MINERAL OCCURRENCES OF THE SELWYN AND LELAND LAKES AREAS, NORTHEAST ALBERTA

Canada-Alberta Partnership Agreement on Minerals
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ABSTRACT

The Selwyn Lake area is underlain by granite gneisses of Archean age, which include two separate belts of high grade metasediments. The southern belt consists of metasediments (including meta-arkose). The northern belt contains large bands of massive amphibolite interlayered with metasediments. The amphibolite is interpreted to be a meta-gabbro. To the east of the area and parallel to Selwyn Lake, the granite gneisses are affected by mylonitization.

Massive sulfides are found in the amphibolite and interlayered biotite quartzite and define the Selwyn Lake Copper showing. The sulfides consist of pyrite, pyrrhotite and chalcopyrite, and are found exposed over a distance of more than 1,000 metres. Chemical analysis of selected grab samples reveal copper contents of up to 0.1%. Analysis also show the presence of minor gold associated with the mineralized zone.

The 17 mineral occurrences of the Leland Lakes area include two showings. The Myers Lake Gold showing is defined by a grab sample with a gold content of 200 ppb and is probably related to a basic intrusion. The Myers Lake Radioactive showing is a 1 by 15 m area of Slave Granite with radiation of up to 2000 total counts per second.

INTRODUCTION

Much of the potential for significant metallic mineral resources in Alberta has not yet been defined, as most of the past economic activity in the province has been focused on petroleum exploration and development. The Canada-Alberta Partnership Agreement on Minerals (also known as the Canada-Alberta MDA) seeks to redress this deficiency. This report forms part of a project that is jointly funded by the Canada-Alberta MDA and by the Alberta Research Council and describes new metallic mineral occurrences in the Leland Lakes areas and a more detailed description of the geology of the Selwyn Lake area and its mineralized zones (Mineral Occurrence 74 of Langenberg et al., 1993). This report is based on field work performed in the summer of 1993, supported by thin sections and geochemical analyses (Appendices 1 and 2).

A total of 18 mineral occurrences are documented in this report, including the Selwyn Lake Copper Showing and two mineral occurrences near Myers Lake, which were were elevated to showings. The Myers Lake Gold Showing has an observed gold content of 200 ppb. The Myers Lake Radioactive Showing was found as an airborne radiometric anomaly and produces 2000 total counts per second (cps) on the ground (Babcock and Hartley, 1971). The description of these occurrences form separate sections of this report, containing descriptions of the geology, economic mineral content and exploration work performed in the area.

LOCATION AND ACCESS

The project areas are located in northeastern Alberta on NTS maps 74M/11, 14, 15 and 16 (see Figures 1 and 2, in pocket). Regularly scheduled flights are available to Fort Smith, Northwest Territories, from where float planes give access to the areas. The accessibility is further enhanced by the presence of fishing camps and lodges on the Leland Lakes and Andrew Lake.

METHODOLOGY

LOCATION

Location of stations and samples were obtained from 1:60,000 scale aerial photographs, which were blown up to 1:10,000 in the Selwyn Lake area. Traverses were made from lake shores and were generally perpendicular to the general strike. In the Selwyn Lake area a Magellan 5000 Nav Pro GPS unit was used in places were it was dificult to determine the exact location.

SAMPLES AND ANALYSES

The samples consist of 1 to 2 kilogram grab samples taken from natural outcrops or old exploration trenches. Most samples were sent for analysis to Loring Laboratories of Calgary. The Inductively Coupled Plasma spectrophotometry method of analysis (ICP) was used to determine the content of selected base metals and other pathfinder elements. Fire assay with atomic absorption emission spectrometry finish (FA/AA) was used to determine the gold content, using a 20 gram aliquot. The analyses are tabulated in Appendix 2.

MINERAL OCCURRENCES (INCLUDING SHOWINGS)

Mineral occurrences (including mineral showings) are described according to the format of Langenberg et al. (1993). A mineral showing is defined following the U.S. Bureau of Mines (1968) as an occurrence **of some merit**, which has not yet become a prospect (whereby a prospect is defined as a non-producing mining property under development and consequently is higher in the hierarchy). A mineral occurrence is elevated to a showing if it meets at least one of the following criteria: 1). the occurrence contains significant, i.e. economical to sub-economical, concentrations of base or precious metals (generally 100 ppb gold or 1% base metals), 2).the occurrence shows a radioactivity level above a threshold of 2,000 counts per second (Total Count channel) on a scintillometer (or spectrometer).

Radioactive occurrences in this report are based on anomalies reported in unpublished Alberta Assessment reports. They were not checked in the field in 1993. They have been reported using SRAT SPP2-NF and 117B scintillometers (Babcock and Hartley, 1971).

PREVIOUS WORK

In 1957, the Alberta Research Council began systematic mapping of the Precambrian Shield in northeastern Alberta, and published district maps on a 1:31,680 scale (Godfrey, 1966; Godfrey and Langenberg, 1986 and 1987). A 1:250,000 compilation map summarizes the geology (Godfrey, 1986a). Geochronological studies have been published on those portions of the Shield initially mapped by the Alberta Research Council (Baadsgaard and Godfrey, 1967 and 1972; Kuo, 1972; Day, 1975). All known mineral occurrences of northeastern Alberta have been summarized by the Alberta Geological Survey (Godfrey, 1986b). The structural geology of the area was put in a regional framework by Langenberg (1983).

Bostock (1982) published the geology of the Ft. Smith area, just north of the Alberta-NWT boundary. Watanabe (1965) described mylonitic rocks of the Charles Lake area.

Langenberg and Nielsen (1982) prepared a detailed account of the metamorphic history of the area. Nielsen et al. (1981) put the crustal evolution of the area into a regional framework. Sprenke et al. (1986) presented the geophysical expression of the area and Goff et al. (1986) reported on the petrology and geochemistry.

The present Canada-Alberta MDA program has resulted in several reports and maps by the Alberta Geological Survey (Salat et al., 1994; Langenberg et al., 1993) and the Geological Survey of Canada (McDonough et al., 1993, 1994; McNicoll et al., 1994; Grover et al., 1993).

HISTORY OF EXPLORATION

In 1963, an aeromagnetic survey was flown over the area by Aero Survey Ltd on behalf of the federal government and the map was published in 1964 (Geophysical Maps 2894G, 2903G, 2904G and 2905G) at a scale of 1:63,360. The flight lines had an average spacing of 800 m.

The mineralized zone and exploration trenches near Selwyn Lake were first reported in an assessment report by James Exploration Ltd (1970), working on behalf of Rio Alto Exploration Ltd. There is no record of the older exploration work, that resulted in the trenches. Two samples were collected from the trenches by James Exploration Ltd. (1970). These samples were assayed and one contains 0.1% Cu.

The Alberta Geological Survey examined the area of the reported mineralization in 1992 to define the geological context of the mineralizing events (Langenberg et al , 1993).

Exploration in the Leland Lakes area has concentrated on Myers Lake, where airborne radiometric anomalies were observed by Vestor Exploration Ltd. (Geo-X Surveys Ltd., 1969; Williams, 1970; Morton, 1970; Babcock and

Hartley, 1971). Assay results were not found in any assessment report, but were apparently not encouraging for additional work. Godfrey (1986 b) indicated the presence of graphite along the Leland Lakes.

GENERAL GEOLOGY

The Precambrian Shield of northeastern Alberta consists of massive to foliated granitoids, granite gneisses and metasediments. The Alberta Shield is part of the Churchill Structural Province and has been designated as Athabasca Mobile Belt by Burwash and Culbert (1976). This mobile belt has been subdivided into Rae Craton, Taltson Magmatic Arc, and the Buffalo Head, Chinchaga and Ksituan terranes by Ross et al. (1991) and Villeneuve et al. (1993). The geological history of the Athabasca Mobile Belt involves sedimentation, deformation, metamorphism and ultrametamorphism, accompanied by remobilization, anatexis and intrusion. These processes have operated during different orogenic periods, resulting in the formation of complex polymetamorphic rocks. Field contact relationships and bulk compositions indicate that the migmatitic granite gneisses and high-grade metasediments were parent materials for several of the granitoid rocks during the process of partial melting (Goff et al., 1986). Consequently, the granitoids may represent Archean basement remobilized during the Aphebian.

Geochronological studies of rocks from the area (Baadsgaard and Godfrey, 1967, 1972) provide further evidence of multiple orogenic cycles in northeastern Alberta. This latter work deals with the Charles Lake, Andrew Lake and Colin Lake districts and identifies two distinct orogenic cycles. Rb-Sr whole rock isochrons on pegmatites within granitoids, gneisses and metasediments in the Charles Lake area give ages of 2470 Ma (Nielsen et al., 1981; see also McNicoll et al., 1994). Thus, the granite gneisses form part of a basement complex, which might originally be Archean. The low initial 87Sr/86Sr ratio (0.7030) of the pegmatites points to the presence of I-type granitoids. This initial Sr ratio is also within the limits for their derivation from mantle-like source material.

Rb and Sr determinations on Slave Granitoids plot on a well-defined isochron indicating an age of 1940 Ma. A high initial 87Sr/86Sr ratio of 0.7100 indicates derivation of these rocks by anatexis of pre-existing sedimentary rocks (Nielsen et al., 1981). The immediate parent materials for the Slave Granitoids are probably the Archean granite gneisses and high-grade metasedimentary rocks, which form large scale inclusions in these granitoids. Most other granitoids, such as the Arch Lake Granitoids, also show Aphebian ages (Baadsgaard, pers. comm., 1982; McNicoll et al., 1994).

K-Ar determinations on muscovite, biotite and hornblende give a narrow distribution of ages. The average age of mica from many rock units is about 1790 Ma, which indicates that the K-Ar dates for all rocks within the region were effectively reset as a consequence of the Hudsonian orogeny. Thus, two Precambrian orogenic cycles are firmly established for the Shield rocks of northeastern Alberta. Two distinct cycles of metamorphism (Langenberg and

Nielsen, 1982) reflect these orogenic cycles. The Archean cycle shows high-pressure granulite facies conditions (P=750 MPa, T=900°C). The Aphebian cycle shows a three-stage cooling sequence from moderate-pressure granulite facies (P=500 MPa, T=740°C), through low-pressure amphibolite facies (P=300 MPa, T=555°C), to greenschist facies (P=200 MPa, T=260°C) conditions. The dating of these cycles has been confirmed by Sm-Nd geochronolgy (Burwash et al., 1985).

Major faults affect most of the rock units and are younger than the macroscopic fold structures in the granitoids. These faults are expressed as shear zones characterized by mylonites (Watanabe, 1965). Retrograde greenschist facies minerals in the mylonitic zones indicate a late Aphebian age for this large-scale faulting, although it cannot be excluded that the ductile deformation started under higher grade conditions (McDonough et al., 1993). The Leland Lakes area is centered along the Leland Lakes Shear Zone and the Selwyn Lake areas is along the Charles Lake Shear Zone.

Extensive brecciation along most faults indicates still younger brittle fault movements at higher crustal levels.

Glacial scouring during the Pleistocene has left numerous fresh outcrops, which greatly facilitate geologic studies in this area.

GEOLOGY OF THE SELWYN LAKE AREA

The Selwyn Lake area is underlain by high grade metasediments and granite-gneiss (Figure 1, in pocket), which belong to the Archean basement of Northeast Alberta (Godfrey, 1986a). The mapped area is contained within a block of basement rocks bordered by two major mylonitic zones which are part of the Charles Lake Shear Zone (Godfrey, 1966; McDonough et al., 1993).

Foliation in these metamorhic rocks is generally mapped as a first foliation. In some cases, a second foliation could be measured, which was younger than the first foliation. Continuous bands of biotite quartzite and schist and amphibolite show tight folding with north-south trending axial planes. In places, complex folding is observed. Shearing has resulted in transposition of original layering in the granite gneisses.

Mylonites and ultramylonites trend northerly. Several faults exist in the area as shown by gouge zones, narrow shear zones, displacement of litho-stratigraphic units and lineaments. The faults trend uniformally N050°E in the south. In the north, their trends are more variable, but are generally northwesterly. Late brittle deformation is indicated by joints, which are often coated with epidote.

Metamorphic grade in the area corresponds to upper amphibolite facies with sillimanite, almandine and cordierite. Muscovite, epidote, chlorite and hematite represent a late phase of retrograde metamorphism.

GRANITE GNEISS AND PEGMATITIC DIORITE (Map units GN and D).

Hornblende-biotite granite gneisses are the predominant rocks in the area (Figure 1). Their texture is commonly granoblastic, and is locally pegmatitic. Usually pink to pink-red in outcrops, the gneisses are dark grey and pinkish in freshly broken hand specimen; however, the amount of mafic mineral (paleosome) is low. The gneisses of the area can be classified as granitic, based on their high quartz and feldspar contents. Bands or layers of meta-sedimentary material are commonly found within the granite gneiss. In the south, a small stock of non-foliated pegmatitic diorite exists (map unit D); it shows many rusty spots where exposed.

The granite gneisses contain many tight and rootless intrafolial folds, but the main layering is fairly continuous. Mylonitization is indicated by plastically deformed quartz, broken feldspars, S-shaped biotite and the neoformation of muscovite, chlorite, epidote and magnetite. This could indicate semi-brittle deformation under greenschist facies condition. However, feldspar often displays tails, which indicate an earlier deformation under higher P and T conditions.

MYLONITE AND ULTRAMYLONITE (Map unit M)

Mylonitization affects mainly the granite-gneisses. Along the western shore of Selwyn Lake, a dextral sense of shearing exists in mylonites as indicated by kinematic indicators, such as domino-shaped feldspar clasts and feldspar clasts with tails.

The mylonite consists of quartzo-feldspathic material, is well-layered and shows some recrystallization. Directly north of Selwyn Lake, in low lying ground, small scattered outcrops of ultramylonite (flint-like, millimetre thick laminations) are encountered.

The mylonites were not found in the center of the mapped area between two brittle NE striking faults. They were probably off-set to the east and are now covered by the water of Selwyn Lake.

METASEDIMENTS (Map units BQ and Qg)

The metasediments which were mapped by Godfrey (1966) can be subdivided into two main units, that exist in two separate belts of outcrops: one in the north and the other in the south (Figure 1). The sedimentary units are in places strongly granitized. Where mapped as sediments, the outcrops contain more than 50% sedimentary material.

Map-unit BQ consists of biotite-rich quartzite, biotite schist and minor amphibolitic schist. Due to the high content of mafic minerals, the map-unit BQ is dark colored in outcrops and often shows rusty weathered surfaces as a result of oxidation of iron-rich mafic minerals. The more quartzitic units carry small red garnet and sillimanite.

Garnetiferous quartzites (map-unit Qg) is characterized in outcrops by light colour, sucrosic texture and the presence of many large porphyroblasts (6 mm and over) of red garnet which can constitute up to 25% of the rock. The matrix is usually sand sized (less than 2mm). In some locations, large feldspar phenocrysts exist and the unit is transitional to the Charles Lake granite (map-unit CL), with which it is often closely associated in outcrops. In thin sections, unit Qg contains much cordierite and a small amount of dark brown biotite. Plagioclase and K-feldspar are present in equal amount; K-feldspar is altered while plagioclase, though fresh, always show bending and breaking. Quartz and biotite contents vary greatly. Hematite is present in one thin section.

The rocks of map-units BQ and Qgwere probably originally pelites and arkoses, respectively. Thin amphibole-rich layers may represent interbeds of dolomitic pelite.

AMPHIBOLITE (Map unit A)

The amphibolite (map-unit A) is mostly found in bands interlayered with the northern belt of metasediments. However, it is also found in small pods or lenses within the southern belt. The latter occurrences may be of different origin than that of the main outcrop in the north. In outcrop, the amphibolite is massive and exhibits dark brown weathering. Freshly broken surfaces are dark grey with white specks. The amphibolite is interlayered with thin bands of greenish feldspathic biotite, chorite quartzite and hornblende-rich quartzite (Figure 3). The massive amphibolite is sometimes injected with granitic material. At the contact with granite gneiss, amphibolite often has a granoblastic to pegmatitic texture and resembles a diorite or a gabbro.

The unit contains several layers with a high percentage of sulfides, which are continuous over the extent of the outcrop area of the amphibolite. These sulfides are often oxidized and form gossans (see section on mineral occurrences).

In thin sections, amphibolite is equigranular and consists mainly of hornblende which can make up 70% of the rock. The rest is composed of plagioclase which is often altered and cloudy. Plagioclase appears to be labradorite. Quartz is rare to absent, but opaque mineral (sulfides) make up 1 to 5% of the thin sections. Hornblende is brownish (grunerite?) in contact with opaque minerals. Away from the more massive body of amphibolite, the unit is less mafic and contain quartz and calcic plagioclase (oligoclase) in large porphyrosblasts reaching 1 cm in size. The more quartz-rich units are usually thinly layered.

It is assumed that the massive amphibolite represents a metamorphosed mafic intrusive of possibly gabbroic composition.

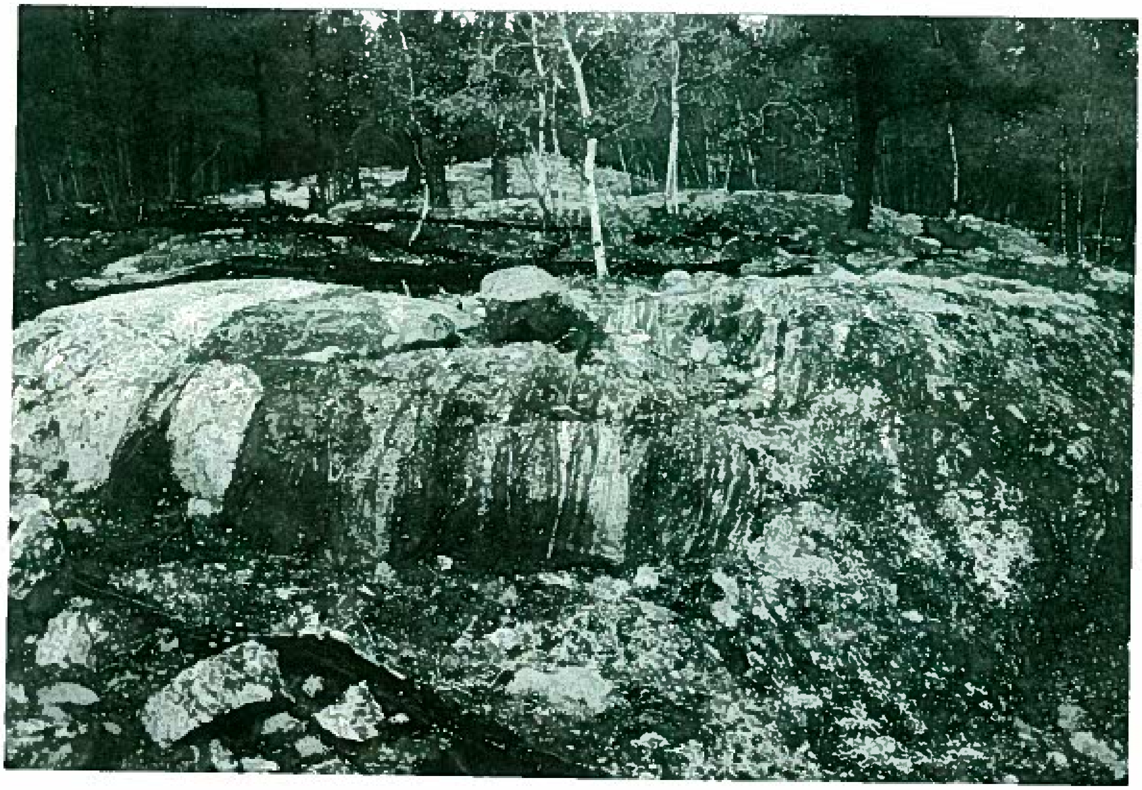

Figure 3. Rounded ridge of amphibolite, metasediments and white pegmatite in an area mapped as amphibolite (unit A) between trenches T1 and T2. The pegmatite intrudes parallel to the foliation.

CHARLES LAKE GRANITE (Map-unit CL)

The Charles Lake granite is mainly developed in the southern belt of metasediments, where it is found in large exposures on top of gently rolling hills. The granite is characterized by large rectangular feldspars which can reach 4 cm in size. Around the feldspars, the groundmass is equigranular and little foliated. Biotite is usually present in small quantities, as are red garnets. The Charles Lake granite contains inclusions of metasediments and amphibolite.

The Charles Lake granite displays sharp contacts with biotite rich schist and quartzite. However, its contacts with garnet rich quartzite and meta-arkose are gradational. This suggests that the Charles Lake granite is the result of anatectic melting of quartzo-feldspathic metasediments.

WHITE PEGMATITE (Map-unit W)

Wide bands of pegmatitic material are found interlayered with the metasedimentary units. Biotite sometimes exceeds 25% of the pegmatite and may give rise to a foliation and gneissic texture. It is suggested that the pegmatite corresponds to restite material after partial melting. The amount of quartz is highly variable, from nil to half of the rock unit.

The white pegmatite occurs in mappable bands along the northern belt, but it is found in minor amounts in many other locations.

PEGMATITIC BIOTITE GRANITE (Map-unit Gm)

A white to pink pegmatitic biotite granite is found near the shore of Selwyn Lake (Figure 1). The area lies between two faults that are defined by their topographic expression and by disruption of litho-stratigraphy. Although the area is on strike with mylonitic bands to the north and south, no mylonite is observed between the faults. The pegmatitic granite intrudes gneissic layers; on its borders it forms minor injected bands and at the center, it occupies more than 50% of the outcrops.

The pegmatitic granite contains biotite and locally remnants of rusty biotite schist where it resembles a migmatite. The texture is generally equigranular and the grain size varies from medium to coarse. The pegmatitic granite is cut by numerous fractures, up to 10 mm in width, that contain massive epidote.

GEOLOGY OF THE LELAND LAKES AREA

The Leland Lakes area (Figure 2, in pocket) exist along the Leland Lake Shear Zone, which is situated between the major Aphebian plutonic masses of the Slave Granitoids in the west and the Arch Lake Granitoids in the east (see Godfrey, 1986 a; Godfrey and Langenberg, 1986 and 1987). Other map units in the area are the Archean Granite Gneiss and metasediments. A mylonitic overprint on these four map units give rise to another four litho-stratigraphic units. Amphibolites, which are generally too small in outcrop area to map on a 1:50 000 scale, do form a mappable body in the central area.. The Archean metasediments and granite gneisses show the effects of high- and moderate-pressure granulite facies metamorphism as shown by metasedimentary rock band No. 57 , which is described in Langenberg and Nielsen (1982).

The mylonitic overprinting on the various rock units is spatially related to the valley of the Leland Lakes, which forms the Leland Lakes Shear Zone. The mylonitization probably took place in various stages. According to Watanabe (1965) there was an older upper to middle greenschist facies mylonitization, followed by a lower greenschist facies stage, whereby the older phase was probably wider in area than the narrow bands of the younger phase. The narrowing of shear zones was described for the Great Slave Lake Shear Zone by Hanmer et al. (1992). McDonough et al. (1994) showed wide high grade mylonites of amphibolite to granulite facies grade in the Leland Lake Shear Zone. However, in our opinion it is not completely certain that these mylonitic textures are spatially related to this shear zone. All rock units away from the shear zones show some mylonitic textures resulting from shearing. This process results in foliation in the granitoids and in an augen texture in megacrystic granitoids such as the Arch Lake and Charles Lake Granitoids. The presence of the linear Leland Lakes Shear Zone appears to be strongly related to the presence of greenschist facies mylonites with greatly reduced grain size (partially recrystallized).

Observations made during the 1993 field season allowed a refinement of the prior geological maps, as shown in Figure 2. The main difference with the previously published ARC maps (Godfrey and Langenberg, 1986) is the extent of the metasediments. The metasediments at the east-side of the Leland Lakes could not be confirmed. Instead, the rocks in that area belong to the (locally slightly gneissic) Arch Lake Granitoids. Another difference is that the metasediments on the west-side of the lake are more continuous, between 59^{0} 53' and 59^{0} 55' North, than previously shown.

MINERAL OCCURRENCES

SELWYN LAKE COPPER SHOWING

The main mineralization is found in large bands of massive amphibolite in the northern part of the area near the contact with metasediments, where the amphibolite is interlayered with garnet-rich quartzite and meta-arkose (Figure 1). The surface expression of the mineralization consists of two to three layers, 1 to 5 metre wide, that occur in brown-red weathered (gossanous) amphibolite and deep green biotite-hornblende quartzite. The layers are continuous over more than 1,000 metres in a north-south direction. The gossanous zone conforms to the outcrop area of amphibolite in the northern part of the area.

In addition to two trenches examined in 1992 (T1a and b, Langenberg et al., 1993), two other trenches (T2 and T3) were found, 500 m to the north and 500 m to the south, respectively (Figure 1). Trench T1a is 2 m south of trench T1b and is about 3 m deep (Figure 4). Massive pyrrhotite and pyrite are found at the bottom of the trenches away from the weathered surface. Substantial amounts of chalcopyrite was seen in trench T3, although Cu contents only reach 0.1% (Sample HS93-08-14-02C contains 895 ppm Cu, see Table 1).

Polished sections indicate development of pyrrhotite and chalcopyrite (Appendix 1). These two minerals are coeval and pyrrhotite is frequently replaced by melnikovite and (sometimes granular) pyrite. Chalcopyrite is fine grained and can occur in inclusions within quartz and feldspar.

Albite and chlorite are often found in the sulfide-bearing rocks. This may indicate hydrothermal alteration associated with mineralization, which is linked to the regional retrograde greenschist facies metamorphism and associated shearing.

Rusty and gossanous bands are also found in biotite schist and biotite-rich quartzite, which are generally in contact with amphibolite (Table 1). Sulfides are commonly found in these schists, but not in great quantity. The ferrugineous alteration, which is widespread in the schists, seems to originate largely from weathering of iron-rich mafic minerals and not from sulfides. The weathering process seems to be enhanced by the presence of graphite.

Figure 4. Trench T1a. Rusty layers of amphibolite and chlorite-biotite quarzite, resulting from oxidation of sulphides.

Geochemical data

A total of 14 samples were collected from gossanous outcrops and trenches. Table 1 give a synopsis of the most interesting analytical results. Copper is the main commodity associated with the sulfides. A gold association may be present, but its correlation with Cu is not very strong. Nickel and cobalt contents are somewhat elevated in comparison to the general area, but are depleted considering the mafic rock environment.

Table 1. Analytical results from the Selwyn Lake area.

Sample no	Location	Cu ppm	Zn ppm	Ni ppm	Co ppm	Au ppb
HS93-08-12-01	E. of Trench 1, East ridge of amphibolite.	72	44	47	20	-
HS93-08-12-03	100 m W of Trench 1.	26	55	10	18	-
HS93-08-12-04	Fe layer in West band of amphibolite.	28	59	32	5	17
HS93-08-12-06	Main amphibolite band +10%py, po. 250 m North of Trench 1a &b.	453	35	39	42	-
HS93-08-12-07	Bio. qtzte + py, po, north end of N. belt	29	38	24	16	5
HS93-08-12-10	Trench 2, amphibolite	44	45	27	13	-
HS93-08-13-03	Bio-schist + py; E side of South belt.	16	43	9	5	-
HS93-08-13-09	Pegmatitic diorite; 50 m.W. of South belt	37	40	21	16	-
HS93-08-14-02 A	10 m. E. of Trench 3; amphibolite + py, po.	438	12	65	57	12
HS93-08-14-02 B	Trench 3; amphibolite +5%py, po.	47	42	13	8	-
HS93-08-14-02 C	Trench 3; amphib. + qtz, F., chlorite layers + 10%py, po.	895	16	46	41	15
HS93-08-14-11	N. tip of south belt; Qtz bio schist + py, po.	38	118	34	11	-
HS93-08-15-15	Half way between Trench 1 and 2 in Fe amphibolite.	47	27	6	3	-
HS93-08-15-17	SW contact of main amphibolite + py, po.	35	79	46	16	–

ppm = part per million.
ppb = part per billion.

Classification

The amount and distribution of sulfides appears to be related to a basic intrusion. However, a relationship of mineralization with shearing can not be excluded.

MYERS LAKE GOLD SHOWING M.O. no. 8 (Leland Lakes area)

Vestor Explorations Ltd. explored some permits in the Myers Lake area southwest of the Leland Lakes in the early '70s. Disseminated pyrite and pyrrhotite (?) were reported in one of the assessment reports (Williams, 1970).

Mineralized zones exist in pyritic amphibolite within sheared Slave Granitoids. The amphibolites are between 1 and 15 m wide and extend for considerable distances along strike. The mineralized zones are generally not indicated by rusty spots.

A thin section shows mainly hornblende, plagioclase and opaques (pyrite). The texture of the rock is relatively equigranular, without a pronounced foliation. If the rock was mylonitized at any stage, it is completely recrystallized.

Geochemical data

Data from one sample, which represents the Myers Lake gold showing, are given in Table 1.

Table 2. Analyses of sample from Myers Lake gold showing

Sample:	Au (ppb):	Cu (ppm):
18-03	200	60

Classification

Gold and sulphides may be related to an originally basic igneous intrusion.

MYERS LAKE RADIOACTIVE SHOWING (Leland Lakes area) M.O. no. 15

An airborne radiometric survey, which was flown for Vestor Explorations Ltd., identified several radioactive anomalies. One of the larger ones (called anomaly A) was followed up on the ground by Babcock and Hartley (1971). They found a 1 m by 15 m radioactive area along a shear zone in relatively undeformed Slave Granitoids with radioactivity of 400-500 cps at waist height and maximum 2000 cps spot highs.

Classification

Radioactive minerals are hosted in granitic rock and are concentrated along brittle fractures.

ADDITIONAL GOLD OCCURRENCES OF THE LELAND LAKES AREA

NORTH LELAND LAKE M.O. NUMBERS: 1, 2, 3 AND 4

Mineralized zones were found along the west side of North Leland Lake in mylonitic metasediments (M.O. nos. 1, 3 and 4) and on the east shore in mylonitic granite gneisses (M.O. no. 2). The mineralized zones are indicated by rusty zones with sulfides over areas of about 10 m by 0.5 m. The sulfides are mainly pyrite and may make up to 5% of the rock.

Geochemical data

Data from four samples that represent mineral occurrences 1 to 4 are shown in Table 3.

Table 3. Analyses of North Leland Lake gold occurrences

M.O. no.:	Sample:	Au (ppb):	Cu (ppm):
1	17-04	23	26
2	17-05	41	797
3	19-07	64	348
4	23-05	33	13

Classification

Gold is probably originally stratiformal and was concentrated by shearing.

SOUTH LELAND LAKE M.O. Nos. 5,6 and 7

Mineralized zones were found in rusty zones in mylonitic metasediments (M.O. nos. 6 and 7) and in quartz veins in granite gneisses (M.O. no 5). Rusty (gossan) zones are about 3 m by 0.5 m. Pyrite exist in places.

Geochemical data

Data from three samples, that represent mineral occurrences 5 to 7 are shown in Table 4.

Table 4. Analyses of South Leland Lake gold occurrences

M.O. no:	Sample:	Au (ppb):	Cu (ppm):
5	13-01	20	5
6	13-03	30	29
7	14-07	27	46

Classification

Gold is probably originally stratiformal and was concentrated by shearing and fracturing.

BASE METAL (CU) OCCURRENCES

NORTH LELAND LAKE M.O. Nos. 9, 10 AND 11

Mineralized zones comprise rusty (gossan) zones in mylonitic metasediments. Metasediments are garnetiferous quartzite and gneiss. The gossanous zones are about 10 m by 1 to 2 m wide. Pyrite.is common

Geochemical data

Data from three samples that represent mineral occurrences 9 to 11 are shown in Table 5.

Table 5. Analyses of North Leland Lake copper occurrences

M.O. no:	Sample:	Au (ppb):	Cu (ppm):
9	22-02	10	245
10	22-06A	16	247
11	22-09	-	197

Classification

Copper is probably originally stratiformal and was concentrated by shearing and fracturing.

SOUTH LELAND LAKE M.O. Nos. 12 AND 13

Mineralized zones were found in rusty (gossan) zones in mylonitic metasediments. Metasediments are garnetiferous quartzites and gneisses. Mineralization is indicated by pyrite.

Geochemical data

Data from 2 samples representing the mineral occurrences are shown in Table 5.

Table 6. Analyses of South Leland Lake copper occurrences

M.O. no:	Sample:	Au (ppb):	Cu (ppm):
12	14-02	-	424
13	14-03	-	215

Classification

Copper is probably originally stratiformal and was concentrated by shearing and fracturing.

IRON (MAGNETITE) OCCURRENCES

NORTH LELAND LAKE M.O. No 14

Quartz-magnetite veins exist along the west shore of North Leland Lake in largely recrystallized mylonitic metasediments. The zone is indicated by a long and narrow magnetic high on GSC map 2905G, and by the magnetite that is visible in outcrop.

Geochemical data

A grab sample contains 16.5% Fe and 552 ppm V. This is the highest Vanadium content observed in the area, and may indicate an iron-vanadium relationship.

Classification

The mineralization is a type of iron-vanadium occurrence.

RADIOACTIVE OCCURRENCES

MYERS LAKE M.O. Nos 16 and 17

An airborne radiometric survey, which was flown for Vestor Explorations Ltd., identified several radiometric anomalies. Two of the larger ones (called anomalies B and D) were followed up on the ground by Babcock and Hartley (1971). They found a 15 m by 0.25 m area with in places 2400 cps total count, that were produced by a fine grained Slave Granite with an unidentified black mineral, which is our occurrence no. 16. Mineral occurrence no. 17 is an area 2 m in diameter in Slave Granite with 2000 cps total count. The anomaly does not appear to be structurally controlled, nor is a definite mineralization evident, except for a black surface coating on parts of the outcrop (Babcock and Hartley, 1971, p.5).

Classification

These are granite hosted radioactive occurrences.

CONCLUSIONS AND RECOMMENDATIONS

Mapping of the northwestern sector of Selwyn Lake has shown the presence of a belt of metasediments associated with large masses of intrusive rocks (which probably was a hornblende gabbro). Continuous and thick massive sulfide bands occur at the contact of amphibolite and metasediments. This contact appears to be gradational and interlayered. Sulfides consist of pyrite, pyrrhotite and chalcopyrite with up to 0.1% Cu. Some gold appears to be associated with the copper minerals. The thickness and continuity of the mineralized zone indicates further exploration is warrented. Only shallow trenches have been dug and deeper testing is warranted.

The Myers Lake gold showing in the Leland Lakes area is of interest and could be trenched and sampled in detail.

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APPENDIX 1

PETROGRAPHY OF SULFIDES IN THE SELWYN LAKE AREA

by A. Skupinski, consultant, Calgary, Alberta

Three samples were studied with a polarizing Zeiss microscope in transmitted and reflected light. The main purpose was examination of sulfides and their alterations. The petrographical descriptions of the rock forming minerals are given as well. Volumetric contributions of the rock-forming and ore minerals were made by visual estimation.

Trench T1a - SAMPLE WL2-09-02-03

The sample is a sulfide-rich amphibolite. The thin section is about 100 microns thick. Only opaque minerals were determined.

Opaque Mineralogy:

All opaques are sulfides, which occur along interstices and intergranular spaces. The dominant sulfide is **Pyrrhotite** with granular, xenomorphic texture. All the grains are anhedral between the rock-forming minerals. The larger Pyrrhotite clusters are well connected. Pyritization of Pyrrhotite is common on the rims and along fractures and cavities within the Pyrrhotite.

The primary product of Pyrrhotite pyritization is **Melnikovite (FeS_2).** **Melnikovite** displays colloform fibrous aggregates. The larger clusters of Melnikovite are gradually recrystallized to granular **Pyrite.** Minor anhedral **Chalcopyrite** is observed with some Pyrrhotite grains. All the sulfides are fresh and unaltered.

Comments

Melnikovite is a variety of Pyrite consisting of fibrous colloform aggregates. The transition Pyrrhotite-Melnikovite is common in deposits formed at low temperatures. Melnikovite is very unstable and unresistant to weathering, indicating that the sample was collected in the trench below the gossan zone.

Trench 2 - SAMPLE HS93-08-14-02D

The sample is a felsic rock (possibly tonalite), which is interlayered with amphibolite, and contains 5-10% sulfides.

Macroscopic Description: Phaneritic greenish-grey rock with a grain size up to 1 cm. Irregularly-shaped Feldspars and Quartz are the only macroscopically visible rock-forming minerals. A system of very fine white veinlets separate the feldspar grains. Fine-grained sulfide is visible between rock-forming minerals. On weathered surfaces, abundant rust occurs.

Mineral Content:

Rock-forming:	Plagioclase (predominant)
	Quartz (common)
	Sericite (common)
	Zircon (accessory)
	Pyroxene (accessory)
	Epidote (trace)
	Chlorite (trace)
Sulfides (≈5%):	Pyrite (common)
	Pyrrhotite (common)
	Chalcopyrite (minor)

The texture is granular-hipidiomorphic, with grain size 1-10 mm. **Plagioclase** is almost entirely sericitized. Only a few grains are without sericite and were determined as Oligoclase (27% An). **Quartz** is xenomorphic against Feldspars. Quartz grains display mosaic texture on borders. The interstices between Feldspars and Quartz are filled with **Albite**, sometimes accompanied by fine-grained aggregatic Chlorite. Albite infills intergranular cavities in sericitized Plagioclase or it forms metasomatic rims. It is always accompanied by sulfides.

Sulfides

The Albite interstitial metasomatism was immediately followed by the coeval assemblage: **Pyrrhotite-Chalcopyrite**. Pyrrhotite is frequently replaced by **Melnikovite** and **Pyrite**. Sulfides are commonly fresh, but traces of oxidation sometimes occur. **Pyrrhotite** forms anhedral clusters of grains. They are sometimes intergrown with **Chalcopyrite**. Clusters are up to 4 mm in size. Chalcopyrite is usually very fine-grained. It also occurs as inclusions in Quartz and Feldspars.

Melnikovite and **Pyrite** are seen within Pyrrhotite as secondary replacements. The textures of replacement occur along intracrystalline sutures and, less commonly, on Pyrrhotite rims.

Locally, cataclastic deformations of Pyrrhotite crystals are noticeable. However, further mineralization of the cracked grains have not been observed. **Pyrite** is also common as idioblastic crystals or clusters of grains up to 1 mm in size. It is usually subhedral or euhedral and very porous.

Comments: The paragenesis Pyrrhotite-Chalcopyrite following the late-stage (green schist facies) Albite interstitial in-fillings indicates a late stage mineralization. Pyrrhotite generally indicates high temperatures of formation, but it is not inconsistent with formation under greenschist facies conditions (see also Ramdohr (1969, p.598). The majority of Pyrite is, most likely, a still later alteration product after pyrrhotite.

Trench 3 - SAMPLE HS93-08-14-02E

The sample is a fine-grained, green-grey and slightly schistose mineralized amphibolite. Sulfide minerals are developed between grains and along foliation planes. The weathered surfaces are very rusty.

Mineral Content:

Rock-forming:	Quartz (common)
	Hornblende:
	Actinolitic (very common)
	Clinopyroxene (common)
	Sericite (pseudomorphic)
	Chlorite (pseudomorphic after Garnet)
	Cordierite (minor)
	Apatite (common accessory)
	Vermiculite (rare)
	Carbonate (rare)
	Epidote (trace)
Sulfides (≈25%):	Pyrrhotite (predominant)
	Chalcopyrite (minor)
	Melnikovite (minor)
	Pyrite (minor)

The texture is nematogranoblastic and panxenomorphic. The rock is medium-grained, poorly foliated, consisting mainly of pale-green Omphacite and Hornblende family minerals. Clinopyroxene forms rounded grains, sometimes grown in clusters over 1 mm in size. It is frequently uralitized along intracrystalline fractures and on rims. Actinolitic Hornblende is an alteration product. Apatite is a very common accessory. It forms rounded grains up to 0.2 mm in size. It commonly occurs as inclusions in clinopyroxene. Chlorite-Sericite pseudomorphous after Garnets are ubiquitous. Secondary silicification is common. Rare irregular grains of partly pinitized Cordierite (?) occur as secondary components. Sulfide mineralization marked the end of the rock's history. Quartz forms fine-grained mosaic laminas and intergranular impregnations between pyroxene and amphiboles. Actinolitic hornblende is colourless or pale green. It is poikiloblastic or fibrous.

Sulfide Mineralization

Sulfide mineralization has been extensively developed along fractures and as a cementing network of the intergranular spaces. The original mineralization is characterized by two coeval phases: **Pyrrhotite-Chalcopyrite**. The textures of unmixing were not observed.

Pyrrhotite and Chalcopyrite display allotriomorphic granular development and variable grain size, 0.1-2.0 mm. Individual grains are frequently clustered in laminar aggregates. Their replacements of aluminosilicate minerals of the rock are probably only apparent. Along cracks and intergranular sutures, Pyrrhotite is frequently replaced by colloform **Melnikovite** and less frequently by **Pyrite**. Recrystallization of Melnikovite to monocrystalline Pyrite is common. Both secondary sulfides display zonal porosity. Original (not derivative of alterations) anhedral **Pyrite** occurs as well. Some cracks in Pyrrhotite are filled with **Goethite**.

Optical Characteristics

Pyrrhotite displays distinctive reflection pleochroism, also without oil (dark pink/light pink). Anisotropy colours (dry, with nicols perfectly crossed) is reddish brown/dark grey. **Chalcopyrite** is of high-temperature origin as weak reflection pleochroism is sometimes noticeable. The crystallization temperature of the paragenesis can be tentatively determined as 600°-450° C. Anisotropy (dry) is above usual standard. **Pyrite** (original) displays distinguishable optical anisotropy. **Melnikovite** and **Pyrite** (secondary) display typical optical properties and no anisotropy effects. The late stage sulfide mineralization did not induce any alteration of the rock-forming minerals.

APPENDIX 2. Geochemical analyses (Loring Laboratories)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
1	To ALBERTA RESEARCH COUNCIL FILE #36109 November 1993																														
2																															
3	ELEMENT	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W
4	SAMPLES	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm
5	HS93070701A	2	20	12	63	0.1	27	7	314	3.34	10	5	2	13	7	0.2	2	2	37	0.14	0.03	21	188	0.84	19	0.01	3	1.04	0.04	0.08	1
6	HS93070705A	513	22	7	65	0.1	18	5	287	3.2	8	5	2	11	14	0.2	2	2	21	0.23	0.06	8	153	1.14	64	0.06	7	1.49	0.02	0.5	1
7	HS93070813	3	47	26	13	1.2	6	2	81	2.82	3	27	10	13	5	0.2	2	2	8	0.05	0.02	9	137	0.14	48	0.01	10	0.6	0.01	0.21	834
8	HS93070814	5	10	30	71	0.4	7	2	187	3.91	17	5	2	15	8	0.2	2	2	14	0.02	0.02	38	63	1.02	35	0.02	2	1.82	0.01	0.23	1
9	HS93070817	1	8	2	39	0.1	26	9	294	4.06	43	5	2	16	7	0.2	2	2	26	0.11	0.03	38	74	1.11	194	0.21	4	2.08	0.02	1.39	1
10	HS93070822	99	10	14	12	0.4	8	1	92	1	8	5	2	2	1	0.2	2	18	5	0.01	0	2	280	0.09	13	0.01	2	0.21	0.01	0.07	1
11	HS93070823	27	45	18	14	0.5	1	1	63	5.58	4	5	2	15	10	0.2	2	3	23	0.01	0.02	18	58	0.33	50	0.05	3	1.02	0.01	0.45	1
12	HS93071018	11	112	5	41	0.2	5	1	210	5.76	22	5	2	16	10	0.2	2	2	74	0.01	0.01	4	129	1.27	306	0.28	2	2.23	0.02	1.06	1
13	HS93071020	3	23	23	9	0.1	3	1	84	1.85	2	5	2	19	9	0.2	2	2	4	0.01	0.02	20	187	0.08	61	0.02	2	0.44	0.01	0.28	1
14	HS93071112	3	113	136	48	0.2	5	1	191	4.32	56	5	2	23	9	0.2	2	2	29	0.03	0.02	11	66	1.11	137	0.13	3	1.77	0.01	0.85	1
15	HS93071121	9	30	35	26	0.2	7	2	145	3.99	5	5	2	14	8	0.2	2	2	31	0.02	0.01	18	152	0.59	122	0.16	3	1.18	0.02	0.91	1
16	HS93071210 A	2	16	10	9	0.1	7	2	37	2.24	14	5	2	7	12	0.2	2	2	3	0.03	0.02	15	153	0.06	32	0.01	4	0.39	0.03	0.19	1
17	HS93071210 B	1	20	8	74	0.1	8	4	282	4.22	3	5	2	17	16	0.2	2	2	34	0.07	0.03	18	124	1.08	143	0.16	2	2.13	0.04	1.21	1
18	HS93071210 C	2	19	5	11	0.2	7	25	69	1.74	844	5	2	9	7	0.2	2	3	4	0.03	0.01	15	268	0.13	23	0.01	71	0.31	0.01	0.08	1
19	HS93071212	2	31	2	38	0.1	3	1	105	6.67	2	5	2	14	7	0.2	2	2	19	0.01	0.01	27	75	0.6	34	0.04	2	1.11	0.01	0.32	1
20	HS93071413	6	34	12	36	0.1	5	1	97	4.51	20	5	2	15	5	0.2	2	2	10	0.02	0.03	32	101	0.44	29	0.02	3	0.88	0.01	0.24	1
21	HS93071511	5	31	8	7	0.1	7	2	49	0.76	4	5	2	5	4	0.2	2	2	3	0.04	0.01	13	249	0.08	19	0.01	14	0.25	0.01	0.07	1
22	HS93071721 A	1	30	7	2	0.1	8	3	54	0.84	1706	5	2	6	3	0.2	2	2	3	0.03	0.02	14	200	0.02	15	0.01	37	0.12	0.01	0.05	1
23	HS93071721 B	4	111	17	2	0.2	11	9	43	1.2	6571	5	2	7	2	0.2	2	6	2	0.02	0.01	15	257	0.01	20	0.01	37	0.15	0.01	0.08	1
24	HS93072017	1	28	12	28	0.2	18	5	158	2.36	41	5	2	13	8	0.2	2	2	13	0.06	0.01	17	173	0.31	38	0.08	4	0.7	0.03	0.39	1
25	HS93072105	2	20	5	45	0.1	7	6	389	3.9	25	5	2	13	72	0.2	2	2	65	0.76	0.09	15	173	1.49	74	0.27	4	1.87	0.12	0.37	29
26	HS93072319	1	23	15	43	0.3	7	3	246	3.41	39	6	2	20	8	0.2	2	2	20	0.03	0.03	28	89	0.87	71	0.17	2	1.63	0.02	1.13	1
27	HS93072401	4	281	29	126	0.4	30	19	453	6.24	12	5	2	15	12	0.2	2	6	30	0.13	0.04	30	154	2.19	12	0.02	2	2.39	0.04	0.04	1
28	HS93072601	2	93	5	94	0.3	60	18	112	4.96	213	5	2	7	11	0.2	2	2	87	0.02	0	17	196	0.98	91	0.23	7	2.59	0.02	0.95	1
29	HS93072602	4	71	15	39	0.2	102	37	105	4.15	5281	5	2	8	9	0.2	2	2	84	0.01	0	15	246	0.9	110	0.14	9	2.5	0.02	0.87	1
30	HS93072703	10	14	17	10	0.2	6	1	78	0.81	37	5	2	2	3	0.2	2	2	8	0.01	0	2	215	0.08	16	0.01	3	0.26	0.01	0.08	48
31	HS93080102	3	8	9	12	0.1	14	4	84	2.24	13	5	2	41	4	0.2	2	2	5	0.08	0.02	12	162	0.31	45	0.02	4	0.65	0.01	0.27	1
32	HS93080401	1	3	5	6	0.1	3	1	36	1.41	2	5	2	9	21	0.2	2	2	4	0.09	0.03	11	145	0.02	15	0.01	5	0.51	0.01	0.2	4
33	HS93080504	3	16	13	43	0.1	6	9	348	3.11	14	5	2	14	23	0.2	2	2	62	0.61	0.04	29	146	1.1	54	0.27	4	1.49	0.07	0.68	3
34	HS93080507	3	44	11	23	0.2	6	2	119	2.75	35	5	2	17	10	0.2	2	3	14	0.07	0.02	13	174	0.46	51	0.05	18	1.09	0.03	0.37	1
35	HS93080707A	9	42	3	50	0.1	11	19	371	2.64	4	5	2	7	83	0.2	2	2	49	1.25	0.06	22	217	1.99	215	0.26	7	2.13	0.03	0.63	1
36	HS93080707B	3	11	23	17	0.4	4	3	237	0.59	2	5	2	10	107	0.5	2	141	8	1.1	0.07	2	157	0.35	155	0.02	29	1.44	0.1	0.29	36
37	HS93080709	1	14	5	68	0.2	117	29	530	5.09	5	5	2	8	70	0.2	2	2	66	1.23	0.04	29	578	1.47	97	0.28	2	2.22	0.07	0.79	1
38	HS93080808	1	8	12	38	0.1	8	5	264	1.39	8	5	2	11	60	0.2	2	2	25	1.06	0.04	24	126	0.86	31	0.23	4	1.22	0.04	0.24	2
39	HS93080813	1	10	5	38	0.1	10	8	244	1.64	4	5	2	13	34	0.2	2	2	29	0.49	0.03	29	116	0.76	54	0.15	2	1.09	0.05	0.38	6
40	HS93080815	1	18	4	9	0.1	27	13	57	3.45	2	5	2	14	5	0.2	2	2	4	0.04	0.02	6	160	0.23	38	0.01	2	0.46	0.01	0.21	1
41	HS93081201	4	72	3	44	0.1	47	20	483	4.64	4	5	2	9	13	0.2	2	2	98	1.02	0.03	24	85	1.48	119	0.24	4	2.08	0.15	0.82	1
42	HS93081203	2	26	7	55	0.1	10	18	374	4.74	3	5	2	2	64	0.2	2	2	109	1.13	0.05	10	120	1.47	287	0.2	2	1.96	0.19	0.46	1
43	HS93081204	3	28	36	59	0.2	32	5	171	1.94	6	5	2	34	19	0.2	2	2	42	0.1	0.01	14	202	1.35	130	0.13	2	1.26	0.06	0.94	1
44	HS93081206	8	453	10	35	0.3	39	42	510	7.72	4	5	2	7	12	0.2	2	2	32	0.92	0.15	19	136	0.5	47	0.06	2	0.75	0.06	0.21	1
45	HS93081207	2	29	11	38	0.1	24	16	234	3.71	4	5	2	15	6	0.2	2	2	52	0.08	0.01	37	145	0.58	48	0.16	2	1.43	0.03	0.41	1
46	HS93081210	3	44	13	45	0.1	27	13	137	4.24	2	5	2	11	6	0.2	2	2	35	0.03	0.01	30	139	0.67	51	0.12	2	1.68	0.02	0.3	1
47	HS93081303	1	16	27	43	0.1	9	5	280	1.33	6	5	2	4	50	0.2	2	2	18	1.33	0.03	13	102	0.86	179	0.1	5	1.35	0.13	0.38	1
48	HS93081309	1	37	6	40	0.1	21	16	435	2.6	4	5	2	2	21	0.2	2	2	59	1.63	0.03	7	58	1.12	39	0.26	2	1.27	0.15	0.17	1
49	HS93081402 A	2	438	9	12	0.4	65	57	464	10	5	5	2	2	45	0.2	2	2	14	1.6	0.35	17	80	0.48	8	0.01	2	0.3	0.01	0.03	1
50	HS93081402 B	5	47	20	42	0.1	13	8	230	2.4	4	5	2	17	2	0.2	2	2	37	0.14	0.01	20	216	0.41	3	0.1	4	0.54	0.01	0.02	1
51	HS93081402 C	1	895	9	16	0.6	46	41	652	8	5	5	2	2	38	0.2	2	2	18	2.33	0.4	19	71	0.57	5	0.01	3	0.11	0.01	0.01	1
52	HS93081411	2	38	39	118	0.1	34	11	354	3.32	5	5	2	8	22	0.2	2	2	64	0.53	0.17	19	218	2.52	209	0.22	2	2.39	0.05	2.07	1
53	HS93081515	4	47	12	27	0.1	6	3	132	7.77	2	5	2	13	9	0.2	2	2	66	0.04	0.01	36	108	0.45	80	0.17	2	1.7	0.01	0.41	1
54	HS93081517	1	35	5	79	0.1	46	16	314	3.59	6	5	2	31	31	0.2	2	2	40	0.58	0.07	42	203	1.85	178	0.22	2	2.04	0.05	1.39	1
55	RE HS9307121B	4	112	16	2	0.2	10	8	41	1.22	6735	5	2	7	3	0.2	2	5	2	0.02	0.01	16	260	0.01	19	0.01	35	0.15	0.01	0.08	1
56	RE HS93072401	2	284	25	130	0.3	31	20	460	6.3	13	5	2	16	12	0.2	2	2	31	0.13	0.04	30	155	2.23	12	0.02	2	2.43	0.04	0.05	1
57	RE HS93081207	2	28	13	38	0.1	25	15	233	3.62	3	5	2	16	5	0.2	2	2	51	0.08	0.01	37	145	0.57	44	0.16	2	1.41	0.03	0.4	1
58	STANDARD C	17	58	38	128	6.6	68	28	1069	3.98	40	18	7	35	52	17.6	14	19	54	0.52	0.09	37	56	0.93	185	0.09	37	1.88	0.06	0.14	10
59	STANDARD C	16	59	38	128	6.8	68	28	1060	3.96	40	17	6	35	52	17	14	22	56	0.51	0.09	37	55	0.92	183	0.09	33	1.88	0.06	0.14	10
60	STANDARD C	18	60	36	128	7.4	67	32	1050	4.01	42	18	7	35	52	18.5	14	17	54	0.51	0.09	39	60	0.92	185	0.09	32	1.92	0.06	0.14	10

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
61	WL3071301	3	5	4	12	0.1	7	2	137	0.71	17	5	2	2	7	0.2	2	2	7	0.15	0.03	4	219	0.46	7	0.01	2	0.39	0.03	0.03	1
62	WL3071302	1	20	5	103	0.1	29	6	331	1.99	3	5	2	7	11	0.2	2	2	20	0.22	0.04	12	228	0.98	150	0.11	3	1.05	0.04	0.65	1
63	WL3071303	3	29	6	8	0.2	8	1	46	3.13	6	5	2	9	4	0.2	2	2	34	0.01	0	16	204	0.1	29	0.01	11	0.82	0.01	0.09	1
64	WL3071401	1	16	6	25	0.1	27	7	129	2.64	2	5	2	3	30	0.2	2	2	70	0.47	0.05	14	208	0.74	87	0.12	2	0.71	0.1	0.26	1
65	WL3071402	16	424	12	51	0.1	38	24	118	5.57	16	5	2	5	4	0.2	2	2	32	0.04	0.01	12	146	1.51	53	0.08	2	2.62	0.01	0.55	1
66	WL3071403	67	215	9	28	0.1	20	6	104	2.86	3	5	2	2	24	0.2	2	2	133	0.29	0.01	8	193	0.45	178	0.11	3	1.2	0.11	0.52	1
67	WL3071404	2	46	18	99	0.1	17	12	294	3.89	2	5	2	5	66	0.2	2	2	91	0.92	0.04	14	145	1.16	79	0.2	2	2.55	0.31	0.97	1
68	WL3071505	1	5	49	38	0.1	37	17	429	2.67	4	5	2	2	185	0.2	7	2	35	1.65	0.02	7	83	1.85	13	0.23	4	2.46	0.01	0.06	1
69	WL3071603	2	137	11	45	0.2	34	11	295	2.83	3	5	2	2	14	0.2	2	2	26	0.33	0.04	9	99	0.88	114	0.07	2	1.24	0.07	0.7	1
70	WL3071604	1	22	54	14	0.1	16	4	106	1.02	2	5	2	9	12	0.2	3	2	3	0.09	0.01	16	141	0.17	53	0.01	5	0.36	0.05	0.13	1
71	WL3071701	1	5	23	44	0.1	72	24	367	16.5	2	5	2	10	4	0.2	2	8	552	0.16	0	9	189	0.95	117	0.27	2	0.77	0.01	0.46	1
72	WL3071702	1	2	5	32	0.1	28	11	222	3.32	2	5	2	13	8	0.2	2	2	40	0.09	0.01	35	147	2.16	18	0.01	33	2.29	0.02	0.09	1
73	WL3071704	3	26	4	7	0.1	16	6	60	2.14	3	5	2	2	23	0.2	2	2	12	0.13	0	9	196	0.12	26	0.01	5	0.31	0.03	0.08	1
74	WL3071705	10	797	43	39	0.6	89	35	418	10.5	3	5	2	7	8	0.2	2	6	73	0.04	0.01	12	153	1.16	42	0.15	2	2.33	0.03	0.3	1
75	WL3071801	2	11	4	68	0.1	9	9	238	3.09	4	5	2	11	27	0.2	2	2	65	0.5	0.04	24	80	2.25	550	0.3	6	2.32	0.19	1.47	1
76	WL3071802	1	95	3	32	0.1	37	18	419	3.22	3	5	2	2	14	0.2	2	2	94	1.5	0.03	4	133	1.11	42	0.2	9	1.3	0.15	0.19	1
77	WL3071803	1	60	3	41	0.1	34	22	376	5.39	5	5	2	5	11	0.2	2	2	144	0.67	0.02	6	80	1.33	209	0.24	2	1.42	0.1	0.78	1
78	WL3071804	1	5	4	30	0.1	41	14	180	4.19	4	5	2	2	20	0.2	2	2	107	0.35	0.07	20	179	2	496	0.18	2	1.68	0.08	0.92	1
79	WL3071901	2	2	2	22	0.1	4	3	207	1.26	2	5	2	2	3	0.2	2	2	18	0.19	0.05	21	101	1.68	8	0.01	2	1.12	0.07	0.03	1
80	WL3071902	1	4	2	2	0.1	5	1	58	0.33	2	5	2	2	1	0.2	2	2	2	0.01	0	2	251	0.04	6	0.01	2	0.03	0.01	0.01	1
81	WL3071907	7	348	12	35	0.1	67	49	331	6.96	42	5	2	11	5	0.2	2	2	56	0.09	0.03	20	145	1.02	108	0.11	2	2.59	0.01	0.98	1
82	WL3072002	1	15	5	39	0.1	19	5	153	2.07	2	5	2	3	18	0.2	2	2	28	0.27	0.05	23	152	0.46	73	0.1	3	0.53	0.08	0.24	1
83	WL3072006	2	35	11	44	0.1	24	12	380	2.84	15	5	2	3	18	0.2	2	2	50	0.41	0.01	7	99	0.97	49	0.16	5	1.04	0.06	0.37	1
84	WL3072110	2	78	11	21	0.1	45	14	160	3.16	8	5	2	13	15	0.2	2	2	33	0.05	0	23	188	0.65	48	0.07	6	2.08	0.03	0.18	1
85	WL3072113	5	112	2	17	0.1	105	23	121	3.11	27	5	2	10	9	0.2	2	2	19	0.04	0	25	150	0.6	22	0.08	4	2.37	0.04	0.11	1
86	WL3072202	6	245	47	63	0.5	73	22	131	5.32	194	5	2	9	7	0.4	2	2	45	0.05	0.01	20	134	1.44	88	0.04	3	2.05	0.02	0.58	1
87	WL3072206 A	18	247	13	41	0.6	41	13	375	3.84	2	5	2	3	8	0.2	2	4	41	0.06	0	10	181	0.86	66	0.05	6	1.24	0.04	0.24	1
88	WL3072206 B	2	59	8	42	0.1	28	13	482	3.89	6	5	2	2	19	0.2	2	2	44	0.71	0.07	11	113	0.87	68	0.12	8	1.57	0.09	0.31	1
89	WL3072207	2	41	3	48	0.1	29	28	265	4.41	3	5	2	2	37	0.2	2	2	103	0.66	0.06	9	379	2.29	330	0.38	4	1.97	0.08	1.33	1
90	WL3072208	2	84	16	54	0.3	22	11	250	4.55	5	5	2	2	96	0.2	2	2	95	0.71	0.04	11	266	1.52	120	0.21	8	2.77	0.2	1.16	1
91	WL3072209	3	197	9	31	0.4	15	14	474	2.18	2	6	2	3	77	0.2	2	2	16	2.6	0.02	7	65	0.34	53	0.11	20	2.42	0.05	0.24	16
92	WL3072305	2	13	9	43	0.1	101	27	306	8.17	14	5	2	8	6	0.2	2	2	65	0.07	0.01	7	191	3.11	66	0.02	18	3.43	0.02	0.44	1
93	WL3072501	3	9	2	22	0.1	17	8	202	1.8	27	5	2	4	4	0.2	2	2	14	0.04	0.01	13	203	0.41	25	0.01	6	0.79	0.01	0.12	1
94																															
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