1994 ASSESSMENT PROGRAM

HAM CLAIM GROUP

MATTHEW CREEK - BOOTLEG MOUNTAIN AREA

ST. MARY LAKE NTS82/F9 E

49°38'30" 116°05'00

OCTOBER 1994 **S.B. HAMILTON, P.ENG.**

TABLE OF CONTENTS

GEOLOGICAL REPORT ON THE HAM CLAIM GROUP

MATTHEW CREEK - OCTOBER, 1994

S.B. HAMILTON, P. ENG.

1.0 SUMMARY

The 1994 geological study on the Ham claim group had three primary objectives.

1. To examine the stratigraphy of the lower Aldridge formation from the west side of Matthew Creek to the Bootleg Mountain diorite sills, and to locate the footwall quartzite marker horizons.

2. To examine the Matthew Creek metamorphic zone in the claim area north of the St. Mary River.

3. To examine the granitic stock outcrop on the claims.

2.0 LOCATION AND ACCESS

The Ham group of mineral claims consists of 98 mineral units located at the confluence of Matthew Creek and the St. Mary River. The property is located approximately four kilometers south-west of the center of the city of Kimberley and seven kilometers west of the town of Marysville.

The claim group is accessed by paved road from Marysville on Highway 95-A. The paved St. Mary Lake road crosses the property from east to west. Good gravel logging roads have been constructed over the claims.

The property centers on Latitude 49 degrees 38 minutes and Longitude 116 degrees 05 minutes. The claim area is outlined on NTS St. Mary Lake map sheet 82 F/9.

3.0 PHYSIOGRAPHY

The claim group is situated in the Rocky Mountain Trench area within the Purcell Mountains with elevations from 790 meters to 1450 meters. Precipitation is average (80-180 cm) while snow is considered to be moderate. Relief is moderate and is well forested. Recent logging in the vicinity of the claims has created some clearcut area.

The main outcrop areas occur along the ridges or are confined to the creek exposures, logging roads and clear cut areas that are fairly prevalent on the claim property.

The most prominent physiographic feature within the claim group is that of Matthew Creek canyon. Matthew Creek cuts through the Lower Aldridge and Matthew Creek metamorphic zone and represents the deepest exposure of Aldridge sedimentary strata in the

Purcell Mountains.

A cross-section of the metamorphic rocks is exposed over the four kilometer length of the canyon that is present on the east side of the claim group.

4.0 CLAIM INFORMATION

The 98 contiguous claim units that make up the Ham Claim group are situated along the east flank of Bootleg Mountain at the confluence of Matthew Creek and the St. Mary River. The St. Mary River constitutes the south boundary line of the claims.

The Ham group occupies a strategic areal position between the extensive land holdings of Cominco, Consolidated Ramrod, and Barkhor-Chapleau. Cominco's Mac and Lake groups border the subject claims to the north and east. Ramrod's extensive Horn group borders the Ham claims south of the St. Mary River. The Darlin claim group controlled by Chapleau Mining is located to the south and west of the Ham property.

5.0 PROPERTY GEOLOGY

5.1 The Lower Aldridge Sedimentary Sequence.

Mapping of exposures on the east flank of Bootleg Mountain, from the base of the lowest member of Bootleg diorite-gabbro sills revealed no evidence of the 100 meter thick footwall ortho-quartzite member. Consequently no footwall quartzite marker zones were found. This stratigraphic section that is present on North Star Mountain appears to have been obliterated on Bootleg Mountain by the intrusion of numerous diorite-gabbro sills in the footwall quartzite interval.

Outcrops consist of normal rusty thin bedded-siltstones and argillaceous siltstones. Generally alteration is confined to typical greenschist phases with only minor biotite development. Bedding thickness ranges from 5-30 cm. Occasional narrow dark grey argillaceous members are present but there is no evidence of carbonates such as those present in the Sullivan footwall rocks west of the Sullivan fault.

The sedimentary series is typically rusty in appearance and similar rusty sequences can be identified as sedimentary remnants within the sill complex on Bootleg Mountain west of the property. The rusty sequences are a result of numerous iron disseminations or narrow laminations and fractures. Only in one or two instances was fresh pyrite noted. Soils are typically rusty and geochemical analysis indicates an uniform iron content of 2-4 per cent throughout the stratigraphic section.

No conglomerate or fragmental zones were noted in any of the exposures examined and turbitites and cross bedded strata appear to be absent.

The entire stratigraphic sequence of sedimentary strata on this portion of the claims is clearly that of typical Lower Aldridge. Bedding strikes and dips are indicative of strata situated on the west limb of the main north trending anticlinal arch that is the dominant fold structure of the Purcell anticlinorium in the Sullivan area.

5.2 Intrusives

The lowest member of the Bootleg Mountain diorite-gabbro sill complex cuts across the north-west corner of the claims. It is concordant with the normal attitude of the intruded sediments. The sill outcrops at several points on the Ham 2 claim and is again noted as cliff forming rocks on the north wall of B Creek on the Ham 1 claim.

Diorite does not appear elsewhere on the property. The rock sequence along the east side of Matthew Creek noted by Leech in 1957 is not diorite but part of the crystalline phase of the metamorphic zone exposed in the creek erosion channel.

A small granitoid pluton was mapped in the central portion of the claim group. It is exposed over an area of approximately 25 hectares. The most prominent portion of the outcrop is located along the east wall of A Creek, at the 1400 meter level. At this point a pegmatitic phase of the pluton reveals coarse plagioclase. Preliminary examination of the weathered outcrop indicates that the intrusive is quartz-monzonite in composition along with pegmatite dyke material. A report from G. Mason of Kimberley mentions the presence of tourmaline and cassiterite in the pegmatitic portion of the intrusive. If this information is correct, this pluton would represent the closest occurrence of tourmaline and tin to the Sullivan Mine. The Matthew Creek pluton is located seven kilometers from the Sullivan corridor. This is less that half the distance than the Hellroaring Creek stock above St. Mary Lake, considered by many to be the source of the Sullivan Mine mineralization.

The Matthew Creek pluton bears a strong resemblance to that of the Hellroaring Creek stock. Both are undoubtedly surface expressions of an extensive Cretaceous granitic complex that underlies this portion of the East Kootenays.

5.3 Metamorphics

The Matthew Creek metamorphic zone underlies the east half of the Ham Claim group and is best exposed at the bottom of Matthew Creek. This zone, that extends from the Kimberley fault at the north to the St. Mary fault zone at the south has an indicated minimum width of 2 kilometers. It is usually described as a quartz-mica schist and was first noted by H.M.A. Rice in his Geological Survey Report of 1937. The presence of the zone was attributed by Rice to be the result of a deepseated Pre-Cambrian granitic complex. Succeeding geologists have universally adhered to this theory, which is one reason that the metamorphic zone has received little attention geologically until the present time.

The writer has always maintained that the alteration present in this metamorphic complex could be the result of ascending hydrothermal solutions, originating from ore bodies concealed below the present outcrop area. The mineral solution ingress was probably along north-south trending axial planes attributed to the prominent anticline in the Matthew Creek area. Localization of the mineralizing solutions could be enhanced by the dolomitic limestone horizons common in the lower portion of the Lower Aldridge formation. These carbonate zones are similar to the dolomitic horizon that acted as the host sediments for the Sullivan sulphide replacement.

Examination of the metamorphic area exposed on the Ham claims in road cuts and at the depths of Matthew Creek reveals that a number of grades of metamorphism exist. Although a large area of quartz-sericite schist is recognized south of the Matthew Creek canyon, alteration in the 4 kilometer canyon indicates several gradational degrees of metamorphism from hornfels to schist material.

The lowest grade of metamorphism above that of the normal areal greenschist phase is recrystalline hornfelsic sediments containing minor amounts of biotite but with a predominance of quartz. This rock type is prevalent in the sediments observed at the north end of the canyon. Intermediate rock types grade upward depending upon the biotite content i.e. 20 per cent to 60 per cent. With the increase of biotite there is usually a slight increase in schistosity (i.e. Metamorphic grades 2-3).

Metamorphic grades 4 and 5 are designated for those highly altered mafic rocks that contain a medium to coarse grained intermixture of biotite-quartz-hornblende/actinolite. This rock type is characteristically grey-green in color, massive, highly resistant and unlike diorite, with which it can be confused is entirely free of jointing. A noticeable outcrop of metamorphic material in contact with normal argillaceous sediments can be observed at the 7.0 kilometer point on the St. Mary Lake road and at the 2.5 kilometer point on the Matthew Creek road. Typical metamorphic rock types are present on the south side of the St. Mary-CFI road from 12 km to 20 km.

The metamorphic grade 6 category has been reserved for those grade 4 and grade 5 rock types that have been further altered to quartz-sericite schist. Sillimanite may be present in some instances.

The level topography at the confluence of Matthew Creek and the St. Mary River appears to indicate that erosion of softer rock material took place at this location. It is suspected that underlying strata was partially composed of sericitic material.

5.4 Mineral Occurrence

Mineral presence on the claim group is scarce. The lack of outcrops and the vast amount of overburden present over the majority of the property has created a negative environment for the discovery of any mineralization. The minor 1.5 - 2.0 percent iron content in the normal Lower Aldridge sediments creates an overall rusty appearance and would tend to mask the presence of gossan.

Gossan is present over the monzonite-porphyry pluton and appears to be the result of the decomposition of normal iron-rich rock components rather than metallic iron. A few prominent sedimentary outcrops are present in this same area but none revealed any mineral occurrences.

The only mineral occurrence within the Matthew Creek canyon area was that of massive vein quartz float containing significant amounts of galena. The float was found 400 meters above the end of Road G at the bottom end of the canyon. The float occurrence was traced uphill to the road bed of the Matthew Creek road, and appears to have been bulldozed from massive metamorphic material during road construction. No evidence of a vein was discovered at the site and it was concluded that the mineralization was present as a mineralized quartz pod within the confines of the enclosing metamorphic rock material.

6.0 GEOCHEMICAL STUDY

6.1 Soil Sampling Program

An extensive soil sampling program was conducted covering the north-east portion of the claims. The area covered is estimated at 200 hectares and extends from 1480 meter elevation to 1140. The project was planned as a reconnaissance study to delineate possible future target areas for more intensive exploration. The existing logging road network was used in preference to a grid system.

Individual soil samples were taken at 100 meter intervals using a soil auger to penetrate to approximate bedrock depth. Sample locations were flagged and location date noted at each test site. A total of 223 samples were taken covering 22 kilometers of roads. Roads were designated from north to south as Roads A to G. Sample numbering progressed from road end.

Soil sample analysis was based on the results of a 32 element I.C.P. determination process and the work was conducted by Acme Analytical Laboratories of Vancouver. Measurements are based on parts per million.

Test results indicated the presence of several anomalous areas with higher than normal readings for lead and zinc in the underlying rocks. One significant zinc anomaly was outlined along the west flank of Matthew Creek and it is detailed under 6.2. All anomalies show supporting lead values. Increased cobalt and nickel readings also occur in the zinc high areas but are inconsistent. Noticeable manganese and barium highs are present and appear directly related to the zinc increases. The presence of manganese can be expected, but barite, the possible source of the abnormally high barium readings is not normally present as a gangue mineral component of base metal deposits in the Sullivan map area. The nearest barite occurrence to the Sullivan mine area is that of the Leg (Legion) property at Wilds Creek north of Creston, 50 kilometers to the south-west where barite occurs either as gangue material or as a primary component of the dolomite. However, barite is a common gangue constituent of the base metal deposits on the west side of the Rocky Mountain trench north of the Skookumchuck River. The Mineral King Mine on Toby Creek east of Invermere, is the prime economic example.

Iron values are consistent within a 1.5 to 2 percent range over the test area. These readings can be considered as normal background and related to the recognized metallic iron content of the Lower Aldridge formation. The only location where iron values exceed the 4 percent range is on the Road D exposure and coincident with the lowest elevation of the above noted anomaly.

Zinc measurements in the anomalous areas range from lows of 40 to 80 ppm to highs of 180-290 ppm representing 2 times to 7 times background. Background zinc content has been calculated at 40 ppm. Lead and zinc values are clearly co-related and lead zinc rations can range from 1:2 to 1:8.

6.2 Anomalous Areas

Scattered anomalous highs have been identified at higher elevations, noticeably along Roads A, B and C. These usually consist of single or paired readings and may have abnormal lead values. These can be attributed to lead-zinc veining in the Lower Aldridge but require further exploration. A-14 and A-16 to 17 are examples where samples indicate up to 5 times background in zinc.

The high zinc analyses shown at A-1 to A-4 represents a 400 meter section that may be the result of concealed vein material. Erratic zinc indications are also present on Road C at the 1700 meter elevation directly below the diorite footwall.

A prominent anomaly containing high zinc evaluations with supporting lead content was outlined in the road cuts along the west flank of Matthew Creek. The apparent strike of the anomaly extends continuously north to south from the switchback on Road A above B Creek, for a continuous length of one kilometer and discontinuously for an additional kilometer. Road D, that runs parallel to Road A and lies directly above Matthew Creek at the 1200 meter contour elevation, along cuts through the anomalous zone from B Creek for a one kilometer length.

The size of the anomalous area cannot be accurately determined at this time due to a lack of cross line measurements. The length has been reasonably well defined from geochemical sampling results from the A Road switchback and along A Road and D Road. Chip samples taken from the bottom of Matthew Creek, and running parallel to the sampling on A and D Roads back up the higher sample values and indicate a length of 2.0 kilometers. The average width has been determined at 1.0 kilometers. The vertical range of the overall sampling program extends from the

1480 meter level at A Road switchback to 1140 meters at Matthew Creek, or 340 meters.

Lead-zinc ratios are consistent over the sampled area and within the anomaly are usually constant at 1:5. This ratio usually increases where higher zinc values are encountered. Along the 800 meter lead-zinc high along D Road ratios of 1:12 are frequent. At the bottom of Matthew Creek rock chip samples appear more in line at 1:5, but high zinc readings reveal ratios of from 1:8 to 1:14.

Zinc measurements along the 2200 meter samples portion of A Road at the switchback location averaged 136 ppm or 2.3 times background. Lead values averaged 23 ppm over the same section or 2 times background. This section represents a 1.0 kilometer strike length of over 2 times background. Individual zinc highs measured from 175 to 291 ppm with lead highs from 31 to 34 ppm.

6.3 Rock Sampling Program

38 rock chip samples were taken along the four kilometer section of Matthew Creek that traverses the Ham claim group. These samples were taken at 100 meter intervals and represents a four kilometer length. The samples were shipped to Acme Analytical Laboratories for I.C.P. analysis.

The rock sample analysis results help to extend both the lateral and vertical dimensions of the anomalous area under study.

The strike length for the anomaly at the 1140 meter creek elevation is 1600 meters. The samples reveal average zinc analysis of 110 ppm of 2 times background. Within this zone an 800 meter section (Samples R-04 to R-16 averaged 136 ppm zinc with the 500 meter core portion averaging 186 ppm zinc or 4.6 times background. The location of this sample line corresponds almost exactly with that of the D Road line 120 meters higher.

At the bottom elevation marked increases in copper, nickel, cobalt and arsenic are evident. These elements have shown definite increases over the 340 meter depth. The ppm values of these metallics lie within the same range as lead readings but with higher erratics.

The consistent presence of iron in all of the samples taken over the anomaly is of particular interest. Minor iron values can be expected in the unmineralized portions of the Lower Aldridge sediments and 1.5% could be classed as background. Iron content also includes ferrosilicate measurements.

In the A Road section 1.5 kilometers west of Matthew Creek and at the 1450 meter elevation, the soil sample assays in the tested area averaged 2.34% iron. In the D Road section, 220 meters lower, the average iron content was calculated at 2.76%. The increase is not significant except that 2 out of the 13 samples taken measured over 4% iron. Samples taken from the bottom of Matthew Creek, 120 meters deeper showed an average iron content of 4.3% over the 2500 meter section tested. Sample values are commonly in the 5% range and a single measurement of 6.58% was recorded.

7.0 PETROGRAPHIC ANALYSIS

A petrographic study was undertaken by Vancouver Petrographics of Vancouver. A suite of 18 specimens was selected from across the property in an effort to provide a wide variety of rock types and metamorphic ranges. Several specimens were taken from within the Matthew Creek metamorphic zone.

Thin section analysis is fully described in the attached petrographic report. The high metamorphic grade 5 rock material is recorded in the report as either an amphibolite (M-13), an amphibole diabase/diorite (M-12, 14, 15) or an amphibolite schist (M-16, M-18). One specimen (M-17), containing 8-10% tourmaline is classed as a tourmaline amphibolite. The latter specimens were taken from the Matthew Creek road, D road or outcrops in Matthew Creek proper.

Although the above specimens were taken within the anomalous zone only minor opaques were noted. The only noticeable example of opaques was indicated in specimen M-16, logged as an amphibole schist where widely disseminated opaque grains were identified in the thin section. Further identification would necessitate polished sections to determine the presence of sulphides, i.e. pyrite or sphalerite. Coincidentally, this specimen was taken at the same point on D Road, where D-07 to D-14 geochemical samples were taken. These samples resulted in the highest geochemical determinations i.e. 220 ppm zinc or 5.5 background.

Tourmaline was noted as an identifiable trace in four thin sections. These thin sections corresponded with metamorphic rock types. One amphibole specimen (M-13) reported conspicuous disseminated tourmaline in the 1-2% range. Specimen M-17 classed as tourmaline-biotite schist, contains 8-10% tourmaline. This specimen coincides with rock chip sample R-06 in the geochemical testing report.

The existence of tourmaline as a microscopic or megascopic ingredient in the more amphibolic sections of the metamorphic material is encouraging. Tourmaline is well recognized as a major alteration constituent of the rocks surrounding the Sullivan ore body. The tourmaline identified on the Ham claim group represents the closest occurrence of that mineral to the Sullivan Mine area yet recorded.

8.0 DISCUSSION

Over the years the writer has maintained that the Matthew Creek metamorphics represents an alteration halo caused by ascending hydrothermal solutions. Such a halo exists surrounding the Sullivan Mine, where high biotitization of the enclosing sediments can be recognized as far away as Concentrator Hill, almost seven kilometers from the ore body. Extreme hanging wall alteration is more localized directly above the ore body in the form of highly albitized-chlorite-biotite-carbonate rock with high pyrite content. This area of extreme metamorphism extends vertically for 200 meters above the ore deposit.

The wider halo of strong biotite and sericite alteration surrounds the albite-chlorite-biotite-carbonate core. This secondary alteration halo is eroded at surface, but is estimated by underground workings to extend for 300 meters vertically at the central portion of the mine.

A reasonable comparison can be made between the alteration zone above and around the Sullivan ore deposit and that of the Matthew Creek metamorphic zone. In both instances a heavy biotite alteration halo can be traced laterally for a considerable distance and in each case a central plagioclase or amphibole core is present. Heavy sericitic alteration is also prominent at both properties.

The increase in trace metal content of the metamorphosed zone on the Ham group can be measured to depth. No similar testing was ever conducted in the hanging wall alteration over the Sullivan deposit to the writer's knowledge. However, a substantial amount of iron sulphides in the form of coarse pyrite has been recognized throughout the Sullivan hanging wall alteration.

The source of mineral solutions at Matthew Creek is in question at this point. It has been established that a positive correlation between the metamorphic rock and the geochemical metal indications exists and that an increase in depth is indicated.

Two possible sources are indicated. The first relates to the presence of axial planes, present within the large anticlinal structure directly west of the Sullivan area. Such an axial break would centre directly over the Ham claim group. North-south striking fracture zones have been recognized within the Sullivan mine as being pre-ore i.e. Hamlet fault, Burchett fault, tin zone and possibly the Sullivan fault. The Sullivan corridor including the north-trending Quantrelle, and Stemwinder ore bodies all have a definite north-south trend.

The second possible source for mineral solutions in the Matthew Creek area may be the Cretaceous intrusive stock location in the center of the Ham claim group. The east flank of the quartz-monzonite porphyry pluton would underlie the anomalous Matthew Creek area at depth, providing a possible contact metamorphic situation with the dolomitic horizons prevalent in the lower portion of the Lower Aldridge formation.

Such horizons have been recognized in the Lower Aldridge in the Rocky Mountain section and have been proven to underlie the Sullivan ore body. DDH 6906 drilled from 42176 X.C.E. encountered thick sections of calcitic siltstone and dolomitic beds at Matthew Creek elevation.

9.0 CONCLUSION

Geological traverses west of Matthew Creek did not locate the massive footwall quartzite horizon that underlies the Middle-Lower Aldridge stratigraphic horizon (Sullivan time zone). The entire claim group was determined to be located in the Lower Aldridge stratigraphy at an undetermined depth.

On the east side of Matthew Creek a continuous section of sedimentary strata can be traced on the Cominco ground from the base of the footwall quartzite marker on North Star Mountain south-west of the Sullivan Mine area, to the bottom of Matthew Creek on the Ham claims. This measured section indicates that the portion of Matthew Creek between 1200 and 1100 meters in elevation represents an interval within the Lower Aldridge formation that is located approximately 650 meters below the Sullivan stratigraphic horizon and at the estimated mid point of the 1200 meter thick Lower Aldridge formation.

Geological work conducted on the Ham claims supports the claim that the Matthew Creek metamorphic zone underlies the eastern portion of the property. The writer contends that this alteration exists as a result of ascending hydrothermal solutions.

The existence of widespread metallic components within the area of metamorphism at Matthew Creek and the lack of these minerals in the unaltered sediments tend to substantiate the theory of metamorphic-mineral association.

The source of the mineralizing solutions has yet to be determined but two possibilities are presented.

1. The solution channelways were provided by axial plane fracturing related to the north-south trending Purcell anticline that overlies the Matthew Creek area.

   Such a channelway may have intersected one of the dolomitic limestone layers that are present in the lower portion of the Lower Aldridge formation.

2. The solution channelways were derived from a contact metamorphic mineral deposit that is present at some point along the underlying flank of the Cretaceous quartz-monzonite pegmatite stock located south-west of the anomaly.

The preceding information seems to indicate the lateral extent of a large anomalous area. The size of the anomaly is reinforced by its spatial relationship and increasing metal values at depth, and tends to indicate the presence of a larger mineral cap or the presence of a substantial polymetallic ore body. Significant tourmaline found in the amphibolitic rock types is of special significance since it tends to indicate a similar source to that of the Sullivan ore deposit. Only further testing of the anomaly to depth will substantiate the above hypothesis. Further work is required on the property and the following program is suggested over a three year period:

1. Additional cross lines to completed geochemical grid;
2. A geophysical program in the anomaly area;
3. An immediate drill hole program to depth to test the higher anomalous zones.

Submitted by

S.B. Hamilton, P.Eng.
Cranbrook, B.C.
October, 1994

STATEMENT OF AUTHOR'S
FIELD SUPERVISOR'S QUALIFICATION

1. Shaun Brian Hamilton, P. Eng.

   Training - Bachelor of Arts and Science (BA) Geology
   University of British Columbia (1948)
   Registered B.C. Professional Engineer (1965) No. 06561

   Experience
   - 1942 Surveyor, Mt. Zeballos Gold Mines, Zeballos V.I, B.C.
   - 1944 Surveyor, Little Billie Mine, Vananda, Texada Island, B.C.
   - 1945-1946 Surveyor, Kenville Gold Mines, Nelson, B.C.
   - 1947 Underground Geologist, Cominco, Con. Mines, Yellowknife N.W.T.
   - 1948 Property Geologist-Engineer, Cominco, Pine Point, N.W.T.
   - 1949-1960 Section Geologist, Cominco, Sullivan Mine, Kimberley, B.C.
   - 1961 Geologist, Special Assignment, Cominco, Bluebell Mine, Riondel, B.C.
   - 1965-1993 P.Eng., Consulting Geologist, Cranbrook, B.C.
   - 1994 P. Eng., Retired

2. Gerald Roy, Tie Lake, Galloway, B.C.

   Experience
   - Underground miner, shift boss, prospector, blaster, (15 years experience)

3. Cole Reid

   Experience
   - Line cutting, tree thinning, claim staking (3 summers)

ROCK SAMPLES - OUTCROPS AT FLOOR OF MATTHEW CREEK

Ham Group Assessment Report, October, 1994

Location of samples north and south, from median point W-4, at mouth of west creek, 200 metres north from E-W claim line.

Direction north at 100 meter intervals

Sample No.	Description
S-001	Fine grained argillaceous siltstone, fresh, with minor rusty laminations, minor mafics, as fresh sediments but recrystallized hornfelsic. Class, metamorphic grade 1. Some greenish fabric as chlorite-biotite intermixture.
S-002	Recrystallized argillaceous fine grained siltstone or quartzite. Feldspar, quartz biotite intermixture. Light greenish mafic mineral, hardness 4.5. No opaques. Class metamorphic grade 3.
S-003	Metamorphosed argillaceous quartzite, medium to coarse grained, greenish quartz-albite, biotite-chlorite intermixture. No opaques. As S-002 but coarser. Metamorphic grade 3.
S-004	Metamorphic. Strong recrystalline intermixture. No opaques. As S-003 but coarser. Met. Grade 4.
S-005	Recrystalline argillaceous quartzite with biotite +/- 20%, euhedral intermixture. No Fe staining. No mafics. Met. grade 2.
S-006	Fine grained silty argillite. Occasional laminations. Slight rusty spots. Relatively unaltered. Class as fresh sediments.
S-007	Fine grained silty argillite, medium grey color. Traces of biotite and sericite. Unaltered. Class as fresh sediments.
S-008	Recrystalline siltstone. Minor biotite. Class as met. grade 1.

from W-4 South at 100 meter intervals

S-01	Fine grained argillaceous siltstone. Fresh rock with rusty fracturing, greyish. Slight sericite development as minor schistose appearance. Met. grade 1.

Sample No.	**Description**

200 meter spacing from 01. south

S-02	Recrystalline argillaceous siltstone. 10-15% biotite development, minor schistosity. Vuggy 1/2 in. quartz veinlet, no mineralization. rusty fracturing. Met. grade 2.
S-03	Recrystalline argillaceous siltstone to medium graned argillaceous quartzite. 20% biotite development as grainy euhedral intermixture. No schistosity. Minor rusty fractures. Met. grade 2.
S-04	Coarse grained recrystalline, heavily biotitized rock with strong amphibole development. Sub-gneissic. Mafics 40%. Some plagioclase development. Not diorite. Met. grade 5.
S-05	Medium to coarse grained, recrystalline quartz with 30% mafics. Amphibole identified as hornblende. Sub-gneissic texture with random crystal development. Not diorite. As S-04. Met. grade 5.
S-06	Strong crystalline hornblende development in massive grey-green matrix having quartz free makeup. Accicular crystal development with strong striations. Hardness 5. Not tourmaline or actinolite. Rhomboid or monoclinic. Met grade 5. Petrographic specimen M-19.
S-07	Fine grained siltstone with dark biotite laminations. Slight rusty color, especially on fractures. Met. grade 2.
S-08	Medium grained metamorphic rock as S-05 but no schistosity or gneissic development. Greyish. No rust. No mavics. Met. grade 4.
S-09	Medium to coarse grained dark grey metamorphic rock from argillaceous quartzite sedimentary equivalent. 50% mafic development with amphibole and quartz. No rust. Met. grade 4.
S-10	Massive to medium-coarse grained metamorphic rock. As S-09 but 30-40% mafic development. Medium-grey-green. No rust. Met. grade 4.
S-11	Medium grained, grey green metamorphic rock with euhedral crystal development as broad lathlike type (Plagioclase?). As S-05 and S-08. Met. grad 4.
S-12	Medium grained, grey green rock as S-11 with rusty fracturing. Slaty appearance. Met. grade 3. Petrographic sample M-12.

Sample No.	Description
S-13	As S-11. Quartz, feldspar, greenish amphibole assemblage. Rusty, Met. grade 4.
S-14	Low grade schistose development of normal hornfelsic argillaceous siltstone. Fe flecked. Sericite development along schistosity planes. Class as normal hornfelsic, Met. grade 2.
S-15	Medium grained, recrystalline, granular texture. Quartz-biotite assemblage. Sub-gneissic with minor sericite. Met. grade 3.
S-16	Medium grained, granular texture. More mafic than S-15 with slight schistosity. Slight gradation from massive metamorphic to schist. Met. grade 3.
S-17	Fine grained hornfelsic sediments. Recrystalline quartz with incipient biotite development. Sample retains original sedimentary characteristics but with slight schistosity due to biotite alignment. Some rusty iron laminations. Rusty fracturing. Met. grade 2.
S-18	Fine grained slightly metamorphosed argillaceous siltstone to siltstone. Rusty iron staining along laminations and cross fractures. No noticeable recrystallization or shistosity. Fresh rock. Met. grade 0.
S-19	As S-18 but slight recrystallization and biotite as rusty flecks. Met. grade 1.
S-20	Medium quartz-biotite development from S-18 and S-19. Schistose development with prominent sericite along schist planes. Met. grade 3.
S-21	Medium grained recrystalline quartz-biotite intermixture. Minor schistose development. 30% vein quartz. No mineralization or iron staining. Met. grade 3.
S-22	As S-21 medium grained quartz-biotite grading into strong sericite development into moderate schistose rock. Sericite planes foliated through specimen. Met. grade 3-4.
S-23	Quartz-sericite schist. High sericite development. No recognizeable sillimanite but light olive-green plaly mineral evident. Met. grade 6.
S-24	Quartz-sericite schist. Medium grey color. Foliated. Met. grade 6.

Sample No.	Description
S-25	Quartz-sericite schist. Equal development of quartz and sericite. Some rusty sections. Met. grade 6.
S-26	Medium-grey quartz-sericite schist. Occasional pink garnets. Met. grade 6.
S-27	Dark grey quartz-biotite hornblende assemblage. Sub-gneissic texture. 50% mafic content. Petrographic specimen M-6. Whitish quartz veining with no metallics. Met. grade 5-6.
S-28	Dark grey quartz-biotite hornblende assemblage 70% mafic content. Met. grade 5-6. Petrographic specimen M-20.
S-29	Dark grey quartz-biotite hornblende with 50-75% mafic content. Met. grade 5-6. No schistosity.
S-30	Medium to light grey quartz-sericite schist with nodular quartz. Sericite development 60%. Met. grade 6.
S-31	As S-30. Met. grade 6.

PETROGRAPHIC STUDY

Ham Group Assessment Report, October, 1994

Rock Suite M-1 to M-15
Petrographic Analysis by Vancouver Petrographic

M-1 Location Top of Road A 10.5 km
Hornfelsic thin bedded to lam SA to A.S. low grade metamorphic with slight schistocity, minor bio. devel. Strike 15° NE dip 18° W. Good bedding

M-2 Location Top of Road B from logging area, ridge. Slightly metamorphosed RC massive with predominant mafics and light colored garnet. Single pytrite crystal. 2 mm resembles mets diorite? no dip.

M-3 Location Top of Road B, end of road
Hornfelsic arg thin bedded seds, grade to A.S. west dipping 15°, North strike. Minor Fe staining.

M-4 Location - Start of ridge from gate, Lower Matthew Cr. Road, East bank
Highly schistosed thin bedded seds - 30 to 15 m cliff face 50 m along W side of road.

M-5 Location - Mid Point Road G from end of road east bank
Metamorphic thin beds, massive to relief bedding structure, 40 m cliff face, samples from 20 m above road.

M-6 Location - past end of Road G - East side overhang of creek, above pipe intake. Metamorphosed seds, bedding (relict) evident.
Original 1-2" AS-AQ bedding, seric schisting of more argillaceous members.

M-7 Location - below Rd G, East side of Mathew Cr. at start of Matthew Cr. cliffs (campsite). Interbeds of Qtzite (met) and schistosed argillite layers.

M-8 Location below Rd G above campsite As M-7 but represents metamorphosed AS-AQ member.

M-9 Location on St. Mary's Road, outcrop of north side road, contact between massive metamorphosed road, and thin bedded argillite and silty argillite.

M-10 Location on St. Mary's Road - unaltered sediments in contact with metamorphosed rock (M-9), argillite to silty argillite, typical rusty appearance, beds 2-6 inches, partially metamorphosed (bio content) minor sericite. Strike N 10^{o}, dip 20^{o} E.

M-11 Matthew Creek road, east side, rusty thin beds over 70 meter outcrop, 15 meters high, beds 2-4 inch (cm), minor schist. along bedding planes. At 2.3 kilometer Strike 19^{o} NW.

M-12 Matthew Creek road - east side at 2.5 kilometers massive metamorphosed face. Med gray green color, no rust, no jointing, very hard and compact.

M-13 Matthew Creek road, east side, between Ryot fault location and Kimberley fault, 7.5 km. massive grey green metamorphic rock.

M-15 Matthew Creek, exposure at 6.2 km at point where Ham group claim base line crossed creek, massive med. grained metamorphic rock.

M-16 Matthew Creek, Road D, west side of Creek exposure at 2.0 km (end of road, massive sub gneissic biotite, quartz, greyish green. Large float boulders)

M-17 Matthew Creek, rock exposure (Rock sample S-06) Amphibole development in dense grey-green aphanitic ground mass

M-18 Matthew Creek, roc, exposure (Rock sample S-26) gneissic, quartz, biotite, amphibole massive metamorphic rock.

M-10 Location on St. Mary's Road - unaltered sediments in contact with metamorphosed rock (M-9), argillite to silty argillite, typical rusty appearance, beds 2-6 inches, partially metamorphosed (bio content) minor sericite. Strike N 10°, dip 20° E.

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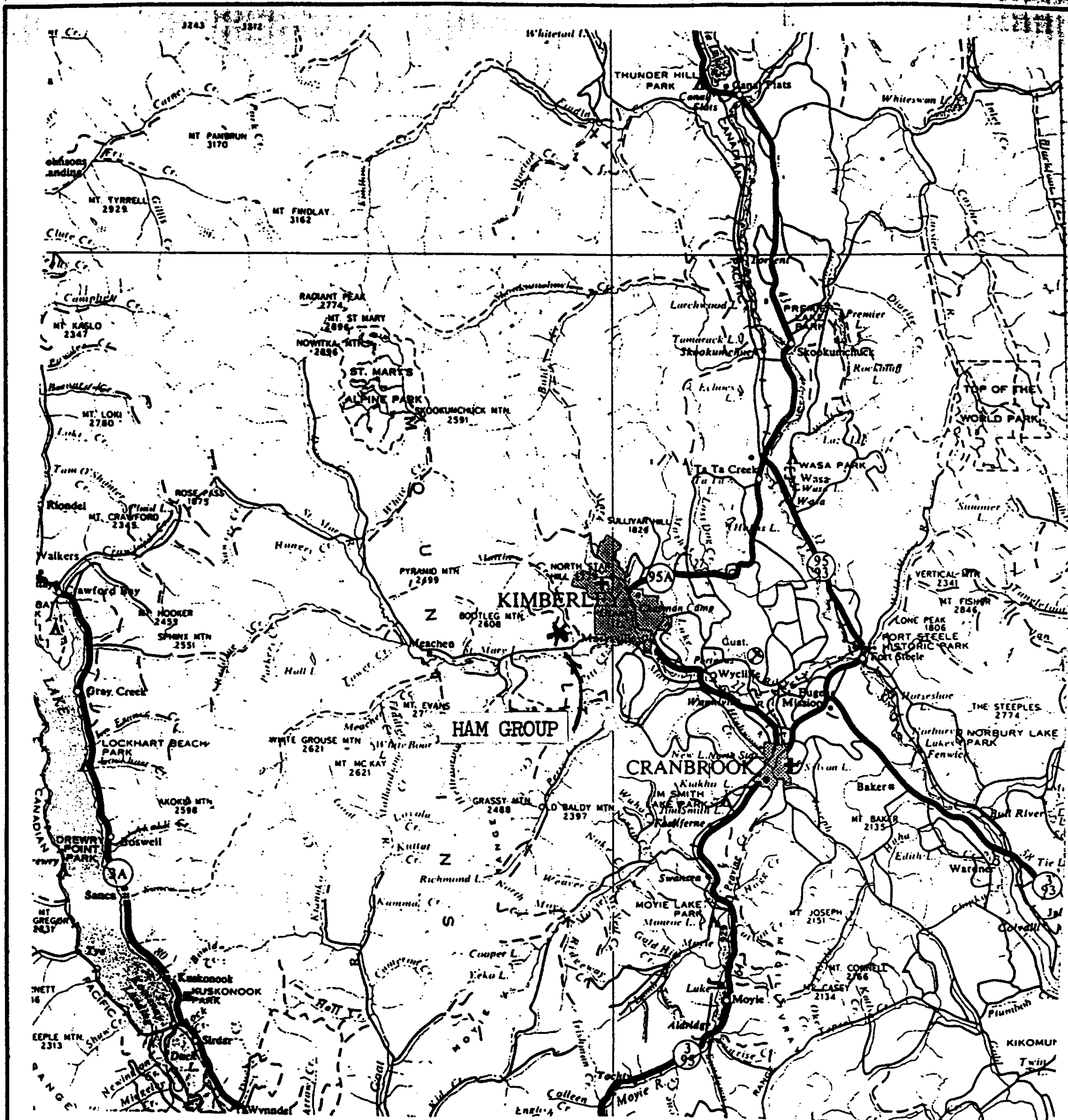
M-18 Matthew Creek, roc, exposure (Rock sample S-26) gneissic, quartz, biotite, amphibole massive metamorphic rock.

HAM CLAIM GROUP

Assessment work 1994

Field personnel			
1@ $250 perday 30 days	S.B.Hamilton	$7500.00	
1@ $80 per day 18 days	C.Reid	$ 960.00	
1@ $200 per day 3 days	J. Roy	$ 400.00	$9,060.00
Engineering		$ 404.75	
Mobilization/Demobilization		—	
Food and Accomodation		—	
Vehicle rentals 1 4x4 30 days @ $75 per day		$ 2250.00	
Contract jobs - soil and rock sampling	- J. Roy	$ 2027.00	
Equipment		$ 215.00	
Instrument rentals - supplied		—	$4592.00
Laboratory analysis - geochemical		$ 2317.69	
petrographic		$ 2150.00	
Report preparation 15 days @ 100 per day		$ 1500.00	
Management		$ 500.00	$6467.69
Total			$20,119.69

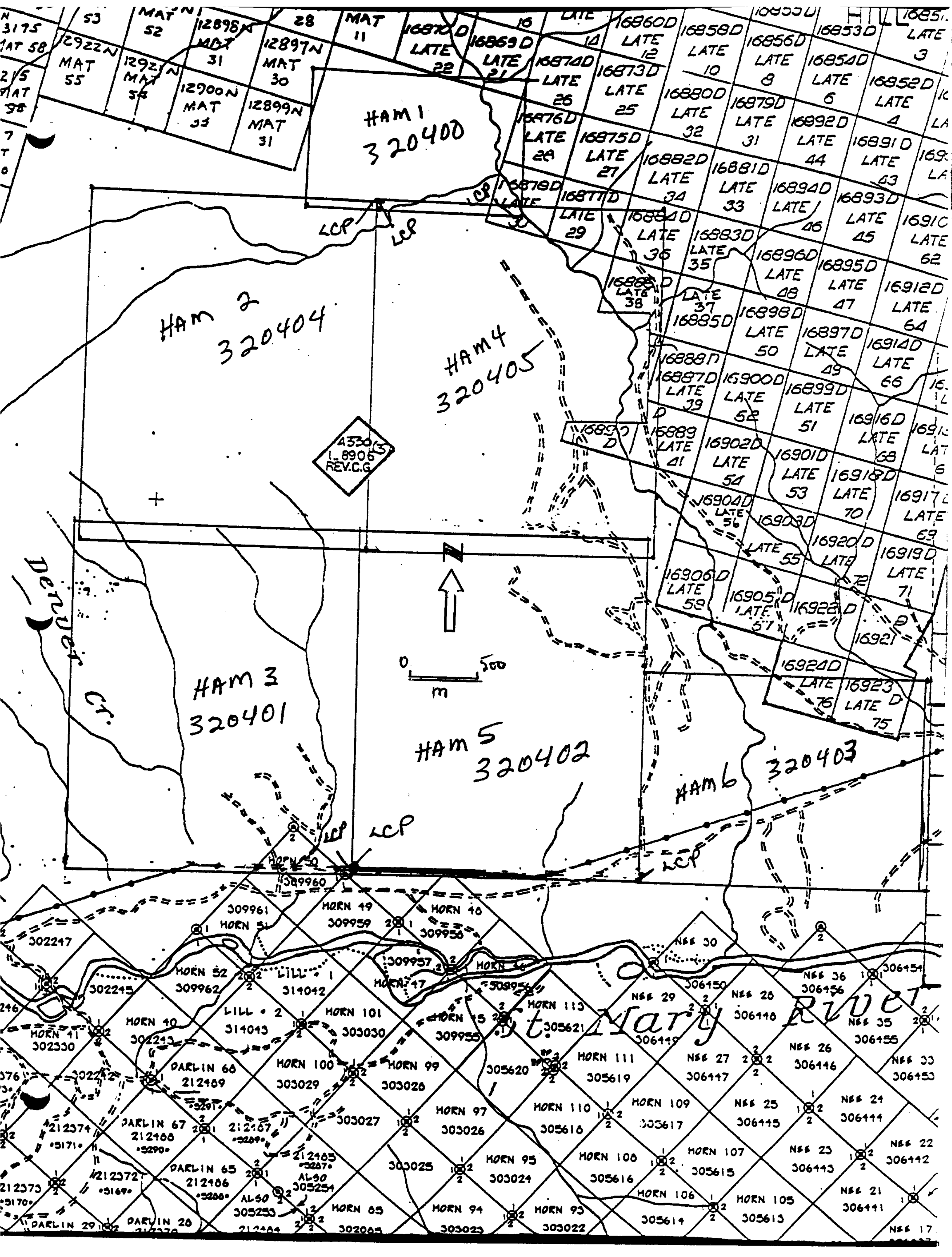


HAM GROUP

Claims Location Map

Scale: 1:600 000

Date: OCT. 1990



HAM 1
320400
HAM 2
320404
HAM 3
320401
HAM 4
320405
HAM 5
320402
HAM 6 320403
A330(S)
L.8906
REV.C.G
LCP
N
0
500
m
Denver Cr.
St. Mary River
HORN 50
309960
309961
HORN 51
HORN 49
309959
HORN 48
309958
309957
HORN 47
HORN 46
HORN 52
309962
LILL 1
314042
LILL 2
314043
HORN 101
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HORN 40
302243
HORN 41
302330
302247
302245
DARLIN 68
212469
HORN 100
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HORN 99
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HORN 45
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HORN 113
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HORN 111
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DARLIN 67
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HORN 110
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HORN 109
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DARLIN 65
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ALSO
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HORN 108
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HORN 107
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ALSO
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HORN 93
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HORN 106
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HORN 105
305613
DARLIN 29
DARLIN 28
NSS 30
NSS 29
306449
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NSS 28
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NSS 21
306441
NSS 17
12898N MAT 31
12897N MAT 30
12922N MAT 55
12921N MAT 54
12900N MAT 33
12899N MAT 31
MAT 52
MAT 11
MAT 58
MAT 58
16870D LATE 22
16869D LATE 21
16860D LATE 12
16858D LATE 10
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16853D
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LATE 3
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LATE 37
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16900D LATE 52
16899D LATE 51
16916D LATE 68
16889 LATE 41
16902D LATE 54
16901D LATE 53
16918D LATE 70
16917
LATE 69
16904D LATE 56
16903D
LATE 55
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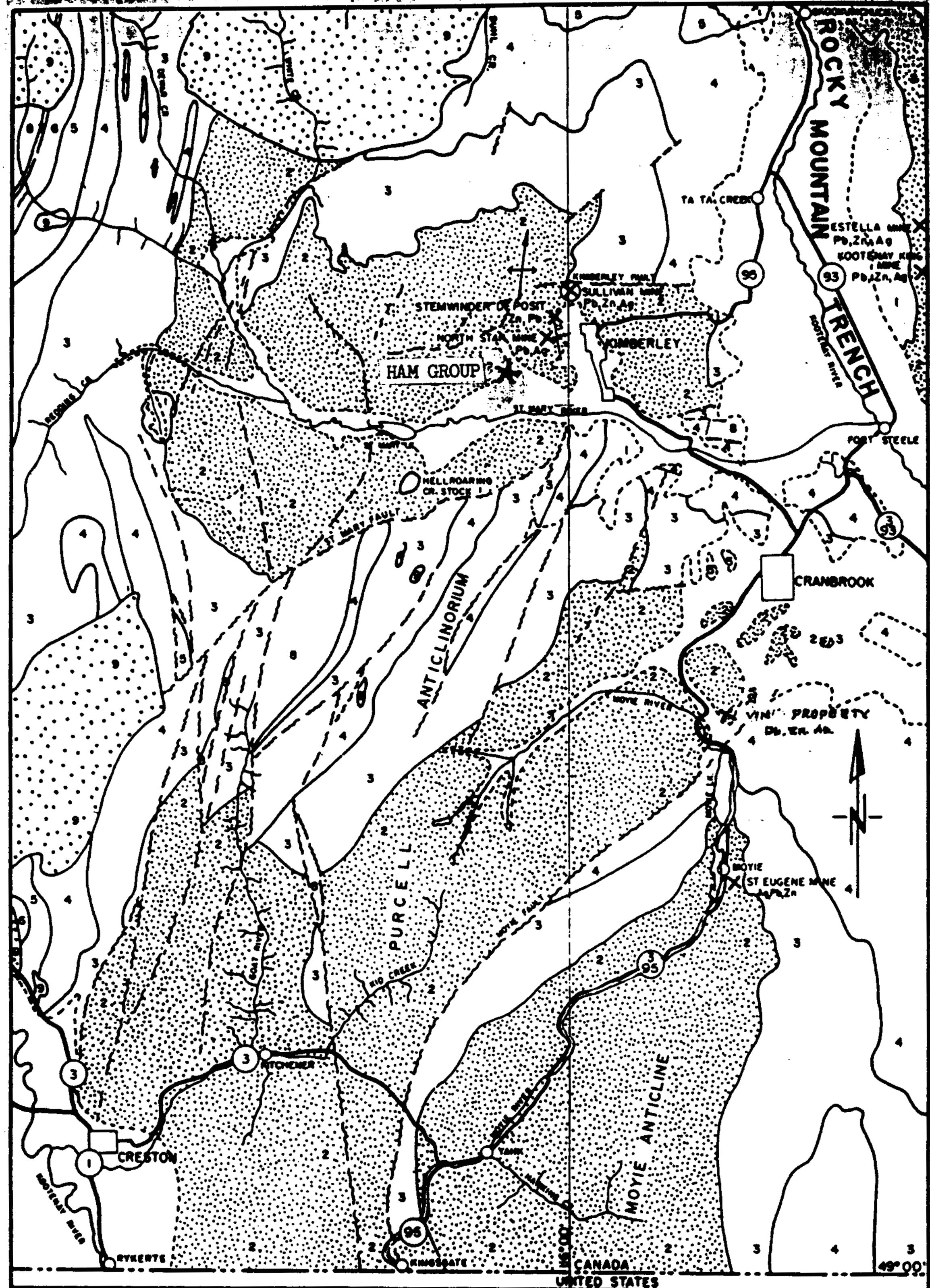
16906D LATE 58
16905D LATE 57
16922D
16921
16924D LATE 76
16923D LATE 75



MAIN HIGHWAY
FAULT
MINE — ACTIVE
MINE — INACTIVE
SYNCLINE — ANTICLINE

5 0 5 10 15
MILES
KILOMETRES
5 0 5 10 15 20 25

MESOZOIC — 9 — Monzonite, Quartz monzonite, Granodiorite

CAMBRIAN SYSTEM

PALEOZOIC — 8 — CRANBROOK FM.–quartzite, gnt, conglomerate, sandstone. EAGER FM.–shale, limestone, siltstone, sandstone.

WINDERMERE SUPERGROUP

PROTEROZOIC — 7 — TOBY FM. conglomerate, argillite, sandstone.

PURCELL SUPERGROUP

6 — MOUNT NELSON FM.–argillite, dolomite, quartzite.

PROTEROZOIC — PURCELL SUPERGROUP

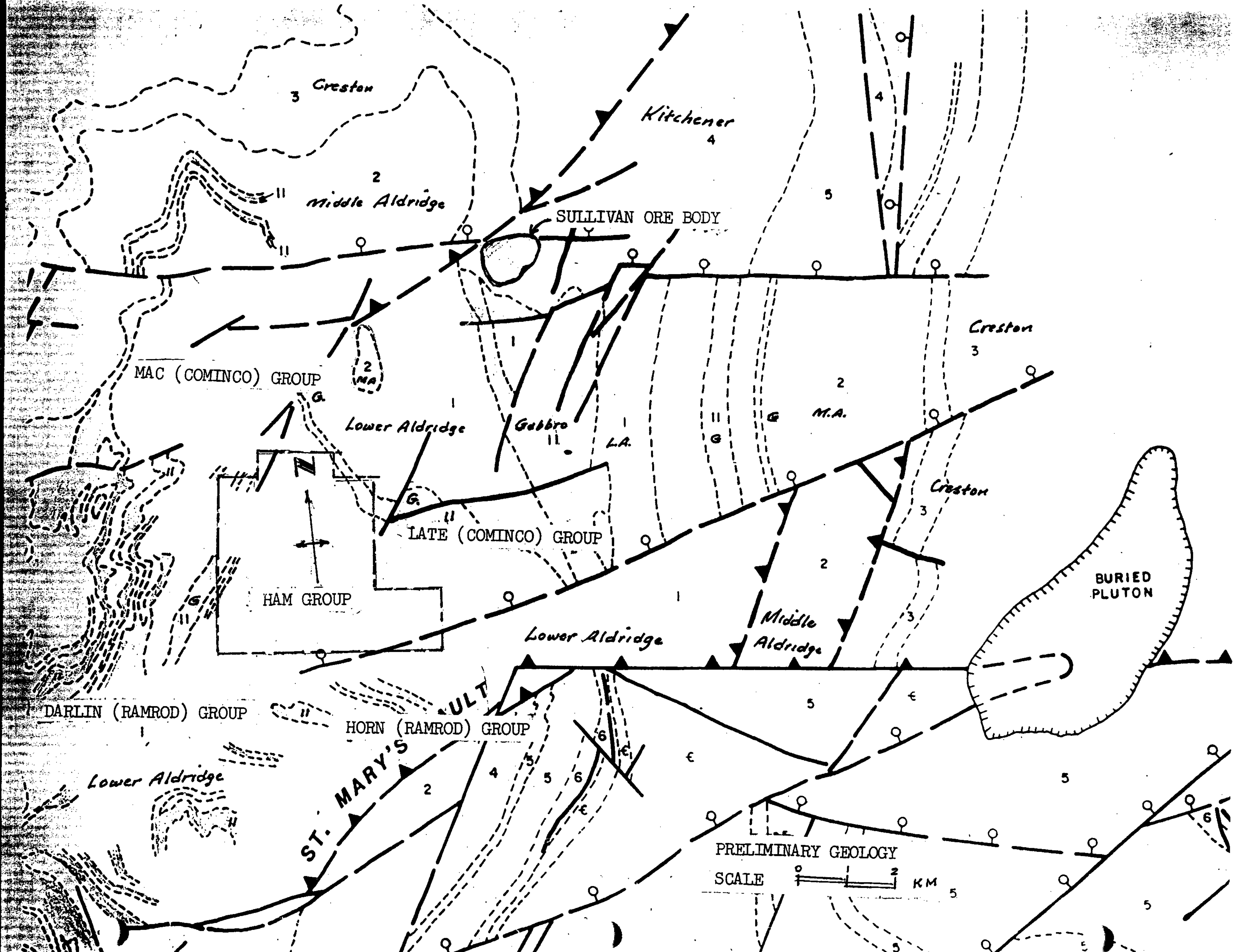
5 — DUTCH CREEK FM.–grey to dark grey calcareous and dolomitic argilite. Minor quartzite.

4 — KITCHENER FM.–grey & green argillite & dolomitic argillite, grey dolomite, quartzite, grey limestone. SIYEH FM.–red weathering grey dolomite & argillaceous dolomite, grey dolomitic argillite & siltstone, quartzite, green argillite, grey limestone.

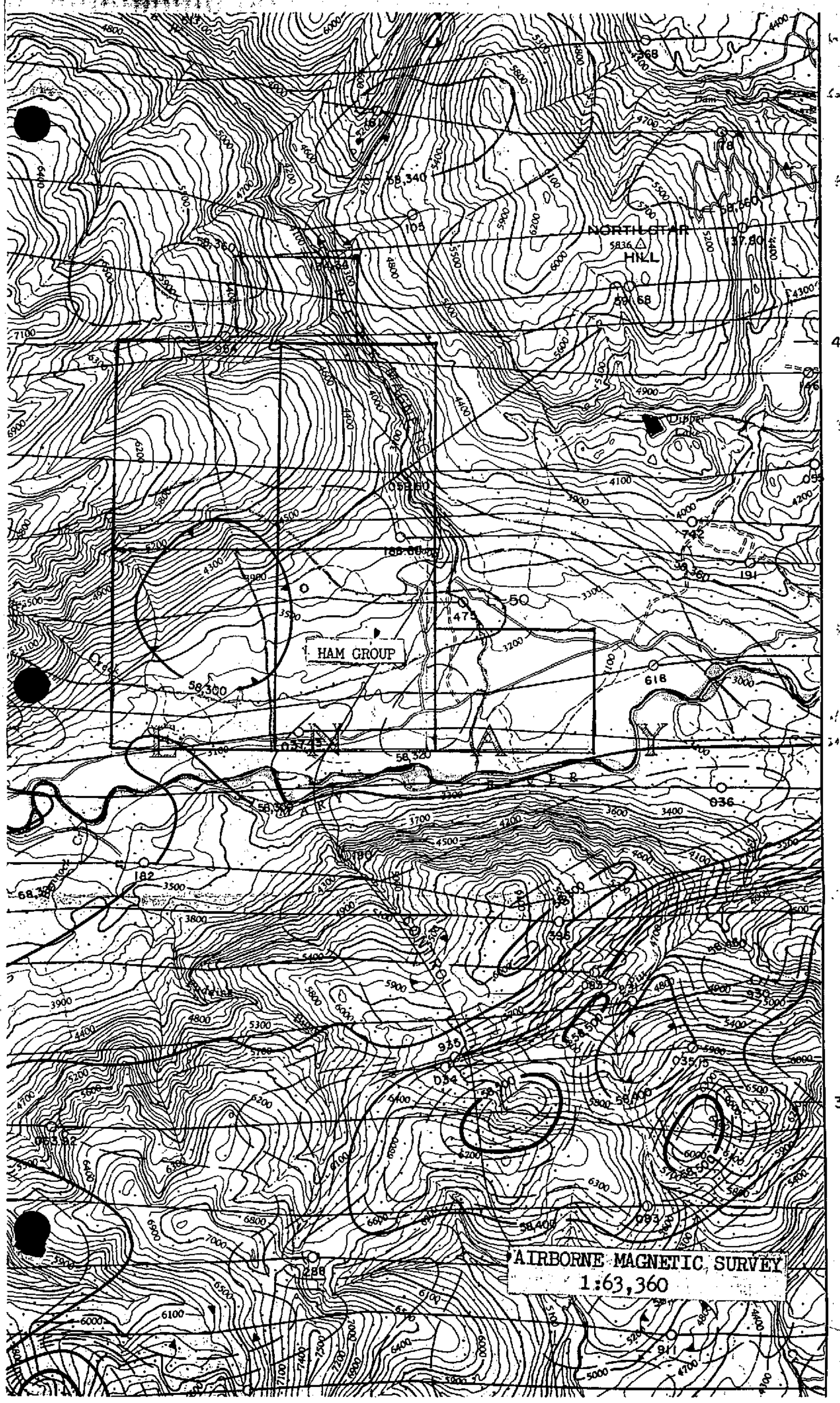
3 — CRESTON FM.–grey & green argillite & siltstone, grey, green, white & purple quartzite.

2 — ALDRIDGE FM.–grey quartzite & siltstone, commonly massive, interbeds, partings, & bed tops of dark argillite.

1 — FORT STEELE FM.–white siliceous quartzite, grey argillaceous quartzite, dark argillite, grey and black dolomitic & calcareous argillite, dolomite.



Creston
Kitchener
Middle Aldridge
SULLIVAN ORE BODY
MAC (COMINCO) GROUP
Lower Aldridge
Gabbro
L.A.
M.A.
Creston
Creston
LATE (COMINCO) GROUP
HAM GROUP
BURIED PLUTON
Lower Aldridge
Middle Aldridge
DARLIN (RAMROD) GROUP
HORN (RAMROD) GROUP
ST. MARY'S
Lower Aldridge
PRELIMINARY GEOLOGY
SCALE 0 1 2 KM



8469 G "Cranbrook"

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

GEOCHEMICAL ANALYSIS CERTIFICATE

S.B. Hamilton File # 94-3312 Page 1

327 - 12th Ave South, Cranbrook BC V1C 2S6

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	Tl ppm	Hg ppm
A-01	2	29	29	126	<.1	42	15	516	2.81	16	<5	<2	5	23	.2	<2	<2	37	.31	.083	14	14	.42	117	.14	4	2.84	.03	.20	<1	<5	<1
A-02	1	51	22	96	<.1	26	24	641	2.65	10	<5	<2	<2	35	<.2	<2	<2	62	.31	.017	10	7	.39	75	.08	2	1.87	.02	.17	<1	<5	<1
A-03	1	35	27	102	<.1	23	17	1274	2.36	13	<5	<2	2	20	.2	<2	<2	34	.28	.062	12	14	.38	126	.11	3	1.97	.02	.14	2	5	<1
A-04	1	32	29	124	<.1	22	16	714	2.09	9	<5	<2	4	18	<.2	2	<2	27	.21	.108	15	13	.23	112	.10	2	1.95	.02	.15	<1	<5	<1
A-05	1	20	15	78	.1	22	15	717	2.20	15	<5	<2	2	16	<.2	<2	<2	30	.22	.145	8	19	.23	96	.11	2	2.39	.02	.10	<1	<5	<1
A-06	1	18	16	57	<.1	26	12	328	2.27	9	<5	<2	3	30	<.2	<2	<2	31	.30	.085	12	17	.41	100	.12	3	2.55	.02	.14	<1	<5	<1
A-07	1	14	18	78	.2	18	12	535	1.97	8	<5	<2	3	27	<.2	<2	<2	23	.29	.224	11	13	.23	160	.09	2	1.99	.02	.14	<1	<5	<1
A-08	1	19	16	91	.1	16	15	870	1.87	7	<5	<2	2	21	<.2	3	<2	23	.21	.300	9	10	.12	186	.12	3	2.69	.03	.09	<1	<5	<1
RE A-08	1	18	18	92	.2	16	15	883	1.90	10	<5	<2	2	21	<.2	2	<2	23	.21	.307	9	11	.13	189	.12	3	2.74	.03	.09	<1	<5	<1
A-09	1	23	18	54	<.1	26	12	522	1.87	11	<5	<2	3	15	<.2	<2	<2	25	.16	.085	13	11	.14	136	.13	3	3.24	.03	.09	1	<5	<1
A-10	1	29	57	72	.1	21	17	502	2.69	12	<5	<2	5	20	<.2	<2	<2	32	.25	.067	19	20	.47	101	.11	2	2.38	.02	.16	<1	<5	<1
A-11	1	19	27	52	<.1	20	13	245	2.48	20	<5	<2	3	12	<.2	2	<2	36	.16	.132	11	16	.21	82	.12	3	2.81	.02	.10	1	<5	<1
A-12	1	35	29	81	.2	25	29	676	2.21	10	<5	<2	<2	24	<.2	<2	<2	31	.32	.037	40	18	.42	79	.10	2	2.17	.02	.11	<1	<5	<1
A-13	1	17	21	62	<.1	25	13	210	2.29	11	<5	<2	4	16	<.2	<2	<2	29	.21	.046	13	15	.28	115	.10	2	2.13	.02	.15	<1	<5	<1
A-14	1	26	106	226	.2	37	22	1860	2.46	27	<5	<2	3	17	.8	<2	<2	30	.17	.096	15	15	.18	259	.10	4	2.19	.02	.12	1	<5	<1
A-15	1	20	25	53	<.1	11	8	302	2.08	6	<5	<2	5	11	<.2	2	<2	30	.22	.033	18	16	.47	60	.11	2	1.31	.02	.17	<1	<5	<1
A-16	1	21	23	146	.2	40	11	563	1.75	15	<5	<2	3	12	.2	2	<2	23	.15	.079	15	14	.20	150	.08	2	1.89	.01	.12	<1	<5	<1
A-17	1	21	18	166	.3	57	34	626	2.34	15	<5	<2	5	16	.4	2	<2	30	.21	.053	15	11	.40	251	.10	2	2.62	.02	.17	<1	<5	<1
A-18	1	18	21	87	<.1	28	22	1122	2.16	14	<5	<2	2	13	<.2	<2	<2	30	.16	.101	13	16	.19	133	.10	<2	2.38	.02	.10	<1	<5	<1
A-19	1	30	30	53	.1	21	17	241	2.31	12	<5	<2	3	15	<.2	<2	<2	31	.23	.035	20	17	.42	64	.10	2	2.09	.01	.10	<1	<5	<1
A-20	1	35	22	72	<.1	28	20	269	2.55	12	<5	<2	5	13	<.2	<2	<2	35	.18	.056	20	19	.44	103	.13	2	2.83	.02	.15	<1	<5	<1
A-21	1	29	17	70	<.1	24	19	392	2.58	9	<5	<2	4	11	<.2	2	<2	35	.16	.058	20	18	.44	87	.12	2	2.56	.02	.13	<1	<5	<1
A-22	1	36	15	49	<.1	20	12	245	2.36	10	<5	<2	5	12	<.2	<2	<2	36	.24	.033	16	20	.46	70	.13	<2	2.13	.02	.18	1	<5	<1
A-23	1	21	26	51	<.1	19	9	197	1.98	11	<5	<2	3	12	<.2	<2	<2	32	.22	.013	13	16	.45	52	.12	<2	1.70	.01	.11	1	<5	<1
A-24	1	32	33	69	<.1	32	25	248	3.74	19	<5	<2	4	18	<.2	<2	<2	53	.15	.044	18	23	.41	119	.18	<2	4.12	.02	.15	1	<5	<1
A-25	1	27	17	43	.1	15	12	357	2.09	11	<5	<2	3	11	<.2	<2	<2	30	.17	.021	17	18	.50	58	.11	2	1.91	.01	.17	<1	<5	<1
A-26	1	30	41	77	<.1	28	50	507	3.37	13	<5	<2	4	23	<.2	<2	<2	48	.21	.072	25	22	.26	129	.14	<2	3.87	.02	.15	<1	<5	<1
A-27	<1	16	12	54	<.1	17	10	177	1.94	9	<5	<2	3	10	<.2	2	<2	29	.15	.062	10	14	.19	67	.09	<2	1.87	.01	.10	<1	<5	<1
A-28	1	17	25	63	<.1	21	13	162	2.21	19	<5	<2	4	11	<.2	<2	<2	31	.13	.076	15	18	.24	77	.09	<2	2.06	.01	.11	1	<5	<1
A-29	<1	11	20	31	.1	8	7	282	1.40	6	<5	<2	2	15	<.2	2	<2	25	.26	.024	14	12	.18	51	.07	2	1.03	.01	.07	<1	<5	<1
A-30	1	18	21	39	<.1	14	9	302	1.96	10	<5	<2	2	14	<.2	<2	<2	28	.28	.024	16	17	.42	54	.09	2	1.35	.02	.13	<1	<5	<1
A-31	1	24	15	58	<.1	22	10	187	2.55	13	<5	<2	4	13	<.2	<2	<2	34	.24	.054	14	19	.44	81	.11	<2	2.19	.02	.14	1	<5	<1
A-32	1	22	16	96	<.1	20	13	335	2.28	7	<5	<2	3	15	<.2	<2	<2	31	.19	.057	13	14	.30	79	.10	<2	1.88	.02	.14	<1	<5	<1
A-33	1	12	10	95	.1	21	17	317	2.05	8	<5	<2	3	16	<.2	<2	<2	30	.15	.066	9	12	.19	69	.11	3	1.91	.02	.11	<1	<5	<1
A-34	1	20	27	163	<.1	20	12	233	2.53	8	<5	<2	4	17	<.2	<2	<2	31	.14	.077	16	14	.30	91	.11	2	1.66	.02	.14	1	<5	<1
STANDARD C	20	60	38	125	6.8	72	32	1048	3.96	38	22	6	37	52	18.7	19	22	61	.49	.091	40	56	.92	182	.08	33	1.88	.06	.15	9	<5	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.
- SAMPLE TYPE: SOIL Samples beginning 'RE' are duplicate samples.

DATE RECEIVED: SEP 23 1994 **DATE REPORT MAILED:** Sept 29/94 **SIGNED BY** .... D.TOYE, C.LEONG, J.WANG; CERTIFIED B.C. ASSAYERS

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	Tl ppm	Hg ppm
A-35	1	18	19	185	.1	18	11	176	2.24	12	<5	<2	4	19	<.2	2	<2	28	.12	.147	15	12	.21	96	.12	4	1.21	.02	.14	<1	<5	<1
A-36	1	20	18	129	.2	24	21	244	2.36	10	<5	<2	5	15	<.2	2	<2	29	.13	.064	8	11	.18	62	.14	3	2.97	.03	.11	<1	<5	<1
RE A-36	1	20	19	131	.2	25	21	248	2.38	14	<5	<2	5	15	<.2	<2	<2	30	.13	.065	8	11	.18	65	.14	4	3.11	.03	.10	<1	<5	<1
A-37	1	16	22	171	.1	16	11	401	2.48	14	<5	<2	5	19	<.2	<2	<2	30	.14	.149	14	13	.26	147	.11	2	1.68	.02	.13	<1	<5	<1
A-38	1	13	22	161	.1	11	9	203	2.19	19	<5	<2	3	16	<.2	<2	<2	24	.14	.218	14	12	.21	120	.08	3	1.52	.01	.10	<1	<5	<1
A-39	1	27	25	157	<.1	20	13	364	2.40	18	<5	<2	4	20	<.2	<2	<2	30	.27	.050	18	18	.52	82	.11	2	1.77	.02	.22	<1	<5	<1
A-40	1	19	20	143	<.1	18	8	204	2.36	14	<5	<2	5	14	<.2	<2	<2	32	.16	.023	15	22	.46	74	.12	3	1.41	.02	.14	<1	<5	<1
A-41	1	28	22	83	<.1	17	9	196	2.71	15	<5	<2	6	13	<.2	<2	<2	31	.17	.053	20	15	.54	51	.11	<2	1.58	.01	.18	<1	<5	<1
A-42	1	15	20	137	.2	18	18	188	2.09	130	<5	<2	4	10	<.2	2	<2	30	.10	.060	11	12	.17	86	.10	2	1.64	.02	.08	<1	<5	<1
A-43	1	16	15	99	.1	11	7	333	1.63	9	<5	<2	3	18	<.2	2	<2	24	.13	.107	10	11	.16	114	.09	3	1.24	.02	.08	<1	<5	<1
A-44	1	16	28	174	.1	18	10	199	2.64	14	<5	<2	4	16	<.2	<2	<2	38	.12	.068	9	10	.21	83	.13	2	1.79	.02	.12	<1	<5	<1
A-45	<1	13	17	126	.2	12	17	820	1.68	7	<5	<2	3	12	<.2	<2	<2	23	.09	.206	8	11	.13	142	.09	4	1.47	.02	.07	<1	<5	<1
A-46	1	19	24	209	.3	30	19	1104	2.26	17	<5	<2	4	21	<.2	<2	<2	32	.16	.242	6	11	.15	150	.15	3	3.87	.03	.09	<1	<5	<1
A-47	1	27	22	89	<.1	19	15	372	2.67	16	<5	<2	6	17	<.2	<2	<2	38	.28	.044	19	18	.62	84	.11	2	1.83	.02	.25	<1	<5	<1
A-48	1	18	31	144	.2	14	21	933	2.22	16	<5	<2	2	44	<.2	<2	<2	33	.31	.184	8	10	.18	250	.12	2	2.18	.03	.11	<1	<5	<1
A-49	1	23	31	90	.1	20	29	192	2.87	14	<5	<2	4	14	<.2	<2	2	43	.12	.086	17	13	.22	107	.15	2	3.89	.03	.11	<1	<5	<1
A-50	1	29	22	115	<.1	17	19	282	3.08	14	<5	<2	5	22	<.2	<2	<2	45	.18	.077	13	12	.37	125	.15	3	2.96	.02	.24	<1	<5	<1
A-51	1	174	19	164	.1	22	21	308	2.59	16	<5	<2	5	24	<.2	<2	<2	40	.17	.157	11	11	.29	185	.12	2	2.27	.03	.20	<1	<5	<1
A-52	1	25	19	140	<.1	16	23	246	2.65	14	<5	<2	3	30	<.2	<2	<2	41	.30	.078	8	15	.56	130	.13	2	2.45	.04	.24	<1	<5	<1
A-53	1	26	20	123	<.1	17	16	269	2.76	13	<5	<2	3	19	<.2	<2	<2	45	.23	.047	10	13	.54	119	.14	3	2.27	.02	.26	<1	<5	<1
A-54	1	23	15	100	<.1	20	18	946	1.71	8	<5	<2	2	33	<.2	2	<2	23	.21	.121	13	10	.18	204	.10	2	2.31	.02	.13	<1	<5	<1
A-55	1	41	28	93	.2	34	34	1204	2.89	13	<5	<2	6	16	<.2	<2	2	37	.18	.076	23	22	.46	118	.12	<2	3.43	.02	.21	<1	<5	<1
A-56	1	18	10	94	.1	34	23	476	1.83	9	<5	<2	3	42	<.2	3	<2	24	.34	.250	9	10	.15	216	.11	4	3.18	.03	.12	<1	<5	<1
A-57	1	20	17	75	<.1	21	14	423	1.92	10	<5	<2	3	22	<.2	<2	<2	27	.18	.174	11	12	.21	221	.09	3	2.04	.02	.14	<1	<5	<1
A-58	1	20	13	109	.1	18	10	283	1.89	9	<5	<2	3	16	<.2	<2	<2	29	.18	.126	10	12	.24	135	.09	<2	1.73	.02	.12	<1	<5	<1
A-59	<1	20	19	63	.1	20	9	141	1.86	4	<5	<2	3	19	<.2	<2	<2	24	.22	.031	15	13	.26	76	.08	2	1.77	.02	.19	<1	<5	<1
A-60	<1	16	9	29	<.1	10	6	225	1.62	4	<5	<2	4	13	<.2	<2	<2	27	.31	.011	16	14	.27	37	.11	2	1.10	.02	.19	2	<5	<1
A-61	<1	16	12	69	<.1	15	7	144	1.49	6	<5	<2	2	15	<.2	2	<2	20	.16	.059	9	10	.19	144	.08	2	1.60	.02	.12	<1	<5	<1
A-62	1	40	11	78	.1	30	15	208	2.10	10	<5	<2	4	17	<.2	<2	<2	27	.17	.047	15	14	.25	108	.11	2	2.66	.02	.16	<1	<5	<1
A-63	1	20	14	58	<.1	18	7	180	1.60	5	<5	<2	3	12	<.2	<2	<2	20	.14	.016	17	11	.36	71	.07	2	1.48	.02	.13	<1	<5	<1
A-64	<1	19	11	45	<.1	12	6	247	1.49	4	<5	<2	3	10	<.2	<2	<2	20	.17	.014	17	11	.42	60	.09	2	1.21	.01	.13	<1	<5	<1
A-65	<1	14	23	75	.1	18	7	337	1.66	7	<5	<2	4	13	<.2	<2	<2	18	.11	.077	15	10	.23	161	.07	2	1.65	.01	.14	<1	<5	<1
A-66	1	23	16	55	<.1	24	9	278	2.03	13	<5	2	5	21	<.2	<2	<2	27	.18	.134	11	12	.25	242	.11	2	2.81	.02	.14	<1	<5	<1
A-67	1	39	27	97	.2	40	10	413	2.59	14	<5	<2	8	37	<.2	<2	2	28	.20	.152	12	12	.23	284	.13	3	4.21	.03	.19	<1	<5	<1
A-68	1	29	23	65	.1	22	8	185	1.95	10	<5	<2	6	20	<.2	<2	<2	23	.18	.036	20	12	.47	125	.09	<2	1.85	.02	.23	<1	<5	<1
STANDARD C	19	61	36	124	6.9	72	32	1047	3.96	44	17	6	38	52	18.7	18	18	61	.52	.091	40	56	.92	183	.08	33	1.88	.06	.15	11	<5	2

Sample type: SOIL. Samples beginning 'RE' are duplicate samples.

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	Tl ppm	Hg ppm
A-69	1	33	11	77	.1	34	10	233	1.99	14	<5	<2	6	31	<.2	<2	<2	23	.24	.084	14	11	.21	318	.11	3	3.13	.03	.16	<1	<5	<1
A-70	1	36	20	53	.1	19	8	424	1.93	9	<5	<2	3	22	<.2	<2	<2	24	.31	.030	38	15	.38	92	.08	2	1.79	.02	.19	<1	<5	<1
A-71	1	19	9	44	<.1	18	6	159	1.60	8	<5	<2	3	17	<.2	<2	<2	21	.19	.043	13	10	.23	111	.08	5	1.46	.02	.13	<1	<5	<1
A-72	1	16	10	52	<.1	24	6	404	1.35	6	<5	<2	2	29	<.2	<2	<2	17	.24	.103	10	8	.13	137	.09	4	2.41	.03	.13	<1	<5	<1
A-73	1	15	9	65	.1	14	6	290	1.54	7	<5	<2	3	22	<.2	3	<2	20	.32	.029	11	11	.20	128	.08	4	1.32	.02	.18	<1	<5	<1
A-74	1	19	13	44	.1	16	7	191	1.87	8	<5	<2	5	14	<.2	<2	<2	24	.18	.029	16	13	.46	88	.08	2	1.46	.01	.19	<1	<5	<1
A-75	<1	17	10	25	<.1	11	5	173	1.44	5	<5	<2	4	10	<.2	3	<2	22	.26	.019	15	11	.24	44	.09	3	1.04	.02	.17	<1	<5	<1
A-76	1	41	17	57	<.1	23	12	270	2.98	13	<5	<2	9	16	<.2	2	<2	32	.17	.015	29	20	.95	105	.09	2	2.04	.01	.41	<1	<5	<1
A-77	1	12	14	77	.1	15	6	345	1.62	7	<5	<2	3	15	<.2	2	<2	20	.21	.042	11	10	.29	142	.08	5	1.71	.02	.17	<1	<5	<1
A-78	<1	13	13	78	.1	12	6	829	1.55	5	<5	<2	<2	19	<.2	<2	<2	18	.20	.154	8	9	.13	243	.08	4	1.88	.02	.14	<1	<5	<1
A-79	1	17	20	52	.1	17	7	283	1.76	6	<5	<2	4	23	<.2	<2	<2	22	.20	.033	16	11	.38	163	.07	3	1.69	.01	.15	<1	<5	<1
A-80	1	20	12	54	<.1	25	7	155	2.03	10	<5	<2	3	20	<.2	2	<2	27	.19	.030	7	11	.22	156	.12	3	2.38	.02	.13	<1	<5	<1
A-81	1	20	24	69	.2	19	7	281	2.10	8	<5	<2	5	17	<.2	<2	<2	22	.19	.031	20	11	.47	170	.08	2	2.17	.02	.21	<1	<5	<1
A-82	1	16	20	109	.1	23	8	454	2.11	8	<5	<2	3	18	<.2	<2	<2	23	.16	.048	17	12	.43	263	.08	4	2.32	.02	.20	<1	<5	<1
B-01	1	22	16	45	.3	11	7	116	2.08	18	<5	<2	4	8	<.2	3	<2	31	.08	.186	5	8	.08	49	.14	2	4.25	.03	.05	<1	<5	<1
RE B-01	1	24	17	46	.1	10	7	120	2.15	17	<5	<2	3	8	<.2	<2	<2	32	.08	.192	5	7	.08	51	.15	3	4.43	.03	.05	<1	<5	<1
B-02	1	27	13	37	.2	12	12	131	2.28	9	<5	<2	4	11	<.2	<2	<2	33	.12	.133	13	11	.11	68	.13	3	3.59	.02	.06	<1	<5	<1
B-03	1	32	9	39	<.1	14	9	223	2.41	8	<5	<2	4	9	<.2	<2	<2	33	.19	.050	13	16	.44	56	.11	3	1.77	.01	.12	<1	<5	<1
B-04	2	51	19	62	.1	34	27	213	3.74	14	<5	<2	6	14	<.2	2	<2	49	.16	.084	21	20	.28	152	.17	2	5.08	.02	.16	<1	<5	1
B-05	1	36	24	55	.2	24	27	234	3.04	9	<5	<2	3	22	<.2	4	<2	40	.28	.038	21	20	.40	96	.13	2	3.08	.02	.13	<1	<5	<1
B-06	1	33	21	48	.1	21	16	259	2.63	8	<5	<2	3	18	<.2	3	<2	38	.20	.034	16	15	.23	95	.14	3	2.74	.02	.09	<1	<5	<1
B-07	1	21	15	56	<.1	23	21	190	2.28	8	<5	<2	4	9	<.2	<2	<2	33	.11	.105	10	11	.13	79	.11	<2	3.09	.02	.07	<1	<5	<1
B-08	1	18	14	50	<.1	13	9	190	2.65	13	<5	<2	3	8	<.2	3	<2	38	.13	.173	10	14	.16	57	.10	<2	3.18	.02	.07	<1	<5	<1
B-09	1	20	12	37	.1	10	7	138	2.09	8	<5	<2	3	7	<.2	3	<2	35	.11	.125	7	11	.12	47	.11	3	2.57	.02	.06	<1	<5	<1
B-10	1	22	12	41	<.1	12	8	150	2.62	12	<5	<2	3	7	<.2	3	<2	41	.11	.104	9	13	.10	50	.12	2	3.42	.02	.05	<1	<5	<1
B-11	1	13	16	63	.3	10	8	168	2.17	8	<5	<2	2	7	<.2	<2	<2	37	.10	.160	6	9	.07	59	.11	2	3.12	.02	.04	<1	<5	<1
B-12	1	17	20	101	.2	28	12	270	2.59	18	<5	<2	3	16	<.2	2	<2	37	.21	.058	16	15	.23	86	.13	4	2.28	.02	.09	<1	<5	<1
B-13	1	20	14	41	.2	19	10	137	2.71	15	<5	<2	4	9	<.2	3	<2	37	.13	.125	10	14	.17	75	.11	2	3.24	.02	.09	<1	<5	<1
B-14	1	28	26	51	<.1	18	10	182	2.30	15	<5	<2	5	10	<.2	3	<2	33	.16	.038	18	16	.38	59	.12	2	2.05	.01	.15	<1	<5	<1
B-15	1	28	25	56	<.1	20	16	175	2.83	15	<5	<2	4	12	<.2	<2	<2	40	.15	.074	20	15	.33	95	.13	3	3.11	.02	.12	<1	<5	<1
C-01	1	17	12	29	.1	8	2	58	2.07	31	<5	<2	2	9	<.2	3	<2	31	.12	.020	14	6	.05	52	.19	3	1.19	.03	.03	1	<5	1
C-02	3	58	25	57	.3	15	108	2180	2.15	41	<5	<2	<2	29	.2	2	<2	29	.40	.051	89	18	.23	78	.07	3	2.41	.02	.10	<1	<5	<1
C-03	1	35	17	57	<.1	17	8	224	2.91	20	<5	<2	5	11	<.2	3	<2	40	.20	.031	20	22	.48	76	.13	<2	2.15	.02	.21	<1	<5	<1
C-04	1	22	11	46	<.1	12	5	129	2.39	10	<5	<2	3	8	<.2	2	<2	41	.15	.009	16	17	.39	47	.13	<2	1.71	.01	.12	<1	<5	<1
C-05	<1	14	11	33	.1	8	3	140	1.22	5	<5	2	<2	8	<.2	3	<2	29	.12	.010	16	11	.17	55	.13	2	.99	.01	.09	<1	<5	<1
STANDARD C	20	60	36	124	6.9	72	32	1041	3.96	43	15	6	37	52	19.0	14	22	61	.51	.090	40	56	.91	182	.08	33	1.88	.06	.16	11	<5	1

Sample type: SOIL. Samples beginning 'RE' are duplicate samples.

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	Tl ppm	Hg ppm
C-06	2	40	20	61	.2	27	16	545	2.72	24	<5	<2	2	28	.2	4	<2	49	.33	.042	34	35	.49	108	.09	2	3.21	.02	.11	1	<5	<1
C-07	<1	17	15	31	<.1	9	3	85	2.24	14	<5	<2	3	7	<.2	4	2	38	.13	.042	10	15	.16	38	.11	<2	1.26	.01	.07	<1	<5	<1
C-08	1	16	13	34	<.1	8	4	123	1.89	8	<5	<2	3	7	<.2	3	<2	38	.16	.033	9	15	.32	43	.14	2	1.01	.01	.15	<1	<5	<1
C-09	1	28	16	64	<.1	14	8	120	2.49	11	<5	<2	4	7	<.2	3	<2	36	.09	.053	12	14	.18	55	.13	<2	2.06	.02	.10	<1	<5	<1
C-10	1	24	14	53	<.1	17	8	115	2.30	9	<5	<2	4	9	<.2	4	<2	36	.13	.028	10	13	.18	41	.12	2	1.81	.02	.10	<1	<5	<1
C-11	1	21	78	51	.4	14	7	140	2.68	32	<5	<2	5	9	<.2	5	<2	33	.09	.048	10	11	.15	62	.14	<2	2.81	.02	.09	2	<5	<1
C-12	1	16	20	54	.1	8	4	269	2.01	12	<5	<2	3	10	<.2	5	<2	33	.18	.126	5	10	.09	59	.11	<2	2.52	.02	.06	1	<5	<1
C-13	<1	9	8	20	<.1	6	2	55	1.19	4	<5	<2	<2	6	<.2	3	<2	32	.11	.012	10	8	.08	21	.09	<2	.69	.01	.06	1	<5	<1
C-14	1	27	14	38	<.1	10	6	89	2.03	8	<5	<2	3	6	<.2	4	<2	39	.09	.033	8	12	.11	30	.11	<2	1.71	.02	.07	<1	<5	<1
RE C-14	<1	24	14	36	<.1	8	5	86	1.89	6	<5	<2	3	6	<.2	3	<2	36	.08	.031	8	10	.10	26	.11	<2	1.58	.01	.07	<1	<5	<1
C-15	1	14	14	28	<.1	9	4	78	1.89	6	<5	<2	3	6	<.2	4	<2	36	.10	.018	8	12	.16	19	.11	<2	1.15	.01	.07	<1	<5	<1
C-16	1	33	15	50	<.1	16	7	230	2.48	9	<5	<2	4	12	<.2	3	<2	41	.24	.022	13	24	.46	42	.13	<2	1.64	.01	.29	<1	<5	<1
C-17	1	29	37	112	<.1	21	10	134	3.48	19	<5	<2	7	10	<.2	4	<2	38	.12	.043	15	18	.44	50	.13	<2	1.95	.01	.13	<1	<5	<1
C-18	1	35	26	50	<.1	13	5	210	2.75	36	<5	<2	5	13	<.2	5	<2	32	.13	.035	23	17	.44	51	.12	<2	1.59	.01	.11	<1	<5	<1
C-19	1	34	17	43	<.1	14	8	172	2.37	37	<5	<2	5	12	<.2	3	<2	31	.18	.025	20	17	.43	50	.12	<2	1.73	.01	.15	<1	<5	<1
C-20	1	32	17	47	<.1	17	7	227	2.82	21	<5	<2	6	12	<.2	3	<2	35	.17	.024	25	21	.63	56	.13	<2	1.94	.01	.30	<1	<5	<1
C-21	1	26	20	87	<.1	19	12	577	2.68	10	<5	<2	5	15	<.2	3	<2	31	.20	.045	25	17	.40	69	.13	<2	2.39	.02	.15	<1	<5	<1
C-22	1	15	22	54	<.1	8	3	192	1.89	10	<5	<2	2	13	<.2	4	<2	30	.20	.034	10	10	.11	65	.11	<2	1.21	.01	.08	1	<5	<1
C-23	<1	17	10	58	<.1	9	6	290	1.80	6	<5	<2	2	9	<.2	4	<2	31	.12	.057	9	11	.12	48	.09	2	1.49	.01	.09	<1	<5	<1
C-24	1	21	18	43	.2	18	9	103	2.92	8	<5	<2	4	20	<.2	4	<2	39	.17	.032	12	14	.13	54	.16	<2	2.97	.03	.08	1	<5	1
C-25	1	30	16	45	<.1	17	6	226	3.17	15	<5	<2	4	13	<.2	3	<2	44	.25	.030	18	19	.63	66	.13	<2	1.95	.02	.29	<1	<5	<1
C-26	<1	20	18	49	<.1	10	6	145	2.37	6	<5	<2	4	9	<.2	5	<2	36	.11	.067	10	14	.15	64	.11	<2	2.47	.02	.08	<1	<5	<1
C-27	1	9	18	56	<.1	6	3	132	2.41	4	<5	<2	5	8	<.2	2	<2	43	.08	.035	8	17	.39	52	.17	<2	1.21	.01	.18	1	<5	<1
C-28	<1	10	11	39	<.1	7	3	115	1.78	7	<5	<2	2	6	<.2	4	<2	28	.09	.030	17	13	.22	28	.12	<2	1.03	.01	.11	1	<5	<1
C-29	1	19	16	111	<.1	15	8	490	2.34	31	<5	<2	4	11	<.2	3	<2	30	.14	.041	16	13	.37	64	.09	<2	1.33	.01	.12	<1	<5	<1
C-30	1	37	28	146	<.1	27	16	224	2.40	17	<5	<2	5	12	<.2	4	<2	28	.13	.056	14	15	.21	73	.11	<2	2.92	.02	.10	<1	<5	<1
C-31	1	35	18	76	.1	23	19	172	1.94	5	<5	<2	2	26	<.2	4	<2	27	.28	.126	5	8	.10	60	.12	<2	2.90	.03	.07	<1	<5	1
C-32	<1	15	12	35	<.1	7	4	93	1.71	8	<5	<2	3	7	<.2	2	<2	28	.12	.041	10	10	.15	38	.08	<2	1.23	.01	.07	1	<5	<1
C-33	<1	27	13	36	<.1	13	8	116	2.06	10	<5	<2	3	8	<.2	3	<2	29	.14	.029	13	16	.29	43	.10	<2	1.75	.01	.08	<1	<5	<1
C-34	1	35	17	26	<.1	9	5	71	1.75	8	<5	<2	2	6	<.2	3	<2	30	.07	.031	12	12	.07	37	.11	<2	2.13	.02	.03	1	<5	<1
C-35	1	18	14	56	<.1	14	10	139	2.15	6	<5	<2	4	9	<.2	3	<2	26	.12	.109	10	12	.16	55	.10	2	2.60	.02	.08	<1	<5	<1
C-36	1	20	27	60	<.1	12	6	141	2.32	13	<5	<2	4	8	<.2	4	<2	32	.14	.064	13	18	.40	41	.09	<2	1.36	.01	.09	<1	<5	<1
C-37	<1	15	22	84	<.1	9	6	214	1.75	4	<5	<2	2	12	<.2	2	<2	25	.11	.096	9	12	.14	80	.08	<2	1.59	.01	.06	<1	<5	<1
C-38	1	17	17	91	<.1	15	8	207	2.20	4	<5	<2	4	10	<.2	4	<2	27	.10	.080	17	14	.37	64	.10	<2	1.72	.01	.12	<1	<5	<1
C-39	1	15	13	79	<.1	15	10	121	2.10	5	<5	<2	3	9	<.2	3	<2	31	.09	.063	8	10	.09	72	.12	<2	3.20	.02	.05	<1	<5	<1
STANDARD C	19	60	40	123	6.5	75	31	1019	3.96	40	15	6	36	51	19.0	14	21	60	.50	.090	40	56	.90	191	.08	33	1.88	.06	.16	12	<5	2

Sample type: SOIL. Samples beginning 'RE' are duplicate samples.

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	Tl ppm	Hg ppm
C-40	1	18	15	75	.1	24	15	202	2.62	13	<5	<2	6	14	<.2	<2	<2	32	.18	.066	13	17	.22	75	.12	4	2.71	.02	.10	1	<5	<1
C-41	1	17	31	122	.1	22	15	410	2.63	10	<5	<2	5	12	<.2	2	<2	37	.16	.115	17	14	.42	103	.11	4	2.01	.02	.20	2	<5	<1
C-42	1	14	11	93	.1	21	14	322	2.06	7	<5	<2	3	16	<.2	3	<2	30	.15	.256	8	13	.15	110	.11	2	2.51	.02	.08	1	<5	<1
C-43	1	18	14	130	<.1	20	14	227	2.65	8	<5	<2	4	18	<.2	3	<2	37	.17	.068	14	14	.36	112	.13	2	2.10	.02	.16	1	<5	<1
D-01	1	155	25	62	.2	49	17	435	3.46	17	<5	<2	7	25	<.2	2	<2	57	.37	.044	49	31	.69	131	.13	3	2.89	.02	.35	<1	<5	<1
D-02	<1	13	11	39	.1	15	10	236	1.48	5	<5	<2	2	12	<.2	<2	<2	23	.16	.041	11	10	.20	81	.07	2	1.26	.01	.08	<1	<5	<1
D-03	1	38	18	47	<.1	20	9	211	1.96	11	<5	<2	2	14	<.2	<2	<2	44	.25	.046	10	13	.38	61	.10	4	1.38	.02	.11	<1	<5	<1
D-04	1	19	22	126	.2	23	18	516	1.86	11	<5	<2	2	20	<.2	<2	<2	32	.18	.214	7	10	.13	133	.11	3	2.71	.02	.07	<1	<5	<1
D-05	1	34	22	131	.1	38	17	511	2.04	11	<5	<2	3	15	<.2	<2	<2	27	.16	.097	13	14	.37	168	.10	2	2.46	.02	.14	1	<5	<1
D-06	1	24	14	76	<.1	14	9	216	1.85	11	<5	<2	3	12	<.2	<2	<2	30	.26	.041	12	17	.41	49	.10	2	1.14	.02	.12	<1	<5	<1
D-07	1	25	25	135	.2	26	14	294	2.77	11	<5	<2	5	17	<.2	<2	<2	39	.27	.042	20	16	.41	113	.13	3	2.33	.02	.21	1	<5	<1
D-08	1	36	34	107	<.1	15	25	531	4.13	16	<5	<2	5	18	<.2	<2	<2	66	.25	.029	21	20	.80	102	.19	<2	2.08	.01	.56	<1	<5	<1
D-09	1	17	29	291	<.1	23	33	591	4.28	21	<5	<2	5	35	<.2	<2	<2	67	.24	.224	8	11	.47	267	.19	6	3.46	.03	.49	1	<5	<1
D-10	1	17	15	221	.1	23	18	487	2.96	13	<5	<2	4	48	.2	<2	<2	49	.30	.142	7	10	.38	188	.17	5	3.35	.03	.37	<1	<5	<1
D-11	1	19	31	173	<.1	16	20	504	3.37	9	<5	<2	4	22	<.2	<2	<2	57	.22	.064	14	14	.64	183	.16	2	2.07	.02	.52	<1	<5	<1
D-12	1	20	22	231	<.1	24	20	365	2.62	7	<5	<2	4	29	<.2	<2	<2	37	.21	.090	14	12	.46	205	.13	2	1.96	.02	.35	1	<5	<1
D-13	1	17	22	189	.2	22	23	316	2.41	13	<5	<2	4	30	<.2	<2	<2	35	.19	.131	10	11	.24	224	.13	3	2.39	.02	.28	<1	<5	<1
D-14	1	23	18	213	.3	36	39	180	2.51	16	<5	<2	5	31	.2	<2	<2	38	.27	.072	10	27	.38	179	.14	3	3.00	.04	.23	<1	<5	<1
D-15	1	18	26	87	.1	15	11	333	2.45	12	<5	<2	4	17	<.2	<2	<2	37	.22	.044	14	26	.65	104	.11	3	1.40	.02	.35	<1	<5	<1
D-16	1	18	17	113	.1	26	23	585	2.16	7	<5	<2	4	35	<.2	2	<2	24	.16	.261	10	12	.18	290	.10	3	2.32	.03	.15	<1	<5	<1
D-17	1	22	21	96	.1	31	25	488	2.32	13	<5	<2	5	35	<.2	<2	<2	30	.23	.096	15	15	.23	236	.11	4	2.90	.02	.18	<1	<5	<1
D-18	1	26	21	76	<.1	24	12	245	2.30	9	<5	<2	5	16	<.2	2	<2	29	.17	.030	22	14	.50	74	.10	3	1.44	.01	.25	<1	<5	<1
RE D-18	1	26	22	77	<.1	24	13	248	2.32	10	<5	<2	6	16	<.2	2	<2	29	.17	.030	21	15	.53	75	.10	3	1.45	.01	.27	<1	<5	<1
D-19	1	16	32	85	<.1	23	15	478	2.00	6	<5	<2	3	26	<.2	2	<2	24	.23	.047	18	13	.41	148	.08	4	1.51	.01	.20	<1	<5	<1
D-20	<1	16	14	55	<.1	14	9	287	2.05	7	<5	<2	3	16	<.2	2	<2	33	.29	.038	11	18	.42	83	.11	<2	1.36	.02	.20	<1	<5	<1
D-21	1	19	19	120	<.1	30	18	685	1.77	7	<5	<2	3	28	<.2	2	<2	21	.16	.065	13	10	.18	281	.08	3	2.22	.02	.14	1	<5	<1
D-22	1	17	17	66	<.1	23	8	248	1.79	8	<5	<2	3	23	<.2	<2	<2	25	.21	.090	11	10	.18	161	.10	2	2.05	.02	.12	<1	<5	<1
D-23	<1	19	17	38	<.1	13	7	282	1.81	3	<5	<2	3	17	<.2	2	<2	28	.34	.011	18	15	.41	51	.11	2	1.45	.02	.21	<1	<5	<1
D-24	1	17	13	88	.1	21	12	553	1.42	6	<5	<2	3	29	<.2	<2	<2	20	.23	.144	12	9	.14	202	.08	2	1.83	.02	.13	<1	<5	<1
D-25	1	19	21	94	.1	27	11	339	1.60	4	<5	<2	3	24	<.2	2	<2	18	.14	.064	12	10	.22	210	.07	3	1.86	.02	.16	<1	<5	<1
D-26	<1	19	17	71	<.1	21	12	262	1.59	5	<5	<2	2	22	<.2	2	<2	23	.14	.057	12	13	.17	134	.08	2	1.90	.03	.14	<1	<5	<1
D-27	1	14	23	91	.2	23	8	292	1.63	7	<5	<2	4	20	<.2	2	<2	20	.17	.078	12	10	.20	183	.08	3	1.84	.02	.14	<1	<5	<1
E-01	1	27	27	51	.1	23	20	218	2.63	12	<5	<2	4	13	<.2	<2	<2	35	.14	.186	21	18	.19	128	.13	4	3.57	.02	.12	<1	<5	1
E-02	1	26	24	47	<.1	17	12	187	2.29	17	<5	<2	6	10	<.2	<2	<2	33	.16	.029	17	18	.41	66	.12	3	1.93	.01	.17	<1	<5	<1
E-03	1	24	21	42	<.1	21	22	377	2.28	11	<5	<2	5	13	<.2	2	<2	34	.17	.030	14	17	.20	89	.11	3	2.53	.02	.14	<1	<5	<1
STANDARD C	20	60	37	126	7.0	73	33	1061	3.96	42	26	6	38	53	19.0	14	22	61	.49	.092	40	54	.95	183	.08	34	1.88	.06	.16	9	<5	2

Sample type: SOIL. Samples beginning 'RE' are duplicate samples.

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	Tl ppm	Hg ppm
E-04	2	33	43	77	.2	35	27	442	3.29	22	<5	<2	8	14	<.2	2	<2	42	.14	.038	17	22	.44	124	.14	<2	3.30	.02	.19	1	<5	1
E-05	1	22	14	66	<.1	29	12	297	1.92	9	<5	<2	3	15	<.2	<2	<2	25	.17	.094	12	12	.19	110	.11	<2	2.64	.02	.12	2	<5	1
E-06	1	19	15	81	.1	24	9	400	1.85	9	<5	<2	3	17	<.2	<2	<2	23	.17	.162	12	11	.20	192	.09	<2	2.01	.02	.13	<1	<5	<1
E-07	1	23	13	61	<.1	15	10	479	1.73	5	<5	<2	3	15	<.2	2	<2	25	.19	.027	16	15	.38	89	.09	<2	1.47	.01	.13	<1	<5	1
E-08	1	46	13	52	.2	22	10	520	2.09	7	<5	<2	4	21	<.2	2	<2	31	.36	.018	32	18	.43	75	.11	<2	1.89	.02	.25	1	<5	1
E-09	1	27	11	86	<.1	25	9	207	2.02	6	<5	<2	4	16	<.2	<2	<2	30	.19	.061	16	14	.24	111	.11	<2	2.30	.02	.14	<1	<5	<1
E-10	1	21	11	112	.1	20	7	274	1.82	5	<5	<2	2	14	<.2	3	<2	23	.19	.045	12	15	.24	132	.09	3	1.86	.02	.16	1	<5	<1
E-11	2	86	25	65	.3	47	15	446	4.71	35	<5	<2	13	34	<.2	<2	<2	66	.84	.022	50	44	.82	130	.14	3	4.80	.03	.53	<1	<5	2
E-12	1	15	12	61	.1	18	7	285	1.77	9	<5	<2	2	27	<.2	3	<2	23	.25	.092	8	11	.18	132	.10	2	2.25	.02	.12	<1	<5	1
E-13	<1	21	9	41	<.1	13	7	192	1.76	6	<5	<2	4	10	<.2	3	<2	25	.19	.021	16	15	.41	38	.09	<2	1.16	.01	.18	2	<5	<1
E-14	1	21	14	46	<.1	15	9	240	1.80	10	<5	<2	4	11	<.2	3	<2	26	.22	.018	16	15	.41	55	.09	<2	1.30	.01	.18	<1	<5	1
E-15	1	16	12	65	<.1	17	7	149	1.59	5	<5	<2	3	13	<.2	<2	<2	21	.20	.015	11	12	.21	79	.09	<2	1.48	.02	.15	<1	<5	<1
E-16	1	23	14	41	.1	14	8	325	1.73	8	<5	<2	2	13	<.2	2	<2	25	.26	.011	22	16	.40	50	.09	<2	1.38	.02	.16	1	<5	<1
E-17	<1	14	9	30	<.1	10	4	147	1.55	8	<5	<2	3	8	<.2	<2	<2	23	.19	.016	15	14	.31	36	.09	2	.95	.01	.13	1	<5	<1
E-18	1	15	13	47	<.1	14	5	156	1.80	8	<5	<2	3	12	<.2	2	<2	26	.22	.013	14	16	.40	50	.10	<2	1.26	.02	.17	1	<5	<1
RE E-18	<1	14	10	47	.1	13	5	154	1.79	7	<5	<2	3	12	<.2	2	<2	26	.22	.013	14	16	.40	49	.10	<2	1.25	.02	.17	1	<5	<1
E-19	<1	16	6	33	<.1	10	5	155	1.52	6	<5	<2	3	11	<.2	2	<2	22	.20	.016	13	12	.22	42	.08	2	.99	.02	.12	1	<5	<1
E-20	1	16	11	55	<.1	13	5	140	1.66	6	<5	<2	3	7	<.2	<2	<2	23	.14	.035	13	13	.24	74	.09	<2	1.25	.01	.12	<1	<5	<1
E-21	1	17	9	41	<.1	12	5	192	1.53	6	<5	<2	3	13	<.2	2	<2	22	.24	.015	16	13	.24	45	.09	<2	1.10	.02	.15	1	<5	<1
E-22	1	22	9	53	<.1	21	8	192	1.92	12	<5	<2	5	12	<.2	<2	<2	25	.15	.063	14	12	.23	103	.10	2	2.04	.02	.11	<1	<5	<1
E-23	1	20	12	104	.1	28	8	214	1.79	8	<5	<2	3	20	<.2	2	<2	23	.19	.086	12	11	.19	147	.10	3	2.15	.02	.15	<1	<5	<1
E-24	<1	17	13	69	<.1	15	7	387	1.53	4	<5	<2	<2	13	<.2	2	<2	23	.15	.020	17	13	.21	85	.07	2	1.35	.02	.12	2	<5	<1
E-25	1	32	15	67	.3	29	11	486	2.20	11	<5	<2	5	19	<.2	<2	<2	27	.19	.228	19	12	.16	227	.13	<2	3.75	.03	.12	<1	<5	<1
E-26	1	18	11	44	.1	17	7	250	1.63	7	<5	<2	3	9	<.2	2	<2	22	.14	.049	13	12	.30	114	.08	<2	1.51	.01	.14	2	<5	<1
E-27	1	16	11	42	.1	15	7	129	1.62	5	<5	<2	4	14	<.2	<2	<2	24	.20	.026	12	12	.22	86	.08	<2	1.53	.01	.14	1	<5	<1
E-28	1	20	18	47	.3	15	6	311	1.78	9	<5	<2	4	17	<.2	3	<2	21	.26	.026	22	14	.41	70	.07	2	1.38	.01	.20	1	<5	<1
E-29	1	24	13	64	<.1	26	9	456	1.97	7	<5	<2	3	17	<.2	<2	<2	22	.17	.092	11	11	.17	143	.09	<2	2.56	.02	.14	<1	<5	<1
E-30	1	20	20	72	.1	22	7	650	1.86	8	<5	<2	3	19	<.2	2	<2	23	.20	.139	13	11	.20	174	.10	3	2.36	.02	.14	1	<5	<1
E-31	<1	9	7	89	.1	8	4	315	.96	2	<5	<2	<2	15	<.2	2	<2	12	.15	.067	8	7	.11	134	.05	2	.81	.01	.08	<1	<5	<1
E-32	1	28	10	67	.1	25	9	191	1.85	9	<5	<2	4	17	<.2	<2	<2	25	.24	.075	12	12	.22	117	.10	2	2.09	.02	.17	2	<5	<1
E-33	1	17	9	52	<.1	23	6	225	1.60	8	<5	<2	3	32	<.2	2	<2	19	.25	.142	9	10	.20	134	.08	2	1.87	.02	.16	1	<5	<1
E-34	1	13	10	37	.1	18	7	189	1.65	4	<5	<2	2	17	<.2	2	<2	22	.21	.039	7	12	.22	82	.08	3	1.62	.02	.16	1	<5	<1
E-35	1	24	18	109	.1	34	8	765	2.23	8	<5	<2	3	50	<.2	<2	<2	22	.38	.231	11	12	.19	284	.12	3	3.05	.03	.20	<1	<5	<1
E-36	1	47	25	45	.2	23	7	341	2.23	13	<5	<2	4	22	<.2	2	<2	27	.49	.028	25	15	.43	78	.09	3	2.00	.02	.26	<1	<5	<1
E-37	1	28	43	61	<.1	29	7	240	2.03	13	<5	<2	3	18	<.2	<2	<2	25	.18	.189	11	12	.19	213	.12	3	3.09	.02	.19	<1	<5	<1
STANDARD C	20	60	38	125	7.0	72	32	1057	3.96	41	20	5	37	53	19.0	14	21	61	.49	.092	40	56	.91	183	.08	34	1.88	.06	.16	11	<5	2

Sample type: SOIL. Samples beginning 'RE' are duplicate samples.

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	Tl ppm	Hg ppm
E-38	1	19	48	64	.3	21	8	190	1.81	7	<5	<2	5	20	<.2	<2	<2	22	.24	.161	11	12	.20	157	.09	2	2.21	.02	.17	<1	<5	<1
E-39	1	24	18	62	.1	26	8	372	2.11	11	<5	<2	4	22	<.2	2	<2	24	.17	.126	13	12	.17	274	.12	2	3.56	.02	.16	<1	<5	<1
E-40	1	18	15	66	<.1	24	8	301	2.11	5	<5	<2	4	19	<.2	2	<2	27	.17	.061	11	12	.28	176	.11	3	2.57	.02	.18	<1	<5	<1
F-01	1	15	39	162	.1	19	6	572	1.77	4	<5	<2	3	26	<.2	<2	<2	18	.23	.117	15	10	.23	219	.07	3	1.70	.02	.16	<1	<5	<1
F-02	1	8	25	130	.3	16	5	424	1.33	3	<5	<2	2	19	<.2	<2	<2	13	.16	.042	14	7	.17	192	.05	2	1.33	.01	.11	<1	<5	<1
F-03	1	14	74	130	.1	14	6	298	2.00	12	<5	<2	4	10	<.2	<2	<2	15	.09	.046	18	9	.39	90	.06	<2	1.24	.01	.20	<1	<5	<1
F-04	1	10	34	99	.3	12	5	582	1.26	2	<5	<2	<2	26	<.2	2	<2	14	.30	.039	11	8	.19	173	.06	2	1.23	.01	.16	<1	<5	<1
F-05	1	14	47	100	.1	14	6	567	1.59	2	<5	<2	4	30	<.2	2	<2	18	.31	.043	14	9	.23	181	.06	3	1.39	.01	.17	<1	<5	<1
F-06	1	10	12	49	.1	12	4	191	1.25	4	<5	<2	2	14	<.2	<2	<2	15	.11	.023	8	7	.15	89	.06	<2	1.44	.02	.12	<1	<5	<1
F-07	1	21	24	66	.1	21	7	210	2.10	6	<5	<2	4	19	<.2	<2	<2	26	.25	.023	14	12	.25	130	.10	2	2.22	.03	.20	<1	<5	<1
F-08	1	15	14	79	.3	24	7	155	1.88	6	<5	<2	3	25	<.2	2	<2	24	.26	.075	8	10	.16	228	.10	2	2.63	.02	.14	<1	<5	<1
RE F-08	1	14	12	78	.2	24	7	153	1.85	7	<5	<2	3	25	<.2	<2	<2	23	.25	.074	8	10	.16	226	.10	2	2.60	.02	.14	<1	<5	<1
F-09	1	20	19	52	<.1	14	7	269	1.62	7	<5	<2	4	17	<.2	<2	<2	22	.23	.035	15	13	.24	81	.07	<2	1.31	.01	.17	1	<5	<1
F-10	1	11	15	58	.2	18	5	556	1.41	5	<5	<2	2	17	<.2	<2	<2	18	.15	.085	8	8	.12	179	.08	<2	1.91	.02	.11	<1	<5	<1
G-01	<1	21	59	130	<.1	21	8	586	1.99	6	<5	<2	4	20	<.2	2	<2	20	.19	.068	13	13	.22	157	.07	2	1.35	.02	.21	<1	<5	<1
G-02	1	14	40	92	.2	13	6	229	1.90	8	<5	<2	6	12	<.2	<2	<2	19	.13	.043	20	12	.42	95	.07	3	.91	.01	.18	<1	<5	<1
G-03	<1	15	9	34	<.1	11	5	160	1.49	5	<5	<2	5	10	<.2	<2	<2	20	.22	.032	14	12	.24	46	.07	<2	.81	.02	.14	1	<5	<1
G-04	1	22	29	124	<.1	20	11	637	2.50	14	<5	<2	7	26	<.2	<2	<2	30	.30	.102	19	21	.52	219	.09	3	1.36	.02	.25	<1	<5	<1
G-05	1	15	12	115	.2	17	8	378	1.68	12	<5	<2	4	18	<.2	<2	<2	20	.13	.319	9	9	.13	222	.09	2	2.18	.02	.09	<1	<5	<1
G-06	1	24	21	51	<.1	18	8	262	2.40	9	<5	<2	6	12	<.2	<2	<2	30	.17	.022	15	14	.38	74	.09	3	1.26	.01	.19	<1	<5	<1
STANDARD C	20	60	37	125	7.0	72	32	1054	3.96	43	17	5	37	52	19.0	13	22	61	.49	.091	40	56	.93	183	.08	34	1.88	.06	.15	11	<5	2

Sample type: SOIL. Samples beginning 'RE' are duplicate samples.

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

GEOCHEMICAL ANALYSIS CERTIFICATE

S.B. Hamilton File # 94-3653 Page 1

327 - 12th Ave South, Cranbrook BC V1C 2S6

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	Tl ppm	Hg ppm
CHIP-01	3	15	11	53	.2	11	3	252	1.83	13	<5	<2	21	6	<.2	2	2	14	.20	.027	36	15	.96	84	.12	3	1.35	.02	.65	1	<5	<1
CHIP-02	5	19	20	82	.1	11	2	348	2.39	13	7	<2	2	16	<.2	<2	<2	62	.36	.030	5	13	.32	81	.22	3	1.08	.07	.62	2	<5	<1
CHIP-03	2	22	17	188	.1	10	8	625	5.05	9	<5	<2	9	21	<.2	<2	3	89	.39	.053	18	20	1.04	74	.26	2	2.08	.06	1.53	1	<5	<1
CHIP-04	3	21	21	103	.2	9	13	642	4.73	7	<5	<2	5	18	<.2	<2	2	109	1.13	.046	7	13	1.15	147	.37	2	2.19	.15	1.69	1	<5	1
CHIP-05	3	25	24	85	.1	13	17	531	4.47	<2	<5	<2	5	70	<.2	<2	<2	101	1.70	.041	8	14	1.19	233	.34	<2	3.30	.38	1.50	<1	<5	1
CHIP-06	1	11	6	92	.1	73	21	459	3.97	105	<5	<2	2	4	<.2	<2	<2	67	.53	.028	3	319	3.03	112	.23	10	2.70	.02	1.51	<1	<5	<1
CHIP-07	3	18	9	31	<.1	12	4	277	2.89	3	<5	<2	17	10	<.2	2	2	53	.25	.038	19	45	.92	102	.17	3	1.48	.06	.74	2	<5	<1
CHIP-08	1	120	28	51	.1	30	21	237	3.84	37	<5	<2	3	56	<.2	<2	<2	41	.52	.033	5	73	1.04	30	.17	<2	1.45	.05	.23	2	<5	<1
CHIP-09	3	24	71	143	<.1	9	8	737	5.07	2	<5	<2	6	26	<.2	<2	<2	97	.87	.072	8	16	1.06	268	.36	<2	2.31	.11	1.83	<1	<5	<1
CHIP-10	1	10	18	82	<.1	10	15	375	1.85	11	5	<2	<2	28	<.2	2	<2	37	.89	.027	4	88	1.10	17	.20	2	1.75	.10	.10	<1	<5	<1
CHIP-11	1	18	20	49	<.1	7	9	292	2.46	15	<5	<2	3	28	<.2	<2	<2	46	1.00	.030	8	16	.89	24	.22	3	1.55	.05	.10	2	<5	<1
CHIP-12	3	40	25	70	<.1	15	7	398	4.08	2	<5	<2	18	4	<.2	<2	2	25	.27	.039	12	28	1.29	65	.20	3	1.87	.02	.65	<1	<5	<1
CHIP-13	1	21	26	171	<.1	8	9	504	3.55	10	<5	<2	<2	28	<.2	<2	2	52	.75	.038	5	34	1.37	28	.23	<2	1.79	.04	.16	1	<5	<1
CHIP-14	2	29	15	92	<.1	14	6	404	3.17	13	<5	<2	15	8	<.2	<2	3	37	.14	.028	22	28	1.45	122	.23	<2	1.82	.03	1.82	<1	<5	<1
CHIP-15	4	35	16	90	<.1	9	7	610	5.00	3	<5	<2	8	50	<.2	<2	2	110	.79	.045	15	21	1.48	234	.32	<2	3.06	.19	2.26	<1	<5	1
CHIP-16	1	11	27	392	<.1	94	40	764	5.48	20	<5	<2	3	5	<.2	<2	<2	120	.39	.029	5	462	3.60	281	.35	<2	4.27	.02	4.75	<1	6	1
CHIP-17	2	15	6	77	.1	10	3	425	3.18	4	<5	<2	13	10	<.2	<2	3	44	.10	.031	13	37	1.70	111	.24	<2	1.99	.04	1.87	<1	<5	<1
CHIP-18	3	28	21	60	.2	13	4	242	3.32	22	<5	<2	14	33	<.2	<2	4	26	.43	.039	39	26	1.08	53	.15	2	1.55	.08	.93	1	<5	<1
CHIP-19	3	37	18	44	.2	9	2	251	3.49	5	<5	<2	16	28	<.2	<2	4	56	.58	.046	29	48	1.82	55	.24	3	2.43	.14	1.74	<1	<5	<1
RE CHIP-19	3	37	18	45	.1	9	2	253	3.53	2	<5	<2	16	28	<.2	<2	3	56	.59	.046	29	48	1.84	55	.24	3	2.45	.15	1.76	3	<5	1
CHIP-20	1	65	4	64	<.1	25	12	666	5.29	10	<5	<2	10	3	<.2	<2	2	18	.06	.019	26	28	.94	16	.02	2	2.11	.01	.16	2	<5	<1
CHIP-21	2	22	14	85	<.1	7	12	411	4.54	4	<5	<2	6	26	<.2	<2	<2	41	.88	.079	16	7	.60	166	.15	2	2.09	.09	.40	<1	<5	<1
CHIP-22	3	17	2	47	<.1	49	23	428	6.58	3	<5	<2	17	8	<.2	<2	<2	48	.17	.037	28	53	.97	30	.03	2	2.78	.04	.14	<1	<5	<1
CHIP-23	1	14	4	41	<.1	42	20	340	5.99	2	<5	<2	12	6	<.2	<2	<2	44	.08	.023	33	50	.71	22	.02	3	2.45	.05	.14	1	<5	<1
CHIP-24	1	13	5	47	<.1	40	13	247	5.13	5	<5	<2	14	6	<.2	<2	<2	39	.12	.035	30	44	.62	48	.05	<2	2.29	.03	.18	1	<5	<1
CHIP-25	1	8	4	50	<.1	41	12	222	5.41	12	<5	<2	11	5	<.2	<2	<2	30	.09	.026	29	43	.60	30	.01	3	2.21	.02	.15	1	<5	<1
CHIP-26	1	1	9	34	<.1	37	14	366	4.62	7	<5	<2	13	7	<.2	<2	<2	26	.09	.023	27	37	.58	25	.01	2	2.01	.04	.16	1	<5	<1
CHIP-27	1	33	9	33	.2	23	9	240	1.36	6	7	<2	<2	23	<.2	2	3	27	.90	.022	2	24	.36	10	.19	2	1.19	.09	.03	2	<5	<1
CHIP-28	2	30	7	56	.1	7	18	290	3.32	4	<5	<2	4	65	<.2	<2	<2	119	1.78	.031	11	9	1.12	164	.37	2	3.37	.35	1.10	<1	<5	1
CHIP-29	1	33	9	85	.1	6	16	500	5.81	4	<5	<2	8	14	<.2	<2	<2	78	1.08	.069	22	4	.67	179	.32	<2	2.46	.12	1.33	1	<5	1
CHIP-30	1	31	5	31	<.1	37	15	279	4.05	8	<5	<2	11	5	<.2	<2	2	24	.10	.028	29	31	.96	21	.01	2	1.96	.03	.18	1	<5	<1
CHIP-001	2	42	35	87	.2	16	6	471	3.33	6	<5	<2	11	25	<.2	<2	3	33	.63	.038	32	44	1.40	58	.17	2	1.95	.09	.96	1	<5	1
CHIP-002	1	43	7	16	.1	23	7	147	1.14	3	<5	<2	<2	28	<.2	<2	<2	24	1.45	.010	3	72	.62	14	.14	3	1.92	.16	.12	1	<5	<1
CHIP-003	1	34	23	10	.1	24	15	74	.52	41	<5	<2	2	89	<.2	2	<2	12	2.88	.010	<2	23	.23	13	.09	2	4.39	.48	.09	1	<5	1
CHIP-004	1	116	18	11	.2	29	10	99	.79	13	<5	<2	<2	112	<.2	<2	<2	16	2.37	.013	<2	8	.23	61	.11	<2	3.54	.36	.12	<1	<5	<1
STANDARD C	19	62	39	129	6.9	74	31	1066	3.96	42	15	7	36	53	17.1	14	20	61	.50	.090	41	60	.94	177	.09	33	1.88	.07	.15	10	<5	2

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.
ASSAY RECOMMENDED FOR ROCK AND CORE SAMPLES IF CU PB ZN AS > 1%, AG > 30 PPM & AU > 1000 PPB
- SAMPLE TYPE: ROCK Samples beginning 'RE' are duplicate samples.

DATE RECEIVED: OCT 12 1994 **DATE REPORT MAILED:** Oct 18/94 **SIGNED BY**..........D.TOYE, C.LEONG, J.WANG; CERTIFIED B.C. ASSAYERS

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	Tl ppm	Hg ppm
CHIP-005	1	7	12	34	<.1	10	5	262	2.37	<2	<5	<2	12	9	<.2	3	2	57	.42	.042	21	17	1.00	70	.20	<2	1.51	.05	.42	<1	<5	<1
CHIP-006	2	11	11	36	<.1	8	3	234	2.47	4	<5	<2	12	28	<.2	2	2	25	.46	.029	16	24	1.07	102	.17	4	1.88	.09	.88	<1	<5	1
CHIP-007	2	20	7	40	<.1	16	5	258	2.81	4	<5	<2	17	14	<.2	2	<2	27	.27	.017	20	26	1.22	111	.20	3	1.90	.05	1.34	<1	<5	<1
CHIP-008	1	12	13	36	<.1	18	6	296	2.48	<2	<5	<2	13	8	<.2	4	<2	21	.32	.025	19	20	.86	67	.20	<2	1.56	.03	.60	<1	<5	<1
RE CHIP-008	2	9	10	35	<.1	15	7	289	2.44	<2	<5	<2	13	8	<.2	<2	2	20	.31	.024	18	19	.83	68	.20	4	1.53	.04	.60	<1	<5	<1
STANDARD C	18	58	38	122	6.7	70	31	1057	3.96	39	19	6	36	51	16.9	15	21	61	.49	.092	39	59	.93	182	.08	34	1.88	.06	.15	10	<5	1

Sample type: ROCK. Samples beginning 'RE' are duplicate samples.

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

GEOCHEMICAL ANALYSIS CERTIFICATE

S.B. Hamilton File # 94-3653 Page 1
327 - 12th Ave South, Cranbrook BC V1C 2S6

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	Tl ppm	Hg ppm
CHIP-01	3	15	11	53	.2	11	3	252	1.83	13	<5	<2	21	6	<.2	2	2	14	.20	.027	36	15	.96	84	.12	3	1.35	.02	.65	1	<5	<1
CHIP-02	5	19	20	82	.1	11	2	348	2.39	13	7	<2	2	16	<.2	<2	<2	62	.36	.030	5	13	.32	81	.22	3	1.08	.07	.62	2	<5	<1
CHIP-03	2	22	17	188	.1	10	8	625	5.05	9	<5	<2	9	21	<.2	<2	3	89	.39	.053	18	20	1.04	74	.26	2	2.08	.06	1.53	1	<5	<1
CHIP-04	3	21	21	103	.2	9	13	642	4.73	7	<5	<2	5	18	<.2	<2	2	109	1.13	.046	7	13	1.15	147	.37	2	2.19	.15	1.69	1	<5	1
CHIP-05	3	25	24	85	.1	13	17	531	4.47	<2	<5	<2	5	70	<.2	<2	<2	101	1.70	.041	8	14	1.19	233	.34	<2	3.30	.38	1.50	<1	<5	1
CHIP-06	1	11	6	92	.1	73	21	459	3.97	105	<5	<2	2	4	<.2	<2	<2	67	.53	.028	3	319	3.03	112	.23	10	2.70	.02	1.51	<1	<5	<1
CHIP-07	3	18	9	31	<.1	12	4	277	2.89	3	<5	<2	17	10	<.2	2	2	53	.25	.038	19	45	.92	102	.17	3	1.48	.06	.74	2	<5	<1
CHIP-08	1	120	28	51	.1	30	21	237	3.84	37	<5	<2	3	56	<.2	<2	<2	41	.52	.033	5	73	1.04	30	.17	<2	1.45	.05	.23	2	<5	<1
CHIP-09	3	24	71	143	<.1	9	8	737	5.07	2	<5	<2	6	26	<.2	<2	<2	97	.87	.072	8	16	1.06	268	.36	<2	2.31	.11	1.83	<1	<5	<1
CHIP-10	1	10	18	82	<.1	10	15	375	1.85	11	5	<2	<2	28	<.2	2	<2	37	.89	.027	4	88	1.10	17	.20	2	1.75	.10	.10	<1	<5	<1
CHIP-11	1	18	20	49	<.1	7	9	292	2.46	15	<5	<2	3	28	<.2	<2	<2	46	1.00	.030	8	16	.89	24	.22	3	1.55	.05	.10	2	<5	<1
CHIP-12	3	40	25	70	<.1	15	7	398	4.08	2	<5	<2	18	4	<.2	<2	2	25	.27	.039	12	28	1.29	65	.20	3	1.87	.02	.65	<1	<5	<1
CHIP-13	1	21	26	171	<.1	8	9	504	3.55	10	<5	<2	<2	28	<.2	<2	2	52	.75	.038	5	34	1.37	28	.23	<2	1.79	.04	.16	1	<5	<1
CHIP-14	2	29	15	92	<.1	14	6	404	3.17	13	<5	<2	15	8	<.2	<2	3	37	.14	.028	22	28	1.45	122	.23	<2	1.82	.03	1.82	<1	<5	<1
CHIP-15	4	35	16	90	<.1	9	7	610	5.00	3	<5	<2	8	50	<.2	<2	2	110	.79	.045	15	21	1.48	234	.32	<2	3.06	.19	2.26	<1	<5	1
CHIP-16	1	11	27	392	<.1	94	40	764	5.48	20	<5	<2	3	5	<.2	<2	<2	120	.39	.029	5	462	3.60	281	.35	<2	4.27	.02	4.75	<1	6	1
CHIP-17	2	15	6	77	.1	10	3	425	3.18	4	<5	<2	13	10	<.2	<2	3	44	.10	.031	13	37	1.70	111	.24	<2	1.99	.04	1.87	<1	<5	<1
CHIP-18	3	28	21	60	.2	13	4	242	3.32	22	<5	<2	14	33	<.2	<2	4	26	.43	.039	39	26	1.08	53	.15	2	1.55	.08	.93	1	<5	<1
CHIP-19	3	37	18	44	.2	9	2	251	3.49	5	<5	<2	16	28	<.2	<2	4	56	.58	.046	29	48	1.82	55	.24	3	2.43	.14	1.74	<1	<5	<1
RE CHIP-19	3	37	18	45	.1	9	2	253	3.53	2	<5	<2	16	28	<.2	<2	3	56	.59	.046	29	48	1.84	55	.24	3	2.45	.15	1.76	3	<5	1
CHIP-20	1	65	4	64	<.1	25	12	666	5.29	10	<5	<2	10	3	<.2	<2	2	18	.06	.019	26	28	.94	16	.02	2	2.11	.01	.16	2	<5	<1
CHIP-21	2	22	14	85	<.1	7	12	411	4.54	4	<5	<2	6	26	<.2	<2	<2	41	.88	.079	16	7	.60	166	.15	2	2.09	.09	.40	<1	<5	<1
CHIP-22	3	17	2	47	<.1	49	23	428	6.58	3	<5	<2	17	8	<.2	<2	<2	48	.17	.037	28	53	.97	30	.03	2	2.78	.04	.14	<1	<5	<1
CHIP-23	1	14	4	41	<.1	42	20	340	5.99	2	<5	<2	12	6	<.2	<2	<2	44	.08	.023	33	50	.71	22	.02	3	2.45	.05	.14	1	<5	<1
CHIP-24	1	13	5	47	<.1	40	13	247	5.13	5	<5	<2	14	6	<.2	<2	<2	39	.12	.035	30	44	.62	48	.05	<2	2.29	.03	.18	1	<5	<1
CHIP-25	1	8	4	50	<.1	41	12	222	5.41	12	<5	<2	11	5	<.2	<2	<2	30	.09	.026	29	43	.60	30	.01	3	2.21	.02	.15	1	<5	<1
CHIP-26	1	1	9	34	<.1	37	14	366	4.62	7	<5	<2	13	7	<.2	<2	<2	26	.09	.023	27	37	.58	25	.01	2	2.01	.04	.16	1	<5	<1
CHIP-27	1	33	9	33	.2	23	9	240	1.36	6	7	<2	<2	23	<.2	2	3	27	.90	.022	2	24	.36	10	.19	2	1.19	.09	.03	2	<5	<1
CHIP-28	2	30	7	56	.1	7	18	290	3.32	4	<5	<2	4	65	<.2	<2	<2	119	1.78	.031	11	9	1.12	164	.37	2	3.37	.35	1.10	<1	<5	1
CHIP-29	1	33	9	85	.1	6	16	500	5.81	4	<5	<2	8	14	<.2	<2	<2	78	1.08	.069	22	4	.67	179	.32	<2	2.46	.12	1.33	1	<5	1
CHIP-30	1	31	5	31	<.1	37	15	279	4.05	8	<5	<2	11	5	<.2	<2	2	24	.10	.028	29	31	.96	21	.01	2	1.96	.03	.18	1	<5	<1
CHIP-001	2	42	35	87	.2	16	6	471	3.33	6	<5	<2	11	25	<.2	<2	3	33	.63	.038	32	44	1.40	58	.17	2	1.95	.09	.96	1	<5	1
CHIP-002	1	43	7	16	.1	23	7	147	1.14	3	<5	<2	<2	28	<.2	<2	<2	24	1.45	.010	3	72	.62	14	.14	3	1.92	.16	.12	1	<5	<1
CHIP-003	1	34	23	10	.1	24	15	74	.52	41	<5	<2	2	89	<.2	2	<2	12	2.88	.010	<2	23	.23	13	.09	2	4.39	.48	.09	1	<5	1
CHIP-004	1	116	18	11	.2	29	10	99	.79	13	<5	<2	<2	112	<.2	<2	<2	16	2.37	.013	<2	8	.23	61	.11	<2	3.54	.36	.12	<1	<5	<1
STANDARD C	19	62	39	129	6.9	74	31	1066	3.96	42	15	7	36	53	17.1	14	20	61	.50	.090	41	60	.94	177	.09	33	1.88	.07	.15	10	<5	2

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.
ASSAY RECOMMENDED FOR ROCK AND CORE SAMPLES IF CU PB ZN AS > 1%, AG > 30 PPM & AU > 1000 PPB
- SAMPLE TYPE: ROCK <u>Samples beginning 'RE' are duplicate samples.</u>

DATE RECEIVED: OCT 12 1994 **DATE REPORT MAILED:** Oct 18/94 **SIGNED BY**..........D.TOYE, C.LEONG, J.WANG; CERTIFIED B.C. ASSAYERS

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	Tl ppm	Hg ppm
CHIP-005	1	7	12	34	<.1	10	5	262	2.37	<2	<5	<2	12	9	<.2	3	2	57	.42	.042	21	17	1.00	70	.20	<2	1.51	.05	.42	<1	<5	<1
CHIP-006	2	11	11	36	<.1	8	3	234	2.47	4	<5	<2	12	28	<.2	2	2	25	.46	.029	16	24	1.07	102	.17	4	1.88	.09	.88	<1	<5	1
CHIP-007	2	20	7	40	<.1	16	5	258	2.81	4	<5	<2	17	14	<.2	2	<2	27	.27	.017	20	26	1.22	111	.20	3	1.90	.05	1.34	<1	<5	<1
CHIP-008	1	12	13	36	<.1	18	6	296	2.48	<2	<5	<2	13	8	<.2	4	<2	21	.32	.025	19	20	.86	67	.20	<2	1.56	.03	.60	<1	<5	<1
RE CHIP-008	2	9	10	35	<.1	15	7	289	2.44	<2	<5	<2	13	8	<.2	<2	2	20	.31	.024	18	19	.83	68	.20	4	1.53	.04	.60	<1	<5	<1
STANDARD C	18	58	38	122	6.7	70	31	1057	3.96	39	19	6	36	51	16.9	15	21	61	.49	.092	39	59	.93	182	.08	34	1.88	.06	.15	10	<5	1

Sample type: ROCK. Samples beginning 'RE' are duplicate samples.

Vancouver Petrographics Ltd.

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

Brian Hamilton, P.Eng
327-12th Ave. South
Cranbrook, B.C. V1C 2S6
Tel 426-3916

JOB # 940333
Oct. 28/94

Dear Brian,

Re: Matthew Creek Metamorphic Suite

A total of 18 thin sections and off-cuts were examined and a petrographic description completed for each, from samples submitted by you. In addition, photomicrographs were taken of each, which hopefully, will be of assistance to you.

The samples represent a range of lithologies which show effects of varied intensity metamorphism, retrogressive metamorphism, shearing and weathering. Amphiboles in many sections, particularly diabase/diorite, appear to have altered to pale secondary amphibole, possibly deuteric alteration. However, vestiges of pyroxene and hornblende which should occur were not noted in any of these sections. This interpretation is therefore in question.

The samples are consistent with a succession of quartz-rich and feldspar-rich impure sediments which were intruded by a series of diorite/diabase sills/dykes. Subsequent metamorphism of both chlorite-biotite-muscovite and amphibolite grades are represented and has affected most lithologies including diabase. Intermediate grades containing garnet, staurolite, cordierite, and sillimanite assemblages were not identified although the masked assemblage of 94-M-6 is not clear. This interpretation is, therefore, also in question.

Most of the higher grade metamorphosed rocks appear to have undergone retrogressive metamorphism to biotite-chlorite grade.

In addition, some of the samples contain significant amounts of <u>tourmaline</u> in schistose rock and felted amphibolite. This suggests an ultimately magmatic source of boron??? The significance of this requires explanation in view of tourmalinization at the base of the Sullivan deposit.

Metallic minerals identified megascopically include pyrite as fine disseminated grains, clusters of fracture controlled grains. Scattered coarser euhedral crystals of pyrite were also noted in a few samples. Ilmenite was also tentatively identified in association with sphene/rutile. Opaque minerals require polished surfaces for more precise identification.

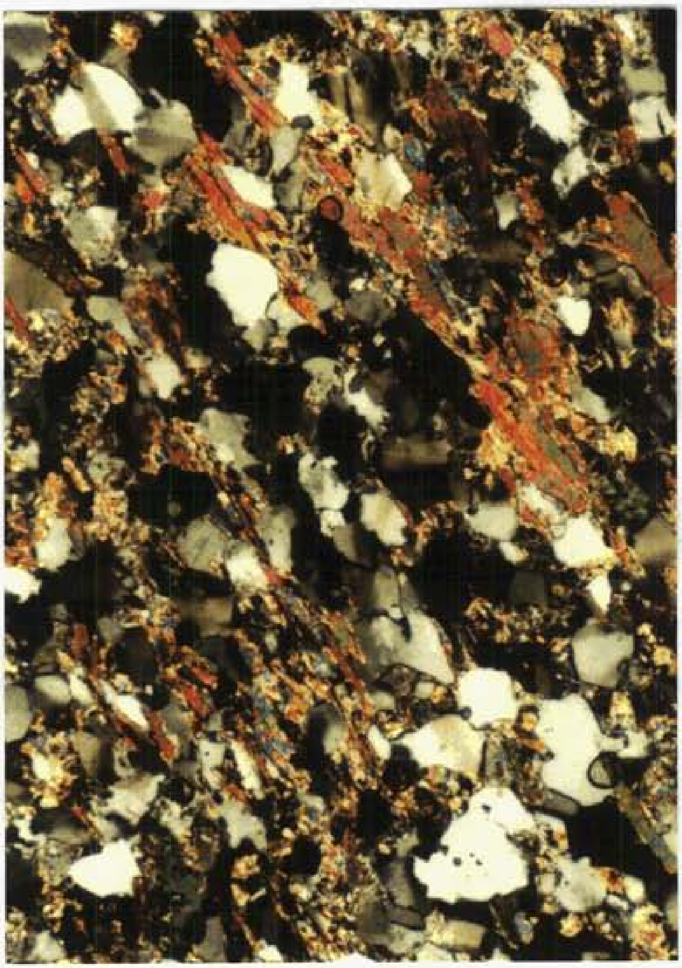
This petrographic study appears to have raised more questions than it has answered. I therefore took more photomicrographs than usual because of subtle differences between most sections. The charges to you for photomicrographs will not reflect this. As requested, four copies of the report and photomicrographs are submitted and will be sent by Loomis courier this date, October 28, 1994.

Yours very truly,

Ken Northcote

K.E. Northcote, Ph.D., P.Eng.

[1] 94-M-1
Quartz, altered-plagioclase, biotite schist



Photomicrograph 94 R XXII-1   Polarized light   Scale 0.1 mm ___

Summary description
Foliated, composed of <u>intermixed</u> fine-grained quartz, sericite-altered plagioclase, biotite. Layering results from relative enrichment of one or other of these components and biotite/plagioclase enrichment produces conspicuously darker bands.

Opaques 1-2%, iron-rich; oxidized to hematite and associated iron-stain.

Microscopic description
Transmitted light
Quartz; 60-65%, anhedral (0.1 to 0.6 mm). Elongate grains aligned in foliation plane. Irregular interlocking grains. Intermixed with biotite and altered plagioclase. Variations in relative abundance produce laminae enriched in quartz.

[1] Continued

Altered plagioclase; 20-22%, anhedral (0.1 to 0.5 mm). Isolated and clusters of grains, generally intergranular to quartz. Dusted appearance. Near complete alteration to microcrystalline felted sericite; few grains unaltered. Intergranular to quartz. Increase in abundance of altered plagioclase relative to quartz and biotite results in plagioclase-enriched laminae.

Biotite; 12-15%, anhedral (.05 to 0.4 mm). Laths with ragged ends. Strong foliation. Reddish brown colour. Increase in relative abundance results in dark laminae enriched in biotite.

Alteration
Sericite; 20%, included with plagioclase, anhedral (microcrystalline to <.03 mm). Felted, near-total replacement of plagioclase. Intergranular to quartz.

Dusting; <<0.5%, weak dusted appearance of plagioclase. Weathering (?) to clay.

Opaques: Polished surface required
Hematite/jarosite(?); 1-2%, anhedral, (microgranular to .05 mm). Clusters of grains with oxidized semiopaque grains.

[2] 94-M-2
Weakly altered hornblende quartz diorite/diabase

Photomicrographs 94 R XXII 2 and 3 Plane and polarized light
Scale 0.1 mm ____

Summary description
Fine/medium grained, felted, weak foliated, interlocking. Composed of hornblende, largely deuteric altered to very fine intergrowths of secondary amphibole, very minor epidote/clinozoisite, associated sphene and traces opaque. Amphibole crystals are touching, loose interlocking. Interstitial interlocking plagioclase. Plagioclase shows slight dusting, conspicuous polysynthetic twinning with indicated composition in labradorite range. Few muscovite clusters, alteration of plagioclase.

Contains some interstitial strained crackled quartz, showing some graphic intergrowths with plagioclase.

[2] Continued

Microscopic description

Altered hornblende (secondary amphibole); 50-55%, anhedral (<.05 to >2.0 mm). Interlocking crystals leaving interstitial spaces infilled by plagioclase and quartz. Pale green colour indicates deuteric alteration to secondary amphibole. Although crystals appear uniform in plane light they are composed aggregates of finer grains producing a granular internal fabric; foliated bladed to plumose habit, and show deformation in polarized light. Patchy alteration to epidote/clinozoisite. Associated sphene.

Plagioclase; 25-30%, anhedral/subhedral (0.1 to 1.5 mm). Lath-like, interlocking interstitial to altered hornblende. Very slight dusting, conspicuous twinning indicates composition in labradorite range. Few sericite clusters.

Quartz; 12-15%, anhedral (0.1 to 2.0 mm). Interstitial masses in optical continuity enclosing plagioclase. Parallel crackles, strained extinction. Some graphic intergrowths with twinned plagioclase; partial replacement of plagioclase(?)

Alteration assemblage

Secondary amphibole; 50-55% included with altered hornblende, anhedral (<.02 to >1.0 mm). Mottled intergrowths of fine anhedral grains in polarized light, foliated bladed/plumose habit. Deformed.

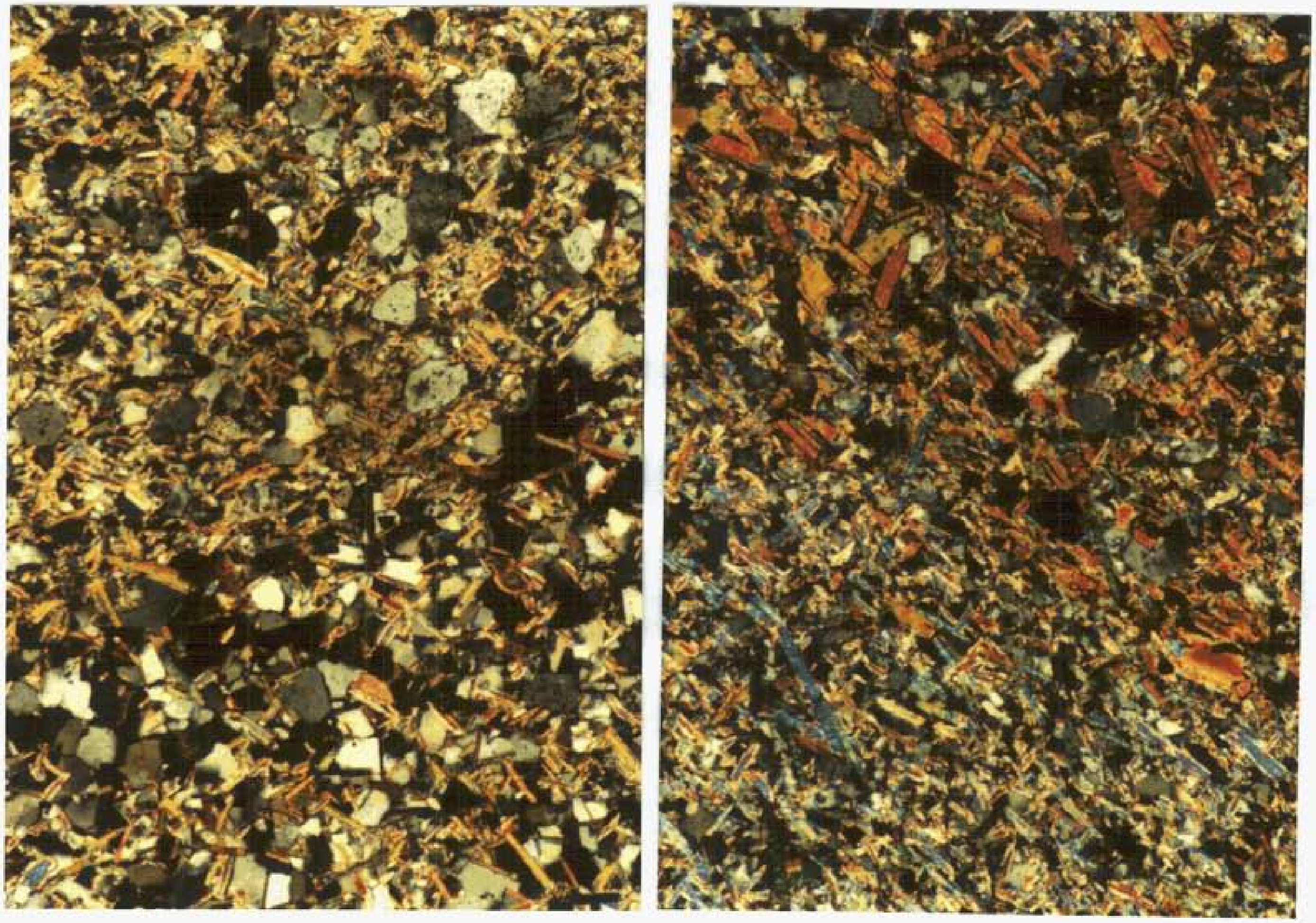
Epidote/clinozoisite; 2%, anhedral (<.05 to 0.1 mm). Irregular clusters of grains associated with deuteric secondary amphibole.

Sericite; 0.5%, anhedral (microcrystalline to 0.1 mm). Clusters of irregular grains/blades, blades, alteration of plagioclase.

Accessory minerals

Sphene; <0.5%, anhedral (<.05 to 0.2 mm). Irregular clusters of grains associated with secondary amphibole, intergrown with traces opaque TiO_2 mineral (ilmenite?)

[3] 94-M-3
Layered quartz-plagioclase-muscovite-biotite schist(?) (Lacks foliation)



Photomicrograph 94 R XXII-4 and 5   Polarized light
Scale 0.1 mm ____

Summary description
Layered schist resulting from variation in average grain-size and relative abundance of major components. Platy mica grains felted, <u>no conspicuous foliation.</u>

[a] Quartz-sericite-(plagioclase > K-feldspar)
[b] Sericite-biotite-<u>K-feldspar</u>-plagioclase
[c] Sericite-plagioclase-quartz-K-feldspar
[d] Quartz-sericite-biotite-plagioclase-K-feldspar

Stained block shows minor K-stain as disseminated grains, showing concentration in certain thin laminae following layering. Not identified in thin section.

Margins of fragment show bleached rind from weathering effects but minerals still discernable. Iron stain

[3] Continued

Opaques 1-2%, requires polished surface. Noted fine disseminated interstitial pyrite, scattered coarser euhedral crystals of pyrite in sample reject.

Microscopic description
Layered, felted, interlocking grains. Layering results from variation in abundance of major constituents and average grain-size.

Quartz; 60-65%, anhedral (<.05 to 0.2 mm) Irregular interlocking varied grain-size and varied relative abundance as compared to other major constituents.

K-feldspar; 5-6%, anhedral (<.05 to 0.2 mm). Disseminated grains. Varied grain-size and varied relative abundance as compared to other major constituents. Conspicuous in stained slab.

Plagioclase; 8-10%, anhedral (<.05 to 0.2 mm). Disseminated grains. Featureless. Varied grain-size and relative abundance as compared to other major constituents. Etched white in stained slab.

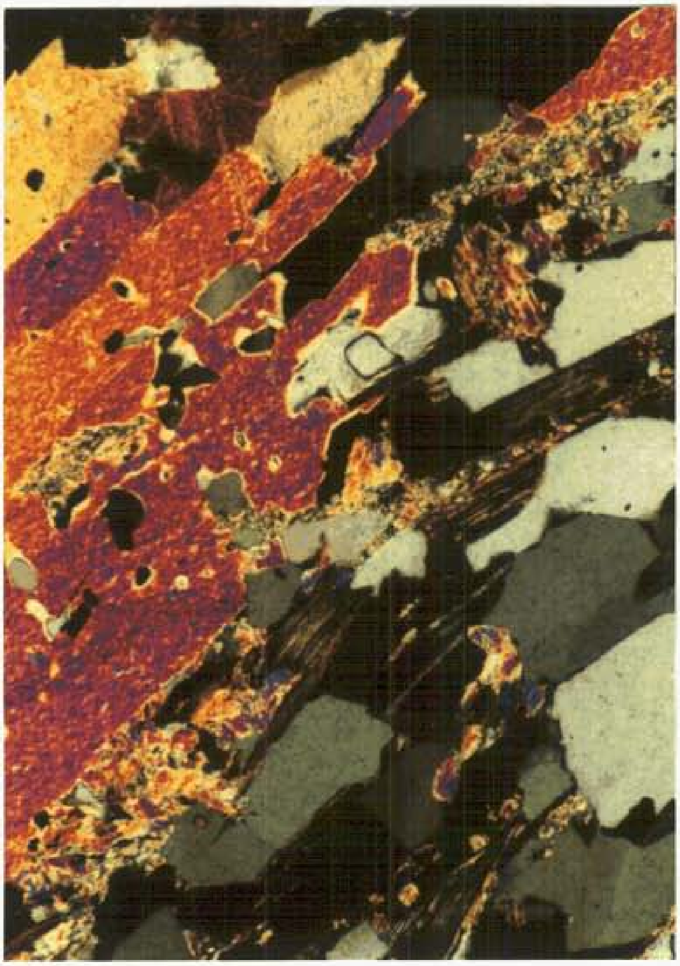
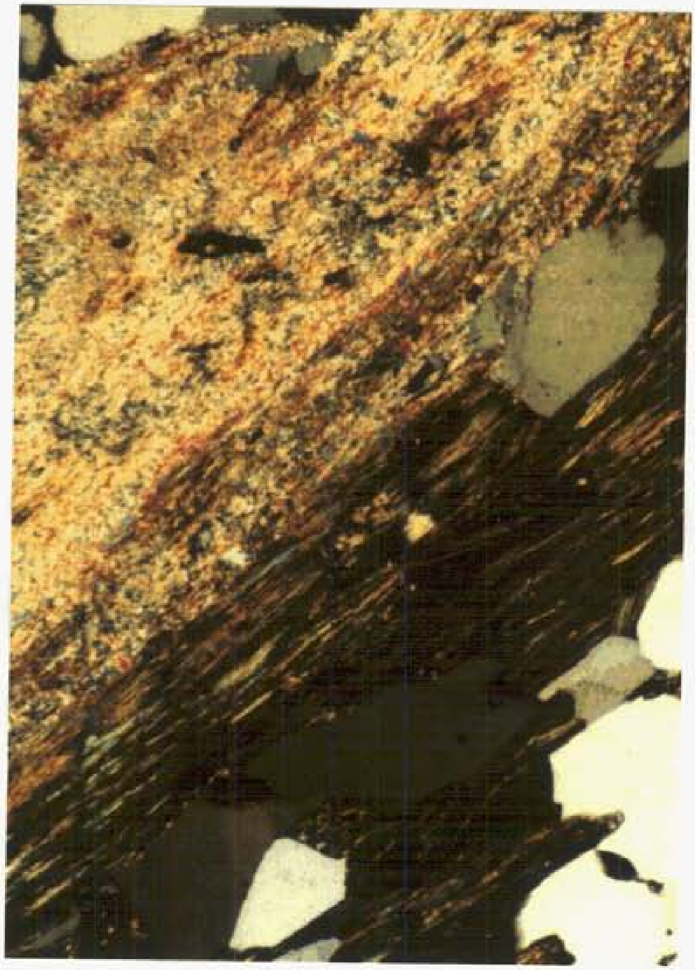
Muscovite/sericite; 18-20%, anhedral (<.05 to >0.25 mm). Loose felted narrow blades. Varied relative abundance as compared to other major constituents.

Biotite; 8-10%, anhedral (<.05 to >0.25 mm). Loose felted broad blades. Varied relative abundance as compared to other major Constituents.

Epidote/clinozoisite; traces, euhedral/subhedral (<.02 to .05 mm).

Opaques; 3-4%, anhedral (<.01 to >0.4 mm). Intergranular. Shows concentration in certain layers. Polished surface required. Noted fine disseminated interstitial pyrite, scattered coarser euhedral crystals of pyrite in sample reject.

[4] 94-M-4
Muscovite-quartz-chlorite-altered biotite schist

Photomicrographs 94 R XXII-6 and 7. Polarized light
Scale 0.1 mm ___

Summary description
Strong foliated layered by grain-size and composition
Layers include:

[a] Muscovite schist, coarse grained, foliated
[b] Quartz and chlorite/microcrystalline to very fine sericite altered biotite. Interfoliated lensoids. Basal plates of biotite show poikilitic quartz.
[c] Sericite-microcrystalline/very fine felted lensoids, foliated remnants of fibrous biotite.

Accessory minerals include rutile; traces zircon(?)
Disseminated opaque grains, very fine irregular and lath shapes.

Note: anticipated sillimanite, altered cordierite; neither were confirmed in this section.

[4] Continued

Microscopic description
Transmitted light
Major components

Muscovite; 35-40%, anhedral (<.05 to >2.0 mm) Strong foliated
[a] Segregated into interlocking foliated muscovite layers
[b] Disseminated foliated blades in quartz-altered biotite-rich layers.

Quartz; 25-30%, anhedral (0.1 to >0.6 mm). Interlocking grains, elongate grains foliated. Forms foliated lensoids among altered biotite lensoids. Lensoids (to several mm).

Biotite; 35-40%, anhedral (<.05 to >2.0 mm). Ragged foliated blades/fibrous remnants; chloritic alteration and felted/weakly foliated microcrystalline sericite lensoids, which locally transect section. Disseminated foliated muscovite blades/laths. Biotite basal plates contain poikilitic quartz and contain abundant crystallographic controlled rutile(?) needles accompanied by fewer coarser long prismatic crystals.
Note: anticipated sillimanite; possible altered cordierite, but neither were confirmed in this section.

Accessory minerals
Zircon; traces, euhedral (to 0.1 mm). Sparsely disseminated crystals

Rutile; 0.5%, subhedral (to >0.2 mm). Long narrow needles. Crystallographic control in biotite. Particularly conspicuous in basal plates. Sparsely disseminated coarser rods. (to >0.5 mm)

Opaques/semiopaques
Rutile; see above

Undetermined iron-rich; <0.5%, anhedral (<.01 to 0.2 mm) irregular grains and laths.

[5] 94-M-5
Altered quartz diorite/diabase

Photomicrographs 94 R XXII-8 and 9   Polarized light
Scale 0.1 mm

Summary description
Outlines of former coarser interlocking hornblende(?) crystals showing deuteric alteration to a fine mosaic of very irregular interlocking fine to very fine prismatic to acicular secondary amphibole crystals. Lesser interstitial weakly to locally strongly altered plagioclase and featureless quartz interstitial to the above assemblage. Alteration assemblage other than deuteric secondary amphibole includes: clinozoisite associated with dusted plagioclase and in irregular veins. Interstitial sericite/ muscovite clusters; very minor chlorite-altered biotite. Very minor accessory sphene.

Veins/fracture fillings include clinozoisite, one lensoid of anhydrite, a trace of quartz.
Very widely scattered opaque grains.

[5] Continued

Microscopic description

Transmitted light

Altered hornblende (secondary amphibole); 55-60%, anhedral (<.02 to >0.6 mm). Deuteric alteration. Interlocking irregular grains, ragged blades form a mosaic that replaces former coarser hornblende crystals (to >2.0 mm) which show very irregular outlines. Anticipated augite remnants in cores of grains but none detected. Associated clusters of clinozoisite intermixed with strong dusted amphibole. Minor chlorite. [Very pale green pleochroism, biaxial (-) large 2V]

Plagioclase; 18-20%, anhedral/subhedral (<.05 to >1.0 mm). Interlocking grains interstitial to amphibole. Varied intensity alteration dusting with minor microcrystalline to very fine-grained sericite alteration. Suggestion of recrystallized (?) unaltered laths. Some grains enclosed in quartz. Distinct polysynthetic twinning indicating composition in andesine range.

Quartz; 10-12%, anhedral (<.05 to 0.75 mm). Interstitial to other major components. In optical continuity enclosing some unaltered plagioclase laths. [Confirmed uniaxial (+)]

Altered biotite; <<0.5%, anhedral (<.05 to 0.2 mm) Chlorite alteration, cleavage traces remain.

Alteration assemblage

Clinozoisite; 4-5%, anhedral (<.05 to 0.5 mm). Associated with strong dusted plagioclase(?) among secondary amphibole grains. Also fracture control.

Sericite/muscovite; 6-8%, anhedral (microcrystalline to >0.2 mm)
[a] Interstitial clusters of ragged grains.
[b] Alteration of plagioclase.

Dusting; 2-3%, percentage included with plagioclase.
[a] Plagioclase, associated with sericite, varied intensity very weak to strong, associated with clinozoisite.

Chlorite; <0.5%, percentage included with biotite, anhedral, alteration of biotite.

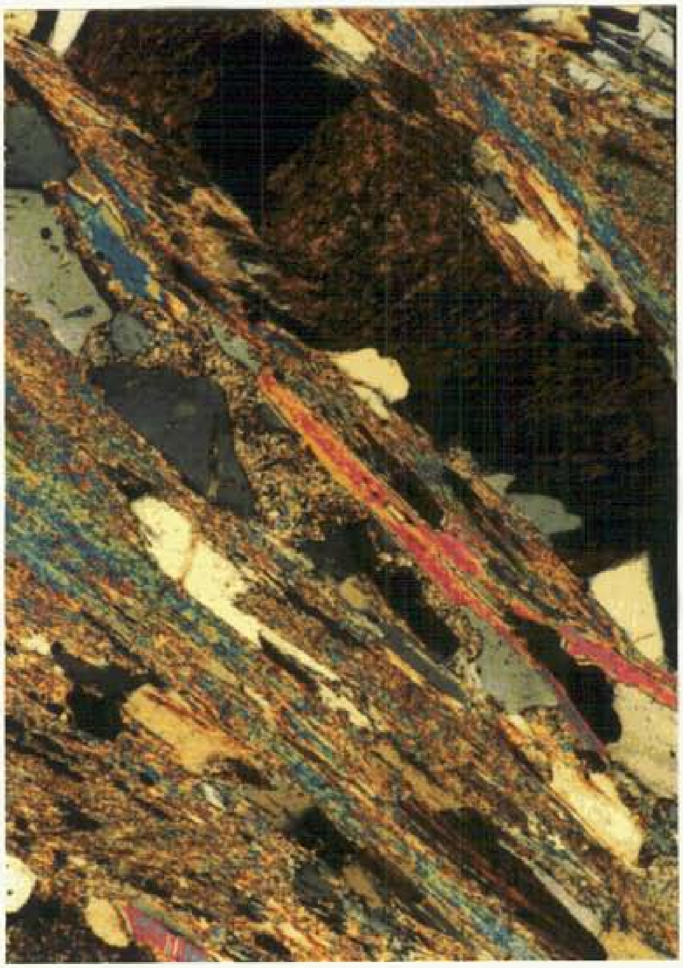
Accessory minerals

Sphene; <0.5%, anhedral/subhedral (<.02 to >0.4 mm). Clusters of grains associated with clinozoisite and amphibole.

Veins/lensoidal fracture fillings

Anhydrite; <1.0%, anhedral (.05 to 0.3 mm) Interlocking bladed, lensoidal fracture filling. [Second order blue birefringence, biaxial (+), 2V-40°]
Clinozoisite; see above
Quartz; trace

[6] 94-M-6
Altered mafic (biotite and hornblende(?)) muscovite schist




Photomicrographs 94 R XXII-10 and 11   Polarized light
Scale 0.1 mm

Summary description
Strong foliated, minerals intermixed to varied amounts and segregated into lensoids enriched in one, two, or more of the major components.

Major components include:
Altered biotite(?); pseudomorphs, complete alteration to "fibrous" chlorite/sericite following original cleavage traces. Overprint loose felted rutile(?).

Muscovite; unaltered, bladed.

Altered plagioclase; microcrystalline sericite dusted/felted replacement.

[6] Continued

Quartz; foliated lensoidal clusters.

Sericite (?)/chlorite(?) foliated fibrous aggregates form lensoids, partings, laminae. Requires electron microprobe study in order to isolate and identify the minerals comprising this assemblage.

Anticipated altered cordierite, sillimanite, staurolite in this assemblage but none of these were confirmed. Felted sericitic plagioclase alteration somewhat resembles altered cordierite. Plagioclase shows a range of intensity of sericite alteration from complete to partial, leaving plagioclase remnants. The most intensely sericitic altered grains are attributed to altered plagioclase. Intensely altered staurolite would resemble some of the altered poikilitic appearing grains attributed to altered biotite.

Noted few small grains of accessory tourmaline in altered biotite(?).

Microscopic description
Strong foliated, minerals intermixed to varied amounts. Segregated into lensoids/laminae enriched in one, two or more of the major components.

Major components include:
Quartz; 22-25%, anhedral, (<.05 to >1.5 mm), generally fine grained, forms interlocking lensoidal clusters of irregular grains. Also as isolated subhedral to irregular grains in lensoidal masses of felted microcrystalline sericite.

Muscovite; 10-12%, subhedral, (<.05 to several mm), sections through very fine to coarse plates. Form isolated coarser irregular blades, but more abundantly as foliated clusters forming lensoidal clusters to near continuous stringers.

Altered stained biotite(?); 15-18%, anhedral, (<.05 to several mm), irregular shaped grains, plates, altered to a fibrous intermix of chlorite and varied abundance of sericite aligned with original cleavage direction. Shows crinkling. Overprint of minute felted needles of semiopaque rutile(?). Locally show irregular outlines of original grains, some retaining a slight poikilitic texture enclosing small quartz grains, few muscovite blades.

Sericite/chlorite(?); 22-25%, fibrous foliated masses (several mm to continuous). Appears to have been sheared into foliated lensoids/partings or laminae of fibrous intermixes of chlorite and sericite (or anthophyllite??). Derived by alteration and shearing of biotite?? Obscured by brown stain. Requires an electron microprobe analysis to isolate and identify specific minerals.

[6] Continued

Undetermined pseudomorphs

Undetermined; 3-5%, subhedral fragmental pseudomorph, (<.05 to >3.0 mm), completely replaced by microcrystalline to very fine felted sericite; very fine poikilitic inclusions quartz, trace tourmaline.

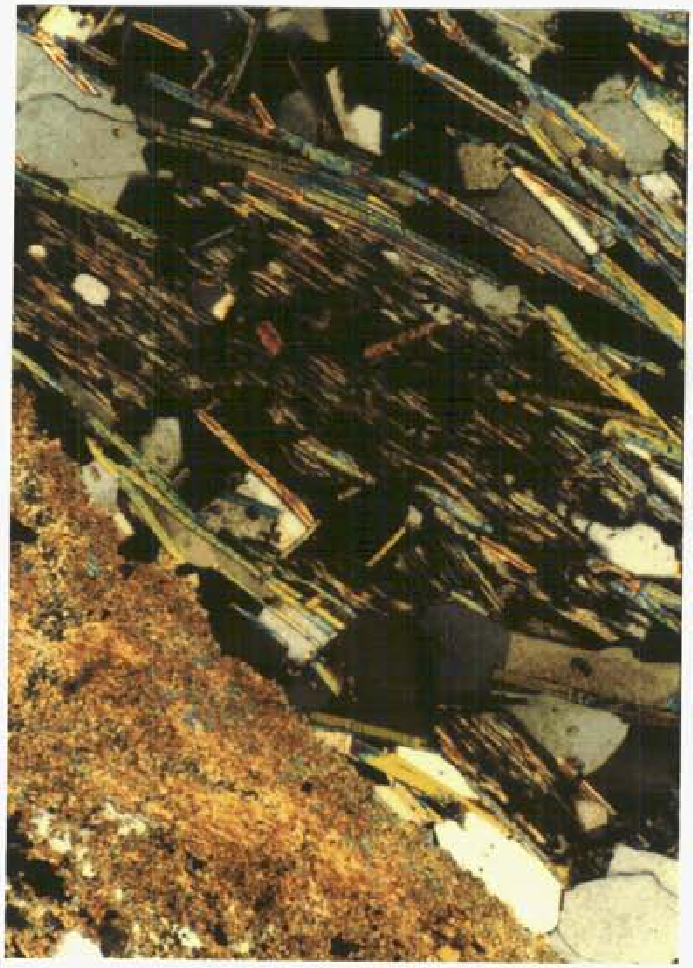
Altered plagioclase; 15-18%, anhedral (<.05 to <1.0 mm). Near complete replacement by felted microcrystalline sericite. Small grains intermixed with and interstitial to quartz. Few grains retain remnant plagioclase.

Accessory minerals

Tourmaline; traces, subhedral (<.05 to 0.1 mm) Disseminated grains in altered biotite(?)

Note: This sample shows strong alteration masking original constituents.

[7] 94-M-7
Chlorite altered biotite-muscovite schist



Photomicrograph 94 R XXII-12 Polarized light
Scale 0.1 mm

Summary description
Foliated, composed of groundmass of interlocking quartz, foliated lensoids. Interfoliated chlorite after biotite(?), lesser unaltered muscovite.

Layers enriched by continuous bands of microcrystalline sericite, surrounding quartz lensoids.

Accessory minerals include tourmaline and TiO_2 (rutile).

Microscopic description
Transmitted light
Groundmass
Quartz; 55-60%, anhedral (0.1 to 0.8 mm). Interlocking, elongate grains, foliated. Strained extinction.

13

[7] Continued

Altered feldspar(?); <<0.5%, anhedral (<.05 to 0.4 mm). Disseminated irregular to subrounded grains, altered to microcrystalline felted sericite. Excludes sericite-rich interlayers below.

Accessory minerals
Tourmaline; <<0.5%, subhedral (<.05 to 0.15 mm). Widely disseminated grains. Maximum absorption (pleochroism) parallel to analyzer direction.

TiO_2(rutile); 0.5-1%, anhedral (<.05 to 0.1 mm). Disseminated grains, loose clusters of grains in quartz groundmass and associated with chloritized biotite.

Foliated overprint
Muscovite; 10-12%, anhedral (<.05 to >1.0 mm). Foliated laths fairly widely disseminated in quartz groundmass and among altered biotite.

Altered biotite(?); 18-20%, anhedral (<.05 to >1.0 mm). Foliated blades, complete alteration to chlorite, lesser sericite. Has a fibrous fabric following original cleavage. Aggregates of microcrystalline TiO_2(?). Crinkled laths common. Poikilitic containing small grains of quartz, traces of tourmaline; few muscovite laths overprint(?).

Sericite-rich interlayering
Sericite; 12-15%, anhedral (microcrystalline to >0.2 mm). Compact aggregates of grains, form a continuous layered groundmass containing lensoids of quartz (partially replaced by sericite(?))

Sericite-rich layers show a decrease in relative abundance of altered biotite, muscovite and quartz.

Opaques negligible.

[8] 94-M-8
Foliated/layered impure quartzite

Photomicrograph 94 R XXII-13   Polarized light
Scale 0.1 mm

Summary description
Impure quartzite, medium to coarse grained. Groundmass of interlocking quartz crystals showing strained extinction. Lacks conspicuous outlines of original grains and overgrowths.

Contains foliated blades of disseminated muscovite and chlorite-sericite altered biotite. Few biotite laths and irregular plagioclase(?) grains completely altered to microcrystalline felted sericite, some interstitial to but most aligned within quartz. Suggests complete recrystallization of quartz. Shows some variation in abundance resulting in streaked appearance.

Weakly disseminated accessory minerals include tourmaline TiO_2 (rutile) and traces of zircon/monazite??

Opaques negligible

[8] Continued

Microscopic description
Groundmass

Quartz; 85-90%, anhedral (<.05 mm to >1 cm). Some segregation into layers by grain-size. Interlocking, recrystallized, strained extinction. Lacks outlines of original grains showing quartz overgrowths. Optically continuous (to >1 cm) but shows stained extinction.

Appears to have engulfed muscovite, biotite, altered biotite and few biotite laths and sericite-altered plagioclase which form disseminated foliated inclusions in recrystallized quartz. Some occur between grains.

Inclusions in quartz; foliated.

Muscovite; 3-4%, anhedral (<.05 to 1.0 mm). Foliated disseminated laths within quartz and some occur between quartz crystals.

Chlorite; 2-3%, anhedral (<.05 to >2.0 mm). Foliated crinkled laths within quartz and between crystals. Intergrown with muscovite.

Biotite; 2-3%, anhedral (<.05 to 1.0 mm). Disseminated foliated, clusters of a few laths. Some intergrowths with muscovite. Varied intensity of alteration to chlorite within and between quartz grains.

Altered plagioclase; 3-4%, anhedral (<.05 to 0.5 mm) Disseminated grains showing complete alteration to microcrystalline felted sericite. Occurs within and between quartz crystals.

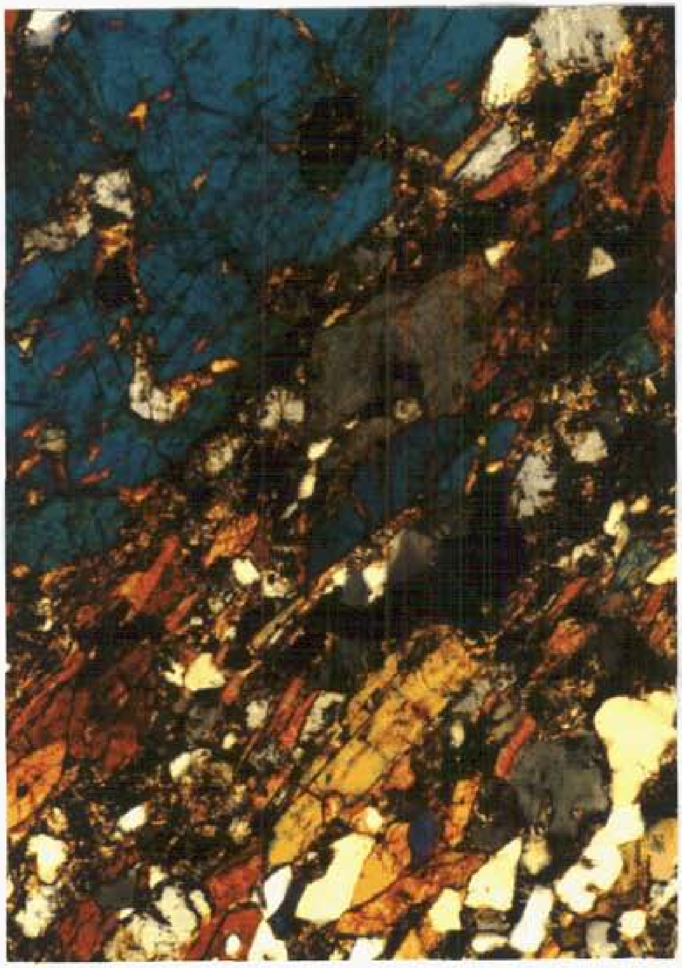
Accessory grains
Tourmaline; traces (+), anhedral (<.05 to >0.1 mm). Imbedded in quartz.

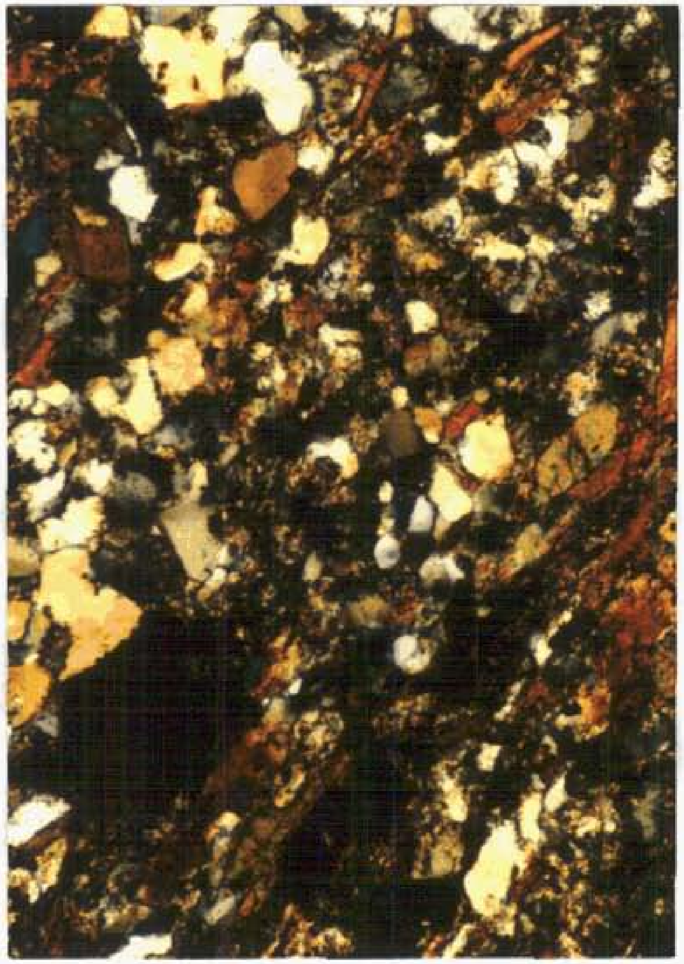
Zircon/monazite(?); trace, (<.05 to 0.1 mm) Not positively identified. Small grains with high R.I., high birefringence. Clear to pale brown, distinct from tourmaline.

TiO_2 (rutile); trace, suspected

Opaques negligible.

[9] 94-M-9
Sheared quartz impregnated diabase





Photomicrographs *94* R XXII-*14* and *15*   *Polarized light*
Scale 0.1 mm

Summary description
Composed of sheared, altered diabase impregnated by quartz. Composed of a groundmass of foliated, fine granulated hornblende, biotite, altered sericitic plagioclase and quartz partially introduced by admixing/impregnation? The biotite content is a result of a metamorphic overprint. Contains sheared/foliated lensoids of coarser diabase with interlocking crystals of weakly poikilitic hornblende, biotite, altered and less altered plagioclase, lesser quartz than groundmass. Stained slab shows very minor K-stain indicating slight K-feldspar content which commonly occurs in small amounts in diabase. Shows varied intensity of dusting in more intensely sheared planes.

Opaques <u>localized clusters</u> in shear planes and in microfractures associated with shear.

[9] Continued

Microscopic description
Lensoids of coarser more euhedral interlocking crystals in a finer foliated sheared groundmass similar constituents.

Hornblende; 25-30%, anhedral/euhedral (<.05 to >4.0 mm). Less intensely sheared lensoids contain the coarser, more euhedral crystal. Poikilitic texture. Smaller anhedral grains in sheared groundmass with other components.

Biotite; 18-20%, anhedral (<.05 to >1.0 mm) A metamorphic overprint. Coarser foliated clusters of grains among hornblende crystals in less sheared lensoids. Finer laths foliated clusters of laths in sheared schistose groundmass, shows continuous shear-controlled laminae. Weak chloritic alteration.

Altered plagioclase; 25-30(?)%, anhedral (<.05 to >1.0 mm) Masked by alteration. Distribution of coarser and finer grains as for hornblende. Grains show varied intensity alteration dusting and microcrystalline sericite. Strongest alteration in sheared groundmass.

Quartz; 18-20%, anhedral (<.05 to >2.0 mm). Very irregular grains. Concentrated in sheared foliated groundmass. Lesser in less sheared coarser lensoids. Aggregates of interlocking grains form lensoids with intermixing of lesser amounts of the other components.

K-feldspar; 4-5(?)%, not confirmed in thin section. Very minor K-feldspar content suggested by slight streaked stain in stained off-cut.

Alteration assemblage
Dusting; patchy semiopaque alteration of plagioclase. Associated sericite.

Sericite; patchy microcrystalline felted alteration of plagioclase.

Chlorite; weak alteration of biotite.

Opaques; <0.5%, anhedral (<.01 to aggregates >0.8 mm). Localized clusters in shear planes and in associated microfractures in hornblende and in and between quartz grains.

[10] 94-M-10
Amphibolite: altered quartz diorite/diabase(?)

Photomicrographs 94 R XXII-17 and 18 Plane and polarized light
Scale 0.1 mm

Summary description: Similar to 94-M-5
Felted interlocking mix of fine to medium grained secondary deuteric (?) amphibole replacing coarser bladed interlocking hornblende(?), lesser altered interstitial plagioclase with significant interstitial quartz.

Very minor accessory sphene with inclusions of opaque (ilmenite?). Trace of colourless isotropic mineral.

Alteration assemblage includes interstitial and irregular crackle veins of clinozoisite. Dusting and sericitic alteration of plagioclase. Clusters of muscovite, very minor chlorite clusters.

Anhydrite gash veinlet.

[10] Continued

Microscopic description

Amphibole; 50-55%, anhedral (<.05 to >0.5 mm, original crystals to >2.0 mm). Very pale green. Aggregates of ragged prismatic to bladed crystal of secondary (deuteric) amphibole. Few associated clusters of acicular crystals also deuteric secondary amphibole. No conspicuous original hornblende; one possible pyroxene grain noted.

Altered plagioclase; 10-12%, anhedral (<.05 to 1.0 mm). Interlocking irregular crystals with amphibole. Varied intensity strong to weak semiopaque dusting and sericite. Associated clinozoisite alteration.

Quartz; 8-10%, anhedral (<.05 to >0.5 mm). Interstitial irregular grains, clusters of grains. Fracture control locally. Strained extinction. Associated very minor gypsum.

Alteration assemblage

Clinozoisite; 12-15%, anhedral (<.05 to >2.0 mm). Associated interstitial altered plagioclase. Occurs mainly as irregular crackle veins and coarse bladed fracture controlled clusters and replacements(?).

Sericite and dusting:

Chlorite; 3-4%, anhedral (<.05 to 0.6 mm) Foliated/radiating bladed clusters. Interstitial to secondary amphibole and clinozoisite.

Muscovite; 8-10%, anhedral (<.05 to >0.5 mm). Scattered ragged blades, clusters of a few blades, interstitial to other components.

Gypsum(?); traces(+), anhedral (<.05 to 0.3 mm). Associated with interstitial quartz. Low (-) R.I. <<quartz. Colourless, low birefringence.

Accessory minerals

Tourmaline; trace, subhedral (to 0.4 mm). Deep brown, slight green mottling, isotropic (basal section), uniaxial (-).

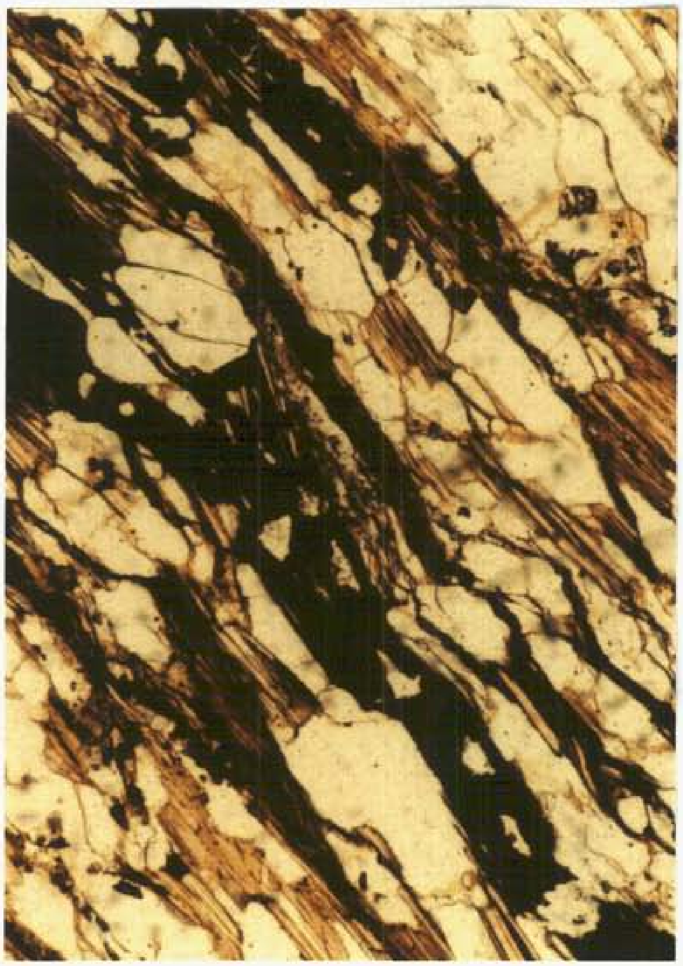
Sphene; <0.5%, anhedral/subhedral (0.1 to 0.8 mm). Scattered grains, irregular clusters of a few grains. Associated opaque in some grains, ilmenite?

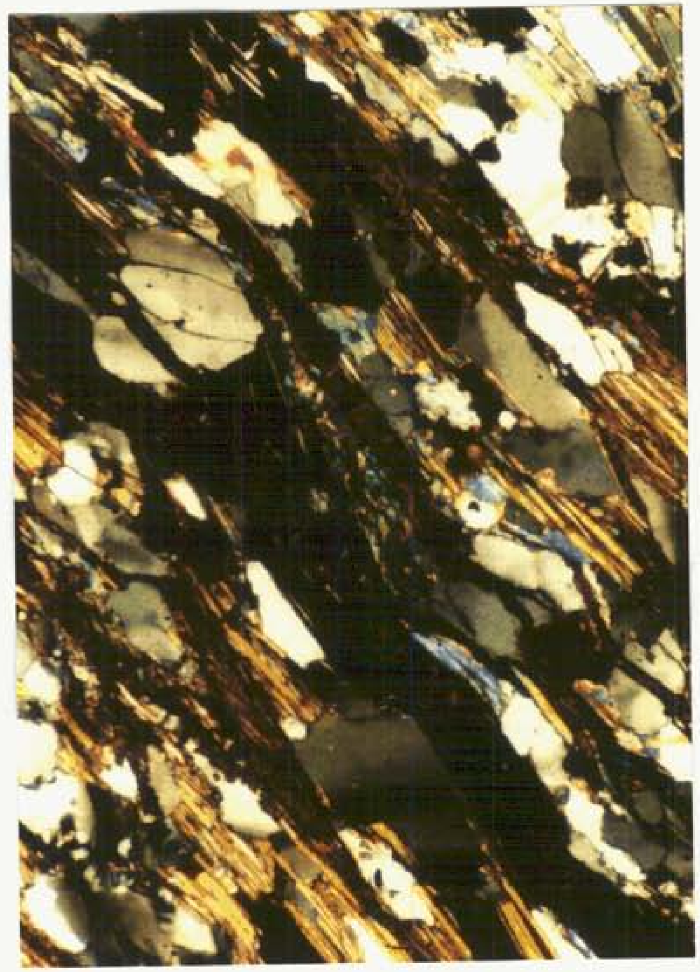
Unidentified; trace, anhedral (0.3 mm). Colourless, isotropic. Moderate (+) R.I.

Opaques

Ilmenite; traces(+), anhedral (<.05 to 0.1 mm). Suspected. Opaque grains/clusters of grains in sphene.

[11] 94-M-11
Quartz-sericite/muscovite altered biotite schist (iron stained) hematite laminae





Photomicrographs 94 R XXII-19 and 20 Plane and polarized light
Scale 0.1 mm ____

Summary description
Foliated schist, quartz groundmass; lensoids of interlocking quartz grains. Lensoids separated by narrow, foliated near-continuous network of variably iron-stained chloritic biotite with lesser associated muscovite/sericite. Iron stain masks muscovite.

Laminated by variations in relative abundance of quartz versus chloritic biotite and muscovite (sericite). Quartz generally predominates but locally forms muscovite-rich laminae.

Contains earthy hematite-filled shear-planes following foliation.

Microscopic description
Groundmass
Quartz; 55-60%, anhedral (<.05 to >0.5 mm). Interlocking

[11] Continued

irregular grains; elongate grains aligned with foliation. Locally near continuous groundmass with overprint of foliated, bladed chloritic biotite and muscovite which locally increase in abundance enclosing quartz aggregate lensoids.

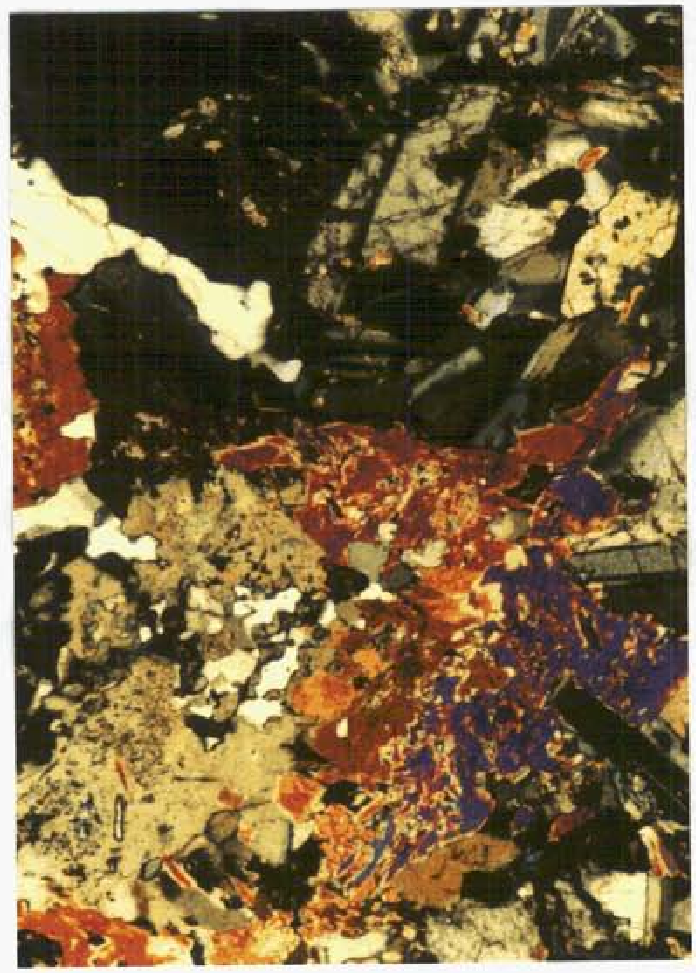
Muscovite; 10-12%, anhedral (<.05 to 0.5 mm). Foliated blades and discontinuous narrow networks, with associated chloritic biotite, enclosing quartz lensoids.

Chlorite altered biotite; 20-22%, anhedral (<.05 to 0.5 mm). As for muscovite. Shows pale brownish pleochroism. Some confusion with iron-stained muscovite.

Partings/veins in foliation plane

Hematite/jarosite; 6-8%, microcrystalline to >0.2 mm) discontinuous and continuous irregular veinlets in braided fractures following foliation. Associated iron-stain.

[12] 94-M-12
Amphibole diabase/diorite



Photomicrographs 94 R XXII-21 and 22 Plane and polarized light
Scale 0.1 mm

Summary description
Loose interlocking felted/weakly foliated acicular/prismatic secondary? (deuteric)?? amphibole with interstitial felted virtually unaltered plagioclase.

Traces of clusters of very fine quartz with plagioclase.

Traces (+) of accessory sphene with probable ilmenite (opaque) inclusions, trace of tourmaline.

Alteration assemblage includes very minor sericite alteration of plagioclase; scattered small clusters of epidote/clinozoisite grains.

Opaque negligible

[12] Continued

Microscopic description

Amphibole; 65-70%, anhedral, (<.05 to 4.0 mm). Loose interlocking felted acicular/prismatic crystals. Very pale green, slight pleochroism. Some grains have an internal pavement fabric of aggregates of very fine grains; others have an aligned acicular habit. Deuteric alteration of preexisting amphibole(?).

Plagioclase; 30-35%, anhedral (<.05 to 1.5 mm). Felted laths/stubby crystals, interstitial to amphibole. Generally very weak dusting alteration with conspicuous twin lamellae indicating composition in upper andesine/lower labradorite range. Scattered clusters of sericite alteration.

Quartz; traces(+), anhedral (<.05 to <0.5 mm). Few clusters of very fine interstitial grains, inconspicuous.

Accessory minerals

Sphene; 1-2%, anhedral (.05 to 0.5 mm). Disseminated grains, clusters of grains. Contains opaque flecks, possible ilmenite?

Tourmaline; trace (one blade noted), subhedral/anhedral (<.05 to 0.2 mm). Mottled green/brown, pleochroic with maximum absorption parallel to analyzer direction.

Alteration assemblage

Dusting; scattered patches semiopaque dusting of plagioclase.

Epidote/clinozoisite; <0.5%, clusters of a few very fine grains, dusted appearance.

Sericite; very minor, clusters of very fine grains, alteration of plagioclase.

Opaques; negligible.

[13] 94-M-13

Amphibolite: Quartz-plagioclase-amphibole-biotite tourmaline schist

Photomicrographs 94 R XXII-23 and 24 Plane and polarized light
Scale 0.1 mm

Summary description

Foliated to weakly felted aggregates of very pale green tinted amphibole forms a near continuous groundmass which contains irregular lensoids of interlocking quartz, lesser weakly sericite-altered plagioclase.

Overprint of foliated disseminated and clusters of partially chlorite-altered biotite. Conspicuous foliated prisms of fine/medium-grained tourmaline, appear to be concentrated in a number of specific horizons. Scattered foliated elongate grains/clusters of sphene.

Pale streaked foliated K-stain in stained block; no K-feldspar noted in section, unaccounted for by sericite.

[13] Continued

Opaques; very minor irregular disseminated grains, clusters of grains.

Microscopic description
Groundmass
Amphibole; 50-55%, anhedral (<.05 to >2.0 mm). Irregular prismatic, foliated loose interlocking crystals. Very pale slight greenish brown tint. Pleochroism barely perceptible. Biaxial(-) large 2V characteristic amphibole cleavage. Second order birefringence.

Quartz; 8-10%, anhedral (<.05 to 0.5 mm). Irregular interstitial to amphibole, lensoidal clusters with plagioclase and amphibole among foliated biotite partings/networks.

Plagioclase; 8-10%, anhedral (<.05 to 0.5 mm). Irregular, interlocking, generally featureless with irregular patchy felted microcrystalline sericite and slight dusting alteration.

K-feldspar; 3-5(?)%, not positively identified in thin section. Streaky stain in shear planes on stained off-cut not accounted for by sericite.

Overprint
Altered biotite; 20-22%, anhedral (<.05 to >1.5 mm) Irregular to ragged laths, single grains and foliated clusters as continuous partings to discontinuous networks in foliation plane partially surrounding lensoids of other major components. Partial alteration to chlorite.

Accessories
Tourmaline; 1-2%, subhedral (0.2 to >1.0 mm). Disseminated prisms, sections aligned in foliation plane. Appear to be concentrated in certain horizons.

Sphene; 1-2%, anhedral (.03 to >1.0 mm). Irregular grains elongate clusters of grains in foliation plane.

Opaques; <0.5%, anhedral (.01 to 0.2 mm). Disseminated irregular shaped clusters.

[14] 94-M-14
Amphibole diabase/diorite

Photomicrograph 94 R XXII-25   Polarized light
Scale 0.1 mm ____

Summary description
Composed of loose interlocking moderately foliated, secondary(?) (deuteric)(??) amphibole with interstitial very patchy altered plagioclase. Few clusters of very fine quartz with plagioclase.

Disseminated irregular grains of sphene

Alteration very minor other than apparent deuteric amphibole. Plagioclase shows scattered clots of dusting with associated clinozoisite/epidote, slight sericite.

Opaques negligible.

Microscopic description
Amphibole; 50-55%, anhedral (<.05 to >2.0 mm). Loose
interlocking foliated/felted, prismatic to acicular

[14] Continued

crystals. Very pale greenish tint, slight pleochroism characteristic amphibole cleavage. Biaxial (-) large 2V. Some larger grains have an internal pavement fabric of very fine grains; others have an aligned acicular habit. Deuteric alteration of preexisting amphibole(?)

Plagioclase; 35-40%, anhedral (<.05 to >1.5 mm). Felted laths, stubby crystals, interstitial to amphibole. Generally very weak alteration with conspicuous twin lamellae indicating composition in the upper andesine range. Scattered intensely dusted clots with epidote/clinozoisite.

Quartz; 1-2%, anhedral (<.05 to 0.5 mm). Few conspicuous clusters of fine grains interstitial to plagioclase.

Accessory minerals
Sphene; 1-2%, anhedral (0.1 to 0.2 mm) Disseminated grains, clusters of grains.

Tourmaline; not detected.

Alteration assemblage (other than deuteric amphibole)
Epidote/clinozoisite; 1-2%, anhedral (<.01 to 0.2 mm). Scattered dusted clots.

Sericite; very weak localized alteration of plagioclase.

Dusting associated with epidote/clinozoisite.

[15] 94-M-15
Amphibole diabase/diorite

Photomicrographs 94 R XXII-26 and 27 Plane and polarized light
Scale 0.1 mm

Summary description
Similar to 94-M-14, some differences in relative percentages of minerals, more conspicuous epidote/dusting alteration.

Composed of loose interlocking, weakly/moderately foliated secondary(?) (deuteric)(??) amphibole with interstitial patchy alteration dusting and associated epidote/clinozoisite. More conspicuous clusters of quartz interstitial to plagioclase than in [14].

Disseminated irregular grains of sphene.

Alteration other than apparent deuteric alteration of amphibole includes epidote/clinozoisite and associated dusting.

[15] Continued

Microscopic description

Amphibole; 50-55%, anhedral (<.05 to >2.0 mm). Loose interlocking, foliated/felted, prismatic to acicular crystals. Pale greenish tint slightly darker than [14], pleochroism distinct. Most larger grains have a partial to complete internal pavement fabric of very fine grains or have an aligned acicular/fibrous habit. Deuteric alteration of preexisting amphibole(?)

Plagioclase; 30-35%, anhedral (<.05 to >2.0 mm). Felted laths, stubby crystals, interstitial to amphibole. Generally weak to moderate epidote/clinozoisite alteration with associated dusting. Conspicuous twin lamellae indicate a composition in upper andesine/low labradorite range.

Quartz; 3-4%, anhedral (<.05 to 0.5 mm) More conspicuous clusters than in [14] interstitial to plagioclase. Strained extinction.

Accessory minerals

Sphene; 0.5-1%, anhedral (0.01 to 0.5 mm) Disseminated grains, clusters of grains.

Tourmaline; not detected.

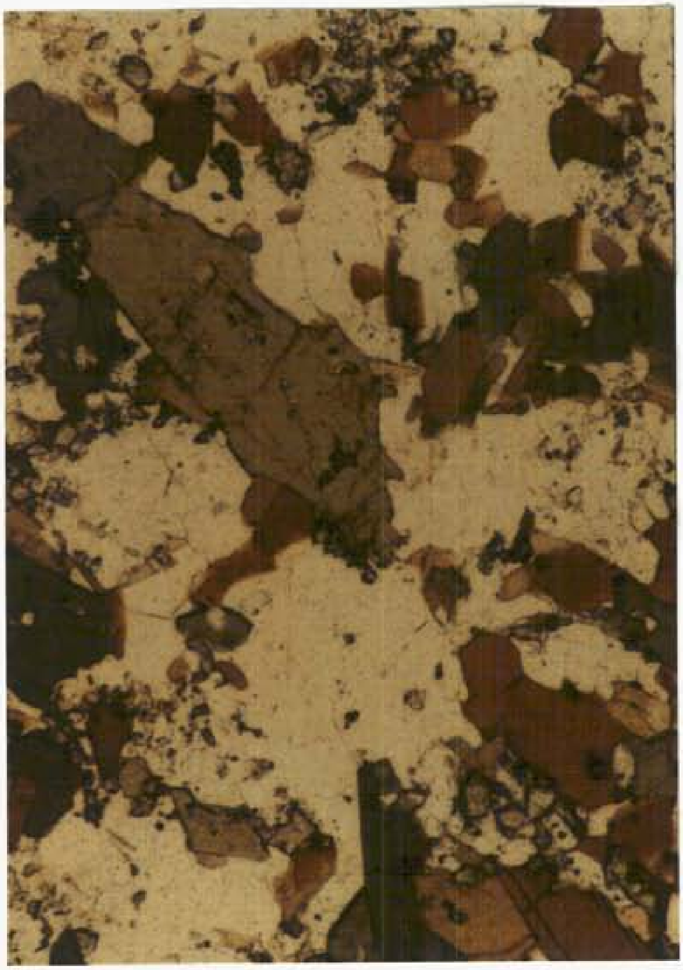
Alteration assemblage

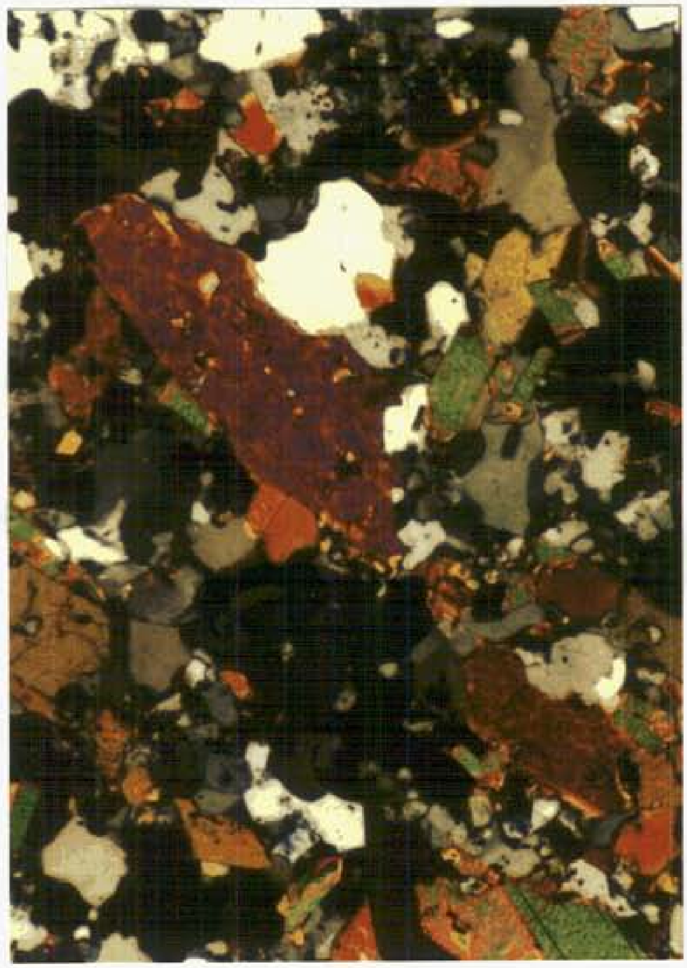
Dusting; 6-8%, associated with epidote/clinozoisite alteration of plagioclase.

Epidote/clinozoisite; 4-5%, associated with semiopaque dusting alteration of plagioclase.

Sericite; 2-3%, intermixed with epidote/clinozoisite and dusting.

[16] 94-M-16
Amphibolite schist, retrograde to biotite ?





Photomicrographs 94 R XXII-28 and 29 Plane and polarized light
Scale 0.1 mm

Summary description
Groundmass is composed mainly of fine interlocking featureless plagioclase and quartz. Some segregation into clusters.

Overprint of hornblende laths/prisms. One of the few sections showing distinct green to brownish pleochroism. Virtually unaltered. Associated with biotite which occurs as distinct grains intergrown with hornblende but does not appear to result from alteration of hornblende.

Alteration very slight, few scattered distinct grains of epidote/clinozoisite.

Accessory minerals include 1-2% disseminated rutile/sphene.

Widely disseminated opaque grains.

[16] Continued

Microscopic description
Groundmass

Plagioclase; 28-30%, anhedral (.05 to 0.5 mm). Interlocking crystals, featureless except for patchy very slight alteration dusting. Few grains show polysynthetic twinning. Conspicuous on etched surface of stained off-cut.

Quartz; 25-28%, anhedral (.05 to 0.5 mm). Interlocking, featureless, not easily distinguishable from featureless plagioclase.

Overprint felted/foliated
Hornblende; 15-18%, anhedral/euhedral (<.05 to >1.0 mm), mainly as single grains, disseminated, showing preferred orientation. Unaltered.

Biotite; 25-28%, anhedral (<.05 to 0.5 mm). Stubby platy habit, light to medium reddish brown pleochroism. Unaltered.

Accessory minerals
Rutile; 1-1.5%, anhedral (<.01 to 0.5 mm). Darker brown tint than sphene. Disseminated loose clusters of single grains and irregular compact aggregates.

Tourmaline; not detected

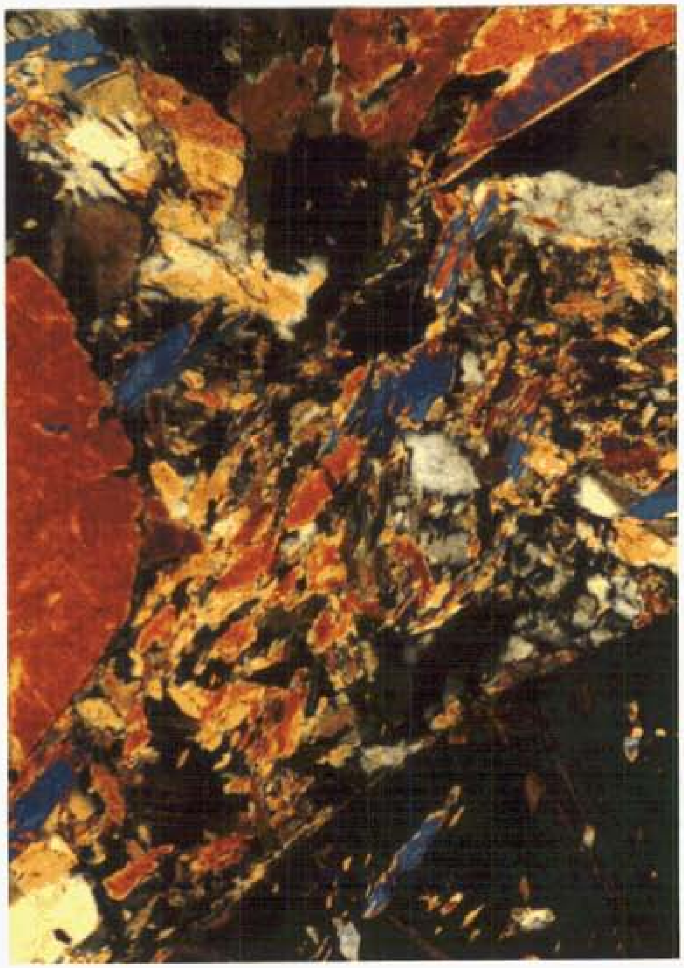
Opaques; requires polished thin section.

Alteration assemblage

Epidote/clinozoisite; <0.5%, subhedral (<.05 to 0.3 mm). Disseminated distinct grains. Does not appear to result from alteration of component minerals in the section.

Dusting; very slight inconspicuous dusting of some plagioclase grains.

[17] 94-M-17
Tourmaline amphibolite



Photomicrographs 94 R XXII-30, 31 Plane/polarized light
Scale 0.1 mm

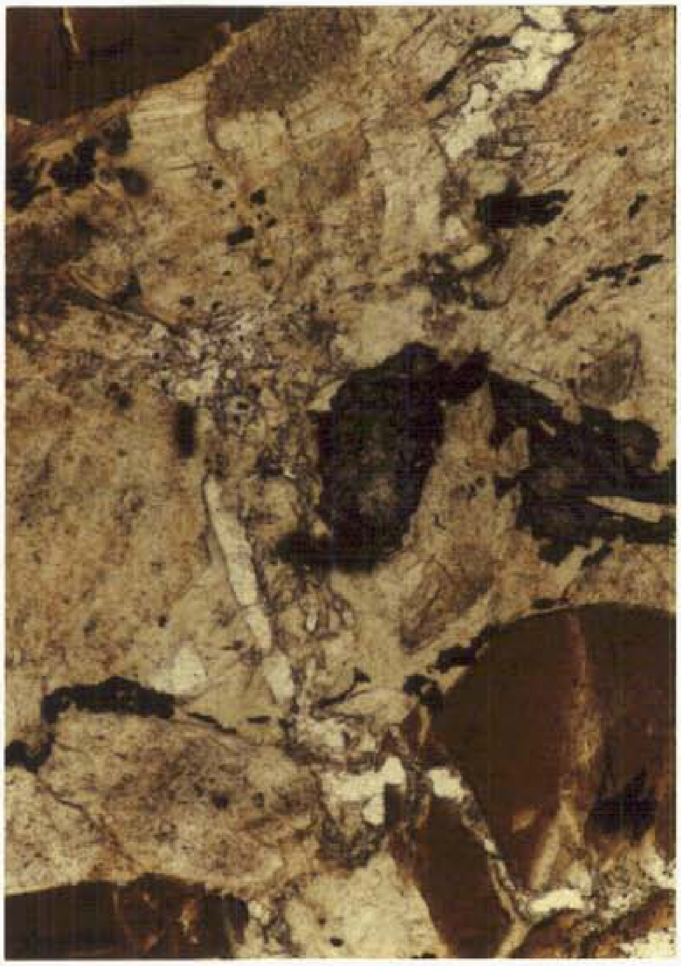
Summary description
Groundmass of felted, tight interlocking acicular and prismatic very pale green to colourless amphibole. Covers a wide range of crystal sizes; coarser prismatic and finer narrow bladed to acicular.

Interstices filled with felted/weakly foliated blades of chlorite with associated chlorite altered biotite.

Contains coarser single and clusters of crystals of euhedral tourmaline among the major constituents.

Disseminated grains clusters of grains of rutile/sphene show beaded interstitial and microfracture control.

17 94-M-17
Tourmaline amphibolite



Photmicrographs R XXII- 36-37 Plane and polarized light
Scale 0.1 mm

[17] Continued

Microscopic description

Amphibole; 70-75%, anhedral/subhedral (<.05 to >2.0 mm). Felted interlocking intermixed habits; coarser crystals prismatic subhedral; finer crystals narrow bladed to acicular.

Biaxial(-), large 2V-80°. Weak pleochroism from very pale greenish tint to colourless. Birefringence .028. Extinction angle 12-16°. Consistent with tremolite/actinolite.

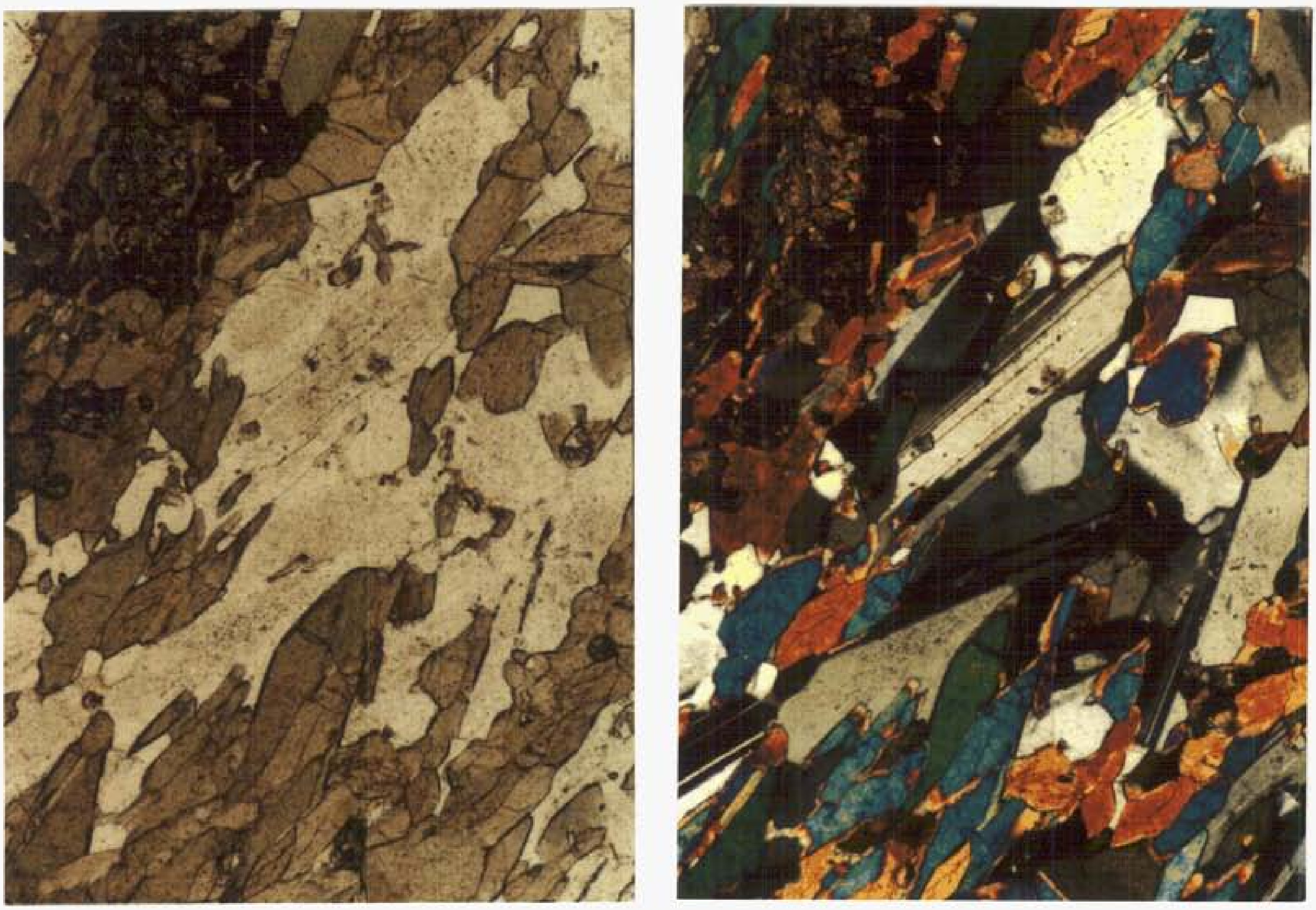
Chlorite/biotite; 18-20%, anhedral (<.05 to 0.5 mm). Radiating/ locally aligned blades of chlorite and lesser chloritic biotite fills interstices among amphibole crystals. Chlorite >> biotite and appears to be an alteration product of biotite.

Tourmaline; 8-10%, euhedral (0.1 to several mm). Disseminated crystals clusters of a few crystals among the above major constituents. Noted in other lithologic units. [Uniaxial (-), second order birefringence masked by colour, strong pleochroism with maximum absorption parallel to analyzer direction]

Accessory minerals

Rutile/sphene; 1-2%, anhedral (<.01 to 0.5 mm). Disseminated grains, clusters of grains showing beaded interstitial and microfracture control.

[18] 94-M-18
Foliated amphibolite schist



Photomicrographs 94 R XXII-32, 33 Plane/polarized light
Scale 0.1 mm

Summary description
Groundmass predominantly foliated plagioclase lensoids, lesser quartz. Interfoliated with a near continuous foliated network of hornblende.

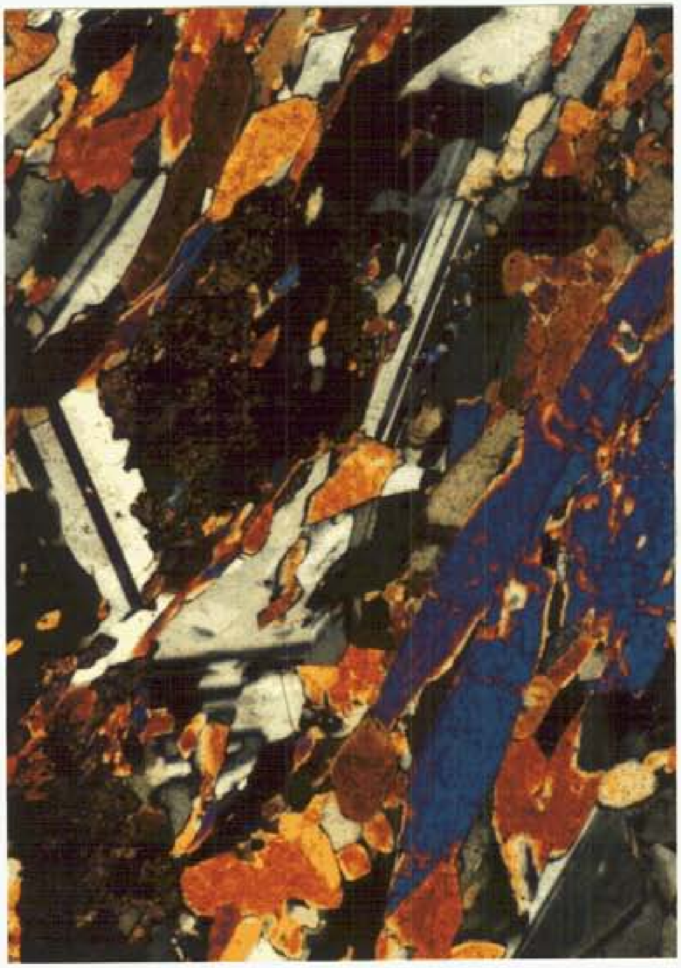
Hornblende and plagioclase virtually unaltered.

Disseminated irregular clusters of rutile/sphene.

Opaques negligible.

Microscopic description
Groundmass
Amphibole (hornblende); 55-60%, euhedral/anhedral (.05 to 4.0 mm). Foliated long prismatic. Forms a near-continuous broad network enclosing irregular lensoids of plagioclase,

[18] 94-M-18
Foliated amphibolite schist



Photomicrographs R XXII-34, 35   Plane and polarized light
Scale 0.1 mm

[18] Continued

very minor quartz.

Plagioclase; 40-45%, anhedral (.05 to >2.0 mm) Foliated, Interstitial to hornblende, long bladed. Unaltered, showing conspicuous twinning indicating composition in upper andesine range.

Quartz; 3-5(?)%, anhedral (<.05 to 0.4 mm) Irregular grains intergrown with plagioclase.

Accessory minerals
Rutile/sphene; 2-3%, anhedral (.01 to 0.5 mm) Single grains and elongate clusters of grains (to >2.0 mm) along foliation plane.

Tourmaline; not detected.


KIMBERLEY
NORTH STAR HILL
Dipper Lake
BOOTLEG MTN
LOWER ALDRIDGE
L.A
HAM GROUP
OVERBURDEN
ST MARY RIVER
MARY LAKE
GEOLOGICAL BRANCH ASSESSMENT REPORT
23,580
82F.070
Transportation
Road, paved
Road, loose surface
Road, rough
Trail/cut line
Railway, single track
Railway, double track
Railway, multi track
Railway, abandoned
Retaining wall
Cut/fill
Bridge, to scale, not to scale
Tunnel, to scale, not to scale
Landmark features
Building, to scale, symbolised
Built up area
Fence
Transmission line
Tower/pylon
Drainage and related features
High water mark; water course definite
High water mark, water course indefinite
Stream, intermittent
Stream, split
Dyke
Flooded land
Swamp/marsh
Beaver dam
Pier
Rock/island less than 20m
Water level
Relief features
Contour, index
Contour, intermediate
Contour, indefinite
Contour, depression
Spot elevation
Vegetation
Wooded area
Control data
Monumented horizontal control point
Monumented vertical control point
Cadastral
Surveys of Federal and Provincial Crown Land
Sub-division of Provincial Crown Land
Rights of way
Township boundary
Mineral claim, Coal lease, Coal licence
Surveyed Cadastral Tie Point
For complete reference to symbols, see "Specifications and Guidelines for Digital Topographic and Cadastral Mapping at 1:20 000" published by the Ministry of Environment and Parks.
Notes
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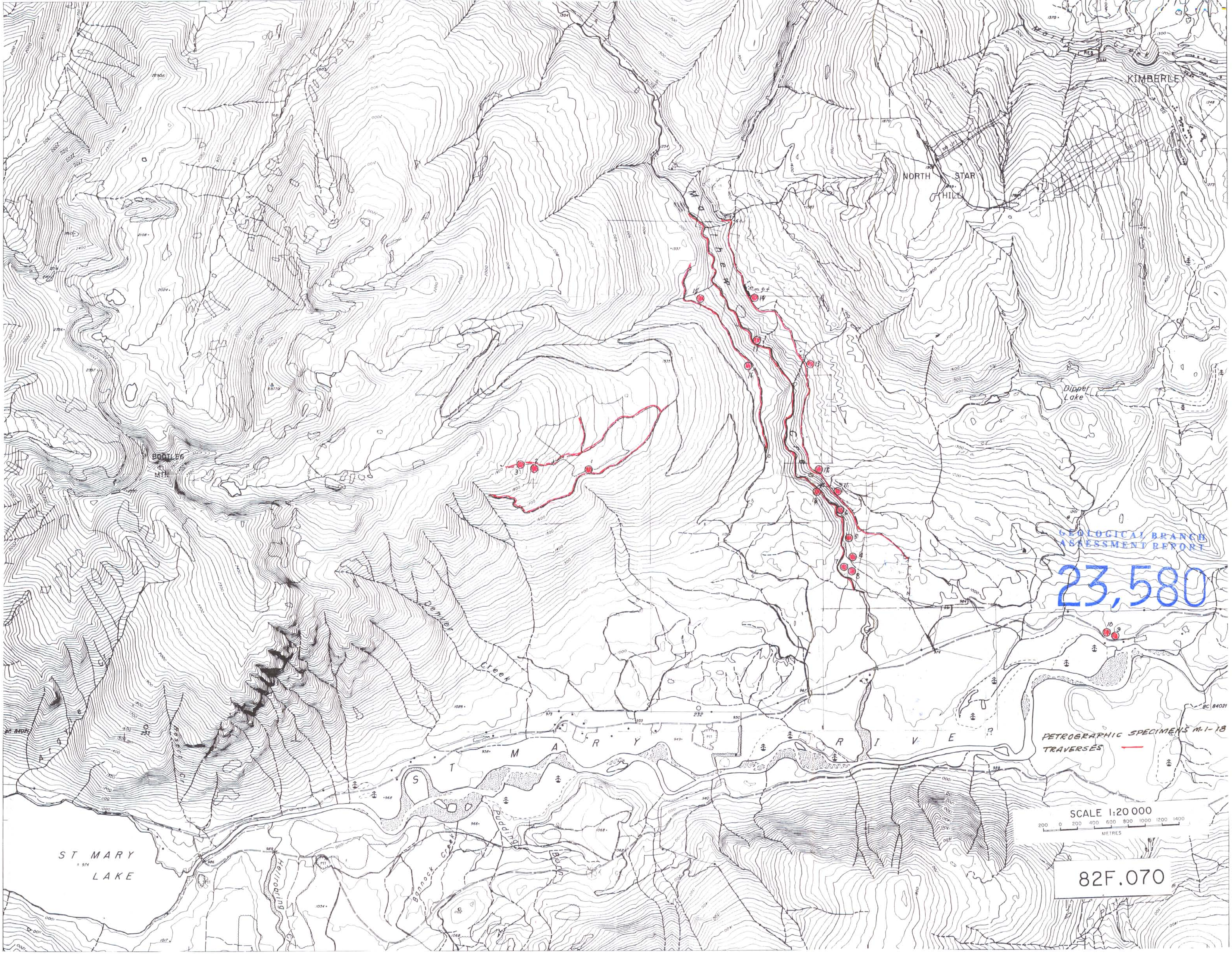
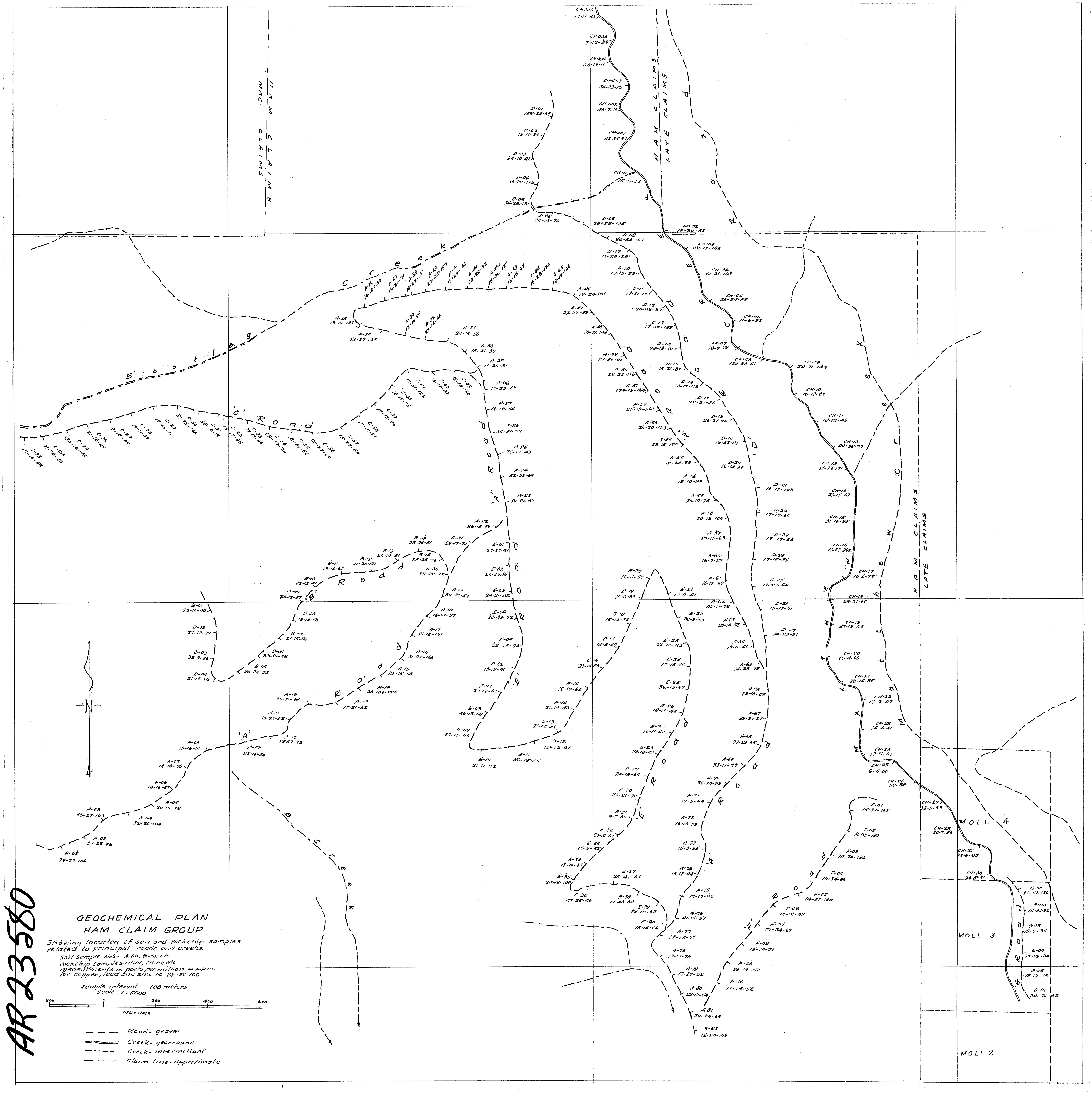
Errors and omissions should be brought to the attention of the Director, Surveys and Resource Mapping Branch, Ministry of Environment and Parks, Parliament Buildings, Victoria B.C. V8V 1X5
SCALE 1:20 000
200 0 200 400 600 800 1000 1200 1400
METRES
GEOLOGICAL PLAN
MATTHEW CREEK AREA
St. Mary Lake
NTS 82 F/9
Scale 1 : 20,000
Legend
Lower Aldridge Formation
Moyie Intrusives - Diorite
Quartz monzonite - Porphyry
Metamorphics
Overburden
Claim Boundary
Bedding Strike - dip
Schistosity
Fault Indicated
Anomalous zone
S.B.H Oct 1994


KIMBERLEY
NORTH STAR HILL
Dipper Lake
BOOTLEG MTN
ST MARY LAKE
S T M A R Y R I V E R
Bannock Creek
Pudding Burn
Dewar Creek
GEOLOGICAL BRANCH ASSESSMENT REPORT
23,580
PETROGRAPHIC SPECIMENS M.1-18
TRAVERSES
SCALE 1:20 000
200 0 200 400 600 800 1000 1200 1400
METRES
82F.070



GEOCHEMICAL PLAN
HAM CLAIM GROUP
Showing location of soil and rockchip samples related to principal roads and creeks.
Soil sample No's- A-02, B-02 etc.
rockchip samples-CH-01, CH-02 etc
measurments in parts per million = p.p.m. for copper, lead and zinc i.e. 29-29-106
sample interval 100 meters
scale 1:5000
200 0 200 400 600
METERS
Road- gravel
Creek- yearround
Creek- intermittant
Claim line-approximate
HAM CLAIMS
MAC CLAIMS
HAM CLAIMS
LATE CLAIMS
MOLL 4
MOLL 3
MOLL 2
Bootleg Creek
'C' Road
'A' Road
'B' Road
'D' Road
'E' Road
'F' Road
'G' Road
B Creek
Red Creek
Creek
Matthew Creek
N
AR 23580


LEGEND
Transportation
Road, paved
Road, loose surface
Road, rough
Trail/cut line
Railway, single track
Railway, double track
Railway, multi track
Railway, abandoned
Retaining wall
Cut/fill
Bridge, to scale, not to scale
Tunnel, to scale, not to scale
Landmark features
Building, to scale, symbolised
Built up area
Fence
Transmission line
Tower/pylon
Drainage and related features
High water mark, water course definite
High water mark, water course indefinite
Stream, intermittent
Stream, split
Dyke
Flooded land
Swamp/marsh
Beaver dam
Pier
Rock/Island less than 20m
Water level
Relief features
Contour, index
Contour, intermediate
Contour, indefinite
Contour, depression
Spot elevation
Vegetation
Wooded area
Control data
Monumented horizontal control point
Monumented vertical control point
Cadastral
Surveys of Federal and Provincial Crown Land
Sub-division of Provincial Crown Land
Rights of way
Township boundary
District lot, Township section line, Indian reserve, Foreshore lot
Mineral claim, Coal lease, Coal licence
1/4 section line in a Township, Legal or Crown subdivision, Rights of way
Surveyed Cadastral Tie Point
For complete reference to symbols, see "Specifications and Guidelines for Digital Topographic and Cadastral Mapping at 1:20 000" published by the Ministry of Environment and Parks.
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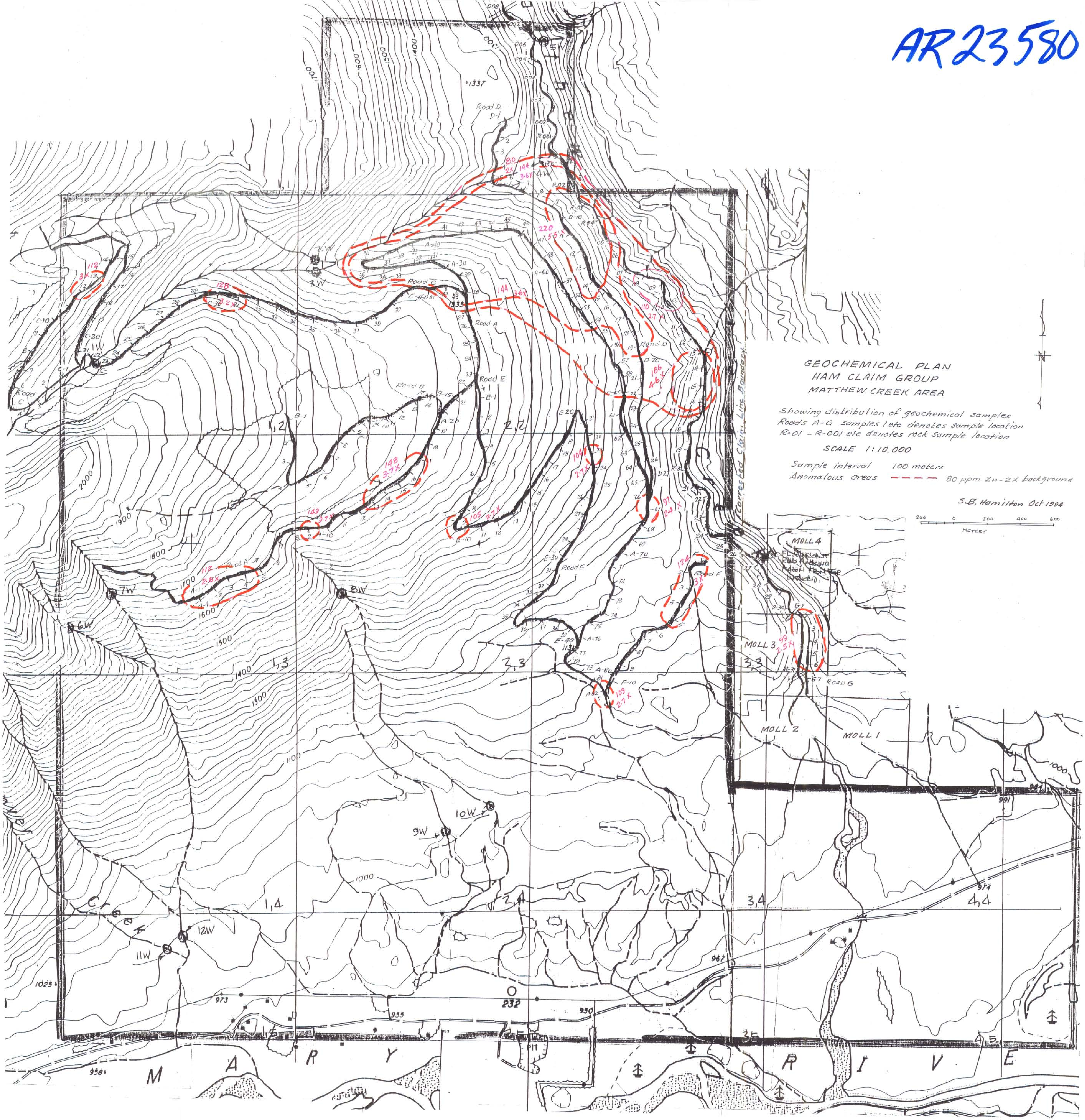
82F.070
GEOLOGICAL PLAN
MATTHEW CREEK AREA
St. Mary Lake
NTS 82 F/9
Scale 1: 20,000
Legend
Lower Aldridge Formation
Moyie Intrusives - Diorite
Quartz monzonite - Porphyry
Metamorphics
Overburden
Claim Boundary
Bedding Strike - dip
Schistosity
Fault Indicated
Anomalous zone ppm Zn
SCALE 1:20 000
200 0 200 400 600 800 1000 1200 1400
METRES
AR 23 580
KIMBERLEY
NORTH STAR HILL
Dipper Lake
BOOTLEG MTN
LOWER ALDRIDGE
L.A.
HAM GROUP
OVERBURDEN
ST MARY RIVER
ST MARY LAKE
L.C.P.

AR 23580


GEOCHEMICAL PLAN
HAM CLAIM GROUP
MATTHEW CREEK AREA
Showing distribution of geochemical samples
Roads A-G samples 1 etc denotes sample location
R-01 - R-001 etc denotes rock sample location
SCALE 1:10,000
Sample interval 100 meters
Anomalous areas 80 ppm Zn - 2X background
S.B. Hamilton Oct 1994
200 0 200 400 600
METERS
N
Corrected Claim Line Boundary
MOLL 4
MOLL 3
MOLL 2
MOLL 1
Road A
Road B
Road C
Road D
Road E
Road F
Road G
1W
3W
4W
5W
6W
7W
8W
9W
10W
11W
12W
1,2
2,2
1,3
2,3
3,3
1,4
2,4
3,4
4,4
Creek
M A R Y R I V E

AR 23 580


HAM CLAIM GROUP
MATTHEW CREEK TRAVERSE
SCALE 1:5000
metamorphics met grade 3-5
quartz sericite schist met grade 6
road
creek
claim line
Bridge
S.B.H. Oct 1984
200 0 200 400
METERS
Road A
Road D
Road
El 1300 m
El 1100 m
El 1200
Matthew Creek
Matthew Creek
Ham No 5
Ham No 4
Ham No 1
MOLL 3
MOLL 4
Claim Line - Corrected
Q-bio mass float met gr 4
hornfelsic A.S rusty lams met gr 3
A.S/rusty lams 10% schistose met gr 2
Q-bio horn. mg 5
fig siltstone
contact met/SA
overburden rusty float
overburden rusty float
f.b. AS-S rusty schistose
Q-bio float amph mg 4
Q-bio
Q-ser sch
Q-ser schist
Intake
Qtz float 2-3% Pb
Qtz float Pb
met gr 4
met grade 2
fig lam SA

GEOLOGICAL BRANCH
ASSESSMENT REPORT

23,580