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Geology, Alteration and Surficial Geochemical Studies

on the

THIMBLE MTN. CLAIM GROUP

Greenwood Mining Division, British Columbia

(NTS 82E/1,2 : 40.09'N - 118.30'E)

[redacted]

By:

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January 1992

On behalf of:

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INTRODUCTION

Background

The Thimble Mtn. claim group comprises 81 units made up of four post, two post and reverted crown grant claims. Ownership is vested with eight different property owners, including Pan Orvana Resources Inc. who staked the Rathful 1 and Rathful 2 four post claims. The property grouping was assembled by Pan Orvana through option agreements with the registered owners during the summer of 1991 as part of the Okanagan Syndicate exploration project. The location of the property is shown in Figure 1.

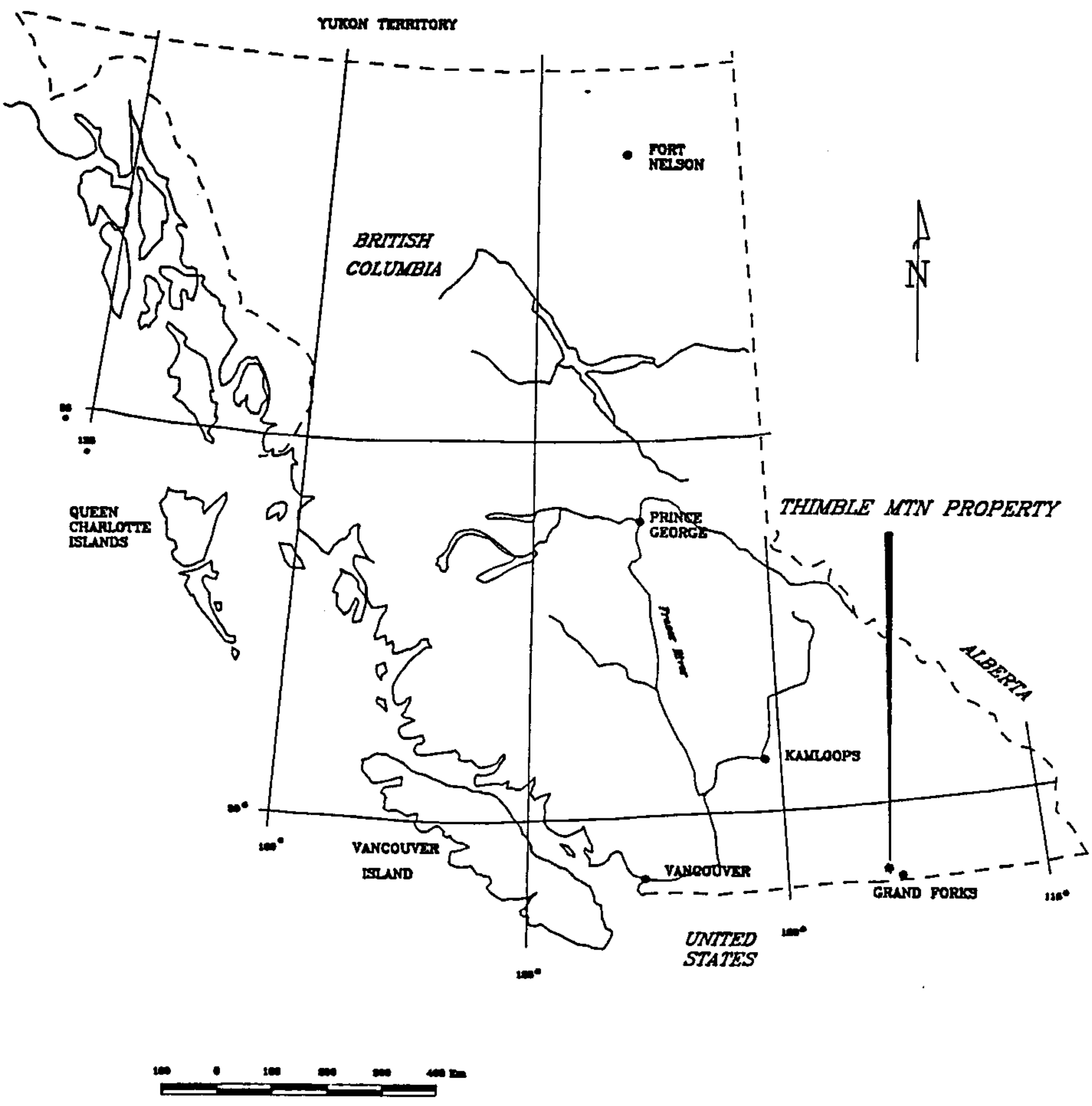
Numerous old shafts, adits and trenches are found on the claim group located on small sulphide bodies, most of which contain significant copper and gold values.

This report describes geological and geochemical work carried out on the claim group between September 1 and November 31, 1991.

Claim Status

The Thimble Mtn. claim group of 81 units is listed below. The registered owners are as indicated with most of the claim grouping held by Pan Orvana under option from the owners.

Claim	Record No.	No of Units	Date of Record	Registered Owner
Rathful 1	6309	20	1991 Apr 10	Pan Orvana
Rathful 2	6310	20	1991 Apr 10	Pan Orvana
Pack Rat	3223	1	1982 Sep 29	Pan Orvana
Lime	4858	18	1987 Feb 24	J. Carson
Schickshock	M36731	1	1973 Aug 8	Kettle River
Sailor Boy	M36732	1	1973 Aug 8	Kettle River
Rad 1	5379	1	1989 Mar 24	Kettle River
Rad 2	5380	1	1989 Mar 24	Kettle River
Rad 3	5381	1	1989 Mar 24	Kettle River
Rad 4	5382	1	1989 Mar 24	Kettle River
Rad 5	5383	1	1989 Mar 24	Kettle River
Rad 6	5384	1	1989 Mar 24	Kettle River
Rad 7	5385	1	1989 Mar 24	Kettle River
Rad 8	5386	1	1989 Mar 24	Kettle River
Hummingbird	5669	1	1990 Mar 15	Jantri Resc.
Hummingbird Fr.	5672	1	1990 Mar 15	Jantri Resc.
Seattle	4770	1	1986 Nov 6	D Geronazzo
No. 1	4863	1	1987 Jan 30	D Geronazzo
Bunker Hill	4864	1	1987 Jan 30	D Geronazzo
Loyal Canadian	4865	1	1987 Jan 30	L Rossi



PAN ORVANA RESOURCES

Fig. 1

LOCATION MAP

OK SYNDICATE
Northeastern Washington and southern British Columbia

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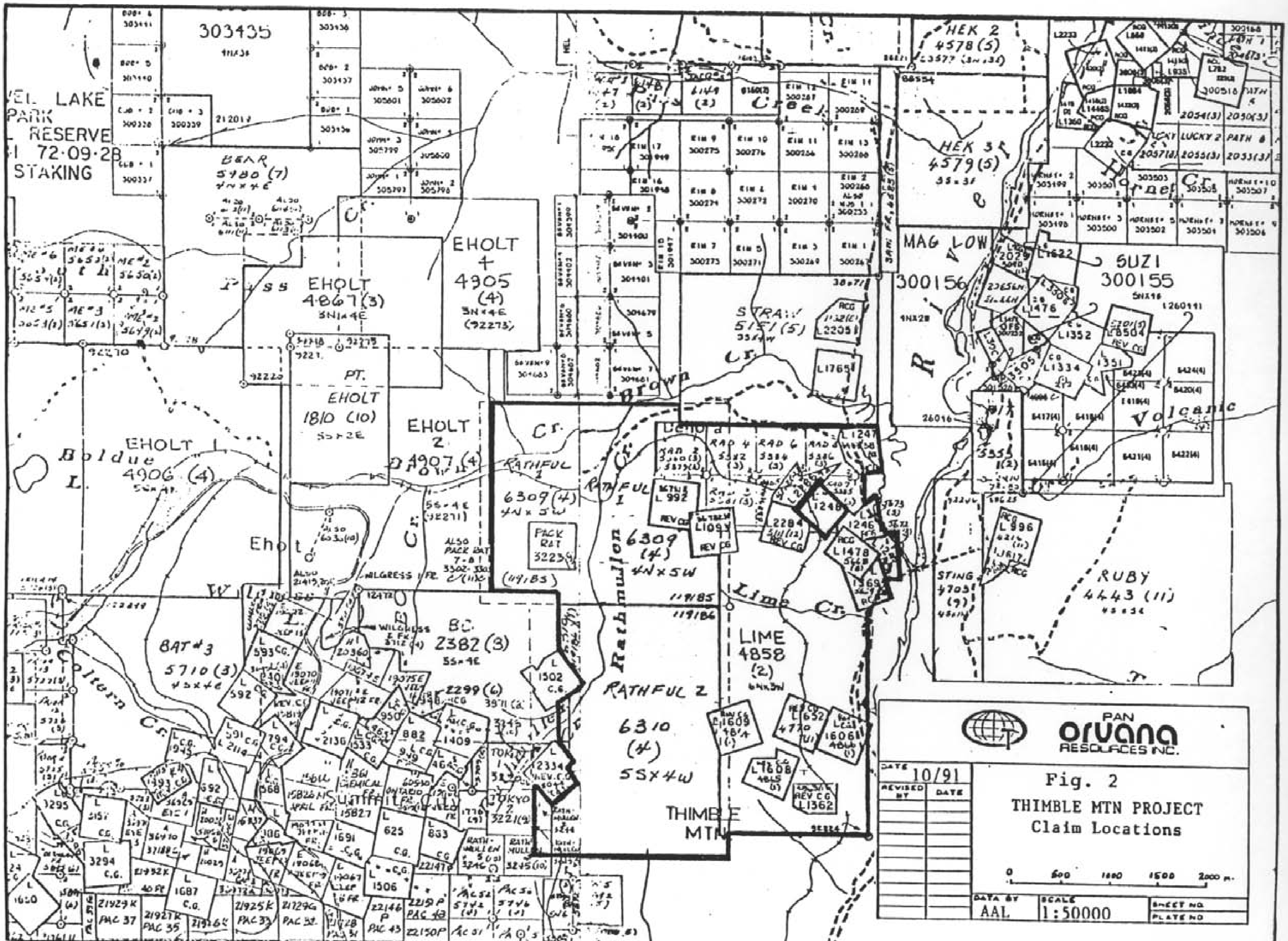


Fig. 2

THIMBLE MTN PROJECT

Claim Locations

Claim	Record No.	No of Units	Date of Record	Registered Owner
Virginia City	4866	1	1987 Jan 30	L Rossi
Amie	4838	1	1986 Dec 24	R Mellet
Blacktail	5111	1	1987 Dec 23	D Geronazzo
No. 3 Fraction	5112	1	1987 Dec 23	D Geronazzo
Mammie	5673	1	1990 Mar 15	R Purdie
OK	5668	1	1990 Mar 15	R Purdie

Total: 81 units

The area of the claim group and location of individual claims are shown in Figure 2.

Work Program

A total of 45 man days of work were performed on the property during the period September 1 - November 31, 1991. The greater part of the effort comprised geological mapping by Andy Laird, supported by Art Ettlinger, geological consultant and specialist in skarn alteration and mineralization. The geological work sought to establish the character and extent of skarn alteration and mineralization and continue work begun earlier in the year by Ettlinger (1991 assessment report). Supplementary geological work was performed by Robert Fredericks and Neil Hillhouse whilst Ian Thomson and Peter Bradshaw executed a detailed geochemical survey of the Rathmullen Creek drainage. Overall technical co-ordination for the project was provided by Ian Thomson.

Location and Access

The Thimble Mtn. claim group is located in south central British Columbia some 14 kilometres north-north west of the town of Grand Forks at approximately 118 30' East, 49 09' North.

B.C. Provincial Highway 3 passes 2 kilometres west of the property whilst a hardtop secondary road runs along the eastern boundary close to the Granby River. Forest access roads have been constructed into the valleys of Brown Creek and Rathmullen Creek and onto the north west flank of Thimble Mtn. The right of way of the former Kettle Valley Railway is passable by vehicle and loops through the northern and eastern part of the claim group.

No part of the property is more than thirty minutes walk from the nearest road or track passable by vehicle.

Topography and Vegetation

The Thimble Mtn. area lies within the Monashee Mountains physiographic region which forms part of the eastern Cordilleran mountains of British Columbia. In this area the mountains tend to be rounded with relatively gentle upper slopes and are separated by either the flat-bottomed, deeply incised valleys of major rivers or the V-shaped valleys of tributary streams. Elevations within the immediate area range from 520 metres (1706 feet) at Grand Forks to 1310 metres (4300 feet) at the summit of Thimble Mtn.

Within the area of the claim group, the flat lands along the Granby River have been cleared for agriculture. The steep east facing slopes of the Granby valley are lightly treed giving way to grassland on the summit of Thimble Mtn. Large areas of Rathmullen and Brown Creek valleys have been clear cut. Elsewhere the land is forested with mixed conifers and deciduous trees.

Previous Exploration

Significant mineral discoveries in the area date from the 1890's and by 1900 several mines, the most important of which was the Phoenix operation (9 kilometres south west of the Thimble Mtn. claim group) of the Granby Mining Corporation, had been put into production. Smelters were constructed at Grand Forks and Greenwood (15 kilometres south west of the Thimble Mtn. claim group) to handle the copper ores which also contained significant amounts of gold and silver. The Phoenix operation continued until 1919, re-opened in 1959 and then closed again in 1978.

The Thimble Mtn. claim group covers ground that has been staked repeatedly and prospected since the turn of the century. Records of early work have been lost but it is believed that some of the shafts and adits date from the 1920's. Minor production (a few tens of tons) was achieved from workings on the Hummingbird, Schickshock, Sailor Boy and Seattle claims whilst at the Senator Mines located on the Pack Rat claim a much larger quantity of massive pyrite and pyrrhotite was mined for smelter flux.

Since the 1960's various groups have conducted exploration programs over different sectors of the claim group. In general these have applied various combinations of prospecting, geological mapping, soil geochemistry, ground magnetic and VLF-EM surveys. Multiple grids have been established at various orientations using metric and imperial increments. Most previous work has targeted copper mineralization with relatively little effort directed towards gold. The property, in its present configuration, has never been subject to a synoptic examination.

DISTRICT GEOLOGY AND MINERALIZATION

Published geological mapping by Little (1983) and Fyles (1990) provides essential information on lithology, structure and geological evolution of the district. For the purpose of this introductory overview, the area of the Phoenix-Boundary mining camp is considered which extends from the fault controlled Granby River valley in the east to Boundary Creek in the west.

Stratified rocks of Carboniferous-Triassic age underlay the greater part of the area. These comprise volcanic rocks and sediments, folded into north-east trend structures and metamorphosed to greenschist facies (Figure 3). The oldest are the Carboniferous - Permian age Knob Hill and Attwood Formations, both of which contain andesitic volcanic rocks and various units of argillite, siltstone, limestone, chert and conglomerate. These are overlain by the Triassic Age Brooklyn Formation consisting of andesitic volcanic flows, microdiorite and tuffs with interbedded units of limestone, sandstone, siltstone, argillite, chert and conglomerate. The conglomerates, limestones and cherts of the Brooklyn Formation are host to most of the mineral deposits mined in the camp.

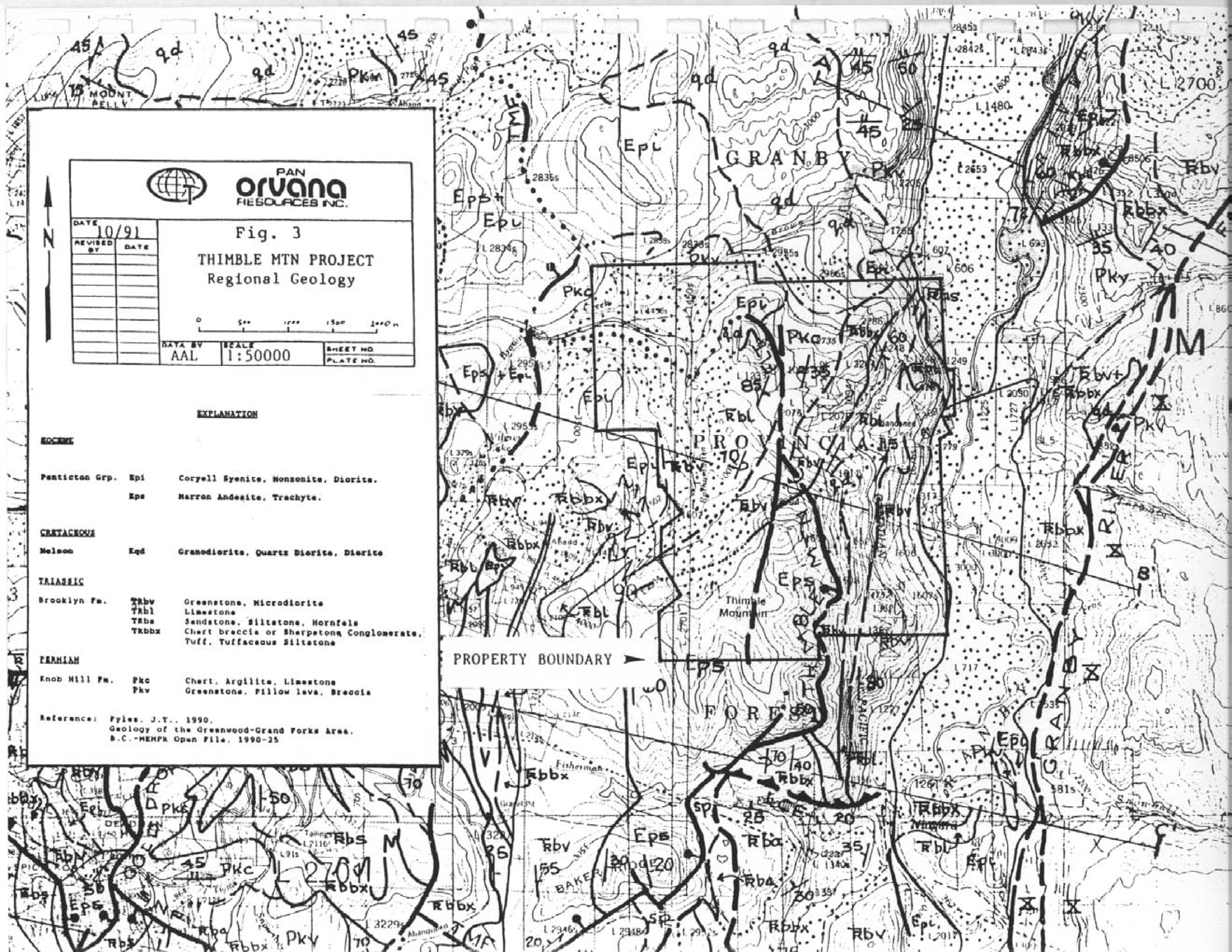


Fig. 3
THIMBLE MTN PROJECT
Regional Geology

A major phase of igneous intrusion took place during the Cretaceous starting with ultramafic rocks, now largely altered to serpentine. The principle Cretaceous intrusions however, are predominantly of diorite-granodiorite composition with smaller amounts of other intermediate to felsic members and are known collectively as Nelson Intrusives. A large mass of Nelson Intrusive granodiorite lies a few kilometres to the north east of the Phoenix camp; smaller plugs ranging from metres to three kilometres in diameter intrude the older stratified rocks throughout the area of interest.

The Mesozoic and Paleozoic rocks are overlain unconformably by flat lying to gently dipping and essentially unmetamorphosed Tertiary Eocene sediments and volcanic rocks of the Penticton Group. These are subdivided into an older sedimentary sequence of arkose, dacitic tuff and conglomerate termed the Kettle River and a younger sequence of andesite, trachyte and basalt volcanic rocks together with their intrusive equivalents named the Marron. For the most part these occur as remnant patches capping hills as at Thimble Mountain.

All of the above lithologies are cut by a younger Eocene phase of intrusive rocks termed Coryell Intrusions. These are bodies of variable size composed of syenite, monzonite, shonkinite and lesser amounts of granite. Within the area of interest these usually occur as small plugs and dykes.

The area was overridden by the Pleistocene ice sheets which modified the local topography by erosion and the deposition of glacial drift of various types. Glacial till is locally extensive as are fluvioglacial sands and gravels derived from the melting ice during the retreat stage. It is believed that for the most part the ice stagnated and downwasted in place. The upper ridges and hilltops became exposed while ice still filled the major valleys. As a result, high level spillways and lakes were formed with attendant fluvioglacial and lacustrine sediments accumulating in depressions. Only the steepest hillsides, when colluvial material is common, can be considered likely to be entirely free of glacial drifts.

Known economic mineralization in the district can be divided into four principal types:

1. Disseminated chalcopyrite with significant gold and silver values in skarns derived from Brooklyn limestone and calcareous argillite: the largest and best known of these occurrences is the Phoenix mine.

2. Gold, copper, silver deposits in alteration zones adjacent to ultramafic (serpentine) bodies, eg. City of Paris mine.

3. Gold and silver bearing quartz veins, often occurring at or near the contact between Nelson Intrusives and Knob Hill Formation rocks eg. Dentonia Mine.

4. Gold bearing stratiform lenses of massive to semi-massive sulphides (pyrite, pyrrhotite and minor chalcopyrite) and adjacent sulphide bearing laminated chert eg. Kettle River prospect.

SURVEY PROCEDURES

Objectives

The present program of work sought to achieve the following objectives.

1. Confirm the basic geological framework of the claim area, disposition of lithologies and main structural elements.

2. Establish the nature and distribution of alteration related to skarn processes with a view to determining the extent and symmetry of any mineralizing system.

3. Undertake a preliminary appraisal of the possible mineral potential of the drift covered valley floor of Rathmullen Creek.

Logistics

Access to and movement within the claim block was achieved by motor vehicle along the forest access roads and railroad grade. Elsewhere foot traverses were undertaken. The field party were based in Grand Forks where a motel unit on monthly rental provided accommodation and a field office.

The present work program was initiated on September 4, 1991 and a sustained effort continued into early October. The claims were re-visited in late October and November to check aspects of the geological mapping. The stream sediment sampling was carried out in early September.

Mapping, Prospecting and Rock Sampling

Mapping, prospecting and rock sampling were completed along open traverses. Geographic control was gained from air photographs, NTS topographic maps and forest service maps. Individual outcrops and sample sites were located by hip chain and compass bearings.

A total of 97 rock samples were collected for assay and geochemical analysis of which 8 were also used for the petrographic study. Both grab and chip channel samples were obtained. Care was taken to collect representative material that was as little weathered as possible.

All sample collection sites were flagged and tagged to enable relocation. Rock sample locations are shown on Figure 5.

Stream Sediment Sampling

A detailed stream sediment survey was completed in the Rathmullen Creek drainage. A total of 44 samples of active stream sediment were collected at approximately 100 metre intervals along Rathmullen Creek and a tributary drainage and placed in high wet strength kraft paper bags. All sample sites were flagged and tagged in the field to enable relocation. Sample locations are shown in Figure 8.

Sample Preparation and Analysis

All rock samples were shipped to Silver Valley Laboratories Inc., Kellog, Idaho, for sample preparation and analysis.

The rock samples were dried at 85 Celsius then jaw crushed to approximately 1/2 inch, roll crushed to approximately minus 10 mesh then split and a 300 gram subsample pulverised to minus 100 mesh prior to analysis.

Gold and silver were determined on a 20 gram sample by fire assay with atomic absorption finish. Detection limits are 5ppb Au and 0.1 ppm Ag.

The elements Pb, Zn, Cu, As, Co, Bi, Te, W and Ni were determined simultaneously by ICP emission spectroscopy from a 0.5 gram sample digested in hot aqua regia. Detection limits for the ICP determination are:

Pb, Zn, Cu, Co	1 ppm
Bi	2 ppm
As, Ni, Te	5 ppm
W	10 ppm

Copies of the analytical data are presented in Appendix 2 of this report.

The stream sediment samples were shipped to Acme Analytical Laboratories, Vancouver, B.C. for sample preparation and initial analysis.

The samples were first dried and then dry sieved using an 80 mesh (180 micron) sieve. The minus 80 mesh portion was retained.

Gold was determined using a 10 gram sample aliquot, ignited at 600' Celsius, digested with hot aqua regia, extracted using MIBK and determined by graphite furnace AA. The published detection limit is 0.3 ppb.

The elements Mo, Cu, Pb, Zn, Ag, Ni, Co, Mn, Fe, As, U, Th, Sr, Cd, Sb, Bi, V, Ca, P, La, Cr, Mg, Ba, Ti, B, Al, Na, K and W were determined simultaneously by ICP emission spectroscopy from a 0.5 gram sample aliquot digested with 3 ml of 3-2-1 $HCL\text{-}HN0_3\text{-}H_20$ at 95' Celsius for one hour, then diluted to 10 cc with H_20.

Detection limits for the ICP analysis are:

Ag	0.1 ppm
Cd, Co, Cr, Cu, Mo, Mn, Ni, Sr, Zn, W	1 ppm
As, B, Ba, Bi, La, Pb, Sb, Th, V	2 ppm
U	5 ppm
Al, Ca, Fe, K, Mg, Na, Ti	0.01%
P	0.001%

Copies of the analytical results are presented in Appendix 3 of this report.

The minus 80 mesh pulps of the stream sediment samples were subsequently dispatched to the laboratory of Bondar-Clegg & Company, Vancouver, B.C., for further analysis.

In this phase of analysis the elements Ag, Cu, Pb, Zn, Mo, Ni, Co, Cd, Bi, As, Sb, Fe, Mn, Te, Ba, Cr, V, Sn, W, La, Al, Mg, Ca, Na, K, Sr and Y were determined simultaneously by ICP emission spectroscopy from a 0.5 gram sample digested with 10 mls of cold 10% HCL shaken for 16 hours. The character and significance of the extraction procedure is described in a later section of this report.

Copies of the analytical results together with a table of effective detection limits are presented in Appendix3.

Petrographic Studies

Thin sections were cut from selected rock samples and examined under a petrographic microscope by A. Ettlinger. Particular attention was given to alteration mineral assemblages and their apparent paragenesis. Copies of the descriptions obtained by this work are included in Appendix 1. The locations from which the samples were collected are shown on Figure 5.

Data Handling and Data Presentation

All geological data were compiled in map form at 1:1,000 scale on a base prepared from published NTS topographic maps. These data are shown in Figure 4 while rock sample locations are shown in Figure 5 and analytical data for Au, Cu and As presented in Figure 16.

The geochemical data from Rathmullen Creek were evaluated critically and selected element distribution patterns plotted as profiles along the drainage. These results are shown in Figures 9 to 15.

Complete analytical data listings are provided in Appendix 2 and 3.

PROPERTY GEOLOGY, ALTERATION AND MINERALIZATION

Geology

Most of the Thimble Mtn. property is underlain by rocks of the Brooklyn Formation (Figure 5). Striking between north and north-north east, dips vary from flat to steeply north west and south east, in places suggesting anticlinal structure. The most significant lithological units are:

1. Chert or "Sharpstone" conglomerate;
2. Massive pale to dark grey argillaceous limestone; and
3. Andesitic volcanic and volcaniclastic rocks (greenstone).

The Sharpstone is the same lithology that hosts ore at the Phoenix mine and is a striking rock, containing very angular chert fragments in a green tuffaceous matrix. Minor greenstone, limestone, and older schist fragments are also seen. The Sharpstone pinches and swells and is believed to be a locally derived fanglomerate. The limestone makes up most of the lower eastern slope of the property and is usually thin bedded and argillaceous, often with thin dirty interbeds of calcareous tuff. The most widespread of the Brooklyn lithologies are the volcanic rocks which make up most of Thimble Mtn. These consist of andesitic flows and dykes, related subvolcanic microdiorites, tuffs and tuff breccias. Lesser Brooklyn units include sandstone, siltstone, conglomerate and minor chert.

The Brooklyn is intruded by small stocks of Nelson Intrusive. This is a coarse grained hornblende diorite of very consistent texture and composition. Both the Nelson and the Brooklyn are intruded by Eocene Coryell syenites and pulaskite dykes, usually pink to grey aphanitic with strong potassium feldspar or biotite phenocrysts. The youngest rocks on the property are the Marron volcanics, also Eocene in age and of similar composition to the Coryell. They overlie the Brooklyn andesites to form the top of Thimble Mtn. An idealized long section of the property is shown in Figure 6.

Alteration and Mineralization

The pre Tertiary rocks on the property are altered to lower greenschist facies. Amphibole, epidote, chlorite, and carbonate skarn alteration can also be seen in a strong continuous belt from the north slope at Thimble Mtn. across Lime and Brown Creeks to the Strawberry showing, a distance of 3000 metres. Within this lies a smaller belt of silicification, mostly in the Sharpstone and other clastics, extending from the Schickshock area across the railroad grade towards Brown Creek. Garnet-pyroxene skarn can be seen in smaller restricted areas, notably the Schickshock showing, the Strawberry showing within the Sharpstone in the area of the Tunnel showing, and on the Seattle showing. The limestone exhibits patchy marblization, strongest in the Schickshock area and scattered across the east slopes of the property. Alteration and geology are shown in Figure 4.

Sulphide mineralization is present at all of the showings indicated on Figure 4, usually as replacement pods of massive pyrrhotite or less commonly pyrite, and often with minor chalcopyrite disseminated throughout. Massive magnetite with pyrrhotite is seen at the Schickshock and Strawberry showings.

Among the rock samples collected (Figure 5) gold values ranged up to 66,240 ppb (1.92 oz/T);copper values ranged up to 19,800 ppm and arsenic values ranged up to 22,709 ppm. The highest gold grades come from;

1. Pyrite in a 20 centimeter fracture or shear zone in marble adjacent to diorite at the Hummingbird showing;

2. Strong chlorite-hematite retrograde skarn with minor pyrite in andesite at the Thimble Mtn. showing; and

3. Massive pyrrhotite with chalcopyrite in weak skarn altered finely interbedded tuff and limestone at the Ike showing.

Working Interpretation

The Thimble Mtn. property contains several small skarn showings which are confined to a 1.5 kilometre wide, north-north east striking belt of Upper Triassic Brooklyn Formation sedimentary and volcaniclastic rocks. Individual skarn showings have different calcsilicate mineralogy,, sulphide-oxide compositions, and degree of

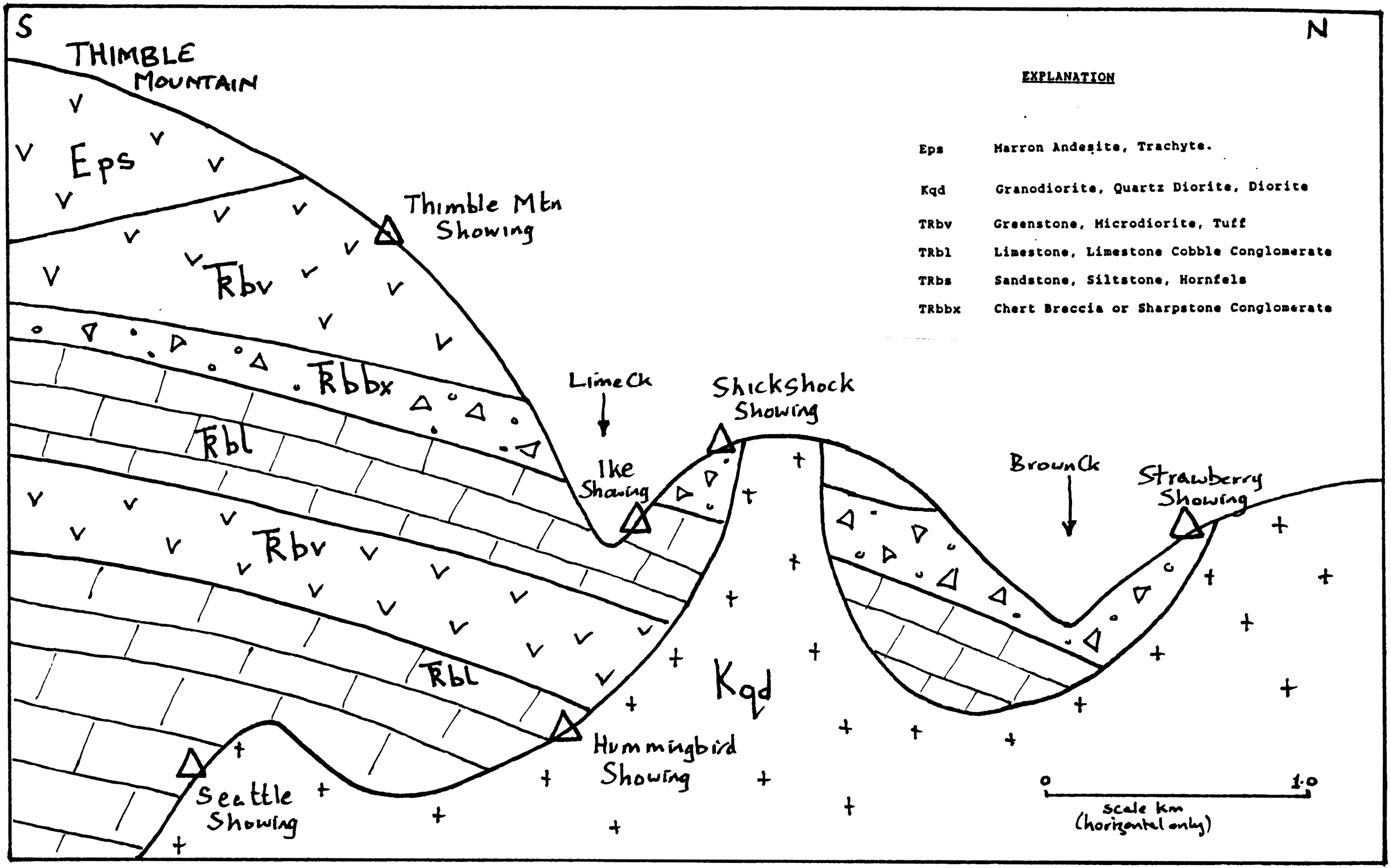


FIGURE 6
Thimble Mtn. Claim Group
Schematic North-South Long Section

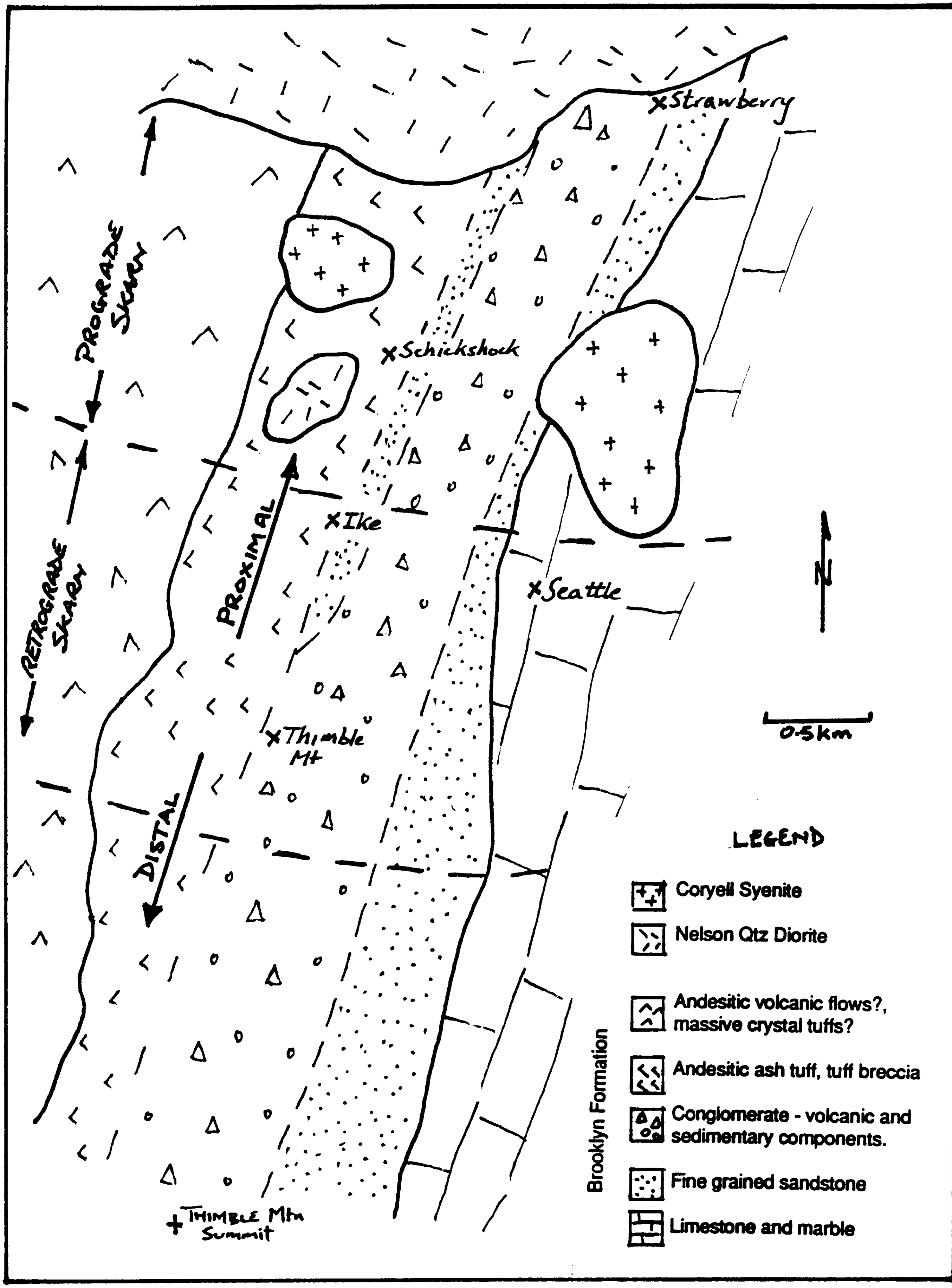


FIGURE 7
Thimble Mtn. Claim Group
Geological Interpretation Map

Individual skarn showings have different calcsilicate mineralogy,, sulphide-oxide compositions, and degree of retrograde alteration, which, considering the similarities in protolith, suggests they are part of a large, zoned skarn system. Skarn at the Strawberry showing is garnet-rich, contains magnetite + pyrrhotite + gold, and occurs near the contact of a large body of Nelson-type quartz diorite. Continuing to the south, the Schickshock crown grant is a sulphide-poor, prograde garnet skarn with limited magnetite + pyrrhotite. This showing is also near a contact with a smaller quartz diorite body which lies to the west of the centre of the claim group. Calcsilicate skarn at the Strawberry and Schickshock showings display little or no retrograde alteration.

Skarn at the Thimble Mtn. showing is distinctly more retrograde altered than the Strawberry and Schickshock occurrences. Only sparse remnant garnet (and pyroxene?) remains. The majority of calcsilicate minerals are replaced by a retrograde assemblage of amphibole-chlorite-carbonate-sulphides. Abundant fine grained hematite and chlorite gives the skarn a mottled dark reddish brown color, identical in appearance to skarn boulders found the Phoenix mine. High grade gold assays (> 1.0 opt) are recovered from chalcopyrite-bearing, magnetite skarn.

Several smaller occurrences of skarn and silicified rock crop out in the area between the Thimble Mtn. and Strawberry showings. Most notable of these are the Seattle and Ike occurrences,which are comprised of chlorite-carbonate-sulphide skarn and massive pyrrhotite mineralization, respectively.

Although additional surface mapping, lithogeochemistry, petrographic analyses and geophysical surveys are required for a better understanding of the geology and skarn formation on Thimble Mtn., construction of a hypothetical model useful for guiding further exploration on the property is possible. Figure 7 illustrates broad relationships among surface geology, skarn distribution, intrusive contacts and alteration mineralogy. There is a suggestion of a proximal-distal skarn relationship between the Strawberry and Thimble Mtn. showings, respectively. This is supported by:

1. Abundance of permissive intrusive rocks near the Strawberry skarn;

2. Higher temperature, garnet dominant skarn at the Strawberry and Schickshock occurrences;

3. Lower temperature, retrograde alteration, and gold-sulphide mineralization at the Thimble Mtn. showing; and

4. Other skarn occurrences which possibly display intermediate characteristic to the above.

Recognition of proximal/distal components of a skarn system is a fundamental guide in exploration because the gold-rich ore bodies occur on the outer margin of the calcsilicate skarn.

DETAILED STREAM SEDIMENT SAMPLING OF RATHMULLEN CREEK

Background

The valley of Rathmullen Creek carries a continuous cover of glacial drift which appears to be at least 10 metres thick and composed dominantly of fluvioglacial material. Kame terraces and kettle holes are clearly visible in a number of places. It is believed that during deglaciation a stagnant ice mass occupied the valley of Brown Creek to the north and gradually downwasted. The fluvioglacial debris seem to be derived not only from the south but also the north and west from the melting ice mass. Glacial till may be present beneath the stratified drift.

Exploration of the Rathmullen valley is severely hampered by the cover of exotic drift. Outcrops higher on both sides of the valley include mineralization and alteration which gives encouragement that the valley floor itself is eminently prospectable.

Previous work in this area has included soil geochemical and ground geophysical surveys by a number of groups. Results have been inconclusive. Soil sampling can be discounted as a technique because of the presence of the stratified drift -it simply won't work. Geophysical surveys seen to be handicapped by an ambiguity of response from potential mineralization - in effect there are too many anomalies.

The need, therefore, is for a means of establishing where, within the valley and beneath the drift cover, the most prospective ground located.

During initial reconnaissance of the area it was noted that Rathmullen Creek is incised into the drift and, although no bedrock is exposed, intersects the ground water table almost continuously along its channel. The presence of seepages emerging at the break in slope from within and beneath the drift, together with the way in which the volume of water increases and decreases and the flow disappears and re-emerges from subterranean flow, are clear evidence of significant ground water flow.

It was postulated that, should mineralization be present beneath the drift, geochemical dispersion of metals from sulphide mineralization could take place hydromorphically with trace elements entering the drainage in solution in ground water at seepage points and subsequently reporting in the stream sediments.

Thus, systematic sampling and analysis of stream sediment along the drainage could reveal where abnormal concentration of metals enter the drainage. The ultimate source in mineralization would lie up the hydraulic gradient of the ground water to the side of the creek. Follow up sampling and analysis of soils and seepages on both banks would reveal on which side of the stream the metals are entering the drainage and further localize the source. Follow up beyond this stage would become more reliant on ground geophysics and geological inference.

Procedures

Sampling: Rathmullen Creek was traversed from the claims line to the confluence with Brown Creek, a distance of 3.8 km. Stream sediment samples were collected at 100m intervals along the creek, and from a single east bank tributary (Figure 8).

Analysis: All samples were sent to Acme Analytical laboratories for sample preparation. The minus 80 mesh fraction of stream sediment was then analysed for gold by aqua regia digestion AA finish and for a further 29 elements by HCL-HNO_3-H_2O digestion and ICP determination. The latter is a strong acid extraction (Tx) which recovers metals from a variety of combination is the sample and thus for elements such as Cu, Zn, and As provides data descriptive of both mechanical and hydromorphic dispersion.

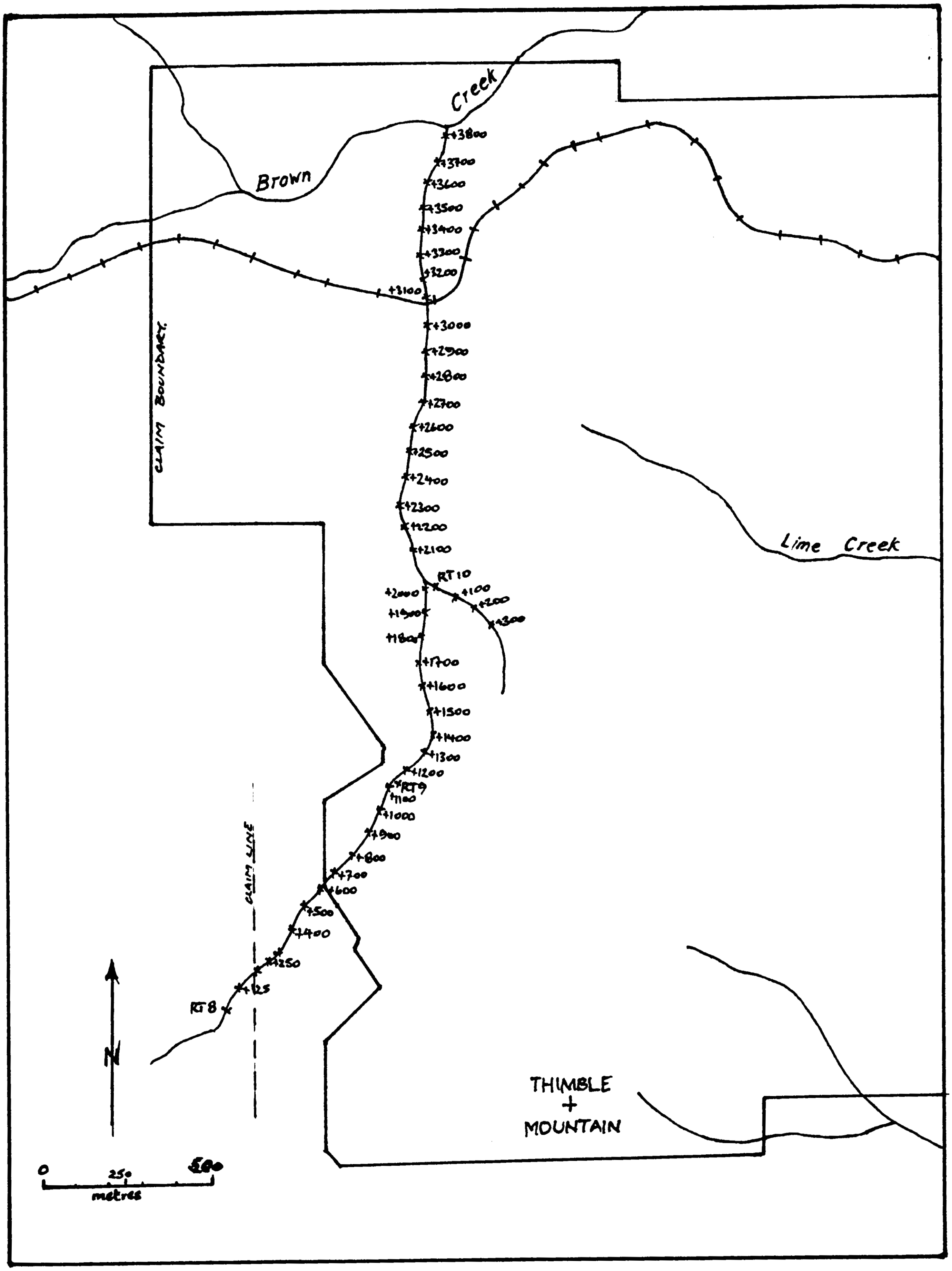


FIGURE 8
Rathmullen Creek
Detailed Stream Sediment
Traverse (Prefix RT8) Sample Locations

The samples were subsequently assigned to Bondar Clegg for analysis by a cold 10% HCL acid digestion (16 hour shake) and ICP simultaneous multi element determination. This is a weak extraction (Cx) which recovers elements that are associated with secondary oxides, organic matter, clays and weathered silicate minerals. Metals incorporated with oxides, organic matter and clays are frequently the product of hydromorphic dispersion. Data from the Cx extraction technique can be used as an indicator of the relative contribution of metals from ground water seepage versus clastic dispersion of detrital debris.

Results

The data are displayed in profile from as a traverse along Rathmullen Creek in Figures 9 to 15. Eight elements are selected for presentation as having potentially meaningful distribution patterns. Data for the strong acid (Tx) extraction and the weak extraction (Cx) are plotted both for Cu, Zn and As.

Iron and Mn (Figures 14 and 15) are presented to examine the possible effect of scavenging or secondary accumulation of metals co-precipitated and absorbed onto secondary oxides of these elements. Iron has a very simple distribution with abundances increasing gradually downstream. Manganese shows a marked peak at site 1100 and a steady increase in abundance downstream from site 2800. The increase in Fe and Mn in the lower part of the drainage occurs where the stream and valley change gradient and is thought to reflect the nature of soils and drainage on the steeper north facing slopes flanking Brown Creek.

Gold (Figure 12) displays an erratic distribution. It occurs in detectable concentrations throughout the drainage, a matter of significance in itself since a source in the district is thus indicated. However, for all practical purposes Au is immobile in this environment,dispersion is by mechanical transport only and the abundances recorded in the streams sediment samples are derived from the adjacent stratified drift. The erratic pattern of abundance is probably at least in part due to the presence of particulate gold. There is, however, a tendency for the higher values to cluster suggesting input of material in the upper part of the drainage between sites 400 and 1000 and again lower in the drainage around site 2500 and 2900.

Zinc, Cu and Cd are mobile in this environment and fully capable of taking part in hydromorphic dispersion. The patterns displayed by these elements are thus particularly important.

Zinc (Figure 10) shows evidence of massive input of material in the headwaters between sites 200 and 600 with down stream dispersion and rapid dilution. The pattern is present in both Tx and Cx. Contrast is, however, stronger in Tx and the percentage of Cx metal is lower (30%) in the area of input that in background locations downstream (40-50%). The relationship of Cx to Tx indicates that a lower proportion of Zn is derived hydromorphically in the headwaters. The massive input of Zn in thus largely in the form of detrital debris.

A small peak in Cx Zn is seen at 3100 where the proportion of Cx to Tx metal also increases sharply to 72%. The site is immediately downstream from the railroad grade and suggests the presence of soluble Zn contamination from this source.

Cadmium (Figure 13) (a geochemical follower of Zn) shows a slightly different pattern with a broader zone of elevated values in the headwaters. This is, however, created partly by a peak at site 1100 which is co-incident with the Mn maxima noted above. Scavenging of Cd by Mn oxides is suspected at this location.

Figure: 9. RATHMULLEN CREEK

STREAM SEDIMENT TRAVERSE

COPPER IN STREAM SEDIMENTS

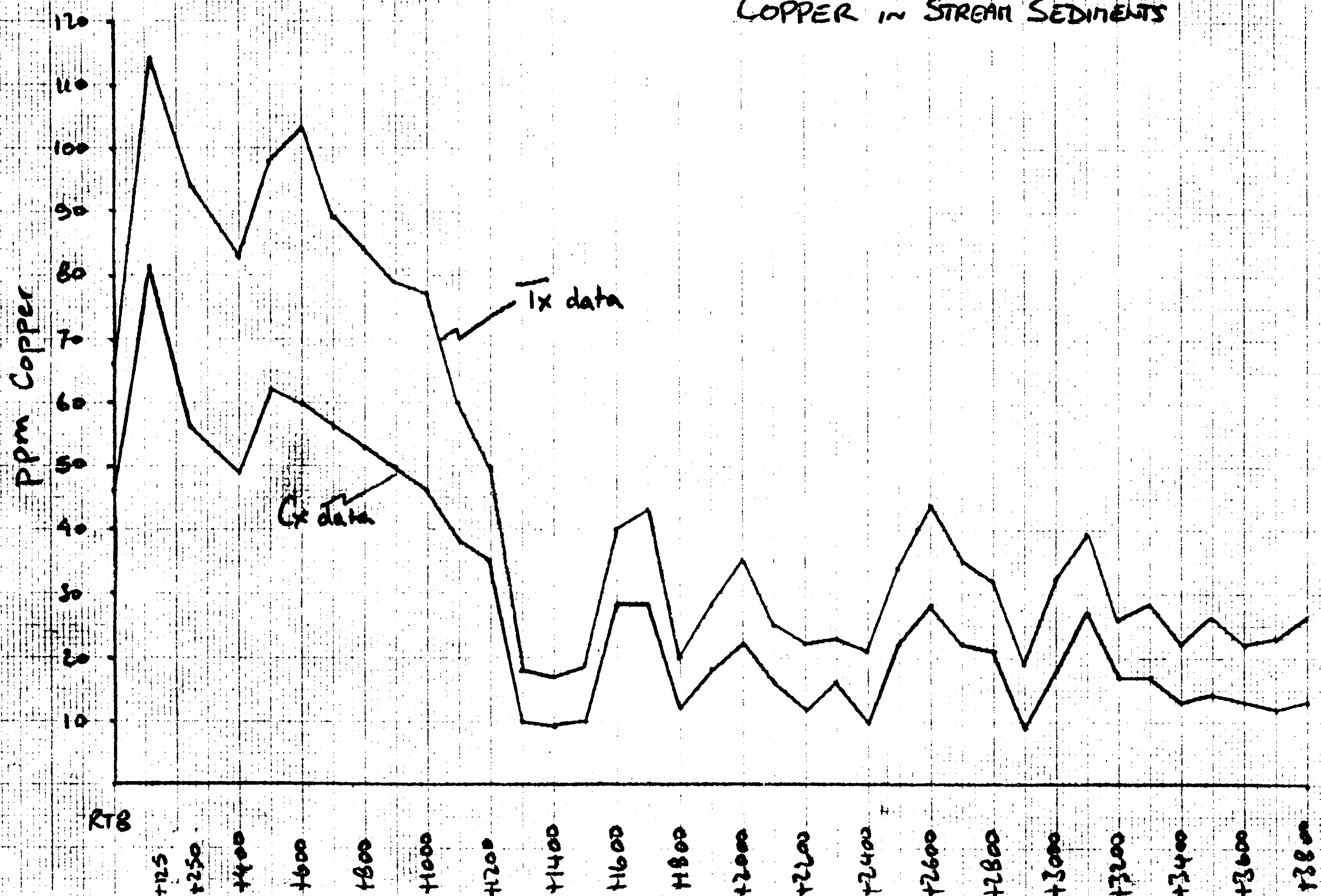


Figure: 10

RATHMULLEN CREEK

STREAM SEDIMENT TRAVERSE

ZINC IN STREAM SEDIMENTS

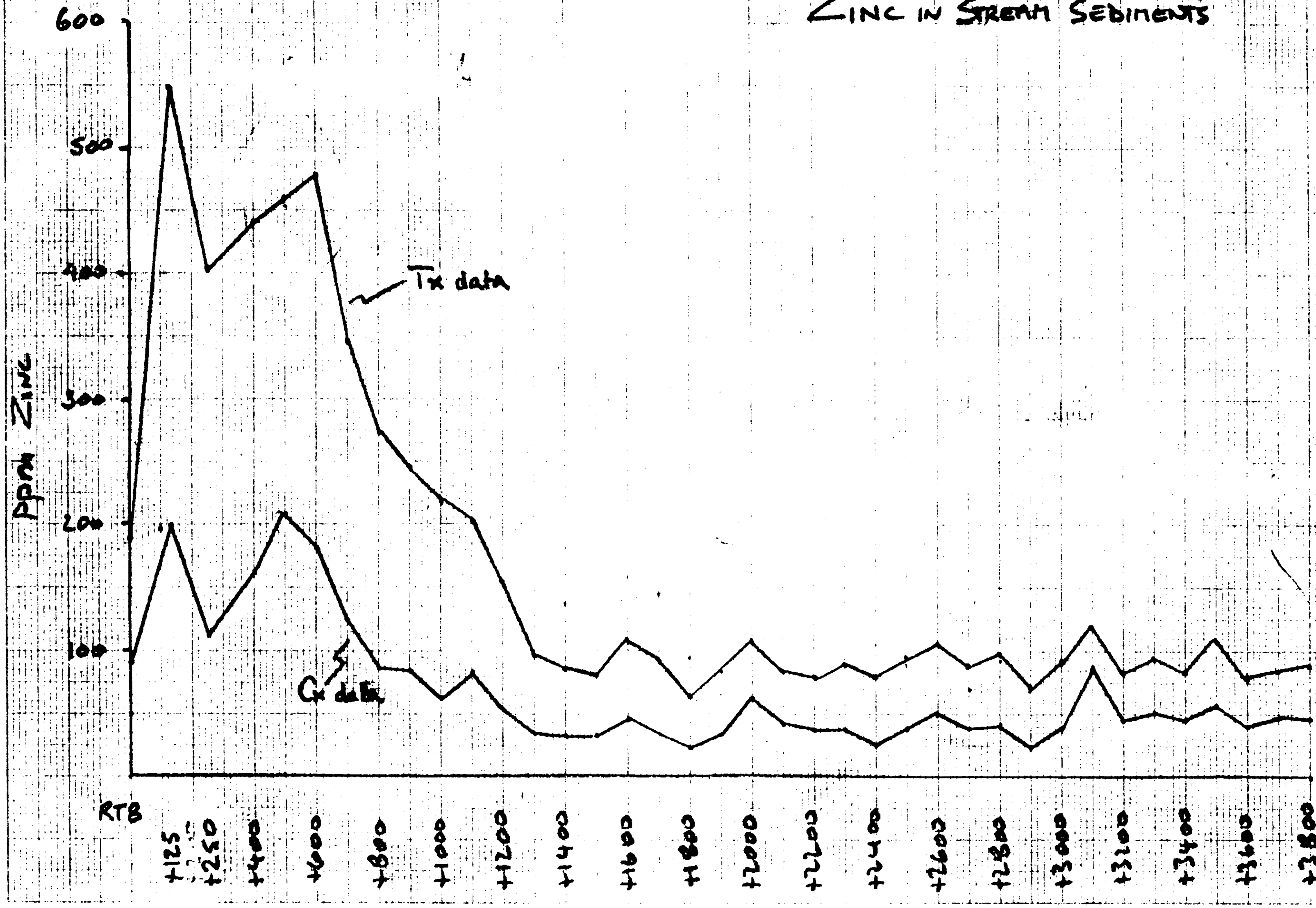


Figure: 11

RATHMULLEN CREEK

STREAM SEDIMENT TRAVERSE

ARSENIC IN STREAM SEDIMENTS

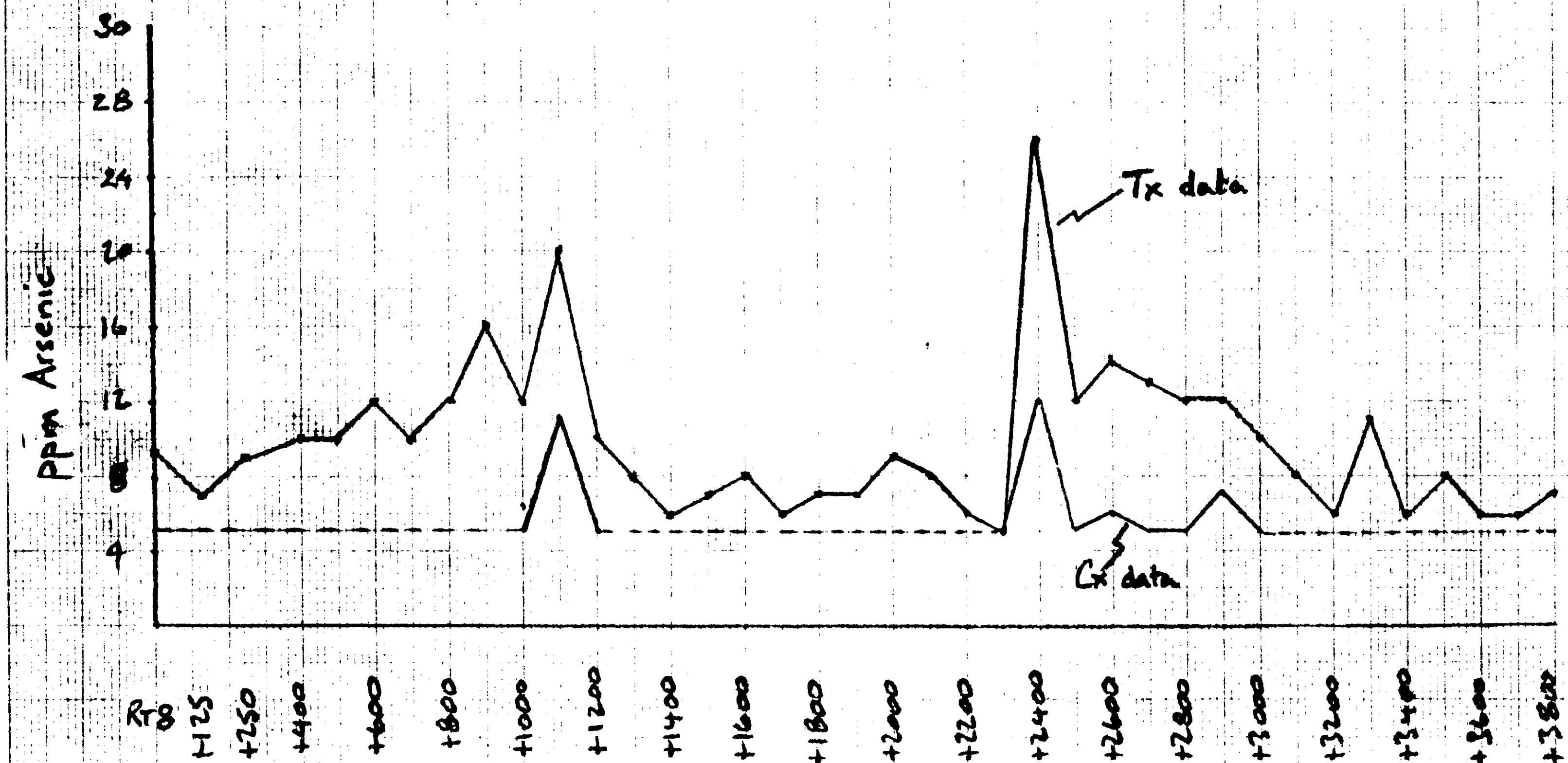


Figure: 12

RATHMULLEN CREEK
STREAM SEDIMENT TRAVERSE
GOLD IN STREAM SEDIMENTS
(Aqua Regia Extraction)

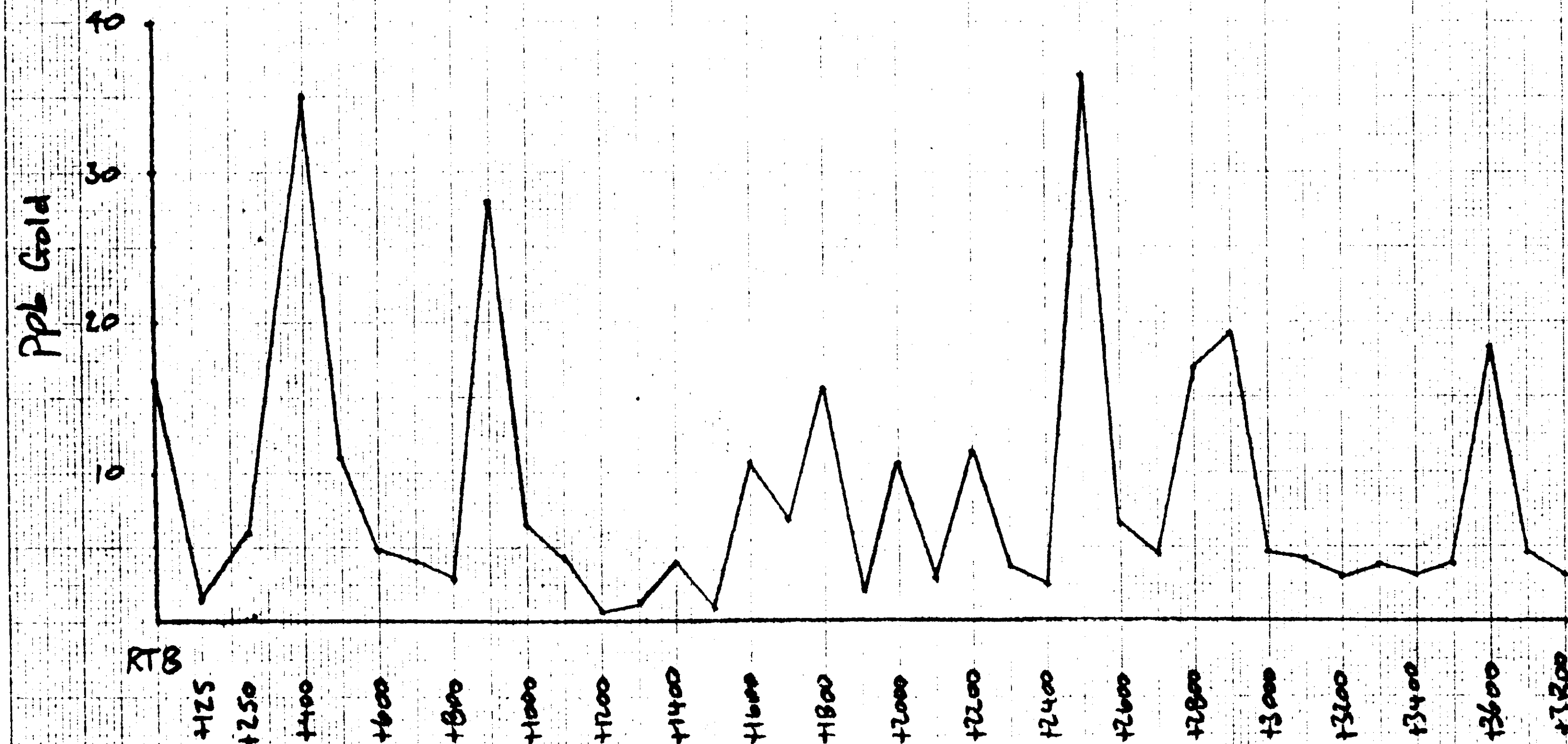
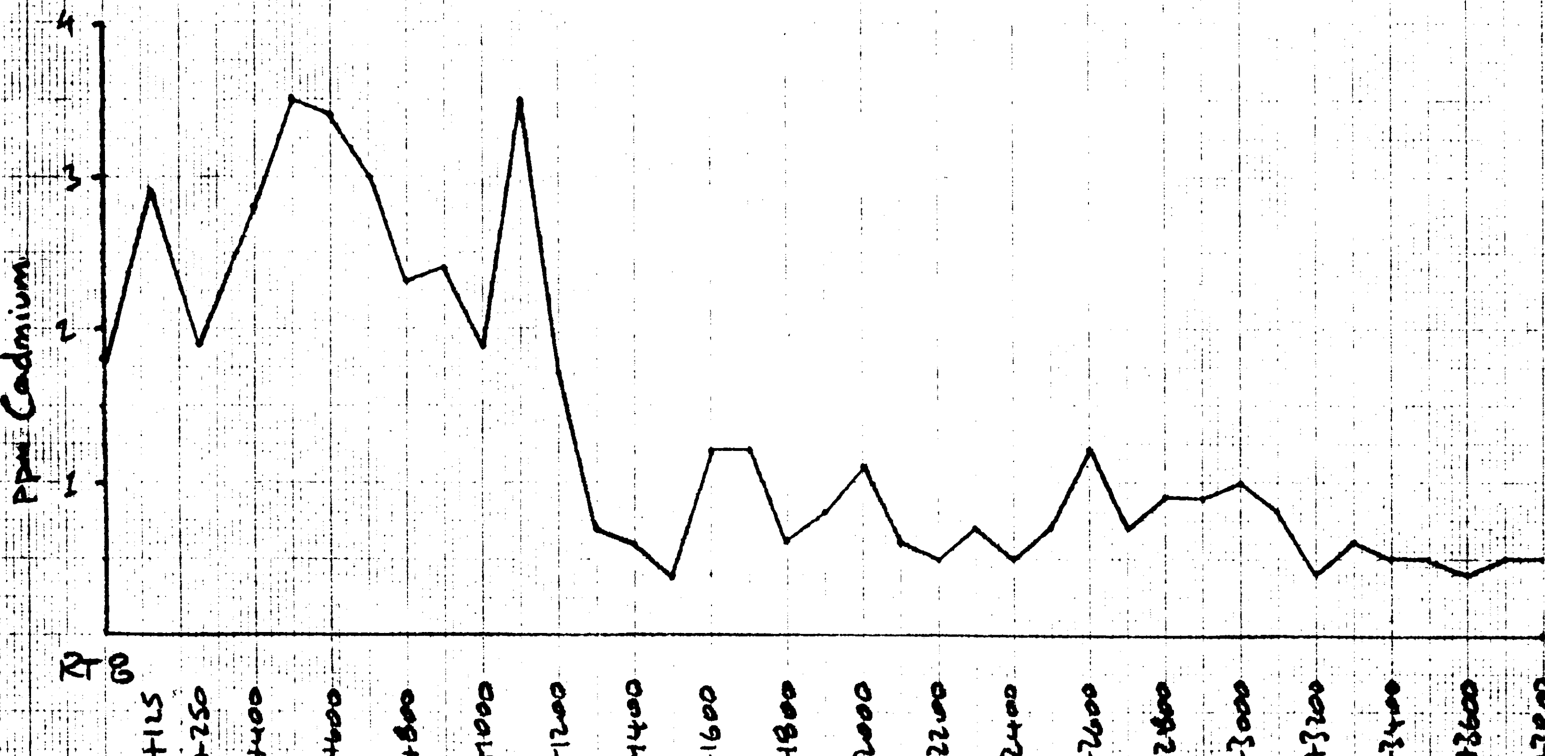


Figure: 13

RATHMULLEN CREEK

STREAM SEDIMENT TRAVERSE

CADMIUM IN STREAM SEDIMENTS (Tx data)



ALBANENE GUIDE LINE NON-REPRODUCIBLE 10 5661 MILLIMETERS

Figure: 14.

RATHMULLEN CREEK

STREAM SEDIMENT TRAVERSE

IRON IN STREAM SEDIMENTS (Tx data)

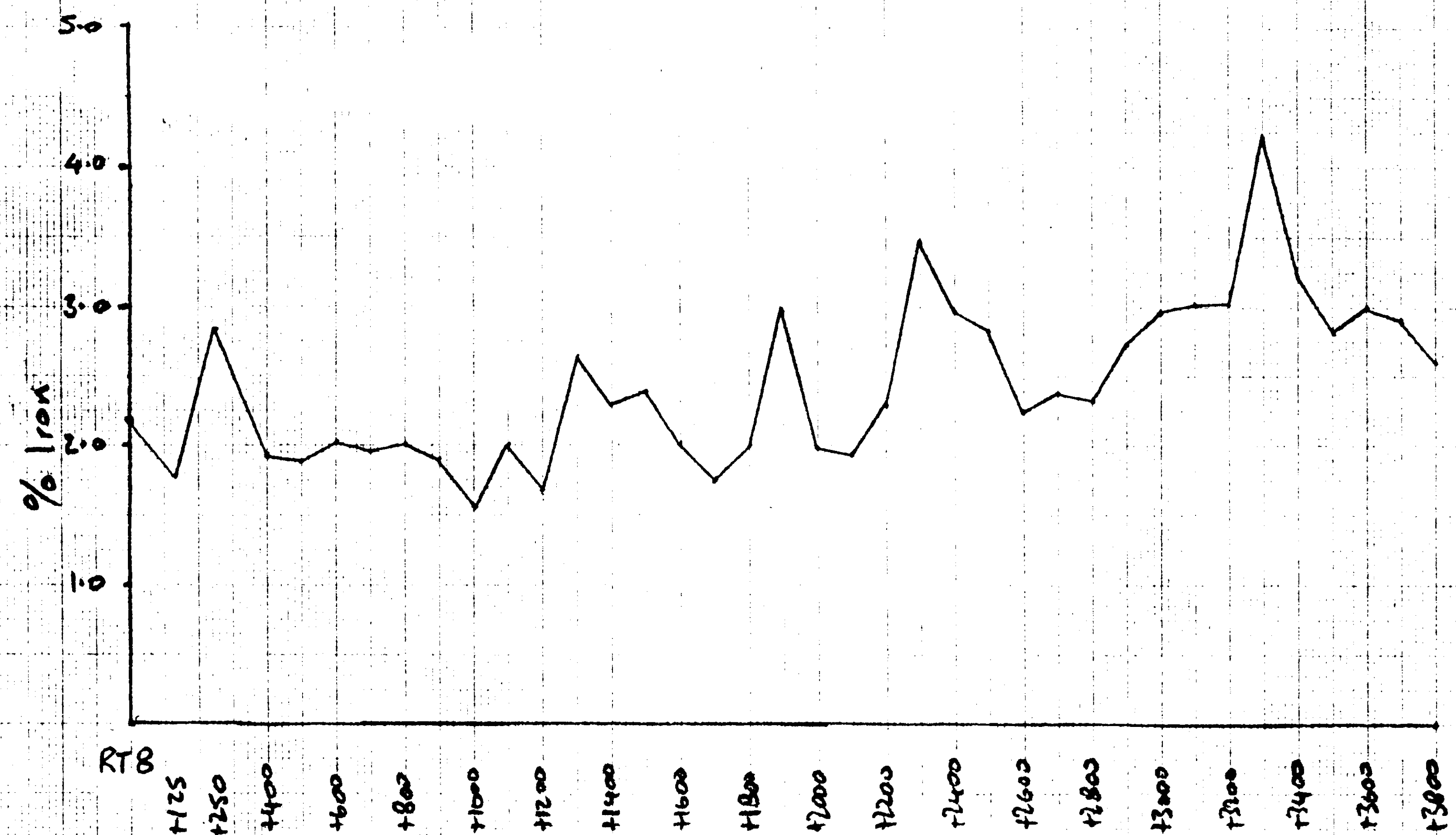
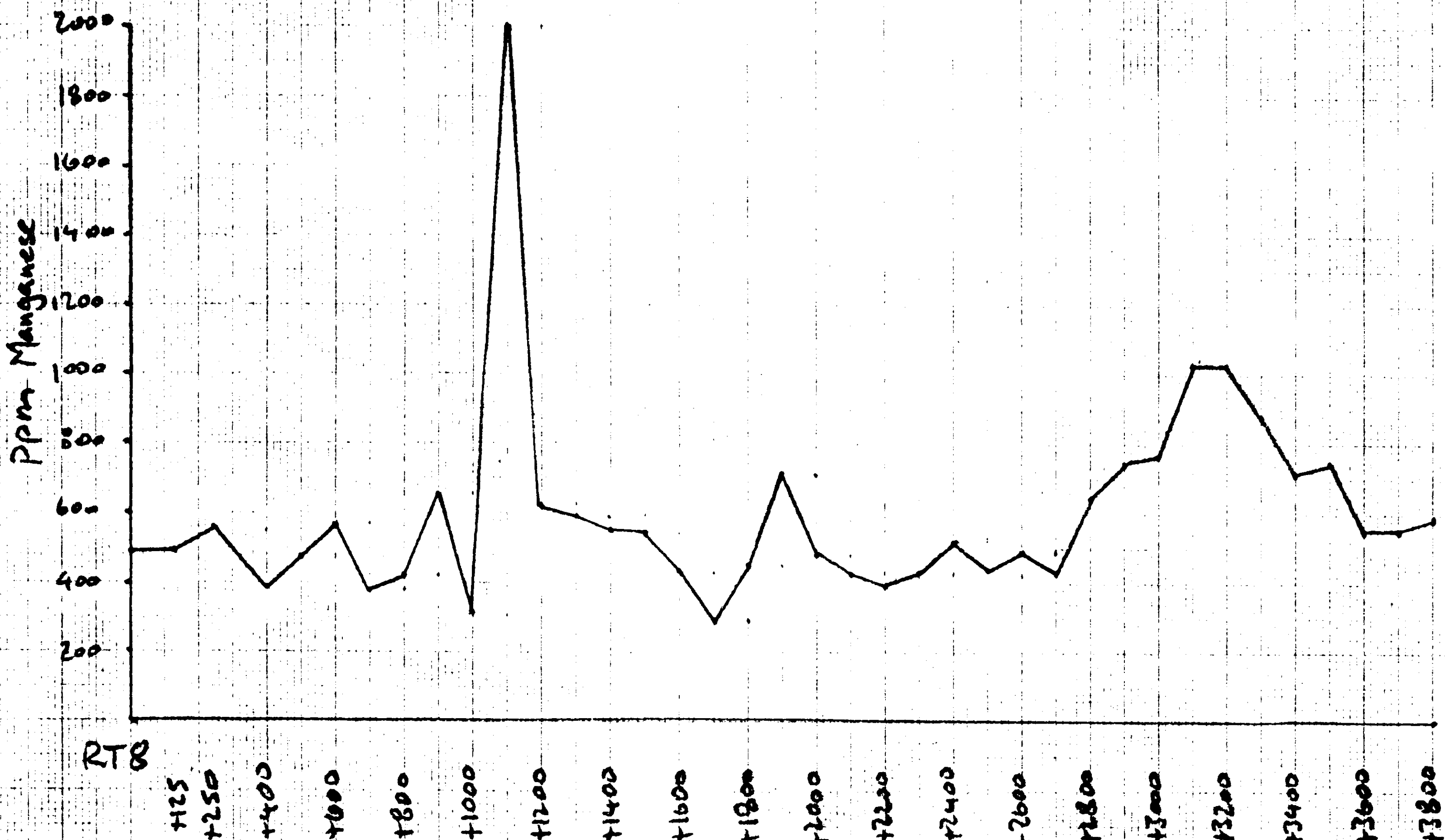


Figure: 15. RATHMULLEN CREEK
STREAM SEDIMENT TRAVERSE
MANGANESE IN STREAM SEDIMENTS (Tx data)



KOE 10 X 10 TO THE CM
ALBANENE NON-REPRODUCIBLE

Copper (Figure 9) displays a broad zone of high values in the headwaters suggesting a principal input of metals between sites 400 and 600. Abundance stays high through to site 1000 at which point downstream dispersion/dilution appears to begin. Values drop precipitously at sites 1300, 1400 and 1500 before rising again. It is suspected that the simple dispersion train has been interrupted by dilution between site 1300 and 1500.

Comparison of the patterns for Cu and Zn show that the profile for Cn is broader suggesting a wider zone of input of Cu rich material extending from site 200 across to 1000.

Downstream, Cu values are somewhat erratic but the patterns suggest further input of material between site 2500 and 2800 and again at site 3100 where contamination from the railroad grade in suspected.

The proportion of Cx Cu is essentially similar throughout the traverse at about 60%. This is indicative of relative consistency in the mode of dispersion. The proportion of Cx material is higher for Cu than Zn, suggesting that Cu is more readily involved in hydromorphic dispersion, a feature not easily rationalized with general expectations and what is known of the secondary environment in this area.

Arsenic has a very simple distribution pattern indicating two zones of metal input at sites 900 to 1100 and 2400 to 2900 respectively. Further, the portion of Cx material, where detected, is relatively high (40-70%). Arsenic is normally less mobile than Cu and Zn in this environment yet appears to be entering the drainage by hydromorphic dispersion.

Working Interpretation

There is no evidence that the distribution of Cu, Zn and As is strongly influenced by secondary scavenging or co-precipitation with Fe or Mn. The data can therefore be interpreted directly in terms of possible geological (ie. mineralization) controls.

Four occurrences of abnormal concentrations of Zn, Cu and As are recognized along Rathmullen Creek:

1. A major input of Cu + Zn between sites 200 and 600. Much of the dispersion appears to be mechanical suggesting that the source may be mineralization outcropping close to the stream channel or abundant mineralized debris in the drift.

2. A significant input of Cu + As between sites 800 and 1000. Copper is a major component of this source which may or may not be spatially related to source 1. Both clastic and hydromorphic processes are contributing to this feature.

3. A significant input of As + Cu between sites 2400 and 2800. Arsenic is more important than Cu in the development of this feature and appears to have a strong component of hydromorphic dispersion.

4. A significant input of Zn + Cu at site 3100. The geographic location and chemical characteristics of this feature suggest that it is due to contamination from the railroad grade.

Occurrences 1, 2 and 3 mentioned above are thought to be significant in terms of mineral potential. Given the frequent geochemical relationship between As and Au, occurrences 2 and 3 are possibly more important.

At this time knowledge is limited to the presence of abnormal metal concentrations in the drainage. The sources of these metals remains enigmatic. Follow up is required to establish their full economic significance. This should involve:

A. Sampling and analysis of break in slope soil and seepage samples at 50m intervals through each of the three metal rich occurrences to determine under which bank the source is located.

B. Sampling and analysis of stream sediment samples from the southerly tributary that enters Rathmullen Creek close to site 1100 and the west bank tributary that enters the creek close to site 2400.

C. Examination of the stream banks for mineralized float.

WORKING CONCLUSIONS AND RECOMMENDATIONS

The present work program has provided evidence that a large, zoned hydrothermal skarn system is present within the claim group. The outer, retrograde altered, portion of the system is currently considered particularly permissive for gold rich mineralization. An east west zone, north from the Thimble Mtn. showing, roughly along the line of Lime Creek, and across to the Senator Mine, should thus become the focus of early attention. Interestingly this would include the area of the As + Cu (stations 2400 to 2800) rich zone of stream sediments in Rathmullen Creek.

A grid should be established across the zone of interest, together with the trend of silicification north east from the Schickshock showing. Detailed geological mapping and prospecting soil geochemical sampling (not over the drift covered portion of the Rathmullen drainage), ground magnetic and IP surveys should be considered for this area.

The next round of work should aim to confirm the nature of the skarn alteration system and define the extent of potentially mineralized ground. Targets developed by this work should be trenched to expose bedrock for examination and sampling and, where justified, tested by diamond drilling.

REFERENCES

Ettlinger, A. 1991. Report on Alteration and Mineralization, SCHICKSHOCK CLAIM GROUP. Unpublished Assessment Report.

Fyles, J.T. 1990. Geology of the Greenwood - Grand Forks Area, British Columbia, NTS 82E/1,2. B.C. Geological Survey, Open File 1990-25.

Little, H.W. 1983. Geology of the Greenwood Map Area, British Columbia. Geological Survey of Canada, paper 79-29.

STATEMENT OF COSTS

THIMBLE MTN. CLAIM GROUP

1. Personnel, Geological Mapping and Sampling, Geochemical Sampling, Data Compilation, September 1, 1991 - November 30, 1991

A. Laird	25.0 days	
A. Ettlinger	6.5 days	
I. Thomson	8.0 days	
P. Bradshaw	2.0 days	
R. Fredericks	2.5 days	
D. Hillhouse	1.0 day	
Total	45.0 days	$ 16,940.26

2.	Assaying and Geochemical Analysis	1,331.48
3.	Field Supplies /Communications	239.44
4.	Drafting/Reproduction	31.46
5.	Accommodation and Subsistence	1,033.32
6.	Travel/Vehicle Expenses	2,662.27
	Total:	$ 22,238.23

STATEMENT OF QUALIFICATIONS

I, Ian Thomson of 1628 West 66 Avenue, Vancouver, British Columbia V6P 2S2 do hereby certify that:

1. I am a graduate (1967) of the University of London, England, with a Bachelor of Science degree in Geology and a graduate (1971) of the University of London, England, with a Doctor of Philosophy degree in Applied Geochemistry.

2. I am a registered Professional Geoscientist in the Province of British Columbia.

3. I have been continuously employed as a geologist-geochemist involved with mineral exploration for 20 years.

4. I hold the position of Chief Geologist with Pan Orvana Resources Inc.

5. I am personally familiar with the area of the Thimble Mtn. Claim Group having worked on the property September 1991.

6. This report is based on information obtained by myself and others working under my direction and from analytical data obtained from commercial laboratories.

Ian Thomson, B.Sc., Ph.D., P.Geo.

STATEMENT OF QUALIFICATIONS

I, Andy A. Laird currently residing at #314 - 251 West 4th Street, North Vancouver, British Columbia V7M 1H8 do hereby certify that:

1. I have been a practicing geologist in Canada and the United States since 1982.

2. I received a B.Sc., Geology in 1982 from the University of British Columbia.

3. This report is based on information I obtained while at Thimble Mountain in 1991, from analytical data from external laboratories and from external consulting.

Andy A. Laird, B.Sc.

APPENDIX 1

Petrographic Descriptions
by
A. Ettlinger

92718 (A. Laird) This rock consists almost entirely of epidote. If forms coarse, anhedral interlocking grains which are turbid due to numerous fluid and opaque inclusions. The epidote replaces garnet, a fractured remant of which is visible in a portion of the polished section. Isotropic and birefringent fragments of garnet are present. Minor calcite occurs interstitial to epidote, and as fracture fillings surrounding the remant garnet. A small amount of pyrite occurs as remant islands surrounded by Fe-oxides.

92913 (A. Laird) Skarn from the Seattle showing. This was probably originally a siliciclastic rock which is now strongly foliated. It consists of approximately of 60% epidote, 25% fine grained quartz, 5-7% sulfides and 8-10% magnetite with minor hematite. Chalcopyrite is most common, and forms attenuated, elongate grains aligned in the foliation plane. Pyrite and magnetite grains are often dismembered. Chalcopyrite can be observed attached to both magnetite and pyrite grains, and pyrite sporadically encloses magnetite, suggesting the three share a common paragenesis. A small amount of hematite replaces the outer margins of magnetite grains, as does rare bornite on chalcopyrite grain margins.

100601 (A. Laird) This is typical of the mottled pale to dark green alteration often seen in Brooklyn sharpstone conglomerate. This sample is from a small adit and dump, immediately west of the northern most railroad tunnel on Thimble Mtn. The rock consists primarily of fine grained quartz, which is completely recrystallized; only vague outlines of remnant chert fragments are visible. Abundant clinozoisite (epidote?) and clots of calcite overprint the conglomerate. Sulfides include: 1% pyrite as anhedral to equant subhedral grains, minor chalcopyrite as small isolated grains and as inclusions in pyrite, and a couple of grains of molybdenite.

100808 (A. Laird) This rock is not skarn altered, but has undergone potassic alteration. It consists almost entirely of submillimeter, angular, lithic and crystal fragments and could be called a volcanic-lithic siltstone. Chert fragments are most abundant, they display varying degrees of quartz recrystallization. Subrounded quartz grains, and angular quartz fragments, exhibiting undulose extinction indicative of deformation, are the next most abundant fragments types. A few whole and broken crystals of plagioclase feldspar suggest the volcanic component. Most crystals and fragments are relatively unaltered. Interstitial to the fragments, however, is abundant secondary green and brown biotite, and lesser chlorite. The biotite fills gaps between fragments, or occurs as disseminations or crosscutting veinlets in rare areas of quartzofeldspathic matrix. Sulfides are absent, and approximately 0.5% ilmenite is associated with chlorite as alteration products of biotite.

100911 (A. Laird) This is a classic garnet-pyroxene skarn. Early, fine grained pyroxene grains are poikilitically enclosed by later, isotropic garnet. Garnet crystals are coarsest and most euhedral where growing into vugs of carbonate. Larger garnet crystals have zoned, anisotropic overgrowths. Garnet is locally altered to carbonate and uniaxial (-) K-feldspar. Less than 0.5% sulfides consist of chalcopyrite and pyrite, which is partially altered to limonite + hematite.

This sample is very similar to skarn found at the Nickel Plate deposit. The abundant, early pyroxene, anisotropic garnet overgrowths, and "retrograde alteration" of garnet to carbonate and K-feldspar, are all characteristics common to that gold skarn. Carbonate - K-feldspar alteration is also observed at the Little Billie mine on Texada Island. Oxidation of the pyrite in this sample is not observed at Nickel Plate, however, this may be the result of later groundwater oxidation.

19817 This is sharpstone conglomerate displaying a skarn altered matrix. Rounded pebbles of recrystallized quartz are supported by a heterogenous matrix of quartz, carbonate and plagioclase. Quartz grain size is highly variable, particularly between different pebbles, suggesting that some metamorphism may have occurred prior to deposition of the conglomerate. Amphibole is the most common skarn alteration mineral. It forms clots of pleochroic green, acicular and tabular crystals generally restricted to the matrix which it locally completely replaces. Chlorite is sparse. A small amount of pyroxene may be present as a dusting of submicron grains associated with carbonate alteration. Approximately 0.5% anhedral pyrite grains are partially to completely replaced by hematite + limonite.

100820 (A. Laird) Andesitic (?) country rock surrounding the trench on Thimble Mtn. (see sample #100821 below). It is a porphyritic volcanic rock, however, compared to #100821, phenocrysts are much more abundant and are often in contact with each other. Plagioclase is most common and displays sericite altered cores with less altered rims. Amphibole phenocrysts may be, in part, secondary after clinopyroxene and are partially altered to epidote + chlorite. The groundmass is dark grey and probably an intergrowth of quartz + feldspars. Submicron grains of hematite impart a reddish internal reflectance to the groundmass under cross polarized, reflected light. 3-5% irregular clots and rounded grains of hematite were probably originally magnetite or ilmenite. No sulfides are present.

100821 (A. Laird) Retrograde skarn from the trench on the Thimble Mtn. showing. This rock is a plagioclase porphyry, possibly a crystal tuff. It contains about 15% plagioclase crystals, many appear broken, in an aphanitic groundmass. Sericite alteration, and later epidote + chlorite have obscured original groundmass composition. Late carbonate filled fractures cut the rock. Approximately 2-3% equant, anhedral grains of hematite (replacing magnetite?) are scattered throughout the rock. No sulfide minerals are observed.

This rock is of volcanic origin. Alteration is not necessarily related to skarn and may result from propylitic alteration associated with regional metamorphism. I don't believe this protolith and alteration style is representative of the mineralization found at this showing.

APPENDIX 2

Rock Sample Descriptions and Analytical Data Listings

THIMBLE MOUNTAIN PROJECT
Rock Samples

SAMPLE #	DESCRIPTION
11979	Massive pyrrhotite, medium grained, minor quartz clasts. Fairly strongly magnetic. Trace to 1% chalcopyrite clots.
11980	Quartzite. Wall rock to massive sulphide. Tan colored with trace to 5% disseminated pyrrhotite.
11981	Massive pyrrhotite. Fine to medium grained. Trace to 20% quartz in groundmass. Trace to 1% chalcopyrite and pyrite. Chalcopyrite as blebs and stringers, pyrite as euhedral coarse grained isolated crystals.
11982	Massive pyrrhotite. Very pure and massive. Trace pyrite and chalcopyrite.
11983	Interbedded hornfels and marble. Thinly bedded 30% light grey marble and 30% biotite hornfels and 40% medium green fine grained rock - pyroxene hornfels? Weak limonite stain. No sulfides.
18739	Massive granular pyrite (50%) and earthy dark red orange/brown iron oxide: Taken from 6 ins shear. Wall rock is marble.
18740	Garnet-magnetite skarn with epidote-chalcopyrite retrograde alteration. 5-30% magnetite, 1-50% sulphide chalcopyrite greater than pyrite. Calc-silicate banding.
18741	20 - 70% magnetite garnetiferous green skarn (epidote) low sulfides.
18742	From bed of green amphibole, medium orange/brown garnet, minor epidote skarn in marble. Medium bedded. Skarn bed up to 3 feet thick.
18743	Epidote/amphibole retrograde alteration of orange/brown garnet skarn. Up to 30% epidote. 1-2% chalcopyrite greater than pyrite. No magnetite.
18744	Mostly dark green amphibole skarn with 10-50% magnetite, 2-20% pyrite, trace chalcopyrite. Malachite stain minor. From bed at least 4 ft thick.
18745	Dark mottled green skarn, mostly pyroxene?, possible celestite and calcite. Very heavy and dense. 1-3% pyrite blebs. Non magnetic.
18746	Altered garnet skarn with quartz-magnetite veins. Magnetite in garnet. Malachite stain.
18747	Gossanous green skarn. Mostly medium to dark orange brown iron oxides, a few blebs of fresh pyrite. Very crumbly and rotten - possibly a structure c 5 ft wide, verticle.
18748	Rotten and fresh pyrite. Appears to be pods in floor of trench. Pyrite is crushed and grey to silvery gold. Endoskarn adjacent.

18749	Skarn, 50% light brown garnet, 50% light grey calcite. No magnetite or sulfides.
18750	Massive magnetite. Minor epidote and pyrite.
19551	Thin drusey quartz veins in unaltered limestone. Wide open fractures.
19552	Massive pyrrhotite, minor pyrite. Unaltered limestone and andesite in IKE trenches.
19553	Quartz-calcite vein material on dump. Fair to strong fine granular chalcopyrite and pyrrhotite disseminated in quartz portion. Calcite fraction is barren and crystalline.
19554	Outcrop at shaft. Sulphide skarn with pyrrhotite, chalcopyrite and calcite.
19555	Outcrop of andesite with skarn. Pyrrohotite, chalcopyrite. calcite, epidote, garnet. Minor limonite oxidation.
19556	Quartz vein with chalcopyrite in andesite.
19557	Very strong, very fine grained pyrrhotite, disseminated in purple grey hornfelsed siliceous limestone interbedded with thin limey horizons and chert.
19558	Very strong to massive laminated magnetite with disseminated chalcopyrite and pyrrhotite in actinolite-epidote skarn after andesite? below unaltered limestone. Pulaskite? dike < 3m thick, unaltered, non mineralized in trench.
19559	Skarn, actinolite, epidote, quartz with minor chalcopyrite and magnetite.
19560	Garnet-epidote skarn after diorite within limestone. Very thin wisps of magnetite, trace disseminated chalcopyrite. In trench at raise from underground.
19561	Grab sample
19562	Thin bedded coarse sharpstone? Mostly altered to epidote-chlorite-carbonate with pyrrhotite.
19563	Fine-med euhedral pyrite disseminated in silicified chlorite-epidote altered sharpstone.
19564	Very sugary recrystallized skarn. Felted black amphibole?, epidote and hematite alteration. Trace pyrite, malachite stain.
19565	Fresh Nelson diorite dike cutting retrograde skarn. Parallel hematite veinlets.
19566	Strongly altered skarn. Very fractured, hematitic. Med. grain pyrite, fine chalcopyrite. Bedding unclear.
19567	Skarn. Massive pyrite with disseminated pyrrhotite.
19568	Grab sample.

19563	Grab sample.
19570	Shear zone with trace pyrite and minor limonite in marble with siliceous fine grain bands parallel to shear.
19571	Hematitic skarn. Very dark fine grained chert clast supported. Matrix black and hard - hornblend?
19572	Strong garnet-pyrite-hornblend skarn. No protolith.
19573	Sulphide skarn. Massive fine pyrrhotite with strong clots of coarse pyrite.
19574	Magnetite skarn. Massive fine magnetite with minor clots of pyrite, weak chalcopyrite and trace spalerite.
19575	Dump sample trenched contact syenite with malachite, azurite, trace pyrite and cuprite?
19576	Grab sample.
19577	Grab sample.
19578	Grab sample.
19579	Massive sphalerite, pyrrhotite, minor chalcopyrite, replacing 10cm limestone bed.
19580	Strongly altered andesite. Epidote-chlorite. Propylitic or retrograde? No amphibole.
19581	Irregular pyrrhotite with minor chalcopyrite replacing bedded marble.
19701	Dark gray, fine grained mafic crystal tuff or microdiorite. Relatively unaltered, nil sulfides.
19702	Fine grained ash/crystal tuff. Limited recrystallized (?) brown biotite.
19703	Dark green siltstone/hornfels(?). Weakly calcareous. Nil sulfides
19704	Massive conglomerate. Predominately rounded chert pebbles, rare angular, red hematitic and intrusive (?) fragments in gray-green fine grained matrix. Nil sulfides. Possible Brooklyn Formation sharpstone conglomerate.
19705	Equigranular relatively fresh quartz diorite. Contains biotite + amphibole + plagiolase(?) phenocrysts in a matrix consisting of 10-15% quartz and K-feldspar(?). Moderately magnetic.
19707	Subcrop of altered mafic tuff or dike. Pervasive dark green chlorite, 1-2% disseminated pyrite. Possible ghosts of plagiolcase or K-feldspar phenocrysts. Locally weakly magnetic.
19708	Altered K-feldspar-phyric dike. Pale green silicified (?) matrix, rare remnant pink K-feldspar phenocyrysts, trace pyrite, weakly magnetic. Possibly a Coryell

pulaskite dike, however, it is highly altered relative to other Coryell intrusions.

19709
19710 Diopside + biotite(?) hornfels. Probable sedimentary protolith. Mottled dark green to brown coloured, local veinlets of altered pyroxene are associated with XX.0 cm clots of oxidized pyrite. 19709 - pyroxene + pyrite clot; 19710 - intensely silicified rock. Protolith uncertain (diorite or sediments?).

19711 Intense quartz-pyrite alteration of diorite(?). Vague remnant igneous texture may be present. Similar to sample 19710 except that here, pyrite is more abundant (2-4%).

19712 West portal of tunnel. Altered chert breccia. Angular to subrounded. light coloured quartz and chert fragments in a dark green chlorite(?) matrix. Some fragments cut by chlorite veinlets(?) while others are replaced by light green pyroxene? Entire rock is very hard.

19713 East portal of tunnel. Chert breccia (Brooklyn sharpstone conglomerate?). While angular chert fragments in a green epidote + chlorite altered matrix. Rare red jasper pebbles and veinlets, ,1% disseminated pyrite.

19714 Altered chert pebble conglomerate. Strongly calcareous, possible pyroxene stockwork as thin veinlets and wispy stringers cutting the conglomerate matrix. Trace pyrite. Brooklyn Formation(?).

19715 4m deep exploration shaft in skarn on summit of Schickshock claim. The following rock types are found in the dump material: 1) massive magnetite with minor calcite and up to 2% pyrite, 2) semi-massive magnetite with pale green pyroxene, 3) porphyritic pulaskite dike with biotite + K-feldspar phenocrysts and secondary calcite + chlorite, 4) massive epidote, 5) massive garnet with lesser magnetite, and 6) weakly magnetic garnet + pyrite skarn with trace amounts of epidote (sample #19715). Additionally, an intensely weathered subcrop of chert is located within 20m of the shaft.

19716 Silicified diorite or other siliceous, cherty rock. Generally, the rock looks like a weathered chert; however, scattered laths of amphibole(?) suggest an igneous protolith. A scraped, trench-like area trending 076^0 from the diorite outcrop, exposes rubble containing massive dark brown garnet, magnetite and calcite.

19717 Generally bleached white, fine grained marble, nil sulfides except for area sampled which is pale apple green, coarser grained, weakly silicified, and contains trace amounts of euhedral pyrite. Possible epidote or scapolite in green marble.

19718 Massive greenish brown garnet skarn cut by dark brown garnet veinlets. Massive skarn may also contain chlorite +/-pyroxene. Trace pyrite.

19719 Pale pyroxene-garnet skarn hosted by (arkosic?) sandstone. Mottled light brown to green, weakly calcareous, clastic texture.

19720 Pale green marble with tremolite or scapolite? Relatively hard (silicified?) , nil sulfides. Sample is surrounded by abundant float of soft white marble.

19721 Pale green, medium/coarse grained marble. Local Fe-stain associated with dark green chlorite alteration.

19723 Tan to buff sandy limestone or calcareous sandstone. Stockwork of X mm wide quartz + hematite veinlets, nil sulfides.

19724 Coryell syenite(?) intruding dark grey micrite. On a fresh surface the intrusion is pale grey with dark green hornblende phenocrysts and less abundant pale green (sausseritized?) plagiolast laths in a light grey aphanitic feldspar matrix. Limestone exhibits only local shearing at contact. Sill striking 39^{0}, dipping 24^{0} at 309^{0}, true thickness approximately 6-8m. Low amplitude, tight symmetrical folding observed in hanging wall micrite. Fold axes are approximately parallel to dike contact.

19725 Exploration shaft with slusher bucket. Massive epidote + magnetite + chlorite skarn with late red hematite + trace pyrite in dump. Epidote skarn in outcrop immediately above shaft contains rare brown garnet and granular chalcopyrite.

19726
19727 60m long trench at 80^{0}. Trench exposes intense retrograde skarn. Garnet is replaced by chlorite + magnetite which is cut by epidote + hematite veinlets. Minor late chalcopyrite. Tuff or siltstone protolith. Very similar to ore found in Phoenix mine. Sample #19726 - high graded for visible chalcopyrite or malachite. Also contains chlorite + magnetite + hematite. Sample #19727 - chlorite + magnetite skarn cut by epidote + hematite veinlets. Rare garnet, nil sulfides.

19728 Small exploration pit in bog. Dark green, soft chloritic rock.

19729 Piled mound of rubble. Hornfelsed sediments? Chloritic, minor biotite, 0.5% pyrite, non-magnetic. Rare quartz + chlorite veining.

19730 Intensely silicified rock. Protolith? Possibly a recrystallized chert. 0.5% disseminated pyrite, salmon pink Fe-oxide staining throughout.

19731 Medium/dark grey, fine grained limestone. Calcite + limonite stockwork, nil sulfides. Bedding observed in slumped blocks.

19732 Subcrop of Coryell granite? Medium/coarse grained, abundant pink K-feldspar, quartz, biotite and lesser amphibole. Sample #19732 - altered rock in subcrop adjacent to granite. Protolith? Siliceous, weakly calcareous, chlorite stockwork.

19733 Stream silt sediment from logging road crossing on Rathmullen Creek. Dark green-grey, organic-rich silt.

19734 Silicified quartz diorite. Abundant white quartz, fine grained, black chlorite stockwork, nil sulfides.

19735 Brown (biotite?) hornfels. Siltstone protolith. Bedding at $65^{0}/60^{0}$ at 335^{0}.

19736 Brecciated micrite. Angular micrite fragments in a variable red hematitic to yellow limonitic matrix. Crosscut by veinlets of coarse calcite. Nil sulfides. Bedding varies from flat lying to vertical, generally ESE-WNW striking.

19737	Variable laminated limestone and ankeritic limestone with 1-2% disseminated euhedral (diagenetic?) pyrite. Irregular patches of bleached, recrystallized limestone overprints laminated limestone and contains coarse anhedral, (recrystallized?) pyrite.
19738	Silicified white fine grained marble. Nil sulfides. Remnant buff coloured ankeritic laminae. Rock is relatively hard and reacts moderately to HCl.
19739 19763	Endoskarn. Epidote + hematite alteration of quartz diorite. This is the intrusion responsible for bleaching, recrystallization and silicification in adjacent micrite. Epidote replaces plagiolase, hematite and tan clay (?) replace amphibole. Nil sulfides. the diorite becomes porphyritic and grades into a fine grained greenstone to the south along the railroad grade. Sample #19739 - endoskarn; 19763- 25-35 cm thick quartz + hematite vein in diorite within several meters of limestone contact. Vein attitude: $270^0/44^0$ at 180^0.
19760	Bleached white, fine grained limestone with ankeritic laminae, mil sulfides. 2750 ft elevation. Bedding at $116^0/28^0$ at 26^0. Limestone becomes finer grained and less bleached with higher elevation and distance from diorite.
19761	Crowded porphyry with bleached white marble halo. Trace pyrite. Sample #19761 - epidote altered porphyry, 0.5% disseminated pyrite.
19762	Rusty weathered, dark brown hornfels. Sedimentary protolith, trace pyrite, interbedded (?) with hard silicified marble. Sample #19762 - hornfels.
19815	Chlorite dominant skarn alteration of crystal tuff protolith.
19816	Skarn altered sharpstone conglomerate. Epidote, chlorite, minor hematite, amphibole, trace pyrite.
19817	Possible chlorite-hematite retrograde alteration of sharpstone conglomerate below greenstone sequence.
19822	Coarse elastic or volcaniclastic rock. Abundant grey angular chert fragments, dark red hematitic matrix, less than 0.5% disseminated pyrite. Possibly sharpstone conglomerate.
19823	Limestone - chert conglomerate. Trace pyrite (pyrrhotite?)
19824	Intense quartz-pyrite alteration of uncertain protolith. Pyrite forms trains of euhedral cubes in a light grey, silicified matrix.
19825	Dark grey, fine grained hornfelsed siltstone. Patchy silicification throughout, minor disseminated pyrite.
19826	Laminated black argillite with scattered remnant pyrite cubes.

O.K. SYNDICATE
THIMBLE MTN. PROJECT   ROCK SAMPLES

SAMPLE #	Au ppb	Ag ppm	Pb ppm	Zn ppm	Cu ppm	As ppm	Co ppm	Bi ppm	Te ppm	W ppm	Ni ppm
11979	814	4.3	100	57	2183	15490	55	7	5	10	25
11980	146	1.8	21	38	355	856	3	2	5	10	21
11981	1078	6.1	110	79	2904	22709	73	2	5	181	39
11982	1206	6.2	125	73	3036	8057	51	2	5	10	27
11983	19	0.1	13	78	32	27	9	2	5	90	15
18739	66240	0.0	446	3940	1302	693	18	0	0	23	19
18740	575	1.3	19	74	3305	52	26	0	0	0	26
18741	272	2.1	30	151	2689	53	40	0	0	25	28
18742	113	2.3	76	1475	65	0	12	6	0	0	13
18743	423	2.8	0	121	4156	0	27	0	0	0	28
18744	286	8.4	42	179	3229	128	43	0	0	38	33
18745	17	0.7	16	36	321	56	15	0	0	10	16
18746	112	4.4	15	46	2216	90	52	0	0	17	40
18747	194	6.0	25	50	1011	215	71	0	0	23	24
18748	468	3.7	0	28	820	136	2230	0	0	37	37
18749	37	0.1	0	81	53	45	14	7	0	0	9
18750	42	0.5	53	10809	434	211	53	28	0	60	37
18949	5	0.8	5	104	62	23	38	2	5	10	319
18950	10	0.8	5	44	36	5	5	2	5	10	29
19551	15395	95.8	36	94	91	43	2	2	5		11
19552	124	8.5	143	365	1716	5	52	2	5		178
19553	3294	327.9	516	2928	19800	7205	190	2	5		17
19554	1642	4.1	89	72	3380	5	261	2	5		145
19555	24	3.5	20	245	654	28	16	2	5		5
19556	1130	6.3	123	23	435	2672	13	2	5		5
19557	25	0.6	19	68	80	5	26	2	5		10
19558	2048	21.0	124	177	12400	5	167	2	5		46
19559	913	3.0	36	139	2335	52	22	2	5		8
19560	42	0.2	20	30	465	5	10	2	5		5
19561	53	1.6	87	76	2462	51	482	2	5		160
19562	17	1.4	63	9	383	104	55	2	5		228
19563	49	0.6	14	39	529	5	37	2	5		78
19564	269	2.2	21	40	658	21	10	2	5		59
19565	66	0.5	10	56	121	11	9	2	5		31
19566	125	1.8	14	40	490	5	16	2	5		84
19567	176	6.0	109	29	1423	5	549	2	5		603
19568	115	2.0	32	63	683	33	82	2	5		130
19569	8	0.4	22	42	76	59	31	2	5		21
19570	<5	0.9	61	181	32	284	9	5	<.3	10	94
19571	5	0.2	15	40	24	77	3	4	<.3	15	22
19572	<5	0.5	22	1329	251	99	29	5	0.6	<10	20
19573	294	6.0	69	20600	2295	41	67	22	3	<10	64
19574	24	1.2	78	7147	363	35	13	22	<.3	<10	10
19575	148	100.8	48	481	35200	18	6	5	<.3	15	25
19576	<5	0.4	21	110	63	<5	5	6	<.3	<10	8
19577	<5	0.4	12	89	151	8	10	4	0.4	<10	12

O.K. SYNDICATE
THIMBLE MTN. PROJECT ROCK SAMPLES

SAMPLE #	Au ppb	Ag ppm	Pb ppm	Zn ppm	Cu ppm	As ppm	Co ppm	Bi ppm	Te ppm	W ppm	Ni ppm
19578	16	0.2	7	237	17	28	9	<2	<.3	<10	24
19579	1662	48.4	220	95900	5024	570	<1	65	4	<10	10
19580	<5	0.2	7	421	25	<5	7	<2	<.3	<10	108
19581	37476	62.5	276	1331	4474	1351	<1	23	2	<10	<5
19701	15	0.3	5	66	49	5	9	2	5	10	11
19702	14	0.7	18	66	20	8	11	2	5	10	14
19703	8	0.1	5	65	45	5	15	2	5	10	5
19704	10	0.1	45	80	50	14	16	2	5	10	8
19705	5	0.1	21	66	58	5	13	2	5	10	25
19706	16	0.1	5	26	109	26	12	2	5	10	13
19707	6	0.1	5	39	146	9	19	2	5	10	50
19708	7	0.1	5	41	4	9	5	2	5	10	5
19709	31	0.3	5	62	196	44	30	2	5	10	64
19710	8	0.1	5	28	43	7	7	2	5	10	13
19711	613	24.8	5	154	8690	49	73	2	5	10	99
19712	14	0.2	5	27	100	5	5	2	5	10	38
19713	16	0.2	5	41	38	156	8	2	5	10	5
19714	5	0.1	5	40	13	5	11	2	5	10	73
19715	361	6.6	25	95	3276	432	7	2	5	80	5
19716	18	0.3	5	54	20	9	4	2	5	10	5
19717	20	0.1	5	13	71	25	16	2	5	10	15
19718	115	0.1	5	12	21	114	6	2	5	10	5
19719	7	0.1	13	67	21	15	5	2	5	10	5
19720	6	0.1	5	28	4	9	2	2	5	10	5
19721	45	1.0	5	24	203	147	23	2	5	10	211
19722	5	0.1	5	66	12	5	11	2	5	10	18
19723	8	0.2	5	91	24	43	22	2	5	10	56
19724	10	0.3	5	41	12	59	5	2	5	10	5
19725	35340	7.8	39	94	2886	385	28	2	5	244	5
19726	1860	90.0	5	124	12300	12	21	2	5	10	5
19727	89	0.1	5	66	95	9	12	2	5	10	5
19728	6	0.1	5	93	72	24	12	2	5	10	24
19729	10	0.2	5	39	109	53	22	2	5	10	62
19730	23	0.3	5	4	23	155	1	2	5	10	5
19731	5	0.3	5	40	16	24	1	2	5	10	5
19732	13	0.1	5	41	13	13	9	2	5	10	5
19734	17	0.1	5	66	27	73	17	2	5	10	66
19735	5	0.1	5	41	13	5	6	2	5	10	12
19736	5	0.2	5	39	6	9	1	2	5	10	6
19737	9	0.5	31	347	49	30	11	2	5	10	20
19738	6	0.1	5	13	9	5	1	2	5	10	5
19739	7	0.4	5	79	37	15	17	2	5	10	31
19760	20	1.3	25	233	39	32	13	2	5	10	5
19761	8	0.3	78	107	20	8	1	2	5	10	5

O.K. SYNDICATE
THIMBLE MTN. PROJECT ROCK SAMPLES

SAMPLE #	Au ppb	Ag ppm	Pb ppm	Zn ppm	Cu ppm	As ppm	Co ppm	Bi ppm	Te ppm	W ppm	Ni ppm
19762	5	2.4	1044	4730	53	225	17	2	5	10	5
19763	14	0.1	5	16	6	39	11	2	5	10	5
19815	59	0.2	6	19	41	16	5	<2	<.3	<10	11
19816	39	0.1	5	21	32	<5	5	2	<.3	<10	16
19817	30	0.1	9	30	41	<5	14	4	<.3	<10	48
19822	<5	0.1	10	42	34	11	18	<2	<.3	<10	60
19823	<5	0.3	10	45	63	<5	17	<2	<.3	<10	47
19824	8	0.2	7	58	21	32	18	<2	<.3	<10	41
19825	5	0.4	15	55	51	23	9	4	<.3	<10	10
19826	7	0.2	20	107	39	<5	15	<2	<.3	<10	30

APPENDIX 3

Stream Sediment Samples
Analytical Data Listings

ACME ANALYTICAL LABORATORIES LTD. 852 E. HASTINGS ST. VANCOUVER B.C. V6A 1R6 PHONE(604)253-3158 FAX(604)253-1716

GEOCHEMICAL ANALYSIS CERTIFICATE

Pan Orvana Resources Inc. File # 91-4381 Page 1

710 - 1177 W. Hastings St, Vancouver BC V6E 2K3 Submitted by: IAN THOMSON

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
RT-8	1	66	11	189	.2	11	6	483	2.17	9	5	ND	1	109	1.8	2	2	44	1.29	.097	32	26	.29	65	.08	5	.77	.03	.07	1	16.6
RT-9	1	77	17	117	.5	17	6	499	2.49	13	5	ND	1	156	1.1	2	2	53	1.18	.064	35	38	.36	84	.10	3	1.15	.03	.08	1	3.4
RT-10	1	42	9	115	.3	17	6	1445	1.82	20	5	ND	1	120	2.0	2	2	38	1.49	.098	27	31	.32	173	.09	3	1.12	.03	.08	1	4.0
RT 8+125	1	114	13	549	.4	15	6	495	1.78	7	5	ND	1	164	2.9	2	2	33	1.79	.069	34	23	.33	80	.07	9	1.20	.04	.08	1	1.5
RT 8+250	1	94	14	404	.9	16	7	558	2.81	9	5	ND	1	108	1.9	2	2	60	1.24	.079	33	37	.48	75	.09	5	1.21	.04	.07	1	5.7
RT 8+400	1	83	16	439	.4	15	5	392	1.93	10	5	ND	1	146	2.8	2	2	39	1.88	.069	27	30	.34	75	.08	6	1.06	.03	.06	1	34.8
RT 8+500	1	98	16	458	.5	16	6	473	1.87	10	5	ND	1	165	3.5	2	2	37	2.24	.070	29	25	.36	83	.07	10	1.11	.04	.07	1	11.0
RT 8+600	1	103	12	476	.5	20	7	567	2.05	12	5	ND	1	153	3.4	2	2	37	2.10	.065	32	27	.41	96	.08	6	1.29	.04	.08	1	4.8
RT 8+700	1	89	13	346	.3	17	5	382	1.95	10	5	ND	1	156	3.0	2	2	40	1.49	.071	26	30	.33	76	.08	6	1.08	.04	.07	1	4.3
RT 8+800	1	84	12	273	.4	16	6	412	2.00	12	5	ND	1	132	2.3	2	3	38	1.31	.067	28	29	.31	82	.08	5	1.19	.04	.07	1	2.7
RT 8+900	1	79	12	243	.4	16	6	654	1.90	16	5	ND	1	138	2.4	2	2	38	1.29	.062	28	28	.31	81	.08	3	1.09	.03	.06	1	28.0
RT 8+1000	1	77	12	219	.5	15	5	308	1.56	12	5	ND	1	157	1.9	2	2	30	1.53	.070	27	24	.29	77	.07	5	1.05	.03	.06	1	6.4
RT 8+1100	1	60	9	201	.4	15	7	2000	2.00	20	5	ND	1	173	3.5	2	2	35	1.60	.063	26	23	.26	122	.07	5	.91	.03	.06	1	4.3
RT 8+1200	1	50	9	152	.3	12	5	620	1.67	10	5	ND	1	135	1.7	2	2	34	1.30	.062	22	24	.25	70	.07	5	.83	.03	.05	1	.8
RE RT 8+900	1	74	12	237	.3	16	6	641	1.86	14	5	ND	1	133	2.5	2	2	38	1.24	.062	28	27	.30	77	.08	3	1.05	.03	.06	1	11.5
RT 8+1300	1	18	8	96	.2	16	7	597	2.62	8	5	ND	4	66	.7	2	2	54	.70	.057	18	36	.63	92	.15	2	1.09	.06	.13	1	1.4
RT 8+1400	1	17	8	85	.2	13	7	546	2.28	6	5	ND	5	59	.6	2	2	42	.58	.058	19	24	.60	93	.11	2	.99	.05	.12	1	4.0
RT 8+1500	1	19	5	80	.1	15	7	540	2.39	7	5	ND	4	63	.4	2	2	45	.62	.062	20	25	.63	110	.13	2	1.03	.06	.14	1	.9
RT 8+1600	1	40	10	108	.2	12	5	427	2.00	8	5	ND	1	122	1.2	2	2	44	1.29	.064	21	36	.27	70	.09	5	.79	.03	.06	1	10.5
RT 8+1700	1	43	7	93	.3	12	4	296	1.75	6	5	ND	1	126	1.2	2	2	39	1.34	.064	24	31	.25	67	.08	5	.82	.03	.06	1	6.8
RT 8+1800	1	20	8	63	.2	15	6	453	2.00	7	5	ND	7	71	.6	2	2	39	.68	.059	19	32	.53	99	.12	2	.83	.04	.12	1	15.3
STANDARD C/AU-S	18	56	39	133	6.9	71	33	1046	3.99	40	17	7	37	51	18.8	16	18	54	.49	.091	38	59	.89	177	.09	34	1.89	.06	.15	13	51.1

ICP - .500 GRAM SAMPLE IS DIGESTED WITH 3ML 3-1-2 HCL-HNO3-H2O AT 95 DEG. C FOR ONE HOUR AND IS DILUTED TO 10 ML WITH WATER.
THIS LEACH IS PARTIAL FOR MN FE SR CA P LA CR MG BA TI B W AND LIMITED FOR NA K AND AL. AU DETECTION LIMIT BY ICP IS 3 PPM.
- SAMPLE TYPE: STREAM SED. AU* ANALYSIS BY ACID LEACH/AA FROM 10 GM SAMPLE.
Samples beginning 'RE' are duplicate samples.

DATE RECEIVED: SEP 11 1991 DATE REPORT MAILED: Sept 17/91. SIGNED BY.......... D.TOYE, C.LEONG, J.WANG; CERTIFIED B.C. ASSAYERS

ACME ANALYTICAL

Pan Orvana Resources Inc. FILE # 91-4381

ACME ANALYTICAL

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
RT 8+1900	1	28	12	83	.2	22	11	703	2.98	7	5	ND	2	114	.8	2	2	60	1.04	.089	27	44	.82	168	.17	2	1.20	.08	.20	1	2.0
RT 8+2000	1	35	12	107	.4	13	7	480	1.96	9	7	ND	1	101	1.1	2	2	41	1.30	.083	24	29	.31	88	.08	4	.80	.03	.08	1	10.5
RE RT 8+2500	1	35	8	93	.3	20	8	438	2.74	15	5	ND	1	109	1.1	2	2	61	1.30	.084	24	46	.41	80	.11	3	.92	.03	.08	1	24.3
RT 8+2100	1	25	6	82	.4	12	7	423	1.93	8	5	ND	1	78	.6	2	2	40	.87	.075	22	29	.30	76	.08	5	.70	.02	.07	1	2.7
RT 8+2200	1	22	8	78	.4	12	6	387	2.29	6	5	ND	1	65	.5	2	2	50	.74	.074	20	38	.28	66	.09	3	.63	.02	.07	1	11.4
RT 8+2300	1	23	7	89	.3	16	8	430	3.47	5	5	ND	1	82	.7	2	2	80	.91	.083	23	59	.33	75	.12	2	.74	.03	.07	1	3.7
RT 8+2400	1	21	7	78	.4	24	9	513	2.98	26	5	ND	2	104	.5	2	3	66	1.54	.077	21	41	.72	105	.14	2	1.22	.07	.17	1	2.5
RT 8+2500	1	34	8	94	.3	24	7	436	2.82	12	5	ND	1	110	.7	2	2	63	1.29	.087	24	48	.42	85	.12	4	.92	.03	.08	1	36.5
RT 8+2600	1	44	11	104	.5	22	8	490	2.25	14	5	ND	1	137	1.2	2	2	49	1.63	.089	26	40	.41	88	.10	6	.93	.03	.09	1	6.6
RT 8+2700	1	35	5	89	.3	18	8	418	2.37	13	5	ND	1	108	.7	2	2	52	1.20	.081	24	39	.39	78	.11	4	.88	.03	.08	1	4.8
RT 8+2800	1	32	7	96	.4	19	7	640	2.32	12	5	ND	1	114	.9	2	2	49	1.26	.086	24	36	.37	89	.10	5	.89	.03	.08	1	11.7
RT 8+2900	1	19	10	70	.3	21	10	741	2.73	12	5	ND	3	76	.9	2	2	50	.75	.073	23	29	.68	135	.14	2	1.18	.07	.17	1	19.2
RT 8+3000	1	32	11	91	.3	20	9	761	2.97	10	16	ND	1	97	1.0	2	2	62	1.04	.085	28	44	.43	112	.13	2	1.06	.03	.12	1	4.7
RT 8+3100	1	39	11	118	.3	20	10	1034	3.04	8	8	ND	1	93	.8	2	2	60	.98	.091	29	40	.46	120	.13	2	1.07	.03	.13	1	4.3
RT 8+3200	1	26	13	82	.2	20	11	1023	3.01	6	6	ND	3	74	.4	2	2	57	.71	.088	29	34	.56	136	.14	2	1.07	.05	.15	1	3.0
RT 8+3300	1	28	9	91	.3	19	11	876	4.22	11	9	ND	1	79	.6	2	2	92	.82	.085	30	61	.39	106	.13	2	.98	.03	.11	1	3.8
RT 8+3400	1	22	6	82	.3	14	8	707	3.22	6	5	ND	1	61	.5	2	4	67	.67	.070	27	40	.31	82	.11	2	.78	.02	.08	1	3.0
RT 8+3500	1	26	8	107	.3	17	8	739	2.84	8	6	ND	1	71	.5	2	5	56	.76	.075	28	36	.36	94	.11	3	.92	.03	.10	1	3.6
RT 8+3600	1	22	11	78	.2	16	8	552	3.00	6	7	ND	1	56	.4	2	2	63	.62	.074	27	38	.32	72	.11	2	.80	.02	.09	1	18.2
RT 8+3700	1	23	13	84	.3	14	7	551	2.91	6	10	ND	1	55	.5	2	2	61	.62	.073	25	37	.30	76	.10	3	.76	.02	.09	1	4.5
RT 8+3800	1	26	8	88	.2	15	8	589	2.60	7	5	ND	1	66	.5	2	2	52	.73	.072	26	35	.33	86	.10	2	.87	.02	.10	1	3.0
RT 10+100	1	50	15	126	.5	21	8	995	1.88	12	5	ND	1	123	2.1	2	2	34	1.52	.084	28	27	.35	151	.10	5	1.31	.04	.11	1	2.0
RT 10+200	1	48	14	117	.7	17	7	693	1.96	6	5	ND	1	126	2.1	2	2	41	1.60	.090	32	42	.36	114	.11	3	1.12	.04	.09	1	2.5
RT 10+300	1	28	17	62	.5	15	7	490	2.06	9	5	ND	1	108	.6	2	2	41	1.27	.065	26	29	.35	109	.12	5	1.35	.04	.10	1	4.8
STANDARD C/AU-S	19	57	39	134	7.3	71	32	1058	4.01	43	16	7	36	52	18.8	17	22	56	.48	.091	39	58	.90	179	.09	34	1.92	.06	.15	11	50.1

Samples beginning 'RE' are duplicate samples.

Bondar-Clegg & Company Ltd.
130 Pemberton Ave.
North Vancouver, B.C.
V7P 2R5
(604) 985-0681 Telex 04-352667

BONDAR-CLEGG

Geochemical Lab Report

A DIVISION OF INCHCAPE INSPECTION & TESTING SERVICES

REPORT: V91-01461.0 (COMPLETE)

REFERENCE INFO:

CLIENT: PAN ORVANA RESOURCES INC.
PROJECT: NONE GIVEN

SUBMITTED BY: UNKNOWN
DATE PRINTED: 4-OCT-91

ORDER		ELEMENT	NUMBER OF ANALYSES	LOWER DETECTION LIMIT	EXTRACTION	METHOD
1	Ag	Silver	88	0.2 PPM	Other	Ind. Coupled Plasma
2	Cu	Copper	88	1 PPM	Other	Ind. Coupled Plasma
3	Pb	Lead	88	2 PPM	Other	Ind. Coupled Plasma
4	Zn	Zinc	88	1 PPM	Other	Ind. Coupled Plasma
5	Mo	Molybdenum	88	1 PPM	Other	Ind. Coupled Plasma
6	Ni	Nickel	88	1 PPM	Other	Ind. Coupled Plasma
7	Co	Cobalt	88	1 PPM	Other	Ind. Coupled Plasma
8	Cd	Cadmium	88	1.0 PPM	Other	Ind. Coupled Plasma
9	Bi	Bismuth	88	5 PPM	Other	Ind. Coupled Plasma
10	As	Arsenic	88	5 PPM	Other	Ind. Coupled Plasma
11	Sb	Antimony	88	5 PPM	Other	Ind. Coupled Plasma
12	Fe	Iron	88	0.01 PCT	Other	Ind. Coupled Plasma
13	Mn	Manganese	88	0.01 PCT	Other	Ind. Coupled Plasma
14	Te	Tellurium	88	10 PPM	Other	Ind. Coupled Plasma
15	Ba	Barium	88	2 PPM	Other	Ind. Coupled Plasma
16	Cr	Chromium	88	1 PPM	Other	Ind. Coupled Plasma
17	V	Vanadium	88	1 PPM	Other	Ind. Coupled Plasma
18	Sn	Tin	88	20 PPM	Other	Ind. Coupled Plasma
19	W	Tungsten	88	20 PPM	Other	Ind. Coupled Plasma
20	La	Lanthanum	88	1 PPM	Other	Ind. Coupled Plasma
21	Al	Aluminum	88	0.01 PCT	Other	Ind. Coupled Plasma
22	Mg	Magnesium	88	0.01 PCT	Other	Ind. Coupled Plasma
23	Ca	Calcium	88	0.01 PCT	Other	Ind. Coupled Plasma
24	Na	Sodium	88	0.01 PCT	Other	Ind. Coupled Plasma
25	K	Potassium	88	0.01 PCT	Other	Ind. Coupled Plasma
26	Sr	Strontium	88	1 PPM	Other	Ind. Coupled Plasma
27	Y	Yttrium	88	1 PPM	Other	Ind. Coupled Plasma

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SAMPLE NUMBER	ELEMENT UNITS	Ag PPM	Cu PPM	Pb PPM	Zn PPM	Mo PPM	Ni PPM	Co PPM	Cd PPM	Bi PPM	As PPM	Sb PPM
P4 RT4		<0.2	19	<2	32	<1	7	3	<1.0	<5	<5	<5
P4 RT5		<0.2	11	<2	11	<1	3	2	<1.0	<5	<5	<5
P4 RT6		<0.2	65	<2	8	<1	3	1	<1.0	<5	<5	<5
P4 RT7		<0.2	94	<2	15	<1	2	2	<1.0	<5	<5	<5
P4 RT8		<0.2	46	<2	90	<1	3	3	1.6	<5	<5	<5
P4 RT9		0.2	45	7	28	<1	5	2	<1.0	<5	<5	<5
P4 RT10		<0.2	27	<2	50	<1	6	3	1.8	<5	11	<5
P4 RT11		<0.2	19	<2	21	<1	4	2	<1.0	<5	<5	<5
P4 RH8 + 125		0.3	81	5	197	<1	4	2	2.3	<5	<5	<5
P4 RH8 + 250		0.6	56	3	111	<1	4	3	1.4	<5	<5	<5
P4 RH8 + 400		0.2	49	6	162	<1	3	2	2.3	<5	<5	<5
P4 RH8 + 500		0.5	62	5	208	<1	5	2	3.1	<5	<5	<5
P4 RH8 + 600		0.4	60	2	183	<1	6	3	3.0	<5	<5	<5
P4 RH8 + 700		0.2	56	<2	125	<1	6	2	2.9	<5	<5	<5
P4 RH8 + 800		0.3	53	3	89	<1	5	2	2.2	<5	<5	<5
P4 RH8 + 900		0.3	50	2	85	<1	5	3	2.1	<5	<5	<5
P4 RH8 + 1000		0.3	46	<2	62	<1	4	1	1.4	<5	<5	<5
P4 RH8 + 1100		0.2	38	<2	83	<1	6	4	3.0	<5	11	<5
P4 RH8 + 1200		0.2	35	<2	52	<1	4	2	1.4	<5	<5	<5
P4 RH8 + 1300		<0.2	10	<2	34	<1	4	3	<1.0	<5	<5	<5
P4 RH8 + 1400		<0.2	9	<2	28	<1	3	3	<1.0	<5	<5	<5
P4 RH8 + 1500		<0.2	10	<2	28	<1	4	3	<1.0	<5	<5	<5
P4 RH8 + 1600		<0.2	28	<2	44	<1	4	2	1.3	<5	<5	<5
P4 RH8 + 1700		<0.2	28	<2	29	<1	4	2	<1.0	<5	<5	<5
P4 RH8 + 1800		<0.2	12	<2	21	<1	4	3	<1.0	<5	<5	<5
P4 RH8 + 1900		<0.2	18	3	33	<1	7	5	<1.0	<5	<5	<5
P4 RH8 + 2000		<0.2	22	<2	62	1	6	4	1.6	<5	<5	<5
P4 RH8 + 2100		<0.2	16	<2	41	1	5	3	1.3	<5	<5	<5
P4 RH8 + 2200		<0.2	12	<2	39	2	4	3	<1.0	<5	<5	<5
P4 RH8 + 2300		<0.2	16	<2	39	2	5	3	1.2	<5	<5	<5
P4 RH8 + 2400		<0.2	10	<2	25	<1	9	5	<1.0	<5	12	<5
P4 RH8 + 2500		<0.2	22	<2	39	1	8	4	1.0	<5	<5	<5
P4 RH8 + 2600		<0.2	28	<2	50	<1	9	4	<1.0	<5	6	<5
P4 RH8 + 2700		<0.2	22	<2	39	<1	7	3	<1.0	<5	<5	<5
P4 RH8 + 2800		<0.2	21	<2	42	<1	6	2	<1.0	<5	<5	<5
P4 RH8 + 2900		<0.2	9	<2	24	<1	7	5	<1.0	<5	7	<5
P4 RH8 + 3000		<0.2	18	<2	39	<1	6	4	<1.0	<5	<5	<5
P4 RH8 + 3100		<0.2	27	13	85	<1	8	15	8.3	<5	<5	<5
P4 RH8 + 3200		<0.2	17	7	45	<1	7	11	4.8	<5	<5	<5
P4 RH8 + 3300		<0.2	17	3	50	<1	6	7	2.1	<5	<5	<5

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P4 RT4		0.41	0.03	<10	57	4	9	<20	<20	13	0.26	0.13
P4 RT5		0.33	0.02	<10	51	3	7	<20	<20	17	0.16	0.09
P4 RT6		0.20	0.04	<10	80	1	5	<20	<20	23	0.20	0.05
P4 RT7		0.25	0.06	<10	121	1	9	<20	<20	24	0.25	0.07
P4 RT8		0.28	0.04	<10	47	2	6	<20	<20	22	0.22	0.07
P4 RT9		0.38	0.04	<10	57	3	9	<20	<20	22	0.32	0.07
P4 RT10		0.53	0.15	<10	160	4	14	<20	<20	18	0.35	0.09
P4 RT11		0.32	0.03	<10	57	3	7	<20	<20	17	0.20	0.09
P4 RH8 + 125		0.40	0.04	<10	64	3	9	<20	<20	24	0.38	0.08
P4 RH8 + 250		0.46	0.05	<10	49	3	10	<20	<20	23	0.40	0.11
P4 RH8 + 400		0.34	0.03	<10	53	2	6	<20	<20	17	0.32	0.05
P4 RH8 + 500		0.40	0.04	<10	64	2	7	<20	<20	20	0.35	0.06
P4 RH8 + 600		0.48	0.05	<10	68	3	8	<20	<20	22	0.43	0.06
P4 RH8 + 700		0.38	0.03	<10	56	2	7	<20	<20	19	0.38	0.06
P4 RH8 + 800		0.44	0.04	<10	63	3	8	<20	<20	20	0.42	0.06
P4 RH8 + 900		0.45	0.06	<10	64	3	9	<20	<20	19	0.38	0.06
P4 RH8 + 1000		0.33	0.02	<10	59	2	7	<20	<20	19	0.35	0.06
P4 RH8 + 1100		0.71	0.29	<10	111	2	13	<20	<20	18	0.30	0.06
P4 RH8 + 1200		0.37	0.06	<10	62	2	7	<20	<20	16	0.27	0.06
P4 RH8 + 1300		0.59	0.05	<10	68	4	9	<20	<20	10	0.23	0.11
P4 RH8 + 1400		0.52	0.05	<10	61	3	9	<20	<20	12	0.21	0.09
P4 RH8 + 1500		0.59	0.04	<10	69	4	9	<20	<20	11	0.23	0.11
P4 RH8 + 1600		0.35	0.04	<10	62	2	8	<20	<20	15	0.26	0.07
P4 RH8 + 1700		0.32	0.02	<10	57	2	7	<20	<20	16	0.27	0.07
P4 RH8 + 1800		0.52	0.04	<10	60	4	8	<20	<20	12	0.23	0.12
P4 RH8 + 1900		0.78	0.07	<10	92	7	12	<20	<20	16	0.31	0.22
P4 RH8 + 2000		0.33	0.05	<10	68	4	9	<20	<20	16	0.24	0.09
P4 RH8 + 2100		0.36	0.04	<10	58	4	8	<20	<20	14	0.20	0.09
P4 RH8 + 2200		0.29	0.03	<10	51	4	7	<20	<20	13	0.17	0.08
P4 RH8 + 2300		0.37	0.03	<10	57	5	9	<20	<20	14	0.21	0.10
P4 RH8 + 2400		0.59	0.04	<10	67	6	12	<20	<20	12	0.27	0.16
P4 RH8 + 2500		0.48	0.04	<10	65	5	10	<20	<20	15	0.27	0.15
P4 RH8 + 2600		0.49	0.05	<10	75	5	12	<20	<20	16	0.29	0.16
P4 RH8 + 2700		0.47	0.04	<10	65	5	10	<20	<20	15	0.27	0.15
P4 RH8 + 2800		0.50	0.06	<10	78	4	9	<20	<20	14	0.28	0.13
P4 RH8 + 2900		0.72	0.07	<10	93	5	11	<20	<20	12	0.27	0.16
P4 RH8 + 3000		0.50	0.08	<10	88	5	10	<20	<20	16	0.30	0.15
P4 RH8 + 3100		0.57	0.13	<10	105	6	11	<20	<20	17	0.31	0.20
P4 RH8 + 3200		0.67	0.12	<10	115	6	11	<20	<20	16	0.29	0.19
P4 RH8 + 3300		0.54	0.10	<10	95	5	10	<20	<20	17	0.27	0.16

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P4 RT4		1.15	<0.01	0.01	90	6
P4 RT5		0.52	<0.01	0.02	40	5
P4 RT6		1.00	0.01	0.02	55	14
P4 RT7		1.58	<0.01	0.03	90	23
P4 RT8		1.20	<0.01	0.02	103	9
P4 RT9		1.02	<0.01	0.01	138	13
P4 RT10		1.38	<0.01	0.01	107	10
P4 RT11		0.74	<0.01	0.01	69	5
P4 RH8 + 125		1.68	<0.01	0.02	157	15
P4 RH8 + 250		1.06	<0.01	0.01	88	15
P4 RH8 + 400		1.67	<0.01	0.01	125	9
P4 RH8 + 500		2.10	<0.01	0.02	151	11
P4 RH8 + 600		1.92	<0.01	0.02	133	14
P4 RH8 + 700		1.38	<0.01	0.02	148	11
P4 RH8 + 800		1.24	<0.01	0.02	121	12
P4 RH8 + 900		1.20	<0.01	0.01	127	11
P4 RH8 + 1000		1.34	<0.01	0.01	144	10
P4 RH8 + 1100		1.50	<0.01	0.01	169	9
P4 RH8 + 1200		1.31	<0.01	0.01	136	7
P4 RH8 + 1300		0.49	0.02	0.04	49	4
P4 RH8 + 1400		0.51	0.02	0.03	48	4
P4 RH8 + 1500		0.49	0.02	0.05	47	4
P4 RH8 + 1600		1.33	<0.01	0.01	128	6
P4 RH8 + 1700		1.30	<0.01	0.01	122	7
P4 RH8 + 1800		0.64	0.02	0.04	63	4
P4 RH8 + 1900		0.94	0.03	0.08	89	6
P4 RH8 + 2000		1.33	<0.01	0.02	96	8
P4 RH8 + 2100		0.89	<0.01	0.01	69	6
P4 RH8 + 2200		0.75	<0.01	0.01	58	5
P4 RH8 + 2300		0.93	<0.01	0.02	72	6
P4 RH8 + 2400		1.46	0.02	0.06	77	4
P4 RH8 + 2500		1.32	<0.01	0.02	97	7
P4 RH8 + 2600		1.62	<0.01	0.02	128	7
P4 RH8 + 2700		1.23	<0.01	0.02	99	6
P4 RH8 + 2800		1.25	<0.01	0.02	104	6
P4 RH8 + 2900		0.56	0.02	0.07	49	4
P4 RH8 + 3000		1.05	<0.01	0.02	88	6
P4 RH8 + 3100		1.03	<0.01	0.03	92	6
P4 RH8 + 3200		0.62	0.01	0.05	59	5
P4 RH8 + 3300		0.85	<0.01	0.02	72	6

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P4 RH8 + 3400		<0.2	13	<2	45	<1	4	4	1.7	<5	<5	<5
P4 RH8 + 3500		<0.2	14	<2	61	<1	5	5	1.2	<5	<5	<5
P4 RH8 + 3600		<0.2	13	<2	40	<1	4	4	1.3	<5	<5	<5
P4 RH8 + 3700		<0.2	12	<2	49	<1	4	4	1.1	<5	<5	<5
P4 RH8 + 3800		<0.2	13	<2	47	<1	5	3	<1.0	<5	<5	<5
P4 RH10 + 100		<0.2	30	<2	52	<1	6	4	1.8	<5	<5	<5
P4 RH10 + 200		<0.2	32	4	62	<1	5	2	1.9	<5	5	<5
P4 RH10 + 300		<0.2	15	6	17	<1	2	2	<1.0	<5	<5	<5

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P4 RH8 + 3400		0.39	0.07	<10	68	3	8	<20	<20	16	0.21	0.10
P4 RH8 + 3500		0.41	0.07	<10	73	4	8	<20	<20	16	0.22	0.11
P4 RH8 + 3600		0.37	0.05	<10	59	3	8	<20	<20	16	0.21	0.11
P4 RH8 + 3700		0.35	0.06	<10	61	3	7	<20	<20	15	0.20	0.10
P4 RH8 + 3800		0.38	0.06	<10	69	3	8	<20	<20	16	0.22	0.11
P4 RH10 + 100		0.52	0.11	<10	138	4	11	<20	<20	19	0.49	0.09
P4 RH10 + 200		0.37	0.07	<10	97	3	9	<20	<20	21	0.33	0.10
P4 RH10 + 300		0.35	0.04	<10	93	2	8	<20	<20	16	0.41	0.10

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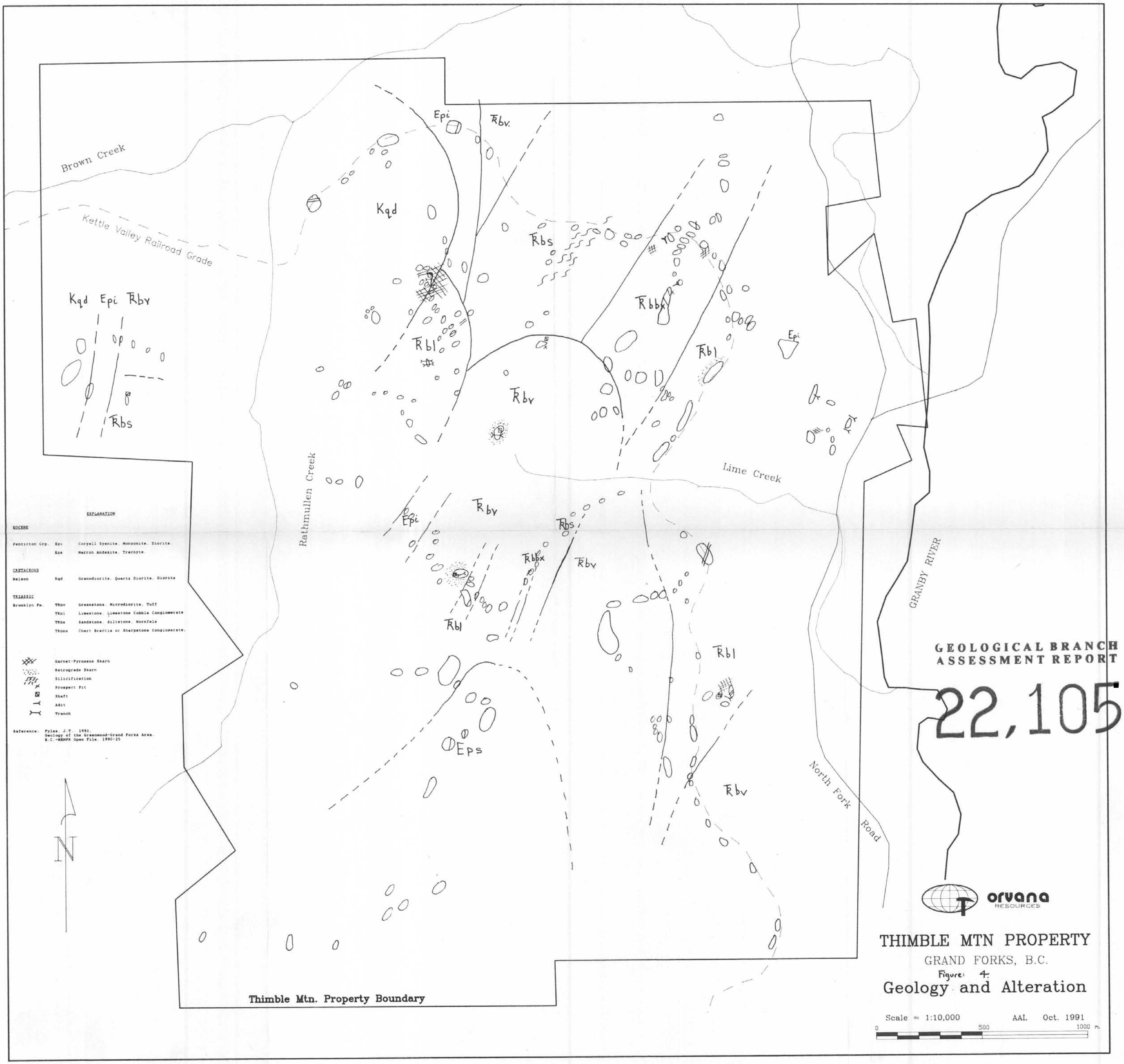
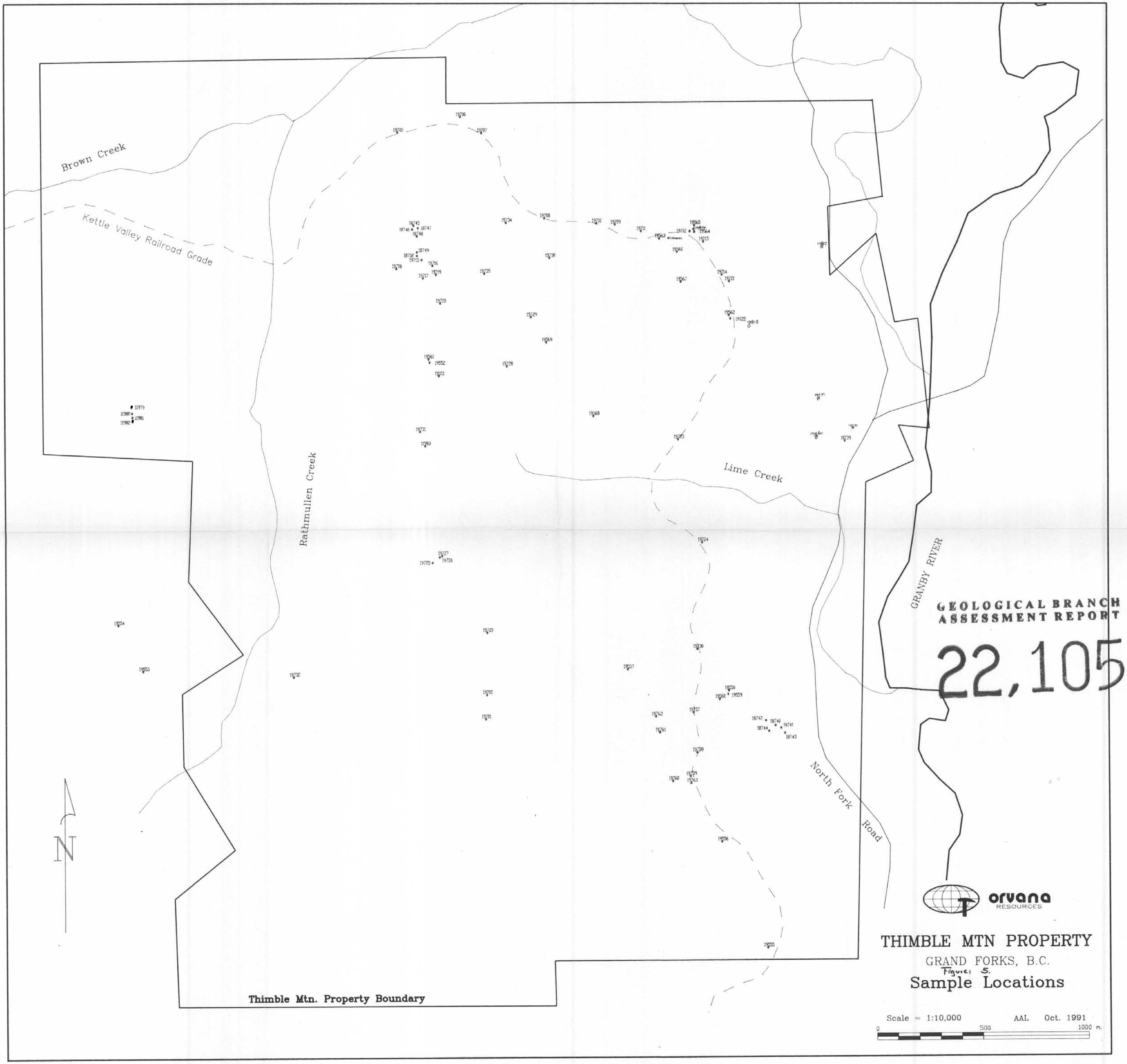
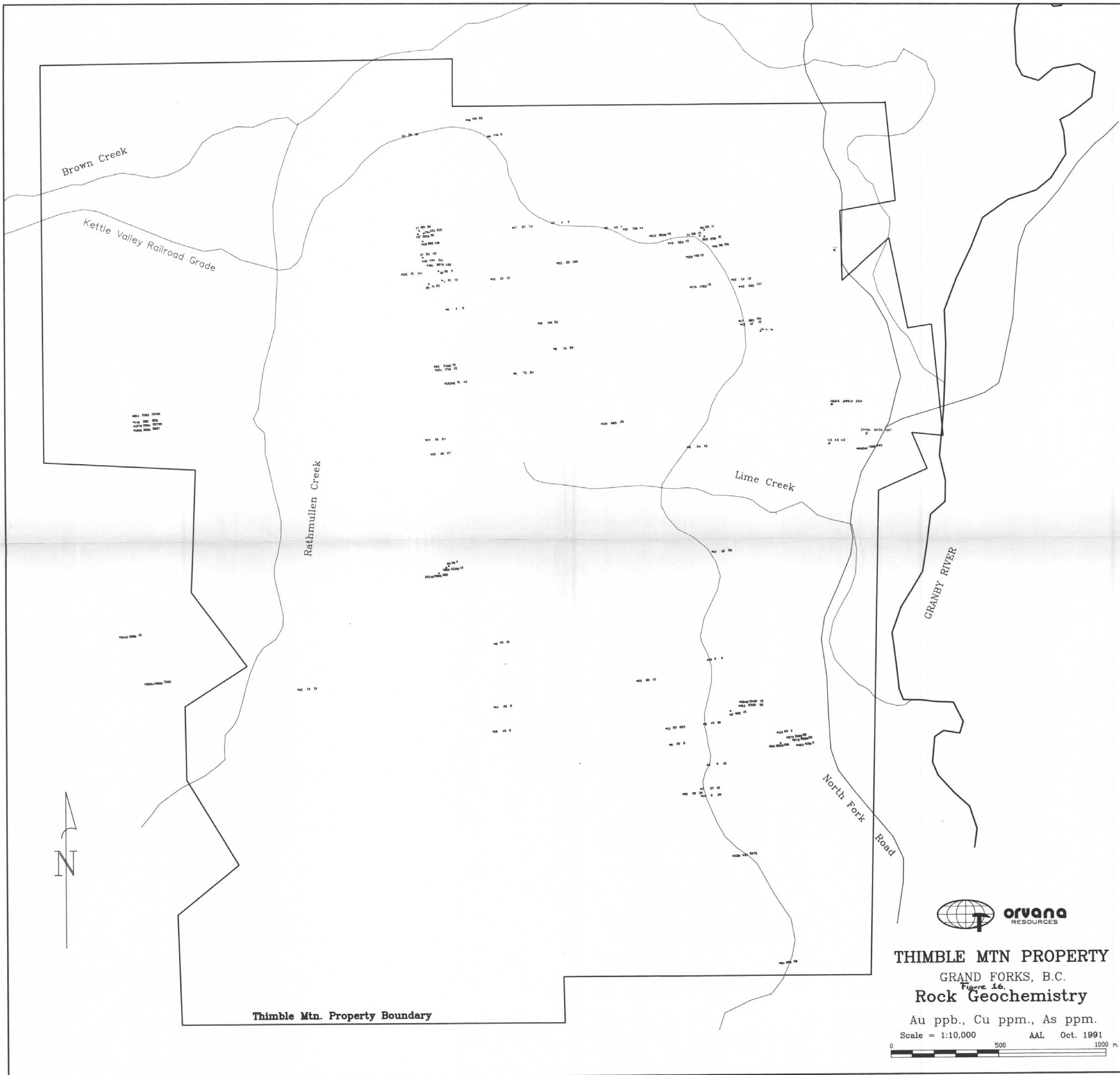
P4 RH8 + 3400		0.69	<0.01	0.02	55	5
P4 RH8 + 3500		0.72	<0.01	0.02	58	5
P4 RH8 + 3600		0.64	<0.01	0.02	48	5
P4 RH8 + 3700		0.63	<0.01	0.02	49	4
P4 RH8 + 3800		0.73	<0.01	0.02	56	5
P4 RH10 + 100		1.54	<0.01	0.03	113	10
P4 RH10 + 200		1.54	<0.01	0.02	110	11
P4 RH10 + 300		1.26	<0.01	0.03	94	7


Brown Creek
Kettle Valley Railroad Grade
Rathmullen Creek
Lime Creek
GRANBY RIVER
North Fork Road
Thimble Mtn. Property Boundary
Kqd
Epi
TRbv
TRbs
TRbl
TRbbx
Eps
N
EXPLANATION
EOCENE
Penticton Grp. Epi Coryell Syenite, Monzonite, Diorite
Eps Marron Andesite, Trachyte.
CRETACEOUS
Nelson Kqd Granodiorite, Quartz Diorite, Diorite
TRIASSIC
Brooklyn Fm. TRbv Greenstone, Microdiorite, Tuff
TRbl Limestone, Limestone Cobble Conglomerate
TRbs Sandstone, Siltstone, Hornfels
TRbbx Chert Breccia or Sharpstone Conglomerate.
Garnet-Pyroxene Skarn
Retrograde Skarn
Silicification
Prospect Pit
Shaft
Adit
Trench
Reference: Fyles, J.T., 1990.
Geology of the Greenwood-Grand Forks Area.
B.C.-MEMPR Open File, 1990-25
GEOLOGICAL BRANCH
ASSESSMENT REPORT
22,105
orvana
RESOURCES
THIMBLE MTN PROPERTY
GRAND FORKS, B.C.
Figure: 4.
Geology and Alteration
Scale = 1:10,000
AAL Oct. 1991
0
500
1000 m.


Brown Creek
Kettle Valley Railroad Grade
Rathmullen Creek
Lime Creek
North Fork Road
GRANBY RIVER
N
Thimble Mtn. Property Boundary
GEOLOGICAL BRANCH
ASSESSMENT REPORT
22,105
orvana
RESOURCES
THIMBLE MTN PROPERTY
GRAND FORKS, B.C.
Figure: 5.
Sample Locations
Scale = 1:10,000
AAL
Oct. 1991
0
500
1000 m.


Brown Creek
Kettle Valley Railroad Grade
Rathmullen Creek
Lime Creek
GRANBY RIVER
North Fork Road
N
Thimble Mtn. Property Boundary
orvana
RESOURCES
THIMBLE MTN PROPERTY
GRAND FORKS, B.C.
Figure 16.
Rock Geochemistry
Au ppb., Cu ppm., As ppm.
Scale = 1:10,000
AAL Oct. 1991
0
500
1000 m.

A.R. 22105