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GEOLOGICAL REPORT

for the

IRON RANGE PROJECT

DELI 1-8, FeO 1-30, HC 1-10, IOX 1-12, IR 1-36, LUKE 1-8, TCK 1-8
Nelson Mining Division
Mapsheets 82F018, 82F019, 82F028
Latitude 49°12'N, Longitude 116°24'W
NTS 6832001 N / 633500E

Prepared for:
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November 12, 2002

GEOLOGICAL SURVEY BRANCH
ASSESSMENT REPORT

26,967

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SUMMARY

The Iron Range Property consists of 112 2-post claim units located in the Goat River area 15km NE of Creston, BC. The claims are owned 100% by Eagle Plains Resources Ltd., and carry no underlying royalties or encumbrances.

The Iron Range deposits were originally staked in 1897 and were covered by Crown Grants held by Cominco Ltd and the CPR. When the grants were reverted in 1999, Eagle Plains Resources Ltd. recognized the opportunity to secure the Iron Range deposits and the original FeO and IR claims were acquired. Past work on the Iron Range deposits by Cominco Ltd. was directed toward the considerable iron oxide resource and consisted of trenching and very shallow (20m depth) diamond drilling in the area along the Iron Range fault zone. Ongoing work by Eagle Plains Resources Ltd. is focused on exploring the potential of the Iron Range fault zone and surrounding area as a conduit and host for both Iron-oxide-Cu-Au (IOCG) mineralisation and sedimentary exhalative (SEDEX) Ag-Pb-Zn mineralisation.

2002 field work included geological mapping with an emphasis on structural and alteration mapping, at a scale of 1:20000. Grid and contour soil geochemical sampling aimed at constraining soil anomalies established in 2001. A limited rock geochemical sampling program was undertaken in order to assess the geochemical character of the Iron Range metasomatic ironstones and associated alteration.

The total cost of the 2002 geological exploration work on the Iron Range Project was $67,506.36.

Iron-oxide mineralisation on the Iron Range Property varies from hematite-rich mylonites to massive hematite and magnetite breccia bodies. Iron-oxide mineralisation crops out over a strike length in excess of 6km within the Iron Range fault zone, and an Iron-oxide + sulphide zone crops out over >1km strike length, and is open to the north. Iron Range metasomatic ironstones are marked by significant enrichment in Fe_2O_3, Au, V, Co, Cr, Ni, SiO_2 and Sc. Metasomatic ironstones from a limited whole-rock surface sampling program return values up to 106 ppm Au. Geochemical targets along and adjacent to the Iron Range fault zone exhibit enrichment in multiple IOCG indicator elements including Cu, Co, Ba, La and P.

SEDEX geochemical anomalies lie within a narrow stratigraphic interval near the contact between the Middle Aldridge and Ramparts facies. This stratigraphic interval is likely the time-equivalent to the Lower-Middle Aldridge contact (LMC), at which the recently closed Sullivan Ag-Pb-Zn deposit is located. Further exploration for SEDEX-Ag-Pb-Zn mineralisation should be focussed around this horizon.

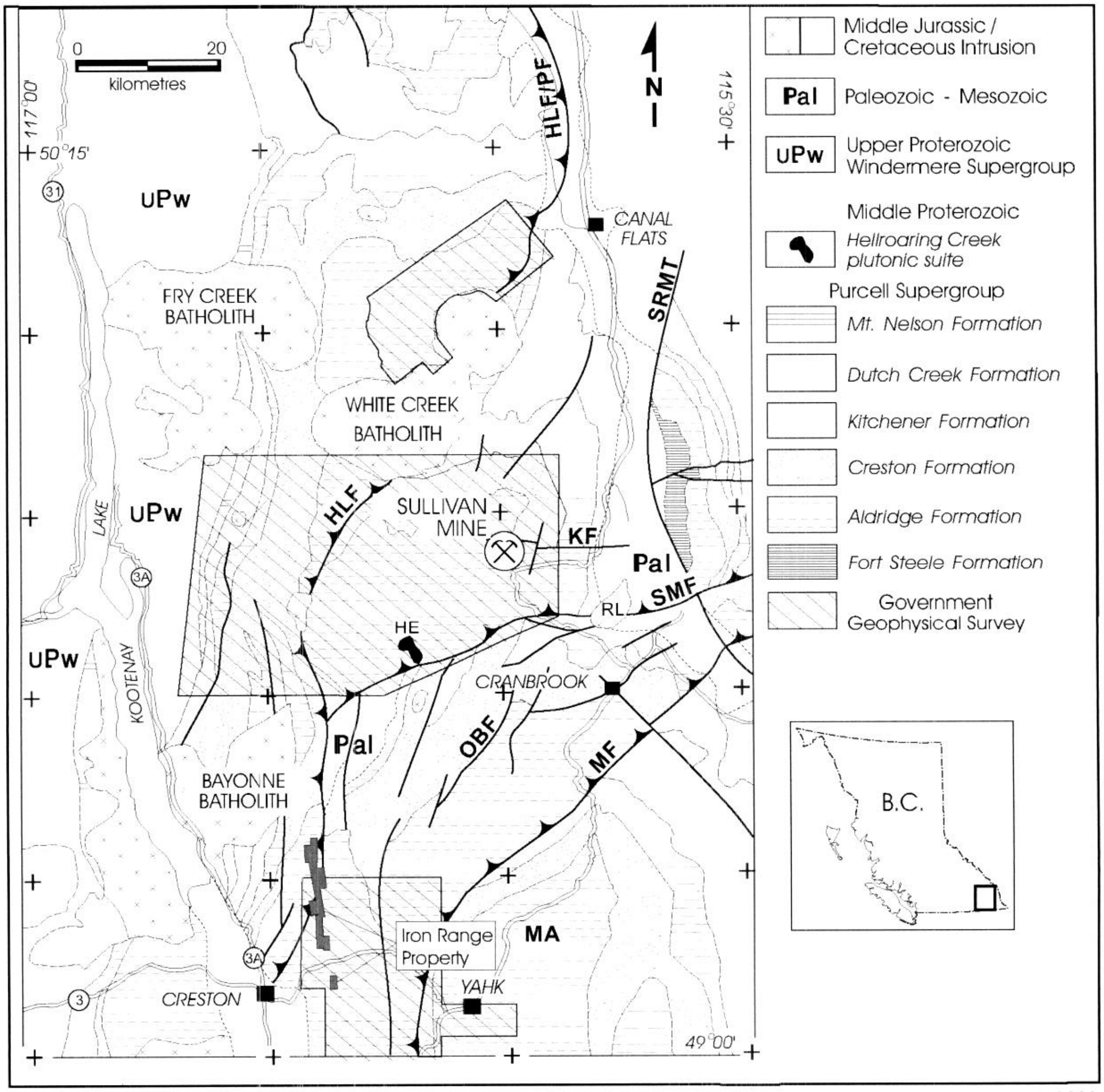
INTRODUCTION

This document is a report on field and analytical work performed by and on the behalf of Eagle Plains resources during 2002. Soil geochemical data is combined with data obtained by Eagle Plains during the 2001 field season.

PROPERTY DESCRIPTION, PHYSIOGRAPHY AND ACCESS

The Iron Range Property is located 15 km northeast of Creston, B.C. near the Goat River, and is accessed by a network of seasonally maintained BC Forest Service roads (Figure 1). The claims cover alpine to subalpine terrain within the Iron Range of the southern Purcell Mountains. Elevations range from 800 to 1900 meters, with moderate to very steep topography. Outcrop exposure is good on ridges but generally poor at lower elevations. Past trenching has exposed significant portions of the Iron Range structure. The summer field season lasts from May to mid-November. A well developed transportation and power corridor lie at the southern end of the IR and DELI claims, where a new high pressure gas pipeline and a high voltage hydro-electric line follow the CPR mainline and Highway 3 south. The rail line provides efficient access to the Cominco Ltd. smelter in Trail, B.C.

Figure 1: Property Location Map / Regional Geology



BCGS, 1998

TENURE

The property consists of 112 claims located on mapsheets 82F018, 82F019, and 82F028 approximately 15 kilometers NE of Creston, B.C. (Figure 2). The claims are owned 100% by Eagle Plains Resources Ltd. and carry no underlying encumbrances.

Figure 2: Claim Map

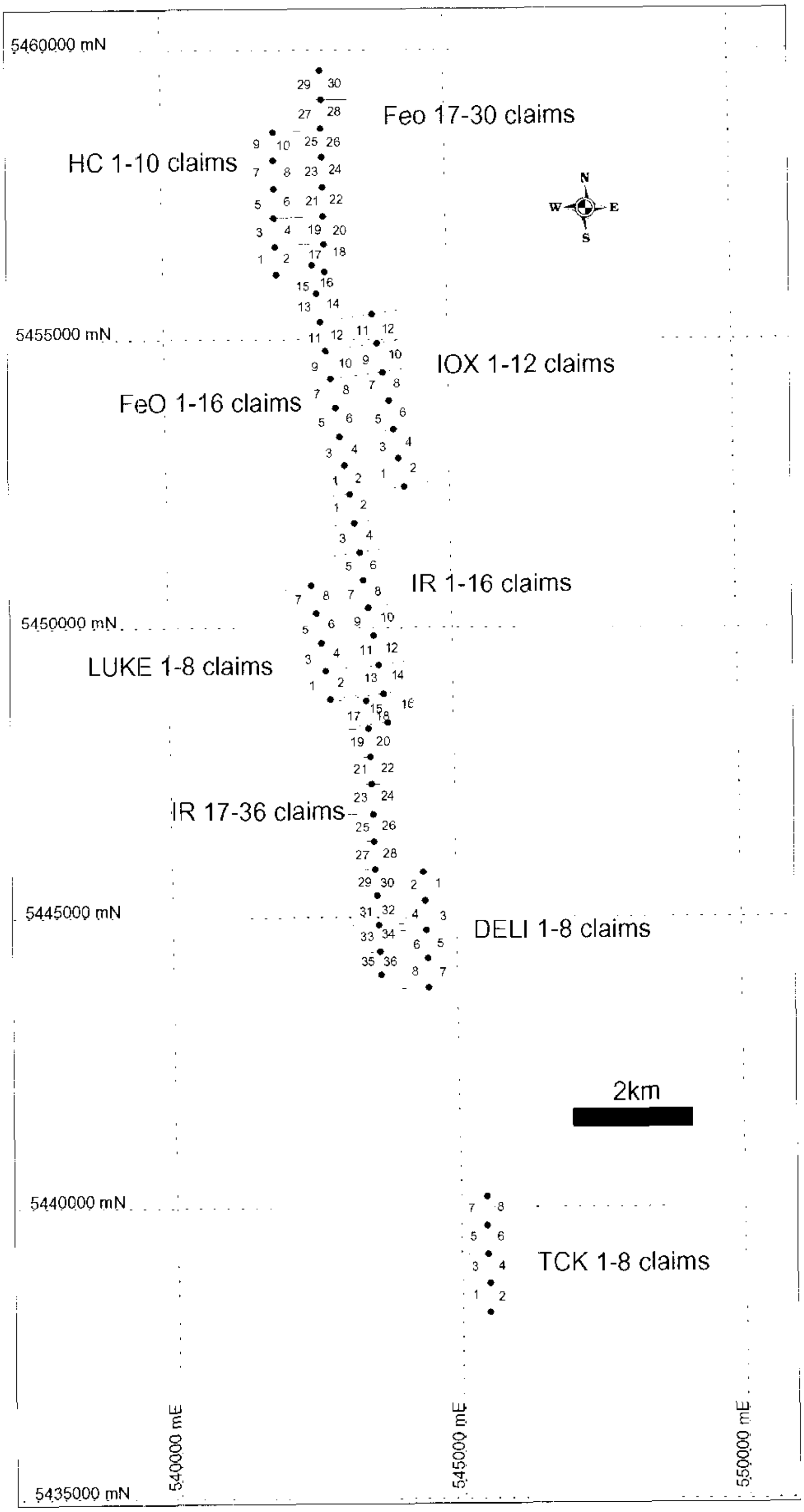


Table 1: List of claims

EAGLE PLAINS RESOURCES
Iron Range Project

Project	Location	Ownership	NSR %	Tenure Number	Claim Name	Map Number	Expiry Date	Mining Division	Units	Tag Number
Iron Range	S.E. B.C.	100% EPL	n/a	379349	FeO 1	82F028	2005SEP09	Nelson	1	687711M
Iron Range	S.E. B.C.	100% EPL	n/a	379350	FeO 2	82F028	2005SEP09	Nelson	1	687712M
Iron Range	S.E. B.C.	100% EPL	n/a	379351	FeO 3	82F028	2005SEP09	Nelson	1	687713M
Iron Range	S.E. B.C.	100% EPL	n/a	379352	FeO 4	82F028	2005SEP09	Nelson	1	687714M
Iron Range	S.E. B.C.	100% EPL	n/a	279353	FeO 5	82F028	2005SEP09	Nelson	1	687715M
Iron Range	S.E. B.C.	100% EPL	n/a	379354	FeO 6	82F028	2005SEP09	Nelson	1	687716M
Iron Range	S.E. B.C.	100% EPL	n/a	379355	FeO 7	82F028	2005SEP09	Nelson	1	687737M
Iron Range	S.E. B.C.	100% EPL	n/a	379356	FeO 8	82F028	2005SEP09	Nelson	1	687738M
Iron Range	S.E. B.C.	100% EPL	n/a	379357	FeO 9	82F028	2005SEP09	Nelson	1	687739M
Iron Range	S.E. B.C.	100% EPL	n/a	379358	FeO 10	82F028	2005SEP09	Nelson	1	687740M
Iron Range	S.E. B.C.	100% EPL	n/a	379359	FeO 11	82F028	2005SEP09	Nelson	1	687741M
Iron Range	S.E. B.C.	100% EPL	n/a	379360	FeO 12	82F028	2005SEP09	Nelson	1	687742M
Iron Range	S.E. B.C.	100% EPL	n/a	379361	FeO 13	82F028	2005SEP09	Nelson	1	687743M
Iron Range	S.E. B.C.	100% EPL	n/a	379362	FeO 14	82F028	2005SEP09	Nelson	1	687744M
Iron Range	S.E. B.C.	100% EPL	n/a	379363	FeO 15	82F028	2005SEP09	Nelson	1	687745M
Iron Range	S.E. B.C.	100% EPL	n/a	379364	FeO 16	82F028	2005SEP09	Nelson	1	687746M
Iron Range	S.E. B.C.	100% EPL	n/a	381631	FeO 17	82F028	2005SEP09	Nelson	1	708577M
Iron Range	S.E. B.C.	100% EPL	n/a	381632	FeO 18	82F028	2005SEP09	Nelson	1	708578M
Iron Range	S.E. B.C.	100% EPL	n/a	381633	FeO 19	82F028	2005SEP09	Nelson	1	708579M
Iron Range	S.E. B.C.	100% EPL	n/a	381634	FeO 20	82F028	2005SEP09	Nelson	1	708580M
Iron Range	S.E. B.C.	100% EPL	n/a	381635	FeO 21	82F028	2005SEP09	Nelson	1	708581M
Iron Range	S.E. B.C.	100% EPL	n/a	381636	Feo 22	82F028	2005SEP09	Nelson	1	708582M
Iron Range	S.E. B.C.	100% EPL	n/a	381637	FeO 23	82F028	2005SEP09	Nelson	1	708583M
Iron Range	S.E. B.C.	100% EPL	n/a	381638	FeO 24	82F028	2005SEP09	Nelson	1	708584M
Iron Range	S.E. B.C.	100% EPL	n/a	381639	FeO 25	82F028	2005SEP09	Nelson	1	708585M
Iron Range	S.E. B.C.	100% EPL	n/a	381640	FeO 26	82F028	2005SEP09	Nelson	1	708586M
Iron Range	S.E. B.C.	100% EPL	n/a	381641	FeO 27	82F028	2005SEP09	Nelson	1	708587M
Iron Range	S.E. B.C.	100% EPL	n/a	381642	FeO 28	82F028	2005SEP09	Nelson	1	708588M
Iron Range	S.E. B.C.	100% EPL	n/a	381643	FeO 29	82F028	2005SEP09	Nelson	1	708589M
Iron Range	S.E. B.C.	100% EPL	n/a	381644	FeO 30	82F028	2005SEP09	Nelson	1	708590M
Iron Range	S.E. B.C.	100% EPL	n/a	379365	IR 1	82F028	2005SEP09	Nelson	1	687721M
Iron Range	S.E. B.C.	100% EPL	n/a	379366	IR 2	82F028,029	2005SEP09	Nelson	1	687722M
Iron Range	S.E. B.C.	100% EPL	n/a	379367	IR 3	82F028	2005SEP09	Nelson	1	687723M
Iron Range	S.E. B.C.	100% EPL	n/a	379368	IR 4	82F028,029	2005SEP09	Nelson	1	687724M
Iron Range	S.E. B.C.	100% EPL	n/a	379369	IR 5	82F028	2005SEP09	Nelson	1	687725M
Iron Range	S.E. B.C.	100% EPL	n/a	379370	IR 6	82F028,029	2005SEP09	Nelson	1	687726M
Iron Range	S.E. B.C.	100% EPL	n/a	370371	IR 7	82F028	2005SEP09	Nelson	1	687727M
Iron Range	S.E. B.C.	100% EPL	n/a	379372	IR 8	82F028.029	2005SEP09	Nelson	1	687728M
Iron Range	S.E. B.C.	100% EPL	n/a	379373	IR 9	82F018,028	2005SEP09	Nelson	1	687729M
Iron Range	S.E. B.C.	100% EPL	n/a	379374	IR 10	82F028.029	2005SEP09	Nelson	1	687730M
Iron Range	S.E. B.C.	100% EPL	n/a	379375	IR 11	82F28.29,18	2005SEP09	Nelson	1	687731M
Iron Range	S.E. B.C.	100% EPL	n/a	379376	IR 12	82F28,29,18	2005SEP09	Nelson	1	687732M
Iron Range	S.E. B.C.	100% EPL	n/a	379377	IR 13	82F018,019	2005SEP09	Nelson	1	687733M
Iron Range	S.E. B.C.	100% EPL	n/a	379378	IR 14	82F018,019	2005SEP09	Nelson	1	687734M
Iron Range	S.E. B.C.	100% EPL	n/a	379379	IR 15	82F018,019	2005SEP09	Nelson	1	687735M
Iron Range	S.E. B.C.	100% EPL	n/a	379380	IR 16	82F019	2005SEP09	Nelson	1	687736M
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Iron Range	S.E. B.C.	100% EPL	n/a	381682	IR 18	82F018,019	2005SEP09	Nelson	1	694248M
Iron Range	S.E. B.C.	100% EPL	n/a	381683	IR 19	82F018	2005SEP09	Nelson	1	694249M
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Iron Range	S.E. B.C.	100% EPL	n/a	381685	IR 21	82F018	2005SEP09	Nelson	1	708591M
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Iron Range	S.E. B.C.	100% EPL	n/a	381688	IR 24	82F018,019	2005SEP09	Nelson	1	708594M
Iron Range	S.E. B.C.	100% EPL	n/a	381689	IR 25	82F018	2005SEP09	Nelson	1	708595M
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Iron Range	S.E. B.C.	100% EPL	n/a	381691	IR 27	82F018	2005SEP09	Nelson	1	708597M
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Iron Range	S.E. B.C.	100% EPL	n/a	381696	IR 32	82F018,019	2005SEP09	Nelson	1	694252M
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Iron Range	S.E. B.C.	100% EPL	n/a	382481	TCK 3	82F009,019	2004NOV16	Nelson	1	695103M
Iron Range	S.E. B.C.	100% EPL	n/a	382482	TCK 4	82F009	2004NOV16	Nelson	1	695104M
Iron Range	S.E. B.C.	100% EPL	n/a	382483	TCK 5	82F009	2004NOV16	Nelson	1	695105M
Iron Range	S.E. B.C.	100% EPL	n/a	382484	TCK 6	82F009	2004NOV16	Nelson	1	695106M

EAGLE PLAINS RESOURCES

Iron Range Project

Project	Location	Ownership	NSR %	Tenure	Claim	Map	Expiry	Mining	Units	Tag
				Number	Name	Number	Date	Division		Number
Iron Range	S.E. B.C.	100% EPL	n/a	382485	TCK 7	82F009	2004NOV16	Nelson	1	695107M
Iron Range	S.E. B.C.	100% EPL	n/a	382486	TCK 8	82F009	2004NOV16	Nelson	1	695108M
Iron Range	S.E. B.C.	100% EPL	n/a	394591	HC 1	82F028	2005SEP09	Nelson	1	687569M
Iron Range	S.E. B.C.	100% EPL	n/a	394592	HC 2	82F028	2005SEP09	Nelson	1	687570M
Iron Range	S.E. B.C.	100% EPL	n/a	394593	HC 3	82F028	2005SEP09	Nelson	1	687571M
Iron Range	S.E. B.C.	100% EPL	n/a	394594	HC 4	82F028	2005SEP09	Nelson	1	687572M
Iron Range	S.E. B.C.	100% EPL	n/a	394595	HC 5	82F028	2005SEP09	Nelson	1	687573M
Iron Range	S.E. B.C.	100% EPL	n/a	394596	HC 6	82F028	2005SEP09	Nelson	1	687574M
Iron Range	S.E. B.C.	100% EPL	n/a	394597	HC 7	82F028	2005SEP09	Nelson	1	687575M
Iron Range	S.E. B.C.	100% EPL	n/a	394598	HC 8	82F028	2005SEP09	Nelson	1	687576M
Iron Range	S.E. B.C.	100% EPL	n/a	394599	HC 9	82F028	2005SEP09	Nelson	1	687577M
Iron Range	S.E. B.C.	100% EPL	n/a	394600	HC 10	82F028	2005SEP09	Nelson	1	687578M
Iron Range	S.E. B.C.	100% EPL	n/a	394606	LUKE 1	082F018	2005SEP09	Nelson	1	687593M
Iron Range	S.E. B.C.	100% EPL	n/a	394607	LUKE 2	082F018	2005SEP09	Nelson	1	687594M
Iron Range	S.E. B.C.	100% EPL	n/a	394608	LUKE 3	082F018	2005SEP09	Nelson	1	687595M
Iron Range	S.E. B.C.	100% EPL	n/a	394609	LUKE 4	082F018	2005SEP09	Nelson	1	687596M
Iron Range	S.E. B.C.	100% EPL	n/a	394610	LUKE 5	082F018	2005SEP09	Nelson	1	687597M
Iron Range	S.E. B.C.	100% EPL	n/a	394611	LUKE 6	082F018	2005SEP09	Nelson	1	687598M
Iron Range	S.E. B.C.	100% EPL	n/a	394612	LUKE 7	082F028	2005SEP09	Nelson	1	687599M
Iron Range	S.E. B.C.	100% EPL	n/a	394613	LUKE 8	082F028	2005SEP09	Nelson	1	687600M
Iron Range	S.E. B.C.	100% EPL	n/a	394614	IOX 1	082F029	2005SEP09	Nelson	1	687581M
Iron Range	S.E. B.C.	100% EPL	n/a	394615	IOX 2	082F029	2005SEP09	Nelson	1	687582M
Iron Range	S.E. B.C.	100% EPL	n/a	394616	IOX 3	082F029	2005SEP09	Nelson	1	687583M
Iron Range	S.E. B.C.	100% EPL	n/a	394617	IOX 4	082F029	2005SEP09	Nelson	1	687584M
Iron Range	S.E. B.C.	100% EPL	n/a	394618	IOX 5	082F029	2005SEP09	Nelson	1	687585M
Iron Range	S.E. B.C.	100% EPL	n/a	394619	IOX 6	082F029	2005SEP09	Nelson	1	687586M
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Iron Range	S.E. B.C.	100% EPL	n/a	394621	IOX 8	082F029	2005SEP09	Nelson	1	687588M
Iron Range	S.E. B.C.	100% EPL	n/a	394622	IOX 9	082F029	2005SEP09	Nelson	1	687589M
Iron Range	S.E. B.C.	100% EPL	n/a	394623	IOX 10	082F029	2005SEP09	Nelson	1	687590M
Iron Range	S.E. B.C.	100% EPL	n/a	394624	IOX 11	082F029	2005SEP09	Nelson	1	687591M
Iron Range	S.E. B.C.	100% EPL	n/a	394625	IOX 12	082F029	2005SEP09	Nelson	1	687592M
Iron Range	S.E. B.C.	100% EPL	n/a	395858	DELI 1	082F019	2005SEP09	Nelson	1	687747M
Iron Range	S.E. B.C.	100% EPL	n/a	395859	DELI 2	082F019	2005SEP09	Nelson	1	687748M
Iron Range	S.E. B.C.	100% EPL	n/a	395860	DELI 3	082F019	2005SEP09	Nelson	1	687749M
Iron Range	S.E. B.C.	100% EPL	n/a	395861	DELI 4	082F019	2005SEP09	Nelson	1	687750M
Iron Range	S.E. B.C.	100% EPL	n/a	395862	DELI 5	082F019	2005SEP09	Nelson	1	687759M
Iron Range	S.E. B.C.	100% EPL	n/a	395863	DELI 6	082F019	2005SEP09	Nelson	1	687760M
Iron Range	S.E. B.C.	100% EPL	n/a	395864	DELI 7	082F019	2005SEP09	Nelson	1	687777M
Iron Range	S.E. B.C.	100% EPL	n/a	395865	DELI 8	082F019	2005SEP09	Nelson	1	687778M

HISTORY AND PREVIOUS WORK

The Iron Range prospect was discovered and staked in 1897 along an extensive belt of iron oxide showings. Initial work included several small shafts, adits, and trenches, as well as limited diamond drilling to a maximum depth of 20 meters. Many of the original claims on the Iron Range were established as Crown Grants. In 1939, The Consolidated Mining and Smelting Company of Canada Ltd., along with its parent company Canadian Pacific Railroad (CPR), acquired the main claim block on the northern part of Iron Range Mountain. The claims were evaluated by CM&S (now Teck Cominco Ltd.), to assess the potential for a large iron resource. As part of this evaluation, Cominco Ltd. completed an extensive trenching program in 1957, exposing the Iron Range structure and mineralisation over more than 4 kilometers strike length. Most of the Iron Range Crown Grants were held by Cominco – CPR until 1999, when they were reverted. Eagle Plains Resources Limited restaked the original Crown Grants as the FeO and IR claims on the day the historic grants lapsed. These claims cover the main part of the Iron Range structure worked by Cominco including the historic Union Jack crown grant in the north and the Rhodesia crown grant in the south. Eagle Plains subsequently staked the TCK claims in the area of Thompson Creek to cover the historic Great War crown grants. In 2001, Eagles Plains undertook extensive soil sampling on the Iron Range property.

2002 WORK PROGRAM

The 2002 Eagle Plains Resources exploration program commenced with a detailed interpretation of geochemical data collected during 2001 (Marshall, 2002), in order to establish geochemical targets for further exploration. Based on these results, Eagle Plains Resources Ltd. staked the LUKE, IOX and DELI claims. 2002 field work included geological mapping with an emphasis on structural and alteration mapping, at a scale of 1:20000. Grid and contour soil geochemical sampling aimed at constraining soil anomalies established from samples collected in 2001. A total of 769 soil samples and 10 silt samples were collected from the Iron Mountain area. Thirty-nine rock samples were analyzed in order to assess the geochemical character of the Iron Range metasomatic ironstones and associated alteration. All samples were collected, handled, catalogued and prepared for shipment by Eagle Plains Resources staff, and were shipped to Assayers Canada, B.C. for analysis (see Geochemistry below).

Field crews were either billeted in Creston or drove to the property from Cranbrook. ATV's were used to access the main part of the property.

All exploration and reclamation work was carried out in accordance to Ministry of Environment, Ministry of Mines and WCB regulations.

The total cost of the 2002 geological exploration work on the Iron Range Project was $67,506.36.

GEOLOGY

Regional Geology

The Middle Proterozoic Belt-Purcell Supergroup comprises a thick (>10,000m) sequence of dominantly clastic sediments deposited in an intracratonic basin. Sedimentary rocks of the Lower Purcell Supergroup, represented by the Aldridge and Creston Formations, are dominated by syn-rifting deep-water turbidites. The Aldridge Formation has been subdivided into three informal members (Reesor, 1958). The >5000m thick Lower Aldridge comprises thin- to medium-bedded argillaceous turbidites which are commonly pyrrhotite-bearing, giving the sediments a rusty weathering appearance. Overlying this sequence, a quartzitic turbidite sequence thins from approximately 800m thickness in the Creston region, where it is referred to as the Ramparts Facies, to the approximately 250m thick footwall quartzite in the footwall to the Sullivan Pb-Zn-Ag deposit. This sequence is generally considered to represent the uppermost Lower Aldridge stratigraphy (e.g. Slack and Höy, 2000).

The 2400m thick Middle Aldridge comprises medium- to thick-bedded quartzofeldspathic turbidites and subordinate laminated siltstone. Both the Lower and Middle Aldridge are intruded by the mafic Moyie Intrusions, largely emplaced as sills into unconsolidated sediments. U-Pb geochronology from Moyie Intrusions has yielded ages of 1468 and 1469 Ma (Anderson and Davis, 1995; Schandl and Davis, 2000) providing an approximate age for Middle Aldridge sedimentation. The Upper Aldridge consists of 300m of thin-bedded argillite and carbonaceous siltstone. Aldridge Formation sediments are overlain by the 1800m thick Creston Formation, comprising grey, green and maroon wacke, mudstone and arenite, deposited in a shallow-water environment.

Felsic intrusives comprise both Proterozoic (e.g. Hell Roaring Creek stock, Greenland Creek pluton) and Cretaceous (e.g. White Creek batholith, Bayonne batholith) granitoids.

Local Geology

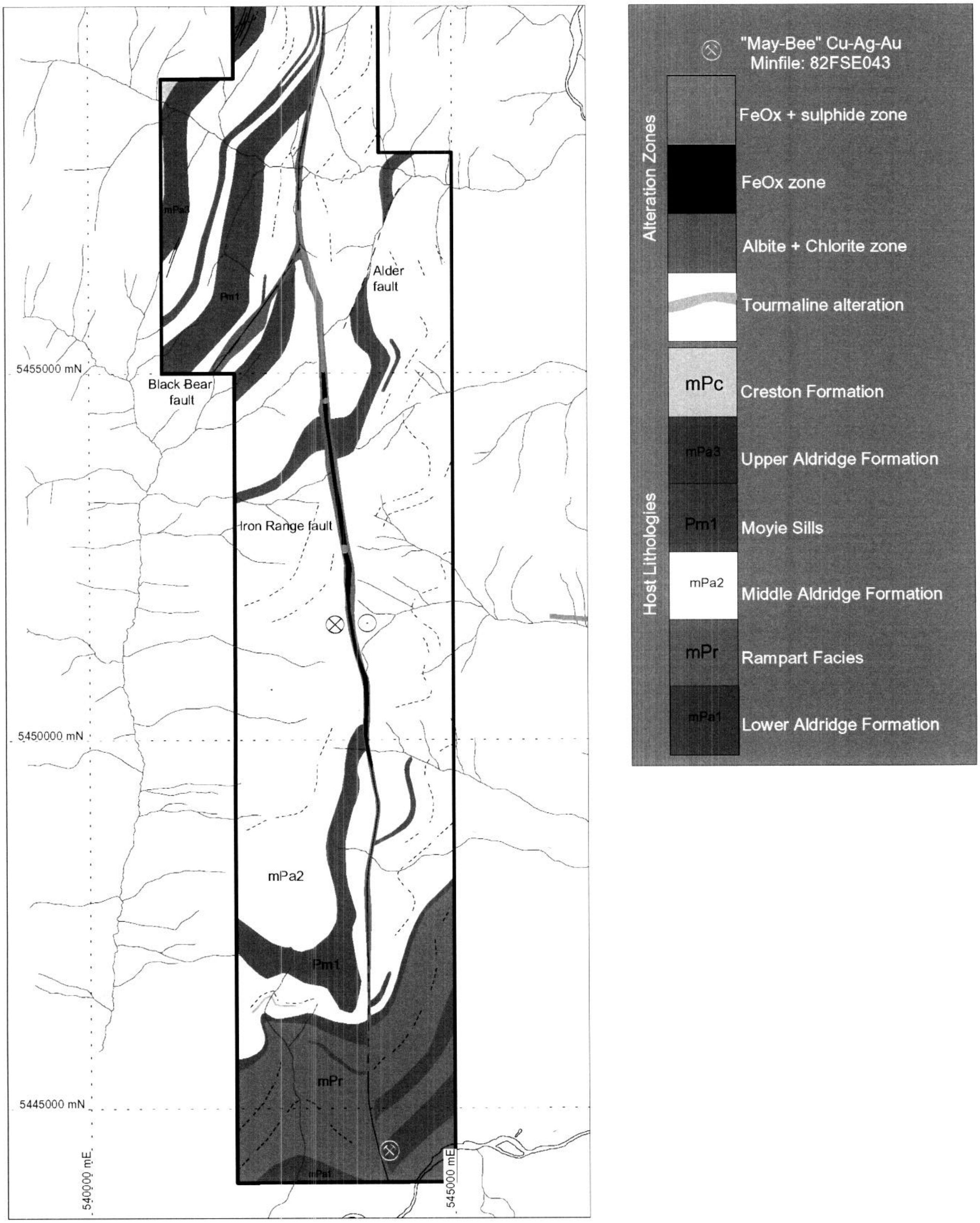
Stratigraphy

Lower Purcell Supergroup rocks from uppermost Lower Aldridge to lowermost Creston Formation are found within the map area (Figure 3). Thin to medium bedded, rusty weathering siltstones and argillites are restricted to the southernmost portion of the map area and are here correlated with the Lower Aldridge.

Approximately 700-800m of medium to thick-bedded, pale to medium grey quartzite, with subordinate laminated siltstone conformably overlies Lower Aldridge stratigraphy. This sequence is correlated with the Rampart facies.

Conformably overlying the Rampart facies are approximately 2000-2500m of medium to thick bedded wacke, quartzite and arenite with subordinate siltstone and silty shale, of the Middle Aldridge. Due to the similarity in lithologies between the Ramparts facies and the Middle Aldridge, the contact between the two is approximate. The position of the Ramparts – Middle Aldridge contact is here based on 1) a subtle change from predominantly pale grey sedimentary rocks in the Middle Aldridge to medium grey rocks in the Ramparts facies; 2) an increase in the relative abundance of concretions in the Ramparts facies; and 3) a consistent increase in the K and Ba concentrations in soils overlying the Ramparts facies (see Geochemistry below).

Figure 3: Property Geology



Approximately 200m of thinly bedded carbonaceous siltstones and argillite comprising the Upper Aldridge crop out in the northwestern portion of the map area. Conformably overlying Upper Aldridge sedimentary rocks pale green phyllites of the lowermost Creston Formation are found on the northwestern margin of the map area.

Intrusive Rocks

Gabbros and diorites of the Moyie Intrusions are present as sills in the Ramparts facies and the Middle Aldridge with individual widths up to approximately 100m. These sills can be divided into a lower series in the Ramparts facies and lowermost Middle Aldridge, and an upper series in the uppermost Middle Aldridge. Individual sills vary substantially in grain size, color and magnetic character rendering correlation based on these characteristics problematic. Most of the sills are non-to weakly-magnetic, and rarely attract a hand magnet. Adjacent to some sill contacts, Aldridge Formation *sedimentary rocks record soft-sediment deformation features consistent with the* interpretation that the sills were emplaced into wet sediments. Gabbro is also found as pods within the Iron Range fault zone, suggesting that gabbro was emplaced as a dyke along at least part of this structure (see below).

While granitoid intrusions are not found within the Iron Range map area, the exposed margin to the Cretaceous Bayonnne batholith crops out approximately 10km to the northwest.

A polymictic lamprophyre breccia dyke with biotite phenocrysts up to 2cm is noted at one locale to be emplaced along the Iron Range fault zone. The matrix to the lamprophyre breccia is non-foliated suggesting it was emplaced late in the fault history.

Folding and related structures

The Iron Range fault zone is exposed on the west limb of the Goat River anticline, a regional scale gently north-northwest plunging fold. The trace of the fault trends approximately north, such that at the northern end of the map area, the fault lies approximately 5km from the axial trace of the Goat River anticline, while at the southern end of the property, the two are approximately coincident. As a consequence, bedding in the northern half of the map area (north of 5 452 000 mN) most commonly dips moderately to the west-northwest, with subordinate beds on the eastern limbs of parasitic anticlines dipping to the east-southeast (Figures 5a,b). The southern half of the map area (south of 5 452 000 mN) is approximately coincident with the axial trace of the Goat River anticline, and bedding is nearly flat lying (Figures 5c,d).

Although east-dipping fold limbs are poorly represented in the map area, an approximately 90° spread in the orientation of east- and west-dipping fold limbs indicates that the Goat River anticline and associated parasitic folds are open folds (Figure 4). The calculated orientation of the axial plane to regional folds is 195/83 (west-northwest-dipping).

Fold axes to mesoscale folds exhibit shallow to moderate plunges to the north-northwest, that are consistent with the calculated βeta axis orientation of 07/015 (Figure 4). The approximately 30° spread in both the plunge of measured and calculated fold axes and the spread in bedding measurements reflect a non-cylindrical component to the regional fold hinges.

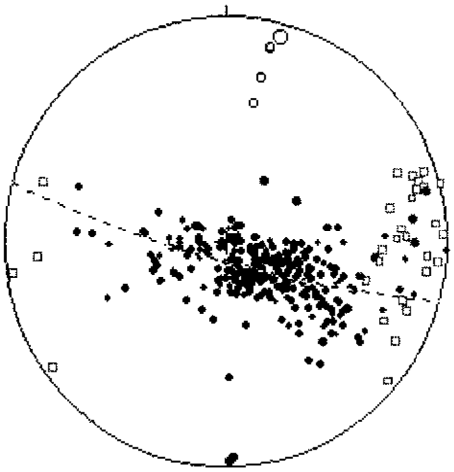


Figure 4: Stereographic projections, Iron Range map area

Filled black circles: bedding measurements
Filled pale grey circles: bedding measurements adjacent to Iron Range fault (drag folds)
Filled dark grey circles: bedding measurements adjacent to Black Bear fault (drag folds)
Small open black circles: fold axis measurements
Large open black circle: calculated fold axis (Beta axis)
Open grey squares: shear fabric

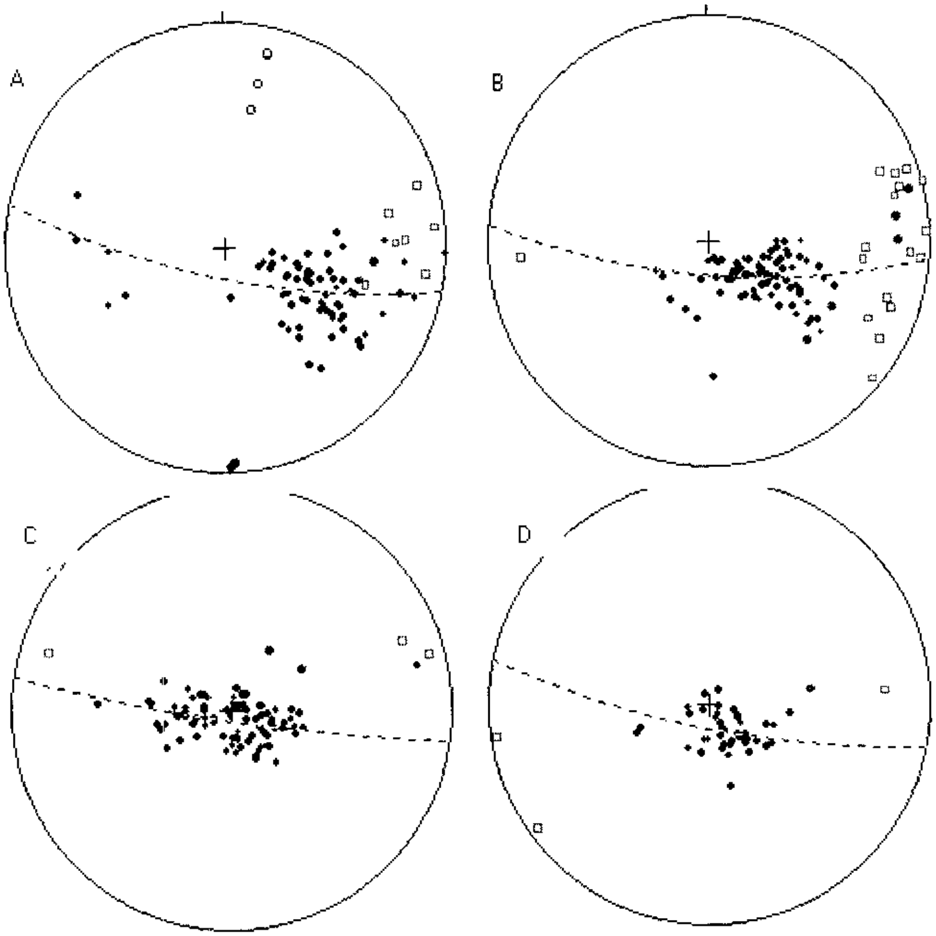


Figure 5: Stereographic projections, Iron Range map area, sorted by domain

Filled black circles: bedding measurements
Filled pale grey circles: bedding measurements adjacent to Iron Range fault (drag folds)
Filled dark grey circles: bedding measurements adjacent to Black Bear fault (drag folds)
Small open black circles: fold axis measurements
Open grey squares: shear fabric

a. Iron Range map area, NW quadrant
b. Iron Range map area, NE quadrant
c. Iron Range map area, SW quadrant
d. Iron Range map area, SE quadrant

A regional foliation is best developed in fine grained siltstones and silty shales, most common in the northern half of the map area. The mean orientation to this regional foliation is 196/61 (west-northwest-dipping). Except where measured along the axial plane of mesoscale parasitic folds, this foliation has a more shallow dip than the calculated axial plane to the Goat River anticline (195/83). This difference can be explained by the common observation that the moderate-dipping regional foliation in fine grained lithologies refracts across coarser grained lithologies to form a sub-vertical fracture cleavage. Thus while the regional foliation is not typically axial planar to regional folds it is a product of the folding event.

Iron Range fault zone

The Iron Range deposits are located along the Iron Range Fault system, a regional structural feature which has a strike length of at least 90 kilometers. The fault zone forms a continuous deformation corridor stretching from the southern to northern ends of the property. Stinson and Brown (1995) note that a southern continuation of the fault is exposed 1.5km southeast of Mt Thompson, where it forms an anastamosing set of faults. To the north of the map area the Iron Range fault is cut by the Arrow Creek thrust system (Reesor, 1981).

In the northern half of the map area the fault trends north-south and a westward deflection of the fault zone at lower elevations in Hall Creek indicates a steep dip to the west. In the southern half of the map area the fault trends north-south, with a near vertical dip.

Within the map area, the Iron Range fault zone ranges in width from <50m to approximately 150m. Net displacement is difficult to constrain due to the lack of distinct stratigraphic horizons, but appears to be minor, based on the apparent offset of a sill in the central portion of the map area. The fault zone is characterized by a combination of brittle and ductile features, including a central mylonite zone with localized cataclastic breccias. This grades outwards in both the footwall and hangingwall into zones of crackle brecciation, veining and localized shearing. The structural features preserved in the fault indicate at least one period of deformation after the sediments were lithified, and after crystallization of the Moyie Intrusions. Further, crackle breccias in the fault zone are not overprinted by the regional foliation, suggesting that at least some deformation along the Iron range fault zone occurred late- to post-folding and regional foliation development. The range of preserved deformation styles suggests deformation occurred near the clastico-frictional to quasi-plastic transition described by Sibson (1977), which typically occurs at a depth between 10 and 15 km.

The shear fabric developed within the fault zone has a mean orientation of 178/77 (west-dipping) and variation in strike of individual measurements between approximately 160 and 200° reflects anastamosing of the shear fabric within the fault zone. Given the correlation between the mean orientation of the measured shear fabric, and the mapped orientation of the fault, the mean shear fabric is taken as a good approximation of the fault orientation. In the northern half of the map area, the shear fabric has a mean orientation of 181/76 (west dipping) while in the southern half the mean orientation is 168/85 (west dipping).

Drag folding of both sediments and gabbroic sills is noted in both the footwall and hangingwall to the fault. Bedding measurements on both sides of the fault exhibit a consistent shift towards more steeply west-dipping orientations as the fault is approached (Figure 2). This suggests predominantly normal displacement on the fault during at least one ductile (or brittle-ductile) slip event. The occurrence of rare pull-apart structures within banded hematite-quartz mylonite also suggests normal displacement.

Early fault history

The occurrence of pods of gabbro along the Iron Range fault zone at stratigraphic positions where no sills are found, as well as the stratigraphic mismatch of sills across the fault zone both suggest that the fault acted as a conduit for emplacement of the Moyie Intrusions. This is further supported by the observation that Moyie intrusions are anomalously thick and abundant in the vicinity of the Iron Range fault. Given that the Moyie Intrusions are widely accepted as having been emplaced into unconsolidated sediments deposited syn-rifting, it seems most likely that at least a portion of the Iron Range fault was active as a normal growth fault during sedimentation.

In the northern half of the map area, the Iron Range fault lies predominantly on the west-dipping limb of the Goat River anticline, which has a mean orientation of approximately 210/30. By unfolding this limb to horizontal about the regional fold axis, the original orientation of the Iron Range fault in the northern half of the map area is shown to have been approximately 170/50 (west-dipping). In the southern half of the map area the fault cuts near flat-lying stratigraphy, and as such the current orientation of the fault of approximately 170/85 (west-dipping) is close to the original orientation.

Other fault zones

A broad zone of weak crackle brecciation and albitisation striking approximately 035° with a near vertical dip marks the previously unnamed Black Bear fault (Figure 3). The fault zone is poorly exposed, and timing, sense and magnitude of displacement remain unconstrained. The projected intersection between the Black Bear fault and the Iron Range fault occurs at approximately 542 900 mE and 5 456 700 mN.

An inferred fault marks the apparent 1100m stratigraphic offset of a sill to the east of the Iron Range fault in the northern half of the map area, and is here named the Alder fault. The Alder fault is not exposed, and it remains uncertain as to whether the apparent offset is a result of the intrusion cutting upsection during emplacement along a growth fault, tectonic displacement, or a combination of the two. The projected intersection of the Alder fault and the Iron Range fault zone occurs at approximately 543 230 mE and 5 455 060 mN.

The Crackerjack fault is described by Stinson and Brown (1995) as a narrow fault zone trending approximately parallel to and east of the Iron Range fault. The Crackerjack fault was located by the author just outside of the map area (545 640 mE, 5 453 170 mN), where it is marked by a zone approximately 10m wide of crackle to mosaic brecciation within Middle Aldridge quartzite. It remains uncertain if and where the Crackerjack and Iron Range faults intersect.

Metasomatism

Albite + Chlorite Zone

The Iron Range fault zone has acted as a conduit for hydrothermal fluids that have resulted in a variety of alteration styles. The Albite + Chlorite Zone affects the entire length of the Iron Range fault within the map area, as well the exposed portion of the Black Bear and Crackerjack faults, covering a mapped area greater than 1.5km^2 (ie. >3% of the map area). The Albite + Chlorite Zone is characterized by moderate to intense albite alteration of sedimentary rocks. Fluid access to the sedimentary rocks shows a clear brittle control, with well-developed albite envelopes developed around some fractures, and albitic alteration rims on breccia clasts. Fractures and breccia matrix and infill contain ± quartz, chlorite, hematite and magnetite, with locally trace pyrite. Where Moyie intrusions are affected by this alteration style, chlorite is the dominant alteration mineral, with subordinate albite, magnetite, hematite and trace pyrite. Fluid access to the Moyie intrusions predominantly accompanied ductile shearing. Total iron oxide minerals account for <10 volume % of the altered rocks in the Albite + Chlorite Zone.

FeOx Zone

Located within the central portion of the Iron Range fault zone, the FeOx Zone is characterized by intense albite and chlorite alteration with >10 volume % total iron oxide (magnetite + hematite + supergene products of the above) and <2 volume % pyrite. Hematite is far more abundant than magnetite, although Stinson and Brown (1995) note that magnetite is commonly pseudomorphed by hematite, suggesting that magnetite may originally have been the dominant iron oxide phase. Iron oxide alteration exhibits both brittle and ductile controls, with banded quartz + hematite mylonite, intensely sheared Moyie intrusions and cataclastic breccias recognized within the zone.

FeOx + Sulphide Zone

The FeOx + Sulphide Zone is similar in character to the FeOx Zone described above, but contains >2% pyrite, and locally up to 20% pyrite. Trace bornite is noted in some hand samples, and Stinson and Brown (1995) report trace chalcopyrite. Sulphides appear to have precipitated contemporaneously with iron oxide minerals. The northern limit to the zone is poorly constrained due to a lack of outcrop. Interestingly, the main exposed portion of the FeOx + Sulphide Zone lies between the projected intersections of the Iron Range fault zones and the Black Bear and Alder faults.

May Bee Showing

The May Bee showing (MINFILE 082FSE043) is located on the southern part of the DELI Claim block (Fig.3). Mineralization is related to a 0.3 - 1.5 meter width quartz vein hosted by a diorite sill assigned to the Middle Proterozoic Moyie intrusions. The sills and an adjoining lamprophyre dyke are hosted in Ramparts facies sediments. Mineralization consists of chalcopyrite in a vertically dipping, northwest striking the quartz vein. Assays include up to 1.81% copper, 1 gram per tonne gold and 17 grams per tonne silver over 0.7 meters. The vein was developed on two levels 55 meters apart, and five other mineralized veins were exposed by trenching. (Minister of Mines Annual Report 1957, p.61). The May Bee showing area was covered by 2002 soil sampling which outlined a geochemically anomalous zone. (Fig. 14)

Tourmaline Zone

Very fine-grained tourmaline needles, comprising up to 10 volume % of the rock, are noted in one 10m thick dark gray silty-shale horizon within the lowermost Middle Aldridge. The relationship of this zone to the Iron Range fault is uncertain.

GEOPHYSICS (see also Appendix III)

A portion of the Iron Range Fault structure was covered by an airborne electromagnetic, total field magnetic, gamma-ray spectrometric and VLF survey flown in 1995-96 by the BCGS. The north-trending Iron Range fault system is the most spectacularly imaged fault detected by the survey (Appendix III, Fig. C20-4c) producing an intense linear magnetic anomaly with a peak amplitude of 1130 nT. The width of the anomaly varies from less than 1 kilometer to about 4 kilometers. Ground follow-up indicates that the primary magnetic sources are the massive lenses of magnetite and hematite which grade outward into wider, less-brecciated, magnetite-rich zones. The highest magnetic susceptibility values in the entire survey were measured in these massive lenses. Peaks in magnetic intensity along the fault zones where no magnetite-rich lenses have been mapped may indicate the position of buried lenses (Lowe et al 2000).

The gamma-ray spectrometric survey detected a wide zone of fault controlled iron-oxide mineralization and albite-sericite alteration along the trace of the Iron Range fault zone. (Appendix III, Fig. C20-5c). The zone is characterized by elevated eTh/K values along the Iron Range structure thought to correlate with albite-rich breccias within the fault zone, regions of extensive albitic alteration adjacent to the fault zone, and apophyses of albite-rich material that extend up to a few meters into adjacent Moyie sills. eTh/K anomalies are most intense in the vicinity of the May-Bee showing.

GEOCHEMISTRY

Rock geochemistry

A total of 39 rock samples were analyzed by Assayers Canada by both whole rock analysis and Multi element ICP scan, as well as AA analysis for gold. The sample suite included the following: unaltered gabbroic Moyie sills (n=3), chlorite altered gabbroic Moyie sills (n=4), garnetiferous Moyie sills (n=1), unaltered Middle Aldridge siltstones (n=5), rusty weathering Middle Aldridge silty shale (n=1), albitised Middle Aldridge siltstones (n=4), albitised Middle Aldridge siltstones with significant FeOx crackle veining (n=3), and metasomatic ironstones (n=16). Further samples were analysed from the May-Bee Cu-Ag-Au prospect (n=2). Large samples were selected for analysis (typically >1Kg), and care was taken to avoid any weathering effects in the samples.

Whole rock analysis (WRA)

A 0.1g sub sample was fused in Lithium metaborate ($LiBO_2$) for 10 minutes at ~1000°C. The fused samples were then dissolved in 50ml of dilute nitric acid and analyzed by ICP. The LOI analysis used a 1g sub sample which was heated for 90 minutes at ~1000°C. The sample was weighed before and after heating to determine the LOI.

Assayers Canada reported significant problems with the Lithium metaborate fusion for some of the Iron Range samples with high Fe content. As a result WRA analyses from 11 samples (IR156A, IR158, IR149A, IR153, IR149C, IR150, IR155, IR269, IR278, IR276, and IR218) have been disregarded in the following interpretations. No analytical problems were reported for the remaining samples.

The whole rock method does have a large dilution factor (0.1g to 50 ml = 500x dilution) affecting the precision of trace element analyses.

Multi element ICP scan (ICP)

A 0.5g sub sample was digested in aqua-regia (HCl-HNO3) for 90 minutes in a water bath at ~90°C. The samples were diluted to 25ml and analyzed by ICP. The multi-element ICP method has a much lower dilution than the WRA method (0.5g to 25ml = 50x dilution) resulting in better precision for trace element analyses.

Aqua Regia digestion can result in incomplete digestion of a number of elements (Al, Ba, Be, Ca, Cr, Fe, Mg, Mn, P, K, Na, Sr, Sn, Ti, W and Zr) depending on sample mineralogy. No analytical problems were reported for any of the samples using this method. However, because of the potential problem of incomplete digestion, analyses for the indicated elements should be considered as semi-quantitative.

Au geochemistry (Au)

A 30g sub-sample was fused using a lead collection flux with a silver inquart. The resulting lead button was oxidized in a furnace to drive off the lead, leaving a precious metal bead. The bead was dissolved in aqua-regia and gold read on the AA. No analytical problems were reported for any of the samples using this method.

Because of the above mentioned analytical concerns, WRA data was used in investigating relative mass changes associated with metasomatism along the Iron Range fault (see Isocon analysis below), and for variations in major element chemistry (see

Major element chemistry below). ICP data was used in studying the covariance of trace elements (see Trace element chemistry below).

Ratios of immobile elements are commonly used in discriminating geochemical rock suites. For the Iron Range samples, a bivariate plot of MgO vs Zr/Al_2O_3 (Figure 6) clearly distinguishes between gabbroic and sedimentary geochemical suites. Zr and Al_2O_3 are relatively immobile in most hydrothermal systems, and while MgO can be mobile in some systems, isocon analysis (see below) indicates that MgO was relatively immobile in the Iron Range alteration systems, and as such its use in discriminating geochemical precursors is justified. The bivariate plot of MgO vs Zr/ Al_2O_3 clearly indicates that the metasomatic ironstones for which useable WRA data was reported were derived from sedimentary precursor rocks. This determination has allowed for an investigation of the relative mass gains and losses by metasomatic alteration by isocon analysis.

Isocon analysis

Isocon analysis is a geochemical technique used to illustrate relative mass changes between unaltered and altered rocks. The concentration of a particular oxide or element is multiplied by a chosen factor for both the unaltered and altered rock, producing a dimensionless bivariate plot of unaltered vs. altered rock. Either pairs of single analyses or averages of unaltered and altered rock compositions can be used. Averages are commonly employed as they tend to smooth out the effects of precursor variation. A line of best fit (the isocon) is drawn through the origin and suspected immobile elements (commonly Zr, TiO_2, Y, Al_2O_3 and Ga). In this investigation, isocons were drawn through Zr. The isocon separates the plot into elements that have been gained during metasomatism vs those that have been lost. The further a given oxide or element plots from the isocon, the greater the relative mass change. Thus, elements lying close to the isocon are relatively immobile during alteration. The slope of the isocon further serves to indicate the overall mass gain or loss during metasomatism.

Gabbroic rocks

An isocon plot was constructed to illustrate the relative mass changes between unaltered gabbro (n=3) and chloritised gabbro (n=4) (Figure 7). Due to analytical problems with the WRAs no samples of gabbroic-precursor metasomatic ironstones were available.

The isocon plot indicates that chloritisation of gabbro involves depletion of CaO, Sr and Cu, and relative gains in K_2O, Na_2O, Ba and LOI, with overall insignificant mass changes. These variations can be explained by the replacement of plagioclase by albite (loss of CaO, Sr, gain in Na_2O), leaching of Cu, hydration of pyroxenes to form chlorite (gain in LOI) and the formation of some biotite (gains in K_2O, Ba).

Sedimentary rocks

Isocon plots were constructed to illustrate the relative mass changes between unaltered siltstones (n=5), albitised siltstones (n=4), and sedimentary precursor metasomatic ironstones (n=6) (Figure 8).

Figure 6: Bivariate plot of MgO vs Zr/Al2O3

grey circles: metasomatic ironstones
white triangles, diamonds: gabbros
black squares: sedimentary rocks
black circles: May Bee showing, vein samples

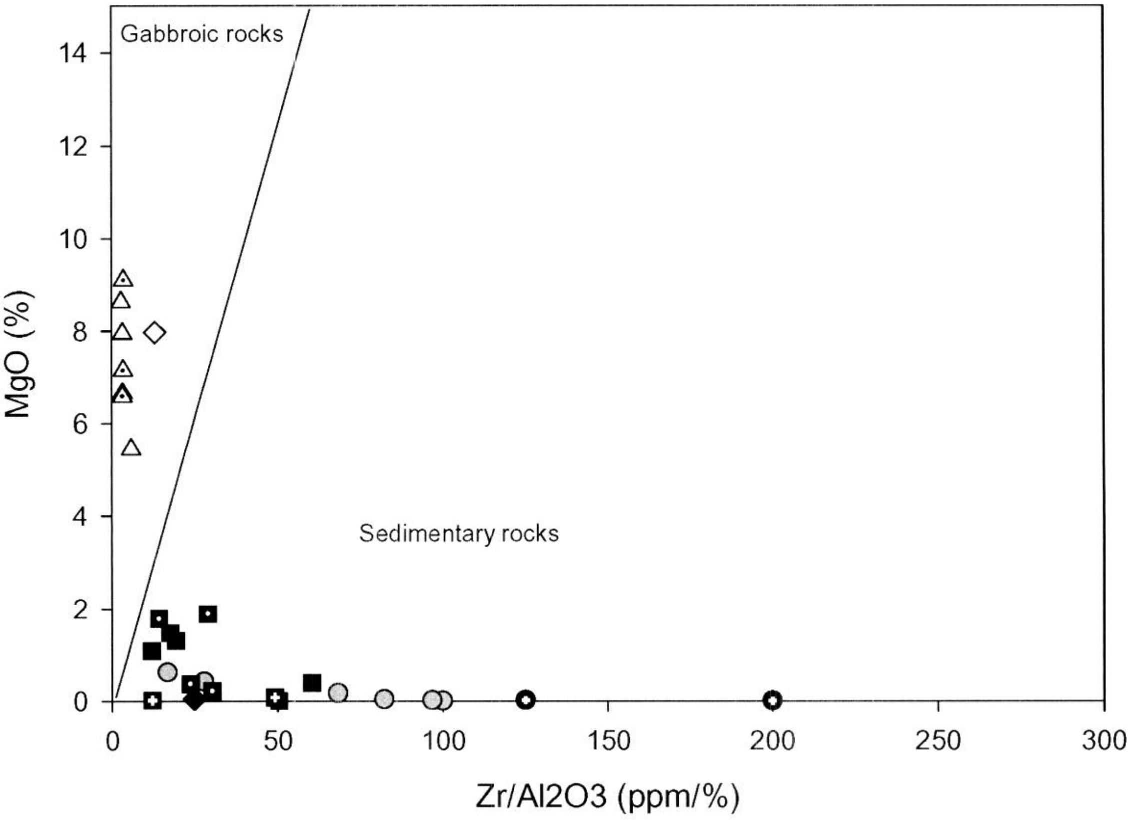


Figure 7: Isocon plot for gabbroic rocks

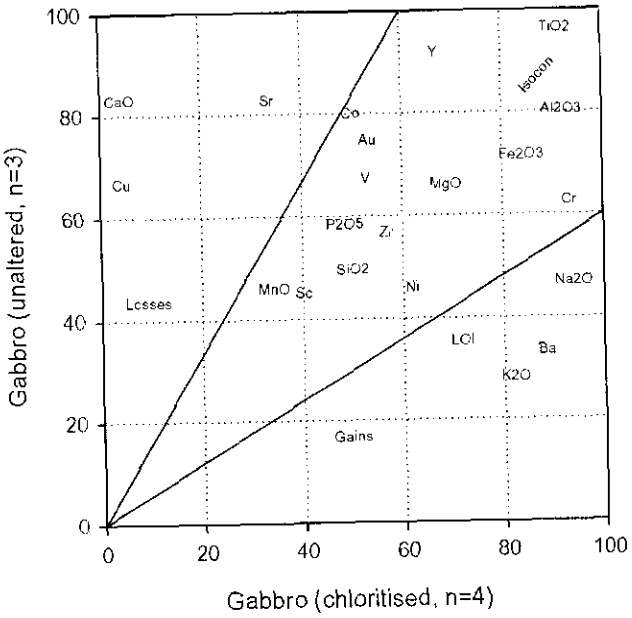
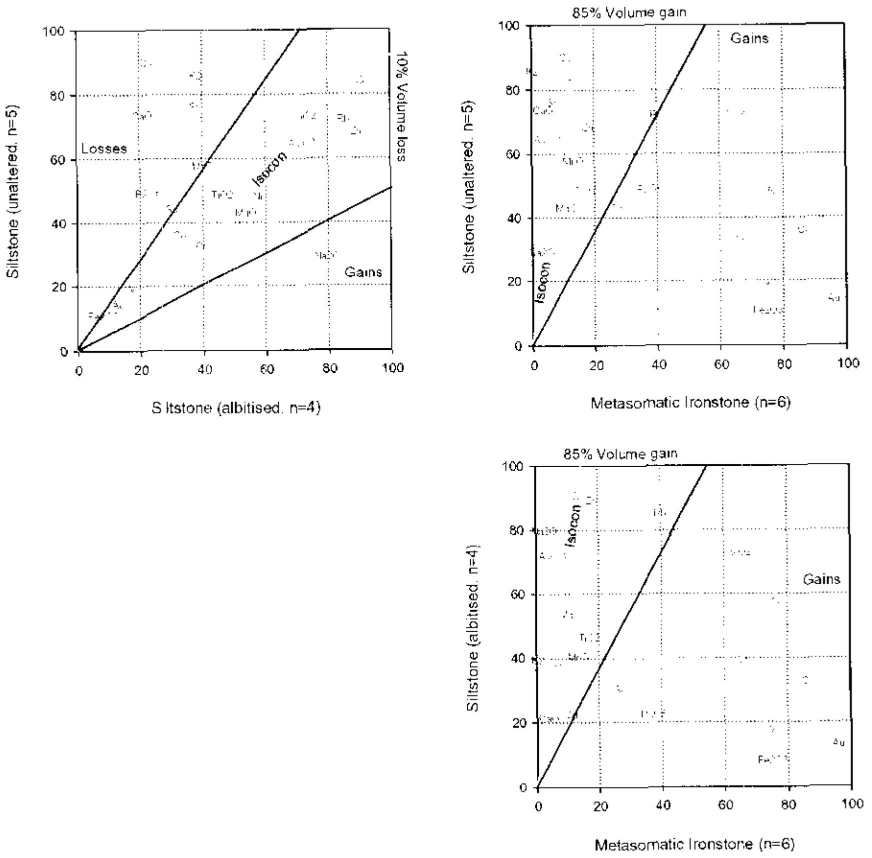


Figure 8: Isocon plots for sedimentary rocks



Isocon plots reveal that the transition from unaltered siltstone to albitised siltstone is marked by the relative depletion of Cu, CaO, K_2O, P_2O_5 and Sr, accompanied by the enrichment in Na_2O. The albitisation process is marked by small overall mass losses.

An isocon plot comparing albitised siltstone and metasomatic ironstone indicates relatively large gains in Au, Fe_2O_3, V and Co, with moderate gains in Cr, Ni, P_2O_5, SiO_2 and Sc. No elements show significant mass losses, and the alteration is marked by large overall mass gains.

An isocon plot comparing unaltered siltstone and metasomatic ironstone indicates similar mass changes. Relatively large gains are seen in Au, Fe_2O_3, V and Co, with moderate gains in Cr, Ni, P_2O_5, SiO_2, Rb, and Sc.

The destruction of detrital plagioclase, potassium-feldspar and possibly apatite, as well as the leaching of Cu and addition of Na_2O can explain the above mass changes during albitisation. Some of the P_2O_5 scavenged during albitisation may be reprecipitated as apatite during ironstone formation, although this has not been confirmed petrographically. CaO, K_2O and Sr scavenged during albitisation appear to be lost, at least from the portion of the system analysed in this study. Au, Fe_2O_3, V, Co, Cr, Ni, SiO_2, Rb, and Sc are all added during metasomatic ironstone formation. These changes can be explained by the addition significant amounts of iron-oxide minerals (gains in Fe_2O_3, V, Sc?, Cr?) and quartz, largely as infill, as well as addition of gold. These elements do not appear to be scavenged during albitisation of sedimentary rocks.

Major element chemistry

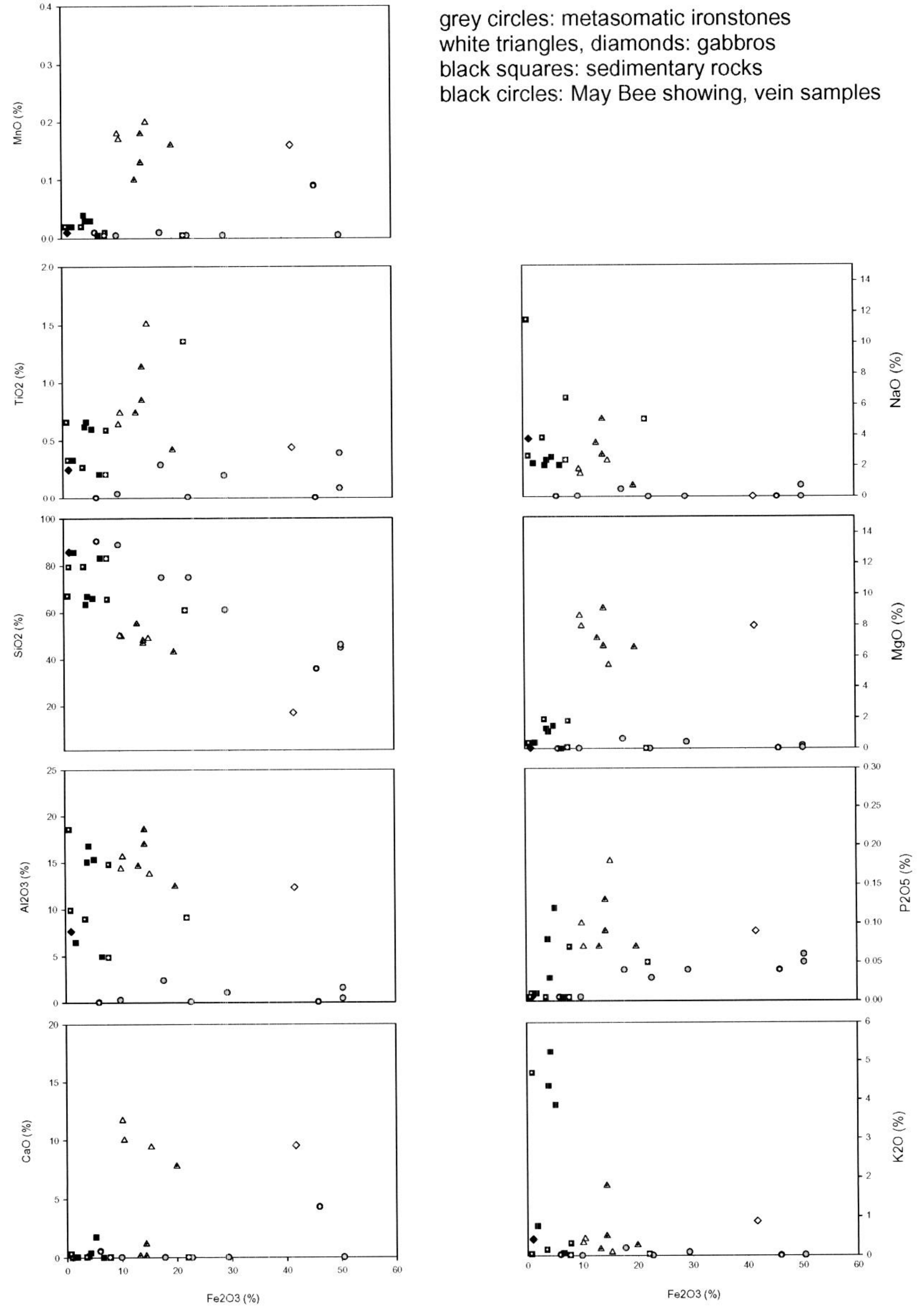
The concentration of Fe_2O_3 is compared to the other major oxides in Figure 9. In the metasomatic ironstone samples, Fe_2O_3 does not show systematic variations with most of the other major oxides. An inverse relationship between Fe_2O_3 and SiO_2 reflects variable proportions of the two main ironstone components: quartz and iron-oxide minerals (predominantly hematite, with subordinate magnetite). A slight increase in P_2O_5 concentrations with increasing Fe_2O_3 may reflect the presence of apatite in these samples, although overall P_2O_5 concentrations remain low (<0.10%).

Trace element chemistry

In Figure 10a, the concentration of Au is compared to that of a number of other trace elements. In the metasomatic ironstones, Au shows positive correlation with Co and Ni, and a weak negative correlation with V.

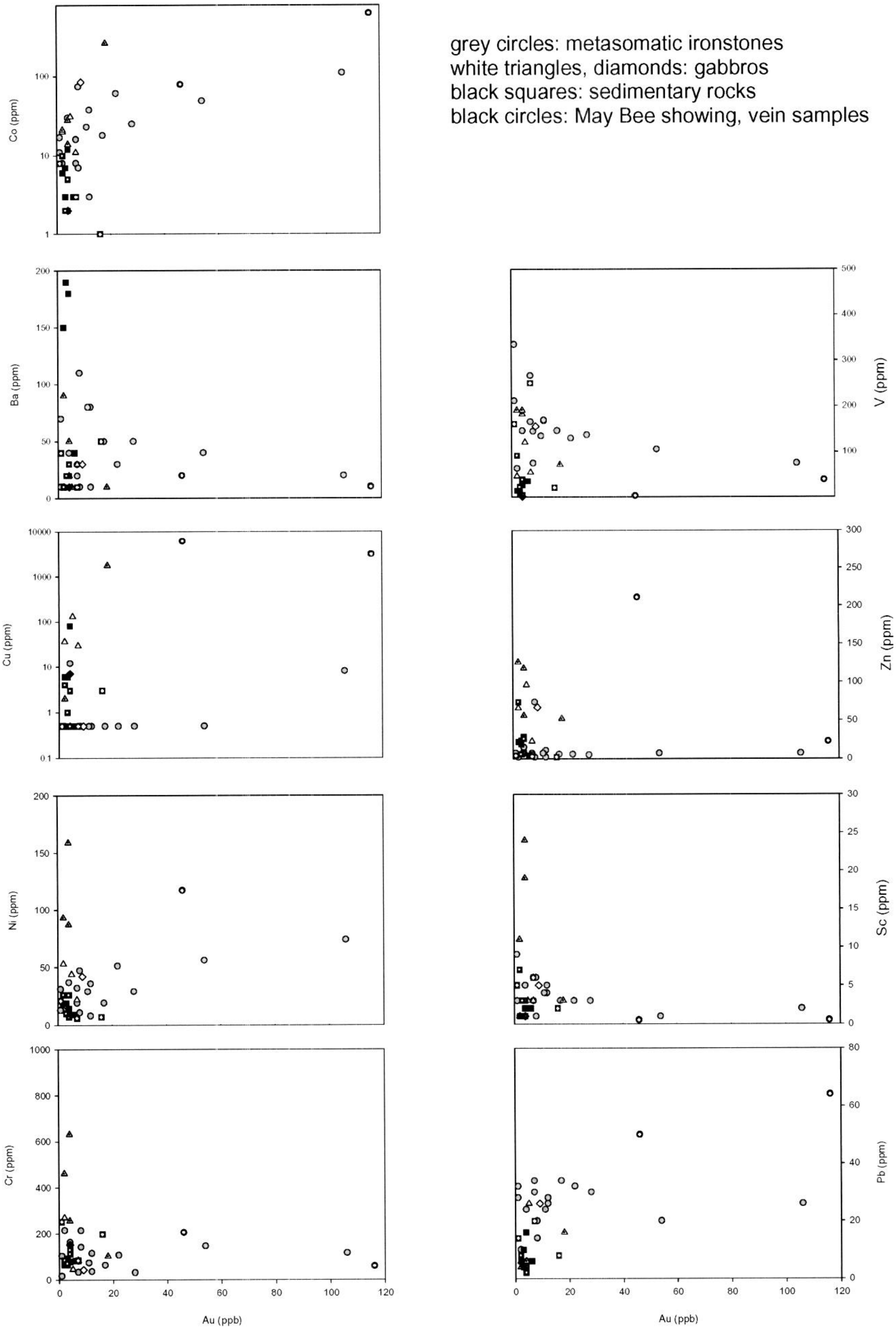
In Figure 10b, Au concentration is compared to the magnetic susceptibility of geochemical samples, determined from the average of five readings with a hand-held magnetic susceptibility meter prior to geochemical analysis. While high gold concentrations are noted in some metasomatic ironstones, these samples do not correspond with high magnetic susceptibility, which is a reflection of magnetite concentration.

Figure 9: Major element chemistry



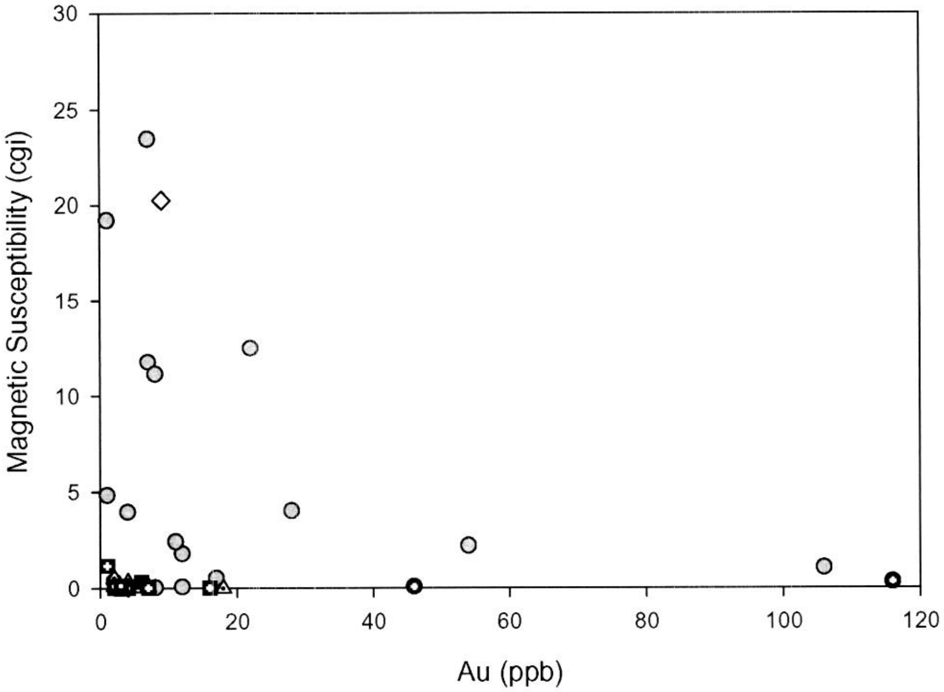
grey circles: metasomatic ironstones
white triangles, diamonds: gabbros
black squares: sedimentary rocks
black circles: May Bee showing, vein samples

Figure 10a: Trace element chemistry vs Au



grey circles: metasomatic ironstones
white triangles, diamonds: gabbros
black squares: sedimentary rocks
black circles: May Bee showing, vein samples

Figure 10b: Magnetic susceptibility vs Au



Soil Geochemistry

The approach adopted in this investigation was to establish a series of indicator elements for the target mineralisation styles, and to use a combination of element frequency plots, element covariance, bivariate element plots and element distribution maps, in order to focus geochemical targets for further exploration. The following indicators were originally investigated, based on geochemical haloes to known Australian and Canadian Proterozoic deposits:

Fe-oxide-Cu-Au (IOCG): Cu, Co, Fe, Ba, K, La, P, V
Sedimentary Exhalative (SEDEX): Pb, Zn, As, Ba, Mn

Other potential indicator elements include Au, REEs and U for IOCG mineralisation and Ag, Sb and B for SEDEX mineralisation, but these were either not analyzed for, or the bulk of analyses are too close to detection to be considered accurate.

IOCG

Examination of element frequency histograms was undertaken for the IOCG-indicator elements Cu, Co, Fe, Ba, K, P and V (Figure 11). La was not investigated as the low precision of analysis relative to absolute concentrations would have resulted in spurious results. Frequency plots for the remaining elements reveal that all of these exhibit approximately normal frequency distributions, with positive skews. This suggests that the distribution of these elements reflects a single major population, with a smaller sub-set of high values controlled by another factor or factors. Frequency distribution plots have allowed for the establishment of the following thresholds for anomalous IOCG indicator elements on the Iron Range property:

Cu	50ppm
Co	20ppm
Fe	4.5%
Ba	300ppm
K	0.2%
P	1800ppm
V	60ppm

Given that the sample area is dominated by siliciclastic metasediments, with a volumetrically smaller component of mafic intrusive bodies, it is likely that the element distributions reflect these rock types to some degree. In order to assess the possible control of mafic intrusions on the occurrence of anomalous indicator-element concentrations, a correlation matrix was constructed (Table 2). Ni, Mg and Cr were used as indicators of a mafic-intrusive affinity. Ni concentrations exhibit a moderate to strong positive correlation with Ba, Co, Cu and La, while Mg shows moderate to strong correlations with Co, Cu, Fe and V. Cr exhibits a moderate positive correlation with Fe. The above correlations suggest that mafic intrusives can explain some of the variability in the IOCG indicator elements. In order to assess the degree to which this holds, bivariate plots of each of Ni, Cr and Cr/Zr vs. Cu were constructed (Figure 12). These plots clearly indicate that the relationship between Cu and the intrusive mafic indicators is not linear, and that anomalous Cu values are not coincident with the highest values of Ni, Cr

Figure 11: Frequency histograms for IOCG indicator elements

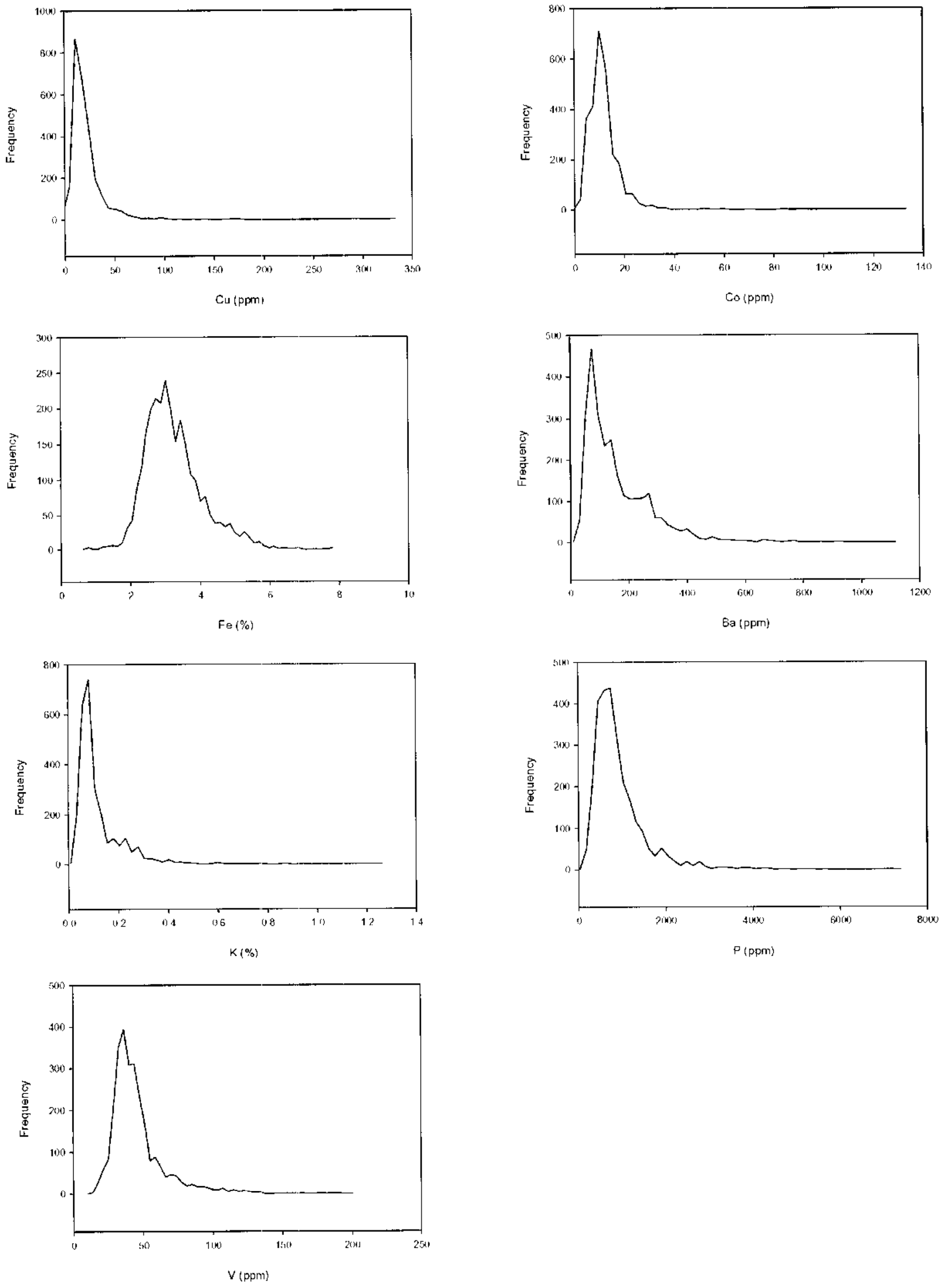
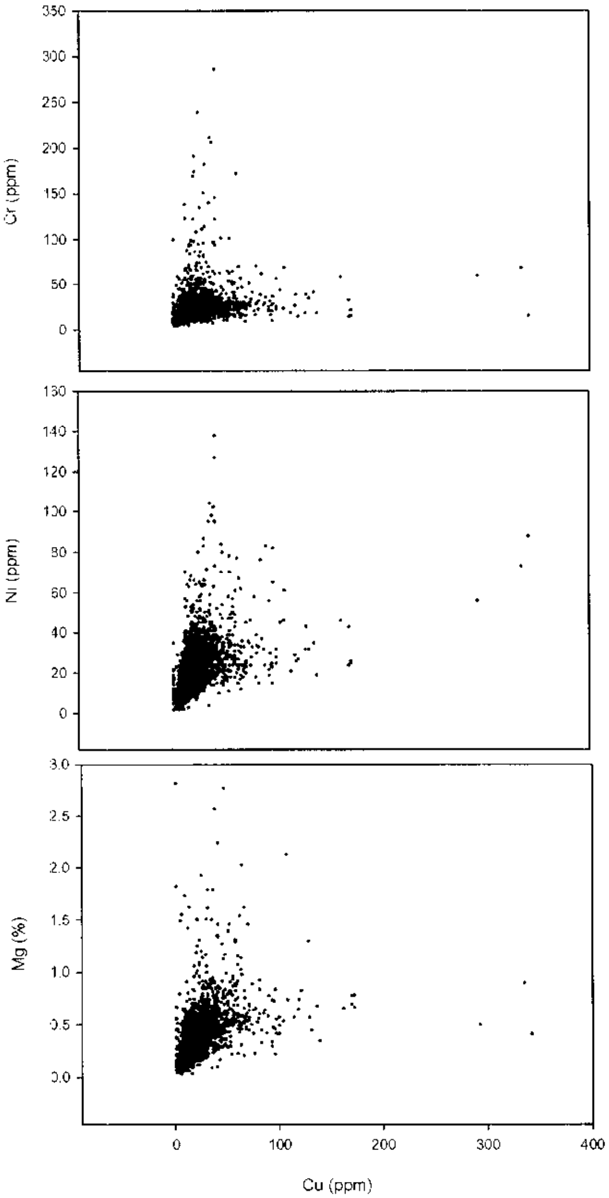


Table 2: Correlation matrix for soil geochemical data

	As	*Ba*	*Co*	*Cr*	*Cu*	*Fe*	*K*	*La*	*Mg*	*Mn*	*Ni*	*P*	*Pb*	*Sr*	*Ti*	*V*	*Zn*	*Zr*
As	1.00																	
Ba	0.11	1.00																
Co	0.29	0.25	1.00															
Cr	0.07	0.09	0.30	1.00														
Cu	0.20	0.12	0.40	0.23	1.00													
Fe	0.07	-0.14	0.30	0.43	0.37	1.00												
K	0.27	0.46	0.31	0.17	0.18	0.05	1.00											
La	0.15	0.25	0.30	0.17	0.19	0.12	0.32	1.00										
Mg	0.10	0.19	0.43	0.69	0.41	0.54	0.33	0.19	1.00									
Mn	0.11	0.51	0.47	0.17	0.23	0.07	0.21	0.27	0.20	1.00								
Ni	0.23	0.43	0.56	0.69	0.45	0.34	0.39	0.45	0.67	0.34	1.00							
P	0.05	0.40	0.16	0.09	0.09	0.11	0.09	0.12	0.06	0.38	0.20	1.00						
Pb	0.21	0.03	0.18	0.15	0.23	0.17	0.01	0.09	0.10	0.19	0.15	0.04	1.00					
Sr	0.19	0.67	0.27	0.09	0.16	-0.16	0.56	0.31	0.19	0.39	0.37	0.39	0.01	1.00				
Ti	0.07	0.00	0.14	0.26	0.19	0.35	0.26	-0.22	0.23	-0.01	0.14	0.17	0.03	0.11	1.00			
V	0.04	-0.11	0.27	0.35	0.47	0.76	0.08	-0.09	0.65	0.05	0.26	-0.03	0.08	-0.10	0.47	1.00		
Zn	0.32	0.53	0.27	0.12	0.17	0.00	0.35	0.17	0.17	0.36	0.39	0.33	0.38	0.46	0.12	-0.02	1.00	
Zr	-0.03	-0.20	-0.14	-0.08	-0.05	0.01	-0.15	-0.25	-0.23	-0.28	-0.15	0.08	-0.08	-0.15	0.45	-0.03	-0.06	1.00

Figure 12: Mafic affinity elements vs. Cu



or Mg. Thus, while the background variations in Cu concentrations appear to be controlled in part by the presence of mafic intrusives, the highest Cu values do not appear to be directly related to mafic intrusions.

Geochemical targets for IOCG mineralisation (Targets 1 to 6) are listed in Table 3 and located in Figure 14. These targets were established primarily by identifying areas of anomalous Cu concentrations (Figure 13), coincident with anomalies in Co, Fe, Ba, K, P and V. IOCG targets exist on the northern and southern ends of the property (Figure 14). Most targets lie on or immediately adjacent to the Iron Range fault, and one significant target lies near the junction of the Iron Range and Black Bear faults.

SEDEX

Examination of element frequency histograms was undertaken for the SEDEX-indicator elements Zn, Pb, As, Ba, and Mn (Figure 15), allowing for recognition of the following threshold values:

Zn	180ppm
Pb	35ppm
As	25ppm
Ba	300ppm
Mn	2000ppm

Frequency plots for Pb and Zn reveal overall low concentrations of these elements, approximately normal distributions and only very minor positive skews to the distributions. Distribution of Pb and Zn values is shown in Figure 16 and 17 respectively. The majority of As analyses are very near detection limit. Ba exhibits a significant positive skew, but is also considered an indicator for IOCG mineralisation. Similarly, Mn exhibits a significant positive skew, but has been considered elsewhere as an indicator element for IOCG mineralisation (e.g. Ernest Henry).

Several elements (Ba, K, As) show significant enrichment in the Ramparts facies relative to other formations. The Middle Aldridge – Ramparts transition is also coincident with a significant enrichment in Zn, with two broadly stratabound geochemical targets identified (Targets 7 and 8, Table 3 and Figure 14). One of these, with a strike length in excess of 600m returned average analyses of 44ppm Pb and 324ppm Zn, with individual Zn analyses up to 899ppm. The other anomaly, with a strike length in excess of 500m and open to the west returned average analyses of 318ppm Zn and 53ppm Pb, with individual Zn analyses up to 1350ppm.

Figure 13: Cu-Distribution

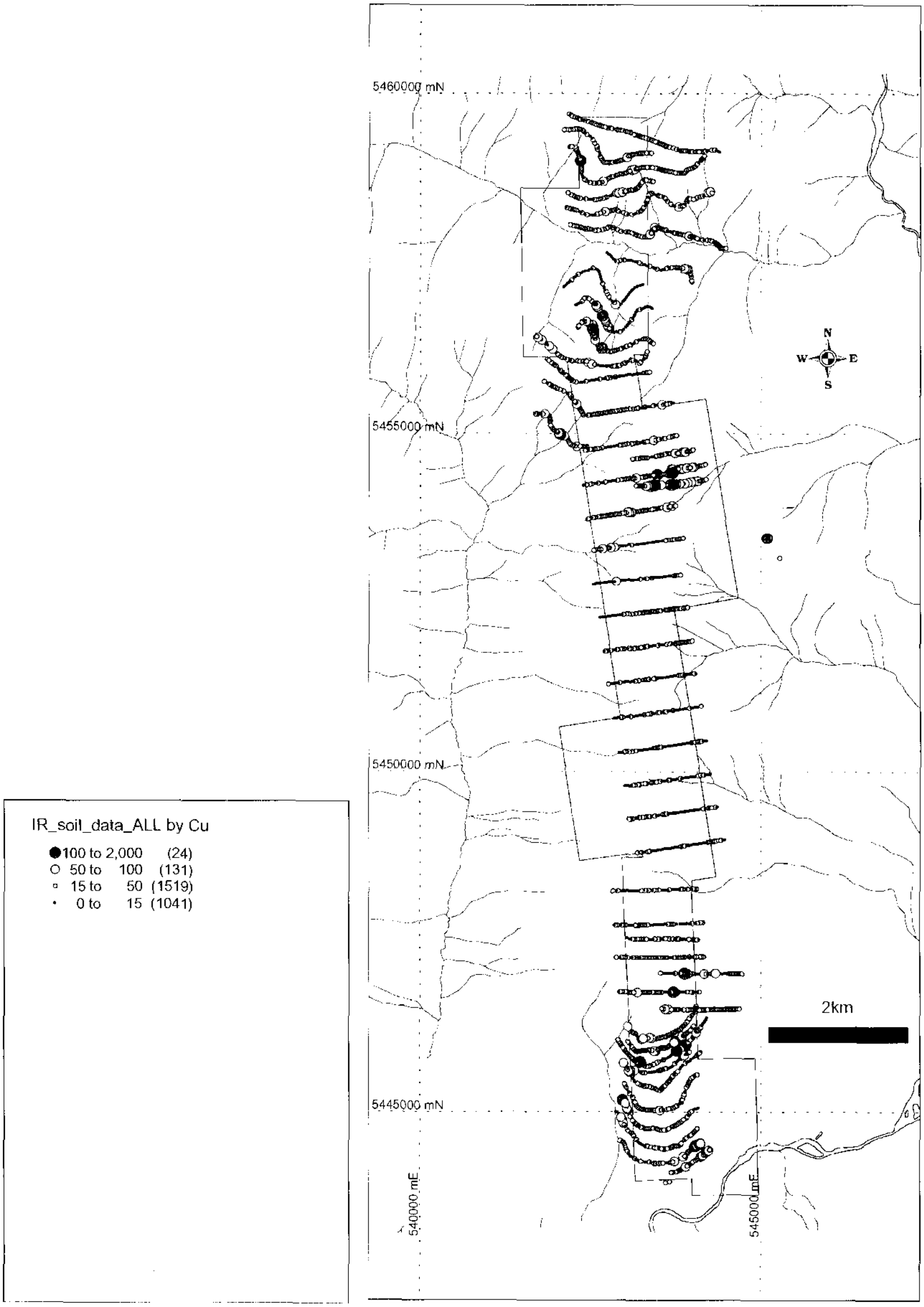


Table 3: Average concentration of indicator elements for anomalous zones

	Background					Geochem Anomalies							
	Property	mP1	mPa3	mPa2	mPr	1	2	3	4	5	6	7	8
		Moyie sills	Upper Aldridge	Middle Aldridge	Ramparts facies								
As(ppm)	10	12	6	7	21	12	3	4	23	28	12	38	104
Ba(ppm)	163	168	80	133	261	287	103	162	163	279	355	283	246
Co(ppm)	12	13	11	11	14	18	16	16	29	26	26	17	26
Cu(ppm)	22	28	23	19	22	33	55	59	99	49	59	45	38
Fe(%)	3.25	3.33	3.39	3.34	2.81	4.3	4.43	3.92	3.92	3.93	3.37	3.12	3.25
K(%)	0.12	0.12	0.07	0.08	0.25	0.11	0.07	0.07	0.18	0.4	0.3	0.18	0.25
La(ppm)	16	14	11	15	21	44	14	12	22	55	31	13	22
Mn(ppm)	854	956	663	775	994	1754	1202	899	991	1360	1636	1043	1373
P(ppm)	929	898	978	887	1133	1815	847	874	646	894	1796	1430	959
Pb(ppm)	20	21	21	20	18	17	32	44	22	20	22	44	53
V(ppm)	46	52	35	46	39	48	89	74	75	51	43	46	45
Zn(ppm)	96	96	84	81	146	92	96	95	74	193	157	324	318
						IOCG targets						SEDEX targets	

Figure 14:
Geochemical Prospectivity map

Cross-hatched areas represent geochemical anomalies 1 to 8 (see Table 3)

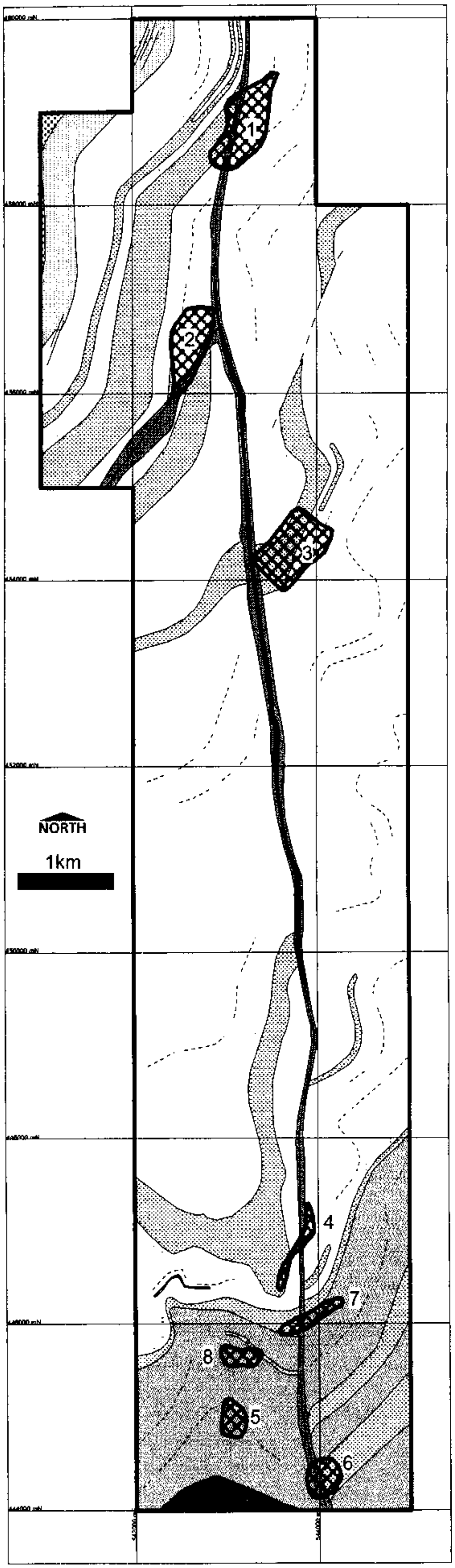


Figure 15: Frequency histograms for SEDEX indicator elements

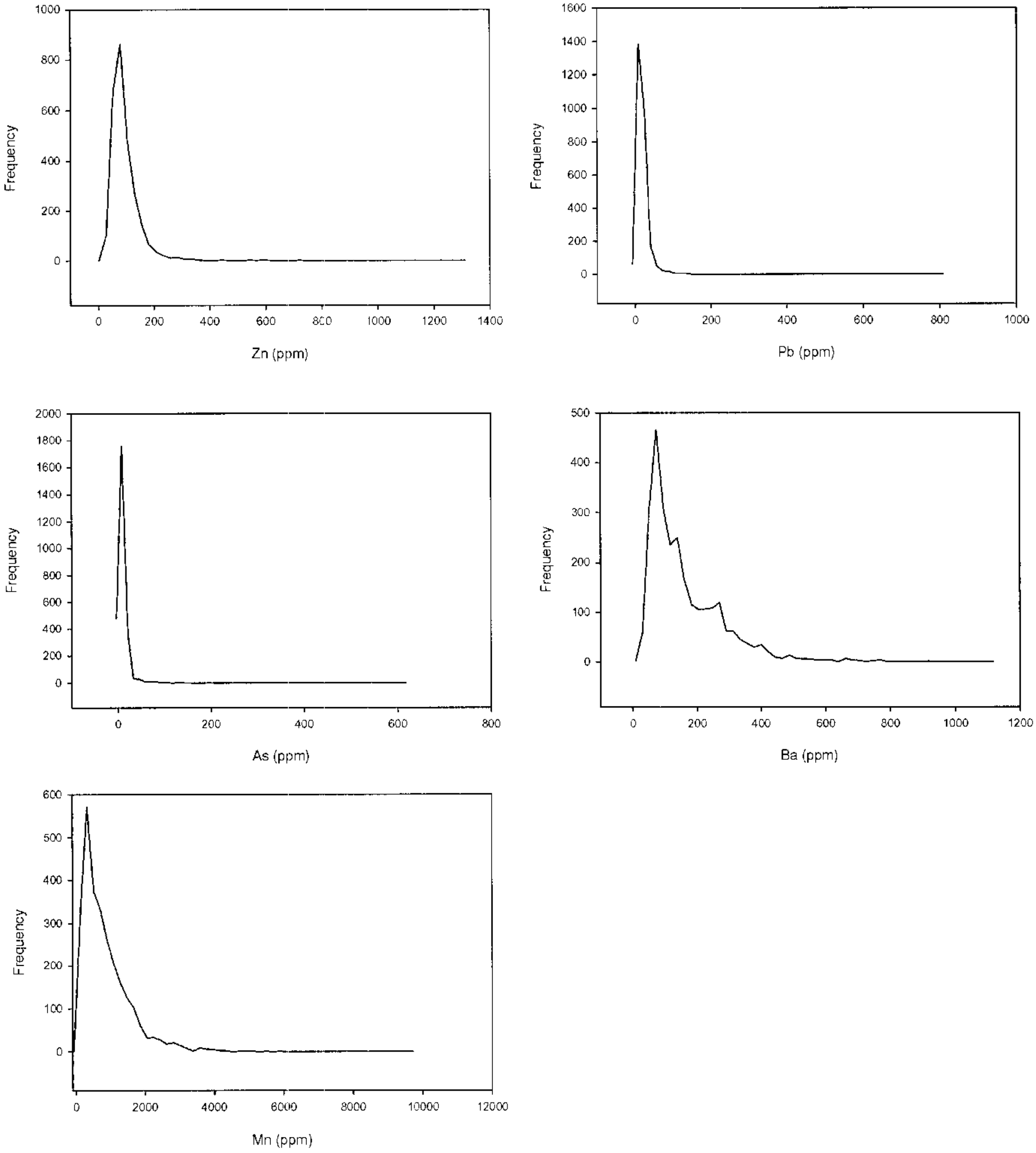


Figure 16: Pb-Distribution

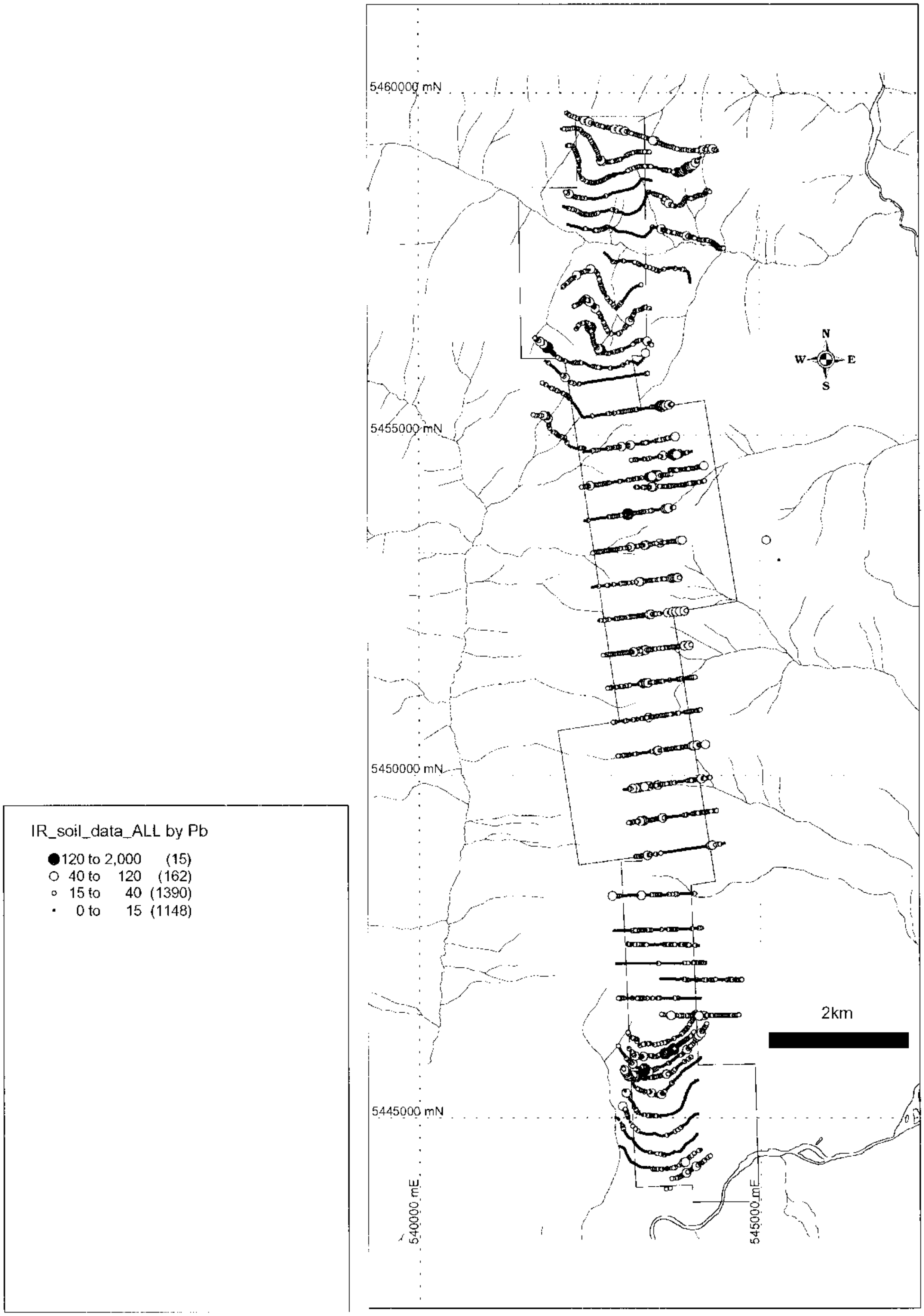
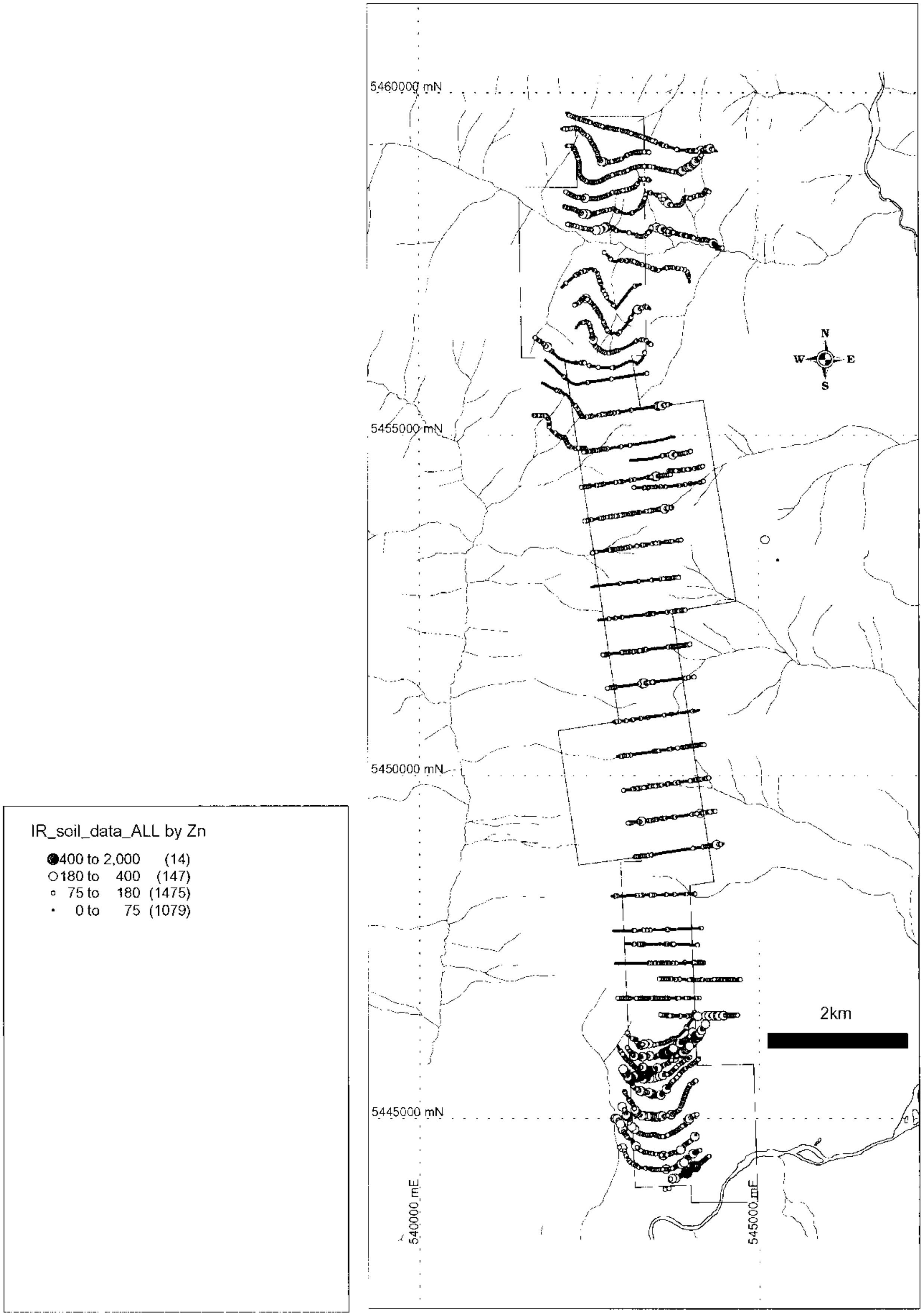


Figure 17: Zn-Distribution



Petrology

A limited petrographic study was undertaken in order to gain insight into the mineralogy and paragenesis of the Iron Range metasomatic ironstones. Sample specific petrographic descriptions are given in Appendix VIII. Three main paragenetic stages include: early albitization of wallrocks, iron-oxide and quartz metasomatism, and late hematite and muscovite growth. Within the main iron-oxide stage, the ironstones exhibit evidence for multiple episodes deformation involving shearing, fracturing and cataclasis, accompanied by quartz and iron-oxide veining and wallrock alteration. Iron oxides are dominated by hematite, which occurs predominantly as infill, with both euhedral laths and massive aggregations common. Euhedral hematite grains also occur with quartz as infill. The morphology of hematite grains suggests that it was a primary metasomatic mineral.

Some euhedral magnetite does occur, and is largely found as infill, as opposed to alteration. Magnetite grains exhibit minor replacement by hematite. Pyrite also occurs as euhedral grains, and exhibits a spatial and temporal relationship with magnetite.

Given the low solubility of Fe^{3+} in comparison to Fe^{2+} in most hydrothermal fluids, the occurrence of primary hematite ($Fe_2O_3 = 2Fe^{3+} + 3O^{2-}$), is most easily explained by oxidation of Fe^{2+} in the fluid to Fe^{3+} at the site of hematite precipitation. Given the predominance of hematite as alteration rather than infill, it seems likely that this process was the result of interaction between an oxidized fluid, and even more oxidized wallrocks. This is consistent with the predominance of magnetite ($Fe_3O_4 = 2Fe^{3+} + Fe^{2+} + 2O^{2-}$) in infill, as opposed to as alteration. Similarly, pyrite shows a strong association with magnetite, and pyrite precipitation may be favored where the Iron Range structure cuts more reduced rock sequences (ie. Upper and Lower Aldridge, as opposed to Middle Aldridge).

Simplified paragenetic sequence for metasomatic minerals, Iron Range ironstones

```
Pyrite                ----------
Magnetite             ----------
Hematite              ------------ --------
Chlorite              - - - - - - - - - - - -
Muscovite             - - - - - - - - - - - - - -
Quartz           - - - - - ------------ - - - - - -
Albite           --------------- - - - - -
```

CONCLUSIONS AND RECOMMENDATIONS

The Iron Range Fault system represents a major structural feature that is markedly different from other structures in the area in terms of deformation and alteration. The Iron Range FeOx deposits are directly linked to this structure which has a strike length of over 90 kilometers. The fault zone is a north trending, steeply west-dipping long-lived brittle-ductile shear zone. The deformation zone most likely originated as a rift related growth fault during Belt-Purcell sedimentation at ca. 1468 Ma. The fault zone now hosts locally intense albite + chlorite ± hematite ± magnetite ± pyrite breccias and mylonites, which likely formed between 10 and 15 km depth, late- to post-development of the Goat River anticline. This depth range is consistent with the inferred maximum burial depth for the region, based on greenschist facies mineral assemblages.

The main deformation and alteration episode reflects normal fault movement with minor net offset. Fault slip may have occurred in response to reactivation of the Iron Range fault as it was rotated to near parallelism with the axial plane of the Goat River anticline during the waning phases of the Kootenay Orogeny. Alternatively deformation and mineralisation may have occurred in response to a later extensional episode.

Given the normal sense of displacement on the Iron Range fault, and the average steep dip to the west, the areas most prone to dilation are predicted to occur along vertical and west-dipping segments of the fault. The importance of this for mineralisation is reflected in the high proportion of mass gain accompanying Fe-oxide mineralisation. As such, the dip of the fault zone can be used as a potential vector towards mineralisation.

The structural history of the fault zone, as well as soil anomalies in As, Ba, Co, Cu, La, Pb and Zn indicate significant exploration potential for both Fe-oxide-Cu-Au and SEDEX-Ag-Pb-Zn mineralisation. The main SEDEX geochemical targets lie within a narrow stratigraphic interval near the contact between the Middle Aldridge and Ramparts facies. This stratigraphic interval is likely the time-equivalent to the Lower-Middle Aldridge contact (LMC), at which the recently closed Sullivan Ag-Pb-Zn deposit is located. Further exploration for SEDEX-Ag-Pb-Zn mineralisation should be focussed around this horizon, and should include the following:

1) extension of soil geochemical sampling to the east and west
2) detailed stratigraphic and alteration mapping (1:5000)
3) comprehensive rock sampling of host lithologies in the context of (2) above.

Iron-oxide-Cu-Au geochemical targets lie predominantly along and immediately adjacent to the Iron Range fault zone. Whole rock geochemistry indicates that iron-oxide mineralisation is marked by significant enrichment in Fe_2O_3, Au, V, Co, Cr, Ni, SiO_2 and Sc, but not in Cu. As such, the exposed and down-dip occurrences of Fe-oxide mineralisation along the Iron Range fault should be further explored as a gold-rich end-member of the Iron-oxide-Cu-Au class of deposits (e.g. Tennant Creek deposits, Australia). Notably, the highest gold concentrations are from weakly magnetic, hematite- and pyrite-rich samples. However, petrographic investigations indicate a paragenetic relationship between magnetite and pyrite. Thus, it remains unclear with which minerals gold was introduced into the ironstones. If gold is associated with pyrite and magnetite, as is the case for the Ernest Henry and Osborne deposits, Australia, then increased magnetic susceptibility of the ironstones may prove a valuable exploration tool.

Alternatively, if gold was emplaced with hematite, or by the oxidation of magnetite to hematite, as is the case respectively for the Olympic Dam and Starra deposits, Australia, then local magnetic lows within the ironstones may prove more fruitful exploration targets.

The metasomatic ironstones analysed in this investigation do not show enrichment in Cu. However, Cu-anomalies indicated by soil geochemistry cannot be explained by changes in host rocks, and warrant further investigation. Statistical analyses of soil geochemical results indicate that although the background variations in IOCG indicator element concentrations appear to be controlled in part by the presence of mafic intrusives, the highest values do not appear to be directly related to mafic intrusions. Of particular interest are those anomalies that occur in the vicinity of complexities in the Iron Range fault zone, such as at the intersection with the Black Bear Fault. Also the geochemical signature of anomalies that occur on steep slopes and in areas of poor or no outcrop may be significantly diluted. Further exploration for IOCG mineralisation should include:

1) a systematic rock-sampling program at areas of known Fe-oxide mineralisation, with emphasis on areas with known pyrite enrichment as well as anomalous soil geochemistry, and follow-up petrography and geochemical interpretation
2) detailed interpretation of existing geophysical datasets

Historical exploration work on the Iron Range has focused on the evaluation of the considerable iron oxide resource exposed on the historic crown grants. The property has not previously been systematically explored for Fe-oxide-Cu-Au mineralisation, and the Iron Range fault zone has never been tested beyond 20 meters depth. Encouraging soil and whole rock anomalies indicate that further exploration and drilling are warranted. The above exploration recommendations are aimed at prioritizing existing structural and geochemical targets for drilling. Further reconnaissance soil sampling along the Iron Range fault zone to the north and south of the current property is also warranted.

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Appendix I

Statement of Qualifications

CERTIFICATE OF QUALIFICATION

I, Lucas J. Marshall of 409 Roxboro Rd. S.W., in the city of Calgary in the Province of Alberta hereby certify that:

1) I am a graduate of the University of British Columbia (1999) with a B.Sc. (Honours) degree.

2) I have been enrolled as a PhD student in Economic Geology at James Cook University, Australia, since 2000.

3) This report is supported by data collected during fieldwork as well as information gathered through research.

Dated this 12th day of November, 2002 in Townsville, Australia.

I, Charles C. Downie of 122 13th Ave. S. in the city of Cranbrook in the Province of British Columbia hereby certify that:

1) I am a Professional Geoscientist registered with the Association of Professional Engineers and Geoscientists of British Columbia (#20137).

2) I am a graduate of the University of Alberta (1988) with a B.Sc. degree and have practiced my profession as a geologist continuously since graduation.

3) This report is supported by data collected during fieldwork as well as information gathered through research.

4) I hold 125,000 shares of Eagle Plains Resources; I Hold an option to purchase a further 250,000 Common Shares of Eagle Plains at $0.25 per share.

Dated this 12th day of November, 2002 in Cranbrook, British Columbia.

C. C. DOWNIE

Appendix II

Statement of Expenditures

STATEMENT OF EXPENDITURES

The following expenses were incurred on the IRON RANGE PROJECT (FeO 1-30, IR 1-36, TCK 1-8 Luke 1-8, IOX 1-12, Deli 1-8 Claims) Nelson Mining Division, for the purpose of mineral exploration between the dates of May 01 – Sept. 30 2002

PERSONNEL

Lucas Marshall, Project Supervisor:28.0 days x $450.00/day	$12,600.00
C. Downie, P. Geo: 23.5 days x $450/day	$10,575.00
T. Termuende, P. Geo: 9.75 days x $450/day	$4,387.50
B. Robison, luvisol technician / first aid: 2.5 days x $300/day	$750.00
J. Campbell, luvisol technician: 17.5 days x $300/day	$5,250.00
M. Betker, luvisol technician: 2.0 days x $300/day	$600.00

EQUIPMENT RENTAL

4WD Vehicle (1): 1 month x $1500.00/month	$1,500.00
mileage: 800 km x $0.20/kmS	$160.00
4WD Vehicle (2): 4.5 days x $60.00/day	$270.00
mileage: 929 km x $0.20/km	$185.80
ATV: 1 month x $1500.00/month	$1,500.00
Motorcycle: 1 day x $50.00/day	$50.00
Radios: 60 man-days x $10/unit/day	$600.00
Field Supply: 61 man/days x $30/day	$1,830.00

OTHER

Other Equipment Rental: (magnetic susceptibility meter, truck and mileage etc)	$4,152.11
Meals/Accommodation/Groceries:	$4,148.70
Consultants: (Chris Gallagher - DigiQuest	$1,125.00
Project Management Fees (Toklat Resources):	$2,113.46
Fuel:	$582.56
Shipping:	$379.33
Analytical (Assayers Canada):	$7,586.46
Drafting/Repro	$1,316.51
Materials/Supplies:	$256.57
Filing Fees:	$1,587.36
Report/Reproduction (est):	$4,000.00
TOTAL:	$67,506.36

Appendix III

High Resolution Geophysical Survey Report

20. HIGH RESOLUTION GEOPHYSICAL SURVEY OF THE PURCELL BASIN AND SULLIVAN DEPOSIT: IMPLICATIONS FOR BEDROCK GEOLOGY AND MINERAL EXPLORATION

C. Lowe[1], D.A. Brown[2], M.E. Best[3], and R.B.K. Shives[4]

1. GSC - Pacific, Natural Resources Canada, P.O. Box 6000, 9860 West Saanich Road, Sidney, British Columbia, V8L 4B2
2. B.C. Geological Survey Branch, Ministry of Energy and Mines, 1810 Blanshard Street, Victoria, British Columbia, V8W 9N3
3. Bemex Consulting International, 5288 Cordova Bay Road, Victoria, British Columbia V8Y 2L4
4. Geological Survey of Canada, Mineral Resources Division, 601 Booth Street, Ottawa, Ontario, K1A 0E8

ABSTRACT

8800 line-kilometres of high-resolution multi-parameter (electromagnetic, magnetic, gamma-ray spectrometry, and VLF) geophysical data were recently acquired in three survey areas in the Purcell Basin, southeastern British Columbia. One of the survey areas encompasses the world-class Sullivan Sedex deposit. The radiometric data provide the first Canadian survey of a Sedex deposit setting, and the electromagnetic data are the first such public-domain data for the region. The surveys were complemented by ground follow-up of selected anomalies and the measurement of physical properties of rocks on outcrops, hand and core specimens. Collectively, these data provide an opportunity to geophysically characterize the lithostratigraphy and Sedex mineralization within the survey areas.

The geophysical data are valuable to geological mapping and interpretation in the survey areas. Using the contrasting radiometric, magnetic and EM responses between the gabbroic Moyie sills and the sedimentary rocks in which they were emplaced, several new sill exposures have been recognized and new sill correlations facilitated. Radiometric and EM responses are particularly sensitive to the nature and content of phyllosilicate minerals, and allow the discrimination of different sedimentary units within the stratigraphic column, even in areas of thin till cover. Magnetic and radiometric data detect subtle variations within Cretaceous granitic intrusions. Faults in the Yahk area are anomalously magnetic, suggesting that fault structures, in addition to those of the Iron Range, were conduits for hydrothermal flow.

Known sulphide mineralization and hydrothermal alteration in the Sullivan - North Star Corridor correlate with enhanced bedrock conductivity, strong finite conductors and positive magnetic anomalies. Sericitic alteration, which is spatially associated with the sulphide mineralization, is imaged in the radiometric data as elevated potassium levels and depleted thorium:potassium ratios relative to unmineralized host rocks. The integrated patterns permit formulation of exploration criteria for undiscovered Sedex occurrences elsewhere in the basin. However, exploration strategies should consider the limitations of the maximum crustal depth to which the different geophysical methods can detect a response: about 30 cm for the radiometric method; about 100 m for the EM method; and up to 20 km for the magnetic method.

INTRODUCTION

In 1995 and 1996 approximately 8800 line-kilometers of electromagnetic, total field magnetic, gamma-ray spectrometric and VLF data were acquired in three survey areas of the Purcell anticlinorium, southeastern British Columbia. The surveys, conducted by Dighem I-Power, were government-funded and specifically designed to cover the Aldridge Formation that hosts the most significant mineral deposits of the area (Fig. 20-1). The northern (Fig. 20-1, Area 2, Findlay Creek) survey area covers about 400 km^2 south of Findlay Creek, and west of Canal Flats. The central (Fig. 20-1, Area 1, St. Mary River) survey area covers approximately 2000 km^2 extending from 6 km east of Kootenay Lake to about 7 km east of the town of Kimberley and includes the Sullivan Mine. The southern (Fig. 20-1, Area 3, Yahk) survey area comprises about 600 km^2 and extends east from Creston to Yahk and south to the U.S. border. The surveys were conducted using an Aerospatiale (AS350B1) helicopter flown at a mean terrain clearance of 60 m (Fig. 20-2). Flight lines, oriented east-west in the St. Mary River and Yahk survey areas and northwest-southeast in the Findlay Creek area, were spaced 400 m apart with control lines approximately 5 km apart.

A number of published reports describe the data, and examine their utility for regional geology and mineral exploration studies (Brown et al., 1997; Lowe et al., 1997, 1998). In this summary paper we present brief explanations of each of the geophysical methods used and comment on their capabilities and limitations. We describe the expected, as well as the observed, geophysical responses of the lithologies and the known mineral occurrences of surveyed areas and we also discuss the geological implications of observed variations. We focus on the Sullivan-North Star Corridor, which includes the Sullivan and the small North Star and Stemwinder Pb-Zn-Ag deposits. Growth faults, chaotic breccia, Moyie sills, manganiferous garnet-rich beds and muscovite and albite-biotite-chlorite alteration are associated with the mineralization in this corridor (Turner et al., 2000a and b). We consider the geophysical responses of each of these features, relying not only on observed correlations among the various parameters, but also on measurements conducted on rock samples.

Lowe, C., Brown, D.A., Best, M.E., and Shives, R.B.K.
2000: High Resolution Geophysical Survey of the Purcell Basin and Sullivan Deposit: Implications for Bedrock Geology and Mineral Exploration; in The Geological Environment of the Sullivan Deposit, British Columbia, (ed.) J.W. Lydon, J.F. Slack, T. Höy, and M.E. Knapp; Geological Association of Canada, Mineral Deposits Division, MDD Special Volume No. 1, p.

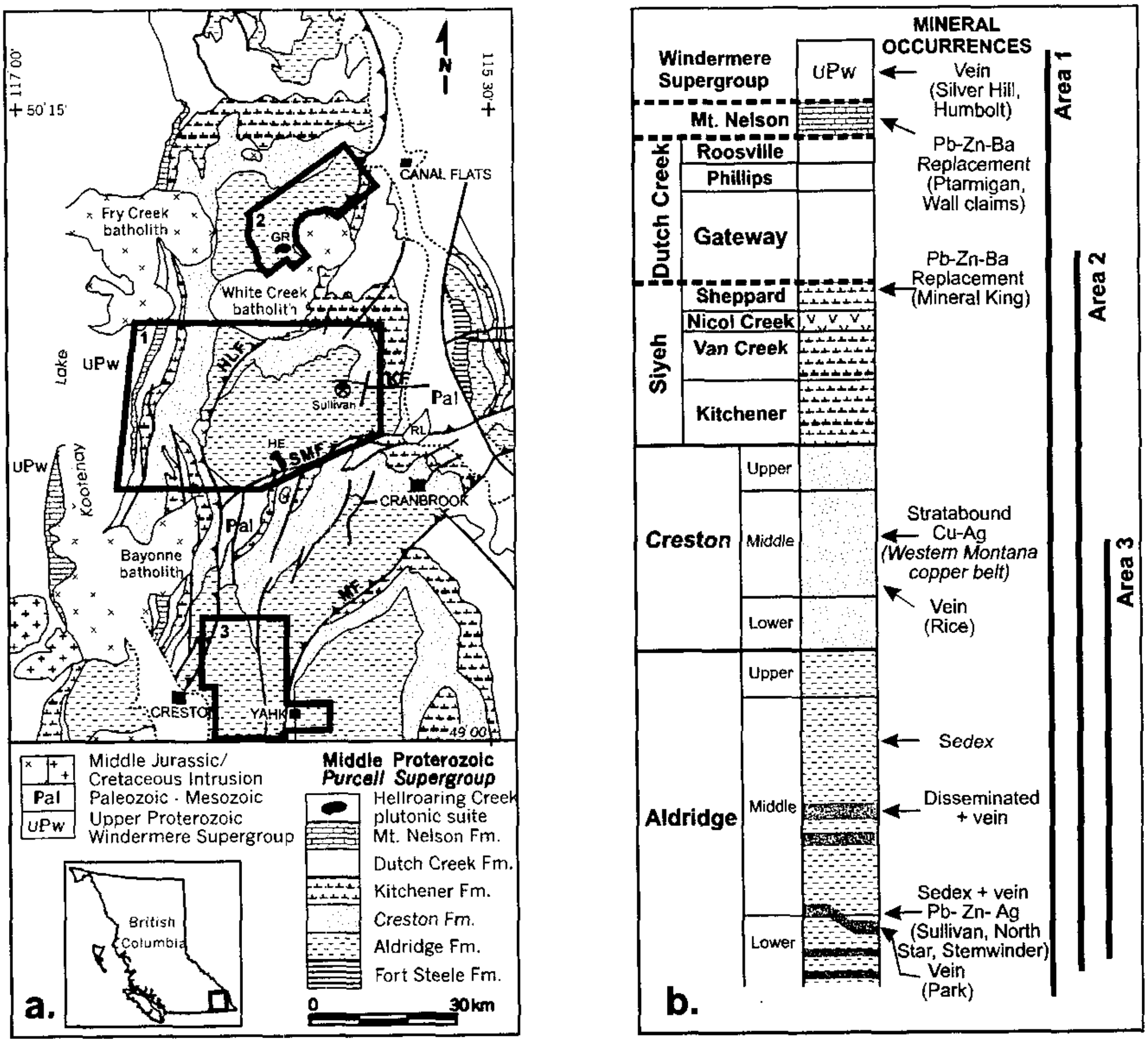

Figure 20-1. **(a)** Regional geological setting of Purcell Supergroup showing the location of the three geophysical survey areas within the Purcell anticlinorium (modified from Höy et al., 1995). 1 = St. Mary River area; 2 = Findlay Creek area; 3 = Yahk area. GR = Greenland Creek stock, HE = Hellroaring Creek stock, HLF = Hall Lake fault, KF = Kimberley fault, MF = Moyie fault, RL = Reade Lake pluton, SMF = St. Mary fault. **(b)** Stratigraphic column for the Purcell Supergroup and basal Windermere Supergroup (modified from T. Höy, written comm., 1996). The stratigraphic position of several mineral occurrences are indicated. Thick vertical lines denote the range of stratigraphy exposed in each survey area.

GEOLOGICAL SETTING

Only a brief overview of the geology of the survey areas is given here. More thorough descriptions are provided by Höy et al. *(2000)* and by Leech *(1957)*; *Reesor (1958, 1973)*; Höy (1984a, b, 1993); and Brown et al. (1995). The three survey areas lie within the Purcell anticlinorium, a broad north-plunging structural culmination cored by middle Proterozoic (circa 1500 to 1350 Ma) metasedimentary rocks of the Purcell Supergroup (Fig. 20-1). The succession is more than 12 km thick and comprises syn-rift, deep water turbidites of the Aldridge Formation, and overlying shallow-water to locally subaerial clastic, carbonate rocks and minor volcanic rocks of the Creston and younger formations which form late- and/or post-rift sedimentary sequences (*see* Fig. 20-1b). Laterally extensive gabbroic sills ("Moyie sills") intrude the Aldridge sedimentary rocks and provide a minimum age for the syn-rift package (1468 Ma, D.W. Davis, unpub. data) (Anderson and Davis, 1995). Upper Proterozoic conglomeratic, siliciclastic and volcanic rocks of the Windermere Supergroup unconformably overlie Purcell Supergroup rocks.

The Sullivan deposit and several smaller Pb-Zn occurrences of probable sea-floor genesis occur near the contact between the lower and middle members of the Aldridge Formation. The majority of other similar base metal and/or tourmaline occurrences occur near the middle part of the middle member of the Aldridge Formation (Höy et al., 2000). The three survey areas were therefore selected primarily to acquire geophysical signatures from the Sullivan deposit and the Sullivan Corridor and to maximize coverage of the Aldridge Formation. However, in addition the survey areas were also designed to acquire geophysical signatures from representatives of most other lithologies of the Purcell anticlinorium. Thus, although turbidites of the Aldridge Formation and siltstones, quartzites and argillites of the overlying Creston Formation predominate in the survey areas, sedimentary rocks of the upper part of the Purcell Supergroup (Kitchener Formation through to the Mount Nelson Formation) and the unconformably overlying Windermere Supergroup (Fig. 20-1b) are covered in the western part of the St. Mary River area. Proterozoic granitic stocks, that appear to have been preferentially generated along the rift axis, are represented by the Hellroaring Creek stock (4 km^2) in the St. Mary survey area and by the Greenland Creek pluton (1.6 km^2; Reesor, 1996) in the Findlay Creek survey area. Small outliers of Paleozoic shelf sediments occur in the southern part of the St. Mary area, and Cretaceous granitic batholiths are represented by the White Creek and Fry Creek batholiths in the St. Mary and Findlay survey areas, respectively.

GEOPHYSICAL METHODS

The full set of geophysical images acquired by the survey has been published as a set of eighteen 1:50,000 images (British Columbia Ministry of Employment and Investment, 1996). The purpose of this paper is to describe the principals of the geophysical methods used in the survey and to discuss the different geophysical responses in the context of the geological characteristics of rocks of the Purcell anticlinorium. Within the constraints of this publication, it is not possible to illustrate all of the geological and geophysical correlations described below, readers wishing to do so are encouraged to consult the 1:50,000 images.

Electromagnetics

Principles and methodology

Electromagnetic (EM) methods are inductive techniques based on Faraday's Law. They measure conductivity (or its inverse, resistivity) and are used to map its variation at the earth's surface. A transmitter, consisting of a time-varying current circulating in a multi-turn coil, produces electric and magnetic (EM) fields that induce time-dependent eddy currents within conductors. In turn, these eddy currents generate secondary EM fields. The objective of an EM survey is to measure the secondary fields, and from these measurements, deduce the electrical properties of the earth's subsurface (Keller and Frischknect, 1966; Nabighian, 1994). Two types of airborne EM (AEM) systems are available. Time-domain EM systems employ a transmitter current consisting of a current pulse or set of current pulses (for example the GEOTEM system). The secondary magnetic fields generated with a time-domain system are measured by one or more receiving coils at several different times. Frequency-domain EM systems employ a transmitter current consisting of a continuous or sinusoidal current at one or more frequencies.

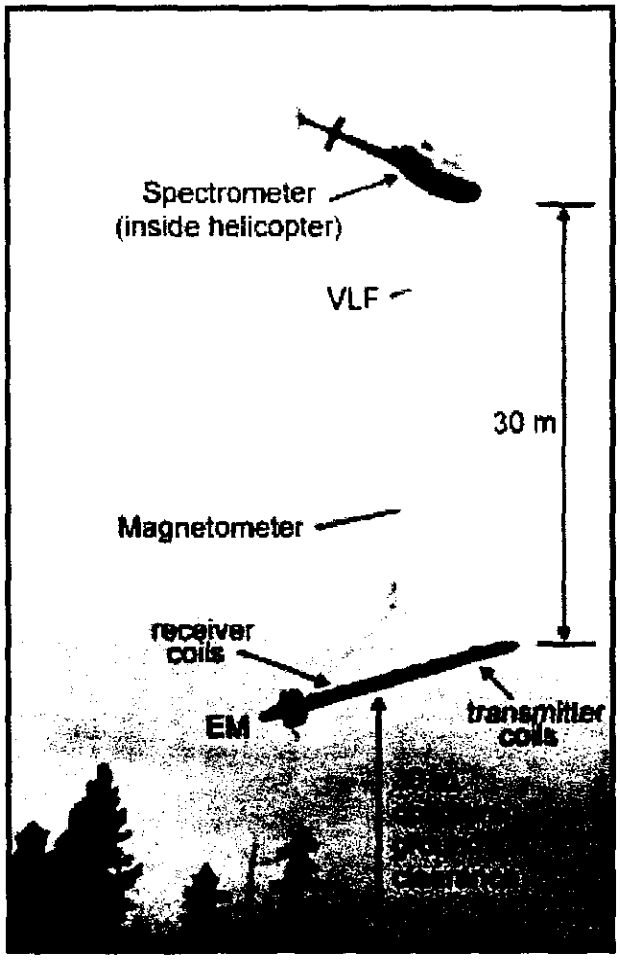

Figure 20-2. Photograph of the Aerospatiale helicopter used to conduct the survey. The helicopter was flown at a mean terrain clearance of 60 m. The gamma-ray spectrometer is housed inside the body of the helicopter, and the VLF, magnetic and electromagnetic systems are housed in birds 10 m, 20 m and 30 m, respectively, beneath the helicopter.

The secondary magnetic fields generated at each frequency with a frequency-domain system are measured by one or more receiving coils. An in-phase component, in-phase with the transmitted sine wave current, and a quadrature component, ninety degrees out of phase with the transmitted sine wave current, are measured at each frequency These values are *normalized* by dividing them by the in-phase value that would be measured in the absence of any conducting bodies (empty space).

The Dighem airborne EM system used in this survey is a frequency-domain EM system consisting of two vertical coaxial transmitter-receiver coil pairs with frequencies of 900 Hz and 5500 Hz, respectively, and three horizontal coplanar transmitter-receiver pairs with frequencies of 900 Hz, 7200 Hz and 56,000 Hz, respectively. The spacing between coil pairs is 8 m except for the 56,000 Hz, which is 6.3 m. All these coils are contained in a fibreglass bird that was towed beneath the helicopter 30 m above the ground surface (Fig. 20-2). The magnitudes of the in-phase and quadrature (secondary) fields depend on coil orientation and separation, transmitter frequency, and the conductivity of the earth. The Dighem coil orientations (coplanar and coaxial) and frequencies are chosen to cover as wide a range of conductor responses as possible for coil separations of approximately 8 m. Generally, the in-phase signal saturates (i.e. attains a constant value) at high frequencies and/or large conductivity values, whereas the quadrature signal attains a maximum value at a finite frequency that depends on the subsurface conductivity and the coil orientation and spacing.

The "skin depth", or depth of penetration of an EM system also depends on the frequency of the system and the conductivity of the earth, with depth of penetration increasing as frequency or conductivity decreases. Consequently, the 900 Hz frequency provides information on the deepest conductivity distribution of the earth, while the 56,000 Hz penetrates only the shallow subsurface. The orientation of the coils determines how the transmitted field couples to a conductive body. Flat lying bodies, such as overburden or sills, couple to the horizontal coplanar coils more effectively than to the vertical coaxial coils. On the other hand, vertical conductors, such as dykes, couple more effectively to the vertical coaxial coils. The size, shape and conductivity of a finite conducting body determine the depth to which it can be "seen" with an EM system (i.e. has secondary field responses that are measurable). The exact behavior is quite complex, but with the low frequency of 900 Hz and coil separation of 8 m of the Dighem system, the maximum depth of penetration is approximately 100 m.

Electromagnetic responses in the Purcell Basin

The conductivity of a rock depends on the minerals present within the rock and on the amount and chemical composition of the pore fluid. Bulk conductivity of low porosity rocks such as volcanic, plutonic, metamorphic and older sedimentary rocks depends more on conducting minerals than on pore fluid. Minerals that can increase the conductivity of a rock include sulphides, clays and graphite. The effect a mineral has on the conductivity of a rock depends on the amount of the mineral present and the connectivity of the mineral grains. A few percent (less than 5%) pyrite or pyrrhotite dispersed throughout a rock may or may not increase the bulk conductivity. It depends on whether the grains are touching each other to form a continuous path for current to flow. The bulk conductivity of a rock with less than 5% sulphides, or any other conducting mineral, is nearly the same as a rock without sulphides. As the proportion of conducting minerals increases the opportunity for mineral grains to touch (connect) increases, hence the bulk conductivity may increase as well. However, even massive sulphide deposits with more than 30% sulphides may be poor conductors if the sulphide grains are coated with a non-conducting mineral (Palacky, 1987).

No laboratory or in situ resistivity measurements were made on rocks in the survey areas. Typical resistivity ranges for sediments comparable to those exposed in the survey areas are (Palacky, 1987): argillite, 70 to 850 ohm-m (14 to 1.2 mS/m; note S/m is the unit of conductivity and is the reciprocal of resistivity which has a unit of ohm-m); dolomite, 700 to 2500 ohm-m (1.4 to 0.4 mS/m); limestone, 350 to 6000 ohm-m (2.9 to 0.16 mS/m); and sandstone, 1000 to 4000 ohm-m (1 to 0.25 mS/m). The resistivity of mudstone and siltstone can vary depending on the graphite and clay content (the greater the graphite and/or clay content, the lower the resistivity). Volcanic and plutonic rocks have resistivity values generally greater than 1000 ohm-m (1 mS/m) and often greater than 5000 ohm-m (0.2 mS/m).

Apparent conductivity is estimated at each location by assuming the earth is a homogeneous conductor and solving for the conductivity (Fraser, 1975). The in-phase and quadrature values, for a given frequency and coil pair, can be used to estimate the conductivity of a homogenous earth because the height of the transmitter and receiver coil pair above the earth are known from the radar altimeter. Obviously the estimated conductivity values near the boundary between two rock units with different conductivities or near finite conducting bodies can be distorted from their actual value; hence the name *apparent conductivity*. Coplanar coil pairs generally produce more representative apparent conductivity maps than coaxial coil pairs for reasons of coupling discussed earlier. Apparent conductivity maps generated from the 900 Hz coplanar pair measure the average conductivity of the earth to a depth of 100 m or more whereas the 56,000 Hz coplanar coil pair only measures the top few meters.

Consequently, argillite in the Aldridge Formation, argillite and argillaceous dolomitic units within the Creston, Kitchener, and Mount Nelson formations, as well as graphitic horizons throughout the stratigraphic sections are expected to show up as conductive zones on apparent conductivity maps. Thick, clay-rich surficial sediments, such as those along many of the river valleys within the survey areas, are also expected to be conductive. Igneous intrusions (e.g. Hellroaring Creek stock; the White Creek and Fry Creek batholiths; Moyie sills) generally do not contain a significantly high proportion of conductive minerals and generally have low porosities, and would thus be anticipated to correlate with resistive zones on apparent conductivity maps. Volcanic rocks (e.g. Nicol Creek lavas in the southeastern St. Mary River area) are also typically resistive, however these rocks tend to have higher porosities, and this may lower their resistivity somewhat.

Finite bedrock conductors are usually caused by massive sulphide or graphite bodies. Shear zones, faults and fractures can also behave like finite bedrock conductors where they contain conducting minerals generated by hydrothermal alteration. A unique source for a finite bedrock conductor is not easy to determine since all generate similar EM responses. Indirect indicators, such as the location of a conductor relative to known geology, the shape of the EM response and the conductivity-thickness product of the conductor, are used to discriminate between different types of bedrock conductors. Surficial conductors commonly produce EM responses quite similar in appearance to those generated by bedrock conductors. However, they can usually be distinguished from bedrock conductors as they are generally less conductive and, by their nature, shallower. Consequently surficial conductors can be distinguished by using different frequencies to determine the depth to the top of the conductor and their conductivity-thickness product.

The apparent conductivity maps, particularly the 900 Hz (Fig. C20-3) and 7200 Hz coplanar maps, outline both resistive and conductive zones within the survey areas that can be correlated with known bedrock geology. Examples of the sensitivity of the method to clay and graphite content within sedimentary units are numerous. An approximately north-trending conductive zone in the Yahk survey area (Fig. C20-3c) west of the Carroll Fault within the Middle and Upper Aldridge Formation has conductivities between 3 and 20 mS/m (333 to 50 ohm-m). This conductive zone is approximately 2 to 3 km wide and extends the length of the survey area. It corresponds with graphitic mudstones and carbonaceous argillites. Similar zones, straddling the contact between the Lower and Middle Aldridge Formation occur within the Saint Mary River survey area, e.g. one near the Vulcan mineral occurrence (Fig. C20-3a). The origin of the Vulcan zone, which extends southwestward from the mineral occurrence, is not yet established. It is narrower than that in the Yahk area, and it has lower conductivities (between 4 and 100 mS/m; 250 and 10 ohm-m).

Within the Saint Mary River area, the Creston Formation (mPc) is generally resistive (Fig. C20-3a) corresponding with the predominance of arenaceous units. Where the proportion of argillites increases so too do the conductivities. For example, the NNE-trending conductive (1.5 to 10 mS/m; 667 to 100 ohm-m) horizon which extends south-southwestward from 116° 26' in the north to about the middle latitude of the survey area correlates with mapped argillaceous units in the lower Creston Formation (Fig. C20-3a).

A NNE-trending conductive (40 to 200 mS/m; 25 to 5 ohm-m) zone in the northwest portion of the Saint Mary River survey area (Fig. C20-3a) is about 3 km wide and correlates with mapped exposures of argillite in the upper Proterozoic Horsethief Creek Group. A large number of finite conductors were delineated within this conductive zone using the 900 Hz coaxial coil data. The conductors are thought to be caused by graphite-rich bodies within the argillite. Farther to the south where quartzite predominates in this formation, apparent conductivities are much lower and only a few weak conductors are delineated. Conductive zones within the Dutch Creek (mPdc), Kitchener (mPk) and Mount Nelson (mPmn) formations in the northwest corner of the St. Mary survey area appear to correspond to argillaceous sequences.

In general, the southwestern portion of the Saint Mary survey area is less conductive than the northwestern portion, even though the same formations have been mapped in both regions. This implies that the southern portion is less argillaceous and more quartzitic than the northern portion. The Dutch Creek Formation near the southern boundary of the survey area shows up as a conductive zone and has conductivities similar to those in the northwest corner. There are several weak conductors (conductivity-thickness between 1 and 5 S) associated with this latter zone.

Conductive zones are observed over several of the river valleys, including the St. Mary River and Matthew Creek in the St. Mary survey area and the Goat River and Kitchener Creek in the Yahk survey area (Fig. C20-3a, c). These zones are presumably due to clay-rich surficial deposits. They overprint the underlying bedrock geology making interpretation difficult. Man-made conductors related to mine tailings in the Sullivan area also overprint the bedrock geology.

Many of the Cretaceous intrusions are difficult to recognize on the apparent resistivity maps because they are resistive zones in a resistive background. For example, the Hall Lake and Sawyer Creek stocks in the Saint Mary survey area (Fig. C20-3a). Similarly, gabbroic Moyie sills in all three survey areas often cannot be distinguished by their electromagnetic responses. However, where sills intrude conductive units, such as graphitic mudstones and carbonaceous argillites in the Middle Aldridge Formation, southern Yahk survey area (Fig. C20-3c) they are readily distinguished.

Most of the faults in the survey areas are not imaged on apparent conductivity maps. This is true even in the case of the Carroll Fault (Fig. C20-3c) where an apparent conductivity contrast is observed across this fault. The contrast is fortuitous, due to the presence of graphitic units in the Middle Aldridge Formation to the west of the fault only and not to the presence of conductive material in the fault zone itself. Fine-grained, clay-rich gouge comprises the matrix of many large tabular breccia bodies mapped in the Iron Range Fault zone (Stinson and Brown, 1995), yet this fault is not imaged electromagnetically. Several finite conductors are mapped along or proximal to the trace of this fault, although most are quite weak (<5 S), or are cultural in origin (e.g. the power line in the Goat River Valley). Stinson and Brown (1995) observed that in the northern part of Iron Range Mountain up to 3-4% pyrite occurs in the fault zone but elsewhere sulphide minerals are rare. The lack of EM response suggests that where pyrite does exist it must have poor electrical connectivity.

Several narrow bedrock conductors located near the Vulcan prospect (Fig. C20-3a) have moderate conductance (5 to 20 S). Some of these conductors were also detected by ground UTEM surveys (Webber, 1979) and subsequently drilled. One hole encountered pyrrhotite in laminations and disseminated in smaller patches at depths of 85 to 95 m (Webber, 1979). Another drill hole encountered disseminated and massive pyrrhotite zones locally containing magnetite at depths of 40 to 45 m (Anderson, 1985). Non-cultural finite conductors aligned across adjacent flight lines are recognized near the Leadville Mine in the northern part of the Yahk survey area and elsewhere. Disseminated sulphide mineralization or clay-rich alteration products developed in shear zones are possible explanations of these aligned conductors.

Magnetics

Principles and methodology

The Earth's magnetic field (the *Geomagnetic* field) comprises three parts: (1) The *internal* field, varies very slowly in time, is of internal origin, and is thought to be due to the movement of partially molten iron in the outer core; (2) The *external* field, which is very small compared to the internal field, is mainly due to solar activity and may vary rapidly in time; (3) Spatial variations of the internal field, which are usually small, and nearly constant in time and space. These are caused by contrasts in the magnetic properties of near-surface rocks and referred to as *local magnetic anomalies.* They are of particular interest to geoscientists and explorationists.

Magnetometers measure all three components of the geomagnetic field. Because the internal field changes slowly over time, models of this field, called the International Geomagnetic Reference Field (*IGRF*) are updated every 5 years. The *IGRF* for the time and location of the survey is calculated and removed from the measured magnetometer value. Measurements recorded at a fixed location(s), *base station(s)*, within the survey area are used to correct for the transient effects of the external field. Once the effect of the Earth's internal and external magnetic fields are removed from magnetometer readings, what remains is that portion of the magnetic field largely resulting from variations in the magnetic mineral content of near-surface rocks.

The most important minerals in geomagnetic studies are magnetite, pyrrhotite and titanomagnetite, as well as, oxides of iron, and oxides of iron and titanium (Telford et al., 1990). The overall magnetic response of a rock will, to a large extent, be determined by the proportion of these accessory minerals. Magnetic susceptibility (k) is the parameter that describes the capacity of a rock to be magnetized. Magnetite which has the largest magnetic susceptibility typically constitutes less than 2% of crustal minerals. Specific lithologies may exhibit a wide range of magnetic susceptibility although there appears to be a general trend of increasing magnetic susceptibility with decreasing quartz content. Rocks lose their magnetism at temperatures above ~580-630°C, corresponding to depths of ~20 - 40 km in continental regions with average geothermal gradients. In the survey areas, the geothermal gradient is high (~30°C/km, Hyndman and Lewis, 1999), and such temperatures are encountered at depths on the order of 20 km. Consequently, magnetic anomaly maps provide information on the distribution of magnetic (and non-magnetic) rocks only to this depth.

Magnetic responses within the Purcell Basin

Prior to the high-resolution survey described here, only low-resolution regional aeromagnetic data (flown at a mean terrain clearance of 300 m on flight lines spaced 800 m apart) were available for the survey areas. The results from the low-resolution regional survey governed expectations of the high-resolution data. It was expected that the increased resolution of the new data would provide significant enhancement of all anomalies visible in the regional data, and in addition, detect numerous small and/or low gradient anomalies not previously imaged. As outlined below, this indeed proved to be the case. Table 30-1 summarizes magnetic susceptibility measurements for more than 1000 rock samples from the survey areas. Measured values generally fall within published ranges (Telford et al., 1990). Sedimentary rocks are commonly non- to weakly-magnetic and, with the notable exception of the Creston Formation, those exposed within the survey areas have the typical low magnetic susceptibility values.

Moderate to intense magnetic anomalies (up to 340 nT) characterize portions of the middle Creston Formation (Fig. C20-4) where it is composed of green quartz arenite and arenaceous siltstone at upper greenschist metamorphism facies (Reesor, 1996). Hand specimens from magnetic green arenite contain abundant porphyroblastic magnetite (>2%). Lower and upper Creston Formation phyllite with little visible magnetite and middle Creston Formation maroon arenite containing hematite are, by comparison, poorly magnetized. Magnetic susceptibility measurements of the green quartz arenite unit, where it is proximal to large intrusions such as the White Creek batholith (Fig. C20-4a), are up to 20-30 times greater than arenite away from intrusions. However, magnetic susceptibilities of other units in the Creston Formation do not show this variation. This suggests that the magnetism of the green arenite is enhanced by contact metamorphism. The magnetic character of this unit (allowing the metamorphic stabilization of significant proportions of magnetite) suggests a unique chemistry relative to other units in the middle Creston Formation. The green arenite is also distinguished by relatively low radioelement concentrations (*see* Fig. C20-5a and discussion *below*). Even in regions where geological mapping of the middle Creston Formation is difficult because of overburden cover (for example, in the northern portion of the St. Mary River area) these geophysical properties allow it to be readily mapped. In western Montana, stratabound copper-silver deposits such as Troy, Montanore and Rock Creek are entirely restricted to the Revett Formation, which is correlated with the middle Creston Formation (Höy, 1993). The unique signatures of the middle Creston Formation therefore make airborne geophysical surveys a valuable tool for mapping the favourable stratigraphic interval for Cu-Ag deposits.

The lower Creston Formation typically comprises fine-grained argillite that commonly contains disseminated and stringer magnetite in the Yahk map area. This apparent restriction of magnetite in the lower Creston Formation to this part of the basin probably reflects original sedimentation conditions. It also results in the lower Creston Formation being unusually magnetic here and observed anomaly values are as high as those mapped in regions underlain by the middle Creston Formation elsewhere in the basin (typically 50 - 250 nT, Fig. C20-4a, b, c).

Pyrrhotite is pervasive throughout the Lower and Middle Aldridge Formation, and consequently it was expected that those units would display higher magnetic anomaly values than younger sedimentary units having significantly less pyrrhotite. However, this is not the case and consequently we infer that much of the pyrrhotite in the Lower and Middle Aldridge Formation must be monoclinic pyrrhotite in contrast to the Sullivan ore body where both monoclinic and magnetic hexagonal pyrrhotite are abundant (Ethier et al., 1976).

The average magnetic susceptibility value for gabbro is more than seventy times that of average sedimentary rocks (Telford et al., 1990). Measured values for gabbroic Moyie sills from within the survey areas (Table 20- 1), are at the low end of the published range of magnetic susceptibilities (average = 6.67×10^{-3} SI) but nonetheless more than six times higher than average values of the Lower and Middle Aldridge formation which they intrude. Consequently, it was expected that shallow and outcropping sills would be readily imaged and that magnetic anomaly data might provide a means of correlating sill outcrops along strike in regions of surficial cover. The sills were poorly imaged in existing regional aeromagnetic data due to the small outcrop area of the sills and the large line spacing of those surveys.

Table 20-1. Magnetic susceptibility and radioelement concentrations for selected geological units of the Purcell anticlinorium as determined by ground measurements in the field, or by laboratory measurement on hand and core samples. Units shown in italics are alteration or textural types associated with Sedex mineralization in the Lower and Middle Aldridge.

Age	Geological Unit	Magnetic Susceptibility			Mean Radioelement Concentration						
		(10^{-3}SI)			K %		eU (ppm)		eTh (pm)		
		Mean	Range	No. of Measurements	Mean	Range	Mean	Range	Mean	Range	No. of Measurements
Mesozoic	Intrusive rocks	6.53	0-33.9	150	4.51	2.9-6.12	6.34	4.58-8.1	16.51	14.1-18.92	2
	Reade Lake stock	7.09	0.3-24	80	4.94	4.7-5.2	7.28	5.2-8.3	16.50	13-22.6	5
	White Creek batholith	12.36	5- 35.7	40							
	America Creek stock	0.30	0-1.26	20	2.90		4.40		14.10		1
	Angus Creek stock	7.00	4.2-12.9	10							
	Hall Lake stock	3.15	0-7.5	20							
Paleozoic	Cranbrook Formation	0.27	0-54	70	2.1	0.1-3.2	3.39	2.2-4.7	11.72	1-19.6	7
	Eager Creek Formation	1.40	0-2.51	20							
Upper Proterozoic	Horsethief Creek Formation	0.87	0-1.3	30	2.15	1.6-2.7	1.3	1.2-1.4	5.6	5.3-5.9	2
	Toby Formation	0.69	0.4-1.14	15							
Middle Proterozoic	Hellroaring Creek stock	0.16	0.02-0.5	50	4.22	2.8-6.3	3.78	1.4-7.3	2.72	1.3-3.7	5
	Moyie sills	6.67	0-160	200	1.11	0.7-2.2	1.31	0.2-2.3	4.59	2.2-9.0	8
	Creston Formation	15.2	0-125.7	330	2.10	1.9-5.2	2.90	1.8-4.7	11.24	9.2-21.6	7
	Upper Aldridge Formation	0.42	0-2.5	40	3.20	2.8-3.6	3.00	2.8-3.2	17.30	15.7-18.9	2
	Middle Aldridge Formation	0.72	0-40.2	120	3.51	1.8-5.4	3.61	2.4-4.7	12.90	9.3-21.6	1
	Lower Aldridge Formation	0.67	0-5	350	3.27	1.1-6.2	3.79	1.2-5.5	12.24	7.4-23.4	9
	sedimentary fragmental	*0.63*	0-2	80	*3.67*	3-4.2	*5.08*	4.4-5.6	*17.23*	16-20.9	8
	garnet-bearing	*7.30*	0.04-40.2	20	*3.25*	2.9-3.7	*6.55*	4.2-9.1	*12.00*	8.7-16.1	7
	muscovite-, sericite bearing	*0.78*	0-2.36	35	*3.74*	2.8-4.43	*3.85*	2.6-5.1	*16.9*	9.8-19.9	9
	albite-bearing	*0.20*	0-0.45	10	*4.00*	3.75-4.25	*3.20*	2.6-3.8	*19.00*	16.9-22	2
	tourmaline-bearing	*0.16*	0.11-0.3	20	*2.75*	0.2-4.2	*4.02*	3.2-4.3	*15.53*	13.5-17.2	5

Analysis of the high-resolution data complemented by ground follow-up investigations led to new identifications of several sill exposures and even in regions of thick glacial cover, such as north of the St. Mary River, the data allowed sills to be correlated along strike. An arch of gabbroic sill is a feature of the Sullivan - North Star corridor (Turner et al., 2000a) and their recognition elsewhere may be important for mineral exploration. In all regions the magnetic response of Moyie sills is quite variable; the majority are poorly magnetized and in many instances an anomaly is observed only over a portion of a sill outcrop. Magnetic sills show a clear association with mapped faults, or are proximal to large intrusions indicating a secondary thermal or possibly hydrothermal origin for the magnetism. This is especially clear for the package of sills outcropping immediately south of the White Creek batholith in the St. Mary area (Fig. C20-4a). Sill segments within the aureole of the intrusion yield significantly higher magnetic anomaly and magnetic susceptibility values than those farther away. Similarly, follow-up ground studies identified gabbro as the source of several small magnetic anomalies proximal to the Hall Lake and St. Mary fault systems (Fig. C20-4a), as well as the string of anomalies extending west-southwest from the Emily Creek Fault in the Findlay area (Fig. C20-4b). The package of Moyie sills exposed in the Hawkins Creek area to the east of the Yahk fault is geophysically atypical, corresponding with higher than average magnetic anomaly values (Fig. C20-4c), moderate apparent conductivities (Fig. C20-3a; up to 10 ms/m; 100 ohm-m on the 56000 Hz coil pair) and elevated K values (not shown here).

Igneous rocks commonly display a wide range of magnetic susceptibility values (Telford et al., 1990). S-type granites, which form by anatexis of metasedimentary rocks, typically are preferentially enriched in ilmenite and tend to have low magnetic susceptibility values. In contrast, I-type granites having a mafic-rich source typically are preferentially enriched in magnetite, and consequently tend to have high magnetic susceptibility values. However, assimilation, metasomatic and/or metamorphic processes, during or subsequent to the emplacement of magma, can alter the chemistry and mineralogy of parts or the whole of an intrusion. Although some workers have suggested that Jurassic intrusions within the Purcell basin may have an I-type affinity (Brandon and Lambert, 1993), little has been published on the affinity of these or the younger Cretaceous bodies. Magmatic differentiation within a large intrusion can lead to spatial variations in magnetic mineral content (magnetite is often preferentially enriched in early mafic phases relative to younger felsic phases). Consequently, it was expected that magnetic anomaly values over small undifferentiated bodies such as the Hall Lake and Sawyer Creek plutons (Fig. C20-4a) would be more uniform than those over the differentiated White Creek and Fry Creek batholiths.

Two magnetically distinctive suites of Cretaceous intrusions were recognized within the survey areas. The White Creek batholith has a weakly magnetic central region and a strongly magnetic margin (Fig. C20-4a, b). This characteristic is also visible in regional magnetic anomaly data (Cook et al., 1995). The magnetic margin is heterogeneous and discontinuous; peak margin amplitudes vary from ~140 nT to >850 nT and the width varies from <500 m to >3 km. High intensity marginal phases correlate with the distribution of biotite monzogranite and hornblende granodiorite phases (units Kwc3 and Kwc2; Reesor, 1996) and lower intensity interior phases with biotite-muscovite leuco monzogranite (unit Kwc4, Reesor, 1996). Contrary to expectation, the Hall Lake pluton and Sawyer Creek stock display similar magnetic characteristics. However, in the case of the Hall Lake stock the magnetic margin is only observed over the northern portion of the body and in the case of the Sawyer Creek stock, only over the southern portion of the stock. Hornfelsed host rocks adjacent to the intrusions are common. The measured magnetic susceptibility of hornfels containing porphyroblastic magnetite ± pyrrhotite is significantly elevated compared to unaltered host rock indicating secondary magnetization of the country rocks.

In contrast, older regional, as well as the new high-resolution magnetic data show that the Fry Creek batholith and the Reade Lake stock (exposed a few kilometres east of St. Mary River area) are characterized by high magnetic values throughout their mapped exposures reflecting a more homogeneous distribution of magnetic minerals in these bodies. (Note: although the Reade Lake Stock does not outcrop within the St. Mary Survey area, the magnetic anomaly associated with it extends into the survey area; Fig. C20-4a). Petrographic studies of the Reade Lake stock by Höy (1993) identified disseminated magnetite. Exposures of this stock are limited and its mapped contact was drawn from regional magnetic anomaly data (Höy and van der Heyden, 1988). Ground follow-up studies showed that outcrops of Eager Creek Formation siltstone occur in areas previously mapped as Reade Lake stock. The siltstone and nearby exposures of Creston Formation adjacent to the stock have elevated magnetic susceptibilities compared with the measured averages of these formations (Table 20-1), which suggests a secondary magnetization. Thus, the stock is not as extensive as previously inferred. Radioelement patterns over the Cretaceous intrusions generally complement magnetic data in that they are elevated in non- to weakly-magnetic felsic rocks and relatively low in more magnetic, mafic units. Together these two methods offer a means of remotely recognizing subtle lithologic changes within intrusions where detailed field mapping is lacking. A spatial association between Cretaceous intrusions, lode gold mineralization and placer deposits highlights the possible applications of combining magnetic and radiometric data in the exploration for these deposit types by identifying specific types of intrusions or deposit trains from them.

Faults can have a variety of expressions on magnetic anomaly maps. If the fault juxtaposes units with contrasting magnetic susceptibilities it will generate a magnetic lineament parallel to the fault trend, and a steep magnetic gradient perpendicular to the fault trend. Faults, which juxtapose units with comparable magnetic susceptibility values, will be magnetically invisible. Movement of fluids along fault zones may produce zones of hydrothermal mineralization and alteration containing magnetic minerals that may then result in prominent magnetic lineations.

Most of the mapped faults within the survey areas offset weakly magnetic sedimentary rocks against weakly magnetic sedimentary rocks and, with the exception of a number of faults in the Yahk area, were not directly imaged in the magnetic anomaly data. However, as discussed above, highly magnetic segments of Moyie sills adjacent to faults form strings parallel to the traces of several faults and provide indirect evidence for the faults. Such is the case along the St. Mary Fault (Fig. C20-4a). Mapped and inferred faults that cut similar stratigraphy in the Yahk survey area (Fig. C20-4c), e.g. the Iron Range, Spider and Moyie faults, are associated with linear zones of moderate to steep magnetic gradient (maximum gradients of approximately 0.21, 0.12 and 0.16 nT/m, respectively). Magnetic sources in the latter cases are magnetite-hematite breccias (Stinson and Brown, 1995).

The north-trending Iron Range fault zone is the most spectacularly imaged fault within the survey areas (Fig. C20-4c) producing an intense linear magnetic anomaly with a peak amplitude of 1130 nT. The width of this anomaly varies from less than 1 km to about 4 km. Ground follow-up studies confirm that the primary magnetic sources are the 0.3 - 5 m wide massive lenses of magnetite and hematite which grade outward to wider, less-brecciated, magnetite-rich zones. Original magnetite abundances in these lenses and breccias range from 5 to 30%, but most is now pseudomorphed by hematite (Stinson and Brown, 1995). The highest magnetic susceptibility values in the entire survey were measured in these massive lenses ($> 400 \times 10^{-3}$ SI). Peaks in magnetic intensity along the fault zones where no magnetite-rich lenses are mapped may be indicative of buried lenses, although elevated anomaly values are also associated with disseminated magnetite and altered Moyie sills in and adjacent to fault zones. The Iron Range fault is also well imaged radiometrically (Fig. C20-5c).

Contrary to expectation, exposures of Nicol Creek basaltic lava in the St. Mary River area could not be distinguished magnetically, although outside the survey areas these lavas may be mapped by their intense magnetic anomalies. Original geochemical differences or subsequent metamorphic overprints are possible explanations of the observed difference.

Gamma-ray spectrometry

Principles and methodology

Gamma-ray spectrometry is a geophysical technique that provides geochemical information on the top few tens of centimetres of the Earth's surface. As with any near-surface geochemical method, interpretation requires an understanding of the nature of the surficial materials, such as tills, glacial outwash, fluvial, or lacustrine deposits and their relationship to bedrock.

Potassium (K), uranium (U), and thorium (Th) are major, mobile trace, and immobile trace elements, respectively. They are present in variable amounts in all rocks and derived materials. Radioelement signatures of minerals, as measured from the gamma-ray spectrometric survey, assist in lithological mapping. K concentrations are measured directly from the airborne gamma-ray spectra, whereas U and Th concentrations are computed from the spectra of their daughter products, Bi^{214} and Ti^{208}, respectively, which are more readily distinguished from the other gamma rays in the spectrum. Where the "normal" distribution of these elements (K, eU – equivalent uranium, eTh - equivalent thorium) is disrupted by a mineralizing process the resultant radioelement anomaly provides direct exploration guidance.

In general, radioelement data complement magnetic data, as radioelement values tend to be elevated in non- to weakly-magnetic, evolved felsic and sedimentary rocks and relatively low in less evolved, more magnetic, mafic units. A more thorough summary of gamma-ray spectrometry theory, techniques, and Canadian case histories is presented in Shives et al. (1995).

For the current surveys, the gamma-ray spectrometric system consisted of a 16 L sodium iodide crystal array attached to a 256 channel Exploranium GR820 spectrometer. A 4 L upward looking crystal was used to monitor background radiation.

Gamma-ray responses within the Purcell Basin

Addition of gamma-ray spectroscopy to the more conventional EM-magnetic surveys was expected to provide important new geochemical information not previously gathered within the Purcell basin. Although airborne and ground gamma-ray spectrometry have been successfully applied to geological mapping and exploration for a variety of mineral deposit types worldwide, the current surveys provide the first Canadian test over a geological terrain containing Sedex deposits. By using the measured radioelement concentrations as a guide to geochemical variations it was anticipated that the large intrusions, and possibly phases within them, could be delineated, and, also that subtle facies or formational variations within the Purcell Supergroup stratigraphy could be differentiated. Of particular interest was whether the muscovite alteration that envelopes the Sullivan deposit and occurs extensively in the Sullivan - North Star corridor (Turner et al., 2000b) could be distinguished from the regionally metamorphosed biotite- and muscovite-bearing sedimentary rocks of the Purcell basin.

Within the three areas surveyed, rugged topography and variable bedrock exposure significantly influence the total radioactivity measured. South-facing slopes are relatively drier, less vegetated, and have more exposed bedrock and talus than north-facing slopes. Consequently, south-facing slopes yield higher radioelement concentrations that are more representative of bedrock values. This is especially obvious in measured K concentrations (*see* K map in British Columbia Ministry of Employment and Investment, 1996). These effects were minimized by using radioelement ratios (eU/eTh, eU/K, and eTh/K) to distinguish important relative variations among the three elements. Air photographs and landsat images, which allowed regions of exposed bedrock to be readily distinguished from regions of dense vegetation and/or surficial cover, were also useful aids in the interpretation of radioelement data.

Regionally, a number of distinct radioelement anomalies and patterns were recognized (Fig. C20-5). Very low eTh/K ratios delineate the distinctive chemistry of the Proterozoic Hellroaring Creek (Fig. C20-5a) and Greenland Creek stocks (Fig. C20-5b). These highly evolved intrusions contain aplitic and pegmatitic phases comprised of quartz, muscovite, sodic plagioclase, microcline feldspar, and minor garnet, beryl, tourmaline, and pyrite. In addition, radioelement variations within the White Creek batholith correlate with mapped phases (Reesor, 1996) and clearly distinguish this batholith from the smaller Sawyer Creek and Hall Lake stocks of Cretaceous age within the St. Mary River area which are characterized by lower radioelement concentrations (Fig. C20-5a).

Outcropping Moyie sills were recognized by low radioelement concentrations (approximately one third lower than the Lower or Middle Aldridge Formation, Table 20-1). Together with magnetic anomaly data this correlation offers assistance for improved sill delineation. An exception to this general rule is the sill package that crops out east of the Yahk Fault and north of Hawkins Creek. Not only is this package characterized by moderate K concentrations (*see* K map in British Columbia, Ministry of Employment and Investment, 1996), but as discussed above it is also electromagnetically and magnetically anomalous.

Along the southern and western edge of the St. Mary survey area, high eTh/K ratios accurately demarcate a quartzite member within the Horsethief Creek Group (Fig. C20-5a, unit HH_2 of Reesor, 1996). The radiometric anomaly is caused by extremely low K contents and elevated thorium-bearing accessory minerals in the quartzite. Farther to the northwest, EM data delineate agillaceous units within this same formation (*see* discussion *above*). West of the Carroll Fault in the Yahk area, high K concentrations (not shown here) correspond with zones of enhanced conductivity associated with graphitic mudstones and carbonaceous argillites in the Middle and Upper Aldridge Formation.

Immediately east of the Hall Lake fault near the southern boundary of the Saint Mary survey area broad areas of elevated eU and eTh values correlate with argillaceous units in the Upper Aldridge and lower Creston formations. Reesors's (1996) mapping of these units in this area supports this correlation, suggesting that extension of the contacts of these units into unmapped areas is possible using airborne radioelement patterns. The lower/middle Creston boundary is recognized by a decrease in eU and eTh levels (and a corresponding increase in eTh/K ratios, Fig. C20-5a), and as described above, is coincident with the transition from low to moderate magnetic anomaly values. These strong and complementary radioelement/magnetic relationships highlight the advantages of multi-technique geophysical surveys and integrative interpretation.

Many examples of fault-controlled iron-oxide mineralization and albite-sericite alteration occur within the survey areas. A belt of elevated eTh/K values along the Iron Range fault zone (Fig. C20-5c) correlates with albite-rich breccias in the fault zone, regions of extensive albitic alteration adjacent to the fault zone, and apophyses of albite-rich material that extend up to a few metres into adjacent Moyie sills (Stinson and Brown, 1995). The most intense anomalies correspond to areas where albite alteration is most intense as at Iron Range Mountain, Mount Thompson, and west of the Sha occurrence (Fig. C20-5c).

Absorption of gamma rays in water results in depleted radioelement concentrations along all of the major drainages and lakes (*see* K map in British Columbia Ministry of Employment and Investment, 1996). However, unconsolidated deposits in these drainages, such as the St. Mary River, Redding Creek, Goat River, Hawkins Creek and Kitchener Creek typically yield elevated eTh/K ratio patterns. These patterns are interpreted as reflecting elevated levels of stable thorium bearing minerals associated with heavy mineral concentrations in the valley floors.

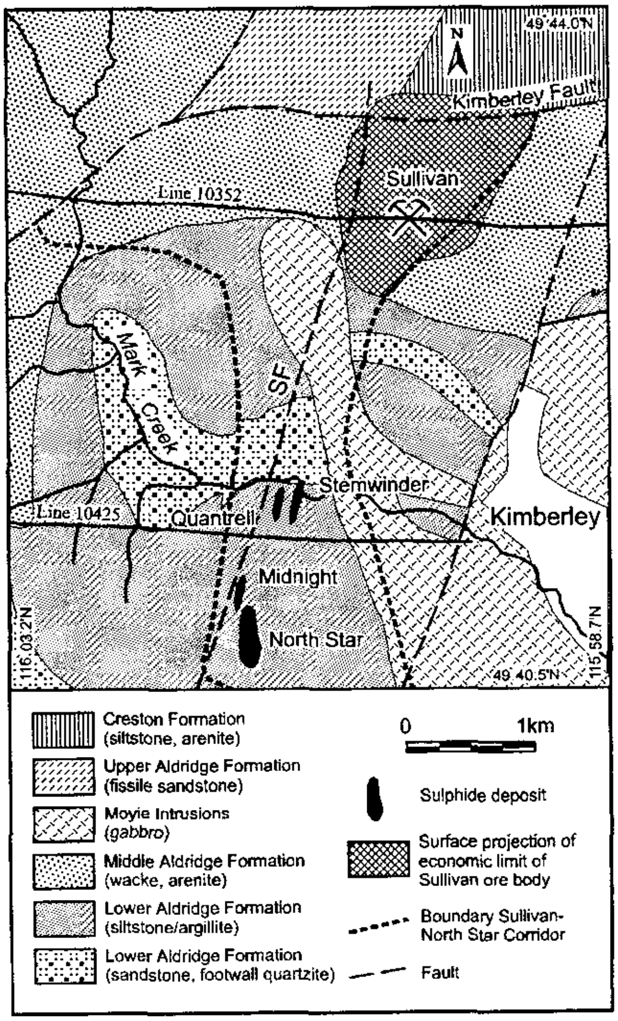

Figure 20-6a. Geological map of the Sullivan-North Star corridor (modified from Hagen (1985) and Turner et al., (2000a)). The boundary to the Sullivan Corridor marks the extent of pervasive, pre-gabbro, hydrothermal alteration and sulphide mineralization.

VLF

The marine transmitter station operated only discontinuously during the survey. In addition, VLF data had a low signal-to-noise ratio, due in part to the resistive nature of the geological units encountered. Although these data may contain some information useful for identifying and/or refining conductors in the near surface they are generally of poor quality and are not considered here.

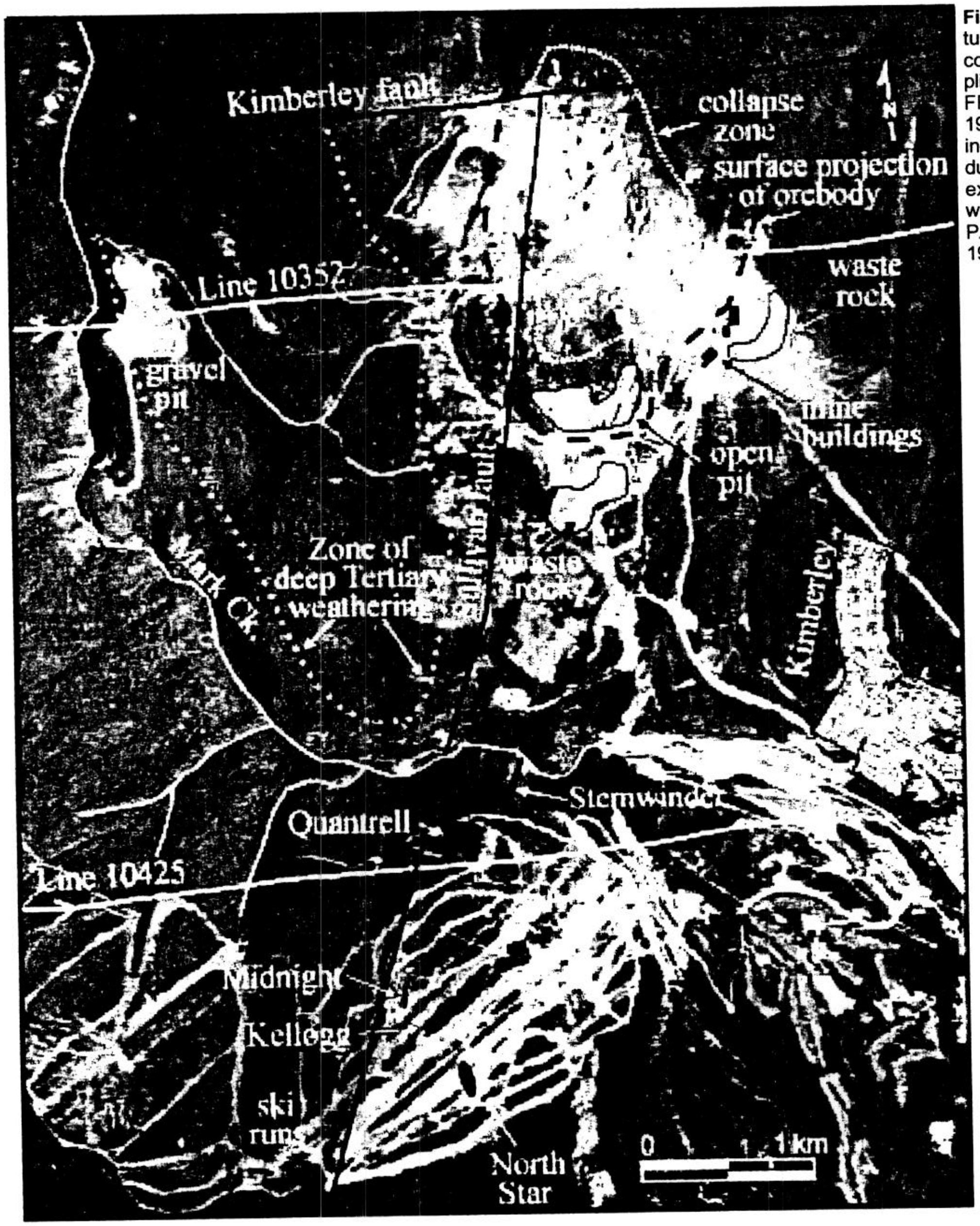

Figure 20-6b. Surface features in the Sullivan-North Star corridor. Airphotograph supplied by Cominco Ltd. (photo FFC94016-19, August 10, 1994). Arrows on flight lines indicate direction of helicopter during data acquisition. The extent of the deep Tertiary weathering zone is taken from P. Ransom (unpub. data, 1996).

THE SULLIVAN - NORTH STAR CORRIDOR

To assess the utility of the three geophysical techniques for mineral exploration we next examine the observed responses within the Sullivan - North Star corridor where a number of significant deposits occur (Fig. 20-6). As discussed above, the quantity and connectivity of sulphide minerals in a mineralized zone will, to a significant extent, determine its overall conductivity. Both pyrrhotite and to a much lesser extent, magnetite (average magnetic susceptibility = 1.5, 6 SI, respectively, Telford et al., 1990) are associated with sulphide mineralization in the Purcell Basin and significant muscovite, albite and/or chlorite alteration of the host rocks is typical in many cases. Consequently, it was expected that mineral occurrences within the corridor would correspond with zones of enhanced conductivity, strong finite conductors, high magnetic anomaly values and low eTh/K anomalies. Despite nearly complete extraction of ore from the Sullivan mine, it gives a significant EM and magnetic response. Also, altered and barren- to weakly- mineralized waste rock on the surface around the deposit corresponds with subtle to intense magnetic, EM, and radioelement anomalies (Fig. 20-6 and C20-7).

Strong finite conductors, that cannot be attributed to cultural features, are coincident with the surface projection of the sulphide-rich Sullivan horizon, especially along the west side of the deposit where it is cut by the Sullivan fault, and along the south side of the open pit (Fig. 20-6 and C20-7a). The Sullivan fault zone contains pyrrhotite at depth and this pyrrhotite is a likely cause for some conductors. The conductors are typically quite broad, with in-phase and quadra-

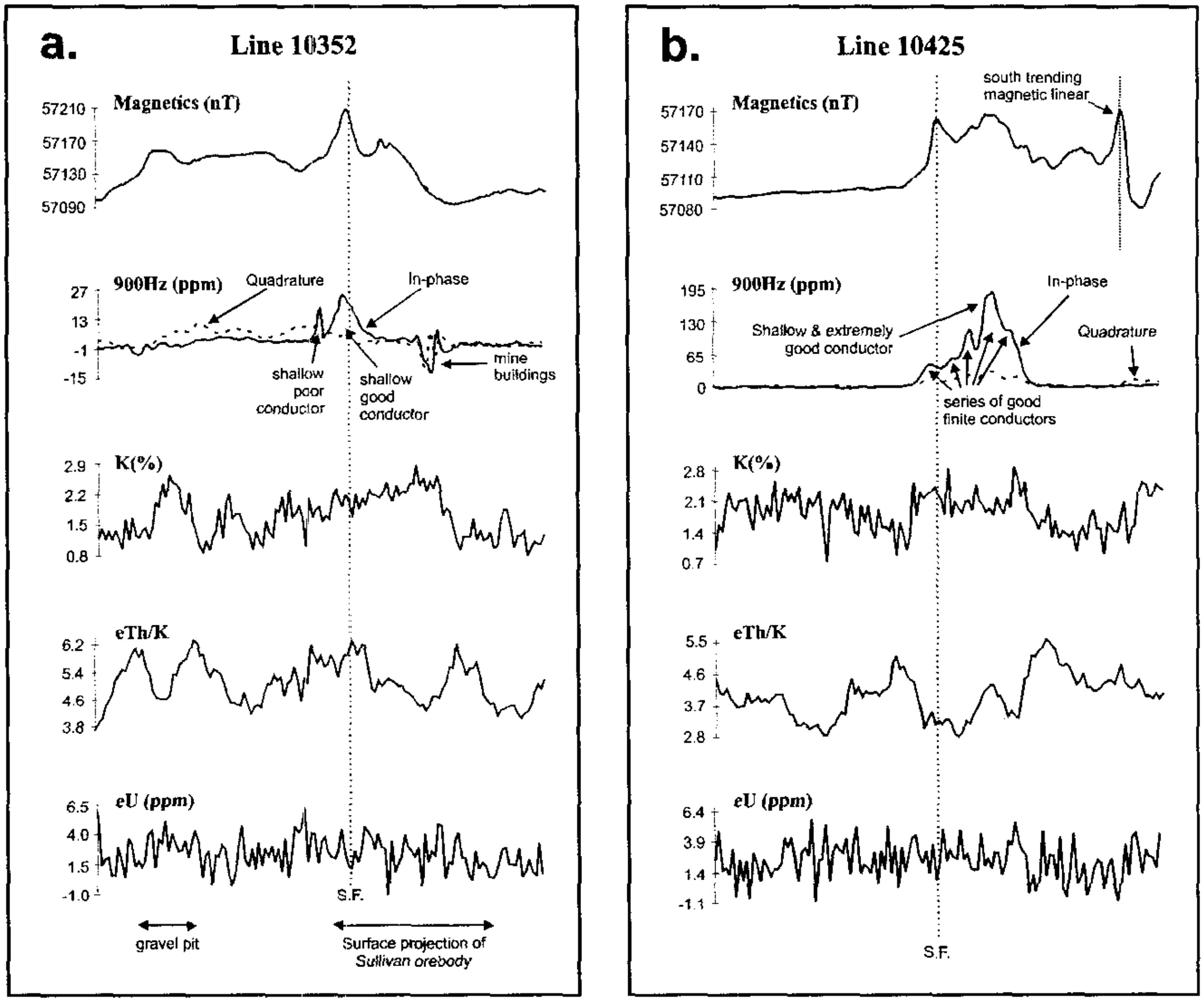

Figure 20-8. Stacked profiles of eU, eTh/K, K, conductivity (900 Hz coaxial data) and magnetic anomaly values along flight lines: **(a)** 10352, over the Sullivan mine; and **(b)** 10425, just south of the Stemwinder deposit. SF = Sullivan fault. See Figure C20-7 for location of flight lines.

ture values, which are generally larger than 15 ppm (Fig. C20-7 and 20-8). The conductors have large conductance values, as calculated from the 900 Hz coaxial data, assuming a two-dimensional vertical conductor in free space. In general, the deeper a conductor is buried the lower the absolute values of both the in-phase and quadrature components. However, the ratio of the in-phase and quadrature components is only slightly affected by burial depth, so it is an important indicator of absolute conductivity. Conductors related to cultural features include mine buildings, heavy equipment, and power lines.

Enhanced conductivity is attributed to the undisturbed massive pyrrhotite body (up to 50 m thick and 500 m long) that underlies the ore zone in the western and shallowest part of the underground workings, and to unmined massive sulphide ore. The collapse zone, which overlies the most extensively mined zone, is not anomalous.

The most prominent cluster of finite conductors within all three, survey areas occurs over an area 1.0 km by 1.2 km in the vicinity of the North Star and Stemwinder mines. It comprises shallow conductors with greater conductance values than those at Sullivan (Fig. 20-8). The conductors are attributed to north-trending sulphide-rich zones, including veins of the abandoned workings and zones consisting of abundant sulphide-filled fractures. An associated zone of enhanced conductivity terminates where the Stemwinder vein pinches out north of Mark Creek, in an area of thick cover and deep weathering (compare Fig. 20-6b and C20-7a). This deep weathering zone comprises oxidized and friable bedrock up to 146 m deep.

A moderately positive, irregularly-shaped (4.5 km by 3.2 km) magnetic anomaly is observed in the corridor area (Fig. C20-7b). Localized zones of elevated anomaly values occur over the Sullivan mine, between the North Star and Stemwinder deposits and over exposures of Moyie sill. The magnetic anomaly is truncated to the north by the north-dipping Kimberley fault. The western and southern boundaries are less well defined. To the east, the anomaly abruptly ter-

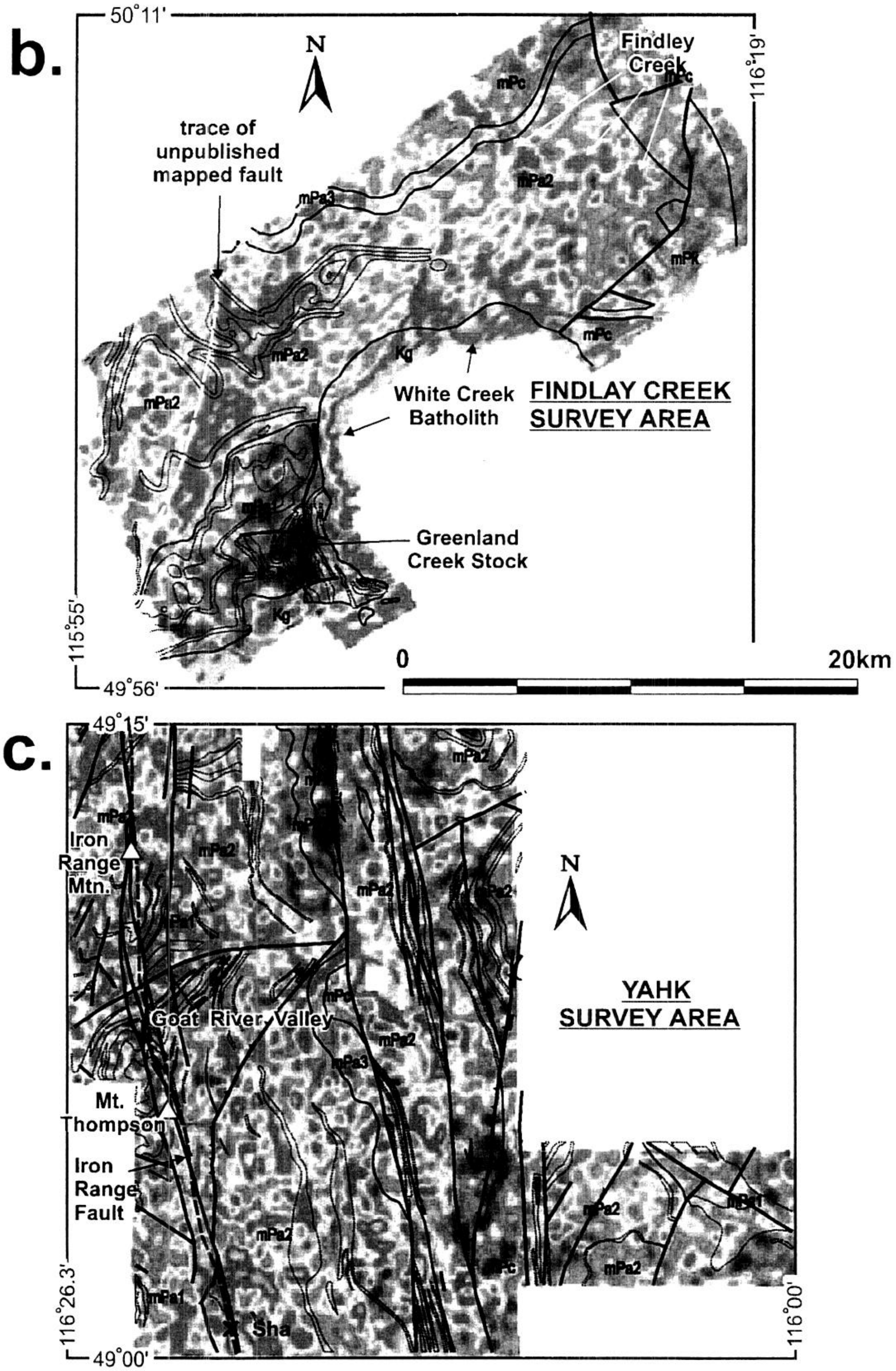

Figure C20-5. eTh/K levels: **a)** St. Mary; **b)** Findlay; **c)** Yahk survey areas. High values are shown in hot colours and low values in cool colours. Geological boundaries from British Columbia Geological Survey Branch Geoscience Map 1995-1. Outcrops of Moyie sills are shown by fine dotted lines. Geological codes are as shown in Figure20-1b.

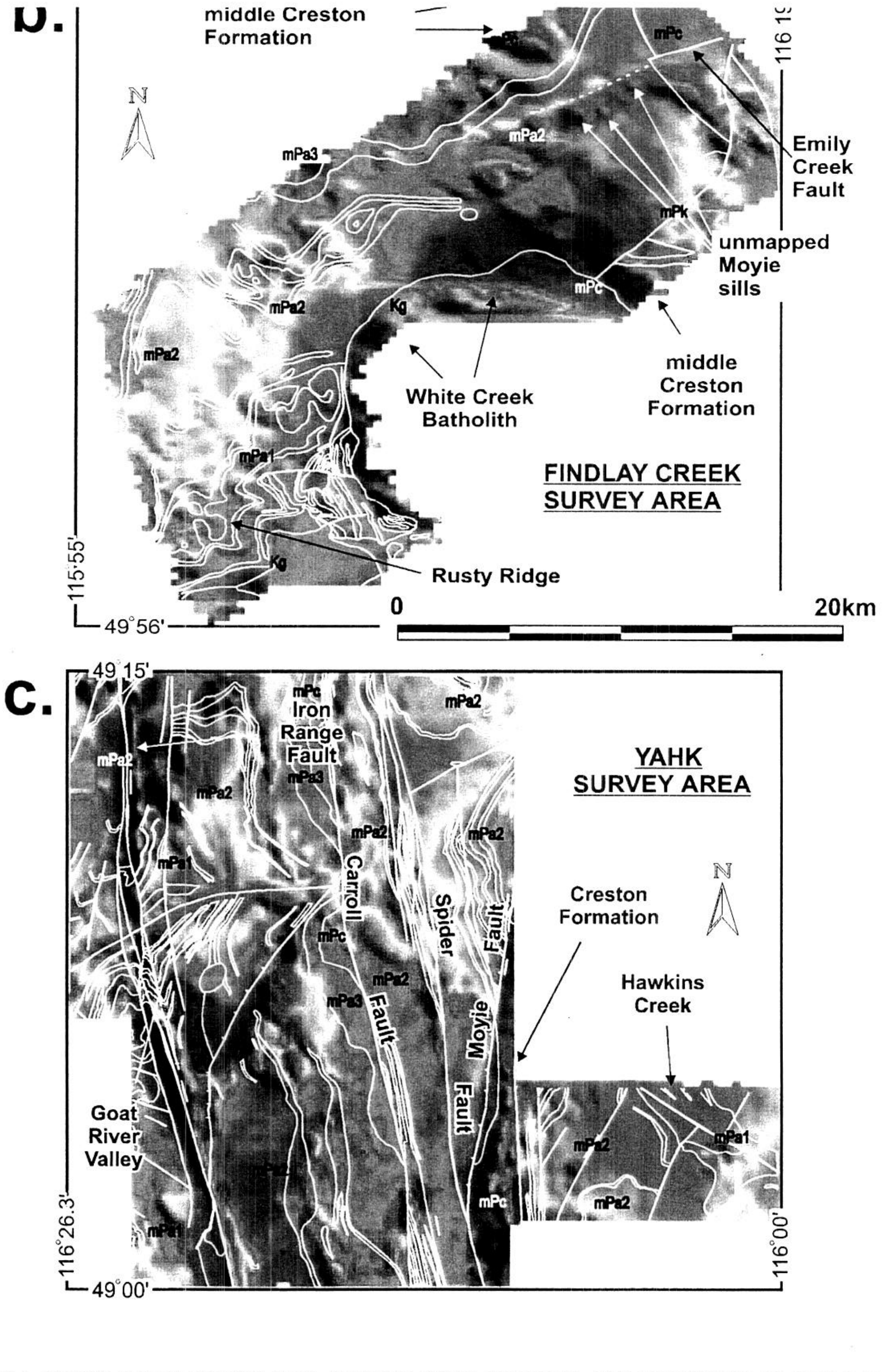

Figure C20-4. Magnetic anomaly data: **a)** St. Mary; **b)** Findlay; **c)** Yahk survey areas. High anomaly values are shown in hot colours and low anomaly values in cool colours. Geological boundaries from British Columbia Geological Survey Branch Geoscience Map 1995-1. Outcrops of Moyie sills are shown by fine dotted lines. Geological codes are as shown in Figure20-1b.

minates at a narrow (< 500 m wide), south-trending magnetic linear that extends from the St. Mary River valley to the Kimberley fault (Fig. C20-4).

Zones of enhanced magnetic anomaly values at the Sullivan mine correspond to the shallowest portions of the mineralized zones adjacent to the Sullivan fault (Fig. C20-7b, 20-8). The magnetic peak at Sullivan is primarily due to the massive pyrrhotite replacement body beneath the western portion of the ore body. Most of this pyrrhotite must only be weakly magnetic, otherwise a stronger anomaly would be expected. Although the eastern portion of the ore body contains minor magnetite (Hamilton et al., 1982) its concentration does not appear to be high enough to affect magnetic amplitudes. The magnetic peak at North Star is situated between the North Star and Stemwinder mines, where abundant disseminated and fracture-filled pyrrhotite occurs. As at the Sullivan Mine, the magnitude of the anomaly suggests that a considerable proportion of the pyrrhotite must be weakly magnetic. North of the Stemwinder Mine lower magnetic amplitudes correspond to the zone of thick Quaternary cover and deep bedrock weathering (*see* Fig. 20-6b).

Elevated radioelement (K, eU, and eTh) concentrations are associated with the Sullivan open pit, collapse zone and waste dumps (Fig. C20-7c, d and 20-8). These anomalies are enhanced by increased bedrock exposure and drainage relative to the surrounding undisturbed, vegetated, moist overburden. Ground spectrometry confirmed the elevated concentrations. Subtle depressed eTh/K ratios are apparent over the eastern and southern waste dumps, but not over the open pit or collapse area. This suggests that the mine waste rock contains more K than does surface bedrock and surficial materials. The area of elevated K, eU and eTh values extends northward from the pit area, across the Kimberley fault and over exposures of the Upper Aldridge Formation on Sullivan Hill. North of the Kimberley fault the radioelement patterns reflect their abundances in the Upper Aldridge argillite and are not related to the mineralization and alteration that characterize the Sullivan-North Star corridor.

Elevated radioelement concentrations and low eTh/K ratios also occur over the North Star deposit. In situ spectrometry on bedrock and talus confirms K enrichment relative to unaltered Aldridge turbiditic sediments. The enrichment is a result of sericite alteration within a narrow sub-vertical zone that extends 2 km to the south. These patterns are enhanced by increased bedrock exposures related to old mine workings, cleared ski runs or talus.

Lower amplitude K enrichments with coincident eTh/K depletions occur west and northwest of North Star Hill, in steeply sloping or bowl-shaped areas covered with very thick clay-rich till. Although these anomalies accurately reflect the relatively K-rich chemistry of the till, the corresponding low magnetic anomaly values suggest that the radioelement anomalies do not represent exploration targets like those known within the Sullivan-North Star corridor.

Associated with the mineralization in this corridor are growth faults, chaotic breccia, Moyie sills, manganiferous garnet-rich beds and muscovite and albite-biotite-chlorite alteration (Turner et al., 2000b). The rock property measurements (Table 20-1) show that relative to most Aldridge sedimentary rocks, sedimentary fragmentals have moderately higher K and eU concentrations, those rich in garnet porphyroblasts have higher magnetic susceptibilities and higher eU concentrations and those that exhibit muscovitic and sericitic alteration have elevated K concentrations and relatively lower eTh/K ratios. Although tourmaline-bearing Aldridge rocks appear to have lower magnetic susceptibility values and to be moderately enriched in eU and eTh relative to unaltered Aldridge sedimentary rocks few samples were available for analysis. More extensive chemical analyses of tourmalinites (Jiang et al, 2000a, b; Slack et al., 2000) do not support relative radioelement enrichment in these rocks.

SUMMARY

The new geophysical data described here permit a refinement of geological interpretations and maps within the survey areas. The shallow sampling depths of the gamma-ray spectrometric and EM methods make them particularly suitable for mapping the surface extent of units whose geophysical signatures contrast with adjacent units. Several new exposures of Moyie sills have been identified using the data, and it has proved possible to correlate sills along strike using their characteristic high apparent resistivities (generally > 5000 ohm-m; <0.2 mS/m), low radioelement concentrations and elevated magnetic anomaly values compared to adjacent sedimentary rocks (Table 20-1). Similarly, radioelement data allow the surface extent of the Proterozoic Hellroaring Creek and Greenland Creek stocks to be mapped more accurately. Zones of low apparent conductivity in the St. Mary area accurately outline exposures of the quartzites in the Horsethief Creek Group (unit HH_2 of Reesor, 1996) formations. Extremely low K content and elevated thorium-bearing accessory minerals in unit HH_2 result in high eTh/K ratios.

The new geophysical data for the Sullivan - North Star corridor provide baseline information for mineral exploration elsewhere in the Purcell Basin. Elevated magnetic values, high electrical conductance, and low eTh/K ratios are characteristic of mineralization and sericitic alteration in the corridor, even in the vicinity of the Sullivan deposit where about 90% of the ore has been removed. Outside of the corridor, the Aldridge Formation typically is characterized by low magnetic values, low electrical conductivities, and by relatively few and relatively weak finite bedrock conductors. This suggests that undiscovered magnetic massive sulphide accumulations in the survey areas must be more deeply buried than the near surface portions of either the Sullivan or the North Star deposits. However, it does not preclude the presence of disseminated sulphides at any depth.

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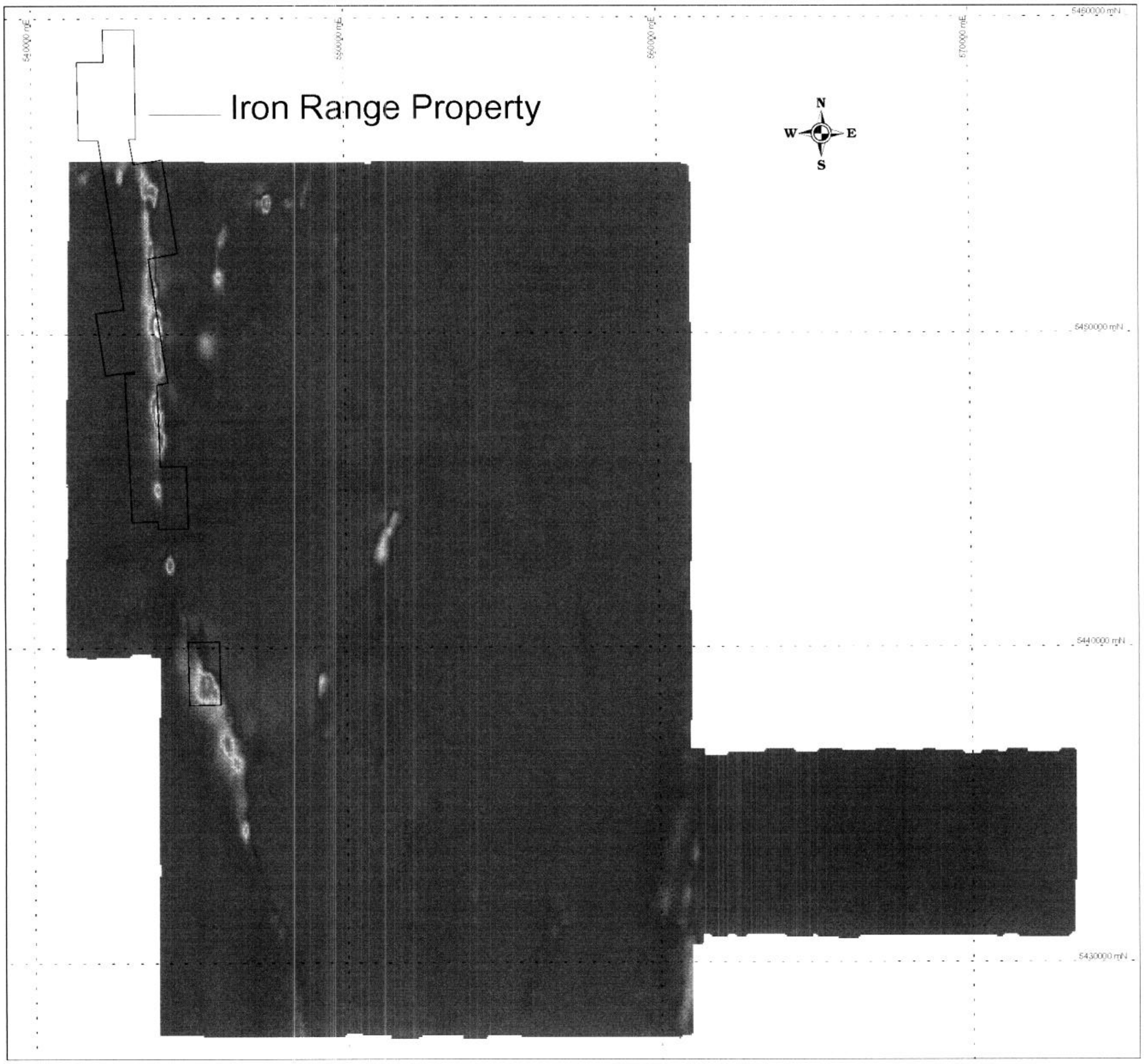
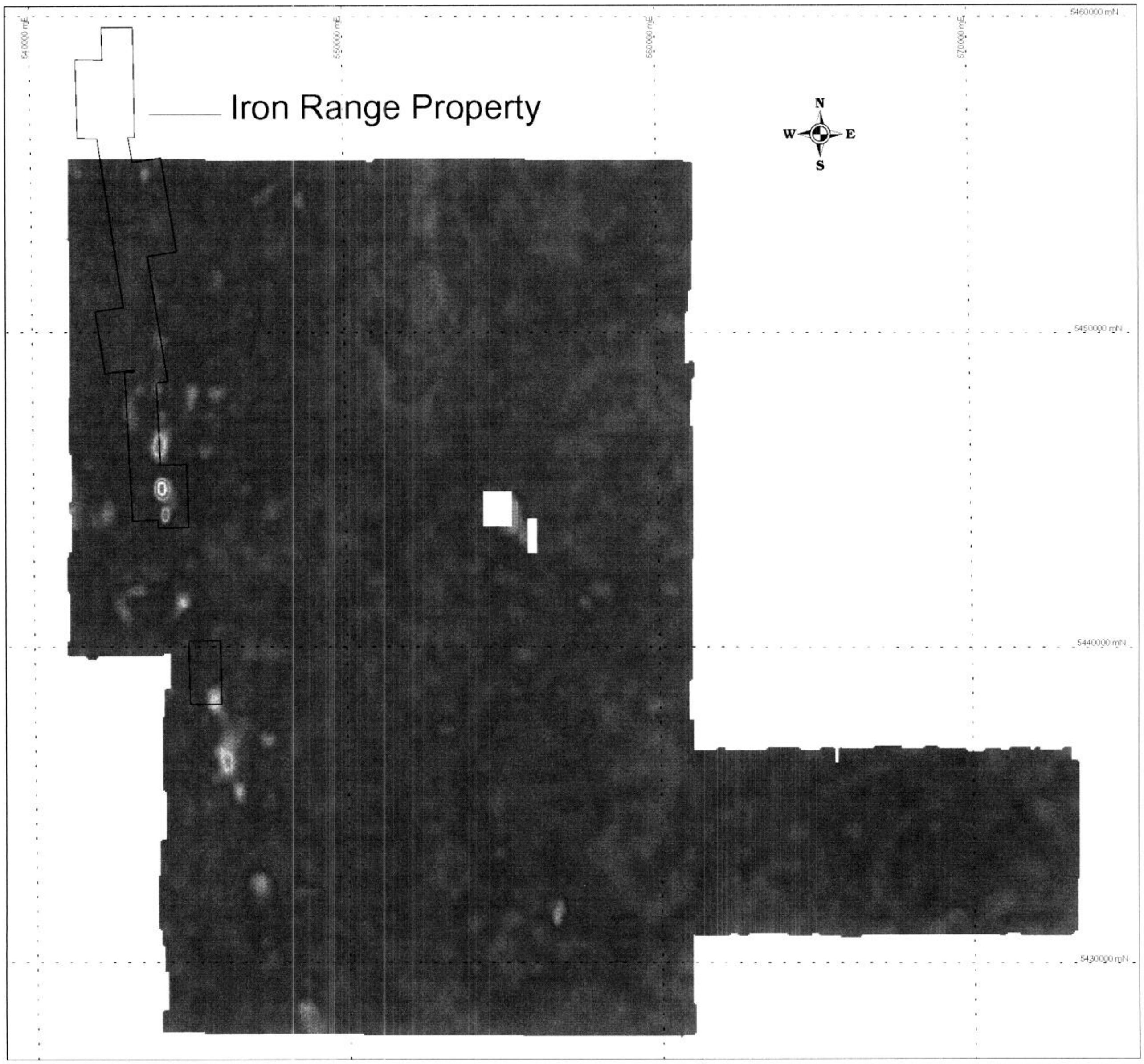
Total magnetics intensity (tmi)



Gamma-ray spectrometry: eTh/K



Appendix IV

Iron Range Deposits, SE British Columbia

IRON RANGE DEPOSITS, SOUTHEASTERN BRITISH COLUMBIA (82F/1)

By **P. Stinson and D.A. Brown**

(Contribution No. 27, Sullivan-Aldridge Project)

KEYWORDS: Economic geology, Proterozoic, Iron Range, albite alteration, breccias, hydrothermal iron oxide deposits.

INTRODUCTION

The Iron Range fault is a steeply dipping north-striking structure in the core of the Goat River anticline, east of Creston. It is characterized by strong alteration along its entire length, and locally, by high concentrations of iron oxide mineralization. Similar alteration was observed along minor subsidiary faults in the northwest and northeast parts of Iron Range Mountain. The main Iron Range deposit consists of the segment of the fault containing the richest iron mineralization and underlies the northern half of the ridge which makes up Iron Range Mountain. This area extends northward onto the Grassy Mountain sheet (82F/8).

The area of most substantial mineralization, where the fault zone runs along the northern part of the crest of Iron Range Mountain, was the focus of a detailed study involving 1:5000 mapping, sample collection, and thin section study of representative samples. The remainder of the Iron Range fault and subsidiary faults with similar alteration were examined and sampled during the course of regional mapping in the Yahk map area (Brown and Stinson, 1995, this volume).

REGIONAL GEOLOGY

Iron Range Mountain is underlain by sediments of the middle Aldridge Formation and several concordant Moyie sills which dip gently to the north and northwest (Figure 1). These rocks comprise the core of the Goat River anticline, a broad, gently north-plunging fold which underlies the west half of the Yahk map area (Brown and Stinson, 1995, this volume). The Iron Range fault is a northerly trending structure which cuts up-section from the International Boundary, in lower Aldridge Formation, to upper Aldridge Formation just north of the Yahk map area; further north it is cut by the Arrow thrust system (Reesor, 1981; Figure 1). It consists of a steeply dipping zone of deformation and mineralization varying in width from about 10 metres near the 49th Parallel to about 150 metres on the northern part of Iron Range Mountain. Net slip on the fault is minor in the main deposit area as sills are offset very little.

However, the amount of deformation and the complex relationships between deformation and mineralization point to a protracted, perhaps multistage history. There is evidence for both west-side-down movement and possibly both directions of strike-slip movement, based on rare kinematic indicators in the mineralized fault, local drag folding, and offsets of marker laminites (D. Anderson, Cominco Ltd., personal communication, 1994). Deformation in the surrounding rocks consists of penetrative cleavage, mainly in silty beds, and local metre-scale folding. Intersection lineations and fold axes in the rocks near the fault have a consistent moderate plunge to the north-northwest. This deformation is strongest near the fault and is probably related to it.

EXPLORATION HISTORY

The Iron Range prospect was discovered and staked in 1897. Over the next five years several shafts, adits, drill holes, and trenches were completed (Blakemore, 1902; Langley, 1922; Young and Uglow, 1926), none of which are preserved. Shafts and drill holes attained a maximum depth of 20 metres below the surface. Cominco Ltd. (then a subsidiary of Canadian Pacific Railways) acquired the main claim block on the northern part of Iron Range Mountain in 1939 and completed a major surface trenching program in 1957. All the exploration activity up to this point was aimed at evaluating the iron resource, which is potentially substantial. The claims remained CPR and Cominco Crown grants until 1994, when they were acquired by Discovery Consultants of Vernon who intend to evaluate the deposit's potential as an Olympic Dam type copper-gold-silver resource.

IRON MINERALIZATION

The intensity and types of mineralization and alteration vary over the length of the Iron Range fault. Mineralized zones can be broadly subdivided into the main deposit (most of the detailed study area), the La Grande zone (the southern part of the detailed study area, named after one of the claims), the Mount Thompson zone (the segment of the fault zone exposed east of the summit of Mount Thompson), and peripheral zones (the

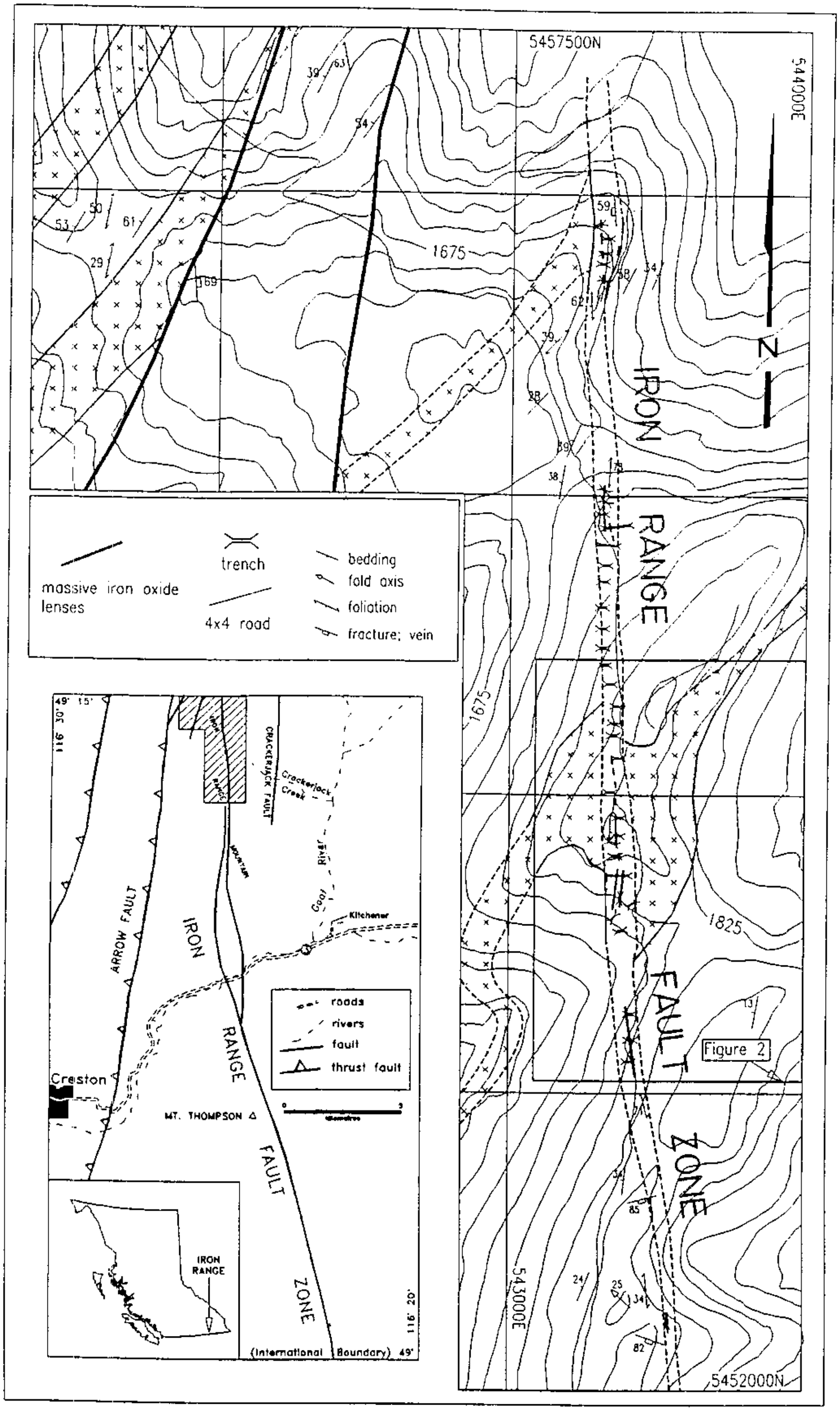


Figure 1. Simplified geological map of the main zone of the Iron Range deposit. Moyie sills are indicated by a cross hatch pattern. The widening of the sills near the fault is mainly a topographic effect. The location of Figure 2 is indicated by the labelled box. The contour interval is 30 metres, and the grid is a 1 kilometre UTM grid. The inset map is the west half of the Yahk map area (simplified from Brown and Stinson, 1995) with the location of the Iron Range map indicated by the hatched area

rest of the Iron Range fault and subsidiary faults). The main deposit produces a continuous, prominent aeromagnetic anomaly (Geological Survey of Canada, 1971).

MAIN ZONE

The main Iron Range deposit is contained within the widest segment of the fault zone. The deposit varies in width from approximately 60 to 150 metres and is at least 3 kilometres long. It runs from the Union Jack claim in the north to the Rhodesia claim in the south (MINFILE 082FSE014-20). This is the area explored by Cominco's 1957 trenching program. Bedrock is exposed in the less-deteriorated trenches; natural outcrop is very rare. Deformation fabrics, veining, and mineralized zones are all strongly aligned in the fault zone and are related to movement across it.

Lenses of massive hematite and magnetite occur along the length of the main zone. They range in width from 0.5 to 3 metres and pinch and swell substantially over their strike length. They are difficult to trace from trench to trench. Where nearly continuous exposure across the fault zone is preserved in trenches on the Maple Leaf claim, there are four parallel lenses spaced from 5 to 40 metres apart (Figure 2).

Most of the massive lenses are surrounded by wider zones of hematite breccia. Less commonly, massive iron oxide lenses cut foliated, sericitic sediments or gabbro. Breccia consists of fragments of albitite in a hematite-rich matrix. Contacts between the breccia and the

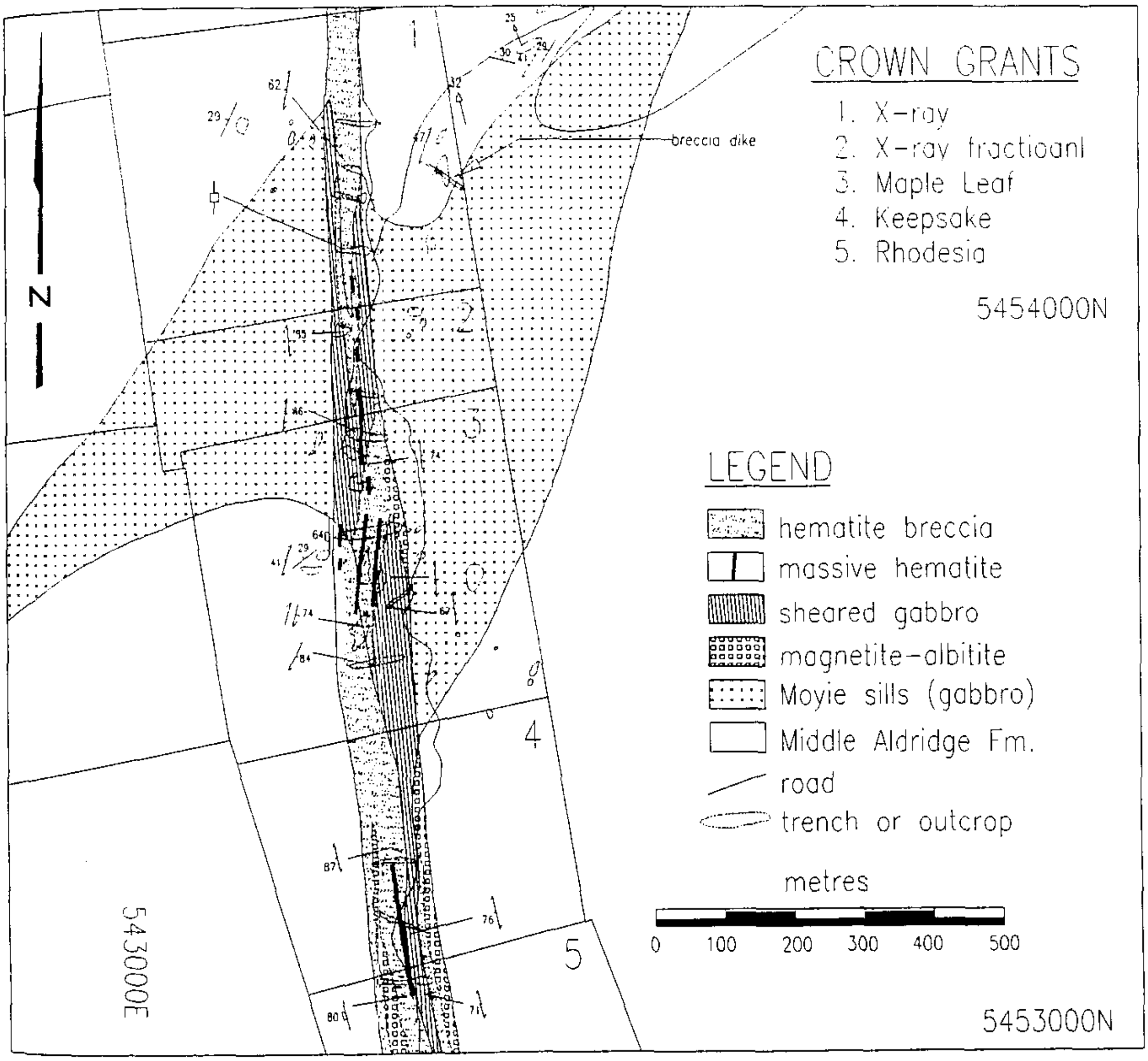


Figure 2. Detailed map of the part of the Iron Range fault and mineralization. See Figure 6 for location.

massive lenses are often gradational as the abundance of clasts diminishes into the lenses. Rare, small, angular fragments of albitite were observed in some of the lenses. Most of the massive lenses have envelopes of microbreccia 2 to 6 metres wide which have 70-80% hematite matrix surrounding angular clasts less than 1 centimetre across. Outward from the hematite-rich zones are wider breccia zones with 30 to 50% hematite as matrix and veins (Photos 1, 2). These breccias have a cataclastic texture. The original matrix is very fine grained fault gouge which is extensively replaced by hematite and minor magnetite. The massive lenses and surrounding breccias constitute the main iron resource of the Iron Range deposit.

The mineralogy of the lenses and breccias is dominantly hematite with variable amounts of magnetite. Thin sections show original magnetite abundances ranging from 5 to 30% as 0.5 to 2-millimetre euhedra. They are strongly pseudomorphed by hematite, with cores of magnetite remaining (Photo 3). The magnetite pseudomorphs sit in a matrix of fine-grained, often radiating, bladed hematite. Parts of the fault zone are occupied by unfractured albitite with disseminated to semimassive magnetite. Large magnetite euhedra (1-5 mm) form local, heavy disseminations, and fine-grained magnetite forms discontinuous veinlets and pods.

Photo 1. A cataclastic breccia from the main Iron Range deposit. The fracture filling is largely hematite and the rest is albitite (hand sample DBR93-220). The large dark spots are lichen. Flare pen for scale.

Sulphide minerals are rare in the Iron Range fault, with the exception of the northernmost trenches. In these trenches there is up to 3 or 4% pyrite as anhedral blebs in the hematite-magnetite lenses and breccias. Traces of chalcopyrite(?) were seen in hand sample but were not found in thin sections. In the remainder of the Iron Range, sulphides were not seen in outcrop or hand sample but some thin sections have tiny blebs of pyrite (<100 μm) within quartz veins. Some pyritic quartz veins with silicic alteration halos occur near the Iron Range fault; their orientations are oblique to the fault. Also, a short distance to the east of the fault on the northern part of Iron Range Mountain, there is an old pit with sulphide-bearing (pyrite-chalcopyrite-galena) quartz vein material in its dump (David Wiklund, Creston, personal communication, 1994). These veins may be related to the pyrite occurrences within the fault.

Foliated gabbro occupies much the width of the fault zone. Mineralization within the gabbro consists of some massive hematite lenses, foliation-parallel veins and zones of disseminated hematite and magnetite, rarer crosscutting breccia veins, and a background level of about 0.5 to 1% disseminated magnetite. The gabbro - iron oxide lens contacts are typically covered by overburden. Where exposed, there are zones of bleaching (albitite?) up to 30 centimetres wide and quartz veins lining the contacts. Crosscutting breccia veins were observed along the margins of the fault zone where strongly foliated gabbro grades into unsheared gabbro of the Moyie sills. The veins are very irregular and contain angular fragments of altered gabbro in a hematitic matrix. Some breccia veins are spatially associated with irregular zones of crosscutting albitic alteration. Disseminated magnetite is ubiquitous in the sheared gabbro, sufficient to be easily detected with a hand magnet. Most of the Moyie sills in the area do not attract a hand magnet and do not register on the regional aeromagnetic map.

Late, white quartz veins cut across all other rock types. The veins are several millimetres to several centimetres wide and most are parallel to the trend of the fault zone. Quartz growth is generally in the plane of the veins and some have several centimetres of shear movement. Some veins contain hematite crystals or angular fragments of massive hematite, apparently plucked from older veins and lenses. Magnetite is present in some quartz veins. These veins are interpreted as having been emplaced late in the deformational history of the fault, representing the last effects of the Iron Range hydrothermal system.

Photo 2. Hematite-filled breccia veins cutting albitite. The veins are parallel to the fault zone. Hematite fillings and veins are interpreted to postdate the initial brecciation. (PST94-LR.23)

LA GRANDE ZONE

The La Grande zone is the segment of the Iron Range fault in the detailed study area south of the main zone (corresponding to MINFILE 082SE021-028). There he fault zone runs about 250 metres east of the ridge top nd is not trenched; it is only exposed where it crosses side ridges. The fault zone appears to be 20 to 40 metres wide but the full width is not exposed. The fault in this rea is a zone of quartz veining with variable iron oxide content in a more diffuse zone of grey quartz-hematite alteration. Iron content locally reaches grades pproaching that of the massive lenses in the main eposit but over narrower widths (<1 m). This quartz-hematite mineralization is crosscut by late white quartz veins, as in the main deposit. In the La Grande zone the ite veins are more common but are less often haracterized by shear textures. Locally these veins contain up to 4% hematite, sometimes as 1 to 2-millimetre, platy euhedra.

MOUNT THOMPSON ZONE

South of Highway 3, a magnetite-rich zone crops out on a ridge top approximately 1.5 kilometres south-southeast of Mount Thompson. A zone of albitite, 1 to 2 metres wide, with disseminated to semimassive magnetite, cuts north-south through nearly flat-lying sediments. A wider surrounding zone has irregular hematite-filled fractures. In this area the fault changes from a single wide zone, as on Iron Range Mountain, to an anastamosing set of faults that are locally intruded by gabbro dikes. The individual faults are difficult to trace southward as outcrop becomes very scarce.

CRACKERJACK FAULT

A fault to the east of the main zone (Crackerjack fault; inset map in Figure 1) has a narrow zone (>5 m wide) of hematite-albitite breccia in one location, immediately to the north of Crackerjack Creek (Dean Barron, personal communication, 1994). One grab sample of the richest mineralization assayed 34% Fe_2O_3. The width of this zone and its extent along the fault are unknown due to poor exposure.

ALTERATION

Several alteration types are associated with the Iron Range deposit. Albite alteration is associated with the highest iron grades. In the main deposit, fine-grained, sugary albite alteration extends over most of the width of the fault zone. Albite alteration is confined to the fault

Photo 3. Photomicrograph showing euhedral magnetite grains in a matrix of bladed hematite. The magnetite grains are almost entirely pseudomorphed by hematite. The slightly darker core of the larger grain is residual magnetite. The field of view is approximately 0.75 by 1.25 mm. Reflected light, plane polarized. (PST94-I.R.11)

zone, except for rare apophyses which extend 1 to 2 metres into poorly foliated gabbro at the eastern contact of the main deposit. Although this alteration primarily affects sedimentary rocks in the fault zone, it is locally well developed in gabbro and, over the length of the fault, is only strongly developed near gabbro. Elsewhere early alteration in the fault zone is silicic.

Gabbro bodies within the fault zone are strongly foliated parallel to strike and are characterized by very strong chlorite alteration formed prior to, or during, shearing. The deformation fabric, seen in thin section, has porphyroclasts of plagioclase wrapped in fine-grained, commonly foliated chlorite. Weak S-C fabrics (Lister and Snoke, 1984) in foliated chlorite indicate west-side-down dip-slip movement. This contrasts with the completely brittle deformation of the albitite and may be attributable to the different competencies and response to stress of the lithologies during deformation. Locally the gabbro is bleached white by albitic alteration.

Sericitic alteration extends outward from the fault zone for about 500 to 1000 metres. The sericitic overprint is best developed in silty beds and is associated with the locally well developed cleavage. In addition to sericite, irregular veins and knots of quartz, epidote, and chlorite were observed in several outcrops of sandstone 100 metres to west of the trenches on the X-ray claim. Sericitic alteration was noted in only one locality in the fault zone, at its western edge on the Maple Leaf claim. There it is associated with a very strong, slaty cleavage developed parallel to the fault. This sericitic slate encloses the westernmost massive hematite lens (Figure 2).

Other alteration associated with the Iron Range fault is minor. Weak, rusty surface stain is present throughout the area, but this is a regional characteristic of the middle and upper Aldridge rocks, due to ubiquitous disseminated pyrrhotite (Höy, 1993). Mafic minerals within the gabbro sills near the fault zone have some chlorite overprint, but it is much weaker than within the fault zone.

Away from the parts of the Iron Range fault and subsidiary faults which have significant iron mineralization in surface exposures, the faults are characterized by a zone of cataclasis and silicic and/or albitic alteration 10 to 20 metres wide. Chloritic alteration was noted in several locations, all near intersections with Moyie sills. Examples are near the International Boundary, and on two faults on the northeast flank of Iron Range Mountain (in 82F/8).

PARAGENESIS AND RELATIONSHIP OF MINERALIZATION TO DEFORMATION

The origin of the Iron Range deposits is strongly linked to deformation in the Iron Range fault zone. Deformation can be separated into three episodes which may represent three stages of a continuous deformation. These are related to different stages in the evolution of the iron oxide mineralization. This is summarized in a paragenetic diagram (Figure 3).

The timing of the first movements on the Iron Range fault is difficult to determine. It is possible that it was originally a growth fault and served as a conduit for feeder dikes to the Moyie sills. The basis for this interpretation is the thick accumulation of sills in this part of the basin (Brown and Stinson, 1995, this volume). Also, much of the deformed material in the fault zone is gabbro, forming long narrow bodies. These have been interpreted as dikes (Blakemore, 1902; Langley, 1922; Young and Uglow, 1926). Within the main deposit, however, at least some of the gabbro bodies are sills that have been stretched into the plane of the fault zone, forming large drag folds and possibly sheath folds (Figure 2). The apparent thickening of the sills near the fault in the detail map area is mainly an effect of topography, but may be partly due to minor shearing along the margins of the main fault zone. If the sheared gabbros are deformed sills, then motion on the Iron Range fault probably began well after the deposition and burial of the Aldridge Formation. Pre-mineralization movement on the fault is inferred from the initial localization of albitite alteration along a narrow, crosscutting zone in the Aldridge sediments.

Albite alteration in the Aldridge Formation is usually the result of hydrothermal activity related to the intrusion of Moyie sills into relatively unconsolidated, water-saturated sediments at shallow levels below the sea-floor (Höy, 1993). The very strong albite alteration in

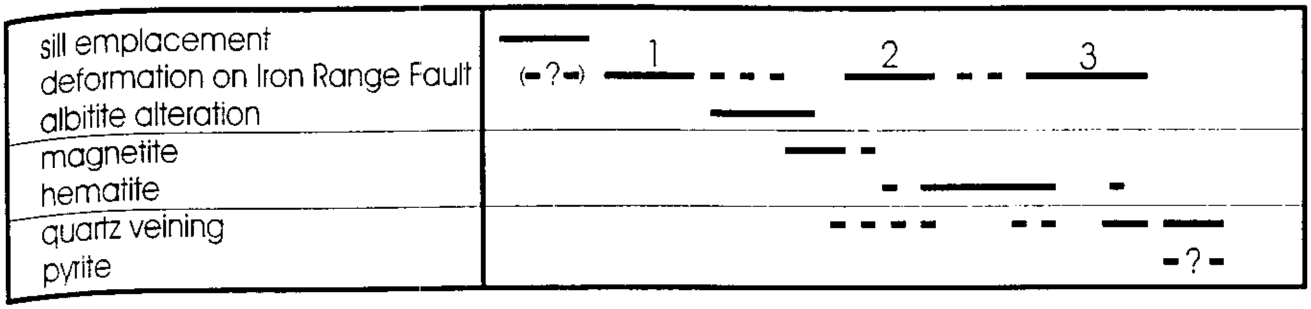


Figure 3. Diagram illustrating paragenetic sequence for the Iron Range deposit. Numbers refer to deformational episodes: (1) Initiation of the Iron Range fault and formation of hydrothermal conduit; (2) Cataclasis of albitite and shearing of gabbro; (3) Further cataclasis and shearing of iron ore.

the main Iron Range deposit is confined to the fault zone, although it is only developed in and around gabbro bodies. Initial magnetite mineralization is interpreted to have occurred with the albitic alteration, perhaps late in this episode. This mineralization is only well developed where subsequent brecciation is weak and shear fabrics are lacking. Magnetite precipitation continued into the next recognizable stage in the evolution of the Iron Range fault.

The main deformation episode followed the albite alteration. In the wide fault zone this consisted of extensive cataclastic brecciation of albitite, foliation development in gabbro, and local development of slaty cleavage in sericitized sediments. The albitite microbreccias are cataclasite (>50% matrix), the breccias are protocataclasite (<50% matrix), and gabbro within the fault zone is locally mylonitic, according to the definitions of Sibson (1977). This variation in deformational style between the different lithologies indicates that this episode occurred at several kilometres depth; cataclastic deformation can occur at depths up to about 5 kilometres (Ramsay and Huber, 1987, p. 584)

This deformation acted as ground preparation for hematite mineralization, although these events may have overlapped to some extent. Fine-grained hematite formed large, fault-parallel lenses and replaced fault gouge in the breccias. This episode began with magnetite deposition, but hematite replaced magnetite and is far more abundant. This change indicates that the fluids became increasingly oxidizing early in this main stage of iron mineralization.

Deformation continued after the main mineralizing episode, resulting in the formation of fractures, shear veins, and local ductile deformation of hematite-rich rocks. Quartz-filled shear veins, with vein-parallel mineral growth and offsets across them, are common along the length of the fault. They crosscut all other lithologies, including early silicified rocks in the La Grande area. Rare extension veins with mineral growth perpendicular to the vein walls were also observed. These vein textures resemble the vein associations in mesothermal, shear zone hosted gold deposits (Roberts, 1987), and may have formed in similar conditions. The iron oxide content of these veins is low. Local, well developed S-C fabrics in hematite breccias are associated with shear veins. Locally, hematite veins are brecciated and filled by quartz. Sulphide-bearing quartz veins, although not shear veins, may have been emplaced during this stage in the deposit evolution or they may be later and unrelated to the iron oxide mineralization.

The deformation style and alteration of the Iron Range fault and subsidiary faults is unusual compared to other faults in the surrounding area (Brown and Stinson, 1995, this volume). These characteristics, and the possible connection to the Moyie sills, indicate that the fault is old, maybe Proterozoic, and perhaps contemporaneous with early movements on the Moyie and St. Mary faults. The source of the large volume of iron contained in the Iron Range deposit is unknown. Potential sources include the Moyie sills and the basement of the Aldridge Formation.

COMPARISON TO OTHER MINERAL DEPOSITS

Hydrothermal iron deposits have received particular attention over the last few years, mainly due to the results of recent work on the Olympic Dam deposit in Australia. Early studies of the Olympic Dam, based on limited drilling information, interpreted the deposit as sedimentary breccias with mineralization and alteration largely due to diagenetic processes (Roberts and Hudson, 1983). Recent studies, based on extensive core logging and underground mapping, have established the hydrothermal nature of the breccias and described the evidence for near-surface hydrothermal brecciation within the host granitic batholith (Oreskes and Einaudi, 1990; Reeve *et al.*, 1990). Copper, gold, silver, uranium, and rare earth elements were deposited late in the evolution of the breccias, after significant iron metasomatism, and were enriched by supergene processes (Oreskes and Einaudi, 1990). These studies note that the core zone of the breccias is broadly associated with a topographic lineament which may reflect an underlying fault zone.

Recent studies propose that the Olympic Dam deposit has important similarities with certain other mineral deposits. This has resulted in the definition of a class of deposits; Olympic Dam type, or Proterozoic iron oxide , (Cu-U-Au-REE; Hitzman *et al.*, 1992;

Lefebure, 1995, this volume). Canadian deposits included in this classification by these workers include the Wernecke breccias in Yukon Territory and deposits of the Great Bear magmatic zone in the Northwest Territories. One aspect of the deposit class is the alteration zoning, a summary of which is presented by Hitzman *et al.* (1992). They propose a typical pattern of albite-magnetite-actinolite grading upward and outward through a potassic zone to an outer hematite-sericite zone, with an intermediate zone of albite-sericite-magnetite alteration in sediment-hosted deposits. The Iron Range has an inner core zone of albite alteration and an outer envelope of sericite alteration corresponding to the deeper sodic alteration zone of this deposit class.

The Iron Range deposit has similarities to this broad class of mineral deposits and could reasonably be included in it. With respect to the Olympic Dam iron breccias, the main genetic differences appear to be the structural style, the origin of the brecciated hostrocks, and the greater depth of formation of the Iron Range deposit. However, enrichment in base and precious metals at Olympic Dam do not have a demonstrated corollary at Iron Range. It is interesting to note the possible fault control at depth at Olympic Dam (Oreskes and Einaudi, 1990), and to speculate that if this fault, or fault system, controlled the upward migration of hydrothermal fluids and metals, it might resemble the present level of exposure on Iron Range Mountain.

ACKNOWLEDGMENTS

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Appendix III

High Resolution Geophysical Survey Report

Appendix V

Analytical Results

Assayers Canada

8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: Chuck Downie
Project: Iron Range
Sample: Soil

Report No : **2V0294 SJ**
Date : Aug-28-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
HCR 13+25E	<0.2	1.48	20	160	0.5	<5	0.08	<1	11	21	28	5.62	0.08	60	0.34	2070	2	0.01	24	2110	40	5	2	<10	9	0.09	51	<10	4	108	5
HCR 13+50E	<0.2	2.24	15	120	1.0	<5	0.07	<1	26	19	44	7.81	0.09	120	0.35	4265	4	0.01	26	4570	38	5	3	<10	10	0.07	63	<10	11	135	6
HCR 13+75E	<0.2	1.62	10	110	0.5	<5	0.03	<1	6	15	23	4.24	0.05	30	0.18	425	2	0.01	13	1740	24	<5	2	<10	2	0.10	52	<10	2	58	8
HCR 14+00E	<0.2	2.28	10	90	0.5	<5	0.03	<1	7	17	24	3.88	0.07	20	0.25	565	<2	0.01	16	1440	30	<5	2	<10	1	0.09	43	<10	2	71	8
HCR 14+25E	<0.2	1.29	25	100	0.5	<5	0.06	<1	8	17	24	5.05	0.07	20	0.29	685	2	0.01	19	1270	30	5	2	<10	1	0.07	45	<10	2	84	4
HCR 14+50E	<0.2	2.81	10	90	1.0	<5	0.05	<1	14	19	39	4.83	0.06	40	0.30	605	2	0.01	21	1990	22	<5	3	<10	3	0.11	45	<10	6	88	17
HCR 14+75E	<0.2	2.08	25	130	0.5	<5	0.05	<1	11	30	21	4.96	0.08	20	0.31	1895	2	0.01	26	2690	34	5	2	<10	2	0.12	51	<10	3	118	9
HCR 15+00E	<0.2	3.10	10	120	0.5	<5	0.22	<1	6	23	25	3.60	0.06	10	0.23	885	<2	0.02	17	1580	24	<5	2	<10	9	0.13	47	<10	2	61	23
HCR 15+25E	<0.2	1.74	20	80	0.5	<5	0.03	<1	12	35	34	5.74	0.08	30	0.39	735	2	0.01	32	1740	30	5	2	<10	<1	0.09	52	<10	5	88	9
HCR 15+50E	<0.2	1.36	10	120	0.5	<5	0.03	<1	9	66	13	4.33	0.06	40	0.44	795	<2	0.01	41	1240	24	5	2	<10	1	0.09	57	<10	2	64	6
HCR 15+75E	<0.2	3.26	10	120	0.5	<5	0.04	<1	12	31	30	3.61	0.06	10	0.27	875	2	0.01	25	1210	16	<5	3	<10	1	0.12	45	<10	4	64	25
HCR 16+00E	<0.2	1.05	5	200	0.5	<5	0.08	<1	7	19	11	3.43	0.06	40	0.13	3865	<2	0.01	13	800	18	<5	1	<10	7	0.07	46	<10	3	61	2
HCR 16+25E	<0.2	1.73	10	100	0.5	<5	0.05	<1	6	23	16	4.36	0.07	20	0.28	760	<2	0.01	18	1120	18	<5	1	<10	<1	0.03	43	<10	2	57	4
HCR 16+50E	<0.2	1.76	5	100	0.5	<5	0.02	<1	6	19	12	3.07	0.05	20	0.25	570	<2	0.01	12	610	12	<5	1	<10	<1	0.06	40	<10	1	43	6
HCR 16+75E	<0.2	1.76	5	180	0.5	<5	0.04	<1	8	20	13	3.44	0.06	10	0.22	4245	<2	0.01	12	1660	18	<5	1	<10	1	0.09	43	<10	1	96	3
HCR 17+00E	<0.2	3.03	5	190	0.5	<5	0.05	<1	11	21	26	3.19	0.06	10	0.37	1360	<2	0.01	21	1380	8	<5	2	<10	1	0.09	39	<10	2	81	15
HCR 17+25E	<0.2	2.29	10	70	0.5	<5	0.03	<1	10	32	38	4.71	0.05	10	0.46	765	<2	0.01	26	1500	18	<5	2	<10	<1	0.05	45	<10	2	55	5
HCR 17+50E	<0.2	3.40	5	120	0.5	<5	0.04	<1	11	23	26	3.38	0.06	10	0.34	1390	<2	0.01	19	1250	12	5	2	<10	1	0.14	48	<10	2	67	28
HCR 17+75E	<0.2	2.48	<5	110	0.5	<5	0.03	<1	13	32	20	4.21	0.05	20	0.42	1740	<2	0.01	22	1320	16	5	2	<10	<1	0.08	53	<10	2	68	5
HCR 18+00E	<0.2	2.65	10	80	0.5	<5	0.03	<1	12	39	26	4.12	0.06	10	0.49	845	<2	0.01	29	1030	22	5	2	<10	<1	0.09	58	<10	2	69	14
HCR 18+25E	<0.2	2.98	5	110	0.5	<5	0.04	<1	12	28	32	3.61	0.05	10	0.38	1000	<2	0.01	23	1000	10	5	2	<10	<1	0.12	50	<10	3	64	13
HCR 18+50E	<0.2	2.51	5	110	0.5	<5	0.03	<1	7	18	21	3.85	0.07	10	0.25	1340	<2	0.01	16	900	34	<5	2	<10	1	0.11	43	<10	2	78	10
HCR 18+75E	<0.2	2.05	5	80	0.5	<5	0.03	<1	11	23	21	3.45	0.05	10	0.40	510	<2	0.01	20	630	18	<5	1	<10	1	0.07	40	<10	2	79	6
HCR 19+00E	<0.2	2.56	<5	100	0.5	<5	0.04	<1	10	27	13	3.15	0.06	10	0.32	1320	<2	0.01	18	930	12	5	1	<10	1	0.08	44	<10	1	75	7
HCR 19+25E	<0.2	2.94	<5	140	0.5	<5	0.06	<1	11	21	24	3.30	0.09	10	0.30	1540	<2	0.01	19	1250	16	<5	2	<10	4	0.12	46	<10	2	97	16
HCR 19+50E	<0.2	2.72	5	130	0.5	<5	0.07	<1	16	26	25	3.29	0.08	10	0.36	2555	<2	0.01	25	1410	26	<5	2	<10	5	0.08	42	<10	3	96	6
HCR 19+75E	<0.2	2.46	5	150	0.5	<5	0.04	<1	11	20	22	3.18	0.05	10	0.25	735	<2	0.01	16	680	20	<5	1	<10	2	0.08	39	<10	2	84	8
HCR 20+00E	<0.2	1.87	5	160	0.5	<5	0.07	<1	9	17	25	3.73	0.07	10	0.23	1670	<2	0.01	15	690	34	5	1	<10	4	0.09	42	<10	2	108	5
HCR 20+25E	<0.2	2.26	5	210	0.5	<5	0.05	<1	11	18	23	3.01	0.07	10	0.28	2740	<2	0.01	17	690	30	<5	1	<10	3	0.09	38	<10	2	119	7
HCR 20+50E	0.2	2.94	5	280	0.5	<5	0.04	<1	11	18	22	4.01	0.06	10	0.25	505	<2	0.01	17	1260	94	<5	2	<10	1	0.11	42	<10	2	195	14

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada
8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: Chuck Downie
Project: Iron Range
Sample: Soil

Report No : 2V0294 SJ
Date : Aug-28-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
HCR 20+75E	0.2	3.12	10	220	1.0	<5	0.06	<1	9	15	17	3.45	0.07	10	0.24	975	<2	0.01	15	1400	68	<5	2	<10	5	0.15	45	<10	2	162	17
HCR 21+00E	0.2	3.57	5	130	0.5	<5	0.04	<1	9	14	13	3.35	0.07	10	0.23	440	<2	0.01	15	910	36	<5	2	<10	2	0.13	41	<10	2	168	18
HCR 21+25E	<0.2	2.26	<5	110	0.5	<5	0.03	<1	5	12	10	3.11	0.06	10	0.14	465	<2	0.01	8	1060	30	<5	1	<10	1	0.10	45	<10	1	112	13
HCR 21+50E	0.4	3.86	5	110	1.0	<5	0.04	<1	7	15	11	3.53	0.06	10	0.23	440	<2	0.01	12	1190	72	5	2	<10	1	0.12	43	<10	2	216	30
HCR 21+75E	<0.2	4.41	10	120	1.0	<5	0.04	<1	13	14	26	3.73	0.06	20	0.24	1230	<2	0.01	17	1380	38	<5	3	<10	1	0.15	41	<10	7	245	40
HCR 22+00E	0.2	2.85	5	210	0.5	<5	0.05	<1	10	13	11	2.88	0.06	10	0.17	1205	<2	0.01	12	900	34	<5	1	<10	2	0.12	41	<10	2	248	14
HCR 22+25E	0.6	4.09	10	200	1.0	<5	0.04	<1	10	14	18	3.00	0.06	10	0.21	1035	<2	0.01	15	860	40	<5	2	<10	2	0.12	38	<10	3	132	41
HCR 22+50E	0.2	4.05	5	200	1.0	<5	0.05	<1	12	16	11	3.00	0.05	<10	0.20	1430	<2	0.01	13	1840	22	<5	2	<10	2	0.12	38	<10	2	174	30
HCR 22+75E	<0.2	2.43	<5	120	0.5	<5	0.03	<1	10	13	12	2.81	0.05	10	0.14	505	<2	0.01	8	950	16	<5	1	<10	1	0.09	42	<10	1	72	10
HCR 23+00E	0.2	2.36	<5	70	0.5	<5	0.03	<1	7	11	11	2.15	0.04	<10	0.09	2345	<2	0.02	6	1530	12	<5	1	<10	1	0.12	35	<10	1	65	7
HC 13+00S 0+00W	<0.2	1.43	<5	110	0.5	<5	0.07	<1	10	16	21	2.87	0.05	10	0.40	515	<2	0.01	15	320	10	<5	3	<10	4	0.06	67	<10	3	61	2
HC 13+00S 0+25W	<0.2	0.84	<5	30	<0.5	<5	0.04	<1	7	11	16	2.33	0.05	10	0.30	470	<2	0.01	10	480	8	<5	2	<10	1	0.07	55	<10	1	51	2
HC 13+00S 0+50W	<0.2	0.87	<5	70	<0.5	<5	0.07	<1	7	11	13	2.34	0.04	10	0.30	170	<2	0.01	10	240	14	<5	2	<10	4	0.10	62	<10	1	49	3
HC 13+00S 0+75W	<0.2	3.09	<5	190	1.0	<5	0.10	<1	12	15	30	3.33	0.06	10	0.42	235	<2	0.01	31	440	8	<5	4	<10	7	0.13	59	<10	5	128	27
HC 13+00S 1+00W	<0.2	2.83	<5	150	0.5	<5	0.11	<1	16	23	48	4.36	0.06	10	0.77	780	<2	0.01	33	530	4	<5	5	<10	6	0.09	87	<10	2	135	8
HC 13+00S 1+25W	<0.2	2.03	<5	160	0.5	<5	0.10	<1	12	18	31	3.25	0.06	10	0.57	1905	<2	0.01	22	480	12	<5	5	<10	7	0.10	73	<10	3	94	6
HC 13+00S 1+50W	<0.2	1.76	<5	240	0.5	<5	0.13	<1	11	20	26	3.16	0.06	10	0.58	1455	<2	0.01	22	580	8	<5	4	<10	13	0.10	75	<10	3	99	4
HC 13+00S 1+75W	0.2	2.81	<5	90	0.5	<5	0.13	<1	10	12	14	3.01	0.04	<10	0.16	330	<2	0.02	11	650	10	<5	2	<10	9	0.15	53	<10	2	64	25
HC 13+00S 2+00W	<0.2	3.24	45	130	0.5	<5	0.72	<1	15	101	55	4.84	0.06	10	0.94	1310	<2	0.01	33	680	14	5	9	<10	39	0.11	132	<10	14	75	10
HC 13+00S 2+25W	<0.2	1.89	<5	110	0.5	<5	0.47	<1	15	25	60	4.59	0.07	10	0.57	1470	<2	0.01	27	620	18	<5	5	<10	22	0.13	109	<10	20	68	5
HC 13+00S 2+50W	0.2	2.80	<5	270	1.5	<5	0.33	<1	18	29	81	5.40	0.09	20	0.60	5935	<2	0.02	39	750	28	5	9	<10	27	0.14	114	<10	32	94	5
HC 13+00S 2+75W	<0.2	3.42	5	170	1.0	<5	0.11	<1	8	25	28	4.20	0.06	10	0.45	160	<2	0.01	24	540	14	<5	5	<10	8	0.13	78	<10	4	68	17
HC 13+00S 3+00W	<0.2	1.40	5	100	0.5	<5	0.07	<1	7	12	12	2.62	0.06	10	0.25	280	<2	0.01	11	660	10	<5	2	<10	3	0.07	45	<10	1	99	4
HC 13+00S 3+25W	<0.2	0.88	5	40	<0.5	<5	0.04	<1	6	16	18	2.60	0.05	20	0.35	115	<2	0.01	12	250	12	<5	2	<10	<1	0.03	47	<10	2	48	2
HC 13+00S 3+50W	<0.2	1.05	20	110	0.5	<5	0.11	<1	6	17	28	3.00	0.05	10	0.30	95	<2	0.01	12	390	18	<5	2	<10	8	0.05	72	<10	2	46	2
HC 13+00S 3+75W	<0.2	1.71	10	100	0.5	<5	0.07	<1	10	16	26	3.92	0.04	10	0.43	365	<2	0.01	15	490	14	<5	3	<10	1	0.05	76	<10	2	77	3
HC 13+00S 4+00W	<0.2	1.60	5	90	0.5	<5	0.05	<1	11	16	25	3.26	0.05	10	0.58	410	<2	0.01	17	340	10	<5	3	<10	<1	0.05	65	<10	3	71	4
HC 13+00S 4+25W	<0.2	1.39	<5	90	0.5	<5	0.08	<1	10	13	20	4.00	0.05	10	0.40	320	<2	0.01	14	470	12	<5	3	<10	1	0.09	82	<10	1	83	4
HC 13+00S 4+50W	<0.2	2.14	<5	90	0.5	<5	0.07	<1	10	15	27	3.47	0.05	10	0.50	470	<2	0.01	17	520	12	<5	3	<10	2	0.07	66	<10	2	76	8
HC 13+00S 4+75W	<0.2	2.98	<5	110	0.5	<5	0.07	<1	9	11	9	2.36	0.04	10	0.13	995	<2	0.01	9	780	12	<5	2	<10	3	0.08	36	<10	1	75	13

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada

8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: Chuck Downie
Project: Iron Range
Sample: Soil

Report No : **2V0294 SJ**
Date : Aug-28-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
HC 13+00S 5+00W	<0.2	1.40	<5	60	0.5	<5	0.04	<1	8	13	20	3.00	0.04	10	0.42	235	<2	0.01	12	340	12	<5	2	<10	<1	0.04	58	<10	1	52	3
HC 13+00S 5+25W	<0.2	2.19	<5	100	0.5	<5	0.06	<1	7	12	16	3.30	0.05	10	0.27	190	<2	0.01	11	500	22	<5	2	<10	2	0.05	44	<10	2	74	9
HC 13+00S 5+50W	<0.2	1.04	<5	70	<0.5	<5	0.05	<1	2	6	5	1.38	0.03	10	0.10	85	<2	0.01	4	310	10	<5	1	<10	4	0.04	22	<10	1	42	2
HC 13+00S 5+75W	<0.2	1.02	5	50	0.5	<5	0.02	<1	4	8	12	2.30	0.03	10	0.15	55	<2	0.01	8	420	12	<5	1	<10	<1	0.02	23	<10	2	43	4
HC 13+00S 6+00W	<0.2	3.23	5	90	0.5	<5	0.06	<1	5	14	10	2.97	0.05	10	0.16	95	<2	0.01	10	510	22	<5	1	<10	3	0.07	28	<10	2	77	13
HC 13+00S 6+25W	0.4	0.99	10	130	0.5	<5	0.13	<1	7	9	13	1.82	0.07	10	0.11	725	<2	0.01	7	480	18	<5	1	<10	12	0.03	31	<10	1	45	1
HC 13+00S 6+50W	0.2	2.44	10	110	0.5	<5	0.05	<1	8	10	11	2.35	0.05	10	0.19	485	<2	0.01	11	550	18	<5	1	<10	3	0.08	28	<10	2	75	15
HC 13+00S 6+75W	0.2	3.26	5	120	1.0	<5	0.04	<1	9	15	16	2.34	0.05	10	0.19	310	<2	0.01	12	800	14	<5	2	<10	2	0.07	25	<10	5	86	18
HC 13+00S 7+00W	0.2	1.94	10	120	0.5	<5	0.06	<1	6	11	11	2.08	0.06	10	0.17	490	<2	0.01	16	630	18	<5	1	<10	4	0.04	19	<10	2	163	7
HC 13+00S 7+25W	<0.2	0.46	<5	40	<0.5	<5	0.06	<1	3	6	5	1.21	0.05	20	0.09	60	<2	0.01	5	260	12	<5	<1	<10	6	0.07	27	<10	1	31	1
HC 13+00S 7+50W	<0.2	3.12	5	130	0.5	<5	0.06	<1	10	14	11	2.70	0.06	10	0.19	1235	<2	0.01	16	1180	16	<5	2	<10	3	0.07	30	<10	2	116	16
HC 13+00S 7+75W	<0.2	2.21	5	140	0.5	<5	0.06	<1	9	26	15	2.51	0.10	10	0.25	905	<2	0.01	22	640	14	<5	2	<10	4	0.05	24	<10	3	97	13
HC 13+00S 8+00W	*<0.2*	*1.74*	*5*	*100*	*0.5*	*<5*	*0.03*	*<1*	*6*	*11*	*7*	*2.07*	*0.06*	*10*	*0.12*	*320*	*<2*	*0.01*	*8*	*670*	*16*	*<5*	*1*	*<10*	*2*	*0.04*	*21*	*<10*	*1*	*66*	*7*
HC 13+00S 8+25W	<0.2	0.72	5	50	<0.5	<5	0.03	<1	2	7	5	1.47	0.05	20	0.08	85	<2	0.01	5	320	12	<5	1	<10	2	0.03	17	<10	1	33	1
HC 13+00S 8+50W	<0.2	2.08	5	160	0.5	<5	0.04	<1	6	13	14	2.04	0.07	10	0.22	220	<2	0.01	15	470	12	<5	2	<10	3	0.05	23	<10	3	102	27
HC 13+00S 8+75W	<0.2	1.40	5	80	0.5	<5	0.05	<1	4	12	9	2.07	0.06	10	0.15	400	<2	0.01	9	1370	12	<5	1	<10	3	0.02	17	<10	1	62	2
HC 13+00S 9+00W	<0.2	1.08	5	70	0.5	<5	0.05	<1	9	26	13	2.66	0.06	20	0.24	380	<2	0.01	15	560	26	<5	1	<10	4	0.03	26	<10	2	57	2
HC 13+00S 9+25W	<0.2	2.14	10	150	1.0	<5	0.10	<1	15	93	16	3.78	0.11	30	0.65	1060	<2	0.01	63	2010	22	<5	3	<10	8	0.12	53	<10	2	135	8
HC 13+00S 9+50W	<0.2	2.68	5	190	0.5	<5	0.05	<1	10	24	17	2.64	0.07	10	0.30	1445	<2	0.01	29	1340	28	<5	2	<10	5	0.07	27	<10	6	153	21
HC 13+00S 9+75W	<0.2	1.96	5	100	0.5	<5	0.07	<1	10	17	8	3.13	0.07	10	0.19	575	<2	0.01	14	1530	26	<5	1	<10	4	0.06	30	<10	1	94	5
HC 13+00S 10+00W	<0.2	3.05	10	110	1.0	<5	0.05	<1	9	13	10	2.88	0.07	10	0.13	490	<2	0.01	14	1050	14	<5	1	<10	2	0.05	24	<10	1	83	18
HC 13+00S 10+25W	<0.2	2.80	5	160	1.0	<5	0.09	<1	8	14	10	2.35	0.06	10	0.22	1050	<2	0.01	23	1320	10	<5	1	<10	6	0.08	27	<10	2	97	15
HC 13+00S 10+50W	<0.2	2.05	5	160	0.5	<5	0.10	<1	8	10	5	2.13	0.06	10	0.10	820	<2	0.01	8	1690	14	<5	1	<10	9	0.08	28	<10	1	61	5
HC 13+00S 10+75W	*0.2*	*2.96*	*5*	*180*	*1.0*	*<5*	*0.05*	*<1*	*9*	*14*	*11*	*2.40*	*0.07*	*10*	*0.17*	*1425*	*<2*	*0.01*	*14*	*1110*	*12*	*<5*	*2*	*<10*	*3*	*0.08*	*28*	*<10*	*3*	*134*	*14*
HC 13+00S 11+00W	0.2	4.68	5	130	1.0	<5	0.04	<1	11	13	11	3.42	0.04	<10	0.07	670	<2	0.01	7	2120	14	<5	3	<10	3	0.16	41	<10	3	76	47
HC 13+00S 11+25W	<0.2	0.83	5	80	<0.5	<5	0.02	<1	3	8	6	1.50	0.04	10	0.10	270	<2	0.01	5	290	10	<5	1	<10	1	0.04	22	<10	1	28	2
HC 13+00S 11+50W	<0.2	1.65	5	70	0.5	<5	0.04	<1	6	23	6	3.70	0.05	10	0.11	240	<2	0.01	8	1430	20	<5	1	<10	<1	0.11	51	<10	1	43	7
HC 13+00S 11+75W	0.4	2.47	5	440	0.5	<5	0.19	<1	8	18	40	2.49	0.05	10	0.10	7835	<2	0.01	14	7590	14	<5	2	<10	13	0.08	31	<10	2	152	6
HC 13+00S 12+00W	<0.2	0.43	5	50	<0.5	<5	0.09	<1	2	5	4	0.73	0.03	10	0.04	100	<2	0.01	3	180	6	<5	<1	<10	5	0.02	20	<10	1	15	1
HC 13+00S 12+25W	<0.2	1.74	<5	70	0.5	<5	0.10	<1	5	16	8	2.63	0.05	10	0.22	270	<2	0.01	9	880	10	<5	1	<10	4	0.04	35	<10	1	42	4

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada
8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: Chuck Downie
Project: Iron Range
Sample: Soil

Report No : **2V0294 SJ**
Date : Aug-28-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
HC 13+00S 12+50W	<0.2	1.02	10	40	0.5	<5	0.02	<1	15	27	17	3.44	0.02	10	0.52	145	<2	<0.01	22	350	14	<5	3	<10	<1	0.02	49	<10	2	38	3
HC 13+00S 12+75W	<0.2	1.00	5	50	<0.5	<5	0.03	<1	5	26	13	2.44	0.04	20	0.52	235	<2	0.01	17	380	10	<5	2	<10	<1	0.01	32	<10	2	38	2
HC 13+00S 13+00W	<0.2	1.93	5	130	0.5	<5	0.09	<1	18	43	36	4.30	0.05	10	0.78	560	<2	0.01	31	740	18	<5	4	<10	2	0.02	63	<10	7	66	3
HC 13+00S 13+25W	<0.2	1.03	5	110	0.5	<5	0.12	<1	6	10	11	3.03	0.05	10	0.12	300	<2	0.01	7	680	34	<5	1	<10	8	0.15	53	<10	1	55	6
HC 13+00S 13+50W	<0.2	0.86	5	40	<0.5	<5	0.03	<1	6	17	11	2.94	0.04	10	0.27	85	<2	0.01	12	430	12	<5	2	<10	<1	0.06	50	<10	1	43	3
HC 13+00S 13+75W	<0.2	1.75	10	120	0.5	<5	0.03	<1	10	21	13	3.02	0.05	10	0.43	165	<2	0.01	19	590	10	<5	2	<10	<1	0.04	44	<10	3	78	7
HC 13+00S 14+00W	<0.2	1.41	5	90	0.5	<5	0.04	<1	12	21	8	3.39	0.03	10	0.48	160	<2	0.01	21	710	10	<5	2	<10	<1	0.03	51	<10	2	58	3
HC 13+00S 14+25W	<0.2	1.65	5	110	0.5	<5	0.04	<1	10	20	1	3.38	0.04	10	0.38	370	<2	0.01	16	1100	12	<5	2	<10	<1	0.05	49	<10	2	69	5
HC 13+00S 14+50W	<0.2	1.09	10	40	0.5	<5	0.02	<1	15	28	10	3.93	0.02	10	0.63	105	<2	0.01	24	340	14	<5	3	<10	<1	0.02	61	<10	2	41	4
HC 13+00S 14+75W	0.2	3.65	5	90	0.5	<5	0.09	<1	10	16	4	3.11	0.04	10	0.22	700	<2	0.01	11	1780	10	<5	3	<10	2	0.11	46	<10	4	57	26
HC 13+00S 15+00W	<0.2	1.97	5	80	0.5	<5	0.06	<1	7	17	<1	2.75	0.06	10	0.55	255	<2	0.01	18	840	8	<5	2	<10	1	0.03	35	<10	2	81	10
HC 14+00S 0+25E	<0.2	0.79	5	140	<0.5	<5	0.12	<1	6	24	<1	3.07	0.04	20	0.37	530	<2	0.01	14	490	10	<5	1	<10	12	0.02	42	<10	1	43	2
HC 14+00S 0+50E	<0.2	1.61	<5	80	0.5	<5	0.03	<1	4	9	<1	2.08	0.04	10	0.11	175	<2	0.01	7	630	10	<5	1	<10	2	0.05	30	<10	2	30	3
HC 14+00S 0+75E	<0.2	1.20	5	130	0.5	<5	0.05	<1	28	13	8	2.42	0.05	20	0.24	915	<2	0.01	13	340	34	<5	1	<10	4	0.04	29	<10	8	43	1
HC 14+00S 1+00E	<0.2	0.95	<5	110	0.5	<5	0.06	<1	6	18	<1	2.92	0.04	10	0.27	130	<2	0.01	12	300	16	<5	1	<10	4	0.06	40	<10	1	35	3
HC 14+00S 1+25E	<0.2	1.22	<5	30	<0.5	<5	0.02	<1	6	36	<1	3.23	0.03	20	0.67	95	<2	0.01	21	250	4	<5	3	<10	<1	0.01	45	<10	1	38	3
HC 14+00S 1+50E	<0.2	1.02	5	70	0.5	<5	0.02	<1	18	30	1	3.14	0.03	20	0.56	235	<2	0.01	22	300	8	<5	3	<10	<1	0.02	34	<10	2	35	2
HC 14+00S 1+75E	0.2	3.48	5	90	1.0	<5	0.04	<1	8	11	1	2.20	0.04	10	0.13	240	<2	0.01	11	660	14	<5	2	<10	2	0.09	27	<10	4	51	41
HC 14+00S 2+00E	<0.2	1.92	5	80	0.5	<5	0.13	<1	3	8	<1	1.74	0.05	<10	0.07	110	<2	0.02	5	690	12	<5	1	<10	7	0.11	32	<10	1	23	15
HC 14+00S 2+25E	<0.2	0.79	5	80	0.5	<5	0.06	<1	3	8	<1	2.12	0.04	20	0.13	60	<2	0.01	7	340	10	<5	1	<10	3	0.04	35	<10	1	37	1
HC 14+00S 2+50E	<0.2	2.76	<5	90	0.5	<5	0.06	<1	5	12	<1	3.45	0.06	10	0.16	205	<2	0.01	9	780	14	<5	1	<10	1	0.08	40	<10	1	62	12
HC 14+00S 2+75E	<0.2	1.74	<5	90	0.5	<5	0.07	<1	6	8	<1	1.91	0.07	10	0.13	650	<2	0.01	8	390	10	<5	1	<10	4	0.06	26	<10	1	51	10
HC 14+00S 3+00E	<0.2	1.88	<5	80	0.5	<5	0.07	<1	4	7	<1	2.17	0.05	10	0.10	105	<2	0.01	7	470	10	<5	1	<10	4	0.09	36	<10	1	41	19
HC 14+00S 3+25E	<0.2	2.99	5	80	0.5	<5	0.03	<1	7	17	<1	2.61	0.04	10	0.27	85	<2	0.01	15	900	10	<5	2	<10	1	0.08	33	<10	2	57	31
HC 14+00S 3+50E	<0.2	3.20	<5	100	0.5	<5	0.03	<1	6	10	<1	2.55	0.04	10	0.14	265	<2	0.02	10	850	10	<5	2	<10	2	0.11	37	<10	2	60	34
HC 14+00S 3+75E	<0.2	2.35	5	170	0.5	<5	0.04	<1	8	16	2	2.13	0.05	20	0.37	240	<2	0.01	17	530	8	<5	2	<10	3	0.04	23	<10	2	67	25
HC 14+00S 4+00E	0.2	4.66	<5	80	1.0	<5	0.04	<1	10	10	2	2.99	0.04	<10	0.14	635	<2	0.02	11	1180	14	<5	2	<10	2	0.15	40	<10	2	66	63
HC 14+00S 4+25E	<0.2	2.05	5	140	0.5	<5	0.03	<1	12	22	2	2.99	0.06	20	0.46	335	<2	0.01	22	710	10	<5	2	<10	<1	0.03	28	<10	2	126	3
HC 14+00S 4+50E	<0.2	1.06	5	100	0.5	<5	0.05	<1	5	19	<1	2.23	0.05	40	0.45	675	<2	0.01	14	610	10	<5	1	<10	3	0.02	31	<10	2	44	1
HC 14+00S 4+75E	<0.2	1.86	5	160	0.5	<5	0.07	<1	7	13	<1	2.36	0.06	20	0.22	380	<2	0.01	15	810	14	<5	1	<10	6	0.06	30	<10	2	74	5

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada
8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
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Toklat Resources Inc.
Attention: Chuck Downie
Project: Iron Range
Sample: Soil

Report No : **2V0294 SJ**
Date : Aug-28-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
HC 14+00S 5+00E	<0.2	1.00	15	70	0.5	<5	0.13	<1	4	11	8	2.48	0.06	10	0.21	185	<2	0.01	8	400	24	<5	1	<10	5	0.05	34	<10	1	51	2
HC 15+00S 0+25E	<0.2	1.86	10	140	0.5	<5	0.03	<1	8	16	12	2.74	0.05	20	0.31	405	<2	0.01	14	500	30	<5	1	<10	1	0.03	28	<10	2	107	3
HC 15+00S 0+50E	<0.2	2.21	5	130	0.5	<5	0.03	<1	6	17	14	2.97	0.04	20	0.23	160	<2	0.01	13	670	26	<5	1	<10	<1	0.03	31	<10	2	84	4
HC 15+00S 0+75E	<0.2	0.48	5	40	<0.5	<5	0.02	<1	2	6	6	1.09	0.03	20	0.07	35	<2	0.01	4	190	10	<5	<1	<10	2	0.02	23	<10	1	25	1
HC 15+00S 1+00E	<0.2	0.58	5	230	0.5	<5	0.11	<1	3	8	7	1.18	0.04	20	0.11	55	<2	0.01	8	170	12	<5	1	<10	14	0.03	21	<10	4	23	1
HC 15+00S 1+25E	<0.2	1.27	5	110	0.5	<5	0.03	<1	5	19	8	2.39	0.05	20	0.18	155	<2	0.01	14	290	16	<5	1	<10	1	0.03	22	<10	1	59	2
HC 15+00S 1+50E	<0.2	2.63	10	90	0.5	<5	0.04	<1	9	21	14	2.58	0.05	10	0.18	310	<2	0.01	19	1000	18	<5	1	<10	2	0.06	24	<10	2	74	17
HC 15+00S 1+75E	<0.2	0.95	10	140	0.5	<5	0.06	<1	5	15	8	2.37	0.06	20	0.31	170	<2	0.01	14	290	22	<5	1	<10	11	0.03	24	<10	4	54	2
HC 15+00S 2+00E	<0.2	0.61	20	40	<0.5	<5	0.03	<1	3	12	7	1.86	0.03	20	0.27	170	<2	0.01	9	340	16	<5	1	<10	1	0.01	16	<10	1	41	1
HC 15+00S 2+25E	<0.2	1.92	15	80	0.5	<5	0.02	<1	5	14	11	2.50	0.04	20	0.27	150	<2	0.01	12	600	26	<5	1	<10	<1	0.05	24	<10	3	74	6
HC 15+00S 2+50E	<0.2	1.36	10	110	1.0	<5	0.02	<1	14	15	23	2.53	0.04	20	0.24	390	<2	0.01	15	320	58	<5	1	<10	2	0.04	27	<10	7	54	3
HC 15+00S 2+75E	<0.2	3.26	5	150	1.0	<5	0.03	<1	6	13	9	2.66	0.05	10	0.18	335	<2	0.01	11	730	16	<5	2	<10	1	0.08	33	<10	2	81	12
HC 15+00S 3+00E	0.2	3.76	5	130	1.0	<5	0.04	<1	7	15	8	3.05	0.06	10	0.27	300	<2	0.01	14	1040	10	<5	2	<10	2	0.10	36	<10	2	111	22
HC 15+00S 3+25E	<0.2	2.58	20	100	1.0	<5	0.04	<1	9	15	9	2.97	0.04	10	0.25	200	<2	0.01	13	500	18	<5	2	<10	3	0.06	29	<10	5	64	21
HC 15+00S 3+50E	0.2	3.85	10	110	1.0	<5	0.08	<1	8	15	12	2.60	0.05	<10	0.14	270	<2	0.02	11	910	18	<5	1	<10	7	0.10	33	<10	1	66	28
HC 15+00S 3+75E	<0.2	1.74	5	120	0.5	<5	0.09	<1	6	12	8	2.73	0.05	10	0.13	120	<2	0.01	8	460	34	<5	1	<10	5	0.10	41	<10	3	48	6
HC 15+00S 4+00E	0.2	5.14	5	70	1.0	<5	0.06	<1	7	13	8	2.86	0.04	<10	0.10	150	<2	0.02	9	1050	10	<5	2	<10	4	0.15	34	<10	2	69	60
HC 15+00S 4+25E	<0.2	1.00	15	50	0.5	<5	0.03	<1	3	17	3	2.63	0.04	10	0.43	140	<2	0.01	12	440	18	<5	1	<10	<1	0.02	26	<10	1	35	2
HC 15+00S 4+50E	<0.2	1.95	10	100	0.5	<5	0.05	<1	7	14	7	2.63	0.06	10	0.25	1205	<2	0.01	12	890	24	<5	1	<10	1	0.06	31	<10	1	97	4
HC 17+00S 0+25W	<0.2	1.65	<5	50	0.5	<5	0.02	<1	4	8	10	2.97	0.03	10	0.18	95	<2	0.01	5	460	10	<5	1	<10	<1	0.09	60	<10	1	39	4
HC 17+00S 0+50W	<0.2	3.35	<5	50	0.5	<5	0.02	<1	4	11	11	3.29	0.04	10	0.17	145	<2	0.01	7	820	12	<5	1	<10	<1	0.11	47	<10	2	46	20
HC 17+00S 0+75W	<0.2	2.97	5	60	0.5	<5	0.02	<1	5	12	10	2.90	0.04	10	0.26	135	<2	0.01	9	460	24	<5	2	20	<1	0.09	43	<10	2	43	27
HC 17+00S 1+00W	0.4	6.33	<5	40	0.5	<5	0.02	<1	6	12	14	2.27	0.03	<10	0.12	180	<2	0.02	6	830	<2	<5	3	<10	1	0.14	30	<10	3	43	68
HC 17+00S 1+25W	<0.2	5.93	<5	50	0.5	<5	0.02	<1	6	12	16	3.75	0.04	<10	0.16	140	<2	0.01	7	870	4	<5	3	<10	<1	0.16	58	<10	3	50	54
HC 17+00S 1+50W	0.2	3.81	<5	50	0.5	<5	0.02	<1	4	10	9	3.03	0.03	10	0.11	105	<2	0.02	6	810	14	<5	2	<10	<1	0.13	43	<10	2	35	22
HC 17+00S 1+75W	<0.2	2.38	<5	70	0.5	<5	0.02	<1	7	22	24	3.65	0.05	10	0.48	250	<2	0.01	16	470	10	<5	4	<10	<1	0.09	70	<10	1	46	6
HC 17+00S 2+00W	<0.2	1.88	<5	50	0.5	<5	0.02	<1	6	14	16	4.00	0.05	10	0.19	195	<2	0.01	8	500	18	<5	2	<10	<1	0.11	58	<10	2	42	7
HC 17+00S 2+25W	<0.2	2.28	<5	60	0.5	<5	0.02	<1	4	9	8	2.94	0.04	10	0.14	585	<2	0.01	6	1770	14	<5	1	<10	<1	0.08	41	<10	1	40	4
HC 17+00S 2+50W	0.2	4.13	<5	70	0.5	<5	0.02	<1	3	11	9	2.84	0.03	10	0.12	195	<2	0.01	6	920	10	<5	2	<10	<1	0.09	33	<10	2	50	36
HC 17+00S 2+75W	<0.2	1.37	10	60	0.5	<5	0.02	<1	9	13	18	2.95	0.06	20	0.40	190	<2	0.01	16	380	16	<5	1	<10	1	0.02	27	<10	8	48	2

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

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Toklat Resources Inc.
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Report No : **2V0294 SJ**
Date : Aug-28-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
HC 17+00S 3+00W	<0.2	1.16	10	60	0.5	<5	0.02	<1	10	13	21	2.81	0.06	20	0.32	415	<2	0.01	16	450	24	<5	1	<10	1	0.03	28	<10	6	48	2
HC 17+00S 3+25W	<0.2	0.81	5	80	0.5	<5	0.08	<1	5	9	16	2.28	0.06	10	0.14	325	<2	0.01	10	380	26	<5	1	<10	11	0.06	32	<10	3	43	2
HC 17+00S 3+50W	0.2	1.46	5	80	0.5	<5	0.05	<1	7	11	19	3.23	0.05	10	0.17	250	<2	0.01	11	370	34	<5	1	<10	4	0.10	43	<10	3	51	5
HC 17+00S 3+75W	0.4	4.23	<5	50	1.0	<5	0.02	<1	14	12	23	3.58	0.04	<10	0.12	955	<2	0.02	8	1030	14	<5	3	<10	<1	0.15	47	<10	4	67	34
HC 17+00S 4+00W	0.2	2.66	5	70	0.5	<5	0.06	<1	5	13	9	4.07	0.05	10	0.16	315	<2	0.01	7	1410	22	<5	2	<10	<1	0.11	55	<10	1	51	13
HC 17+00S 4+25W	0.2	2.96	5	80	0.5	<5	0.02	<1	8	16	18	3.94	0.06	10	0.25	270	<2	0.01	11	680	22	<5	2	<10	<1	0.11	54	<10	2	61	18
HC 17+00S 4+50W	<0.2	1.18	5	170	<0.5	<5	0.17	<1	5	13	10	2.49	0.05	10	0.16	1160	<2	0.01	9	980	20	<5	1	<10	12	0.07	36	<10	1	96	3
HC 17+00S 4+75W	<0.2	1.48	5	80	0.5	<5	0.04	<1	8	16	54	5.33	0.07	10	0.22	510	<2	0.01	11	2940	30	<5	1	<10	<1	0.17	64	<10	1	79	8
HC 17+00S 5+00W	0.2	1.75	<5	120	0.5	<5	0.08	<1	6	12	9	3.43	0.07	10	0.12	655	<2	0.01	8	830	26	<5	1	<10	3	0.12	48	<10	2	78	6
HC 17+00S 5+25W	<0.2	1.53	5	80	<0.5	<5	0.04	<1	5	14	14	2.48	0.10	10	0.30	1340	<2	0.01	12	790	14	<5	1	<10	<1	0.03	28	<10	1	73	2
HC 17+00S 5+50W	0.8	2.29	15	670	3.5	<5	0.32	2	42	34	76	3.46	0.09	70	0.23	>10000	<2	0.02	28	950	120	5	3	<10	25	0.08	47	<10	64	227	3
HC 17+00S 5+75W	<0.2	1.03	5	110	<0.5	<5	0.16	<1	5	11	13	2.88	0.08	10	0.23	650	<2	0.01	10	380	24	<5	1	<10	5	0.03	35	<10	1	86	2
HC 17+00S 6+00W	0.2	1.82	5	80	0.5	<5	0.07	<1	5	13	12	3.57	0.05	10	0.13	315	<2	0.01	8	440	28	<5	1	<10	3	0.14	51	<10	1	59	12
HC 17+00S 6+25W	<0.2	2.85	10	130	1.5	<5	0.24	<1	6	20	21	3.84	0.07	10	0.28	290	<2	0.01	16	650	40	<5	2	<10	11	0.09	44	<10	7	87	9
HC 17+00S 6+50W	0.2	3.66	5	90	1.0	<5	0.06	<1	7	9	16	2.10	0.05	10	0.09	465	<2	0.02	7	1130	18	<5	2	<10	5	0.14	31	<10	4	72	13
HC 17+00S 7+00W	<0.2	2.47	15	130	1.5	<5	0.34	<1	17	30	89	3.84	0.09	30	0.58	1785	<2	0.01	24	1020	48	<5	2	<10	13	0.02	51	<10	36	106	3
HC 17+00S 7+25W	0.2	2.25	10	140	1.5	<5	0.31	<1	10	19	49	3.51	0.08	30	0.30	2085	<2	0.01	14	710	36	<5	2	<10	11	0.07	52	<10	33	104	4
HC 17+00S 7+50W	<0.2	1.56	5	40	0.5	<5	0.03	<1	7	15	28	3.05	0.08	20	0.57	195	<2	0.01	17	310	14	<5	2	<10	<1	0.03	38	<10	4	68	2
HC 17+00S 7+75W	<0.2	3.23	<5	90	1.0	<5	0.09	<1	13	15	60	3.54	0.06	20	0.61	630	<2	0.01	18	1170	12	<5	3	<10	1	0.10	65	<10	13	99	8
HC 17+00S 8+00W	<0.2	2.52	5	110	0.5	<5	0.15	<1	11	17	47	3.42	0.07	20	0.36	580	<2	0.01	15	530	26	<5	2	<10	4	0.09	48	<10	11	86	8
HC 13+00N 6+75E	<0.2	4.87	<5	210	1.0	<5	0.18	<1	18	26	93	5.10	0.14	<10	0.74	470	<2	0.02	56	3380	16	<5	7	<10	11	0.16	106	<10	4	164	28
HC 13+00N 7+00E	<0.2	3.44	<5	200	1.0	<5	0.13	<1	14	18	36	3.86	0.09	10	0.65	455	<2	0.02	30	2000	10	<5	5	<10	7	0.13	79	<10	2	122	18
HC 13+00N 7+25E	<0.2	4.14	<5	160	1.0	<5	0.14	<1	15	19	33	3.84	0.09	<10	0.51	420	<2	0.02	28	2600	12	<5	4	<10	9	0.16	74	<10	2	114	35
HC 13+00N 7+50E	<0.2	2.90	<5	230	1.0	<5	0.14	<1	13	16	24	3.49	0.08	10	0.31	850	<2	0.02	21	4180	14	<5	3	<10	11	0.12	58	<10	2	187	9
HC 13+00N 7+75E	<0.2	3.05	5	310	1.0	<5	0.11	<1	12	20	17	3.12	0.07	10	0.27	345	<2	0.02	22	1900	12	<5	2	<10	7	0.11	36	<10	3	115	17
HC 13+00N 8+00E	<0.2	1.35	10	280	0.5	<5	0.15	<1	11	31	18	3.21	0.08	30	0.42	430	<2	0.01	24	590	18	<5	2	<10	12	0.01	33	<10	3	74	2
HC 13+00N 8+25E	<0.2	1.77	5	610	0.5	<5	0.13	<1	10	17	27	2.58	0.10	20	0.33	1350	<2	0.01	26	370	54	<5	2	<10	16	0.03	27	<10	9	130	3
HC 13+00N 8+50E	<0.2	2.41	10	390	0.5	<5	0.09	<1	10	18	18	3.21	0.11	20	0.35	430	<2	0.01	30	760	34	<5	2	<10	5	0.05	40	<10	2	184	4
HC 13+00N 8+75E	<0.2	1.91	5	210	0.5	<5	0.04	<1	8	12	15	2.34	0.07	10	0.23	115	<2	0.01	22	390	22	<5	1	<10	1	0.06	31	<10	2	99	8
HC 13+00N 9+00E	<0.2	1.56	5	210	0.5	<5	0.05	<1	8	11	13	2.00	0.07	20	0.21	180	<2	0.01	18	360	24	<5	1	<10	3	0.04	28	<10	1	79	5

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada
8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: Chuck Downie
Project: Iron Range
Sample: Soil

Report No : **2V0294 SJ**
Date : Aug-28-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
HC 13+00N 9+25E	<0.2	1.66	<5	230	0.5	<5	0.09	<1	10	11	8	2.14	0.06	10	0.17	390	<2	0.01	16	660	26	<5	1	<10	6	0.06	31	<10	1	111	4
HC 13+00N 9+50E	<0.2	0.68	5	140	<0.5	<5	0.04	<1	3	9	7	1.63	0.05	30	0.18	55	<2	0.01	8	190	18	<5	1	<10	1	0.01	19	<10	1	39	2
HC 13+00N 9+75E	<0.2	1.29	5	190	0.5	<5	0.05	<1	8	13	13	1.93	0.07	30	0.26	460	<2	0.01	17	270	28	<5	1	<10	2	0.02	21	<10	2	136	3
HC 13+00N 10+00E	<0.2	1.82	5	330	0.5	<5	0.08	<1	9	11	12	2.06	0.09	20	0.21	795	<2	0.01	28	340	32	<5	1	<10	6	0.05	26	<10	2	221	6
HC 13+00N 10+25E	<0.2	2.09	5	280	0.5	<5	0.08	<1	10	12	15	2.19	0.09	10	0.22	710	<2	0.01	23	530	26	<5	2	<10	4	0.06	28	<10	2	148	16
HC 13+00N 10+50E	<0.2	1.52	10	360	0.5	<5	0.11	<1	9	11	20	2.12	0.06	10	0.18	460	<2	0.01	16	1850	26	<5	1	<10	4	0.04	21	<10	3	84	5
HC 13+00N 10+75E	<0.2	1.51	5	250	0.5	<5	0.09	<1	7	10	10	1.83	0.07	10	0.15	1015	<2	0.01	13	940	18	<5	1	<10	5	0.06	24	<10	2	91	5
HC 13+00N 11+00E	<0.2	1.72	10	310	0.5	<5	0.08	<1	8	11	15	2.19	0.09	20	0.24	455	<2	0.01	21	460	20	<5	1	<10	6	0.05	24	<10	2	117	8
HC 13+00N 11+25E	<0.2	2.49	5	250	0.5	<5	0.07	<1	9	13	20	2.41	0.08	10	0.27	380	<2	0.01	24	1010	18	<5	2	<10	3	0.08	28	<10	3	95	23
HC 13+00N 11+50E	<0.2	1.20	5	180	0.5	<5	0.06	<1	6	13	18	2.43	0.07	30	0.38	320	<2	0.01	16	500	14	<5	1	<10	1	0.02	23	<10	2	67	2
HC 13+00N 11+75E	<0.2	2.16	5	350	0.5	<5	0.08	<1	10	16	16	2.69	0.09	20	0.36	495	<2	0.01	29	1070	16	<5	2	<10	3	0.05	35	<10	2	123	7
HC 13+00N 12+00E	<0.2	2.97	5	270	1.0	<5	0.10	<1	10	15	21	2.58	0.09	10	0.33	385	<2	0.01	26	1180	16	<5	2	<10	4	0.08	32	<10	3	98	26
HC 13+00N 12+25E	<0.2	3.26	5	220	1.0	<5	0.08	<1	10	13	21	2.54	0.07	10	0.30	850	<2	0.02	27	1020	14	<5	3	<10	4	0.12	35	<10	5	97	46
HC 13+00N 12+50E	<0.2	3.22	5	260	1.0	<5	0.15	<1	14	17	29	3.15	0.10	10	0.37	1065	<2	0.01	34	1260	20	<5	2	<10	8	0.09	40	<10	3	138	18
HC 13+00N 12+75E	<0.2	3.54	10	320	1.0	<5	0.14	<1	21	29	61	4.00	0.12	10	0.53	850	<2	0.01	45	810	40	<5	3	<10	10	0.06	47	<10	4	138	17
HC 13+00N 13+00E	<0.2	1.55	10	170	0.5	<5	0.08	<1	9	15	21	2.63	0.08	20	0.46	720	<2	0.01	19	550	18	<5	2	<10	5	0.03	33	<10	3	80	3
HC 13+00N 13+25E	<0.2	0.88	10	70	<0.5	<5	0.04	<1	6	12	17	2.35	0.06	20	0.40	150	<2	0.01	12	390	12	<5	2	<10	1	0.02	29	<10	2	53	2
HC 13+00N 13+50E	<0.2	2.24	5	200	0.5	<5	0.08	<1	10	14	21	2.67	0.08	10	0.28	1540	<2	0.02	26	1570	20	<5	2	<10	4	0.06	34	<10	1	114	8
HC 13+00N 13+75E	<0.2	1.47	5	210	0.5	<5	0.07	<1	10	16	25	2.49	0.07	20	0.42	720	<2	0.01	20	370	16	<5	2	<10	3	0.03	34	<10	3	83	3
HC 13+00N 14+00E	<0.2	1.79	5	320	0.5	<5	0.11	<1	10	15	26	2.74	0.09	20	0.37	1220	<2	0.01	22	870	18	<5	2	<10	6	0.04	30	<10	2	110	3
HC 13+00N 14+25E	<0.2	2.51	<5	280	1.0	<5	0.06	<1	12	16	16	2.83	0.08	20	0.38	415	<2	0.01	37	670	16	<5	2	<10	4	0.04	35	<10	2	102	9
HC 13+00N 14+50E	<0.2	1.01	10	90	0.5	<5	0.03	<1	7	14	19	2.58	0.06	30	0.49	145	<2	0.01	16	340	14	5	2	<10	1	0.02	30	<10	2	49	3
HC 13+00N 14+75E	<0.2	0.91	<5	130	0.5	<5	0.07	<1	4	8	7	1.71	0.05	20	0.18	120	<2	0.01	7	250	12	<5	1	<10	6	0.03	28	<10	1	40	3
HC 13+00N 15+00E	<0.2	1.46	5	130	0.5	<5	0.04	<1	7	14	10	2.69	0.07	20	0.31	410	<2	0.01	14	680	16	<5	2	<10	<1	0.03	35	<10	1	75	2
HC 13+00N 15+25E	0.2	4.53	5	240	1.0	<5	0.11	<1	11	14	21	2.89	0.08	10	0.23	905	<2	0.02	17	2540	16	<5	3	<10	7	0.14	39	<10	5	137	36
HC 13+00N 15+50E	0.2	4.55	5	240	1.0	<5	0.07	<1	11	14	14	3.16	0.06	10	0.19	555	<2	0.02	17	1450	16	<5	2	<10	3	0.14	41	<10	4	105	39
HC 13+00N 15+75E	<0.2	2.40	5	160	0.5	<5	0.07	<1	7	10	12	2.45	0.07	10	0.14	300	<2	0.01	11	2380	22	<5	1	<10	3	0.12	40	<10	1	82	14
HC 13+00N 16+00E	0.2	5.02	5	130	1.0	<5	0.06	<1	12	15	19	2.99	0.06	<10	0.19	710	<2	0.02	17	2220	14	<5	2	<10	3	0.13	40	<10	2	135	50
HC 13+00N 16+25E	<0.2	1.77	<5	160	0.5	<5	0.05	<1	6	13	7	2.22	0.08	10	0.19	545	<2	0.01	12	870	18	<5	1	<10	2	0.05	34	<10	1	87	8
HC 13+00N 16+50E	<0.2	3.16	10	230	1.0	<5	0.08	<1	12	21	17	3.03	0.08	10	0.36	830	<2	0.01	20	2710	20	<5	3	<10	4	0.06	37	<10	2	118	15

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

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MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
HC 13+00N 16+75E	<0.2	3.44	5	260	1.0	<5	0.06	<1	14	23	26	3.13	0.10	10	0.44	240	<2	0.01	27	1440	14	<5	4	<10	3	0.06	40	<10	6	108	29
HC 13+00N 17+00E	<0.2	1.35	5	120	0.5	<5	0.04	<1	5	14	14	2.31	0.07	20	0.28	195	<2	0.01	12	810	16	<5	2	<10	1	0.05	33	<10	2	86	3
HC 13+00N 17+25E	*<0.2*	*2.34*	*10*	*170*	*0.5*	*<5*	*0.10*	*<1*	*15*	*24*	*22*	*3.29*	*0.10*	*20*	*0.52*	*915*	*<2*	*0.01*	*27*	*2760*	*20*	*<5*	*3*	*<10*	*7*	*0.05*	*43*	*<10*	*2*	*134*	*7*
HC 13+00N 17+50E	<0.2	2.47	5	260	0.5	<5	0.11	<1	11	20	21	2.88	0.11	20	0.40	2015	<2	0.01	23	1700	36	<5	3	<10	7	0.06	39	<10	3	189	7
HC 13+00N 17+75E	<0.2	2.72	5	280	1.0	<5	0.08	<1	12	18	20	3.02	0.10	20	0.40	625	<2	0.01	25	2110	24	<5	3	<10	4	0.08	41	<10	3	179	10
HC 13+00N 18+00E	<0.2	2.22	5	190	0.5	<5	0.06	<1	12	18	29	2.95	0.10	20	0.45	750	<2	0.01	21	1230	16	<5	3	<10	3	0.06	42	<10	4	107	8
HC 13+00N 18+25E	<0.2	2.50	5	200	0.5	<5	0.09	<1	12	22	28	3.52	0.12	20	0.52	455	<2	0.01	32	1190	20	<5	2	<10	6	0.05	42	<10	2	155	5
HC 13+00N 18+50E	<0.2	2.33	10	140	0.5	<5	0.10	<1	11	20	37	2.99	0.10	20	0.46	550	<2	0.01	27	880	22	<5	3	<10	9	0.06	36	<10	9	121	12
HC 13+00N 18+75E	<0.2	2.27	10	140	0.5	<5	0.07	<1	14	20	26	3.03	0.07	20	0.42	285	<2	0.01	31	800	22	<5	2	<10	4	0.05	34	<10	4	137	6
HC 13+00N 19+00E	<0.2	2.48	10	190	1.0	<5	0.11	<1	13	21	34	3.54	0.10	10	0.42	770	<2	0.01	30	1580	30	<5	2	<10	9	0.06	40	<10	4	151	5
HC 13+00N 19+25E	<0.2	1.71	10	170	0.5	<5	0.13	<1	9	15	15	2.49	0.09	20	0.28	460	<2	0.01	16	1080	18	<5	1	<10	7	0.04	30	<10	2	99	2
HC 13+00N 19+50E	<0.2	1.59	5	230	0.5	<5	0.12	<1	9	14	19	2.35	0.21	10	0.26	3625	<2	0.03	14	1170	18	<5	2	<10	8	0.06	37	<10	2	129	3
HC 14+00N 7+75E	<0.2	2.56	5	290	1.0	<5	0.14	<1	12	31	36	3.66	0.13	30	0.43	1125	<2	0.01	54	920	20	<5	2	<10	17	0.03	29	<10	21	71	3
HC 14+00N 8+00E	<0.2	0.97	10	160	0.5	<5	0.07	<1	7	21	20	2.70	0.10	30	0.42	460	<2	0.01	19	480	10	<5	1	<10	10	0.01	21	<10	2	50	2
HC 14+00N 8+25E	<0.2	1.47	5	350	0.5	<5	0.12	<1	9	20	14	2.18	0.12	20	0.25	1885	<2	0.01	23	1240	14	<5	1	<10	14	0.03	23	<10	3	87	2
HC 14+00N 8+50E	<0.2	1.52	5	250	0.5	<5	0.09	<1	9	20	10	2.32	0.07	20	0.28	730	<2	0.01	26	670	14	<5	1	<10	12	0.04	24	<10	2	73	3
HC 14+00N 8+75E	<0.2	1.29	5	190	0.5	<5	0.15	<1	8	16	6	2.21	0.08	20	0.22	800	<2	0.01	15	850	16	<5	1	<10	16	0.05	29	<10	1	56	3
HC 14+00N 9+00E	<0.2	2.00	10	220	0.5	<5	0.11	<1	11	21	22	2.84	0.09	20	0.36	290	<2	0.01	36	680	18	<5	1	<10	14	0.03	26	<10	3	73	6
HC 14+00N 9+25E	<0.2	2.29	5	330	1.0	<5	0.19	<1	12	19	21	2.71	0.12	10	0.28	1255	<2	0.01	28	1540	24	<5	2	<10	45	0.07	30	<10	4	96	10
HC 14+00N 9+50E	<0.2	2.55	5	340	1.0	<5	0.19	<1	10	22	21	3.20	0.15	20	0.33	550	<2	0.01	41	930	24	<5	2	<10	25	0.06	32	<10	6	109	5
HC 14+00N 9+75E	<0.2	1.95	10	390	0.5	<5	0.16	<1	11	15	13	2.59	0.10	10	0.26	895	<2	0.01	28	660	28	<5	1	<10	21	0.06	28	<10	2	109	4
HC 14+00N 10+00E	<0.2	1.92	5	340	0.5	<5	0.11	<1	8	17	20	2.61	0.12	20	0.32	475	<2	0.01	30	710	26	<5	1	<10	11	0.03	23	<10	5	133	2
HC 14+00N 10+25E	<0.2	3.17	5	670	1.0	<5	0.14	<1	11	16	19	2.91	0.11	10	0.30	530	<2	0.02	51	760	36	<5	2	<10	17	0.09	32	<10	3	219	14
HC 14+00N 10+50E	<0.2	1.54	5	600	0.5	<5	0.10	<1	6	13	9	2.01	0.09	20	0.25	300	<2	0.01	22	290	28	<5	1	<10	9	0.03	23	<10	1	140	3
HC 14+00N 10+75E	<0.2	2.45	5	660	1.0	<5	0.07	<1	8	15	17	2.42	0.11	20	0.27	900	<2	0.01	31	350	40	<5	2	<10	6	0.05	27	<10	3	237	7
HC 14+00N 11+00E	<0.2	1.16	5	460	0.5	<5	0.09	<1	7	14	14	2.30	0.07	20	0.32	260	<2	0.01	21	300	36	<5	1	<10	8	0.01	20	<10	2	124	2
HC 14+00N 11+25E	<0.2	3.37	5	610	1.0	<5	0.15	<1	12	20	26	3.38	0.13	10	0.38	240	<2	0.02	65	560	40	<5	2	<10	12	0.08	39	<10	5	280	16
HC 14+00N 11+50E	*<0.2*	*1.49*	*5*	*310*	*0.5*	<5	*0.12*	*<1*	*8*	*14*	*14*	*2.09*	*0.09*	*20*	*0.35*	*430*	<2	*0.01*	*21*	*250*	*22*	<5	*1*	*<10*	*10*	*0.03*	*29*	*<10*	2	*142*	2
HC 14+00N 11+75E	<0.2	1.74	5	500	0.5	<5	0.15	<1	9	13	10	2.16	0.10	10	0.24	1140	<2	0.01	24	330	34	<5	1	<10	15	0.05	28	<10	2	172	5
HC 14+00N 12+00E	<0.2	2.36	<5	670	1.0	<5	0.21	<1	11	23	36	3.11	0.11	20	0.50	1210	<2	0.01	37	430	26	<5	3	<10	15	0.05	51	<10	14	160	3

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada

8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: Chuck Downie
Project: Iron Range
Sample: Soil

Report No : **2V0294 SJ**
Date : Aug-28-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
HC 14+00N 12+25E	<0.2	2.97	<5	440	0.5	<5	0.13	<1	18	18	55	4.89	0.18	10	0.87	795	<2	0.01	41	500	14	<5	8	<10	2	0.08	125	<10	2	141	4
HC 14+00N 12+50E	<0.2	3.12	<5	540	0.5	<5	0.17	<1	14	18	38	3.91	0.14	10	0.71	710	<2	0.02	44	470	8	<5	6	<10	10	0.11	98	<10	2	129	9
HC 14+00N 12+75E	<0.2	2.11	5	500	0.5	<5	0.13	<1	9	14	15	2.45	0.12	10	0.34	970	<2	0.01	25	900	18	<5	2	<10	6	0.06	35	<10	2	149	5
HC 14+00N 13+00E	<0.2	3.11	5	420	1.0	<5	0.11	<1	12	16	18	2.70	0.11	10	0.35	1390	<2	0.02	38	1240	18	<5	2	<10	6	0.10	34	<10	4	171	18
HC 14+00N 13+25E	<0.2	1.39	5	320	0.5	<5	0.16	<1	9	17	10	2.32	0.10	20	0.41	1365	<2	0.01	23	560	20	<5	1	<10	10	0.03	28	<10	1	135	2
HC 14+00N 13+50E	<0.2	0.98	5	400	0.5	<5	0.13	<1	8	10	6	1.73	0.13	20	0.19	1450	<2	0.01	15	560	34	<5	1	<10	12	0.02	18	<10	2	130	2
HC 14+00N 13+75E	<0.2	1.39	5	230	0.5	<5	0.07	<1	9	11	16	2.18	0.11	20	0.27	425	<2	0.01	18	540	36	<5	1	<10	3	0.01	16	<10	2	140	1
HC 14+00N 14+00E	<0.2	1.35	5	500	0.5	<5	0.16	<1	11	15	20	2.67	0.13	20	0.34	1680	<2	0.01	21	490	22	<5	2	<10	9	0.05	44	<10	2	96	2
HC 14+00N 14+25E	<0.2	1.95	10	180	0.5	<5	0.05	<1	12	13	29	2.70	0.15	30	0.32	375	<2	0.01	21	530	34	<5	3	<10	3	0.04	22	<10	10	126	22
HC 14+00N 14+50E	<0.2	1.09	5	320	0.5	<5	0.07	<1	7	10	15	2.01	0.10	30	0.30	300	<2	0.01	15	190	26	<5	1	<10	6	0.02	18	<10	3	96	2
HC 14+00N 14+75E	<0.2	0.90	5	200	0.5	<5	0.09	<1	7	9	14	2.14	0.10	30	0.32	350	<2	0.01	12	200	20	<5	1	<10	6	0.02	27	<10	2	72	2
HC 14+00N 15+00E	<0.2	2.05	5	270	0.5	<5	0.10	<1	11	15	31	2.88	0.12	20	0.42	365	<2	0.01	28	370	22	<5	2	<10	6	0.03	31	<10	2	111	6
HC 14+00N 15+25E	<0.2	0.86	10	90	0.5	<5	0.04	<1	7	11	20	2.23	0.10	30	0.30	330	<2	0.01	14	310	20	<5	1	<10	2	0.01	13	<10	3	72	2
HC 14+00N 15+50E	<0.2	2.79	5	430	1.0	<5	0.12	<1	14	15	46	3.48	0.15	20	0.47	460	<2	0.01	31	1140	22	<5	4	<10	5	0.08	58	<10	6	136	20
HC 14+00N 15+75E	<0.2	1.45	5	230	0.5	<5	0.15	<1	13	18	33	3.29	0.12	20	0.59	770	<2	0.01	23	710	22	<5	3	<10	6	0.03	58	<10	3	101	2
HC 14+00N 16+00E	<0.2	1.00	5	180	0.5	<5	0.09	<1	6	9	10	1.77	0.12	20	0.30	460	<2	0.01	10	260	22	<5	1	<10	4	0.01	20	<10	2	73	1
HC 14+00N 16+25E	<0.2	2.29	5	360	0.5	<5	0.16	<1	12	14	20	3.07	0.13	20	0.42	1125	<2	0.01	23	960	18	<5	2	<10	12	0.06	40	<10	2	144	5
HC 14+00N 16+50E	<0.2	1.46	5	150	0.5	<5	0.07	<1	9	16	18	2.92	0.09	30	0.49	525	<2	0.01	19	400	16	<5	2	<10	3	0.01	29	<10	3	73	2
HC 14+00N 16+75E	<0.2	2.33	5	190	0.5	<5	0.09	<1	10	14	13	2.73	0.09	20	0.35	405	<2	0.01	21	550	16	<5	1	<10	6	0.06	29	<10	2	83	9
HC 14+00N 17+00E	<0.2	1.13	5	250	0.5	<5	0.13	<1	11	13	10	2.39	0.13	20	0.37	2140	<2	0.01	17	470	22	<5	1	<10	11	0.02	19	<10	2	81	2
HC 14+00N 17+25E	<0.2	1.37	5	180	0.5	<5	0.08	<1	10	12	14	2.65	0.11	20	0.35	950	<2	0.01	19	410	22	<5	1	<10	7	0.02	24	<10	2	88	2
HC 14+00N 17+50E	<0.2	1.21	10	130	0.5	<5	0.11	<1	7	9	22	2.48	0.09	10	0.33	440	<2	0.01	15	680	16	<5	2	<10	7	0.03	35	<10	2	103	2
HC 14+00N 17+75E	<0.2	2.10	10	260	0.5	<5	0.15	<1	11	12	25	3.14	0.11	10	0.43	650	<2	0.01	23	1480	20	<5	2	<10	11	0.06	45	<10	3	110	4
HC 14+00N 18+00E	<0.2	2.89	10	160	1.0	<5	0.12	<1	18	17	60	4.46	0.14	10	0.69	670	<2	0.01	28	1400	20	<5	5	<10	7	0.08	85	<10	6	109	6
HC 14+00N 18+25E	<0.2	2.61	5	150	1.0	<5	0.08	<1	15	20	36	3.84	0.12	20	0.64	265	<2	0.01	26	720	16	<5	4	<10	6	0.08	63	<10	3	86	10
HC 14+00N 18+50E	<0.2	2.44	5	170	0.5	<5	0.11	<1	19	30	64	4.87	0.11	20	0.98	280	<2	0.01	31	510	16	<5	6	<10	6	0.10	106	<10	4	86	8
HC 14+00N 18+75E	<0.2	2.77	10	190	1.0	<5	0.20	<1	19	24	40	4.44	0.16	20	0.58	475	<2	0.01	37	900	26	<5	4	<10	13	0.07	65	<10	3	141	10
HC 16+00N 6+25E	<0.2	2.02	15	220	1.0	<5	0.09	<1	16	31	32	3.82	0.10	30	0.52	1310	<2	0.01	33	2470	18	<5	2	<10	8	0.06	35	<10	4	82	4
HC 16+00N 6+50E	<0.2	2.17	15	180	1.0	<5	0.07	<1	14	29	33	3.63	0.09	30	0.49	750	<2	0.01	31	2960	16	<5	2	<10	7	0.06	33	<10	3	81	5
HC 16+00N 6+75E	<0.2	2.33	10	150	1.0	<5	0.11	<1	15	31	47	3.59	0.10	30	0.51	800	<2	0.01	31	1150	14	<5	3	<10	11	0.07	33	<10	8	79	16

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada
8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: Chuck Downie
Project: Iron Range
Sample: Soil

Report No : **2V0294 SJ**
Date : Aug-28-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
HC 16+00N 7+00E	<0.2	2.49	10	200	1.0	<5	0.17	<1	13	29	25	3.52	0.10	30	0.48	665	<2	0.01	32	3020	14	<5	2	<10	24	0.06	33	<10	3	76	7
HC 16+00N 7+25E	<0.2	2.55	5	330	1.0	<5	0.21	<1	14	26	21	3.24	0.11	20	0.46	1780	<2	0.01	32	4030	10	<5	2	<10	19	0.07	30	<10	3	73	7
HC 16+00N 7+50E	<0.2	2.41	5	220	1.0	<5	0.10	<1	14	22	25	3.15	0.10	20	0.41	1710	<2	0.01	29	2540	12	<5	2	<10	11	0.08	31	<10	4	70	7
HC 16+00N 7+75E	<0.2	2.16	5	260	0.5	<5	0.17	<1	13	26	22	3.11	0.12	20	0.44	2535	<2	0.01	30	2610	12	<5	2	<10	19	0.06	30	<10	3	79	4
HC 16+00N 8+00E	<0.2	2.66	5	170	1.0	<5	0.10	<1	16	33	46	3.96	0.10	20	0.61	675	<2	0.01	43	2230	14	<5	3	<10	7	0.07	40	<10	4	79	10
HC 16+00N 8+25E	<0.2	2.91	10	290	1.0	<5	0.13	<1	17	37	30	3.54	0.10	20	0.51	2170	<2	0.02	41	4290	18	<5	3	<10	13	0.09	42	<10	4	148	14
HC 16+00N 8+50E	<0.2	1.84	5	280	0.5	<5	0.18	<1	16	33	25	3.41	0.10	20	0.46	2320	<2	0.01	27	1590	28	<5	2	<10	16	0.06	43	<10	3	154	3
HC 16+00N 8+75E	<0.2	2.55	5	170	1.0	<5	0.07	<1	16	36	31	3.73	0.09	20	0.65	1165	<2	0.01	38	1960	16	<5	3	<10	5	0.08	47	<10	2	119	6
HC 16+00N 9+00E	<0.2	2.29	10	250	1.0	<5	0.07	<1	18	44	33	4.02	0.09	20	0.74	1370	<2	0.01	48	1110	20	<5	3	<10	6	0.05	50	<10	3	113	4
HC 16+00N 9+25E	<0.2	2.31	5	130	0.5	<5	0.05	<1	15	34	32	3.59	0.09	20	0.68	825	<2	0.01	34	890	16	<5	3	<10	6	0.06	42	<10	5	102	7
HC 16+00N 9+50E	<0.2	2.14	10	190	0.5	<5	0.09	<1	14	31	24	3.36	0.08	20	0.56	1340	<2	0.01	32	820	14	<5	2	<10	9	0.05	41	<10	3	85	4
HC 16+00N 9+75E	<0.2	1.81	5	180	0.5	<5	0.06	<1	13	27	18	3.21	0.08	20	0.51	650	<2	0.01	27	700	18	<5	2	<10	4	0.06	38	<10	2	107	3
HC 16+00N 10+00E	<0.2	1.54	5	260	0.5	<5	0.08	<1	13	21	17	2.88	0.08	20	0.40	1705	<2	0.01	24	750	36	<5	2	<10	7	0.06	33	<10	3	123	3
HC 16+00N 10+25E	<0.2	1.67	10	270	0.5	<5	0.04	<1	16	20	27	3.01	0.06	20	0.43	740	<2	0.01	28	440	62	<5	2	<10	2	0.04	29	<10	3	132	3
HC 16+00N 10+50E	<0.2	1.96	10	500	0.5	<5	0.05	<1	17	22	30	3.09	0.07	20	0.42	2100	<2	0.01	27	720	74	<5	2	<10	3	0.06	33	<10	4	153	4
HC 16+00N 10+75E	<0.2	1.93	10	290	0.5	<5	0.05	<1	17	22	29	3.24	0.07	20	0.42	1650	<2	0.01	23	640	86	5	2	<10	3	0.07	34	<10	4	138	5
HC 16+00N 11+00E	<0.2	2.32	10	600	1.0	<5	0.19	<1	17	23	26	3.36	0.07	20	0.44	1420	<2	0.01	28	630	114	<5	2	<10	22	0.07	36	<10	4	205	5
HC 16+00N 11+25E	<0.2	2.20	10	920	1.0	<5	0.11	<1	15	30	17	3.51	0.09	20	0.42	1125	<2	0.01	27	1200	70	<5	2	<10	8	0.11	44	<10	2	274	8
HC 16+00N 11+50E	<0.2	2.43	5	500	1.0	<5	0.11	<1	14	23	19	3.32	0.09	20	0.57	1465	<2	0.01	26	600	54	<5	2	<10	7	0.09	42	<10	3	167	6
HC 16+00N 11+75E	<0.2	2.82	5	260	1.0	<5	0.08	<1	15	19	26	3.15	0.09	10	0.48	1105	<2	0.01	25	780	92	<5	2	<10	5	0.09	40	<10	4	164	12
HC 16+00N 12+00E	0.2	1.80	5	370	0.5	<5	0.12	<1	16	20	26	3.31	0.08	10	0.45	2390	<2	0.01	24	680	136	<5	2	<10	10	0.07	39	<10	3	294	4
HC 16+00N 12+25E	<0.2	2.36	10	350	1.0	<5	0.15	<1	17	20	24	3.02	0.10	10	0.39	2955	<2	0.01	24	920	108	<5	2	<10	14	0.09	37	10	4	319	7
HC 16+00N 12+50E	<0.2	1.97	5	320	0.5	<5	0.09	<1	13	18	19	2.90	0.09	10	0.34	1710	<2	0.01	23	430	58	<5	2	<10	6	0.09	37	<10	2	205	6
HC 16+00N 12+75E	0.2	3.77	5	370	1.0	<5	0.16	<1	12	14	25	2.82	0.10	10	0.28	1605	<2	0.02	24	1240	44	<5	3	<10	15	0.16	37	<10	6	177	43
HC 16+00N 13+00E	<0.2	3.28	5	250	1.0	<5	0.14	<1	14	18	19	2.85	0.09	10	0.39	850	<2	0.02	39	890	38	<5	2	<10	8	0.12	36	<10	4	221	27
HC 16+00N 13+25E	0.2	3.08	5	280	1.0	<5	0.09	<1	14	20	18	2.89	0.09	10	0.39	2245	<2	0.01	38	790	44	<5	2	<10	5	0.10	37	<10	3	228	18
HC 16+00N 13+50E	<0.2	3.04	5	370	1.0	<5	0.10	<1	12	15	13	2.48	0.08	10	0.28	1110	<2	0.02	39	730	26	<5	2	<10	8	0.12	33	<10	2	232	18
HC 16+00N 13+75E	<0.2	2.48	<5	330	1.0	<5	0.13	<1	13	18	13	2.55	0.09	10	0.33	2795	<2	0.01	31	680	16	<5	2	<10	9	0.08	35	<10	3	163	8
HC 16+00N 14+00E	<0.2	2.98	5	250	1.0	<5	0.08	<1	12	18	16	2.59	0.07	10	0.37	1115	<2	0.02	35	800	14	<5	2	<10	8	0.09	35	<10	3	123	19
HC 16+00N 14+25E	<0.2	1.72	<5	250	0.5	<5	0.06	<1	11	18	15	2.66	0.08	20	0.38	1215	<2	0.01	24	380	14	<5	2	<10	6	0.05	35	<10	2	80	4

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada

8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: Chuck Downie
Project: Iron Range
Sample: Soil

Report No : **2V0294 SJ**
Date : Aug-28-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
HC 16+00N 14+50E	<0.2	2.95	5	220	1.0	<5	0.08	<1	15	17	21	2.53	0.08	10	0.31	1045	<2	0.02	37	570	14	<5	2	<10	9	0.09	32	<10	5	91	18
HC 16+00N 14+75E	<0.2	1.49	5	70	0.5	<5	0.03	<1	6	13	16	2.66	0.09	20	0.34	300	<2	0.01	16	530	14	<5	1	<10	1	0.03	18	<10	2	71	3
HC 16+00N 15+00E	<0.2	2.22	10	140	1.0	<5	0.04	<1	12	15	18	2.82	0.08	20	0.25	410	<2	0.01	22	580	18	<5	2	<10	3	0.04	25	<10	4	76	13
CDIR02D01	0.4	5.69	10	40	1.0	<5	0.03	<1	7	15	23	2.83	0.04	10	0.16	130	<2	0.02	10	1150	10	<5	4	<10	1	0.21	42	<10	9	39	111
CDIR02D02	<0.2	5.14	10	480	2.0	<5	0.28	<1	62	656	265	9.61	0.80	50	5.65	2345	<2	0.01	353	2310	80	15	24	<10	28	0.37	198	<10	20	310	16

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada

8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Rock

Report No : **2V0321 RJ**
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
Hourglass 1	<0.2	0.22	<5	130	<0.5	<5	9.21	<1	14	117	5	3.40	0.23	<10	4.08	1455	<2	0.01	160	1330	12	5	2	<10	68	<0.01	8	<10	11	21	5
Hourglass 2	5.2	0.95	35	110	<0.5	<5	7.14	1	8	134	3720	3.19	0.12	10	1.23	1140	<2	0.01	98	360	18	5	8	<10	3	<0.01	22	<10	8	166	3
IR156A	<0.2	0.73	<5	40	<0.5	5	0.03	<1	30	163	12	>15.00	0.01	<10	0.63	55	<2	0.01	37	230	24	5	5	<10	<1	0.08	146	20	<1	15	12
IR158	<0.2	0.03	<5	10	<0.5	20	0.01	<1	3	37	<1	>15.00	0.01	<10	0.01	<5	<2	0.01	8	200	28	5	4	<10	<1	0.02	168	30	<1	2	13
IR156B	*<0.2*	*0.16*	*<5*	*30*	*<0.5*	*20*	*0.01*	*<1*	*61*	*107*	*<1*	*>15.00*	*0.01*	*<10*	*0.12*	*10*	*<2*	*0.01*	*51*	*220*	*32*	*5*	*3*	*<10*	*<1*	*0.02*	*130*	*30*	*<1*	*6*	*15*
IR149A	<0.2	0.61	<5	80	<0.5	15	<0.01	<1	38	115	<1	>15.00	0.02	<10	0.32	5	<2	0.01	36	330	26	5	5	<10	<1	0.09	170	10	<1	11	14
IR153	<0.2	0.53	<5	30	<0.5	20	<0.01	<1	8	34	<1	>15.00	0.02	<10	0.23	20	<2	0.01	19	200	30	5	6	<10	<1	0.03	166	20	<1	7	15
IR149C	<0.2	0.76	<5	80	<0.5	10	<0.01	<1	23	74	<1	>15.00	0.03	<10	0.40	<5	<2	0.01	29	300	24	5	4	<10	<1	0.10	135	10	<1	7	13
IR150	<0.2	0.13	<5	50	<0.5	20	<0.01	<1	25	31	<1	>15.00	0.03	<10	0.03	<5	<2	0.01	29	200	30	10	3	<10	<1	0.03	137	40	<1	5	14
IR155	<0.2	0.07	<5	50	<0.5	25	<0.01	<1	18	64	<1	>15.00	0.01	<10	0.02	85	<2	0.01	19	360	34	5	3	<10	<1	0.02	146	50	<1	6	16
IR269	<0.2	3.37	<5	10	0.5	5	0.12	<1	74	214	<1	>15.00	0.03	<10	2.74	195	<2	0.01	47	920	20	5	6	<10	<1	0.08	145	10	<1	74	27
IR278	<0.2	1.33	<5	70	<0.5	15	0.02	<1	11	17	<1	>15.00	0.02	<10	0.82	35	<2	0.01	31	240	32	5	9	<10	<1	0.04	212	20	<1	7	16
IR275	<0.2	0.36	<5	20	<0.5	25	<0.01	<1	111	116	8	14.43	0.02	<10	0.25	10	<2	0.01	74	180	26	5	2	<10	<1	0.06	75	10	<1	7	11
IR290	<0.2	0.49	<5	40	<0.5	15	0.01	<1	49	146	<1	11.19	0.02	<10	0.37	50	<2	0.01	56	250	20	5	1	<10	<1	0.01	106	<10	<1	7	9
IR259	<0.2	0.03	<5	110	<0.5	10	0.01	<1	7	143	<1	9.84	<0.01	<10	0.01	5	<2	0.01	11	120	14	5	1	<10	<1	<0.01	75	10	<1	2	7
IR276	<0.2	0.56	<5	20	<0.5	20	0.01	<1	16	82	<1	>15.00	0.03	<10	0.21	15	<2	0.01	32	360	34	5	3	<10	<1	0.03	267	<10	<1	5	17
IR321	<0.2	0.06	<5	10	<0.5	5	0.01	<1	8	215	<1	6.13	<0.01	<10	0.01	15	<2	0.01	13	90	10	5	1	<10	<1	0.02	64	10	<1	2	6
IR483	<0.2	0.10	<5	10	0.5	15	0.01	<1	17	104	<1	>15.00	0.01	<10	0.04	30	<2	0.02	13	190	28	5	3	<10	<1	0.07	335	10	<1	7	14
IR258	<0.2	0.38	<5	40	0.5	<5	0.01	<1	8	252	<1	10.02	0.01	<10	0.01	35	<2	0.06	21	240	14	5	5	<10	<1	0.17	161	<10	<1	4	8
IR148A	<0.2	0.30	<5	50	<0.5	5	0.01	<1	1	197	3	4.56	0.01	<10	0.05	15	<2	0.04	7	70	8	5	2	<10	<1	0.01	22	<10	<1	2	4
IR218	<0.2	0.09	<5	10	<0.5	5	<0.01	<1	3	84	<1	13.19	0.01	<10	0.02	<5	<2	0.04	6	240	20	5	6	<10	<1	0.11	250	30	<1	3	10
IR243	<0.2	2.06	<5	10	<0.5	<5	0.04	<1	10	85	4	5.70	0.04	10	1.14	55	<2	0.05	26	410	8	<5	7	<10	<1	0.01	92	<10	<1	74	7
IR050	<0.2	1.19	<5	20	<0.5	<5	0.02	<1	5	113	<1	2.58	0.02	10	1.18	150	<2	0.03	26	100	2	<5	3	<10	<1	<0.01	39	<10	<1	26	3
IR383	<0.2	0.29	<5	20	<0.5	<5	0.12	<1	2	71	1	0.55	0.01	<10	0.24	195	<2	0.07	10	70	<2	<5	3	<10	<1	0.06	23	<10	2	6	2
IR78A	<0.2	2.24	<5	10	0.5	<5	0.46	<1	20	269	36	3.47	0.03	<10	2.37	585	<2	0.02	53	290	6	<5	1	<10	7	0.20	47	<10	1	66	3
IR78B	<0.2	5.07	<5	90	1.0	<5	0.26	<1	21	462	2	9.19	0.89	<10	5.60	1260	<2	0.02	93	390	4	5	11	<10	<1	0.22	191	<10	3	126	7
IR298	<0.2	4.74	<5	50	0.5	<5	0.07	<1	28	256	<1	9.73	0.05	40	4.23	980	<2	0.03	159	530	6	5	19	<10	<1	0.01	183	<10	2	56	8
IR223	<0.2	4.17	<5	20	<0.5	<5	0.02	<1	14	632	<1	8.13	0.03	<10	4.53	730	<2	0.02	87	230	6	5	24	<10	<1	0.03	191	<10	1	118	6
IR075	<0.2	2.37	<5	10	0.5	<5	0.70	<1	31	46	130	5.67	0.01	<10	1.56	720	<2	0.03	44	640	26	<5	3	<10	8	0.34	121	<10	6	96	5
IR331	<0.2	2.36	5	30	0.5	<5	1.35	<1	11	85	29	1.69	0.05	<10	0.82	225	<2	0.19	22	260	<2	<5	3	<10	32	0.14	55	<10	4	23	2

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada
8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Rock

Report No : **2V0321 RJ**
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IR369	<0.2	2.86	<5	10	<0.5	<5	0.33	<1	264	102	1746	10.69	0.02	<10	2.44	665	<2	0.02	987	240	16	5	3	<10	<1	0.10	72	<10	1	52	8
IR081A	<0.2	1.04	<5	150	0.5	<5	0.08	<1	6	64	6	2.03	0.36	20	0.51	160	<2	0.02	19	430	6	<5	1	<10	<1	0.03	15	<10	8	22	2
IR081B	<0.2	0.30	<5	30	<0.5	<5	0.02	<1	2	130	3	0.65	0.09	20	0.13	100	<2	0.03	7	130	4	<5	1	<10	1	0.01	6	<10	3	8	3
IR464	<0.2	0.50	<5	20	<0.5	<5	0.02	<1	3	93	6	1.28	0.07	20	0.20	125	<2	0.02	10	150	10	<5	1	<10	1	0.01	7	<10	3	19	3
IR456	<0.2	1.41	25	180	0.5	<5	0.17	<1	12	79	81	3.56	1.11	10	0.74	225	<2	0.03	14	600	16	<5	2	<10	7	0.18	28	<10	9	29	5
IR261	<0.2	0.57	<5	40	<0.5	<5	<0.01	<1	3	82	<1	4.05	0.01	10	0.01	5	<2	0.03	9	120	6	<5	2	<10	<1	0.02	36	<10	<1	4	4
IR431	<0.2	1.21	5	190	0.5	<5	0.09	<1	7	65	<1	2.65	1.12	10	0.48	150	<2	0.02	19	240	4	<5	1	<10	<1	0.17	20	<10	11	24	3
IR440A	*3.0*	*0.01*	*35*	*20*	*<0.5*	*<5*	*0.37*	*<1*	*79*	*205*	*6159*	*4.37*	*0.02*	*<10*	*0.01*	*75*	*<2*	*0.03*	*117*	*190*	*50*	*5*	*<1*	*<10*	*6*	*<0.01*	*4*	*<10*	*<1*	*211*	*3*
IR440B	<0.2	0.03	10	10	<0.5	30	2.43	<1	634	59	3030	>15.00	0.01	<10	0.03	565	<2	0.01	833	360	64	10	<1	<10	<1	<0.01	39	<10	<1	23	24
IR187	<0.2	4.48	<5	30	0.5	10	5.56	<1	85	43	<1	>15.00	0.03	<10	4.41	1015	<2	0.01	42	420	26	5	5	<10	9	0.01	156	<10	2	67	18
IR184	<0.2	0.17	5	10	<0.5	<5	0.03	<1	2	152	7	0.72	0.04	10	0.02	45	<2	0.04	9	100	6	5	1	<10	2	<0.01	2	<10	1	7	2

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada

8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Rock

Report No : **2V0321 RL**
Date : Sep-12-02

ICP Whole Rock Assay

Lithium Metaborate Fusion

Sample Number	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	CaO %	MgO %	Na_2O %	TiO_2 %	K_2O %	MnO %	P_2O_5 %	LOI %	Ba ppm	Sr ppm	Zr ppm	Sc ppm	Y ppm	Be ppm	Co ppm	Cr ppm	Cu ppm	Ni ppm	V ppm	Zn ppm	Rb ppm	Nb ppm	Total %
IR156A *	48.38	2.03	45.31	0.04	1.04	0.23	0.35	0.04	0.01	0.09	2.19	50	60	50	15	10	<5	40	260	<5	80	315	15	<100	30	99.80
IR158 *	4.64	0.20	91.65	0.01	<0.01	0.01	0.11	0.02	<0.01	0.14	0.20	20	60	50	20	<5	<5	<5	45	<5	40	630	<5	<100	<10	97.07
IR156B	44.82	0.44	50.38	0.01	0.18	0.01	0.09	0.01	<0.01	0.05	3.58	50	<10	30	10	<5	<5	75	175	<5	60	270	5	300	<10	99.68
IR149A *	44.42	2.62	57.51	0.03	0.57	0.42	0.47	0.16	<0.01	0.09	3.31	940	50	50	15	25	<5	55	220	<5	80	445	30	200	<10	109.81
*IR153 **	*13.32*	*2.34*	*80.41*	*0.02*	*0.38*	*0.56*	*0.17*	*0.05*	*<0.01*	*0.06*	*2.16*	*50*	*<10*	*90*	*15*	*10*	*<5*	*15*	*40*	*<5*	*115*	*520*	*5*	*600*	*10*	99.62
IR149C *	29.96	2.73	62.99	0.05	0.72	0.24	0.56	0.24	<0.01	0.12	3.13	220	20	70	15	5	<5	30	160	<5	95	440	20	300	<10	100.88
IR150 *	8.00	0.96	81.65	0.02	0.05	0.04	0.17	0.16	<0.01	0.07	2.37	100	10	60	15	5	<5	35	55	<5	75	490	10	300	<10	93.60
IR155 *	45.49	0.49	55.13	0.02	0.01	0.05	0.10	0.06	0.01	0.07	1.67	70	30	30	10	5	<5	30	115	<5	55	290	5	400	10	103.20
IR269 *	18.57	10.76	55.49	0.21	4.63	1.52	1.66	0.54	0.03	0.19	5.72	40	10	150	20	20	5	115	335	20	90	460	320	700	30	99.55
IR278 *	8.56	2.81	84.65	0.05	1.34	0.02	0.20	0.01	<0.01	0.10	1.47	70	40	100	25	5	<5	25	20	<5	80	660	<5	400	<10	99.34
IR275	61.14	1.08	29.31	0.02	0.43	0.01	0.20	0.09	<0.01	0.04	6.35	40	<10	30	5	5	<5	95	210	<5	30	140	5	300	<10	98.75
IR290	75.00	2.39	17.76	0.03	0.63	0.52	0.29	0.20	0.01	0.04	2.24	130	<10	40	5	5	<5	55	245	<5	50	145	<5	200	<10	99.20
IR259	75.07	0.10	22.71	0.01	<0.01	0.01	0.01	<0.01	<0.01	0.03	0.63	110	10	10	<5	<5	<5	5	245	<5	20	135	<5	100	<10	98.64
IR276 *	47.37	1.91	48.49	0.03	0.34	0.03	0.30	0.22	<0.01	0.10	0.77	50	10	40	10	5	<5	20	125	<5	65	415	40	500	20	99.70
IR321	88.80	0.31	9.86	0.05	0.02	0.05	0.04	<0.01	<0.01	<0.01	0.30	10	<10	30	<5	5	<5	10	275	<5	45	85	5	200	50	99.52
IR483	46.04	1.58	50.38	0.03	0.04	0.76	0.39	0.02	<0.01	0.06	0.23	10	10	130	15	<5	<5	20	170	<5	25	725	15	100	230	99.67
IR258	61.04	9.14	22.01	0.05	0.02	5.05	1.36	0.05	<0.01	0.05	0.85	70	30	110	20	50	<5	25	390	<5	40	290	15	300	10	99.74
IR148A	83.07	4.88	7.75	0.05	0.08	2.39	0.21	0.02	<0.01	<0.01	0.89	70	20	240	5	35	<5	5	280	<5	20	30	10	200	40	99.45
IR218 *	35.76	7.37	50.79	0.06	0.03	4.26	0.66	0.09	<0.01	0.06	0.49	30	<10	80	35	10	<5	15	145	5	60	760	25	800	270	99.80
IR243	65.54	14.83	7.83	0.09	1.79	6.46	0.59	0.32	0.01	0.07	1.85	60	70	210	10	45	<5	20	110	<5	40	125	75	400	40	99.50
IR050	79.68	9.00	3.52	0.09	1.90	3.85	0.27	0.16	0.02	<0.01	1.18	60	40	260	5	20	<5	20	160	<5	50	55	30	600	40	99.80
IR383	66.98	18.58	0.72	0.33	0.37	11.51	0.66	0.05	0.02	<0.01	0.40	30	20	440	10	10	5	15	105	<5	20	40	5	300	110	99.75
IR78A	49.79	15.62	10.41	10.01	7.95	1.49	0.74	0.43	0.17	0.07	3.06	100	230	50	35	15	<5	40	475	50	120	260	130	<100	10	99.89
IR78B	46.88	16.97	14.35	1.17	9.10	2.72	0.85	1.79	0.18	0.09	5.19	390	70	60	40	15	5	20	510	<5	110	295	125	100	10	99.48
IR298	47.94	18.55	14.36	0.14	6.65	5.05	1.14	0.50	0.13	0.13	4.71	100	60	60	40	10	5	40	280	5	175	260	55	<100	<10	99.40
IR223	55.18	14.64	13.23	0.15	7.16	3.50	0.74	0.17	0.10	0.07	4.44	40	120	50	40	15	<5	15	610	5	85	235	105	<100	<10	99.50
IR075	48.75	13.81	15.28	9.42	5.44	2.34	1.51	0.09	0.20	0.18	2.25	30	230	80	50	25	5	55	60	120	70	470	130	<100	<10	99.42
IR331	50.13	14.38	10.08	11.71	8.63	1.79	0.64	0.33	0.18	0.10	1.76	70	160	40	50	15	<5	25	405	30	85	280	70	<100	<10	99.85
IR369	43.11	12.45	19.93	7.79	6.57	0.75	0.42	0.27	0.16	0.07	7.89	40	120	40	40	10	<5	250	185	1005	235	220	70	<100	<10	99.62
IR081A	63.47	15.07	3.95	0.16	1.31	2.07	0.62	4.36	0.04	0.08	2.28	1450	30	290	15	30	5	15	95	<5	30	85	25	200	10	93.62

* Incomplete fusion. Sample matrix not compatible with this analysis type.

Sample is fused with Lithium metaborate
and dissolved in dilute HNO3.

Signed:

Assayers Canada
8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436   Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Rock

Report No : **2V0321 RL**
Date : Sep-12-02

ICP Whole Rock Assay

Lithium Metaborate Fusion

Sample Number	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	CaO %	MgO %	Na_2O %	TiO_2 %	K_2O %	MnO %	P_2O_5 %	LOI %	Ba ppm	Sr ppm	Zr ppm	Sc ppm	Y ppm	Be ppm	Co ppm	Cr ppm	Cu ppm	Ni ppm	V ppm	Zn ppm	Rb ppm	Nb ppm	Total %
IR081B	79.56	9.93	0.91	0.05	0.22	2.66	0.33	4.70	0.02	0.01	0.54	870	20	300	5	30	<5	10	150	5	5	15	5	400	10	99.10
IR464	85.62	6.46	1.83	0.09	0.40	2.18	0.33	0.76	0.02	0.01	0.75	200	70	390	5	30	<5	15	120	5	15	30	20	300	10	98.58
IR456	66.02	15.35	5.18	1.75	1.48	2.59	0.60	3.86	0.03	0.12	2.61	1510	180	270	15	35	5	25	120	80	30	70	20	500	10	99.87
IR261	83.19	4.96	6.61	0.03	0.01	2.06	0.21	0.07	<0.01	<0.01	1.36	50	30	250	5	10	<5	15	110	<5	20	55	5	300	20	98.59
IR431	66.80	16.78	4.29	0.42	1.10	2.40	0.66	5.24	0.03	0.03	1.82	1260	70	200	15	40	5	20	100	<5	25	80	40	500	30	99.81
IR440A	90.43	0.05	5.97	0.57	<0.01	0.04	<0.01	0.03	0.01	<0.01	2.10	30	20	<10	<5	<5	<5	80	330	3225	70	5	200	200	10	99.63
IR440B	35.84	0.08	45.95	4.32	0.02	<0.01	<0.01	<0.01	0.09	0.04	12.85	10	20	10	<5	<5	<5	415	130	1265	320	40	20	200	<10	99.42
IR187	17.10	12.33	41.66	9.53	7.97	0.01	0.44	0.88	0.16	0.09	9.40	80	50	160	15	10	<5	130	55	<5	110	270	80	300	20	99.70
IR184	85.65	7.66	1.03	0.08	0.05	3.79	0.25	0.42	0.01	<0.01	0.50	50	70	190	5	30	<5	15	220	15	30	20	15	200	10	99.54

* Incomplete fusion. Sample matrix not compatible with this analysis type.

Sample is fused with Lithium metaborate
and dissolved in dilute HNO3.

Signed:

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8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Silt

Report No : **2V0321 LJ**
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IRJC02S-01	<0.2	1.45	<5	140	0.5	<5	0.28	<1	21	54	41	4.13	0.10	20	0.74	825	<2	0.03	33	530	30	<5	3	<10	27	0.09	70	<10	8	67	3
IRJC02S-02	<0.2	0.88	<5	40	0.5	<5	0.20	<1	11	26	30	2.50	0.04	10	0.48	345	<2	0.03	20	250	16	<5	2	<10	6	0.08	42	<10	4	58	2

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada

8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Soil

Report No : 2V0321 SJ
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IRL08N 4+75W	<0.2	3.42	5	50	0.5	<5	0.02	<1	8	21	28	4.55	0.07	10	0.51	280	<2	0.01	18	980	28	<5	4	<10	<1	0.12	71	<10	3	72	18
IRL08N 5+00W	<0.2	3.26	5	80	0.5	<5	0.02	<1	9	19	27	4.16	0.05	10	0.52	255	<2	0.01	16	690	20	<5	4	<10	<1	0.10	71	<10	2	67	12
IRL08N 5+25W	<0.2	3.32	5	70	0.5	<5	0.03	<1	6	17	15	4.37	0.05	10	0.38	145	<2	0.02	13	610	14	<5	3	<10	<1	0.12	60	<10	2	53	17
IRL08N 5+50W	<0.2	4.55	5	60	0.5	<5	0.02	<1	5	18	15	3.37	0.05	10	0.32	170	<2	0.01	13	650	8	<5	3	<10	<1	0.11	45	<10	3	64	29
IRL08N 5+75W	<0.2	4.42	<5	70	0.5	<5	0.03	<1	7	20	17	3.22	0.05	10	0.29	300	<2	0.02	15	730	10	<5	3	<10	<1	0.12	47	<10	3	67	30
IRL08N 6+00W	<0.2	3.94	5	60	0.5	<5	0.03	<1	6	20	16	4.74	0.07	10	0.31	235	<2	0.02	14	870	20	<5	2	<10	<1	0.15	59	<10	3	62	28
IRL08N 6+25W	0.2	2.46	5	60	0.5	<5	0.02	<1	6	16	17	3.61	0.05	10	0.32	280	<2	0.01	12	410	40	<5	2	<10	<1	0.12	54	<10	2	92	12
IRL08N 6+50W	<0.2	2.04	<5	80	0.5	<5	0.02	<1	8	15	17	4.15	0.06	10	0.34	175	<2	0.01	15	560	26	<5	2	<10	<1	0.12	63	<10	4	105	8
IRL08N 6+75W	<0.2	1.16	<5	60	0.5	<5	0.03	<1	7	11	12	3.05	0.06	10	0.18	445	<2	0.01	10	590	20	<5	1	<10	2	0.13	52	<10	1	55	3
IRL08N 7+00W	0.2	4.39	5	60	0.5	<5	0.02	<1	4	11	15	2.59	0.04	10	0.18	95	<2	0.02	8	550	6	<5	3	<10	<1	0.11	38	<10	3	43	45
IRL08N 7+25W	<0.2	4.20	5	60	0.5	<5	0.02	<1	4	15	16	3.16	0.05	10	0.24	115	<2	0.02	11	570	12	<5	2	<10	<1	0.10	40	<10	2	49	25
IRL08N 7+50W	<0.2	4.78	5	50	0.5	<5	0.02	<1	5	17	22	3.21	0.05	10	0.23	235	<2	0.01	11	850	10	<5	2	<10	<1	0.10	39	<10	2	55	30
IRL08N 7+75W	0.2	4.67	<5	50	0.5	<5	0.02	<1	5	11	14	2.49	0.04	10	0.12	170	<2	0.02	7	600	8	<5	3	<10	<1	0.14	40	<10	3	32	49
IRL08N 8+00W	<0.2	4.52	5	50	0.5	<5	0.02	<1	5	17	14	3.47	0.05	10	0.23	205	<2	0.02	10	630	10	<5	2	<10	<1	0.12	46	<10	3	41	29
IRL08N 8+25W	<0.2	6.28	<5	50	0.5	<5	0.02	<1	5	17	14	3.68	0.04	<10	0.14	145	<2	0.02	8	670	6	<5	3	<10	<1	0.14	43	<10	3	37	58
IRL08N 8+50W	<0.2	5.72	<5	50	0.5	<5	0.02	<1	5	14	15	3.63	0.05	<10	0.17	195	<2	0.02	8	1000	10	<5	3	<10	<1	0.15	49	<10	2	39	45
IRL08N 8+75W	<0.2	5.42	<5	60	0.5	<5	0.02	<1	6	14	18	3.37	0.04	<10	0.25	200	<2	0.02	10	720	8	<5	4	<10	<1	0.14	53	<10	2	48	40
IRL08N 9+00W	<0.2	2.54	<5	90	0.5	<5	0.05	<1	8	12	18	3.63	0.05	<10	0.46	800	<2	0.02	10	690	14	<5	3	<10	2	0.14	80	<10	1	48	9
IRL08N 9+25W	<0.2	1.33	<5	40	0.5	<5	0.05	<1	6	11	30	4.16	0.05	10	0.43	210	<2	0.01	12	1100	12	<5	2	<10	<1	0.09	116	<10	1	45	3
IRL08N 9+50W	<0.2	1.16	5	30	0.5	<5	0.03	<1	3	11	10	4.34	0.05	10	0.18	90	<2	0.01	8	690	16	<5	1	<10	<1	0.08	64	<10	1	38	4
IRL08N 9+75W	<0.2	2.94	<5	50	0.5	<5	0.05	<1	6	11	15	3.40	0.05	10	0.17	420	<2	0.02	8	1220	14	<5	2	<10	1	0.13	55	<10	1	44	12
IRL08N 10+00W	<0.2	4.04	<5	60	1.0	<5	0.04	<1	7	22	16	2.78	0.05	10	0.36	275	<2	0.02	15	1050	10	<5	3	<10	1	0.16	51	<10	3	49	24
IRL07N 7+25W	<0.2	3.14	<5	70	0.5	<5	0.05	<1	15	14	45	5.21	0.05	10	1.27	470	<2	0.01	27	560	10	<5	9	<10	<1	0.09	133	<10	3	96	6
IRL07N 7+50W	<0.2	3.54	<5	70	0.5	<5	0.04	<1	11	13	25	4.05	0.05	10	0.68	325	<2	0.02	18	510	6	<5	5	<10	<1	0.14	94	<10	3	85	15
IRL07N 7+75W	<0.2	2.85	<5	50	0.5	<5	0.03	<1	10	12	25	4.14	0.05	<10	0.77	260	<2	0.01	17	530	10	<5	5	<10	<1	0.12	97	<10	1	76	11
IRL07N 8+00W	<0.2	3.74	<5	70	0.5	<5	0.07	<1	11	12	25	3.57	0.05	<10	0.64	435	<2	0.01	18	640	10	<5	4	<10	<1	0.12	78	<10	2	79	15
IRL07N 8+25W	<0.2	3.84	<5	70	0.5	<5	0.05	<1	13	13	23	3.71	0.05	<10	0.67	290	<2	0.01	17	600	8	<5	5	<10	<1	0.13	82	<10	2	79	21
IRL07N 8+50W	<0.2	3.58	<5	80	0.5	<5	0.04	<1	10	12	25	3.46	0.05	<10	0.56	655	<2	0.02	18	660	10	<5	4	<10	<1	0.14	74	<10	3	82	17
IRL07N 8+75W	<0.2	2.04	<5	80	0.5	<5	0.05	<1	13	12	34	4.12	0.04	10	0.93	2075	<2	0.01	19	400	14	<5	5	<10	<1	0.12	108	<10	3	70	5
IRL07N 9+00W	<0.2	3.40	<5	70	0.5	<5	0.06	<1	10	11	28	3.95	0.05	<10	0.57	280	<2	0.01	15	520	12	<5	4	<10	<1	0.13	96	<10	3	77	15

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada
8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Soil

Report No : 2V0321 SJ
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IRL07N 9+25W	<0.2	3.24	<5	70	0.5	<5	0.04	<1	19	10	70	6.48	0.05	10	1.46	455	<2	0.01	23	480	10	<5	13	<10	<1	0.16	206	<10	4	87	8
IRL07N 9+50W	<0.2	2.40	<5	60	0.5	<5	0.03	<1	13	9	34	4.46	0.05	10	0.89	305	<2	0.01	16	530	12	<5	7	<10	<1	0.09	122	<10	2	68	7
IRL07N 9+75W	<0.2	3.14	<5	60	0.5	<5	0.02	<1	6	10	16	2.95	0.05	10	0.26	120	<2	0.02	9	530	10	<5	3	<10	<1	0.12	53	<10	2	55	23
IRL07N 10+00W	<0.2	2.86	5	80	0.5	<5	0.02	<1	5	12	14	2.89	0.05	10	0.31	140	<2	0.01	12	600	14	<5	2	<10	<1	0.06	42	<10	2	59	12
IRL07N 10+25W	0.2	3.91	5	90	1.0	<5	0.03	<1	8	11	20	2.86	0.05	10	0.38	190	<2	0.02	14	570	14	<5	3	<10	<1	0.09	48	<10	4	70	29
IRL07N 10+50W	<0.2	3.14	5	70	0.5	<5	0.02	<1	8	14	16	3.15	0.06	10	0.37	190	<2	0.01	13	610	16	<5	2	<10	<1	0.10	48	<10	2	71	21
IRL07N 10+75W	<0.2	3.71	5	80	0.5	<5	0.03	<1	9	14	17	3.09	0.06	10	0.34	300	<2	0.01	14	780	18	<5	3	<10	<1	0.10	46	<10	3	68	18
IRL07N 11+00W	<0.2	3.59	5	70	0.5	<5	0.02	<1	6	12	15	2.91	0.05	10	0.25	125	<2	0.01	11	530	20	<5	3	<10	<1	0.10	48	<10	3	63	23
IRL07N 11+25W	<0.2	1.46	10	40	0.5	<5	0.02	<1	5	16	12	4.21	0.05	10	0.31	120	<2	0.01	12	1050	28	5	2	<10	<1	0.05	50	<10	1	74	4
IRL07N 11+50W	<0.2	1.67	5	60	0.5	<5	0.02	<1	6	12	11	2.84	0.05	10	0.28	365	<2	0.01	12	350	32	<5	2	<10	<1	0.06	38	<10	2	60	5
IRL07N 11+75W	<0.2	3.29	<5	70	0.5	<5	0.02	<1	5	16	10	3.36	0.05	10	0.26	110	<2	0.01	11	410	16	<5	2	<10	<1	0.10	46	<10	2	47	21
IRL07N 12+00W	<0.2	3.03	<5	70	0.5	<5	0.02	<1	7	13	15	3.12	0.06	10	0.25	235	<2	0.01	11	510	14	<5	2	<10	<1	0.11	46	<10	2	58	21
IRL07N 12+25W	0.2	3.45	5	70	0.5	<5	0.03	<1	6	12	14	2.80	0.05	10	0.22	185	2	0.01	11	580	14	<5	2	<10	1	0.10	38	<10	2	81	17
IRL07N 12+50W	0.2	3.19	5	80	0.5	<5	0.03	<1	9	12	18	2.94	0.06	10	0.25	270	<2	0.02	13	640	22	<5	2	<10	<1	0.14	44	<10	4	77	19
IRL07N 12+75W	0.2	2.40	5	70	0.5	<5	0.02	<1	6	16	14	3.65	0.05	10	0.33	220	<2	0.01	13	570	28	<5	2	<10	<1	0.07	44	<10	2	86	8
IRL07N 13+00W	<0.2	1.22	5	40	0.5	<5	0.02	<1	7	13	18	2.71	0.04	10	0.38	425	<2	0.01	14	520	14	<5	1	<10	<1	0.04	35	<10	2	49	2
IRL07N 13+25W	<0.2	3.82	5	50	0.5	<5	0.02	<1	6	16	22	3.65	0.06	10	0.25	190	<2	0.02	13	840	18	<5	3	<10	<1	0.13	47	<10	5	56	27
IRL07N 13+50W	<0.2	3.16	10	50	0.5	<5	0.02	<1	6	15	17	3.77	0.06	10	0.25	330	<2	0.01	12	960	28	<5	2	<10	<1	0.11	45	<10	3	60	17
IRL07N 13+75W	<0.2	4.79	5	60	0.5	<5	0.02	<1	6	16	19	3.06	0.06	10	0.23	325	<2	0.02	12	910	12	<5	3	<10	<1	0.11	39	<10	3	70	30
IRL07N 14+00W	<0.2	4.73	10	50	0.5	<5	0.02	<1	5	17	19	2.98	0.06	10	0.23	165	<2	0.01	11	870	12	<5	2	<10	<1	0.08	33	<10	2	49	27
IRL07N 14+25W	0.2	4.40	5	70	0.5	<5	0.03	<1	4	13	15	3.12	0.05	10	0.17	135	<2	0.02	9	800	14	<5	2	<10	<1	0.09	38	<10	2	45	23
IRL07N 14+50W	<0.2	2.88	5	70	0.5	<5	0.02	<1	4	14	9	4.43	0.05	10	0.19	95	<2	0.02	9	640	18	<5	1	<10	<1	0.13	57	<10	1	39	24
IRL07N 14+75W	<0.2	3.90	5	60	0.5	<5	0.02	<1	5	13	10	3.46	0.06	10	0.21	150	<2	0.02	10	1020	12	<5	2	<10	<1	0.11	45	<10	2	46	24
IRL07N 15+00W	0.2	2.93	5	60	0.5	<5	0.03	<1	6	13	17	3.78	0.06	10	0.27	185	<2	0.01	13	840	38	<5	2	<10	<1	0.10	46	<10	1	61	9
IRL05N 3+75E	<0.2	2.43	<5	120	1.0	<5	0.18	<1	20	30	81	4.92	0.06	10	0.93	640	<2	0.02	30	600	32	<5	4	<10	<1	0.23	114	<10	3	104	9
IRL05N 4+00E	<0.2	2.84	<5	90	1.0	<5	0.17	<1	24	31	75	4.12	0.07	10	0.64	1110	<2	0.02	24	790	30	<5	4	<10	3	0.20	90	<10	10	87	10
IRL05N 4+25E	<0.2	2.64	<5	80	1.0	<5	0.17	<1	12	22	31	3.66	0.05	10	0.48	265	<2	0.02	19	860	18	<5	3	<10	4	0.18	71	<10	4	77	13
IRL05N 4+50E	<0.2	2.42	<5	80	1.0	<5	0.16	<1	15	28	42	3.97	0.05	10	0.63	330	<2	0.02	23	340	16	<5	3	<10	4	0.22	84	<10	7	69	15
IRL05N 4+75E	<0.2	1.60	<5	110	0.5	<5	0.15	<1	11	21	23	3.74	0.05	10	0.47	475	<2	0.02	18	750	16	<5	2	<10	3	0.17	68	<10	2	74	6
IRL05N 5+00E	<0.2	1.84	<5	80	1.0	<5	0.16	<1	14	25	41	4.11	0.05	10	0.63	320	<2	0.01	23	820	16	<5	3	<10	3	0.18	76	<10	4	78	8

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada
8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Soil

Report No : **2V0321 SJ**
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IRL05N 5+25E	<0.2	1.94	<5	80	0.5	<5	0.22	<1	18	27	50	4.13	0.06	10	0.73	550	<2	0.01	24	820	14	<5	3	<10	5	0.16	78	<10	8	78	4
IRL05N 5+50E	<0.2	2.01	<5	80	1.0	<5	0.29	<1	16	29	60	3.86	0.05	10	0.76	530	<2	0.02	26	680	16	<5	4	<10	10	0.15	82	<10	8	75	4
IRL05N 5+75E	<0.2	2.20	<5	70	1.0	<5	0.16	<1	13	21	51	3.93	0.05	10	0.51	290	<2	0.02	19	620	14	<5	3	<10	5	0.20	74	<10	6	63	18
IRL05N 6+00E	<0.2	2.09	<5	80	1.0	<5	0.19	<1	14	22	42	3.66	0.05	10	0.49	525	<2	0.02	19	720	16	<5	3	<10	6	0.16	70	<10	6	76	7
IRL05N 6+25E	<0.2	1.95	<5	80	1.0	<5	0.33	<1	17	26	64	3.72	0.06	10	0.51	1195	<2	0.02	23	710	18	<5	2	<10	12	0.12	67	<10	9	84	4
IRL05N 6+50E	<0.2	1.81	<5	90	0.5	<5	0.24	<1	16	35	45	3.91	0.06	10	0.60	475	<2	0.02	22	470	20	<5	3	<10	8	0.16	79	<10	5	72	5
IRL05N 6+75E	<0.2	1.61	<5	150	0.5	<5	0.57	<1	17	40	47	3.83	0.14	10	0.60	1505	<2	0.02	22	850	20	<5	3	<10	19	0.14	73	<10	6	97	4
IRL05N 7+00E	<0.2	2.29	<5	90	0.5	<5	0.57	<1	19	57	66	4.03	0.08	10	0.83	1390	<2	0.02	30	1050	22	<5	3	<10	22	0.08	77	<10	13	90	3
IRL05N 7+25E	<0.2	1.81	<5	80	0.5	<5	0.32	<1	19	50	58	4.29	0.07	10	0.74	845	<2	0.01	27	490	22	<5	4	<10	13	0.13	86	<10	8	72	4
IRL05N 7+50E	<0.2	1.98	<5	70	0.5	<5	0.20	<1	17	63	46	3.84	0.09	20	1.13	605	<2	0.01	37	320	16	<5	4	<10	6	0.08	65	<10	4	68	3
IRL05N 7+75E	<0.2	1.86	<5	70	0.5	<5	0.10	<1	16	39	31	3.58	0.06	10	0.59	380	<2	0.01	25	490	18	<5	3	<10	3	0.12	62	<10	4	79	4
IRL05N 8+00E	<0.2	1.21	<5	160	0.5	<5	0.24	<1	13	29	24	3.27	0.07	10	0.48	1090	<2	0.01	19	540	24	<5	2	<10	12	0.09	64	<10	2	70	2
IRL05N 8+25E	<0.2	2.38	<5	150	1.0	<5	0.22	<1	17	22	26	3.47	0.07	10	0.39	745	<2	0.02	19	1620	22	<5	2	<10	9	0.12	61	<10	2	116	6
IRL05N 8+50E	<0.2	2.33	<5	160	0.5	<5	0.13	<1	20	32	44	4.41	0.09	10	0.72	940	<2	0.01	28	800	20	<5	4	<10	3	0.12	89	<10	3	143	5
IRL05N 8+75E	<0.2	2.18	<5	90	0.5	<5	0.18	<1	20	37	45	4.50	0.10	10	0.76	495	<2	0.01	30	590	26	<5	4	<10	10	0.13	90	<10	4	108	7
IRL05N 9+00E	<0.2	1.76	5	100	0.5	<5	0.15	<1	17	38	37	4.45	0.08	10	0.67	605	<2	0.01	28	570	80	<5	3	<10	6	0.10	83	<10	3	141	3
IRL05AN 0+00	<0.2	2.65	10	60	0.5	<5	0.03	<1	6	24	19	4.53	0.06	10	0.31	160	<2	0.01	17	820	22	<5	2	<10	<1	0.11	58	<10	3	57	8
IRL05AN 0+25W	<0.2	1.53	20	100	0.5	<5	0.05	<1	9	18	32	4.31	0.10	20	0.30	1435	<2	0.01	20	1440	50	5	1	<10	2	0.04	38	<10	3	79	3
IRL05AN 0+50W	<0.2	3.86	5	90	1.0	<5	0.03	<1	9	27	23	3.65	0.07	10	0.34	340	<2	0.02	18	1020	18	<5	3	<10	<1	0.12	47	<10	4	71	20
IRL05AN 0+75W	<0.2	3.38	<5	100	0.5	<5	0.08	<1	9	56	31	5.33	0.07	30	0.41	655	<2	0.02	27	1890	16	<5	3	<10	1	0.09	59	<10	3	63	9
IRL05AN 1+00W	<0.2	4.95	5	90	0.5	<5	0.03	<1	6	29	18	5.29	0.07	10	0.29	340	<2	0.02	14	1460	18	<5	2	<10	<1	0.13	60	<10	2	59	25
IRL05AN 1+25W	<0.2	4.76	5	180	1.0	<5	0.03	<1	12	23	24	3.30	0.06	20	0.34	420	<2	0.02	17	940	10	<5	4	<10	<1	0.11	43	<10	4	58	22
IRL05AN 1+50W	<0.2	3.09	5	130	0.5	<5	0.03	<1	11	31	15	4.16	0.06	20	0.38	1230	<2	0.02	30	1220	14	<5	3	<10	<1	0.07	45	<10	3	66	6
IRL05AN 1+75W	<0.2	4.61	<5	60	0.5	<5	0.07	<1	5	14	16	2.62	0.05	10	0.18	200	<2	0.02	9	1380	8	<5	2	<10	5	0.12	38	<10	2	44	26
IRL05AN 2+00W	<0.2	3.93	5	60	0.5	<5	0.02	<1	5	26	12	4.46	0.06	10	0.35	215	<2	0.01	13	700	12	<5	3	<10	<1	0.09	52	<10	3	50	17
IRL05AN 2+25W	<0.2	3.63	<5	80	0.5	<5	0.05	<1	6	26	12	4.33	0.05	10	0.35	290	<2	0.02	15	870	14	<5	2	<10	<1	0.08	52	<10	1	48	14
IRL05AN 2+50W	<0.2	3.95	<5	60	0.5	<5	0.04	<1	7	28	14	4.88	0.06	10	0.40	245	<2	0.02	17	1040	18	<5	2	<10	<1	0.11	56	<10	2	56	19
IRL05AN 2+75W	<0.2	2.80	<5	70	0.5	<5	0.03	<1	8	26	14	5.19	0.06	20	0.39	250	<2	0.01	17	590	16	<5	2	<10	<1	0.10	58	<10	2	52	6
IRL05AN 3+00W	<0.2	3.82	5	70	0.5	<5	0.04	<1	7	24	20	4.10	0.06	10	0.28	345	<2	0.02	15	1080	14	<5	2	<10	<1	0.09	49	<10	2	54	11
IRL05AN 3+25W	<0.2	3.30	<5	70	0.5	<5	0.04	<1	6	21	15	5.07	0.06	10	0.28	290	<2	0.02	12	900	18	<5	2	<10	<1	0.13	61	<10	1	48	17

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada

8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Soil

Report No : 2V0321 SJ
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IRL05AN 3+50W	<0.2	3.62	<5	70	0.5	<5	0.04	<1	8	18	18	3.25	0.05	10	0.33	175	<2	0.02	16	740	12	<5	2	<10	1	0.08	38	<10	2	49	12
IRL05AN 3+75W	<0.2	4.22	<5	80	0.5	<5	0.03	<1	7	19	16	4.13	0.05	10	0.29	175	<2	0.02	13	680	8	<5	2	<10	<1	0.12	54	<10	2	42	30
IRL05AN 4+00W	<0.2	3.41	<5	70	0.5	<5	0.03	<1	7	23	15	4.02	0.06	10	0.29	170	<2	0.02	13	620	14	<5	2	<10	<1	0.14	56	<10	2	51	16
IRL05AN 4+25W	<0.2	2.17	<5	90	0.5	<5	0.03	<1	10	23	23	4.73	0.07	10	0.43	1240	<2	0.01	18	1910	20	<5	2	<10	<1	0.10	61	<10	2	72	5
IRL05AN 4+50W	<0.2	2.46	<5	100	0.5	<5	0.08	<1	10	25	18	4.68	0.08	10	0.39	710	<2	0.02	17	920	18	<5	2	<10	3	0.11	62	<10	2	61	5
IRL05AN 4+75W	<0.2	1.94	<5	90	0.5	<5	0.04	<1	7	29	14	4.96	0.08	10	0.37	245	<2	0.01	17	660	22	<5	2	<10	<1	0.15	71	<10	2	59	8
IRL05AN 5+00W	<0.2	3.42	5	90	1.0	<5	0.05	<1	8	16	28	3.39	0.08	20	0.26	940	<2	0.02	13	1390	26	<5	2	<10	1	0.13	48	<10	5	72	10
IRL05AN 0+25E	<0.2	1.84	5	80	0.5	<5	0.07	<1	18	26	24	3.33	0.09	10	0.37	1555	<2	0.01	20	980	28	<5	1	<10	2	0.09	44	<10	3	86	4
IRL05AN 0+50E	<0.2	1.98	10	80	1.0	<5	0.04	<1	14	25	28	3.06	0.08	20	0.40	1160	<2	0.01	22	1190	38	<5	1	<10	2	0.07	38	<10	5	90	3
IRL05AN 0+75E	<0.2	3.00	10	70	1.0	<5	0.05	<1	21	32	34	3.75	0.09	20	0.52	890	<2	0.01	30	950	38	<5	2	<10	<1	0.10	48	<10	9	114	6
IRL05AN 1+00E	<0.2	2.07	10	80	0.5	<5	0.08	<1	22	36	34	3.30	0.09	20	0.57	2100	<2	0.01	37	980	70	<5	1	<10	3	0.06	46	<10	6	154	2
IRL05AN 1+25E	<0.2	1.98	20	140	1.0	<5	0.14	<1	26	54	54	4.12	0.11	20	0.65	2725	<2	0.01	47	1470	122	5	2	<10	7	0.06	51	<10	7	205	3
IRL05AN 1+50E	<0.2	2.13	10	110	0.5	<5	0.08	<1	21	39	34	4.34	0.10	20	0.60	1305	<2	0.01	34	820	94	<5	3	<10	3	0.08	53	<10	4	164	3
IRL05AN 1+75E	<0.2	2.41	10	120	1.0	<5	0.15	<1	14	32	32	4.17	0.10	20	0.58	660	<2	0.01	31	1070	56	<5	2	<10	7	0.11	54	<10	3	163	5
IRL05AN 2+00E	0.2	2.90	<5	110	1.0	<5	0.07	<1	12	24	30	3.96	0.08	10	0.33	665	<2	0.02	18	2530	68	<5	3	<10	<1	0.20	65	<10	2	152	14
IRL05AN 2+25E	<0.2	2.84	<5	100	1.0	<5	0.12	<1	16	29	71	5.21	0.11	10	0.68	645	<2	0.01	25	1420	38	<5	5	<10	<1	0.19	114	<10	3	136	10
IRL05AN 2+50E	<0.2	3.09	<5	70	1.0	<5	0.08	<1	13	33	55	4.52	0.08	<10	0.63	320	<2	0.01	24	910	24	<5	4	<10	<1	0.20	95	<10	2	90	25
IRL05AN 2+75E	<0.2	3.64	<5	60	0.5	<5	0.09	<1	14	26	51	4.15	0.06	<10	0.69	355	<2	0.01	24	850	22	<5	4	<10	<1	0.18	82	<10	2	92	18
IRL05AN 3+00E	0.2	3.27	<5	70	1.0	<5	0.09	<1	14	23	44	4.29	0.05	10	0.55	420	<2	0.02	20	680	24	<5	4	<10	<1	0.21	89	<10	3	91	27
IRL05AN 3+25E	0.2	4.42	5	70	1.0	<5	0.07	<1	8	15	29	3.38	0.05	<10	0.24	385	<2	0.02	13	1170	16	<5	2	<10	1	0.18	53	<10	3	90	29
IRL05AN 3+50E	0.2	4.02	<5	80	1.0	<5	0.04	<1	7	15	25	3.05	0.04	<10	0.23	140	<2	0.02	12	640	10	<5	2	<10	<1	0.16	51	<10	2	58	50
IRL05AN 3+75E	0.4	3.94	<5	70	0.5	<5	0.05	<1	9	13	27	2.64	0.04	<10	0.21	900	<2	0.02	11	1130	10	<5	2	<10	1	0.17	44	<10	3	87	25
IRL05AN 4+00E	0.4	4.06	<5	50	1.0	<5	0.05	<1	8	12	22	2.76	0.05	<10	0.20	170	<2	0.02	11	500	10	<5	2	<10	1	0.17	48	<10	3	78	62
IRL04AN 0+00	<0.2	1.88	<5	120	1.0	<5	0.32	<1	12	27	63	3.54	0.05	10	0.49	565	<2	0.02	22	630	22	<5	2	<10	11	0.10	58	<10	10	69	4
IRL04AN 0+25E	0.2	2.15	<5	110	1.0	<5	0.24	<1	12	25	68	3.40	0.06	10	0.46	500	<2	0.02	21	610	24	<5	2	<10	9	0.10	56	<10	10	66	4
IRL04AN 0+50E	<0.2	2.51	<5	120	1.0	<5	0.21	<1	18	28	96	3.63	0.07	20	0.46	1170	<2	0.02	25	600	28	<5	3	<10	8	0.13	61	<10	11	81	6
IRL04AN 0+75E	0.2	2.12	<5	110	1.0	<5	0.34	<1	15	22	93	2.64	0.05	20	0.34	1555	<2	0.02	22	1040	24	<5	1	<10	14	0.06	43	<10	16	59	2
IRL04AN 1+00E	0.4	2.20	<5	120	1.0	<5	0.22	<1	11	21	93	3.59	0.05	10	0.30	335	<2	0.02	19	340	32	<5	3	<10	7	0.15	53	<10	11	53	14
IRL04AN 1+25E	0.2	1.92	<5	100	1.0	<5	0.28	<1	16	22	53	3.42	0.07	10	0.34	815	<2	0.02	18	500	32	<5	2	<10	9	0.12	54	<10	13	57	6
IRL04AN 1+50E	<0.2	1.97	<5	90	0.5	<5	0.11	<1	8	21	37	3.42	0.05	10	0.32	240	<2	0.02	17	310	26	<5	2	<10	3	0.14	53	<10	7	58	14

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada
8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Soil

Report No : **2V0321 SJ**
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IRL04AN 1+75E	<0.2	1.72	5	80	0.5	<5	0.10	<1	6	15	23	2.92	0.04	10	0.17	90	<2	0.01	9	260	20	<5	2	<10	4	0.09	48	<10	3	41	8
IRL04AN 2+00E	0.2	2.85	5	80	1.0	<5	0.04	<1	6	15	17	2.65	0.05	10	0.18	135	<2	0.01	11	500	14	<5	2	<10	<1	0.09	32	<10	3	88	23
IRL04AN 2+25E	<0.2	1.97	10	100	0.5	<5	0.06	<1	6	33	15	3.92	0.05	10	0.39	160	<2	0.01	16	320	26	<5	2	<10	<1	0.05	53	<10	2	77	5
IRL04AN 2+50E	0.6	2.38	10	130	0.5	<5	0.05	<1	6	23	16	4.21	0.06	20	0.21	300	<2	0.01	13	520	34	5	1	<10	<1	0.04	40	<10	2	105	7
IRL04AN 0+25W	<0.2	1.94	5	130	1.0	<5	0.30	<1	14	28	68	3.36	0.06	10	0.48	870	<2	0.01	22	980	26	<5	2	<10	10	0.06	51	<10	10	78	3
IRL04AN 0+50W	<0.2	1.71	5	130	0.5	<5	0.14	<1	11	22	33	3.24	0.04	10	0.37	290	<2	0.01	15	450	20	<5	2	<10	4	0.10	48	<10	5	72	4
IRL04AN 0+75W	<0.2	1.69	<5	130	1.0	<5	0.13	<1	24	23	83	2.92	0.05	10	0.33	825	<2	0.01	15	720	18	<5	2	<10	5	0.10	49	<10	7	58	3
IRL04AN 1+00W	<0.2	1.26	<5	340	0.5	<5	0.18	<1	9	29	24	3.39	0.06	10	0.50	210	<2	0.01	17	450	18	<5	2	<10	6	0.13	62	<10	3	55	4
IRL04AN 1+25W	<0.2	2.14	<5	560	0.5	<5	0.40	<1	20	28	49	3.82	0.06	10	0.59	1230	<2	0.02	24	900	22	<5	2	<10	16	0.10	62	<10	10	82	4
IRL04AN 1+50W	<0.2	2.00	<5	760	1.0	<5	0.30	<1	14	26	55	3.65	0.05	10	0.56	1160	<2	0.01	21	690	22	<5	3	<10	11	0.11	65	<10	10	70	4
IRL04AN 1+75W	<0.2	1.67	<5	700	0.5	<5	0.33	<1	17	25	38	3.32	0.05	10	0.49	860	<2	0.01	19	630	22	<5	2	<10	13	0.09	62	<10	8	62	3
IRL04AN 2+00W	<0.2	1.81	<5	670	1.0	<5	0.37	<1	19	23	71	3.41	0.05	10	0.45	1565	<2	0.02	20	730	24	<5	2	<10	14	0.09	58	<10	13	53	3
IRL04AN 2+25W	<0.2	1.98	<5	670	1.0	<5	0.33	<1	16	26	67	3.74	0.05	10	0.55	1055	<2	0.02	24	600	24	<5	3	<10	12	0.12	68	<10	10	60	5
IRL04AN 2+50W	<0.2	1.88	<5	740	1.0	<5	0.44	<1	15	23	100	3.27	0.05	10	0.49	1520	<2	0.02	25	940	20	<5	2	<10	18	0.07	55	<10	19	53	3
IRL04AN 2+75W	<0.2	2.40	<5	550	1.0	<5	0.30	<1	14	26	100	3.48	0.05	20	0.57	1030	<2	0.02	28	810	22	<5	2	<10	12	0.08	61	<10	23	57	4
IRL04AN 3+00W	<0.2	1.73	<5	190	0.5	<5	0.16	<1	16	23	49	3.53	0.04	10	0.62	425	<2	0.01	20	410	14	<5	3	<10	3	0.16	71	<10	7	61	4
IRL04AN 3+25W	<0.2	1.48	<5	110	0.5	<5	0.14	<1	12	23	24	3.63	0.04	<10	0.63	615	<2	0.01	19	940	16	<5	2	<10	1	0.15	70	<10	1	75	4
IRL04AN 3+50W	<0.2	1.50	<5	60	0.5	<5	0.11	<1	11	20	19	3.78	0.04	<10	0.51	290	<2	0.01	17	530	16	<5	2	<10	<1	0.18	75	<10	1	67	7
IRL04AN 3+75W	<0.2	3.22	<5	70	1.0	<5	0.09	<1	15	18	41	3.49	0.05	<10	0.47	400	<2	0.02	17	930	18	<5	3	<10	<1	0.17	70	<10	4	68	25
IRL04AN 4+00W	<0.2	2.46	<5	70	0.5	<5	0.10	<1	16	23	46	5.38	0.04	<10	0.82	440	<2	0.01	27	800	22	<5	6	<10	<1	0.19	121	<10	1	85	11
IRL04AN 4+25W	<0.2	2.22	<5	70	0.5	<5	0.08	<1	14	20	50	4.40	0.04	<10	0.61	365	<2	0.01	23	750	20	<5	4	<10	<1	0.17	109	<10	2	70	11
IRL04AN 4+75W	0.2	3.58	<5	130	1.0	<5	0.10	<1	12	22	43	2.76	0.04	<10	0.17	810	<2	0.02	15	1980	14	<5	2	<10	4	0.17	44	<10	1	102	20
IRL04AN 5+00W	0.2	4.69	<5	90	1.0	<5	0.06	<1	15	11	96	3.35	0.05	<10	0.22	495	<2	0.02	15	1590	24	<5	2	<10	1	0.20	49	<10	2	80	40
IRL04AN 5+25W	<0.2	2.69	<5	80	1.0	<5	0.09	<1	19	22	172	4.64	0.08	<10	0.67	770	<2	0.01	25	850	74	<5	3	<10	<1	0.18	89	<10	2	103	9
IRL04AN 5+50W	<0.2	2.84	<5	100	1.0	<5	0.10	<1	28	16	172	4.82	0.20	10	0.79	2550	<2	0.01	26	1430	96	<5	3	<10	<1	0.14	126	<10	5	123	5
IRL04AN 5+75W	<0.2	2.87	<5	110	1.0	<5	0.13	<1	22	15	170	4.59	0.14	10	0.70	1615	<2	0.01	24	1110	38	<5	4	<10	1	0.17	117	<10	5	101	9
IRL04AN 6+00W	<0.2	2.61	<5	100	1.0	<5	0.12	<1	24	15	121	5.67	0.14	20	0.83	1630	<2	0.01	27	720	26	<5	5	<10	<1	0.24	164	<10	5	123	8
IRL04AN 6+25W	<0.2	2.93	5	70	1.0	<5	0.12	<1	17	17	95	4.95	0.11	10	0.73	805	<2	0.01	24	1330	18	<5	3	<10	<1	0.22	120	<10	3	101	9
IRL04AN 6+50W	<0.2	2.67	<5	80	0.5	<5	0.11	<1	13	16	51	4.34	0.08	<10	0.53	485	<2	0.01	17	590	16	<5	3	<10	<1	0.21	90	<10	2	87	13
IRL04AN 6+75W	<0.2	2.06	<5	70	0.5	<5	0.04	<1	8	15	18	3.92	0.05	<10	0.22	740	<2	0.02	9	1530	18	<5	2	<10	<1	0.22	92	<10	1	55	8

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada
8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Soil

Report No : 2V0321 SJ
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IRL04AN 7+00W	<0.2	3.09	<5	100	0.5	<5	0.05	<1	12	26	29	3.36	0.05	10	0.37	1310	<2	0.02	15	810	12	<5	3	<10	<1	0.18	71	<10	4	69	13
IRL04AN 7+25W	<0.2	4.69	<5	60	1.0	<5	0.04	<1	10	20	23	2.64	0.04	<10	0.20	515	<2	0.02	9	630	6	<5	3	<10	1	0.17	45	<10	4	52	49
IRL04AN 7+50W	<0.2	4.78	<5	70	0.5	<5	0.04	<1	7	50	23	3.65	0.05	<10	0.45	230	<2	0.01	16	680	16	<5	4	<10	<1	0.14	58	<10	2	73	41
IRL04AN 7+75W	<0.2	4.96	<5	60	0.5	<5	0.03	<1	6	40	16	5.56	0.06	<10	0.25	180	<2	0.01	9	660	22	<5	3	<10	<1	0.20	78	<10	2	61	49
IRL04AN 8+00W	<0.2	5.08	5	70	1.0	<5	0.04	<1	12	29	35	3.33	0.05	<10	0.39	580	<2	0.02	16	710	10	<5	4	<10	<1	0.14	57	<10	3	76	38
IRL06N 8+75W	<0.2	2.62	5	110	0.5	<5	0.08	<1	13	15	18	3.58	0.07	10	0.59	465	<2	0.01	21	680	14	<5	3	<10	2	0.10	63	<10	2	92	6
IRL06N 9+00W	<0.2	2.24	5	170	0.5	<5	0.12	<1	12	16	22	4.09	0.09	10	0.67	1020	<2	0.01	20	520	16	<5	3	<10	3	0.09	77	<10	2	84	4
IRL06N 9+25W	<0.2	2.38	5	190	0.5	<5	0.09	<1	16	20	45	5.13	0.08	10	0.92	2670	<2	0.01	26	800	18	5	6	<10	<1	0.10	109	<10	5	130	4
IRL06N 9+50W	<0.2	2.46	10	160	1.0	<5	0.07	<1	16	44	31	4.51	0.08	10	0.88	705	<2	0.01	36	720	20	<5	4	<10	<1	0.11	84	<10	3	103	5
IRL06N 9+75W	*<0.2*	*1.97*	5	*120*	*0.5*	<5	*0.11*	<1	*16*	*15*	46	4.79	*0.07*	*10*	*0.79*	*930*	<2	*0.01*	*21*	610	*12*	<5	5	*<10*	*<1*	*0.08*	*108*	<10	3	91	3
IRL06N 10+00W	<0.2	2.26	5	90	0.5	<5	0.07	<1	14	19	39	4.08	0.10	10	0.60	455	<2	0.01	23	1450	10	<5	3	<10	1	0.09	80	<10	2	91	5
IRL06N 10+25W	<0.2	2.03	5	100	0.5	<5	0.08	<1	16	15	50	4.50	0.09	10	0.64	560	<2	0.01	21	500	10	<5	3	<10	<1	0.09	90	<10	2	87	4
IRL06N 10+50W	<0.2	1.61	5	60	0.5	<5	0.05	<1	12	15	31	4.57	0.07	10	0.70	295	<2	0.01	19	380	14	<5	4	<10	<1	0.09	97	<10	2	66	3
IRL06N 10+75W	<0.2	1.51	<5	80	0.5	<5	0.06	<1	9	13	15	3.79	0.06	10	0.61	320	<2	0.01	15	290	10	<5	4	<10	<1	0.03	80	<10	1	59	3
IRL06N 11+00W	<0.2	2.74	5	110	0.5	<5	0.08	<1	11	14	19	3.53	0.07	10	0.39	845	<2	0.01	18	730	14	<5	3	<10	2	0.11	62	<10	2	100	14
IRL06N 11+25W	<0.2	2.33	5	130	0.5	<5	0.05	<1	12	13	18	3.65	0.06	10	0.48	695	<2	0.01	18	460	10	<5	3	<10	<1	0.09	68	<10	2	79	10
IRL06N 11+50W	<0.2	3.24	5	140	1.0	<5	0.06	<1	13	14	26	3.52	0.07	10	0.47	685	<2	0.01	22	600	14	<5	4	<10	<1	0.12	65	<10	4	89	19
IRL06N 11+75W	0.2	2.41	5	150	0.5	<5	0.08	<1	12	14	20	3.79	0.06	10	0.57	885	<2	0.01	20	650	16	<5	3	<10	1	0.07	69	<10	2	111	4
IRL06N 12+00W	<0.2	3.15	5	130	1.0	<5	0.06	<1	13	12	24	3.41	0.06	10	0.55	575	<2	0.01	22	820	14	<5	3	<10	1	0.09	61	<10	3	95	12
IRL06N 12+25W	<0.2	2.59	5	160	0.5	<5	0.14	<1	12	13	18	3.58	0.06	10	0.60	785	<2	0.01	20	590	12	<5	4	<10	6	0.06	70	<10	2	121	5
IRL06N 12+50W	<0.2	2.39	5	150	0.5	<5	0.06	<1	15	16	29	4.42	0.07	10	0.63	1315	<2	0.01	23	640	22	<5	4	<10	<1	0.08	81	<10	2	109	4
IRL06N 12+75W	0.2	2.16	5	160	0.5	<5	0.05	<1	15	15	34	4.62	0.07	10	0.89	1125	<2	0.01	24	610	16	<5	5	<10	<1	0.04	105	<10	1	95	3
IRL06N 13+00W	<0.2	2.55	<5	140	0.5	<5	0.14	<1	15	16	51	5.52	0.05	10	1.39	710	<2	0.01	28	450	18	<5	8	<10	7	0.05	135	<10	2	100	4
IRL06N 13+25W	<0.2	2.45	5	120	0.5	<5	0.10	<1	16	16	48	5.75	0.08	10	1.17	605	<2	0.01	26	570	18	<5	7	<10	3	0.10	137	<10	4	98	4
IRL06N 13+50W	<0.2	2.48	<5	100	0.5	<5	0.14	<1	16	17	52	5.57	0.07	10	1.46	675	<2	0.01	29	520	14	<5	6	<10	1	0.09	144	<10	2	95	4
IRL06N 13+75W	<0.2	3.77	<5	90	1.0	<5	0.33	<1	21	24	107	6.80	0.07	10	2.13	1015	<2	0.01	46	690	18	<5	13	<10	10	0.10	189	<10	14	100	5
IRL06N 14+00W	<0.2	2.82	<5	90	0.5	<5	0.26	<1	18	18	66	5.73	0.06	10	1.62	760	<2	0.01	33	440	18	<5	8	<10	8	0.09	152	<10	7	97	4
IRL06N 14+25W	<0.2	2.08	<5	120	0.5	<5	0.10	<1	14	11	27	4.32	0.07	10	0.74	835	<2	0.01	18	630	16	<5	4	<10	2	0.09	110	<10	2	101	4
IRL06N 14+50W	<0.2	2.38	5	100	0.5	<5	0.12	<1	15	12	38	4.54	0.07	10	0.90	1010	<2	0.01	19	660	16	<5	6	<10	3	0.09	120	<10	2	106	4
IRL06N 14+75W	<0.2	1.96	<5	80	0.5	<5	0.05	<1	10	11	17	3.86	0.06	10	0.43	380	<2	0.01	13	520	16	<5	3	<10	<1	0.11	79	<10	1	68	5

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada
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Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Soil

Report No : **2V0321 SJ**
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IRL06N 15+00W	<0.2	1.75	<5	140	0.5	<5	0.07	<1	12	15	21	3.39	0.07	10	0.53	2145	<2	0.01	17	480	14	<5	3	<10	<1	0.09	73	<10	2	70	3
IRL06N 15+25W	<0.2	2.33	<5	80	0.5	<5	0.04	<1	10	11	18	3.06	0.06	10	0.35	360	<2	0.01	15	470	14	<5	3	<10	<1	0.11	58	<10	2	65	9
IRL06N 15+50W	*<0.2*	*2.87*	*5*	*90*	*0.5*	*<5*	*0.04*	*<1*	*12*	*11*	*19*	*3.21*	*0.06*	*10*	*0.33*	*465*	*<2*	*0.01*	*16*	*570*	*16*	*<5*	*3*	*<10*	*<1*	*0.12*	*60*	*<10*	*3*	*71*	*13*
IRL06N 15+75W	<0.2	3.02	5	80	0.5	<5	0.04	<1	11	12	25	3.46	0.06	10	0.43	220	<2	0.01	17	490	14	<5	3	<10	<1	0.12	71	<10	3	78	14
IRL06N 16+00W	<0.2	2.06	5	70	0.5	<5	0.05	<1	7	15	15	3.88	0.06	10	0.44	175	<2	0.01	17	550	26	<5	3	<10	<1	0.08	69	<10	1	70	6
IRL06N 16+25W	<0.2	2.70	5	110	0.5	<5	0.05	<1	10	12	14	3.03	0.06	10	0.25	910	<2	0.01	13	500	32	<5	2	<10	<1	0.12	52	<10	2	117	10
IRL06N 16+50W	<0.2	3.01	5	90	1.0	<5	0.08	<1	10	13	16	3.77	0.07	10	0.31	280	<2	0.01	14	670	38	<5	2	<10	1	0.13	59	<10	2	115	18
IRL06N 16+75W	<0.2	1.78	5	80	0.5	<5	0.08	<1	13	17	29	3.58	0.07	10	0.40	755	<2	0.01	17	470	32	<5	2	<10	1	0.08	64	<10	2	89	4
IRL06N 17+00W	<0.2	1.29	5	100	0.5	<5	0.26	<1	8	12	22	4.61	0.09	10	0.38	195	<2	0.01	13	390	32	<5	2	<10	12	0.13	86	<10	2	67	6
IRL06N 17+25W	0.2	3.56	5	120	1.0	<5	0.05	<1	11	13	25	3.11	0.06	10	0.24	605	<2	0.02	15	810	44	<5	3	<10	1	0.12	46	<10	4	139	18
IRL06N 17+50W	0.2	2.13	<5	90	0.5	<5	0.06	<1	7	11	18	2.87	0.05	10	0.15	185	<2	0.02	8	420	34	<5	1	<10	2	0.13	50	<10	2	88	8
IRL06N 17+75W	0.2	1.96	10	70	1.0	<5	0.04	<1	9	12	26	3.36	0.05	10	0.21	190	<2	0.02	11	480	88	<5	2	<10	<1	0.10	45	<10	3	86	8
IRL06N 18+00W	0.2	1.65	<5	80	1.0	<5	0.04	<1	16	14	28	3.37	0.06	10	0.29	755	<2	0.02	19	520	56	<5	2	<10	3	0.09	41	<10	11	97	4
IRL06N 18+25W	0.2	1.84	5	80	1.0	<5	0.03	<1	42	11	50	3.04	0.05	20	0.29	1020	<2	0.01	16	500	60	<5	2	<10	2	0.07	45	<10	10	67	4
IRL06N 18+50W	<0.2	3.23	5	130	1.0	<5	0.03	<1	13	12	16	3.04	0.06	10	0.25	660	<2	0.01	16	870	18	<5	2	<10	<1	0.11	43	<10	2	101	18
IRL06N 18+75W	0.2	2.00	5	110	0.5	<5	0.03	<1	10	11	14	3.01	0.06	10	0.24	495	<2	0.01	14	420	20	<5	2	<10	<1	0.07	43	<10	2	90	6
IRL06N 19+00W	0.2	3.20	5	130	1.0	<5	0.04	<1	12	11	13	2.95	0.06	10	0.21	435	<2	0.01	16	750	14	<5	2	<10	<1	0.10	37	<10	2	112	19
IRL06N 19+25W	<0.2	1.00	<5	140	1.0	<5	0.11	<1	14	9	22	2.32	0.06	20	0.16	440	<2	0.01	14	460	22	<5	1	<10	19	0.05	29	<10	13	58	2
IRL06N 19+50W	0.4	2.26	5	90	1.0	<5	0.04	<1	10	12	20	3.13	0.06	10	0.21	440	<2	0.01	15	580	18	<5	1	<10	3	0.09	33	<10	4	85	6
IRL06N 19+75W	0.4	3.50	5	140	1.0	<5	0.03	<1	11	11	22	2.95	0.06	10	0.20	1085	<2	0.02	15	840	14	<5	2	<10	1	0.14	36	<10	3	84	29
IRL06N 20+00W	<0.2	1.39	5	140	0.5	<5	0.12	<1	7	11	10	3.84	0.08	10	0.19	695	<2	0.01	12	660	20	<5	1	<10	7	0.10	44	<10	1	74	4
IRL08AS 0+00	*<0.2*	*2.50*	*5*	*80*	*1.0*	*<5*	*0.05*	*<1*	*11*	*15*	*17*	*2.97*	*0.07*	*10*	*0.25*	*710*	*<2*	*0.02*	*15*	*1000*	*14*	*<5*	*2*	*<10*	*4*	*0.15*	*44*	*<10*	*6*	*56*	*14*
IRL08AS 0+25W	<0.2	2.31	25	80	2.5	<5	0.11	<1	19	50	25	3.89	0.11	40	0.35	415	<2	0.02	24	650	26	<5	4	<10	14	0.12	61	<10	39	48	5
IRL08AS 0+50W	0.2	3.77	5	100	1.0	<5	0.04	<1	8	13	14	2.44	0.06	10	0.15	615	<2	0.02	12	870	10	<5	2	<10	<1	0.14	37	<10	3	53	28
IRL08AS 0+75W	<0.2	3.29	<5	100	1.0	<5	0.04	<1	7	15	12	3.02	0.07	<10	0.18	355	<2	0.02	13	690	12	<5	2	<10	1	0.16	47	<10	2	42	32
IRL08AS 1+00W	<0.2	4.13	10	80	1.0	<5	0.03	<1	9	20	21	3.71	0.12	10	0.36	230	<2	0.01	20	920	12	<5	2	<10	<1	0.15	45	<10	5	59	29
IRL08AS 1+25W	<0.2	2.67	20	100	1.0	<5	0.05	<1	11	14	16	2.80	0.10	10	0.26	1020	<2	0.01	16	730	14	<5	2	<10	1	0.12	39	<10	4	65	11
IRL08AS 1+50W	0.2	2.10	5	110	0.5	<5	0.03	<1	7	14	7	3.25	0.08	10	0.20	455	<2	0.01	12	600	14	<5	1	<10	<1	0.13	48	<10	2	67	10
IRL08AS 1+75W	0.4	4.41	5	110	1.0	<5	0.03	<1	10	13	15	2.65	0.06	<10	0.16	385	<2	0.02	17	670	8	<5	2	<10	1	0.15	39	<10	4	51	48
IRL08AS 2+00W	0.2	2.14	10	90	0.5	<5	0.03	<1	7	12	9	2.78	0.06	10	0.17	540	<2	0.01	10	520	12	<5	1	<10	<1	0.10	41	<10	2	41	8

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3 at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada
8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Soil

Report No : 2V0321 SJ
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IRL08AS 2+25W	<0.2	3.17	5	120	1.0	<5	0.03	<1	11	12	12	2.48	0.06	10	0.15	630	<2	0.02	16	600	8	<5	2	<10	<1	0.10	32	<10	3	58	21
IRL08AS 2+50W	0.2	3.15	15	90	1.0	<5	0.03	<1	9	23	13	3.04	0.07	10	0.23	625	<2	0.01	16	650	14	<5	2	<10	<1	0.11	40	<10	2	71	17
IRL08AS 2+75W	<0.2	2.88	10	100	1.0	<5	0.03	<1	8	18	12	2.81	0.06	10	0.17	590	<2	0.02	13	730	10	<5	1	<10	<1	0.12	41	<10	2	58	13
IRL08AS 3+00W	<0.2	3.05	15	100	1.0	<5	0.02	<1	9	74	24	4.04	0.08	10	0.53	190	<2	0.01	38	530	16	5	3	<10	<1	0.13	62	<10	2	61	19
IRL08AS 3+25W	<0.2	2.95	10	160	1.0	<5	0.03	<1	20	146	41	4.62	0.16	20	1.34	850	<2	0.01	95	880	26	15	6	<10	<1	0.14	80	<10	7	91	8
IRL08AS 3+50W	<0.2	3.59	<5	260	1.5	<5	0.06	<1	24	206	38	4.94	0.24	10	2.57	995	<2	0.01	98	610	16	<5	7	<10	<1	0.31	101	<10	4	101	9
IRL08AS 3+75W	<0.2	2.59	5	220	1.0	<5	0.07	<1	19	114	31	3.85	0.23	20	1.61	1430	<2	0.01	64	950	18	<5	4	<10	4	0.19	68	<10	6	80	5
IRL08AS 4+00W	<0.2	2.28	5	100	0.5	<5	0.04	<1	12	53	26	3.48	0.15	20	0.72	860	<2	0.01	36	950	22	<5	2	<10	1	0.10	51	<10	5	84	4
IRL08AS 4+25W	<0.2	1.78	5	90	0.5	<5	0.03	<1	9	22	20	3.02	0.11	10	0.37	950	<2	0.01	18	840	18	<5	1	<10	1	0.09	41	<10	4	68	4
IRL08AS 4+50W	<0.2	1.83	10	70	0.5	<5	0.06	<1	6	25	16	3.55	0.08	10	0.34	215	<2	0.01	15	740	22	<5	1	<10	1	0.12	48	<10	3	52	6
IRL08AS 4+75W	<0.2	3.49	5	160	1.5	<5	0.27	<1	18	67	23	4.03	0.11	10	1.07	635	<2	0.02	39	1850	18	<5	3	<10	19	0.25	68	<10	4	99	19
IRL08AS 5+00W	<0.2	2.96	5	100	1.0	<5	0.04	<1	9	14	19	2.76	0.07	10	0.21	720	<2	0.02	13	1070	14	<5	2	<10	<1	0.12	39	<10	4	59	10
IRL08AS 5+25W	<0.2	2.88	10	90	1.0	<5	0.04	<1	6	14	14	3.08	0.08	10	0.20	210	<2	0.01	11	790	16	<5	2	<10	<1	0.11	39	<10	3	52	14
IRL08AS 5+50W	<0.2	3.58	10	100	1.0	<5	0.04	<1	7	14	10	3.18	0.07	10	0.19	260	<2	0.02	14	580	16	<5	2	<10	<1	0.15	43	<10	3	47	31
IRL08AS 5+75W	<0.2	3.02	5	100	1.0	<5	0.04	<1	10	14	11	3.02	0.08	10	0.20	360	<2	0.02	16	450	16	<5	2	<10	<1	0.13	40	<10	3	49	16
IRL08AS 6+00W	0.2	4.22	5	60	1.0	<5	0.03	<1	6	12	11	2.87	0.06	<10	0.13	205	<2	0.02	11	770	12	<5	2	<10	<1	0.15	39	<10	2	37	43
IRL08AS 0+25E	<0.2	2.69	5	110	0.5	<5	0.07	<1	11	13	18	2.60	0.09	10	0.28	1915	<2	0.01	17	1670	18	<5	1	<10	7	0.09	37	<10	5	95	6
IRL08AS 0+50E	<0.2	2.85	40	100	1.0	<5	0.04	<1	11	23	33	3.31	0.09	10	0.34	835	<2	0.01	27	950	18	105	2	<10	1	0.12	43	<10	6	125	13
IRL08AS 0+75E	<0.2	1.92	10	110	0.5	<5	0.03	<1	9	16	15	3.03	0.07	10	0.26	735	<2	0.01	15	540	14	10	2	<10	1	0.11	41	<10	4	59	7
IRL08AS 1+00E	<0.2	1.56	10	100	0.5	<5	0.06	<1	8	38	12	3.35	0.07	10	0.27	375	<2	0.01	29	670	16	5	2	<10	2	0.08	45	<10	3	51	4
IRL08AS 1+25E	<0.2	1.86	5	300	1.0	<5	0.24	<1	14	18	19	2.92	0.09	20	0.28	3235	<2	0.01	17	930	22	<5	2	<10	28	0.11	40	<10	7	92	4
IRL08AS 1+50E	<0.2	1.48	5	160	0.5	<5	0.06	<1	9	18	12	3.85	0.08	10	0.30	1205	<2	0.01	12	1570	22	<5	2	<10	<1	0.16	63	<10	2	116	6
IRL08AS 1+75E	<0.2	3.28	15	120	1.0	<5	0.04	<1	12	14	18	3.18	0.07	10	0.31	840	<2	0.02	14	990	14	<5	3	<10	<1	0.15	53	<10	4	61	25
IRL08AS 2+00E	<0.2	3.63	5	80	1.0	<5	0.04	<1	20	15	15	3.51	0.06	10	0.21	420	<2	0.01	16	1180	12	<5	4	<10	<1	0.11	40	<10	5	55	33
IRL08AS 2+25E	<0.2	1.13	5	70	0.5	<5	0.05	<1	11	13	7	2.98	0.06	10	0.19	560	<2	0.01	9	630	16	<5	2	<10	<1	0.07	37	<10	3	40	3
IRL08AS 2+50E	<0.2	1.99	10	100	1.0	<5	0.04	<1	19	41	13	4.31	0.06	10	0.36	405	<2	0.01	28	790	16	<5	3	<10	<1	0.09	66	<10	2	62	9
IRL08AS 2+75E	<0.2	2.04	65	110	0.5	<5	0.03	<1	16	44	9	4.18	0.05	10	0.38	490	<2	0.01	26	610	14	5	3	<10	<1	0.08	65	<10	2	53	6
IRL08AS 3+00E	<0.2	1.77	40	80	1.0	<5	0.04	<1	24	33	9	3.53	0.07	10	0.29	400	<2	0.01	29	760	16	<5	2	<10	<1	0.09	56	<10	3	47	6
IRL08AS 3+25E	<0.2	3.39	10	110	1.0	<5	0.05	<1	15	24	14	3.42	0.06	10	0.27	675	<2	0.01	22	970	16	<5	2	<10	<1	0.12	47	<10	2	66	21
IRL08AS 3+50E	<0.2	3.34	5	120	1.0	<5	0.03	<1	30	17	15	3.30	0.06	10	0.22	350	<2	0.02	17	750	16	<5	2	<10	<1	0.14	48	<10	4	64	30

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada
8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Soil

Report No : 2V0321 SJ
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IRL08AS 3+75E	<0.2	2.75	15	100	1.0	<5	0.04	<1	18	20	13	3.58	0.07	10	0.33	1155	<2	0.01	18	800	14	<5	2	<10	<1	0.12	51	<10	2	69	11
IRL08AS 4+00E	<0.2	2.88	5	90	0.5	<5	0.04	<1	11	20	12	3.13	0.06	10	0.30	495	<2	0.01	14	550	12	<5	2	<10	<1	0.11	48	<10	2	53	15
IRL08AS 4+25E	<0.2	3.31	5	140	1.0	<5	0.06	<1	14	19	16	3.09	0.07	10	0.36	655	<2	0.02	17	600	10	<5	3	<10	3	0.13	46	<10	5	64	17
IRL08AS 4+50E	<0.2	2.50	5	120	1.0	<5	0.13	<1	13	14	16	2.61	0.08	10	0.29	985	<2	0.01	15	840	16	<5	2	<10	8	0.11	36	<10	4	62	12
IRL08AS 4+75E	<0.2	2.85	<5	220	1.0	<5	0.05	<1	13	21	15	2.90	0.07	10	0.37	570	<2	0.02	25	500	12	<5	2	<10	5	0.14	44	<10	3	68	12
IRL08AS 5+00E	<0.2	2.27	<5	180	1.0	<5	0.10	<1	10	20	10	2.70	0.10	10	0.35	1540	<2	0.02	22	620	10	<5	2	<10	12	0.12	43	<10	3	84	6
IRL09AS 0+00	<0.2	1.43	5	140	0.5	<5	0.21	<1	11	19	14	2.73	0.11	10	0.23	540	<2	0.02	17	380	16	<5	1	<10	9	0.10	42	<10	3	88	3
IRL09AS 0+25E	<0.2	0.88	5	90	0.5	<5	0.13	<1	7	18	10	2.47	0.08	10	0.27	160	<2	0.01	11	390	12	<5	1	<10	5	0.08	42	<10	4	54	2
IRL09AS 0+50E	0.2	2.18	5	270	0.5	<5	0.22	<1	10	12	10	2.18	0.05	10	0.13	3225	<2	0.02	10	3190	12	<5	1	<10	26	0.09	30	<10	2	125	3
IRL09AS 0+75E	<0.2	1.17	5	190	0.5	<5	0.14	<1	9	10	11	2.00	0.07	10	0.11	1510	<2	0.01	7	2180	14	<5	1	<10	10	0.08	28	<10	1	75	2
IRL09AS 1+00E	<0.2	3.30	10	200	1.0	<5	0.13	<1	11	20	20	2.71	0.09	10	0.23	725	<2	0.02	17	1080	10	<5	2	<10	11	0.12	39	<10	5	88	10
IRL09AS 1+25E	<0.2	4.93	15	250	2.0	<5	0.28	<1	14	53	58	5.40	0.32	40	0.88	655	<2	0.03	57	620	30	<5	8	<10	19	0.18	75	<10	40	107	16
IRL09AS 1+50E	<0.2	2.51	5	160	1.0	<5	0.23	<1	11	30	26	3.41	0.16	20	0.53	430	<2	0.02	30	300	20	<5	3	<10	15	0.11	52	<10	13	73	5
IRL09AS 1+75E	<0.2	0.90	<5	90	0.5	<5	0.10	<1	6	21	10	1.84	0.07	10	0.45	230	<2	0.01	12	160	4	<5	2	<10	6	0.05	29	<10	4	39	2
IRL09AS 2+00E	<0.2	2.55	5	120	1.0	<5	0.20	<1	9	15	9	2.50	0.07	10	0.22	390	<2	0.02	11	2420	8	<5	2	<10	15	0.09	32	<10	3	108	7
IRL09AS 2+25E	<0.2	3.38	25	160	2.0	<5	0.12	<1	10	38	31	3.86	0.17	70	0.63	310	<2	0.02	36	360	26	<5	7	<10	12	0.10	55	<10	67	79	6
IRL09AS 2+50E	<0.2	3.14	15	220	1.5	<5	0.19	<1	14	37	37	4.07	0.24	50	0.68	1470	<2	0.02	32	700	22	<5	5	<10	17	0.11	54	<10	35	133	4
IRL09AS 2+75E	<0.2	2.30	15	330	1.0	<5	0.21	<1	9	36	29	2.73	0.26	20	0.54	445	<2	0.02	29	400	20	<5	3	<10	22	0.07	33	<10	9	105	3
IRL09AS 3+00E	<0.2	3.03	20	170	1.5	<5	0.19	<1	12	32	94	3.26	0.22	40	0.47	340	<2	0.02	30	450	32	<5	4	<10	15	0.11	47	<10	33	92	5
IRL09AS 3+25E	<0.2	3.37	5	220	1.0	<5	0.23	<1	12	13	13	2.49	0.08	10	0.18	775	<2	0.02	14	3290	10	<5	2	<10	28	0.12	32	<10	4	151	18
IRL09AS 3+50E	<0.2	3.27	5	170	1.0	<5	0.14	<1	11	12	11	2.32	0.07	<10	0.17	945	<2	0.02	13	2950	12	<5	2	<10	19	0.13	33	<10	3	93	17
IRL09AS 3+75E	0.2	3.76	5	190	1.0	<5	0.05	<1	13	12	12	2.46	0.05	10	0.15	625	<2	0.02	21	950	10	<5	2	<10	5	0.13	34	<10	4	115	29
IRL09AS 4+00E	<0.2	1.55	5	190	0.5	<5	0.08	<1	8	13	10	1.99	0.11	10	0.25	745	<2	0.01	17	1160	10	<5	1	<10	7	0.06	24	<10	4	105	2
IRL09AS 4+25E	<0.2	2.00	<5	330	0.5	<5	0.09	<1	10	14	11	2.04	0.10	10	0.19	2245	<2	0.02	18	830	12	<5	2	<10	10	0.08	27	<10	5	136	4
IRL09AS 4+50E	<0.2	3.14	<5	200	1.0	<5	0.07	<1	11	13	13	2.27	0.09	10	0.21	1070	<2	0.02	22	1560	12	<5	2	<10	7	0.12	31	<10	5	126	14
IRL09AS 4+75E	<0.2	1.53	5	180	0.5	<5	0.14	<1	10	15	10	2.18	0.11	10	0.25	1140	<2	0.01	16	890	16	<5	1	<10	13	0.08	29	<10	3	96	2
IRL09AS 5+00E	<0.2	2.32	5	230	1.0	<5	0.10	<1	13	17	17	2.51	0.13	10	0.27	940	<2	0.02	21	1420	16	<5	2	<10	9	0.10	33	<10	7	101	6
IRL09AS 5+25E	<0.2	2.24	5	200	1.0	<5	0.08	<1	11	18	19	2.61	0.12	10	0.31	770	<2	0.02	21	970	20	<5	2	<10	6	0.11	35	<10	5	110	9
IRL09AS 5+50E	<0.2	1.87	5	180	0.5	<5	0.14	<1	10	17	19	2.44	0.12	10	0.31	965	<2	0.01	16	1120	16	<5	2	<10	11	0.10	34	<10	5	85	6
IRL09AS 5+75E	<0.2	2.39	5	160	1.0	<5	0.10	<1	10	15	16	2.56	0.12	10	0.28	625	<2	0.02	17	1390	14	<5	2	<10	8	0.11	35	<10	4	105	13

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Soil

Report No : 2V0321 SJ
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IRL09AS 6+00E	<0.2	2.40	5	160	1.0	<5	0.08	<1	9	15	23	2.43	0.12	10	0.29	465	<2	0.01	18	810	16	<5	2	<10	5	0.11	32	<10	7	96	22
IRL09AS 6+25E	<0.2	2.54	5	290	1.0	<5	0.24	<1	11	18	46	2.84	0.17	20	0.30	2415	<2	0.01	25	1830	26	<5	2	<10	18	0.11	36	<10	10	143	4
IRL09AS 6+50E	<0.2	2.69	<5	220	1.0	<5	0.16	<1	14	36	41	3.37	0.18	10	0.56	1105	<2	0.01	42	940	18	<5	2	<10	11	0.16	46	<10	5	160	9
IRL09AS 6+75E	<0.2	2.75	<5	190	1.0	<5	0.08	<1	14	43	42	3.37	0.16	20	0.63	570	<2	0.01	39	930	20	<5	3	<10	5	0.15	46	<10	7	119	14
IRL09AS 0+25W	<0.2	2.10	5	150	0.5	<5	0.23	<1	10	17	10	2.27	0.07	10	0.26	595	<2	0.01	13	2140	10	<5	1	<10	16	0.07	33	<10	3	94	5
IRL09AS 0+50W	<0.2	1.88	5	130	0.5	<5	0.25	<1	8	14	14	2.24	0.09	10	0.21	400	<2	0.02	15	360	10	<5	1	<10	12	0.09	33	<10	4	76	5
IRL09AS 0+75W	<0.2	1.66	5	180	0.5	<5	0.19	<1	9	20	17	2.48	0.13	10	0.27	1330	<2	0.02	16	840	12	<5	1	<10	12	0.06	34	<10	5	119	2
IRL09AS 1+00W	<0.2	3.03	5	130	1.0	<5	0.10	<1	11	19	20	2.61	0.12	10	0.27	1190	<2	0.02	19	1160	12	<5	3	<10	6	0.11	37	<10	9	146	12
IRL09AS 1+50W	<0.2	2.52	25	140	1.5	<5	0.51	<1	14	32	83	3.65	0.21	40	0.45	895	<2	0.02	33	410	26	<5	5	<10	22	0.09	71	<10	36	64	5
IRL09AS 1+75W	<0.2	3.44	40	160	1.0	<5	0.44	<1	10	37	97	3.28	0.19	20	0.42	265	<2	0.02	65	370	34	<5	5	<10	23	0.11	67	<10	29	48	5
IRL09AS 2+00W	<0.2	3.72	20	170	2.0	<5	0.25	<1	14	39	129	4.48	0.29	30	0.57	535	<2	0.02	43	410	24	<5	10	<10	19	0.12	85	<10	40	64	9
IRL09AS 2+25W	<0.2	1.20	5	90	0.5	<5	0.11	<1	9	17	15	2.25	0.13	10	0.25	545	<2	0.02	13	170	12	<5	2	<10	5	0.06	35	<10	4	45	2
IRL09AS 2+50W	<0.2	2.30	15	310	1.0	<5	0.33	<1	14	21	36	2.79	0.14	10	0.27	1845	<2	0.02	30	500	12	<5	2	<10	27	0.09	48	<10	4	112	6
IRL09AS 2+75W	<0.2	1.85	5	170	0.5	<5	0.15	<1	13	14	13	2.87	0.15	10	0.28	675	<2	0.02	18	420	10	5	1	<10	10	0.09	48	<10	2	65	4
IRL09AS 3+00W	<0.2	2.12	<5	200	1.0	<5	0.17	<1	12	15	11	2.87	0.10	10	0.26	1230	<2	0.02	14	830	14	<5	2	<10	17	0.09	45	<10	3	86	5
IRL09AS 3+25W	<0.2	2.61	<5	130	1.0	<5	0.09	<1	13	15	19	3.05	0.11	10	0.31	815	<2	0.02	15	390	12	<5	3	<10	9	0.12	58	<10	9	71	12
IRL09AS 3+50W	<0.2	2.85	5	100	1.0	<5	0.07	<1	14	13	10	3.23	0.12	10	0.29	340	<2	0.02	13	590	10	<5	2	<10	5	0.11	51	<10	3	67	11
IRL09AS 3+75W	<0.2	3.35	5	130	1.0	<5	0.10	<1	12	10	9	3.11	0.11	<10	0.18	930	<2	0.02	11	1230	10	<5	2	<10	4	0.14	48	<10	2	87	12
IRL09AS 4+00W	<0.2	2.76	5	130	1.0	<5	0.09	<1	11	12	12	2.89	0.15	10	0.34	340	<2	0.02	12	560	8	<5	2	<10	4	0.12	52	<10	3	70	16
IRL09AS 4+25W	<0.2	3.40	5	200	1.0	<5	0.17	<1	15	10	14	4.16	0.45	10	0.40	985	<2	0.02	11	670	10	<5	4	<10	9	0.17	73	<10	5	80	15
IRL09AS 4+50W	<0.2	3.23	5	330	1.5	<5	0.18	<1	19	8	14	5.65	0.88	10	0.60	1400	<2	0.02	11	400	8	<5	4	<10	12	0.23	96	<10	5	91	6
IRL09AS 4+75W	<0.2	3.47	<5	320	1.5	<5	0.10	<1	19	8	12	5.72	0.94	10	0.60	705	<2	0.02	10	420	8	<5	4	<10	6	0.25	97	<10	6	92	15
IRL09AS 5+00W	<0.2	3.26	<5	300	1.5	<5	0.13	<1	17	8	13	5.43	0.87	<10	0.57	840	<2	0.02	11	360	10	<5	4	<10	9	0.23	95	<10	4	85	11
IRL09AS 5+25W	<0.2	2.80	5	220	1.0	<5	0.18	<1	19	9	14	4.97	0.70	10	0.51	1065	<2	0.02	11	370	10	<5	3	<10	11	0.20	84	<10	4	94	7
IRL09AS 5+50W	<0.2	3.86	5	120	1.0	<5	0.06	<1	15	18	29	3.30	0.15	10	0.37	395	<2	0.02	16	670	10	<5	4	<10	2	0.15	57	<10	5	75	25
IR800S 0+00	<0.2	1.87	5	170	0.5	<5	0.23	<1	11	17	13	2.41	0.30	10	0.36	425	<2	0.02	24	480	16	<5	2	<10	15	0.09	27	<10	6	120	11
IR800S 0+25E	<0.2	1.68	10	240	0.5	<5	0.41	<1	12	21	20	2.59	0.29	20	0.42	1180	<2	0.01	26	870	20	<5	2	<10	28	0.08	26	<10	10	134	6
IR800S 0+50E	<0.2	2.33	20	280	1.0	<5	0.95	<1	16	26	60	3.64	0.49	80	0.46	1060	<2	0.02	49	1360	46	<5	5	<10	57	0.09	36	<10	71	179	13
IR800S 0+75E	<0.2	2.89	15	530	1.0	<5	1.45	<1	20	13	41	2.49	0.19	40	0.31	2850	<2	0.02	39	5200	24	<5	3	<10	126	0.12	25	10	24	442	20
IR800S 1+00E	<0.2	2.82	10	390	2.0	<5	0.56	<1	15	15	21	2.63	0.17	20	0.42	1395	<2	0.02	26	3790	18	<5	3	<10	53	0.11	29	<10	14	101	12

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada

8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Soil

Report No : **2V0321 SJ**
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IR800S 1+25E	<0.2	2.61	10	450	1.0	<5	0.66	<1	16	20	25	3.10	0.22	30	0.51	2355	<2	0.02	29	1440	20	<5	4	<10	39	0.09	28	<10	20	145	9
IR800S 1+50E	<0.2	1.76	10	430	0.5	<5	1.01	<1	10	16	21	2.13	0.23	10	0.36	1925	<2	0.02	22	1490	30	<5	2	<10	58	0.08	24	<10	6	80	6
IR800S 1+75E	<0.2	1.99	5	490	1.0	<5	0.72	<1	11	35	17	2.65	0.16	20	0.58	1490	<2	0.02	37	3050	18	<5	4	<10	51	0.07	31	<10	12	173	6
IR800S 2+25E	<0.2	2.10	5	1150	1.0	<5	1.21	1	16	24	38	2.91	0.18	20	0.41	3490	<2	0.02	26	5600	48	<5	4	<10	112	0.09	29	10	15	614	15
IR800S 2+50E	<0.2	1.46	5	310	0.5	<5	0.52	<1	9	21	16	2.16	0.21	10	0.44	975	<2	0.02	20	560	28	<5	2	<10	24	0.06	31	<10	3	118	4
IR800S 2+75E	<0.2	2.10	5	330	0.5	<5	0.44	<1	11	13	29	2.02	0.20	10	0.31	840	<2	0.02	27	2410	12	<5	2	<10	34	0.08	24	<10	5	98	4
IR800S 3+00E	<0.2	2.18	10	210	0.5	<5	0.23	<1	16	27	52	2.92	0.22	10	0.54	880	<2	0.01	30	550	18	<5	3	<10	14	0.09	43	<10	7	78	6
IR800S 3+25E	<0.2	2.38	10	430	1.0	<5	0.40	<1	19	26	69	2.75	0.19	10	0.53	1785	<2	0.02	33	1340	16	<5	3	<10	30	0.11	36	<10	6	108	9
IR800S 3+50E	<0.2	2.29	10	200	1.0	<5	0.49	<1	19	29	50	2.98	0.28	10	0.51	930	<2	0.02	30	370	22	<5	4	<10	14	0.12	44	<10	9	103	17
IR800S 3+75E	<0.2	2.65	5	280	1.0	<5	0.22	<1	16	20	40	2.75	0.29	10	0.43	615	<2	0.02	23	580	18	<5	3	<10	20	0.12	39	<10	7	75	26
IR800S 4+00E	<0.2	3.74	10	300	1.0	<5	0.49	<1	24	28	88	2.65	0.16	10	0.42	1390	<2	0.02	32	3830	12	<5	3	<10	40	0.14	38	<10	7	104	20
IR800S 4+25E	<0.2	2.99	5	210	1.0	<5	0.29	<1	17	20	64	2.74	0.26	10	0.46	665	<2	0.02	24	850	10	<5	3	<10	27	0.11	41	<10	8	80	15
IR800S 4+50E	<0.2	2.62	15	220	0.5	<5	0.31	<1	16	22	51	2.59	0.23	10	0.49	1045	<2	0.02	23	1200	20	<5	2	<10	25	0.09	37	<10	5	86	7
IR800S 4+75E	<0.2	2.39	5	170	0.5	<5	0.20	<1	16	23	56	2.63	0.22	10	0.50	595	<2	0.02	29	760	12	<5	3	<10	11	0.10	38	<10	6	81	13
IR800S 5+00E	<0.2	2.20	10	250	0.5	<5	0.33	<1	15	25	48	2.55	0.20	10	0.48	1060	<2	0.02	24	1450	22	<5	3	<10	27	0.09	37	<10	6	104	5
IR800S 0+25W	<0.2	2.63	10	310	1.0	<5	0.61	<1	13	15	22	2.73	0.35	20	0.36	1070	<2	0.02	21	1530	20	<5	3	<10	46	0.11	28	<10	13	119	20
IR800S 0+50W	<0.2	3.10	15	280	1.0	<5	0.27	<1	15	30	26	3.16	0.27	30	0.52	1080	<2	0.02	29	740	26	<5	4	<10	23	0.14	41	<10	17	144	12
IR800S 0+75W	<0.2	2.39	15	240	1.0	<5	0.38	<1	15	24	24	3.17	0.36	30	0.51	1140	<2	0.01	23	1440	20	<5	3	<10	30	0.11	41	<10	15	119	9
IR800S 1+00W	<0.2	2.56	5	350	1.0	<5	0.34	<1	13	15	16	2.57	0.28	20	0.33	1215	<2	0.02	22	620	20	<5	3	<10	34	0.11	32	<10	8	137	16
IR800S 1+25W	<0.2	3.22	15	420	1.0	<5	0.67	<1	16	15	33	2.78	0.22	20	0.33	2385	<2	0.02	34	3200	20	<5	3	<10	54	0.13	28	<10	19	209	18
IR800S 1+75W	<0.2	2.23	10	550	0.5	<5	0.59	<1	12	17	26	2.47	0.24	20	0.37	1045	<2	0.02	33	5290	16	<5	3	<10	84	0.10	24	10	15	355	13
IR800S 2+00W	<0.2	2.02	15	170	0.5	<5	0.26	<1	14	18	21	2.66	0.23	10	0.38	395	<2	0.02	27	1680	18	<5	3	<10	33	0.09	34	<10	8	117	16
IRL10AS 0+00	<0.2	2.57	5	160	1.0	<5	0.14	<1	15	26	26	3.30	0.22	20	0.68	1050	<2	0.01	25	970	46	<5	2	<10	16	0.15	49	<10	8	101	7
IRL10AS 0+25E	<0.2	2.33	5	190	1.0	<5	0.08	<1	14	44	23	3.22	0.15	10	0.68	1035	<2	0.01	34	860	32	<5	3	<10	8	0.14	49	<10	5	103	8
IRL10AS 0+50E	<0.2	2.63	15	180	1.0	<5	0.16	<1	14	62	30	3.15	0.17	10	0.75	1060	<2	0.01	43	1290	34	<5	3	<10	12	0.15	49	<10	6	122	12
IRL10AS 0+75E	<0.2	2.80	25	290	1.5	<5	0.27	<1	26	35	33	3.68	0.17	40	0.51	3345	<2	0.01	30	2660	66	<5	3	<10	26	0.14	47	<10	22	186	6
IRL10AS 1+00E	<0.2	4.79	70	340	1.5	<5	0.44	<1	12	14	20	2.99	0.13	10	0.24	1780	<2	0.02	13	5030	54	<5	3	<10	41	0.19	38	<10	10	112	26
IRL10AS 1+25E	<0.2	1.66	20	190	0.5	<5	0.27	<1	11	17	22	2.51	0.16	10	0.32	1225	<2	0.01	18	790	34	<5	2	<10	23	0.08	32	<10	6	132	3
IRL10AS 1+50E	<0.2	1.48	15	190	1.0	<5	0.19	<1	15	24	22	2.87	0.19	20	0.37	1400	<2	0.01	21	600	56	<5	2	<10	13	0.07	35	<10	7	156	2
IRL10AS 1+75E	<0.2	1.91	30	160	1.0	<5	0.28	<1	16	33	36	3.64	0.18	20	0.46	975	<2	0.01	49	660	38	<5	6	<10	17	0.08	44	<10	14	134	7

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada

8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Soil

Report No : **2V0321 SJ**
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Sc	Sn	Sr	Ti	V	W	Y	Zn	Zr
	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	%	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
IRL10AS 2+00E	<0.2	2.27	15	190	1.0	<5	0.23	<1	16	57	28	4.30	0.32	20	0.70	770	<2	0.01	64	1950	28	5	8	<10	19	0.11	61	<10	9	211	7
IRL10AS 2+25E	<0.2	2.21	5	320	1.0	<5	0.24	<1	11	23	19	2.69	0.21	10	0.40	670	<2	0.02	30	1310	24	<5	3	<10	31	0.12	36	<10	5	281	11
IRL10AS 2+50E	<0.2	2.58	10	300	1.0	<5	0.17	<1	10	14	11	2.50	0.14	10	0.24	685	<2	0.03	18	3930	16	<5	2	<10	23	0.11	28	10	4	221	10
IRL10AS 2+75E	<0.2	2.19	5	170	1.0	<5	0.13	<1	10	14	21	2.35	0.16	20	0.27	560	<2	0.03	17	850	18	<5	2	<10	16	0.11	29	<10	8	123	14
IRL10AS 3+00E	<0.2	2.83	5	250	1.0	<5	0.18	<1	9	14	16	2.42	0.13	10	0.25	610	<2	0.03	18	1840	14	<5	2	<10	21	0.12	31	<10	5	161	22
IRL10AS 3+25E	<0.2	1.42	5	230	0.5	<5	0.22	<1	10	16	16	2.50	0.22	20	0.36	680	<2	0.03	18	1000	20	<5	2	<10	19	0.08	28	<10	6	187	3
IRL10AS 3+50E	<0.2	1.83	5	200	1.0	<5	0.14	<1	13	18	18	2.87	0.24	20	0.39	560	<2	0.03	24	380	24	<5	2	<10	10	0.11	32	<10	7	160	5
IRL10AS 3+75E	<0.2	2.47	10	170	1.0	<5	0.13	<1	14	24	35	3.31	0.27	60	0.40	790	<2	0.03	42	1150	30	<5	3	<10	12	0.12	35	<10	48	251	8
IRL10AS 4+00E	<0.2	2.20	5	500	1.0	<5	0.27	<1	12	19	16	2.94	0.28	20	0.33	1355	<2	0.03	26	3240	20	<5	3	<10	35	0.11	31	<10	10	238	8
IRL10AS 4+25E	*<0.2*	*2.46*	*5*	*410*	*1.0*	*<5*	*0.15*	*<1*	*11*	*16*	*17*	*2.91*	*0.25*	*20*	*0.35*	*690*	*<2*	*0.03*	*26*	*730*	*20*	*<5*	*2*	*<10*	*14*	*0.12*	*33*	*<10*	*7*	*177*	*8*
IRL10AS 4+50E	<0.2	2.43	10	180	1.0	<5	0.13	<1	10	15	18	2.65	0.16	10	0.29	610	<2	0.03	22	2260	18	<5	2	<10	13	0.12	33	<10	6	174	11
IRL10AS 4+75E	<0.2	2.36	5	690	1.0	<5	0.29	<1	17	66	18	3.49	0.25	10	1.06	3175	<2	0.03	53	1780	28	<5	3	<10	39	0.17	45	10	4	330	4
IRL10AS 5+00E	<0.2	2.21	10	190	1.0	<5	0.09	<1	10	18	18	2.55	0.17	10	0.38	445	<2	0.02	21	1140	18	<5	2	<10	9	0.11	33	<10	7	125	13
IRL10AS 5+25E	<0.2	2.36	10	170	1.0	<5	0.12	<1	11	15	17	2.66	0.18	20	0.33	630	<2	0.03	23	620	24	<5	2	<10	11	0.12	33	<10	11	166	17
IRL10AS 5+50E	<0.2	1.96	10	160	1.0	<5	0.18	<1	10	19	19	2.72	0.19	20	0.35	540	<2	0.02	26	620	16	<5	2	<10	16	0.11	34	<10	9	96	12
IRL10AS 5+75E	<0.2	2.03	10	280	1.0	<5	0.33	<1	12	33	19	2.82	0.21	20	0.45	890	<2	0.03	35	1600	16	<5	2	<10	33	0.12	36	<10	8	110	7
IRL10AS 6+00E	<0.2	2.59	10	190	1.0	<5	0.14	<1	10	16	20	2.61	0.19	10	0.33	385	<2	0.03	20	1210	14	<5	2	<10	13	0.13	35	<10	5	75	20
IRL10AS 6+25E	<0.2	2.11	10	270	1.0	<5	0.15	<1	11	16	22	2.74	0.19	10	0.33	850	<2	0.03	22	1170	16	<5	2	<10	15	0.11	34	<10	7	98	7
IRL10AS 6+50E	<0.2	2.06	5	610	1.0	<5	0.20	<1	11	17	20	2.67	0.20	20	0.32	2015	<2	0.03	21	1120	18	<5	2	<10	24	0.12	33	<10	7	142	6
IRL10AS 6+75E	<0.2	2.48	10	130	2.0	<5	0.13	<1	26	21	34	2.94	0.20	30	0.39	1500	<2	0.03	27	1180	18	<5	3	<10	12	0.14	42	<10	24	102	7
IRL10AS 7+00E	<0.2	3.37	10	400	1.5	<5	0.23	<1	14	20	21	3.14	0.20	20	0.37	1895	<2	0.03	30	2800	18	<5	3	<10	30	0.15	39	<10	16	151	11
IRL10AS 0+25W	<0.2	2.26	5	240	1.0	<5	0.24	<1	19	22	32	3.00	0.11	10	0.38	2300	<2	0.03	24	890	26	<5	2	<10	18	0.11	43	<10	5	110	5
IRL10AS 0+50W	<0.2	1.86	5	240	0.5	<5	0.29	<1	16	19	49	2.74	0.10	10	0.37	2620	<2	0.02	21	860	24	<5	2	<10	17	0.09	39	<10	4	122	3
IRL10AS 0+75W	<0.2	2.24	5	160	0.5	<5	0.06	<1	9	15	22	2.70	0.11	10	0.31	540	<2	0.02	17	840	16	<5	2	<10	2	0.12	38	<10	4	77	11
IRL10AS 1+00W	<0.2	3.33	10	190	1.0	<5	0.12	<1	11	21	20	2.73	0.11	10	0.37	675	<2	0.03	22	780	18	<5	3	<10	5	0.12	38	<10	10	90	23
IRL10AS 1+25W	<0.2	3.27	10	200	2.0	<5	0.16	<1	14	26	15	3.37	0.10	10	0.44	1220	<2	0.03	29	530	18	<5	3	<10	5	0.14	50	<10	12	71	20
IRL10AS 1+50W	<0.2	2.97	15	130	1.5	<5	0.07	<1	16	28	14	3.36	0.09	20	0.50	595	<2	0.03	22	830	14	<5	3	<10	<1	0.11	49	<10	8	65	9
IRL10AS 1+75W	<0.2	2.37	5	120	1.0	<5	0.08	<1	14	30	15	3.43	0.08	10	0.60	585	<2	0.03	21	640	16	<5	3	<10	1	0.12	55	<10	6	67	5
IRL10AS 2+00W	<0.2	2.16	15	230	1.0	<5	0.10	<1	13	22	8	4.47	0.10	10	0.46	850	<2	0.03	26	790	16	<5	3	<10	1	0.14	55	<10	5	78	5
IRL10AS 2+25W	<0.2	1.77	10	110	1.0	<5	0.11	<1	19	20	12	3.10	0.09	10	0.40	700	<2	0.03	19	750	24	<5	3	<10	2	0.12	46	<10	5	66	4

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada
8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Soil

Report No : **2V0321 SJ**
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IRL10AS 2+50W	<0.2	2.23	15	180	1.0	<5	0.09	<1	19	22	15	3.21	0.09	10	0.45	925	<2	0.03	23	650	12	<5	3	<10	5	0.13	49	<10	4	69	6
IRL10AS 2+75W	<0.2	3.08	15	220	1.0	<5	0.08	<1	19	16	19	3.08	0.08	10	0.30	825	<2	0.03	19	790	16	<5	3	<10	6	0.15	43	<10	6	72	13
IRL10AS 3+00W	<0.2	2.56	10	140	1.0	<5	0.08	<1	14	16	18	2.69	0.09	10	0.31	1345	<2	0.03	19	1470	16	<5	2	<10	8	0.10	40	<10	8	70	5
IRL10AS 3+25W	<0.2	2.59	20	150	1.0	<5	0.10	<1	16	20	22	3.18	0.12	10	0.39	1275	<2	0.03	22	890	18	<5	2	<10	4	0.13	47	<10	4	95	7
IRL10AS 3+50W	<0.2	2.18	45	170	1.0	<5	0.08	<1	16	15	20	2.99	0.09	10	0.32	1560	<2	0.03	20	730	44	5	2	<10	6	0.10	35	<10	6	95	6
IRL10AS 3+75W	<0.2	1.26	10	140	0.5	<5	0.12	<1	8	15	6	2.64	0.08	10	0.31	625	<2	0.03	14	440	16	<5	2	<10	5	0.07	37	<10	3	96	2
IRL10AS 4+00W	0.2	1.62	10	130	0.5	<5	0.09	<1	12	17	60	2.54	0.08	10	0.23	1585	<2	0.03	34	600	20	<5	2	<10	4	0.09	41	<10	3	105	2
IRL10AS 4+25W	<0.2	2.00	20	220	1.0	<5	0.12	<1	17	22	43	3.09	0.09	10	0.29	1575	<2	0.04	35	1400	18	<5	2	<10	5	0.10	53	<10	3	113	4
IRL10AS 4+50W	<0.2	2.49	15	180	1.0	<5	0.14	<1	17	23	71	4.03	0.20	10	0.57	390	<2	0.04	45	500	16	<5	3	<10	3	0.14	78	<10	3	75	7
IRL10AS 4+75W	<0.2	2.69	35	260	1.0	<5	0.18	<1	20	16	32	4.90	0.37	50	0.57	1880	<2	0.03	19	860	26	<5	6	<10	9	0.17	106	<10	35	86	6
IRL10AS 5+00W	<0.2	2.54	70	320	1.0	<5	0.37	<1	24	13	22	5.36	0.60	10	0.65	2665	<2	0.04	14	1220	20	<5	5	<10	14	0.18	121	<10	7	133	5
IR1450S 0+00	<0.2	3.93	65	270	1.0	<5	0.29	<1	30	65	58	4.38	0.20	10	1.31	850	<2	0.04	50	710	12	<5	4	<10	11	0.20	85	<10	3	117	14
IR1450S 0+25E	<0.2	3.58	80	180	1.0	<5	0.50	<1	23	25	32	2.89	0.11	10	0.38	555	<2	0.04	31	440	16	<5	3	<10	18	0.14	45	<10	5	65	36
IR1450S 0+50E	*<0.2*	*3.38*	25	*220*	*1.0*	<5	*0.26*	<1	22	21	42	*3.08*	*0.19*	*10*	*0.48*	*1250*	<2	*0.03*	33	*1960*	*20*	<5	3	*<10*	*15*	0.14	45	*<10*	9	*127*	*23*
IR1450S 0+75E	<0.2	3.28	25	440	1.0	<5	0.50	<1	24	21	37	3.03	0.17	10	0.50	1665	<2	0.03	28	3410	20	<5	3	<10	37	0.14	43	<10	6	123	17
IR1450S 1+00E	<0.2	4.12	35	140	1.0	<5	0.69	<1	19	19	21	2.94	0.09	10	0.29	175	<2	0.04	23	410	14	<5	3	<10	23	0.15	40	<10	7	58	46
IR1450S 1+25E	<0.2	3.00	20	180	1.0	<5	0.25	<1	17	18	17	2.73	0.15	10	0.37	580	<2	0.03	27	1270	26	<5	2	<10	13	0.13	41	<10	3	138	18
IR1450S 1+50E	<0.2	2.77	30	180	1.0	<5	0.25	<1	19	25	25	3.03	0.15	10	0.49	265	<2	0.03	36	250	34	<5	2	<10	11	0.11	47	<10	3	146	14
IR1450S 1+75E	<0.2	3.57	35	210	1.0	<5	0.28	<1	21	23	18	2.92	0.15	10	0.39	800	<2	0.04	26	960	122	<5	3	<10	13	0.15	44	10	4	636	32
IR1450S 2+00E	<0.2	2.62	35	290	1.0	<5	0.30	<1	17	22	19	2.85	0.14	10	0.40	1110	<2	0.03	26	1650	66	<5	2	<10	13	0.13	41	10	3	585	7
IR1450S 2+25E	<0.2	3.02	35	260	1.0	<5	0.24	<1	17	26	37	3.17	0.13	10	0.45	805	<2	0.03	35	450	68	<5	3	<10	12	0.12	51	10	4	457	8
IR1450S 2+50E	<0.2	2.53	20	300	1.0	<5	0.31	<1	18	21	22	2.73	0.14	10	0.40	1665	<2	0.03	27	280	42	<5	2	<10	20	0.13	43	10	4	368	16
IR1450S 2+75E	<0.2	2.69	30	240	1.0	<5	0.19	<1	25	28	26	2.91	0.16	10	0.50	1135	<2	0.03	30	290	60	<5	2	<10	11	0.12	48	<10	3	338	10
IR1450S 3+00E	<0.2	4.22	50	320	1.0	<5	0.29	<1	39	33	46	2.87	0.11	10	0.42	670	<2	0.04	49	330	140	<5	3	<10	22	0.16	41	10	5	533	46
IR1450S 3+25E	<0.2	3.63	75	270	1.0	<5	0.55	<1	20	27	75	3.37	0.17	20	0.42	1680	<2	0.04	46	1120	34	<5	4	<10	20	0.14	49	<10	14	206	16
IR1450S 3+50E	<0.2	3.31	135	110	1.5	<5	1.02	<1	19	60	293	3.52	0.14	30	0.50	585	<2	0.04	56	520	26	<5	6	<10	24	0.10	61	<10	56	73	10
IR1450S 3+75E	<0.2	2.57	15	250	1.0	<5	0.49	<1	16	20	18	3.14	0.15	10	0.52	1200	<2	0.03	23	1340	22	<5	3	<10	21	0.10	48	<10	3	118	10
IR1450S 4+00E	<0.2	2.59	15	340	1.0	<5	0.27	<1	14	17	25	2.85	0.14	10	0.44	1140	<2	0.03	26	1670	28	<5	2	<10	22	0.11	40	<10	4	207	10
IR1450S 4+25E	<0.2	3.34	15	220	1.0	<5	0.15	<1	14	15	27	2.79	0.13	10	0.38	515	<2	0.03	22	1290	22	<5	3	<10	12	0.14	42	<10	8	168	38
IR1450S 4+50E	<0.2	2.62	25	170	1.0	<5	0.17	<1	14	18	23	2.63	0.14	10	0.32	600	<2	0.03	22	1030	26	<5	2	<10	12	0.13	38	<10	4	180	14

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada

8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Soil

Report No : **2V0321 SJ**
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IR1450S 4+75E	<0.2	2.40	15	220	1.0	<5	0.31	<1	17	26	55	3.29	0.21	20	0.51	1400	<2	0.03	28	1060	34	<5	4	<10	20	0.10	48	<10	19	125	7
IR1450S 5+00E	<0.2	3.06	15	280	1.0	<5	0.54	<1	18	27	46	3.51	0.22	10	0.51	1085	<2	0.03	29	3290	30	<5	4	<10	28	0.12	47	<10	11	155	13
IR1450S 5+25E	<0.2	3.01	20	160	1.0	<5	0.28	<1	15	25	40	3.38	0.22	20	0.52	775	<2	0.03	24	990	30	<5	4	<10	13	0.12	53	<10	25	99	10
IR1450S 5+50E	<0.2	2.75	20	170	1.0	<5	0.31	<1	16	28	29	3.29	0.23	20	0.52	740	<2	0.03	25	460	28	<5	4	<10	14	0.12	53	<10	20	77	19
IR1450S 5+75E	<0.2	3.01	15	260	1.0	<5	0.31	<1	14	23	23	3.18	0.18	10	0.40	1630	<2	0.04	25	1050	20	<5	3	<10	12	0.15	48	<10	13	103	17
IR1450S 6+00E	<0.2	1.24	10	180	0.5	<5	0.29	<1	11	23	17	2.61	0.23	10	0.38	1215	<2	0.03	20	910	30	<5	2	<10	17	0.07	33	<10	6	85	3
IR1450S 6+25E	<0.2	1.80	20	190	0.5	<5	0.25	<1	13	24	20	2.77	0.18	10	0.42	885	<2	0.03	23	1790	36	<5	2	<10	20	0.08	36	<10	6	123	4
IR1450S 6+50E	<0.2	1.85	15	210	0.5	<5	0.34	<1	13	22	25	2.78	0.18	10	0.43	1605	<2	0.03	22	930	34	<5	2	<10	19	0.09	37	<10	6	103	3
IR1450S 6+75E	<0.2	1.78	15	190	0.5	<5	0.34	<1	12	23	20	2.68	0.15	10	0.43	1190	<2	0.03	22	550	32	<5	2	<10	20	0.08	35	<10	6	98	5
IR1450S 7+00E	<0.2	1.82	20	200	1.0	<5	0.30	<1	14	22	25	2.80	0.15	30	0.38	1190	<2	0.03	24	890	38	<5	3	<10	17	0.08	33	<10	21	223	5
IR1450S 0+25W	<0.2	3.41	250	210	1.0	<5	0.28	<1	32	62	86	3.74	0.17	10	0.64	1090	<2	0.03	37	390	20	<5	5	<10	11	0.11	77	<10	10	48	27
IR1450S 0+50W	<0.2	2.06	10	360	0.5	<5	0.20	<1	18	17	16	2.60	0.10	10	0.32	2250	<2	0.03	18	1380	16	<5	1	<10	12	0.13	37	<10	2	88	4
IR1450S 0+75W	<0.2	2.00	15	400	0.5	<5	0.19	<1	19	23	13	2.73	0.17	10	0.44	1860	<2	0.03	17	3480	16	<5	2	<10	14	0.12	36	<10	2	181	4
IR1450S 1+00W	*<0.2*	*3.14*	*20*	*360*	*1.0*	*<5*	*0.18*	*<1*	*20*	*28*	*35*	*3.22*	*0.24*	*<10*	*0.54*	*1160*	*<2*	*0.04*	*20*	*4180*	*12*	*<5*	*3*	*<10*	*14*	*0.16*	*51*	*<10*	*2*	*164*	*23*
IR1450S 1+25W	<0.2	1.97	5	420	0.5	<5	0.24	<1	14	20	23	2.74	0.16	10	0.45	1880	<2	0.03	23	1890	16	<5	3	<10	16	0.09	37	<10	5	125	4
IR1450S 1+50W	<0.2	1.85	15	300	0.5	<5	0.37	<1	14	19	20	2.58	0.16	10	0.42	1440	<2	0.03	20	1220	18	<5	2	<10	32	0.10	38	<10	6	92	5
IR1450S 1+75W	0.2	1.87	90	270	1.0	<5	0.26	<1	19	20	28	2.95	0.16	20	0.46	1505	<2	0.03	24	970	58	<5	2	<10	20	0.10	40	10	7	286	4
IR1450S 2+00W	<0.2	2.03	35	170	1.0	<5	0.20	<1	23	17	38	2.88	0.16	20	0.42	1515	<2	0.03	26	1520	24	<5	2	<10	17	0.10	41	<10	17	112	4
IR1450S 2+25W	<0.2	2.42	15	280	1.0	<5	0.32	<1	19	17	31	2.92	0.17	20	0.44	1580	<2	0.03	25	1360	26	<5	2	<10	26	0.10	41	<10	9	100	4
IR1450S 2+50W	<0.2	2.72	10	290	1.0	<5	0.26	<1	17	18	30	3.08	0.18	20	0.44	1530	<2	0.03	27	980	20	<5	2	<10	25	0.13	41	<10	11	84	6
IR1450S 2+75W	<0.2	2.62	10	200	1.0	<5	0.18	<1	18	17	27	2.83	0.16	20	0.37	1410	2	0.03	24	1970	16	<5	2	<10	14	0.14	40	<10	9	92	13
IR1450S 3+00W	<0.2	1.90	20	200	1.0	<5	0.21	<1	16	16	24	2.74	0.16	20	0.38	1430	<2	0.03	19	1970	22	<5	1	<10	15	0.09	36	<10	6	93	3
IR1450S 3+25W	<0.2	1.63	30	690	1.0	<5	0.58	<1	21	19	29	2.94	0.17	30	0.36	3855	<2	0.03	19	2080	60	5	2	<10	47	0.10	33	<10	10	199	3
IR1450S 3+50W	<0.2	1.88	5	310	1.0	<5	0.18	<1	14	25	22	2.73	0.15	10	0.49	1770	<2	0.03	22	1770	18	<5	2	<10	14	0.11	38	<10	4	107	3
IR1450S 3+75W	<0.2	2.03	10	230	1.0	<5	0.19	<1	13	21	18	2.66	0.13	10	0.41	1110	<2	0.03	21	830	18	<5	2	<10	13	0.11	38	<10	4	80	5
IR1450S 4+00W	<0.2	2.13	20	330	1.0	<5	0.22	<1	16	56	18	3.08	0.16	10	0.83	1665	<2	0.03	42	680	20	<5	3	<10	17	0.13	51	<10	4	102	3
IR1450S 4+25W	<0.2	1.91	5	200	0.5	<5	0.24	<1	12	15	11	2.53	0.13	10	0.30	860	<2	0.03	16	2050	14	<5	2	<10	20	0.11	34	<10	3	81	4
IR1450S 4+50W	<0.2	2.74	20	170	1.0	<5	0.18	<1	17	15	13	2.67	0.15	10	0.31	655	<2	0.03	20	1060	14	<5	2	<10	8	0.12	40	<10	4	94	11
IR1450S 4+75W	<0.2	2.72	130	190	1.0	<5	0.53	<1	19	33	45	3.66	0.25	20	0.56	640	<2	0.03	27	290	22	<5	5	<10	17	0.12	76	<10	18	65	7
IR1450S 5+00W	<0.2	2.58	5	230	1.0	<5	0.17	<1	16	18	26	2.89	0.15	10	0.34	955	<2	0.03	31	1130	14	<5	3	<10	10	0.12	46	<10	5	129	8

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada
8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Soil

Report No : **2V0321 SJ**
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IR1350S 0+00	<0.2	2.71	5	350	1.0	<5	0.14	<1	11	21	18	2.89	0.24	10	0.40	540	<2	0.03	22	1440	18	<5	3	<10	14	0.12	39	<10	6	148	16
IR1350S 0+25W	<0.2	2.68	<5	580	1.0	<5	0.16	<1	11	21	13	3.03	0.27	10	0.40	1380	<2	0.03	23	2530	20	<5	3	<10	28	0.11	36	<10	6	181	6
IR1350S 0+50W	<0.2	1.96	<5	410	0.5	<5	0.12	<1	10	18	13	2.71	0.28	10	0.40	895	<2	0.03	20	1070	18	<5	2	<10	12	0.10	34	<10	5	191	7
IR1350S 0+75W	<0.2	2.19	<5	340	1.0	<5	0.14	<1	9	18	10	2.69	0.28	10	0.36	825	<2	0.03	21	1230	18	<5	2	<10	7	0.10	31	<10	4	199	4
IR1350S 1+00W	<0.2	2.24	<5	250	1.0	<5	0.18	<1	9	18	12	2.82	0.31	10	0.38	500	<2	0.03	22	850	16	<5	2	<10	8	0.10	32	<10	4	147	3
IR1350S 1+25W	<0.2	1.92	<5	270	0.5	<5	0.17	<1	8	18	10	2.52	0.26	10	0.36	625	<2	0.03	20	960	16	<5	2	<10	10	0.09	29	<10	3	192	4
IR1350S 1+50W	<0.2	1.26	<5	390	0.5	<5	0.17	<1	7	15	7	1.99	0.19	10	0.30	1325	<2	0.03	15	830	14	<5	2	<10	18	0.06	25	<10	3	144	2
IR1350S 1+75W	<0.2	1.47	<5	200	0.5	<5	0.13	<1	7	17	10	2.27	0.24	20	0.35	400	<2	0.03	20	820	14	<5	2	<10	11	0.07	27	<10	4	119	3
IR1350S 2+00W	<0.2	2.30	10	410	1.0	<5	0.19	<1	11	19	22	2.67	0.26	20	0.33	1075	<2	0.04	26	1560	18	<5	3	<10	19	0.09	30	10	10	308	10
IR1350S 2+25W	<0.2	2.45	15	390	1.0	<5	0.15	<1	10	17	13	2.54	0.20	10	0.28	1350	<2	0.03	24	3620	18	<5	2	<10	17	0.10	30	<10	4	295	8
IR1350S 2+50W	<0.2	2.15	15	240	1.0	<5	0.15	<1	10	15	15	2.34	0.18	10	0.30	1090	<2	0.03	20	960	20	<5	2	<10	13	0.10	31	<10	8	122	10
IR1350S 2+75W	<0.2	2.13	10	330	1.0	<5	0.20	<1	10	18	13	2.41	0.17	20	0.33	905	<2	0.03	23	800	20	<5	2	<10	18	0.09	31	<10	7	116	7
IR1350S 3+00W	<0.2	2.33	15	260	1.0	<5	0.12	<1	11	18	13	2.53	0.16	10	0.34	1025	<2	0.03	25	620	26	<5	2	<10	10	0.10	34	<10	6	160	9
IR1350S 3+25W	0.2	2.15	50	240	1.0	<5	0.17	<1	12	21	12	2.62	0.17	10	0.36	875	<2	0.03	28	420	36	<5	2	<10	16	0.10	37	10	5	276	6
IR1350S 3+50W	0.6	2.38	635	200	1.0	<5	0.22	<1	13	24	20	3.33	0.22	10	0.46	920	<2	0.03	27	720	288	15	3	<10	20	0.10	40	10	6	710	7
IR1350S 3+75W	<0.2	2.75	160	130	2.0	<5	0.20	<1	31	30	55	3.72	0.24	60	0.53	1605	<2	0.03	78	710	94	5	7	<10	16	0.11	46	<10	56	295	5
IR1350S 4+00W	<0.2	2.44	85	120	1.0	<5	0.12	<1	18	30	36	3.42	0.22	20	0.54	520	<2	0.03	38	480	64	5	3	<10	7	0.11	47	<10	11	164	5
IR1350S 0+25E	<0.2	2.48	20	700	1.0	<5	0.22	<1	10	20	16	2.85	0.27	20	0.40	1145	<2	0.03	23	1430	20	<5	3	<10	31	0.10	34	<10	8	192	12
IR1350S 0+50E	<0.2	3.74	15	330	1.0	<5	0.20	<1	15	23	26	3.47	0.33	20	0.45	320	<2	0.04	29	1020	18	<5	4	<10	13	0.15	46	<10	11	133	45
IR1350S 0+75E	<0.2	2.30	10	490	1.0	<5	0.73	<1	19	20	34	3.16	0.25	20	0.42	1960	<2	0.03	24	3960	20	<5	3	<10	53	0.10	33	<10	9	276	5
IR1350S 1+00E	<0.2	2.20	10	320	1.0	<5	0.39	<1	15	17	21	3.05	0.18	10	0.37	2220	<2	0.03	24	2760	28	<5	2	<10	30	0.12	38	<10	6	146	5
IR1350S 1+25E	<0.2	3.40	25	270	1.0	<5	0.34	<1	18	33	37	4.68	0.61	30	0.60	1500	<2	0.03	35	1030	40	<5	5	<10	19	0.13	64	<10	23	152	5
IR1350S 1+50E	<0.2	1.77	5	230	0.5	<5	0.23	<1	9	17	10	2.64	0.26	10	0.39	825	<2	0.03	18	490	16	<5	2	<10	15	0.09	37	<10	4	98	2
IR1350S 1+75E	<0.2	1.51	10	260	0.5	<5	0.17	<1	9	16	9	2.43	0.22	10	0.36	860	<2	0.03	18	720	18	<5	2	<10	9	0.08	31	<10	4	122	2
IR1350S 2+00E	<0.2	1.26	5	250	0.5	<5	0.12	<1	7	14	10	2.06	0.23	10	0.29	790	<2	0.03	13	380	12	<5	2	<10	9	0.08	28	<10	4	101	3
IR1350S 2+25E	<0.2	2.25	10	330	1.0	<5	0.15	<1	10	16	14	2.61	0.25	20	0.36	760	<2	0.03	23	1850	16	<5	2	<10	14	0.10	33	<10	8	137	6
IR1350S 2+50E	<0.2	2.24	5	330	1.0	<5	0.34	<1	10	15	14	2.45	0.25	10	0.32	1690	<2	0.03	20	2470	18	<5	2	<10	31	0.11	31	<10	6	169	6
IR1350S 2+75E	<0.2	2.60	10	390	1.0	<5	0.30	<1	10	17	22	2.72	0.28	20	0.36	1025	<2	0.03	25	2000	16	<5	3	<10	25	0.11	35	<10	11	121	12
IR1350S 3+00E	<0.2	1.92	5	390	0.5	<5	0.21	<1	8	15	9	2.37	0.25	10	0.32	1110	<2	0.03	23	1260	14	<5	2	<10	15	0.09	28	<10	5	134	3
IR1350S 3+25E	<0.2	1.38	5	170	0.5	<5	0.11	<1	7	14	10	2.21	0.23	20	0.34	205	<2	0.03	15	650	12	<5	2	<10	6	0.08	30	<10	4	98	2

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada

8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Soil

Report No : **2V0321 SJ**
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
IR1350S 3+50E	<0.2	0.77	10	60	0.5	<5	0.09	<1	6	12	12	1.97	0.17	20	0.32	145	<2	0.02	11	290	10	<5	2	<10	2	0.08	29	<10	5	41	2
IR1350S 3+75E	<0.2	0.96	5	240	0.5	<5	0.18	<1	7	12	7	1.90	0.21	20	0.29	910	<2	0.03	12	410	14	<5	2	<10	12	0.07	27	<10	4	87	1
IR1350S 4+00E	<0.2	1.46	15	130	0.5	<5	0.18	<1	11	20	23	2.74	0.20	20	0.45	435	<2	0.03	19	240	14	<5	3	<10	6	0.11	49	<10	5	68	4
IR1350S 4+25E	<0.2	1.69	10	120	0.5	<5	0.22	<1	11	18	19	2.67	0.22	20	0.45	260	<2	0.03	19	190	14	<5	2	<10	9	0.10	46	<10	4	88	4
IR1350S 4+50E	<0.2	2.28	5	310	1.0	<5	0.26	<1	11	18	16	2.94	0.29	10	0.43	470	<2	0.03	24	1480	14	<5	3	<10	15	0.09	38	<10	5	147	7
IR1350S 4+75E	<0.2	3.25	10	210	1.0	<5	0.78	<1	12	28	73	3.63	0.41	80	0.50	725	<2	0.04	36	650	22	<5	4	<10	24	0.13	45	<10	58	136	10
IR1350S 5+00E	<0.2	1.59	5	150	0.5	<5	0.21	<1	9	15	9	2.50	0.30	10	0.34	635	<2	0.03	15	940	14	<5	2	<10	8	0.09	34	10	3	97	2
IR1350S 5+25E	<0.2	1.33	5	120	0.5	<5	0.33	<1	8	15	10	2.32	0.27	20	0.35	310	<2	0.03	15	330	14	<5	2	<10	9	0.08	33	<10	4	73	3
IR1350S 5+50E	<0.2	1.52	10	100	0.5	<5	0.26	<1	9	17	19	2.58	0.26	20	0.38	225	<2	0.03	15	300	16	<5	2	<10	9	0.08	38	<10	11	77	4
IR1350S 5+75E	<0.2	0.92	15	40	0.5	<5	0.10	<1	7	15	15	2.27	0.20	20	0.38	150	<2	0.03	13	260	14	<5	2	<10	2	0.06	32	<10	5	47	2
IR1350S 6+00E	<0.2	1.94	10	140	0.5	<5	0.15	<1	9	19	12	2.74	0.29	10	0.39	365	<2	0.03	18	220	16	<5	2	<10	6	0.10	41	<10	4	87	5
IRJC02D-01	<0.2	2.70	10	350	1.0	<5	0.23	<1	12	16	25	2.79	0.18	20	0.43	855	<2	0.03	26	1080	18	<5	3	<10	29	0.10	31	<10	9	121	15
IRJC02D-02	<0.2	1.36	20	80	0.5	<5	0.20	<1	13	21	39	2.99	0.35	30	0.55	395	<2	0.03	24	610	18	<5	3	<10	13	0.10	37	<10	19	81	5
IRL09AS 7+00E	<0.2	3.10	5	260	1.0	<5	0.11	<1	14	24	18	3.37	0.17	20	0.39	670	<2	0.03	29	990	18	<5	2	<10	7	0.16	47	<10	7	129	14

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada

8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: Chuck Downie
Project: Iron Range
Sample: Silt

Report No : **2V0294 LJ**
Date : Aug-28-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
CDIR02501	0.4	1.57	5	380	1.0	<5	0.91	<1	25	33	48	4.03	0.12	30	0.37	8130	<2	0.02	42	1120	40	5	3	<10	40	0.06	33	<10	23	233	5
CDIR02502	<0.2	1.35	15	140	0.5	<5	0.23	<1	14	28	24	3.32	0.12	20	0.34	1255	<2	0.01	25	600	56	<5	2	<10	29	0.04	29	<10	6	126	3
CDIR02503	0.2	1.18	15	220	2.0	<5	0.56	2	17	27	46	2.52	0.12	30	0.25	4925	<2	0.02	74	1220	70	30	1	<10	85	0.02	19	<10	27	177	2
CDIR02504	<0.2	1.32	15	270	1.5	<5	0.67	1	13	25	42	2.68	0.12	30	0.36	2785	<2	0.01	46	1190	68	5	1	<10	62	0.02	22	<10	31	152	2

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Assayers Canada

8282 Sherbrooke St., Vancouver, B.C., V5X 4R6
Tel: (604) 327-3436 Fax: (604) 327-3423

Toklat Resources Inc.
Attention: T. Termuende
Project: IR02
Sample: Silt

Report No : **2V0340 LJ**
Date : Sep-12-02

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

Sample Number	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
TTIR02S01	<0.2	1.27	<5	70	0.5	<5	0.24	<1	13	17	26	2.90	0.21	10	0.56	430	<2	0.03	15	250	16	<5	3	<10	7	0.14	60	<10	9	68	3
TTIR02S02	<0.2	1.05	5	70	0.5	<5	0.13	<1	7	16	14	1.98	0.24	10	0.36	305	<2	0.03	13	190	10	<5	2	<10	7	0.08	25	<10	10	57	2
TTIR02S03	<0.2	1.57	5	110	1.0	<5	0.13	<1	11	18	25	2.44	0.26	20	0.34	530	<2	0.03	18	310	18	<5	3	<10	8	0.09	37	<10	22	63	2
TTIR02S04	<0.2	1.50	5	70	0.5	<5	0.21	<1	11	17	23	2.67	0.31	10	0.47	360	<2	0.03	14	250	28	<5	3	<10	9	0.12	41	<10	12	78	2

A .5 gm sample is digested with 5 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

ASSAYERS CANADA

Assayers Canada
8282 Sherbrooke St.
Vancouver, B.C.
V5X 4R6
Tel: (604) 327-3436
Fax: (604) 327-3423

Quality Assaying for over 25 Years

Geochemical Analysis Certificate

2V-0321-RG2

Sep-12-02

Company: **Toklat Resources Inc.**
Project: IR02
Attn: T. Termuende

We *hereby certify* the following geochemical analysis of 24 rock samples submitted Aug-22-02 by T. Termuende.

Sample Name	Au ppb
IR156A	4
IR158	12
IR156B	22
IR149A	12
IR153	7
IR149C	11
IR150	28
IR155	17
IR269	8
IR278	1
IR275	106
IR290	54
IR259	8
IR276	7
IR321	2
IR483	1
IR258	1
IR148A	16
IR218	7
IR243	2
IR050	4
IR383	3
IR78A	2
IR78B	2

Certified by ______________

ASSAYERS CANADA

Assayers Canada
8282 Sherbrooke St.
Vancouver, B.C.
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Tel: (604) 327-3436
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Quality Assaying for over 25 Years

Geochemical Analysis Certificate

2V-0321-RG3

Sep-12-02

Company: **Toklat Resources Inc.**
Project: IR02
Attn: T. Termuende

We *hereby certify* the following geochemical analysis of 15 rock samples submitted Aug-22-02 by T. Termuende.

Sample Name	Au ppb
IR298	4
IR223	4
IR075	5
IR331	7
IR369	18
IR081A	2
IR081B	4
IR464	3
IR456	4
IR261	6
IR431	3
IR440A	46
IR440B	116
IR187	9
IR184	4

Certified by ____________________

Appendix VI

Sample Locations

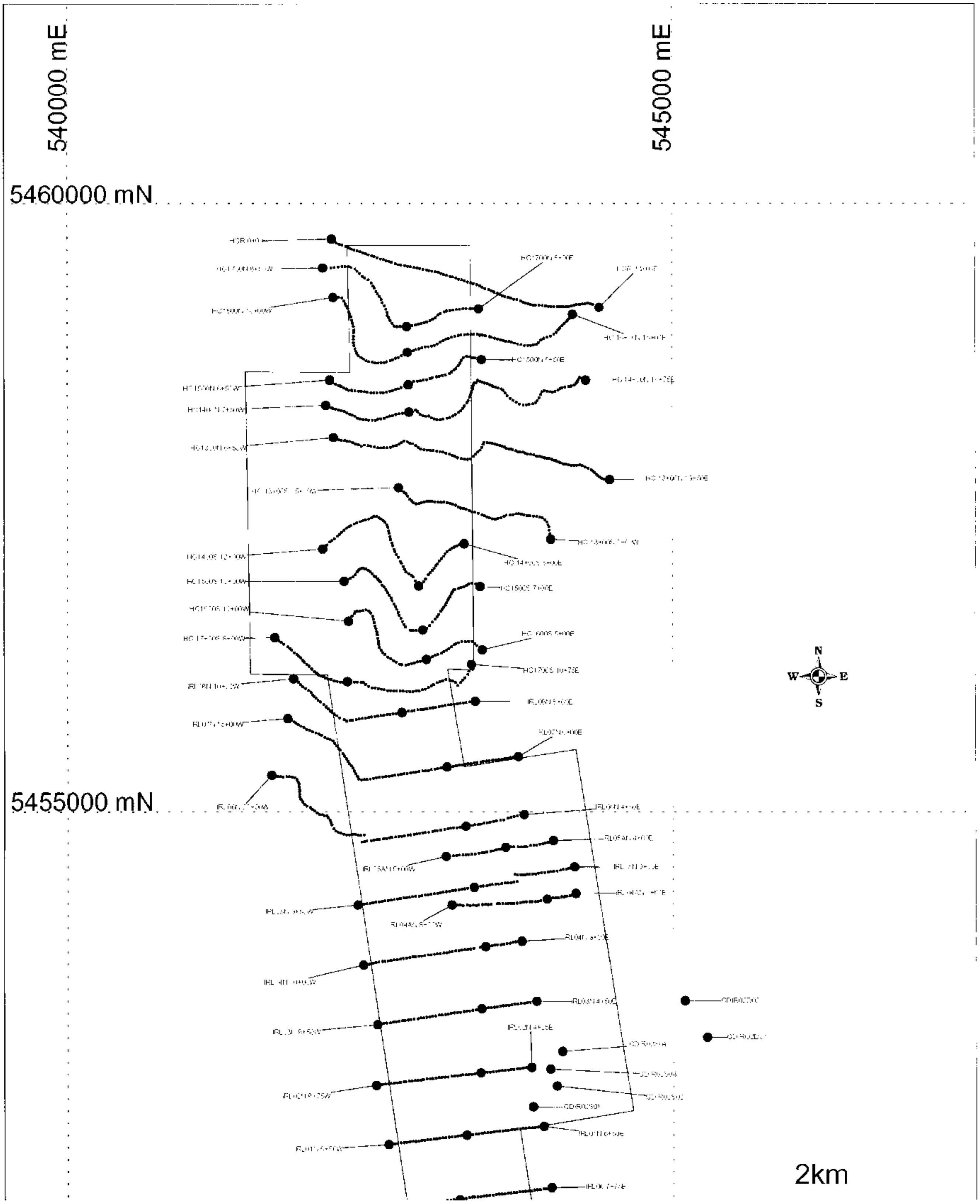
2001 and 2002 soil and silt samples,

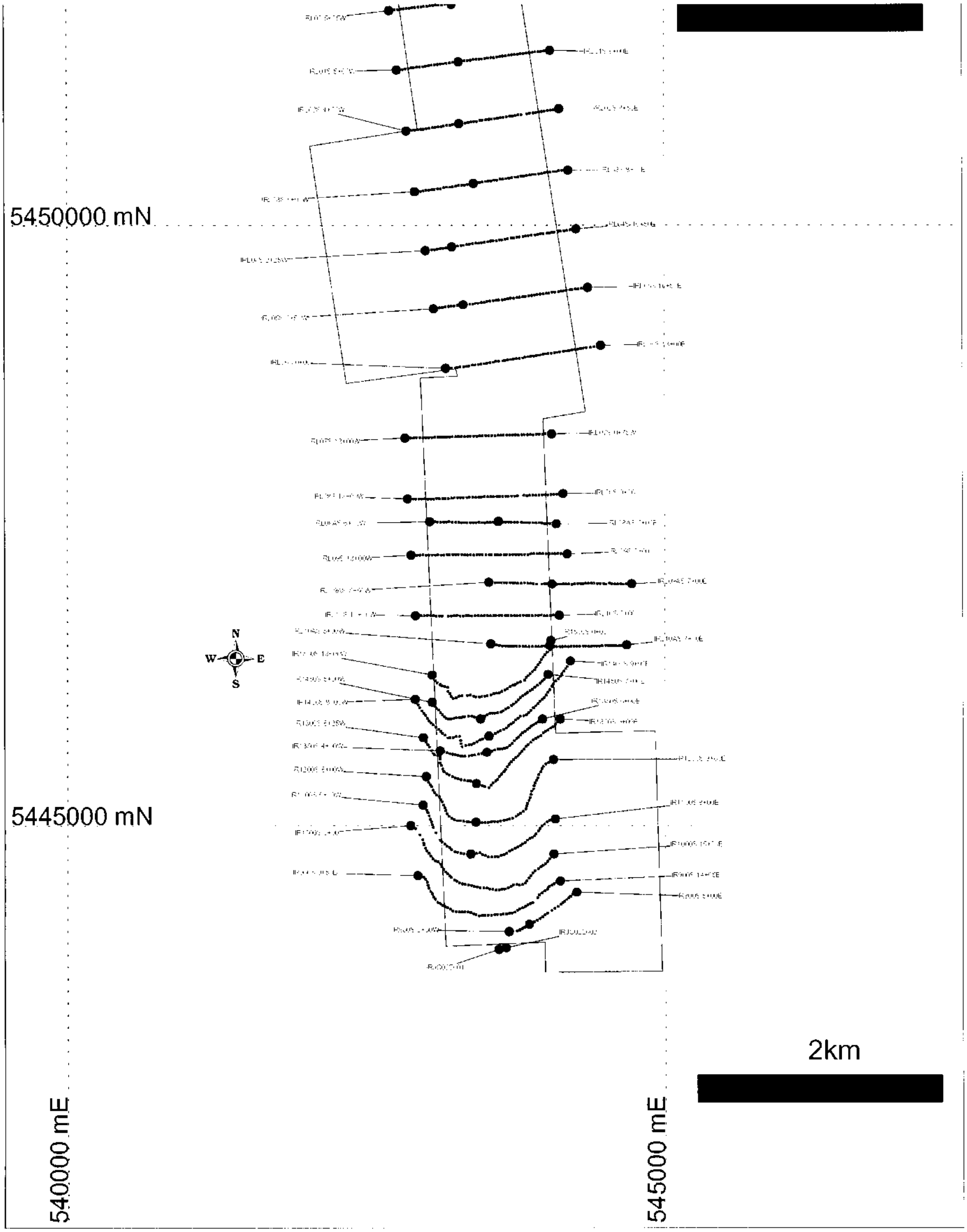
DELI 1-8, FeO 1-30, HC 1-10, IOX 1-12, IR 1-36, LUKE 1-8 claims

2002 rock samples

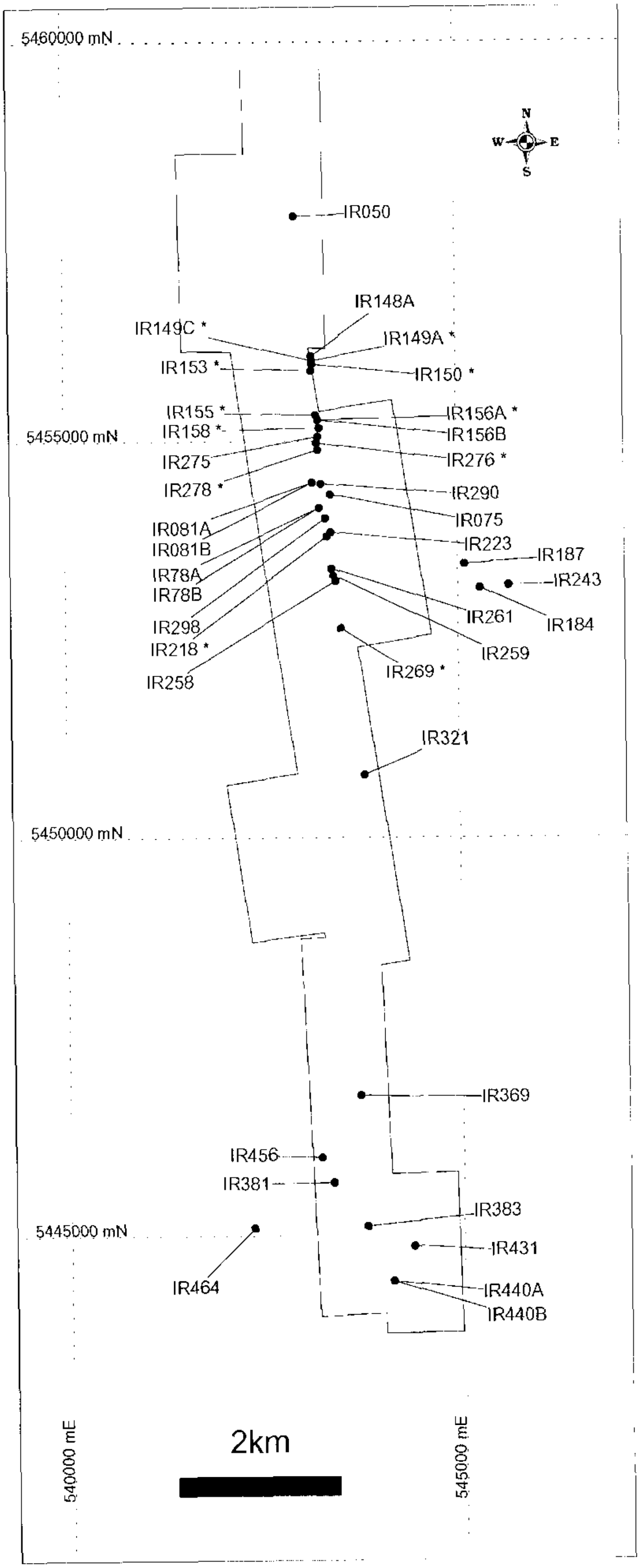
DELI 1-8, FeO 1-30, HC 1-10, IOX 1-12, IR 1-36, LUKE 1-8 claims

Sample location map (soils + silts, 2001 + 2002)




5450000 mN
5445000 mN
540000 mE
545000 mE
N
W
E
S
2km

Sample location map (rocks, 2002)



Appendix VII

Geochemical sample descriptions

Name	Easting	Northing	Rock type
IR156A *	543236	5455260	Metasomatic Ironstone
IR158 *	543257	5455162	Metasomatic Ironstone
IR156B	543236	5455260	Metasomatic Ironstone
IR149A *	543174	5456006	Metasomatic Ironstone
IR153 *	543163	5455878	Metasomatic Ironstone
IR149C *	543174	5456006	Metasomatic Ironstone
IR150 *	543176	5455960	Metasomatic Ironstone
IR155 *	543217	5455318	Metasomatic Ironstone
IR269 *	543510	5452639	Metasomatic Ironstone
IR278 *	543236	5454890	Metasomatic Ironstone
IR275	543239	5455053	Metasomatic Ironstone
IR290	543279	5454467	Metasomatic Ironstone
IR259	543430	5453307	Metasomatic Ironstone
IR276 *	543224	5454975	Metasomatic Ironstone
IR321	543793	5450781	Metasomatic Ironstone
IR483	546253	5439437	Metasomatic Ironstone
IR78A	543250	5454163	Moyie sills: gabbro, unaltered
IR075	543399	5454331	Moyie sills: gabbro, unaltered
IR381	543345	5445665	Moyie sills: gabbro, unaltered
IR184	545280	5453150	Middle Aldridge: siltstone, rusty weathering
IR78B	543250	5454163	Moyie sills: gabbro, chlorite alteration
IR298	543326	5454033	Moyie sills: gabbro, chlorite alteration
IR223	543394	5453855	Moyie sills: gabbro, chlorite alteration
IR369	543701	5446745	Moyie sills: gabbro, chlorite alteration
IR440A	544095	5444425	May-Bee: quartz-sulphide vein
IR440B	544095	5444425	May-Bee: quartz-sulphide vein
IR081A	543169	5454479	Middle Aldridge: siltstone, unaltered
IR081B	543169	5454479	Middle Aldridge: siltstone, albite alteration
IR464	543169	5454479	Middle Aldridge: siltstone, unaltered
IR456	543195	5445976	Middle Aldridge: siltstone, unaltered
IR261	543405	5453399	Middle Aldridge: siltstone, unaltered
IR431	544362	5444867	Middle Aldridge: siltstone, unaltered
IR187	545090	5453450	Moyie sills: gabbro, garnet-bearing
IR243	545637	5453180	Middle Aldridge: siltstone, albite alteration
IR050	542963	5457824	Middle Aldridge: siltstone, albite alteration
IR383	543776	5445116	Middle Aldridge: siltstone, albite alteration
IR258	543445	5453241	Middle Aldridge: siltstone, albite + FeOx alteration
IR148A	543168	5456064	Middle Aldridge: siltstone, albite + FeOx alteration
IR218 *	543342	5453803	Middle Aldridge: siltstone, albite + FeOx alteration

N.B. Asteriks (*) indicates samples for which analytical problems were reported. For these samples only, whole Rock analyses (WRA) are to be disregarded, no problems were reported for ICP analyses.

Appendix VIII

Petrographic descriptions

IR243 Fault breccia

Clasts: albite (20-30%), quartz (60-70%), muscovite (1%), chlorite 10(%), pyrite (2%), magnetite (<1%), hematite (<1%)
Matrix: chlorite (70-80%), muscovite (5%), albite (10%), quartz (15%), magnetite (<1%), hematite (1%), pyrite (1%)

The sample is an albite- and chlorite-rich, clast supported fault breccia. Clasts are derived from quartz-rich metasiltstones, are predominantly angular, and range up to 2cm in size. The feldspar component to the clasts has been completely replaced by albite. Some albite grains contain inclusions of muscovite. Chlorite occurs both as isolated patches within clasts, and as the dominant matrix mineral. Muscovite in the matrix is both synchronous with chlorite, and occurs in discrete shear bands cutting chlorite-rich matrix. Pyrite occurs as subhedral grains disseminated both within clasts and the breccia matrix. Magnetite occurs as fine euhedral grains within clasts and matrix, and is largely replaced by hematite.

IR218 **Crackle breccia**

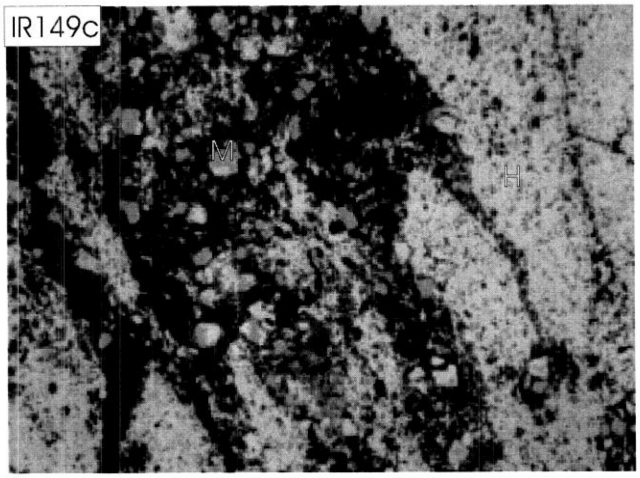
Clasts:	albite (60-80%), quartz (20-30%), muscovite (5%), hematite (5%)
Veins:	hematite (80-90%), quartz (10-20%)

The sample is an intensely albitized metasediment with abundant hematite crackle veins. Clasts are dominated by subhedral metasomatic albite crystals, with subordinate rounded quartz grains. Muscovite occurs predominantly as very fine grains disseminated within clasts. Hematite-rich veins are abundant, and are locally seen to cut individual albite grains. Hematite occurs as very fine-grained euhedral laths forming a dense mesh with abundant inclusions of albitised wallrock. The thicker veins are cored by coarse quartz crystals. Quartz grains contain abundant very fine 2-phase (liquid + vapour) and subordinate 3-phase (liquid + vapour + halite) fluid inclusions. Quartz veinlets with narrow muscovite selvages cut albitised clasts and hematite veins.

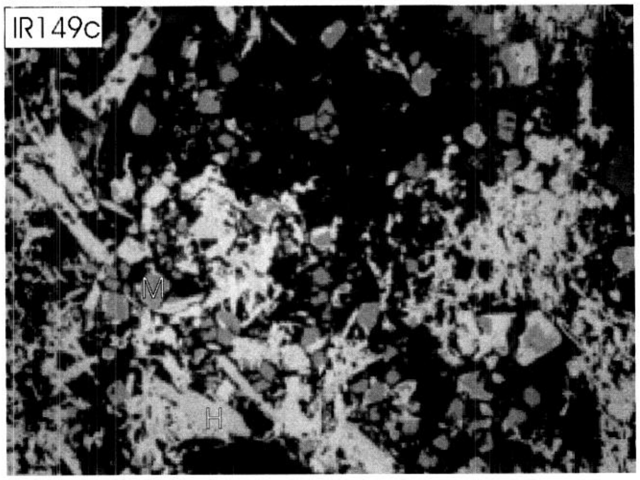
IR149c Fault breccia / Metasomatic ironstone

Clasts/matrix: albite (10-70%), hematite (20-85%), muscovite (2%), quartz (5-10%), chlorite (1%)
Infill: quartz (50-70%), albite (10-20%), muscovite (2%), chlorite (2%), hematite (5-10%), magnetite (5%), pyrite (2%)

The sample is a metasomatic ironstone, derived from brecciation and metasomatism of a fine-grained precursor. Clasts are difficult to distinguish from comminuted matrix, due to the intensity of alteration to coarse-grained albite, and fine-grained hematite. Locally intergrown hematite laths form massive amalgamations. Coarse-grained muscovite and patchy chlorite are also metasomatic in origin. Some rounded (primary?) quartz grains are preserved within clasts, and may indicate a metasedimentary (siltstone?) precursor. Infill occurs as anastamosing quartz veins, with variable albite, muscovite, chlorite, magnetite, hematite and pyrite. Magnetite and pyrite both occur as subhedral, relatively coarse grains. Hematite in the infill occurs predominantly as alteration rims on magnetite grains, and also as rare euhedral laths.



Width of view=2.1mm
M=magnetite
H=hematite

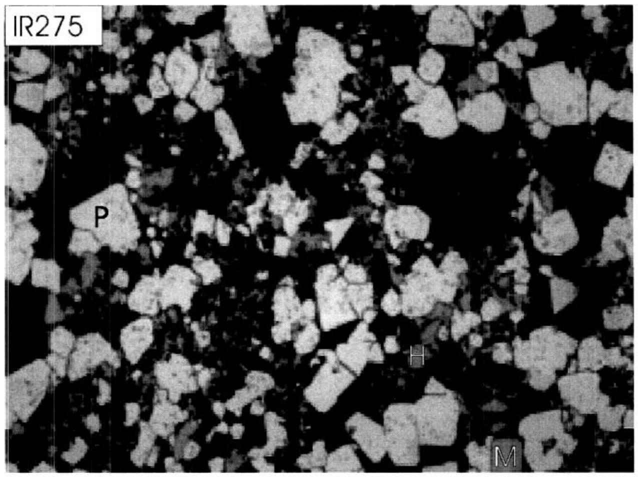


Width of view=1.1mm
M=magnetite
H=hematite

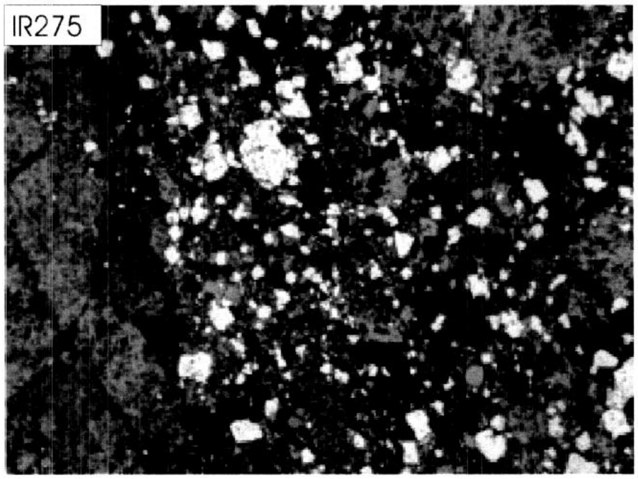
IR275 Mylonite / Metasomatic ironstone

Clasts/matrix:	hematite (50%), quartz (10-20%), pyrite (20-30%), magnetite (<5%), chlorite (5%), muscovite (5%)
Infill:	quartz (50-60%), pyrite (20-30%), hematite (10%), magnetite (5-10%), muscovite (5-10%)

The sample is a mylonitic metasomatic ironstone. Macroscopic banding is a result of juxtaposed bands of quart-rich infill, and hematite-rich alteration. Clasts and matrix are difficult to distinguish one from another, and are characterized by pervasive alteration to predominantly massive hematite, with subordinate subhedral pyrite, magnetite, fine grained muscovite and patchy chlorite. Precursor mineralogy is largely obscured but the sample was likely quartz-rich metasediment (ie. quartzite), due to the scarcity of aluminous phases in the metasomatised equivalent. Infill is dominated by coarse-grained quartz, with prominent undulose extinction and commonly recrystallised to fine grain sizes within anastamosing shear bands, shear fabric being defined by alignment of muscovite grains. Quartz infill is associated with coarse-grained euhedral to subhedral pyrite, hematite and subordinate muscovite, preferentially developed in areas of fine-grained (recrystallised) quartz. Within the infill component, hematite occurs predominantly as blocky-irregular to near-cubic crystals polymorphed after magnetite, and contains some relic magnetite within the crystal cores. Subordinate fine-grained hematite laths also occur as infill.



Width of view=1.1mm
P=pyrite
M=magnetite
H=hematite

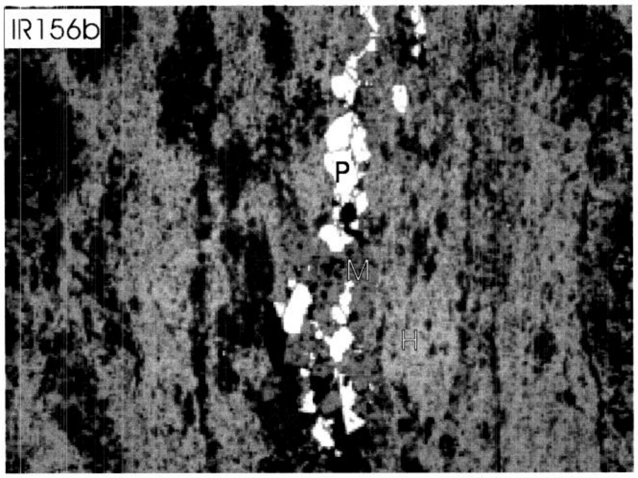


Width of view=2.1mm

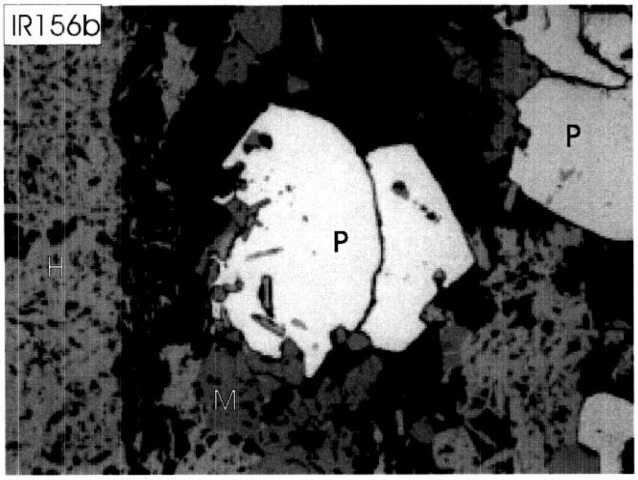
IR156b Mylonite / Metasomatic ironstone

Clasts/matrix:	hematite (60%), quartz (30-35%), pyrite (1-3%), magnetite (1-2%), chlorite (1-2%), muscovite (1-2%)
Infill:	quartz (50-60%), pyrite (20-30%), hematite (10%), magnetite (5-10%), muscovite (5-10%)

The sample is a mylonitic metasomatic ironstone, similar to IR275. Macroscopic banding is a result of juxtaposed bands of quartz-rich infill, and hematite-rich alteration. Clasts and matrix are difficult to distinguish one from another, and are characterized by pervasive alteration to interconnected hematite laths with inter-granular quartz, and locally massive hematite. Precursor mineralogy is largely obscured but the sample was likely quartz-rich (ie. quartzite), due to the scarcity of aluminous phases in the metasomatised equivalent. Infill is dominated by predominantly fine-grained quartz, with local inclusions of coarser grains with undulose extinction, suggesting that much of the quartz may be recrystallised. Magnetite and pyrite are strongly confined to the infill component, commonly nucleating adjacent to hematized clasts. Magnetite shows only very minor replacement by hematite, and hematite laths within the infill component are very rare. Infill also contains abundant patchy chlorite and coarser grained muscovite.



Width of view=4.2mm
P=pyrite
M=magnetite
H=hematite



Width of view=1.1mm
P=pyrite
M=magnetite
H=hematite

Iron Range Project
Claim units /
sample locations

▪ Claim posts

• • • • Soil samples

◎ Rock samples

see APPENDIX VI
for sample numbers

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GEOLOGICAL SURVEY BRANCH
ASSESSMENT REPORT

26,967

26977

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