 | 0.88 | 2.45 | 1.77 | 89 | 94 | 19 | 57 | 223 | 6 | 38 | 0.5 | 197 | 0.05 |
| 14920007 | 04-May | 25 | -20 | -20 | 128 | 7.32 | 0.31 | 0.86 | 2.6 | 2.21 | 94 | 166 | 22 | 59 | 336 | 6 | 62 • | 0.47 | 360 | 0.019 |
| 14920008 | 05-May | 35 | 26 | -20 | 196 | 7.61 | 0.4 | 0.95 | 2.25 | 1.86 | 91 | 225 | 26 | 73 | 472 | 9 | 147 • | 0.57 | 377 | 0.065 |
| 14920009 | 06-May | 42 | -20 | -20 | 161 | 8.79 | 0.61 | 0.94 | 1.66 | 1.62 | 103 | 222 | 26 | 84 | 341 | 10 | 30 | 0.37 | 219 | 0.075 |
| 14920010 | 01-Jun | 49 | -20 | -20 | 83 | 7.13 | 0.43 | 0.87 | 2.95 | 2.35 | 101 | 35 | 21 | 30 | 134 | -5 | 14 | 0.75 | 129 | 0.014 |
| 14920011 | 01-Jul | 41 | -20 | 101 | 111 | 7.32 | 0.44 | 1.4 | 2.54 | 1.83 | 71 | 87 | 16 | 34 | 338 | 9 | 83 • | 1.24 | 162 | 0.012 |
| 14920012 | 02-Jul | 28 | -20 | -20 | 52 | 8.02 | 0.32 | 1.02 | 2.69 | 2.24 | 78 | 49 | 19 | 33 | 143 | 6 | 21 | 0.59 | 127 | 0.009 |
| 14920013 | 03-Jul | 28 | -20 | -20 | 89 | 8.49 | 0.37 | 1.23 | 2.89 | 1.74 | 95 | 56 | 22 | 36 | 145 | 6 | 26 | 0.59 | 98 | 0.011 |
| 14920014 | 01-Aug | 31 | -20 | -20 | 87 | 9.01 | 0.45 | 1.1 | 3.01 | 1.97 | 74 | 29 | 15 | 37 | 195 | -5 | 8 | 1.13 | 189 | 0.02 |
| 14920015 | 02-Aug | 47 | -20 | -20 | 90 | 9.17 | 0.6 | 1.08 | 3.42 | 2.07 | 295 | 32 | 16 | 37 | 154 | -5 | 20 | 0.7 | 125 | 0.021 |
| 14920016 | 03-Aug | 60 | -20 | -20 | 124 | 8.5 | 0.78 | 1.79 | 3.06 | 2.05 | 119 | 43 | 14 | 41 | 214 | 7 | 18 | 1.18 | 246 | 0.03 |
| 14920017 | 04-Aug | 72 | -20 | -20 | 146 | 7.56 | 0.88 | 2.12 | 2.9 | 1.25 | 133 | 57 | 14 | 40 | 228 | 8 | 24 | 1.2 | 230 | 0.039 |
| 14920018 | 01-Dec | 106 | -20 | -20 | 91 | 7.16 | 1.4 | 2.09 | 2.27 | 1.32 | 133 | 91 | 11 | 19 | 219 | 12 | 21 | 1.43 | 68 | 0.037 |
| 14920019 | 02-Dec | 110 | -20 | -20 | 80 | 6.77 | 1.45 | 2.14 | 2.44 | 2.05 | 132 | 41 | -10 | 13 | 158 | 11 | 41 | 1.59 | 97 | 0.018 |
| 14920022 | 03-Dec | 57 | -20 | -20 | 85 | 6.24 | 0.56 | 0.75 | 2.39 | 2.86 | 53 | 83 | 19 | 19 | 275 | -5 | 24 | 0.93 | 135 | 0.013 |
| 14920023 | 13-1 | 56 | -20 | -20 | 89 | 6.85 | 0.5 | 0.66 | 2.18 | 2.07 | 74 | 66 | 20 | 25 | 133 | 5 | 25 | 0.44 | 229 | 0.065 |
| 14920024 | 13-2 | 18 | -20 | -20 | 103 | 6.53 | 0.16 | 0.27 | 2.52 | 1.88 | 27 | 64 | 23 | 34 | 205 | -5 | 29 | 0.29 | 191 | 0.01 |
| 14920025 | 13-3 | 43 | -20 | -20 | 330 | 7.26 | 0.64 | 1.31 | 1.73 | 1.46 | 31 | 320 | 23 | 71 | 555 | 11 | 54 | 0.83 | 448 | 0.091 |
| 14920026 | 13-4 | 36 | -20 | -20 | 135 | 8.3 | 0.31 | 0.52 | 4.22 | 1.48 | 64 | 66 | 22 | 15 | 203 | -5 | 28 | 0.53 | 168 | 0.027 |
| 14920027 | 13-5 | 97 | -20 | -20 | 90 | 6.95 | 1.15 | 1.69 | 1.69 | 1.08 | 114 | 61 | 15 | 33 | 120 | 10 | 13 | 0.96 | 65 | 0.103 |
| 14920028 | 14-1 | 36 | -20 | -20 | 100 | 7.02 | 0.44 | 0.54 | 2.66 | 2.03 | 53 | 53 | 26 | 45 | 165 | -5 | 11 | 0.55 | 252 | 0.03 |
| 14920029 | 14-2 | 61 | -20 | -20 | 135 | 6.37 | 0.54 | 0.93 | 3.09 | 1.13 | 77 | 59 | 19 | 53 | 181 | 6 | 17 | 0.91 | 334 | 0.019 |
| 14920030 | 14-3 | 20 | -20 | -20 | 106 | 6.24 | 0.19 | 0.3 | 2.59 | 2.02 | 35 | 48 | 24 | 17 | 151 | -5 | 27 | 0.45 | 104 | 0.012 |
| 14920031 | 14-4 | 73 | -20 | -20 | 60 | 6.66 | 1.03 | 1.27 | 2.45 | 1.92 | 87 | 38 | 17 | 20 | 167 | 7 | 11 | 1.01 | 90 | 0.027 |
| 14920032 | 14-5 | 111 | -20 | -20 | 77 | 6.68 | 1.55 | 2.41 | 2.28 | 1.33 | 137 | 118 | 10 | 24 | 270 | 11 | 19 | 1.17 | 94 | 0.045 |
| 14920033 | 15-1 | 54 | -20 | -20 | 98 | 5.77 | 0.7 | 0.85 | 2.36 | 1.33 | 57 | 37 | 18 | 38 | 90 | 6 | 8 | 0.72 | 128 | 0.04 |
| 14920034 | 18-1 | 24 | -20 | -20 | 36 | 7.95 | 0.3 | 1.07 | 3.12 | 2.03 | 166 | 39 | 20 | 30 | 88 | -5 | 22 | 0.39 | 132 | 0.024 |
| 14920035 | 18-2 | 46 | -20 | -20 | 46 | 7.73 | 0.56 | 1.06 | 2.57 | 1.93 | 153 | 29 | 15 | 31 | 70 | -5 | 17 | 0.4 | 107 | 0.027 |
| 14920036 | 19-1 | 123 | -20 | 38 | 98 | 7.16 | 1.39 | 3.09 | 2.64 | 1.34 | 328 | 56 | -10 | 25 | 314 | 14 | 31 | 4.29 | 225 | 0.031 |
| 14920037 | 19-2 | 91 | -20 | -20 | 61 | 7.48 | 1.09 | 2.46 | 2.75 | 1.24 | 317 | 69 | 10 | 24 | 258 | 10 | 26 | 2.41 | 179 | 0.032 |
| 14920038 | 19-3 | 135 | -20 | -20 | 78 | 7.59 | 1.71 | 2.98 | 2.31 | 1.02 | 322 | 42 | -10 | 36 | 146 | 14 | 11 | 1.88 | 104 | 0.069 |
| 14920045 | 19-4 | 58 | -20 | -20 | 41 | 6.7 | 0.68 | 1.53 | 2.81 | 1.87 | 214 | 34 | 15 | 28 | 131 | 6 | 28 | 0.91 | 133 | 0.028 |
| 14920046 | 19-5 | 75 | -20 | -20 | 48 | 8.04 | 1.13 | 2.24 | 2.92 | 1.92 | 382 | 32 | 13 | 30 | 69 | 9 | 17 | 0.74 | 42 | 0.033 |
| 14920047 | 19-6 | 136 | -20 | 33 | 79 | 7.13 | 1.37 | 2.6 | 2.54 | 1.67 | 326 | 52 | -10 | 27 | 281 | 13 | 46 | 3.18 | 142 | 0.041 |
| 14920048 | 19-7 | 29 | -20 | -20 | 43 | 7.58 | 0.31 | 1.08 | 3.03 | 2.67 | 185 | 45 | 17 | 19 | 111 | -5 | 18 | 0.53 | 158 | 0.013 |
| 14920049 | 20-1 | 14 | -20 | -20 | 36 | 7.51 | 0.19 | 1.06 | 3.28 | 2.24 | 126 | 68 | 22 | 21 | 290 | -5 | 38 | 0.93 | 292 | 0.013 |

# Egil Lievgard Statistics

| Sample ID | Ag | Cu | Pb | Zn | Mo | Ni | Co | Cd | Bi | As | Sb | Fe Tot | Mn | Te | Ba |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14920050 21-1 | -0.5 | 6 | 7 | 69 | 9 | 4 | 7 | -1 | -5 | 33 | -5 | 2.87 | 404 | -25 | 526 |
| 14920051 21-2 | -0.5 | 6 | 9 | 79 | 4 | 5 | 9 | -1 | -5 | 26 | -5 | 3.95 | 598 | -25 | 520 |
| 14920052 21-3 | -0.5 | 5 | 5 | 62 | 8 | 3 | 7 | -1 | -5 | 36 | -5 | 2.12 | 491 | -25 | 497 |
| 14920053 21-4 | -0.5 | 15 | 6 | 83 | 7 | 5 | 8 | -1 | -5 | 48 | -5 | 2.89 | 720 | -25 | 306 |
| 14920054 21-5 | -0.5 | 5 | -2 | 74 | 6 | 8 | 23 | -1 | -5 | 13 | -5 | 3.94 | 980 | -25 | 553 |
| 14920055 23-1 | -0.5 | 12 | 42 | 226 | 20 | 4 | 7 | -1 | -5 | 6 | -5 | 2.74 | 685 | -25 | 107 |
| 14920056 24-1 | -0.5 | 8 | 20 | 162 | 14 | 3 | 5 | -1 | -5 | 10 | -5 | 2.08 | 341 | -25 | 106 |
| 14920057 24-2 | -0.5 | 57 | 136 | 880 | 58 | 14 | 11 | 3.1 | -5 | 16 | -5 | 4.05 | 3617 | -25 | 202 |
| 14920058 24-3 | -0.5 | 16 | 47 | 666 | 17 | 7 | 9 | -1 | -5 | 11 | -5 | 3.98 | 1164 | -25 | 147 |
| 14920059 24-4 | -0.5 | 9 | 40 | 464 | 11 | 3 | 8 | 2.1 | -5 | 10 | -5 | 4.08 | 1626 | -25 | 129 |
| 14920060 25-1 | -0.5 | 17 | 3 | 375 | 15 | 38 | 26 | -1 | -5 | 15 | -5 | 6.49 | 2095 | -25 | 259 |
| 14920061 25-2 | -0.5 | 10 | 4 | 366 | 39 | 25 | 17 | -1 | -5 | 18 | -5 | 6.55 | 2152 | -25 | 260 |
| 14920062 25-3 | -0.5 | 8 | -2 | 231 | 77 | 30 | 28 | -1 | -5 | 15 | -5 | 6.54 | 2235 | -25 | 307 |
| 14920063 26-1 | -0.5 | 6 | 14 | 265 | 16 | 16 | 13 | -1 | -5 | 13 | -5 | 3.5 | 851 | -25 | 161 |
| 14920066 26-2 | -0.5 | 18 | 8 | 256 | 16 | 14 | 9 | 1 | -5 | 15 | -5 | 2.95 | 644 | -25 | 196 |
| 14920067 26-3 | -0.5 | 29 | 32 | 543 | 6 | 30 | 15 | 1.4 | -5 | 12 | -5 | 4.72 | 910 | -25 | 347 |
| 14920068 28-1 | -0.5 | 19 | 22 | 434 | 9 | 10 | 8 | 1.2 | -5 | 28 | -5 | 3.28 | 631 | -25 | 162 |
| 14920069 28-2 | -0.5 | 12 | 23 | 357 | 8 | 8 | 8 | -1 | -5 | 30 | -5 | 3.14 | 643 | -25 | 143 |
| 14920070 28-3 | -0.5 | 22 | 28 | 1109 | 29 | 16 | 16 | 2.3 | -5 | 24 | -5 | 6.53 | 1411 | -25 | 248 |
| 14920071 30-1 | -0.5 | 17 | 8 | 756 | 11 | 40 | 18 | -1 | -5 | 11 | -5 | 6.68 | 1103 | -25 | 261 |
| 14920072 30-2 | -0.5 | 12 | 7 | 182 | 46 | 8 | 12 | -1 | -5 | 36 | -5 | 3.97 | 1292 | -25 | 216 |
| Statistics | | | | | | | | | | | | | | | |
| Mean | 0.035 | 6 | 12 | 151 | 8 | 8 | 8 | 1 | 0 | 18 | 0 | 1.52 | 555 | 0 | 148 |
| Median | -0.5 | 10 | 6 | 167 | 10 | 8 | 15 | -1 | -5 | 16 | -5 | 4.36 | 1134 | -25 | 293 |
| Max | 0.6 | 57 | 136 | 1109 | 77 | 45 | 73 | 3 | -5 | 244 | -5 | 9.52 | 3617 | -25 | 713 |
| Min | -0.5 | -1 | -2 | 43 | 2 | -1 | 5 | -1 | -5 | -5 | -5 | 1.54 | 328 | -25 | 106 |
| 90%ile | -0.5 | 22 | 31 | 467 | 29 | 30 | 32 | 1 | -5 | 47 | -5 | 6.81 | 2191 | -25 | 567 |
| 95%ile | -0.5 | 25 | 40 | 752 | 39 | 38 | 42 | 1 | -5 | 53 | -5 | 8.02 | 2358 | -25 | 613 |
| 98%il | -0.5 | 32 | 46 | 863 | 55 | 41 | 54 | 2 | -5 | 112 | -5 | 9.17 | 3063 | -25 | 659 |

| Sample ID | Cr | V | Sn | W | La | Al | Mg | Ca | Na | K | Sr | Y | Ga | Li | Nb | Sc | Ta | Ti | Zr | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14920050 21-1 | 7 | 35 | -20 | -20 | 86 | 7.33 | 0.22 | 0.77 | 2.63 | 2.08 | 118 | 104 | 18 | 37 | 231 | -5 | 36 | 0.32 | 170 | 0.023 |
| 14920051 21-2 | 7 | 48 | -20 | -20 | 72 | 7.76 | 0.3 | 0.89 | 3.01 | 2.09 | 129 | 66 | 19 | 46 | 149 | -5 | 29 | 0.39 | 209 | 0.018 |
| 14920052 21-3 | 6 | 27 | -20 | -20 | 39 | 7.41 | 0.24 | 0.92 | 2.77 | 1.75 | 116 | 60 | 20 | 41 | 107 | -5 | 30 | 0.28 | 121 | 0.025 |
| 14920053 21-4 | 8 | 30 | -20 | -20 | 68 | 7.4 | 0.37 | 0.79 | 2.98 | 2.21 | 92 | 101 | 25 | 91 | 215 | -5 | 35 | 0.32 | 237 | 0.021 |
| 14920054 21-5 | 22 | 69 | -20 | -20 | 61 | 7.18 | 0.84 | 1.92 | 2.71 | 2.38 | 281 | 45 | 11 | 27 | 110 | 8 | 29 | 1.12 | 104 | 0.034 |
| 14920055 23-1 | 15 | 22 | -20 | -20 | 71 | 5.9 | 0.13 | 0.19 | 2.56 | 1.59 | 29 | 58 | 26 | 13 | 226 | -5 | 21 | 0.36 | 177 | 0.02 |
| 14920056 24-1 | 8 | 15 | -20 | -20 | 59 | 5.98 | 0.08 | 0.13 | 2.25 | 1.37 | 22 | 44 | 28 | 9 | 144 | -5 | 20 | 0.27 | 119 | 0.066 |
| 14920057 24-2 | 20 | 36 | -20 | -20 | 137 | 7.96 | 0.31 | 0.25 | 2.6 | 1.58 | 56 | 126 | 27 | 20 | 191 | -5 | 26 | 0.29 | 127 | 0.054 |
| 14920058 24-3 | 14 | 24 | -20 | -20 | 152 | 7.29 | 0.23 | 0.35 | 2.38 | 1.6 | 42 | 135 | 23 | 23 | 327 | -5 | 42 | 0.37 | 84 | 0.115 |
| 14920059 24-4 | 5 | 27 | -20 | -20 | 183 | 7.62 | 0.16 | 0.19 | 3.6 | 2.08 | 45 | 136 | 42 | 20 | 277 | -5 | 26 | 0.36 | 354 | 0.01 |
| 14920060 25-1 | 47 | 99 | -20 | -20 | 114 | 8.05 | 1.12 | 1.3 | 1.84 | 1.06 | 105 | 84 | 12 | 67 | 205 | 10 | 15 | 0.97 | 125 | 0.078 |
| 14920061 25-2 | 60 | 63 | -20 | -20 | 222 | 8 | 0.51 | 0.71 | 1.76 | 1.25 | 79 | 151 | 19 | 67 | 237 | 6 | 26 | 0.58 | 164 | 0.099 |
| 14920062 25-3 | 75 | 104 | -20 | -20 | 210 | 7.99 | 0.91 | 1.1 | 2 | 1.74 | 121 | 116 | 16 | 52 | 185 | 10 | 28 | 0.88 | 128 | 0.114 |
| 14920063 26-1 | 33 | 47 | -20 | 41 | 91 | 6.56 | 0.43 | 0.57 | 2.54 | 2.62 | 52 | 69 | 22 | 18 | 210 | -5 | 22 | 0.66 | 189 | 0.021 |
| 14920066 26-2 | 42 | 38 | -20 | -20 | 84 | 6.42 | 0.33 | 0.56 | 2.11 | 1.73 | 61 | 56 | 20 | 35 | 143 | -5 | 19 | 0.46 | 133 | 0.049 |
| 14920067 26-3 | 63 | 86 | -20 | -20 | 124 | 7.08 | 0.61 | 0.58 | 2.12 | 2.33 | 86 | 96 | 22 | 27 | 231 | 8 | 9 | 0.57 | 399 | 0.032 |
| 14920068 28-1 | 19 | 30 | -20 | -20 | 110 | 6.58 | 0.23 | 0.34 | 2.34 | 1.52 | 45 | 93 | 23 | 17 | 206 | -5 | 17 | 0.41 | 141 | 0.034 |
| 14920069 28-2 | 15 | 25 | -20 | -20 | 99 | 6.74 | 0.19 | 0.26 | 2.46 | 1.56 | 34 | 64 | 27 | 16 | 193 | -5 | 21 | 0.39 | 117 | 0.027 |
| 14920070 28-3 | 35 | 59 | 23 | -20 | 263 | 7.44 | 0.54 | 0.7 | 2.14 | 2.09 | 72 | 229 | 23 | 38 | 441 | 7 | 63 | 0.75 | 201 | 0.061 |
| 14920071 30-1 | 42 | 72 | -20 | -20 | 203 | 8.01 | 0.73 | 0.56 | 2 | 1.73 | 64 | 119 | 23 | 28 | 240 | 7 | 21 | 0.6 | 171 | 0.054 |
| 14920072 30-2 | 26 | 45 | -20 | -20 | 81 | 6.45 | 0.3 | 0.62 | 2.08 | 1.72 | 71 | 67 | 20 | 24 | 181 | 6 | 24 | 0.55 | 148 | 0.163 |
| Statistics | | | | | | | | | | | | | | | | | | | | |
| Mean | 16 | 25 | 3 | 10 | 40 | 0.58 | 0.31 | 0.53 | 0.35 | 0.34 | 62 | 44 | 6 | 13 | 78 | 6 | 13 | 0.42 | 73 | 0.023 |
| Median | 15 | 45 | -20 | -20 | 90 | 7.33 | 0.46 | 0.99 | 2.58 | 1.88 | 92 | 65 | 20 | 31 | 204 | 6 | 26 | 0.64 | 160 | 0.030 |
| Max | 85 | 136 | 26 | 101 | 330 | 9.17 | 1.71 | 3.09 | 4.22 | 2.86 | 382 | 320 | 42 | 91 | 597 | 14 | 147 | 4.29 | 578 | 0.163 |
| Min | -2 | 14 | -20 | -20 | 36 | 5.77 | 0.08 | 0.13 | 1.66 | 1.02 | 22 | 29 | -10 | 9 | 69 | -5 | 8 | 0.27 | 42 | 0.009 |
| 90%ile | 60 | 104 | -20 | -20 | 181 | 8.19 | 1.15 | 2.14 | 3.06 | 2.33 | 275 | 150 | 26 | 63 | 338 | 11 | 51 | 1.24 | 330 | 0.078 |
| 95%ile | 73 | 111 | -20 | 33 | 210 | 8.50 | 1.40 | 2.46 | 3.27 | 2.45 | 322 | 225 | 27 | 71 | 439 | 12 | 63 | 1.87 | 376 | 0.103 |
| 98%il | 77 | 132 | 14 | 40 | 254 | 8.96 | 1.53 | 2.90 | 3.56 | 2.66 | 328 | 261 | 28 | 82 | 537 | 14 | 86 | 3.01 | 437 | 0.115 |

# APPENDIX # 2

| | |
|---|---|
| ROCK SAMPLE ANALYSIS | |
| WOLE ROCK ANALYSIS | EIGHT PAGES |

BONDAR CLEGG

# Geochemical Lab Report

REPORT: V01-01483.0 ( COMPLETE )

REFERENCE:

CLIENT: MR. EGIL LIVGARD

PROJECT: NONE GIVEN

SUBMITTED BY: E. LIVGARD

DATE RECEIVED: 09-AUG-01 DATE PRINTED: 12-OCT-01

| SAMPLE TYPES | NUMBER | SIZE FRACTIONS | NUMBER | SAMPLE PREPARATIONS | NUMBER |
|---|---|---|---|---|---|
| R ROCK | 29 | 2 -150 | 29 | CRUSH/SPLIT & PULV. | 29 |

REMARKS: Due to digestion limitations based upon sample mineralization, IC30 results for Al, Ba and Cr may vary.
Please note that this is a Correction Certificate and that all results contained herein are to supersede any and all previously reported. Results for 97981 & 97997 were added.
RRD 09/28/01

REPORT COPIES TO: 1990 KING ALBERT AVE. INVOICE TO: 1990 KING ALBERT AVE.

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*****************************************************************************

# Geochemical Lab Report

BONDAR CLEGG

REPORT: V01-01483.0 ( COMPLETE ) REFERENCE:

CLIENT: MR. EGIL LIVGARD
PROJECT: NONE GIVEN

SUBMITTED BY: E. LIVGARD
DATE RECEIVED: 09-AUG-01 DATE PRINTED: 12-OCT-01

| DATE APPROVED | ELEMENT | | NUMBER OF ANALYSES | LOWER DETECTION | EXTRACTION | METHOD |
|---|---|---|---|---|---|---|
| 010822 | 1 PT | Pt - FA36 | 2 | 5 PPB | FIRE ASSAY | FIRE ASSAY-ICP |
| 010822 | 2 Ag | Ag - IC30 | 29 | 0.5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 3 Cu | Cu - IC30 | 29 | 1 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 4 Pb | Pb - IC30 | 29 | 2 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 5 Zn | Zn - IC30 | 29 | 2 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 6 Mo | Mo - IC30 | 29 | 1 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 7 Ni | Ni - IC30 | 29 | 1 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 8 Co | Co - IC30 | 29 | 1 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 9 Cd | Cd - IC30 | 29 | 1.0 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 10 Bi | Bi - IC30 | 29 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 11 As | As - IC30 | 29 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 12 Sb | Sb - IC30 | 29 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 13 Fe Tot | Fe - IC30 | 29 | 0.01 PCT | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 14 Mn | Mn - IC30 | 29 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 15 Te | Te - IC30 | 29 | 25 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 16 Ba | Ba - IC30 | 29 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 17 Cr | Cr - IC30 | 29 | 2 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 18 V | V - IC30 | 29 | 2 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 19 Sn | Sn - IC30 | 29 | 20 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 20 W | W - IC30 | 29 | 20 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 21 La | La - IC30 | 29 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 22 Al | Al - IC30 | 29 | 0.01 PCT | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 23 Mg | Mg - IC30 | 29 | 0.01 PCT | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 24 Ca | Ca - IC30 | 29 | 0.01 PCT | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 25 Na | Na - IC30 | 29 | 0.01 PCT | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 26 K | K - IC30 | 29 | 0.01 PCT | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 27 Sr | Sr - IC30 | 29 | 1 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 28 Y | Y - IC30 | 29 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 29 Ga | Ga - IC30 | 29 | 10 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 30 Li | Li - IC30 | 29 | 2 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 31 Nb | Nb - IC30 | 29 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 32 Sc | Sc - IC30 | 29 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 33 Ta | Ta - IC30 | 29 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 34 Ti | Ti - IC30 | 29 | 0.01 PCT | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 35 Zr | Zr - IC30 | 29 | 5 PPM | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 36 S | S - IC30 | 29 | 0.002 PCT | HF-HNO3-HCLO4-HCL | INDUC. COUP. PLASMA |
| 010822 | 37 SiO2 | SiO2 - XR80 | 2 | 0.01 PCT | BORATE FUSION | XRAY FLUORESCENCE |
| 010822 | 38 TiO2 | TiO2 - XR80 | 2 | 0.01 PCT | BORATE FUSION | XRAY FLUORESCENCE |
| 010822 | 39 Al2O3 | Al2O3 - XR80 | 2 | 0.01 PCT | BORATE FUSION | XRAY FLUORESCENCE |
| 010822 | 40 Fe2O3 | Fe2O3 - XR80 | 2 | 0.01 PCT | BORATE FUSION | XRAY FLUORESCENCE |
| 010822 | 41 MnO | MnO - XR80 | 2 | 0.01 PCT | BORATE FUSION | XRAY FLUORESCENCE |
| 010822 | 42 MgO | MgO - XR80 | 2 | 0.01 PCT | BORATE FUSION | XRAY FLUORESCENCE |
| 010822 | 43 CaO | CaO - XR80 | 2 | 0.01 PCT | BORATE FUSION | XRAY FLUORESCENCE |
| 010822 | 44 Na2O | Na2O - XR80 | 2 | 0.01 PCT | BORATE FUSION | XRAY FLUORESCENCE |
| 010822 | 45 K2O | K2O - XR80 | 2 | 0.01 PCT | BORATE FUSION | XRAY FLUORESCENCE |
| 010822 | 46 P2O5 | P2O5 - XR80 | 2 | 0.01 PCT | BORATE FUSION | XRAY FLUORESCENCE |
| 010822 | 47 LOI | LOI - XR80 | 2 | -2.00 PCT | Ignition 1000 Deg. | GRAVIMETRIC |
| 010822 | 48 Total | Whole Rock Tot.-XR80 | 2 | 0.01 PCT | | |
| 010822 | 49 Cr2O3 | Cr2O3 - XR80 | 2 | 0.01 PCT | BORATE FUSION | XRAY FLUORESCENCE |
| 010822 | 50 Rb | Rb - XR80A | 2 | 5 PPM | BORATE FUSION | XRAY FLUORESCENCE |
| 010822 | 51 Hf | Hf-NA03Subcontractor | 2 | 2 PPM | NOT APPLICABLE | NEUTRON ACTIVATION |
| 010822 | 52 Th | Th-NA03Subcontractor | 2 | 0.5 PPM | NOT APPLICABLE | NEUTRON ACTIVATION |

BONDAR CLEGG

# Geochemical Lab Report

CLIENT: MR. EGIL LIVGARD
PROJECT: NONE GIVEN
REPORT: V01-01483.0 ( COMPLETE )
DATE RECEIVED: 09-AUG-01
DATE PRINTED: 12-OCT-01


| SAMPLE NUMBER | ELEMENT UNITS | PT PPB | Ag PPM | Cu PPM | Pb PPM | Zn PPM | Mo PPM | Ni PPM | Co PPM | Cd PPM | Bi PPM | As PPM | Sb PPM | Fe Tot PCT | Mn PPM | Te PPM | Ba PPM | Cr PPM | V PPM | Sn PPM | W PPM | La PPM | Al PCT | Mg PCT | Ca PCT | Na PCT | K PCT | Sr PPM | Y PPM | Ga PPM | Li PPM | Nb PPM | Sc PPM | Ta PPM | Ti PCT | Zr PPM | S PCT | SiO2 PCT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 65901 | | | <.5 | 87 | 19 | 76 | 2 | 29 | 18 | 1.1 | <5 | 109 | <5 | 4.63 | 561 | <25 | 1109 | 98 | 201 | <20 | <20 | 13 | 9.61 | 1.65 | 4.12 | 3.15 | 2.46 | 815 | 16 | 25 | 43 | 22 | 15 | <5 | 0.43 | 12 | 0.790 | |
| 97973 | | | <.5 | 29 | 14 | 42 | 8 | 4 | 3 | <1.0 | <5 | 22 | <5 | 2.07 | 215 | <25 | 304 | 106 | 17 | <20 | <20 | 32 | 6.42 | 0.16 | 0.13 | 1.15 | 2.43 | 50 | 11 | 18 | 30 | 43 | <5 | <5 | 0.20 | 48 | 0.013 | |
| 97974 | | | <.5 | 12 | 11 | 30 | <1 | 5 | 6 | 4.4 | <5 | 13 | <5 | 1.98 | 366 | <25 | 462 | 149 | 10 | <20 | <20 | 24 | 7.30 | 0.09 | 0.44 | 2.64 | 2.92 | 78 | 14 | 13 | 18 | 41 | <5 | 12 | 0.20 | 46 | <.002 | |
| 97975 | | | <.5 | 5 | 2 | 28 | 4 | 4 | 7 | <1.0 | <5 | 6 | <5 | 1.64 | 257 | <25 | 547 | 107 | 16 | <20 | <20 | 28 | 8.13 | 0.06 | 0.14 | 2.57 | 3.50 | 90 | 13 | 18 | 11 | 44 | <5 | <5 | 0.20 | 54 | 0.014 | |
| 97976 | | | <.5 | 7 | 14 | 472 | 4 | 4 | 1 | 2.7 | <5 | 29 | <5 | 4.41 | 1785 | <25 | 17 | 35 | 2 | <20 | <20 | 484 | 9.36 | 0.08 | 0.23 | 5.07 | 3.07 | 5 | 58 | 32 | 7 | 266 | <5 | <5 | 0.40 | 91 | <.002 | |
| 97977 | | | <.5 | 3 | 10 | 80 | 6 | 4 | <1 | 1.4 | <5 | 20 | <5 | 1.62 | 728 | <25 | 24 | 39 | <2 | <20 | <20 | 53 | >10.00 | 0.04 | 0.21 | 5.18 | 3.33 | 13 | 15 | 28 | 10 | 91 | <5 | <5 | 0.16 | 67 | <.002 | |
| 97978 | | | <.5 | 3 | 12 | 118 | <1 | 3 | 2 | 1.2 | <5 | <5 | <5 | 2.82 | 1263 | <25 | 23 | 33 | <2 | <20 | <20 | 129 | 8.73 | 0.05 | 0.49 | 4.47 | 3.21 | 23 | 53 | 29 | 13 | 310 | <5 | 35 | 0.26 | 156 | <.002 | |
| 97979 | | | <.5 | 3 | 5 | 267 | 8 | 5 | <1 | 1.4 | <5 | 24 | <5 | 4.13 | 1833 | <25 | 23 | 79 | 2 | <20 | <20 | 340 | 5.52 | 0.01 | 0.09 | 2.50 | 3.08 | 21 | 91 | 31 | 7 | 302 | <5 | 54 | 0.31 | 88 | <.002 | |
| 97980 | | | <.5 | 35 | 48 | 4095 | 6 | 3 | 1 | 14.0 | <5 | 11 | <5 | 4.14 | 741 | <25 | 85 | 73 | <2 | 34 | <20 | 17 | 7.11 | 0.04 | 0.16 | 3.79 | 2.75 | 35 | 15 | 31 | 8 | 67 | <5 | 7 | 0.15 | 38 | 1.388 | |
| 97981 | | | <.5 | 3 | 11 | 87 | 1 | 2 | 1 | <1.0 | <5 | <5 | <5 | 2.11 | 395 | <25 | 134 | 85 | 7 | <20 | <20 | 59 | 7.04 | 0.10 | 0.23 | 3.49 | 2.82 | 23 | 70 | 25 | 28 | 199 | <5 | 11 | 0.15 | 28 | 0.002 | 73.68 |
| 97982 | | | <.5 | 9 | 23 | 98 | 18 | 3 | <1 | 1.2 | <5 | 17 | <5 | 1.64 | 206 | <25 | 71 | 144 | <2 | <20 | <20 | 125 | 6.66 | 0.01 | 0.12 | 2.94 | 2.78 | 19 | 31 | 26 | 3 | 134 | <5 | <5 | 0.14 | 68 | 0.077 | |
| 97983 | | | 1.3 | 41 | 435 | 610 | 10 | <1 | <1 | 3.4 | <5 | 37 | <5 | 1.90 | 15 | <25 | 41 | 39 | 2 | <20 | 22 | 78 | 8.39 | <.01 | 0.28 | 5.99 | 1.72 | 17 | 31 | 30 | <2 | 154 | <5 | 30 | 0.13 | 92 | 0.067 | |
| 97985 | | | <.5 | 37 | 9 | 139 | 19 | <1 | <1 | 1.1 | <5 | 34 | <5 | 2.42 | 408 | <25 | 18 | 121 | <2 | <20 | <20 | 126 | 4.30 | <.01 | 0.09 | 1.78 | 2.60 | 5 | 18 | 24 | 5 | 77 | <5 | 10 | 0.14 | 47 | 0.019 | |
| 97986 | | | <.5 | 2 | <2 | 42 | 4 | <1 | <1 | 1.2 | <5 | 37 | <5 | 0.93 | 38 | 30 | 24 | 118 | <2 | <20 | <20 | 83 | 6.20 | 0.03 | 0.01 | 2.47 | 2.65 | 3 | 11 | 34 | 3 | 34 | <5 | 9 | 0.09 | 52 | <.002 | |
| 97987 | | | <.5 | 42 | 16 | 2361 | 2 | 5 | 4 | 1.7 | 75 | 87 | <5 | 3.87 | 692 | <25 | 14 | 117 | <2 | 41 | 22 | 287 | 2.62 | <.01 | 0.10 | 0.34 | 2.49 | 15 | 492 | 23 | 7 | 1957 | <5 | 281 | 0.09 | 490 | 0.017 | |
| 97988 | | | <.5 | 46 | 47 | 760 | 18 | 32 | 23 | 3.6 | <5 | 38 | <5 | 6.37 | 2289 | 26 | 91 | 57 | 116 | <20 | <20 | 324 | 7.40 | 1.34 | 3.10 | 5.30 | 1.33 | 156 | 219 | 27 | 513 | 167 | 13 | 25 | 1.13 | 115 | 1.430 | |
| 97989 | | | <.5 | 7 | 2 | 39 | 12 | 3 | 2 | <1.0 | <5 | 19 | <5 | 2.90 | 75 | <25 | 69 | 71 | 5 | 21 | <20 | 25 | 6.37 | 0.01 | 0.03 | 2.59 | 2.96 | 10 | 22 | 32 | 15 | 219 | <5 | 34 | 0.18 | 51 | 0.394 | |
| 97990 | | | <.5 | 7 | 12 | 140 | 25 | <1 | 1 | <1.0 | <5 | 10 | <5 | 2.31 | 57 | <25 | 48 | 97 | 2 | <20 | <20 | 16 | 6.26 | <.01 | 0.03 | 2.78 | 2.89 | 7 | 27 | 33 | 4 | 178 | <5 | 18 | 0.17 | 35 | 1.086 | |
| 97991 | | | <.5 | 9 | 148 | 925 | 136 | 3 | 3 | 5.1 | <5 | 7 | <5 | 5.31 | 14 | <25 | 108 | 13 | 9 | <20 | 32 | 10 | 9.02 | <.01 | 0.02 | 1.96 | 3.07 | 19 | 15 | 37 | 4 | 194 | <5 | 6 | 0.24 | 27 | 0.102 | |
| 97992 | | | <.5 | 54 | 69 | 1197 | 10 | 5 | 10 | 4.3 | <5 | <5 | 20 | 7.50 | 183 | <25 | 102 | 98 | 3 | <20 | <20 | 16 | 6.65 | 0.02 | 0.15 | 4.53 | 1.71 | 16 | 16 | 31 | 10 | 116 | <5 | 10 | 0.15 | 50 | 1.424 | |
| 97993 | | | <.5 | 84 | 294 | 1618 | <1 | 1 | 7 | 12.9 | <5 | 18 | 31 | 5.73 | >20000 | <25 | >2000 | 33 | 4 | 21 | <20 | 57 | 7.90 | <.01 | 0.03 | 4.70 | 1.09 | 86 | 25 | 36 | 9 | 111 | <5 | 20 | 0.26 | 96 | 0.167 | |
| 97994 | | | <.5 | 3 | 45 | 203 | <1 | 3 | <1 | 2.6 | <5 | 8 | <5 | 1.05 | 1464 | 35 | 91 | 88 | 4 | <20 | <20 | 105 | 7.23 | 0.01 | 0.80 | 5.54 | 0.92 | 144 | 31 | 30 | 6 | 107 | <5 | 21 | 0.13 | 62 | 0.006 | |
| 97995 | | | <.5 | 26 | 141 | 924 | <1 | 3 | 8 | 3.7 | <5 | <5 | <5 | 7.61 | 4325 | <25 | 29 | 83 | <2 | <20 | <20 | 200 | 6.30 | <.01 | 0.13 | 5.18 | 0.24 | 57 | 25 | 30 | 6 | 97 | <5 | 19 | 0.13 | 66 | 0.030 | |
| 97996 | | | <.5 | 19 | 30 | 64 | 17 | 3 | <1 | <1.0 | <5 | 21 | <5 | 3.03 | 63 | <25 | 53 | 81 | 3 | 22 | <20 | <5 | 7.32 | <.01 | 0.02 | 4.69 | 2.20 | 17 | 6 | 33 | <2 | 89 | <5 | 15 | 0.16 | 15 | 0.104 | |
| 97997 | | | <.5 | 2 | 4 | 81 | <1 | <1 | 1 | <1.0 | <5 | <5 | <5 | 2.07 | 465 | <25 | 17 | 97 | <2 | <20 | <20 | 47 | 6.26 | <.01 | 0.05 | 2.99 | 3.13 | 7 | 12 | 36 | 5 | 70 | <5 | 13 | 0.15 | 47 | <.002 | 75.75 |
| 97998 | | | <.5 | 4 | 6 | 98 | 5 | 5 | <1 | <1.0 | <5 | 7 | <5 | 3.68 | 113 | 28 | 15 | 89 | 3 | <20 | <20 | 91 | 6.25 | 0.02 | 0.14 | 2.81 | 2.61 | 10 | 24 | 39 | 12 | 78 | <5 | 15 | 0.18 | 122 | <.002 | |
| 110572 | | | <.5 | 6 | 5 | 56 | 9 | 4 | <1 | 2.8 | <5 | 12 | <5 | 1.31 | 92 | <25 | 113 | 110 | <2 | <20 | <20 | 28 | 7.26 | 0.04 | 0.09 | 2.89 | 2.86 | 15 | 20 | 25 | 4 | 106 | <5 | 12 | 0.11 | 80 | <.002 | |
| 110573 | | <5 | <.5 | 15 | <2 | 620 | 34 | 14 | 50 | 1.9 | <5 | 10 | <5 | >10.00 | 8454 | <25 | 30 | 25 | 21 | <20 | <20 | 60 | 3.22 | 0.51 | 1.07 | 1.92 | 1.17 | 23 | 200 | 11 | 27 | 260 | 6 | 76 | 0.33 | 23 | 0.018 | |
| 110574 | | <5 | <.5 | 3 | 4 | 232 | <1 | 2 | <1 | 1.1 | <5 | 6 | <5 | 3.69 | 857 | <25 | 7 | 104 | <2 | <20 | <20 | 134 | 5.63 | <.01 | 0.19 | 3.45 | 3.03 | 6 | 79 | 34 | 48 | 207 | <5 | 37 | 0.19 | 491 | <.002 | |

BONDAR CLEGG

# Geochemical Lab Report

CLIENT: MR. EGIL LIVGARD
PROJECT: NONE GIVEN
REPORT: V01-01483.0 ( COMPLETE )
DATE RECEIVED: 09-AUG-01
DATE PRINTED: 31-AUG-01


| SAMPLE NUMBER | ELEMENT UNITS | TiO2 PCT | Al2O3 PCT | Fe2O3 PCT | MnO PCT | MgO PCT | CaO PCT | Na2O PCT | K2O PCT | P2O5 PCT | LOI PCT | Total PCT | Cr2O3 PCT | Rb PPM | Hf PPM | Th PPM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 65901 | | | | | | | | | | | | | | | | |
| 97973 | | | | | | | | | | | | | | | | |
| 97974 | | | | | | | | | | | | | | | | |
| 97975 | | | | | | | | | | | | | | | | |
| 97976 | | | | | | | | | | | | | | | | |
| 97977 | | | | | | | | | | | | | | | | |
| 97978 | | | | | | | | | | | | | | | | |
| 97979 | | | | | | | | | | | | | | | | |
| 97980 | | | | | | | | | | | | | | | | |
| 97981 | | 0.24 | 12.44 | 2.59 | 0.05 | 0.19 | 0.30 | 4.41 | 4.83 | 0.04 | 0.42 | 99.21 | 0.01 | 252 | 18 | 26.0 |
| 97982 | | | | | | | | | | | | | | | | |
| 97983 | | | | | | | | | | | | | | | | |
| 97985 | | | | | | | | | | | | | | | | |
| 97986 | | | | | | | | | | | | | | | | |
| 97987 | | | | | | | | | | | | | | | | |
| 97988 | | | | | | | | | | | | | | | | |
| 97989 | | | | | | | | | | | | | | | | |
| 97990 | | | | | | | | | | | | | | | | |
| 97991 | | | | | | | | | | | | | | | | |
| 97992 | | | | | | | | | | | | | | | | |
| 97993 | | | | | | | | | | | | | | | | |
| 97994 | | | | | | | | | | | | | | | | |
| 97995 | | | | | | | | | | | | | | | | |
| 97996 | | | | | | | | | | | | | | | | |
| 97997 | | 0.22 | 11.60 | 2.63 | 0.06 | 0.03 | 0.06 | 4.03 | 4.69 | 0.01 | 0.44 | 99.52 | 0.02 | 191 | 7 | 8.4 |
| 97998 | | | | | | | | | | | | | | | | |
| 110572 | | | | | | | | | | | | | | | | |
| 110573 | | | | | | | | | | | | | | | | |
| 110574 | | | | | | | | | | | | | | | | |

BONDAR CLEGG

# Geochemical Lab Report

CLIENT: MR. EGIL LIVGARD | PROJECT: NONE GIVEN

REPORT: V01-01483.0 ( COMPLETE ) | DATE RECEIVED: 09-AUG-01 | DATE PRINTED: 12-OCT-01 | PAGE 2A( 3/ 6)

| STANDARD NAME | ELEMENT UNITS | PT PPB | Ag PPM | Cu PPM | Pb PPM | Zn PPM | Mo PPM | Ni PPM | Co PPM | Cd PPM | Bi PPM | As PPM | Sb PPM | Fe Tot PCT | Mn PPM | Te PPM | Ba PPM | Cr PPM | V PPM | Sn PPM | W PPM | La PPM | Al PCT | Mg PCT | Ca PCT | Na PCT | K PCT | Sr PPM | Y PPM | Ga PPM | Li PPM | Nb PPM | Sc PPM | Ta PPM | Ti PCT | Zr PPM | S PCT | SiO2 PCT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CANMET STSD-4 | | - | <.5 | 74 | 15 | 109 | 3 | 35 | 15 | <1.0 | <5 | 25 | <5 | 4.15 | 1591 | <25 | 1742 | 74 | 98 | <20 | <20 | 18 | 6.46 | 1.22 | 2.73 | 2.10 | 1.31 | 362 | 19 | 12 | 16 | 17 | 12 | <5 | 0.44 | 45 | 0.113 | - |
| Number of Analyses | | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | - |
| Mean Value | | - | 0.3 | 74 | 15 | 109 | 3 | 35 | 15 | 0.5 | 3 | 25 | 3 | 4.15 | 1591 | 13 | 1742 | 74 | 98 | 10 | 10 | 18 | 6.46 | 1.22 | 2.73 | 2.10 | 1.31 | 362 | 19 | 12 | 16 | 17 | 12 | 3 | 0.44 | 45 | 0.113 | - |
| Standard Deviation | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Accepted Value | | - | 0.3 | 66 | 16 | 107 | 2 | 30 | 13 | 0.6 | - | 15 | 7 | 4.10 | 1520 | - | 2000 | 66 | 106 | 2 | - | 24 | 6.40 | 1.28 | 2.86 | 2.00 | 1.33 | 350 | 24 | - | 14 | 9 | 14 | <1 | 0.46 | 53 | 0.090 | - |
| ANALYTICAL BLANK | | - | <.5 | 3 | <2 | <2 | <1 | <1 | <1 | <1.0 | <5 | <5 | <5 | 0.03 | <5 | <25 | <5 | <2 | <2 | <20 | <20 | <5 | <0.01 | <.01 | <.01 | <.01 | <.01 | <1 | <5 | <10 | <2 | <5 | <5 | <5 | <.01 | <5 | <.002 | - |
| Number of Analyses | | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | - |
| Mean Value | | - | 0.3 | 3 | 1 | 1 | <1 | <1 | <1 | 0.5 | 3 | 3 | 3 | 0.03 | 3 | 13 | 3 | 1 | 1 | 10 | 10 | 3 | <0.01 | <.01 | <.01 | <.01 | <.01 | <1 | 3 | 5 | 1 | 3 | 3 | 3 | <.01 | 3 | 0.001 | - |
| Standard Deviation | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Accepted Value | | 5 | 0.2 | 1 | 2 | 1 | 1 | 1 | 1 | 0.5 | 2 | 5 | 5 | 0.05 | 1 | <1 | <1 | 1 | 1 | <1 | <1 | <1 | - | <.01 | <.01 | - | <.01 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <.01 | <1 | <.001 | <0.01 |
| CANMET SO-2 REF STD | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 51.91 |
| Number of Analyses | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| Mean Value | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 51.91 |
| Standard Deviation | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Accepted Value | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 51.70 |
| CANMET STSD-2 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 53.50 |
| Number of Analyses | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| Mean Value | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 53.50 |
| Standard Deviation | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Accepted Value | | - | 0.5 | 47 | 66 | 246 | 13 | 53 | 19 | 0.8 | - | 42 | 5 | 5.20 | 1060 | - | 540 | 81 | 101 | 5 | 7 | 59 | 8.50 | 1.88 | 2.86 | 1.28 | 1.76 | 400 | 37 | - | 65 | 20 | 16 | 2 | 0.47 | 62 | 0.060 | 53.70 |

BONDAR CLEGG

# Geochemical Lab Report

CLIENT: MR. EGIL LIVGARD

PROJECT: NONE GIVEN

REPORT: V01-01483.0 ( COMPLETE )

DATE RECEIVED: 09-AUG-01 DATE PRINTED: 12-OCT-01 

| STANDARD NAME | ELEMENT UNITS | TiO2 PCT | Al2O3 PCT | Fe2O3 PCT | MnO PCT | MgO PCT | CaO PCT | Na2O PCT | K2O PCT | P2O5 PCT | LOI PCT | Total PCT | Cr2O3 PCT | Rb PPM | Hf PPM | Th PPM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CANMET STSD-4 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Number of Analyses | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mean Value | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Standard Deviation | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Accepted Value | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ANALYTICAL BLANK | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Number of Analyses | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mean Value | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Standard Deviation | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Accepted Value | | <.01 | <0.01 | <0.01 | <.01 | <.01 | <.01 | <.01 | <.01 | <.01 | <0.01 | <0.01 | <0.01 | <1 | <1 | <0.1 |
| CANMET SO-2 REF STD | | 1.38 | 14.52 | 7.61 | 0.09 | 0.86 | 2.60 | 2.48 | 2.86 | 0.67 | 14.31 | 84.98 | <0.01 | 78 | - | - |
| Number of Analyses | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | - | - |
| Mean Value | | 1.38 | 14.52 | 7.61 | 0.09 | 0.86 | 2.60 | 2.48 | 2.86 | 0.67 | 14.31 | 84.98 | <0.01 | 78 | - | - |
| Standard Deviation | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Accepted Value | | 1.38 | 14.75 | 7.69 | 0.09 | 0.87 | 2.64 | 2.48 | 2.85 | 0.67 | 14.26 | - | <0.01 | 78 | - | - |
| CANMET STSD-2 | | 0.80 | 15.64 | 7.27 | 0.14 | 3.11 | 4.18 | 1.75 | 2.18 | 0.31 | 10.32 | 88.88 | 0.01 | 111 | - | - |
| Number of Analyses | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | - | - |
| Mean Value | | 0.80 | 15.64 | 7.27 | 0.14 | 3.11 | 4.18 | 1.75 | 2.18 | 0.31 | 10.32 | 88.88 | 0.01 | 111 | - | - |
| Standard Deviation | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Accepted Value | | 0.79 | 15.75 | 7.25 | 0.14 | 3.11 | 4.00 | 1.72 | 2.12 | 0.32 | 10.30 | - | 0.01 | 104 | - | - |

Geochemical Lab Report

BONDAR CLEGG

CLIENT: MR. EGIL LIVGARD
PROJECT: NONE GIVEN

REPORT: V01-01483.0 ( COMPLETE )
DATE RECEIVED: 09-AUG-01 DATE PRINTED: 12-OCT-01 PAGE 3A( 5/ 6)

| SAMPLE NUMBER | ELEMENT UNITS | PT PPB | Ag PPM | Cu PPM | Pb PPM | Zn PPM | Mo PPM | Ni PPM | Co PPM | Cd PPM | Bi PPM | As PPM | Sb PPM | Fe Tot PCT | Mn PPM | Te PPM | Ba PPM | Cr PPM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 97975 | | | <.5 | 5 | 2 | 28 | 4 | 4 | 7 | <1.0 | <5 | 6 | <5 | 1.64 | 257 | <25 | 547 | 107 |
| Duplicate | | | <.5 | 4 | 4 | 28 | 4 | 5 | 6 | <1.0 | <5 | 6 | 9 | 1.65 | 277 | <25 | 555 | 110 |
| 97993 | | | <.5 | 84 | 294 | 1618 | <1 | 1 | 7 | 12.9 | <5 | 18 | 31 | 5.73 | >20000 | <25 | >2000 | 33 |
| Duplicate | | | <.5 | 82 | 293 | 1515 | <1 | 2 | 6 | 12.6 | <5 | 18 | 29 | 5.58 | >20000 | <25 | >2000 | 33 |

| SAMPLE NUMBER | V PPM | Sn PPM | W PPM | La PPM | Al PCT | Mg PCT | Ca PCT | Na PCT | K PCT | Sr PPM | Y PPM | Ga PPM | Li PPM | Nb PPM | Sc PPM | Ta PPM | Ti PCT | Zr PPM | S PCT | SiO2 PCT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 97975 | 16 | <20 | <20 | 28 | 8.13 | 0.06 | 0.14 | 2.57 | 3.50 | 90 | 13 | 18 | 11 | 44 | <5 | <5 | 0.20 | 54 | 0.014 | |
| Duplicate | 16 | <20 | <20 | 29 | 8.16 | 0.06 | 0.14 | 2.60 | 3.56 | 83 | 13 | 17 | 11 | 43 | <5 | <5 | 0.20 | 56 | 0.012 | |
| 97993 | 4 | 21 | <20 | 57 | 7.90 | <.01 | 0.03 | 4.70 | 1.09 | 86 | 25 | 36 | 9 | 111 | <5 | 20 | 0.26 | 96 | 0.167 | |
| Duplicate | 3 | <20 | <20 | 55 | 7.67 | <.01 | 0.03 | 4.71 | 1.08 | 87 | 24 | 35 | 8 | 137 | <5 | 23 | 0.26 | 99 | 0.164 | |

BONDAR CLEGG

# Geochemical Lab Report

CLIENT: MR. EGIL LIVGARD
PROJECT: NONE GIVEN
REPORT: V01-01483.0 ( COMPLETE )
DATE RECEIVED: 09-AUG-01
DATE PRINTED: 12-OCT-01


| SAMPLE NUMBER | ELEMENT UNITS | TiO2 PCT | Al2O3 PCT | Fe2O3 PCT | MnO PCT | MgO PCT | CaO PCT | Na2O PCT | K2O PCT | P2O5 PCT | LOI PCT | Total PCT | Cr2O3 PCT | Rb PPM | Hf PPM | Th PPM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 97975 | | | | | | | | | | | | | | | | |
| Duplicate | | | | | | | | | | | | | | | | |
| 97993 | | | | | | | | | | | | | | | | |
| Duplicate | | | | | | | | | | | | | | | | |

# APPENDIX # 3

GOLD ASSAYS THREE PAGES

BONDAR CLEGG

# Geochemical Lab Report

REPORT: V01-01483.1 ( COMPLETE )

REFERENCE:

CLIENT: MR. EGIL LIVGARD

SUBMITTED BY: E. LIVGARD

PROJECT: NONE GIVEN

DATE RECEIVED: 06-SEP-01 DATE PRINTED: 14-SEP-01

| DATE APPROVED | ORDER | | ELEMENT | NUMBER OF ANALYSES | LOWER DETECTION LIMIT | EXTRACTION | METHOD |
|---|---|---|---|---|---|---|---|
| 010913 | 1 | Au30 | Au - FA30 | 7 | 5 PPB | Fire Assay of 30g | 30g Fire Assay - AA |

| SAMPLE TYPES | NUMBER | SIZE FRACTIONS | NUMBER | SAMPLE PREPARATIONS | NUMBER |
|---|---|---|---|---|---|
| R ROCK | 7 | 2 -150 | 7 | SAMPLES FROM STORAGE | 7 |

REPORT COPIES TO: 1990 KING ALBERT AVE. INVOICE TO: 1990 KING ALBERT AVE.

*******************************************************************************

This report must not be reproduced except in full. The data presented in this report is specific to those samples identified under "Sample Number" and is applicable only to the samples as received expressed on a dry basis unless otherwise indicated

*******************************************************************************

Bondar Clegg Canada Limited
130 Pemberton Avenue, North Vancouver, BC, V7P 2R5, Canada
Tel: (604) 985-0681, Fax: (604) 985-1071

BC BONDAR CLEGG

# Geochemical Lab Report

CLIENT: MR. EGIL LIVGARD PROJECT: NONE GIVEN

REPORT: V01-01483.1 ( COMPLETE ) DATE RECEIVED: 06-SEP-01 DATE PRINTED: 14-SEP-01 

| SAMPLE NUMBER | ELEMENT UNITS | Au30 PPB |
|---|---|---|
| R2 65901 | | 8 |
| R2 97975 | | <5 |
| R2 97980 | | <5 |
| R2 97983 | | <5 |
| R2 97991 | | <5 |
| R2 97992 | | <5 |
| R2 97993 | | <5 |

Bondar Clegg Canada Limited
130 Pemberton Avenue, North Vancouver, BC, V7P 2R5, Canada
Tel: (604) 985-0681, Fax: (604) 985-1071

CLIENT: MR. EGIL LIVGARD PROJECT: NONE GIVEN

REPORT: V01-01483.1 ( COMPLETE ) DATE RECEIVED: 06-SEP-01 DATE PRINTED: 14-SEP-01 

| STANDARD NAME | ELEMENT UNITS | Au30 PPB |
|---|---|---|
| HX12 Oxide | | 6518 |
| Number of Analyses | | 1 |
| Mean Value | | 6517.7 |
| Standard Deviation | | - |
| Accepted Value | | 6600 |
| ANALYTICAL BLANK | | <5 |
| Number of Analyses | | 1 |
| Mean Value | | 2.5 |
| Standard Deviation | | - |
| Accepted Value | | 5 |

Bondar Clegg Canada Limited
130 Pemberton Avenue, North Vancouver, BC, V7P 2R5, Canada
Tel: (604) 985-0681, Fax: (604) 985-1071

# APPENDIX # 4

ROCK SAMPLE DESCRIPTION THREE PAGES

# ROCK SAMPLE DESCRIPTION



Sample # 5-5

Located at silt sample of same number

Slightly tan glassy feldspar - Perthite ? 40-50 %

Pink feldspar - Orthoclase 20-25 %

Quartz 20 %

Hornblende 5%

Minor magnetite

Disseminated irregular brown and black iron oxide and minor fine flaky soft grey metallic mineral –Molybdenite?.

Not assayed

GLUNDEBERY GRANITE

Sample # 65901

Very fine grained – equigranular

Tan grains – feldspar- 80-85%

Black grains-pyroxene? 15-20 % – minor magnetite ?

Minor finely disseminated pyrite

CONTACT METAMORPHIC

Sample # 97973

Fragments mixed in a small clay hill –hydrothermal alteration

-altered granite – hairline fractures –5-10 mm apart irregularly one directional-filled with brown iron oxide.

ALTERED GLUNDEBERY GRANITE

Sample #97974

Fresh granite – much like #97975 as described in petrographic report (97975 ) without any obvious alteration features.

FRESH GLUNDEBERY GRANITE

Sample # 97975

See petrographic report

Sample # 97976

Coarse grained –5-40mm- feldspar 70% , and quartz 30%, - minor fine grained black mineral. A few 1-2 mm grains of magnetite

QUARTZ—FELDSPAR DYKE

Sample # 97977

As above

Sample # 97978

Coarse grained granite with minor biotite to 10mm

60 % orthoclase 35% quartz 5% biotite

Minor fine blebs of iron oxide disseminated throughout

Minor magnetite – Up to ½ % ?

## ROCK SAMPLE DESCRIPTION

### FRESH GLUNDEBERY GRANITE

Sample 10-3

Located about 200m WSW of silt 10-3 location
Fine to medium grained
50% K-feldspar 14 % plagioclase 35% quartz 1 % biotite
Quartz colour ranges from glassy through grey to black smokey glass – partly rounded!

### GRANITE

Sample # 97979

Coarse grained GRANITE low in black minerals
Gossan Ridge is moderately to completely covered with iron and manganese oxide on the surface and on fracture surfaces. Irregular patches of iron oxide is scattered throughout (2-3 % ).
Fractures and parallel streaks of quartz and of mini breccias noted with widths of 1 to 2mm.

Sample 15-1

From near high pass above Gossan Ridge
Homogeneous light grey groundmass with microscopic disseminated black mineral – biotite? 15-20 % white sub-angular to sub-rounded feldspar phenocrysts 2 to 10mm in size.

### PORPHYRITIC ANDESITE

Sample #97980

Intrusive- sheared- fractures every 1to10mm – fracture surfaces covered with oxide
Feldspar some sericite – quartz – 4-5 % sulphides- pyrite, pyrrhotite, sphalerite and bornite ?

Sample #97981

GLUNDEBERY GRANITE –IC30 and whole rock analysis
Porphyritic – phenocrysts 10mm – fine to moderate grained groundmass with lightly smokey quartz , white feldspar and 5% hornblende and biotite.

Sample #97982

As sample #97980

Sample #97983

Glundebery granite- moderately oxidized – minor visible pyrite

Sample #97984

N.S.

Sample #97985

Coarse grained granite—fracture surfaces covered with iron and manganese oxide.
High quartz content –5% ? irregular oxide patches.

PORPHYRITIC ANDESITE (cont'd)

Sample #97986
K-feldspar 60-70 % the remainder glassy quartz equigranular fine grained
Minor black specks and bright crimson! staining – hematite alteration.

Sample #97987
Quartz vein carrying 2-3 % black minerals – iron oxide staining – width 35cm.

Sample #97988
See petrographic report.

Sample #97989
Very small outcrop between large boulders – no hand specimen obtained
Rock appears fractured – sheared and/or brecciated and high in iron oxide.

Sample #97990
See petrographic report

Sample #97991
Totally oxidized float from higher up the hillside—spongy looking .

Sample #97992
See petrographic report

Sample #97993
See petrographic report

Sample #97994
As sample #97992 with much more " cataclastic deformation in which K-feldspar was recrystallized to interlocking aggregates "

Sample #97995
As sample #97992 with higher iron content in the form of brown oxide and metallic hematite.

Sample #97996
GLUNDEBERY GRANITE with miarolitic cavities- minor development of serecite- strong surface oxidation and internal iron oxide patches – minor fine pyrite - .

Sample #97997
GRANITE consisting of 60% pink K-feldspar, 35 % clear quartz, 5% hornblende.
No alteration is evident.

Sample #97998
See petrographic report

PORPHYRITIC ANDESITE (cont'd)

Sample #110572

GRANITE consisting of 40% K-feldspar ( part K- feldspar alteration), 30% plagioclase, 30% quartz and minor iron oxide.
Considerable fine grained "groundmass" which may be deformation and recrystallization.
Minor cavities which are coated with iron oxide
It is located near the apex of an apparent curved structure seen on aerial photos.

Sample # 110573

Heavy black rock
From scree at the very head of east creek tributary to the head of Chokatha Lakes from due south .
Minerals noted: biotite, black amphibolite, glassy slight brownish amorphous silica ?, minor ankerite?, high luster reddish-brown sphalerite?, very soft metallic grey graphite and in hand specimen on location also tentatively identified pyrrhotite .

CONTACT METAMORPHIC?

Sample #110574

From same scree as above
Star shaped (round ) fibrous looking amphibolite ? 1to 3 mm in diameter- sometimes with a silica center in a groundmass (40%) of amorphous greenish white and black material ?

A METAMORPHOSED GABBRO ???

Sample 13-2

From same scree as above
Fine-grained GLUNDEBERY GRANITE

# APPENDIX # 5

PETROGRAPHIC REPORT TEN PAGES

**Vancouver Petrographics Ltd.**

8080 GLOVER ROAD, LANGLEY, B.C. V3A 4P9
**PHONE (604) 888-1323 • FAX (604) 888-3642**

webpage: members.home.net/vanpetro

Report 010555 for

**Livgard Consultants,**
**1990 King Albert Ave.,**
**Coquitlam, B.C., V3J 1Z2** **September, 2001**

**Samples: 97975, 97988, 97990, 97992, 97993, 97998**

**Summary:**

**Sample 97975** is a slightly porphyroblastic granite with a few megacrysts of K-feldspar (one with a rim of plagioclase) in a groundmass of medium to coarse grained plagioclase, quartz, and K-feldspar, with much less abundant biotite and minor hornblende. Plagioclase is replaced slightly by sericite-(limonite). Most of the biotite is replaced completely by muscovite-limonite. Hornblende is replaced completely by sericite-limonite with patches of hematite.

**Sample 97988** is a brecciated rock containing fragments of two varieties of porphyritic, hypabyssal latite and minor fragments of quartz diorite. Latite is dominated by plagioclase with moderately abundant magnetite and interstitial patches of quartz and disseminated grains of pyrite. Fragments are cemented by a matrix dominated by ankerite with patches of quartz, pyrite, and minor calcite and sphalerite. Sphalerite contains exsolution lenses of chalcopyrite.

**Sample 97990** is a porphyritic potassic granite containing scattered medium to coarse grains of K-feldspar and quartz surrounded by patches of very fine to fine grained K-feldspar and quartz. Minor minerals include plagioclase, pyrrhotite, pyrite, and chlorite. Zircon is more abundant than in a normal granite and has an unusual texture. K-feldspar contains abundant, dusty hematite inclusions. Plagioclase probably was originally more abundant, and was in part replaced by K-feldspar. In the weathered part of the sample are a few veinlets of limonite.

**Sample 97992** is a fine to medium grained quartz diorite dominated by fresh plagioclase with much less abundant quartz and minor K-feldspar. The texture of plagioclase is similar to that in many of the other samples, but without the strong K-feldspar replacement typical of many of the other samples. Hematite patches maybe in part after hornblende and in part after pyrite. A replacement patch is of sphalerite with lesser pyrite and minor chalcopyrite and galena. A large replacement zone is of quartz with clusters of specular hematite, magnetite, and minor pyrite.

**Sample 97993** is a potassic granite that is dominated by medium to coarse grained K-feldspar with much less abundant hornblende, quartz, and plagioclase, and minor pyrite and barite. Hornblende is replaced completely by hematite-(quartz-sericite). Plagioclase is replaced strongly by K-feldspar. In scattered patches and a few seams, K-feldspar was recrystallized to much finer grained aggregates, probably as a result of weak cataclastic deformation. Abundant veinlets are of hematite/limonite.

**Sample 97998** is a coarse grained, hornblende potassic granite dominated by perthitic K-feldspar and quartz with lesser coarse patches of altered hornblende(?), represented by intergrowths of hematite/limonite and quartz, and plagioclase. Larger plagioclase grains are altered moderately to strongly to K-feldspar. Very fine grained, fresh plagioclase and lesser quartz are interstitial to perthite grains. Quartz forms a set of subparallel, in part braided veinlets.

**John G. Payne, Ph.D.,**
**Tel: (604)-597-1080**
**Fax: (604)-597-1080 (call first)**
**email: jgpayne@telus.net**

**Sample 97975 Biotite Granite**

The sample is a slightly porphyroblastic granite with a few megacrysts of K-feldspar (one with a rim of plagioclase) in a groundmass of medium to coarse grained plagioclase, quartz, and K-feldspar, with much less abundant biotite and minor hornblende. Plagioclase is replaced slightly by sericite-(limonite). Most of the biotite is replaced completely by muscovite-limonite. Hornblende is replaced completely by sericite-limonite with patches of hematite.

| mineral | percentage | main grain size range (mm) | |
|---|---|---|---|
| **megacryst** | | | |
| K-feldspar | 5- 7% | 10 | |
| plagioclase | 0.5 | 0.3-0.5 | |
| **groundmass** | | | |
| plagioclase | 30-35 | 0.5-1.7 | (a few grains up to 2.7 mm across) |
| K-feldspar | 25-30 | 0.7-1.7 | |
| quartz | 25-30 | 0.3-1.5 | (a few grains up to 2 mm across) |
| biotite | 3- 4 | 0.2-0.8 | |
| hornblende | 0.7 | 0.5-3.5 | |
| limonite-hematite | 1 | 0.1-0.2 | |
| ilmenite | minor | 0.07-0.1 | |
| zircon | trace | 0.05-0.15 | |
| **veinlets** | | | |
| *limonite-sericite* | *0.3* | *cryptocrystalline* | |

One megacrystic patch up to 1 cm across has a broad core of two K-feldspar grains and a rim up to 0.4 mm wide of plagioclase; the latter is altered slightly to disseminated flakes of sericite. At one end, the "rim" of plagioclase cuts across one of the K-feldspar grains over a length of 3 mm. K-feldspar *in the core of the patch contains 1% exsolution patches of plagioclase*

Plagioclase forms mainly anhedral grains and a few subhedral prismatic grains. A few grains have patches up to 0.2 mm across of myrmekite along borders with K-feldspar grains. Most grains are altered slightly to disseminated flakes of sericite, and a few are altered moderately to patches of sericite flakes, in part stained light yellow to medium orange by limonite.

K-feldspar forms anhedral to subhedral grains, commonly with Carlsbad twins. Grains are fresh.

Quartz is concentrated moderately in irregular patches up to a few mm across as slightly sutured grains with slightly strained extinction. A few patches show moderate recrystallization to much finer, strongly interlocking, subgrain aggregates.

Biotite forms anhedral flakes alone and in clusters of a few flakes. A few contain relic, relatively fresh patches with pleochroism from light to medium brown. A few, small, fresh flakes preserved inside quartz grains have pleochroism from medium brown to semi-opaque. Most grains are replaced completely by pseudomorphic muscovite and abundant, irregular patches of cryptocrystalline orange-brown limonite and locally red-brown hematite.

Hornblende forms one elongate prismatic grain 3.5 mm long and a few equant grains from 0.5-0.7 mm in size. It was replaced completely by sericite-(limonite) with 5% disseminated patches of cryptocrystalline hematite.

Ilmenite forms equant, anhedral grains, mainly associated with biotite.

Zircon forms subhedral to euhedral grains, mainly associated with biotite.

A few late veinlets up to 0.03 mm wide are of patches of cryptocrystalline sericite and patches of dark brown limonite; these were formed during surface weathering.

**Sample 97988** **Brecciated Porphyritic Hypabyssal Latite; Matrix of Ankerite-Quartz-Pyrite-Calcite**

The sample contains fragments of two varieties of porphyritic, hypabyssal latite and minor fragments of quartz diorite. Latite is dominated by plagioclase with moderately abundant magnetite and interstitial patches of quartz and disseminated grains of pyrite. Fragments are cemented by a matrix dominated by ankerite with patches of quartz, pyrite, and minor calcite and sphalerite. Sphalerite contains exsolution lenses of chalcopyrite.

| mineral | percentage | main grain size range (mm) |
|---|---|---|
| **phenocrysts** | | |
| plagioclase | 4- 5 | 0.5-0.8 |
| quartz | 0.5 | 0.7-1.5 |
| **groundmass** | | |
| plagioclase | 65-70 | 0.03-0.05; 0.05-0.1 |
| magnetite | 3- 4 | 0.03-0.07 |
| biotite | 2- 3 | 0.05-0.2 (a few flakes up to 0.5 mm long) |
| pyrite | 1 | 0.5-2 |
| hematite/limonite | 1 | cryptocrystalline |
| chlorite | 0.3 | 0.005-0.015 |
| apatite | 0.2 | 0.05-0.2 |
| zircon | trace | 0.05-0.15 |
| fluorite | trace | 0.1-0.17 |
| **breccia matrix** | | |
| ankerite | 12-15 | 0.7-2 |
| pyrite | 2- 3 | 0.3-2 |
| quartz | 1- 2 | 0.05-0.3 |
| calcite | 1 | 0.2-0.5 |
| sphalerite | 0.2 | 0.2-0.3 |
| chalcopyrite | trace | 0.01-0.03 |

Plagioclase forms scattered prismatic phenocrysts from 1.5-2.5 mm long. In most fragments, plagioclase forms interlocking, anhedral to subhedral grains that range widely in size from 0.1-1 mm. Most grains contain abundant dusty opaque inclusions.

Quartz forms scattered, anhedral phenocrysts. It also occurs as patches from 0.3-1 mm in size interstitial to plagioclase.

Magnetite forms disseminated anhedral to subhedral grains and clusters of a few grains (0.03-0.1 mm). Some of these grains are altered slightly along grain margins to hematite. As well, magnetite forms clusters of grains from 0.005-0.01 mm in size intergrown with plagioclase along margins of coarser grained magnetite patches.

Pyrite forms porphyroblastic, subhedral to anhedral grains, many of which nucleated on patches of magnetite. Some contain moderately abundant inclusions of relic magnetite. One large pyrite grains contains a few inclusions of quartz and two inclusions of colourless to pale purple fluorite.

Biotite forms ragged, mainly equant grains with pleochroism from light to medium brown. It is concentrated moderately in ragged clusters intergrown with finer grained plagioclase.

Several interstitial patches mainly from 0.1-0.3 mm in size are of pale to light green to brownish green chlorite; many of these are associated with patches of quartz or with patches of very fine grained plagioclase.

(continued)

Apatite forms disseminated acicular to prismatic grains enclosed in plagioclase grains. It is moderately abundant in some fragments and rare in others.

Zircon forms minor subhedral prismatic grains.

A few finer grained, distinctly porphyritic fragments up to 10 mm long contain elongate prismatic phenocrysts of plagioclase from 0.5-1 mm long in a groundmass of interlocking plagioclase grains 0.03-0.15 mm in size. These fragments also contain 3-5% irregular clusters of biotite and disseminated magnetite as in the main fragment type. They may represent inclusions of an earlier formed hypabyssal rock, probably from the same parent magma. A few plagioclase phenocrysts are altered slightly to moderately to irregular patches of extremely fine grained chlorite.

One fragment 2.5 mm across of quartz diorite is dominated by anhedral plagioclase grains with fine, discontinuous albite twins (as in other plutonic samples). It contains irregular, interstitial patches of much finer grained plagioclase and minor patches of each of quartz, magnetite, and rutile.

In the breccia matrix, ankerite forms skeletal grains interstitial to fragments in patches and veinlets. Much of the ankerite is replaced moderately by limonite. At one end of the sample and in a few other patches, ankerite is replaced strongly by limonite/hematite. In some ankerite patches, calcite forms disseminated grains, in part controlled by crystallographic directions in the ankerite. Some large ankerite grains are strained moderately.

Adjacent to ankerite patches, plagioclase grains are free of dusty opaque inclusions; further from the veinlets some of these grains contain dusty opaque inclusions. As well, plagioclase grains in veinlets and patches are free of opaque inclusions. A few veinlets up to 0.1 mm wide are dominated by inclusion-free plagioclase with much less abundant quartz and ankerite.

Pyrite forms anhedral patches intergrown coarsely with ankerite. A few are replaced slightly along their margins by hematite.

A few patches contain moderately abundant to abundant quartz intergrown with ankerite; in some patches, quartz forms euhedral; prismatic grains intergrown with interstitial ankerite. In a few quartz-rich patches, quartz forms an intergrowth of anhedral grains.

A few patches up to 1.5 mm in size are of one to a few grains of sphalerite that contain 5-7% exsolution blebs and slender plates of chalcopyrite. In some patches, chalcopyrite inclusions are concentrated in a broad core of the patch, leaving a thin partial rim of inclusion-free, colourless sphalerite. In some patches, chalcopyrite forms extremely thin plates in parallel orientation along a major crystallographic direction in sphalerite.

**Sample 97990** **Porphyritic Potassic Granite; Disseminated Pyrite, Pyrrhotite; K-feldspar Alteration; Limonite Veinlets**

Scattered medium to coarse grains of K-feldspar and quartz are surrounded by patches of very fine to fine grained K-feldspar and quartz. Minor minerals include plagioclase, pyrrhotite, pyrite, and chlorite. Zircon is more abundant than in a normal granite and has an unusual texture. K-feldspar contains abundant, dusty hematite inclusions. Plagioclase probably was originally more abundant, and was in part replaced by K-feldspar. In the weathered part of the sample are a few veinlets of limonite.

| mineral | percentage | main grain size range (mm) | |
|---|---|---|---|
| K-feldspar | 70-75% | 0.3-1.7 | (a few up to 3 mm across) |
| quartz | 17-20 | 0.3-1.7 | (a few up to 3.5 mm across) |
| plagioclase | 3- 4 | 0.2-0.7 | |
| pyrite | 2 | 0.3-1 | |
| pyrrhotite | 1 | 0.2-0.4 | |
| chlorite | 1 | 0.05-0.07 | |
| hematite | 0.3 | 0.02-0.05 | |
| zircon | 0.2 | 0.03-0.2 | (a few up to 0.3 mm long) |
| **veinlets** | | | |
| limonite-clay-pyrite | minor | lim/clay cryptocrystalline; py 0.03-0.1 | |
| limonite | 0.5 | cryptocrystalline | |

K-feldspar forms anhedral grains that vary widely in size. Some have Carlsbad twins. Grain borders with quartz commonly are irregular in detail. A few K-feldspar grains contain coarse, graphic intergrowths of quartz.

Quartz forms anhedral grains intergrown coarsely to finely with K-feldspar. Many coarser grains are strained slightly to moderately .

Especially near one corner of the section, plagioclase forms several subhedral grains that are altered moderately to strongly to patches of K-feldspar. This texture suggests that a significant percentage of the K-feldspar (possibly up to 25%) may have formed by replacement of plagioclase.

Pyrite forms disseminated grains and a few clusters up to 1.5 mm across of a few to several grains. Many are subhedral to euhedral.

Pyrrhotite forms irregular, commonly interstitial patches from 0.2-0.5 mm in size and locally up to 1.2 mm long. It is concentrated strongly in the end of the section away from the weathered zone, and is not intergrown with primary pyrite. Alteration is complete to cryptocrystalline, secondary pyrite.

Chlorite forms interstitial patches up to 0.4 mm in size of slightly interlocking flakes. Chlorite is neutral to very pale green in colour; it may be secondary after biotite.

A few patches up to 0.5 mm in size are of anhedral grains of hematite. A few proximal patches up to 0.3 mm in size are of plates of specular hematite intergrown with anhedral hematite.

Zircon forms disseminated, anhedral to subhedral, equant to irregular grains and a few clusters of grains. Many of the larger grains have irregular outlines, which is atypical of zircon in an igneous rock.

One wispy veinlet consists of cryptocrystalline material of unknown composition (possibly clay or jarosite); it contains scattered anhedral grains of pyrite from 0.03-0.1 mm in size. Towards the weathered zone the veinlet is dominated by dense limonite.

In the weathered zone at one end of the section are a few veinlets of limonite. The main vein is 0.05-0.07 mm wide. One vein at the end of the section is up to 0.3 mm wide. In this zone, some pyrite grains are replaced slightly to strongly by limonite.

**Sample 97992** **Quartz Diorite; Hematite Alteration; Sphalerite Replacement Patch Quartz-Specular Hematite-Magnetite-(Pyrite) Replacement**

The sample is a fine to medium grained quartz diorite dominated by fresh plagioclase with much less abundant quartz and minor K-feldspar. The texture of plagioclase is similar to that in many of the other samples, but without the strong K-feldspar replacement typical of the other samples. Hematite patches maybe in part after hornblende and in part after pyrite. A replacement patch is of sphalerite with lesser pyrite and minor chalcopyrite and galena. A large replacement zone is of quartz with clusters of specular hematite, magnetite, and minor pyrite.

| mineral | percentage* | main grain size range (mm) | |
|---|---|---|---|
| plagioclase | 25-30% | 0.2-1 | |
| quartz | 4- 5 | 0.1-0.5 | |
| hematite/limonite | 3- 4 | 0.5-1 | |
| sphalerite | 1 | 1-2 | |
| K-feldspar | 0.3 | 0.3-0.7 | |
| rutile | 0.1 | 0.05-0.4 | |
| zircon | trace | 0.1-0.3 | |
| chalcopyrite | trace | 5-15 microns | (one grain 0.04 mm across) |
| galena | trace | 0.02-0.03 | |
| **replacement** | | | |
| quartz | 55-60 | 0.07-1 | (a few grains up to 1.7 mm) |
| hematite | 3- 4 | 0.05-0.15 | |
| magnetite | 1 | 0.07-0.4 | |
| pyrite | 0.3 | 0.1-0.5 | |

* *percentage is of thin section (replacement patch occupies 15-20% of hand sample)*

Plagioclase forms anhedral to subhedral, equant to prismatic grains. Albite twins are poorly developed, discontinuous, and generally similar in texture to plagioclase in Samples 97993, 97988 and 97990.

Quartz forms anhedral, interstitial grains and patches.

Hematite/limonite forms irregular patches up to a few mm across; a few of these may be secondary after hornblende. Many of these contain two phases, semi-opaque hematite with moderate reflectivity and deep reddish orange limonite with low reflectivity. Pyrite forms anhedral grains, mainly associated with patches of hematite.

Sphalerite occurs mainly in a patch 5 mm across intergrown with minor very fine grained pyrite and quartz. *It contains zones with abundant exsolution blebs of chalcopyrite, mainly less than 5* microns in size, with a few up to 15 microns across. A few inclusions are of galena. The sulfide patches are fractured coarsely and corroded along fractures; some fractures are filled with secondary minerals, mainly light orange limonite.

K-feldspar forms scattered grains intergrown coarsely with plagioclase.

Rutile forms anhedral to subhedral prismatic grains that are concentrated strongly in a few clusters.

Zircon forms a few equant grains associated with hematite.

(continued)

The zone of strong quartz-hematite alteration occupies about 2/3 of the thin section. Quartz forms submosaic to slightly interlocking grains. Plagioclase forms relic patches of corroded grains intergrown with quartz; these are concentrated in one diffuse band.

Most patches of hematite are dominated by aggregates of subparallel to subradiating plates of specular hematite. Some of these contain irregular grains of magnetite; textures suggest that hematite was formed partly by replacement of magnetite.

Magnetite forms patches up to 1.5 mm in size of anhedral grains. The replacement zone is moderately magnetic.

Some patches of hematite contain irregular, corroded, interstitial grains of pyrite.

**Sample 97993** **Potassic Granite; K-feldspar-Hematite Alteration; Hematite/Limonite Veinlets**

The sample is dominated by medium to coarse grained K-feldspar with much less abundant hornblende, quartz, and plagioclase, and minor pyrite and barite. Hornblende is replaced completely by hematite-(quartz-sericite). Plagioclase is replaced strongly by K-feldspar. In scattered patches and a few seams, K-feldspar was recrystallized to much finer grained aggregates, probably as a result of weak cataclastic deformation. Abundant veinlets are of hematite/limonite.

| mineral | percentage | main grain size range (mm) |
|---|---|---|
| K-feldspar | 75-80% | 0.5-2 |
| quartz | 5- 7 | 0.3-1 |
| plagioclase | 5- 7 | 0.7-1.7 |
| hornblende | 5- 7 | 0.7-1.7 |
| pyrite | 0.7 | 0.3-0.7 |
| barite | 0.2 | 0.05-0.15 |
| zircon | minor | 0.1-0.3 |
| **veinlets** | | |
| hematite/limonite | 2- 3 | cryptocrystalline-0.01 |

K-feldspar forms anhedral grains, many of which contain dusty hematite inclusions. Adjacent to altered hornblende grains, hematite is much more abundant along fractures in K-feldspar. The rock contains 3-5% irregular patches and a few seams of cataclastic deformation in which K-feldspar was recrystallized to interlocking aggregates of grains 0.01-0.03 mm in size.

Quartz forms interstitial patches up to 2 mm in size of anhedral, mainly unstrained grains.

Plagioclase forms anhedral to subhedral grains, many of which are altered moderately to strongly to K-feldspar. A few have a rim of K-feldspar up to 0.2 mm thick. In many grains, albite twins are thin and discontinuous.

Hornblende forms anhedral to subhedral grains that were replaced completely by patches of dense hematite and aggregates of quartz. Iron oxide varies from opaque hematite with moderate reflectivity to deep orange brown limonite with very low reflectivity. A few patches up to 1.5 mm across contain extremely fine grained sericite(?) camouflaged and stained orange to reddish brown by limonite/ hematite.

Pyrite forms anhedral, equant grains that are fractured coarsely and replaced moderately along grain borders and fractures by cryptocrystalline, deep reddish orange hematite/limonite. It is concentrated mainly in one half of the section.

Barite forms scattered, anhedral, interstitial grains, in part associated with pyrite and hematite.

Zircon forms a few disseminated, subhedral to anhedral grains.

Hematite/limonite forms an irregular network of abundant, wispy, discontinuous, in part braided veinlets, mainly from 0.005-0.02 mm wide. Associated with a few of these are irregular grains of barite from 0.05-0.1 mm in size.

**Sample 97998** **Perthitic Hornblende Potassic Granite; K-feldspar Alteration; Strong Hematite-(Quartz-Leucoxene) Alteration of Mafic Grains; Quartz Veinlets**

The sample is a coarse grained granite dominated by perthitic K-feldspar and quartz with lesser coarse patches of altered hornblende(?), represented by intergrowths of hematite/limonite and quartz, and plagioclase. Larger plagioclase grains are altered moderately to strongly to K-feldspar. Very fine grained, fresh plagioclase and lesser quartz are interstitial to perthite grains. Quartz forms a set of subparallel, in part braided veinlets.

| mineral | percentage | main grain size range (mm) | |
|---|---|---|---|
| perthite | 55-60% | 0.7-2.5 | (a few up to 5 mm across) |
| quartz | 17-20 | 0.5-2 | (a few up to 3.5 mm across) |
| hornblende (?) | 15-17 | 1-2.5 | (a few up to 4 mm) |
| plagioclase | 7- 8 | 0.3-1.5; 0.05-0.1 (interstitial) | |
| zircon | trace | 0.1-0.3 | |
| **interstitial patches** | | | |
| sericite/chlorite-hematite/limonite | 0.3 | 0.01-0.03 (ser/chl); cryptocrystalline-0.01 (lim/hem) | |
| **veinlets** | | | |
| quartz | 1 | 0.005-0.03 | |

Perthite forms anhedral grains that are intergrown coarsely with quartz. It consists of a K-feldspar host with 25-35% lenses of plagioclase, mainly averaging 0.02 mm thick oriented parallel to one major crystallographic direction. The core of one large perthite grain contains a much finer perthitic intergrowth with plagioclase lenses averaging 0.05 x 0.003 mm in size. A few grains have Carlsbad twins.

Quartz forms anhedral grains intergrown coarsely with perthite. Only locally are grains slightly to moderately strained.

Plagioclase forms anhedral to subhedral grains that are replaced slightly to strongly by K-feldspar. It also forms clusters and trains of grains averaging 0.07-0.1 mm in size between coarser grains of perthite.

Many hornblende grains are elongate and subhedral to irregular in outline; they are replaced completely, mainly by semi-opaque hematite. Some contain minor to moderately abundant patches up to 0.2 mm in size of leucoxene and minor patches of quartz. A few of these oxide-rich patches may be secondary after biotite. Much weaker hematite alteration extends outward for up to 0.3 mm into the plagioclase lenses in adjacent perthite grains as disseminated patches with a deep red-brown colour. Near one end of the section, a patch up to 15 mm in size is of several coarse grains of hornblende(?) that were replaced by intergrowths of patches of red-brown hematite and patches of interlocking grains of quartz (0.05-0.1 mm).

Zircon forms a very few anhedral to subhedral grains associated with altered hornblende.

Sericite/chlorite forms a few patches up to 0.4 mm across. Hematite is associated with sericite and in part is concentrated along the border of some patches. One interstitial patch 0.7 mm across is mainly of colloform, orange to semi-opaque limonite, with minor cores of sericite/chlorite up to 0.1 mm in size.

A set of subparallel veinlets including one major braided veinlet 0.1-0.2 mm wide are of interlocking quartz grains. In a few places in the largest veinlet, part of the width of the veinlet is occupied by quartz grains that are in subparallel orientation perpendicular to the walls of the veinlet. The veinlets are best developed in perthite grains and generally are much narrower and more discontinuous in quartz grains. The main exception to this is that the largest veinlet is as wide in some quartz grains as it is in adjacent perthite grains.

# APPENDIX # 6

TANTALUM BEARING PEGMATITES TWO PAGES

# TANTALUM BEARING PEGMATITE EXPLORATION



Pegmatites are formed in all tectomagmatic cycles of all ages. Favourable intrusions in the Cordillera are usually of Mid-Cretaceous age, but the Middle Proterozoic age was remarkably productive (about 1.8 to 1.6 billion years) in other areas. Rare- element pegmatites are related primarily to leucocratic biotite-muscovite granites, syenites and nepheline syenites that formed in the last stages of crystallization. These are termed fertile granites etc. Deep regional fault reactivation of old tectonic lineament axis of greenstone belts or flanking gneissic troughs often provide channel ways for these late usually small (less than 100 sq, km) granitic intrusive stocks

Pegmatites will form in structures or dilational zones in the country rock around the fertile parent magma. They are commonly hosted in metamorphic schist (andalusite-cordierite-muscovite). These pegmatites constitute a pegmatite field, which is concentrically zoned around the parent magma.

The pegmatites and their parent magma may be graphic (quartz-microcline intergrowth) and/or miarolitic (cavities bounded by crystal surfaces).

Several types of pegmatites are known. They may be roughly classed by depth of formation as follows:

Barren miarolitic pegmatites formed at shallow depths in or near the parent magma.
Rare-element pegmatites formed at intermediate depth.
Mica bearing pegmatites formed at deep levels.

Rare-element pegmatite fields may be zoned from near the parent magma and outward as follows:

1 Barren with granitic texture
2 Barren with microcline, biotite and showing graphic intergrowth
3 Barren with muscovite, beryl and showing graphic intergrowth
4 Zoned microcline-albite with muscovite, beryl, Nb-Ta minerals
5 Zoned albite-microcline with Li, Rb, Cs, Be, Ta, B, P, F.
6 Albite with Li, Be, Ta, Sn.
7 Albite, spodumene with minor Be, Ta, Sn.
8 Quartz veins with cassiterite and/or wolframite and/or beryl.

The above zoning is very idealized and there will be much overlapping as well as missing and additional minerals in each zone.

MINERALOGY:

PLAGIOCLASE becomes more sodic (albite) with increasing fractionation.

ROSE QUARTZ patches may occur in quartz core. This is restricted to barren tourmaline pegmatites AND to Be, Ta, Nb bearing pegmatites.

MUSCOVITE which is coarse flaked yellow-green and silvery is typical of Be, Ta, Nb bearing pegmatites.

TOURMALINE – black is restricted to simple (poor) Be, Ta, Nb bearing pegmatites WHILE, when grading to blue and green with albite, indicates better Ta, Nb mineralization.

BERYL occurs in columnar form with greenish-yellow to brownish colour in simple plucky pegmatites. With increasing fractionation the beryl turns pale to white and/or pink in stubby or tabular crystals (hexagonal). This is typical for rare-element pegmatites.

APATITE in some pegmatites is blue and indicative of Be, Ta, Nb mineralization and the intensity of blue increases with increasing mineralization.