PETROGRAPHIC REPORT ON

THE BLUE CLAIM

OMINECA MINING DIVISION

93M/16E

55°59'N 126°20'W

OWNER AND OPERATOR

ASARCO EXPLORATION COMPANY OF CANADA LTD.

by R. E. GALE, P. Eng.

JULY 4, 1984

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INTRODUCTION

The Blue claim of 20 units was staked in June 1983 because of the known occurrence of significant copper-gold-silver values in favorable altered host rocks.

According to previous assessment reports and descriptions in the BCDM Annual Reports, work has been carried on in the Blue claim area more or less continuously since 1967, principally by KAZA Copper Mines Ltd., Dynasty Explorations Ltd. and Dome Mines Ltd. Earlier work has included the drilling of at least 12 short drillholes in the Main Showing but no ore reserves have been established and there is no published information on the drilling results.

This present report inviestigates the different rocks exposed in the Main Showing and relates ICP geochemical assay values to the different rock types. Further exploration by geophysical means is recommended.

LOCATION - ACCESS - TOPOGRAPHY

The Blue claim is located about 30 kilometers north of Bulkley House at the north end of Takla Lake at an elevation of approximately 1000 meters.

Access is most conveniently gained by helicopter from Germanson Landing 96 kilometers to the east or Takla Landing 40 kilometers to the south.

Much of the area is open rolling rocky terrane with rock knolls about 25 meters to 50 meters high. The area was burned over several years ago. Rock exposure is generally good.

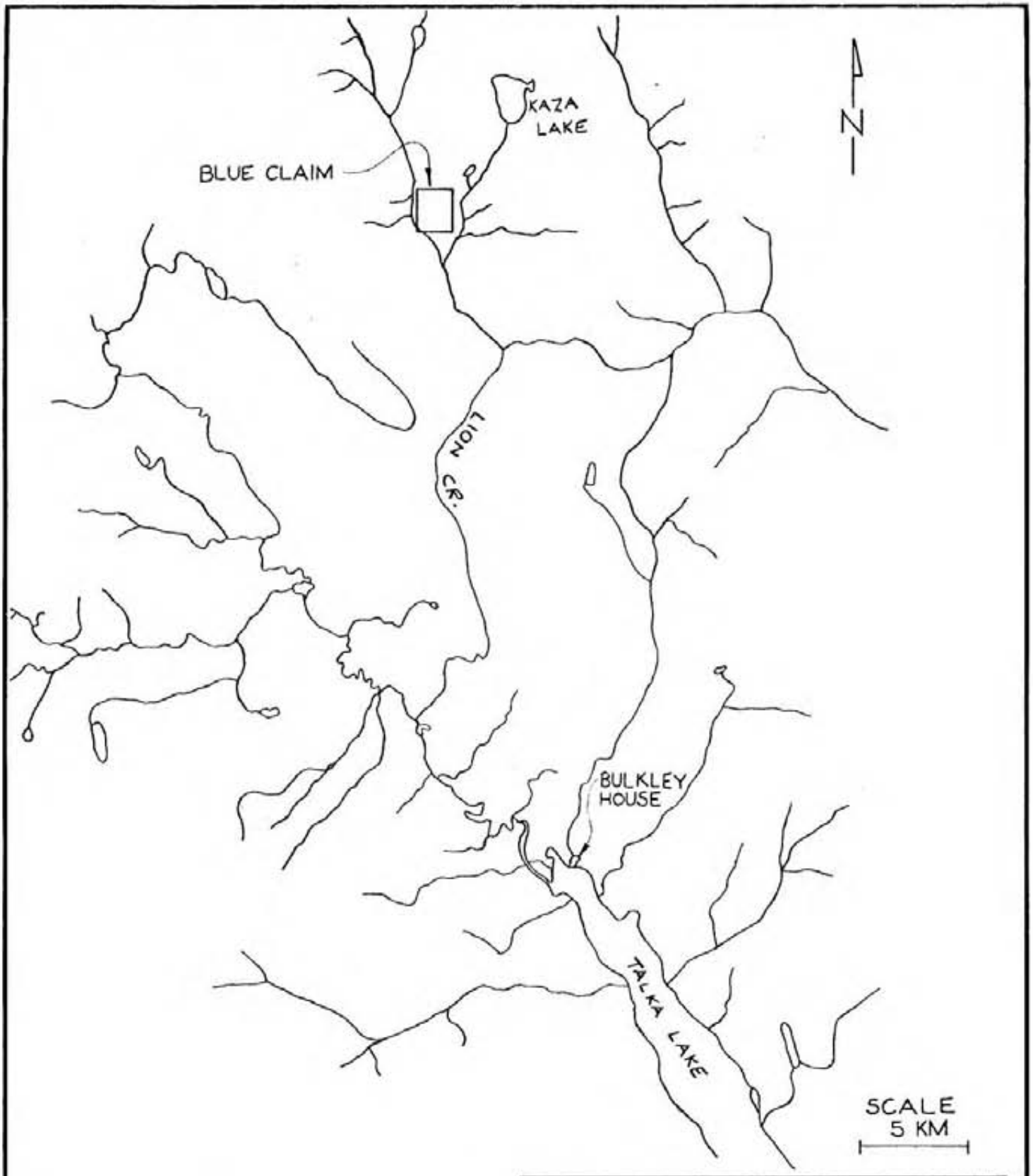

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FIGURE ONE

BLUE CLAIM
INDEX MAP

Drawn by	Date	N.T.S.	SCALE	
R.G.	JULY 84	93 M 16	1:250,000	

VanCal

REGIONAL GEOLOGY

Andesitic volcanic rocks, flows and pyroclastics of the Takla Formation of Triassic-Jurassic age are the predominent rocks in the area. Ultramafic intrusions cutting the Takla rocks represent a late period of intrusive activity in the volcanic cycle.

Irregular masses, dikes and sills of felsic composition are of probable Tertiary age cutting all other rocks.

Major strike-slip faults parallel to the Pinchi Lake fault system probably underlie the valley of Driftwood River, Omineca River and other major parallel river drainages in the area.

LOCAL GEOLOGY

(1) STRUCTURAL GEOLOGY

As evident on airphotos and on the claims at the Main Showing, the many small knobs of outcrop making up the showing are divided by a network of NW and NE-trending fractures and shear zones which make correlation between different outcrops difficult. The NW trending gullies probably represent steep strike slip and shallow northeast-dipping shallow thrust faults.

A. Sutherland Brown (BCMM 1967) noted the presence here of a N40^{o}W shear zone. Bedding in the volcanic rocks also trends northwest and has a shallow ($\pm$30^{o}) dip to the northeast.

The step-like nature of the outcrops within this showing seems to fit a picture of flat-northeast-dipping shears parallel to bedding with a similar attitude. If this idea is correct then mineralized zones along faults and or favorable beds may also dip flatly northeast and could lie stratigraphically above several of the drillholes on the west side of the showing.

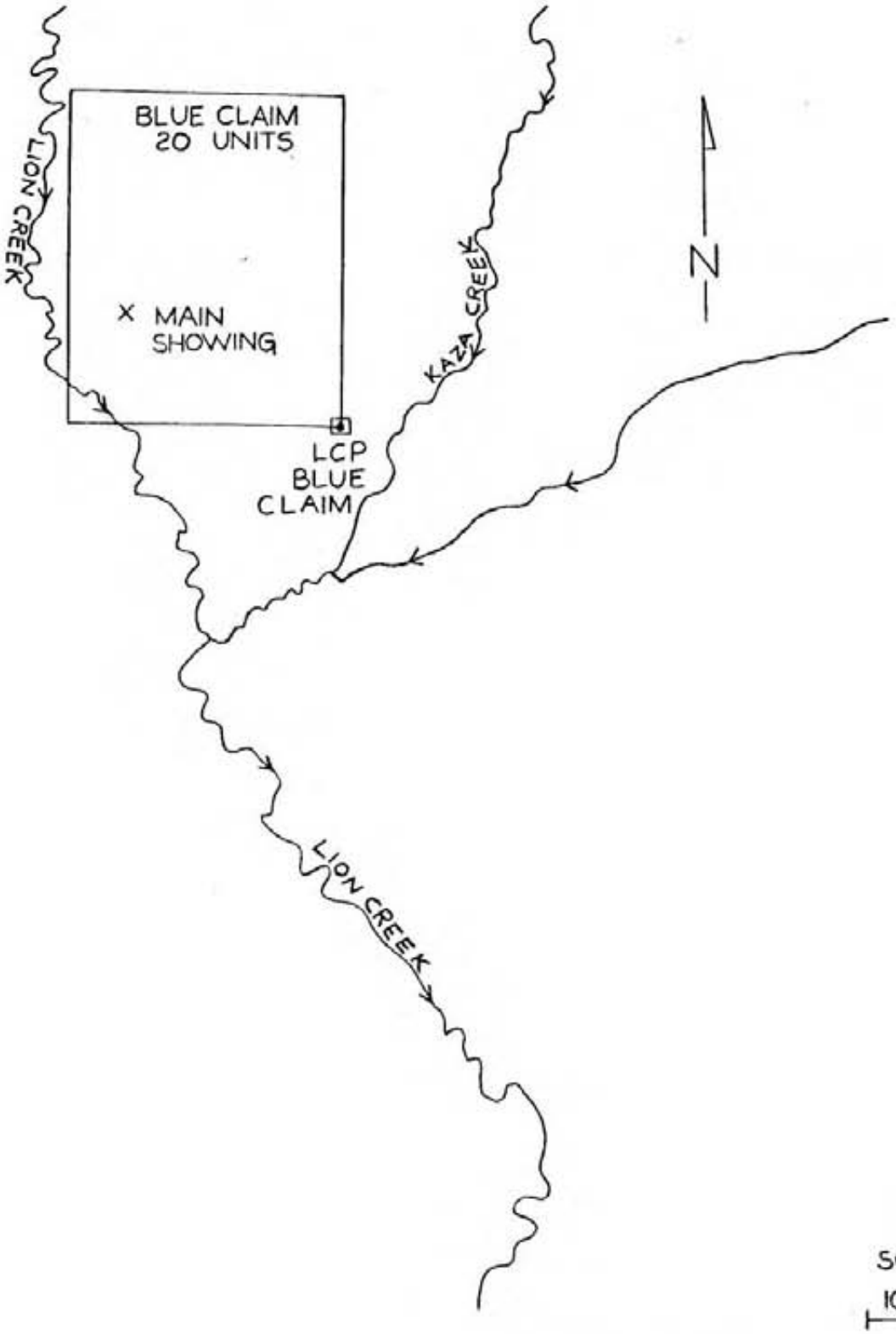

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FIGURE TWO
BLUE CLAIM
LOCATION - MAIN SHOWING

Drawn by	Date	N.T.S.	SCALE
R.G.	JULY 84	93M16	1:50,000

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(2) ROCK TYPES - PETROGRAPHY

Figure Three is a geological sketch map showing the distribution of the 3 types of rock noted in the Main Showing. The map also notes the location of samples which were analyzed by ICP analysis and petrographic study.

Petrographic specimen 12 represents the least-altered porphyritic andesite of the Takla volcanic suite. Progressively more strongly altered andesite with abundant calcite-quartz-sulfide alteration is represented by specimens H1, 13 and 1a.

The highest stage of alteration is represented by samples DDH 1c, 3, 11 and 2. In the latter rocks K-feldspar, epidote and tremolite are notable. The highest precentage of sulfides and magnetite and the best gold, silver and copper values are present in these rocks. Sample 76830 with 2300 ppb Au, 16.3 ppm Ag and 20,387 ppm Cu and sample 76831 with 545 ppb Au, 9.7 ppm Ag and 4630 ppm Cu are representative of the most altered rocks. These rocks also have higher background Hg values and reduced Ba values compared to the less altered-mineralized rocks.

Sample 1c is identified in thin section as altered mafic dike consisting of large nornblende phenocrysts in a fine-grained groundmass of sericitized plogiodose.

Samples 5c and 10 are representative of late felsic intrusives. They are quite fresh and postdate alteration and mineralization, cutting all other rocks. Their composition ranges from andesite to dacite.

The following table indicates which samples in the petrographic report - included as Appendix B, were analyzed by ICP analysis.

ROCK TYPE	ICP ANALYSIS NO.	PETROGRAPHIC SAMPLE NO.
Altered Andesite	76828	1H
Altered Andesite Bx	76829	None
Altered Andesite - strg cpy	76830	2
Altered Andesite - strg magnetite	76831	None
Weakly Altered Andesite	76832	13
Strongly Altered Andesite	76833	1a
Altered Andesite	76834	None

Results of I.C.P. geochemical analyses are included as Appendix C.

(3) ALTERATION AND MINERALIZATION

Following deposition of the Takla series volcanic rocks, these rocks were subjected to folding and faulting in conjunction with movements along high angle NW-trending strike slip faults.

Quartz-carbonate hydrothermal alteration along steep dipping and flat northeast dipping faults followed the time of faulting. Northerly-trending ampbibolite dikes intruded the volcanic rocks forming skarn-type altered mineralized zones near amphibolite dike contacts and out along limy-altered horizons.

The present shape and size of altered-mineralized zones will depend on the shape, size and attitude of the favorable limy horizons at their intersections with the basic dikes. The present extent of mineralization appears to be small, in the order of 10-20 meters wide and 200 - 300 meters long, but blind extensions dipping at shallow angles to the northeast may be possible.

CONCLUSIONS - RECOMMENDATIONS

The results of the drilling done several years ago by KAZA Copper Mines should be obtained if possible.

An I.P. survey along the east side of the Main Zone of mineralization would disclose the presence of any flat-dipping blind zones of skarn mineralization in the down-dip eastern direction.

Robert E Gale

R. E. Gale

July 4, 1984

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Sinclair, A. J. - Report on Fire Group of Claims for Northstar Explorations Ltd. Assessment Report 1191 - July 1967.

Dean, P. M. - Report on Kaza Copper Property for Kaza Copper Ltd. Assessment Report 4477 - June 1973.

Fraser, B. M. - Rock Geochemical Survey on the Flame 1 Mineral Claim. Assessment Report 8869 - December, 1980.

B.C.D.M. Reports Fire Claim, 1967, pg. 88; 1968, pg. 118; 1969, pg. 108; 1970, pg. 177; 1973 pg. 361.

APPENDIX A

STATEMENT OF COSTS

HELICOPTER CHARTER - July 21, 1983	
Can-West Aviation	$ 529.00
WAGES - R. Gale & D. Fletcher	250.00
ROOM AND BOARD - 2 men	50.00
TRUCK TRANSPORTATION	75.00
ICP ANALYSES	105.00
PETROGRAPHIC REPORT - Vancouver Petrographics	519.00
DRAFTING - REPORT WRITING	200.00
	$1728.00

Robert E. Gale

APPENDIX B

PETROGRAPHIC REPORT

Vancouver Petrographics Ltd.

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JOHN G. PAYNE, Ph. D. Geologist

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Report for: R. E. Gale,
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Vancouver, B.C.,
V6E 3L2

April 30, 1984

Samples: 1a, 1c, DDH-1c, 1H, 2, 5a, 3, 10, DDH 11, 12, 13.

Summary:

PORPHYRIES: 5c, 10, 12.

These samples are porphyritic intrusive or subvolcanic rocks of dacite to andesite in composition. Phenocrysts are plagioclase and quartz. Amphibole phenocrysts were also present in lesser amounts but these have been completely altered to chlorite,sericite,calcite. The groundmass is plagioclase. Pervasive sericite-calcite alteration has occured throughout the groundmass and the plagioclase phenocrysts. Chlorite occurs within the groundmass in small patches and is sometimes intergrown with calcite or sericite.

ALTERED ANDESITE: H1, 13, 1a.

These samples are flows of andesitic composition which have been quite highly altered by chlorite,calcite and quartz. Quartz was not recognised in sample #13 but it is possible that it is present. The plagioclase in these rocks is untwinned for the most part and has a relief very similar to quartz. It appears to have recrystallised during the alteration and where quartz occurs it is intergrown with the plagioclase,rather than replacing it. Small amounts of sulphides (chalcopyrite,pyrite) are associated with the quartz. The original fabric and mineralogy of the rocks has been obscured by the alteration. The plagioclase is cloudy with chlorite which occurs along the cleavages. The chlorite and calcite are concentrated in a partly interconnected patchwork which has replaced the plagioclase. Chlorite pseudomorphs after amphibole(?) occur in sample 13. Minor sericite is associated with the calcite.

(continued)

SUMMARY (cont.)

ALTERED (K-SPAR) ANDESITE: DDH 1c and 3.

These samples are similar to the other andesites but have been more altered and altered by a different assemblage. Pervasive K-spar with some epidote has replaced the plagioclase. The mafic mineral is tremolite in sample 3. Quartz-calcite-pyrite veinlets and vein-like patches are later than the K-spar-epidote alteration. This alteration has formed chlorite from the tremolite or has replaced the tremolite with calcite.

ALTERED MAFIC VOLCANICS: DDH 11 and 2.

These samples are highly altered volcanic rocks in which the original minerals and texture have been almost completely obscured. They contain a high proportion of chlorite and tremolite with only small amounts of remnant plagioclase. Quartz-sulphide (chalcopyrite,pyrite) vein-like patches are associated with the chlorite-tremolite alteration. Later calcite alteration replaces some of the tremolite and occurs in a system of veinlets and patches throughout the rocks.

ALTERED MAFIC DYKE: 1c.

This sample is a massive intrusive rock originally consisting of large hornblende phenocrysts set in a plagioclase (?) matrix. There were also a few plagioclase phenocrysts. The plagioclase has been entirely altered to sericite and the hornblende has been altered (in part) to tremolite. Tremolite also occurs as small grains within the mass of sericite and around the hornblendes. Small amounts of calcite occur in the sericite. This sample may be a mafic phase of the porphyries or perhaps a dyke related to the mafic volcanics.

A. L. Littlejohn

A. L. Littlejohn, M.Sc.

1a: Altered (chlorite,calcite,quartz) andesite

This sample is a massive,dark green,more or less equigranular volcanic rock. It was probably a flow of andesitic composition. Alteration has resulted in the formation of chlorite from the original mafic minerals,most of which are unrecognisable but there are a few bladed chlorite aggregates which suggest that the main mafic mineral was amphibole. Calcite occurs in a system of vein-like patches throughout the rock. In places it has weathered out giving the hand specimen a vuggy appearance. Quartz is usually associated with the development of chlorite. Minerals are:

plagioclase	48%
chlorite	26
calcite	15
quartz	9
sericite	1
Fe-Ti oxide	1
apatite	trace
opaque (pyrite?)	trace

Plagioclase forms irregularly shaped to subhedral interlocking grains 0.2 to 1.0mm in size,averaging about 0.5mm. The smaller ones tend to be partly included within the larger ones. The grains are very cloudy with incipient chlorite mineralization which occurs along the cleavages. Some grains are speckled with fine calcite.

Chlorite forms flakes about 0.2mm in size which occur in shapeless patches up to 1mm in size. These are partly connected with one another by thin masses of chlorite occuring between the plagioclase grains. In places there are bladed grains and aggregates,sometimes in splays,which are intergrown with the plagioclase and quartz.These are possibly pseudomorphs after amphibole.

Quartz forms subrounded grains 0.4 to 1.2mm in size which occur in aggregates of a few grains around the chloritic patches and are intergrown with the plagioclase. Fine chlorite occurs within the outer zone of these,where in contact with the plagioclase.

Calcite forms ragged,shapeless grains of variable size up to 1.0mm which are intergrown with the plagioclase.Fine grains occur within the plagioclase which is adjacent to the calcite grains. There are also several vein-like patches of relatively coarse calcite. Fine calcite occurs in small patches within the masses of chlorite. Calcite is associated with fine sericite which occurs in small patches along with some of the finer calcite. Scattered flakes occur between the plagioclase and the chlorite. Calcite may enclose small chlorite aggregates.

Fe-Ti oxides form ragged,rounded to prismatic grains less than 0.05mm in size which occur in small aggregates within the chlorite and in the plagioclase around the chlorite. Streaky clusters are common in some of the chlorite masses.A few small grains of rutile are associated with the Fe-Ti oxide mixture.

Trace minerals are apatite and an opaque (probably pyrite which can be recognised in the hand specimen). The apatite forms prismatic grains up to 0.1mm in size which occur in clusters of a few grains within the plagioclase. The pyrite forms subcubic grains about 0.1mm in size which are scattered about the rock.

13: Altered (chlorite,calcite) andesite

This sample is a medium grained,more or less equigranular fairly massive dark green volcanic rock. It was probably a flow of andesitic composition. Alteration has been pervasive and has resulted in the formation of chlorite from the origianl mafic minerals (which are unrecognisable). Thin veinlets and vein-like patches of calcite occur throughout the rock. Pyrite occurs in one of the vein-like patches in the hand specimen. Minerals are:

plagioclase	53%
chlorite	35
calcite	12
Fe-Ti oxide	trace
apatite	trace

Plagioclase forms irregularly shaped to subhedral interlocking grains 0.2 to 1.0mm in size,averaging about 0.5mm. The smaller grains are partly included within the larger ones. In one place near a calcite patch there has been some movement and the plagioclase has been granulated to a mass of very fine grains along a discontinuous shear zone. Most of the section shows no signs of deformation.

Chlorite forms ragged flakes up to 0.5mm in size which occur in a partly interconnected patchwork,intergrown with the plagioclase. Individual patches are ragged and up to 1.5mm in size. The edges of the mass of chlorite flakes penetrate into the surrounding plagioclase grains. Fine flakes are disseminated in and between the plagioclase grains throughout.

Calcite forms irregularly shaped grains 0.1 to 1.0mm in size which are intergrown with the plagioclase throughout the rock. Very fine grains occur in small clusters around the larger ones and occur within the plagioclase. Vein-like patches of calcite a few millimeters in size consist of a mass of subrounded grains about 0.5mm in size. There are also widely spaced, discontinuous veinlets of calcite less than 0.07mm in width which cut through the plagioclase and the chlorite.

Fe-Ti oxides form ragged grains less than 0.05mm in size which are scattered about the rock,usually at the edges of the chlorite patches.

Apatite forms fine prismatic grains about 0.05mm in size which occur within the plagioclase

H1: Altered (chlorite,calcite,quartz) andesite

This sample is a massive,medium grained,more or less equigranular volcanic rock which has been quite highly altered with chlorite,calcite and quartz. Sulphides (chalcopyrite,pyrite) are associated with the quartz which tends to occur in thin layer-like patches along with calcite and chlorite. The calcite in the rock has weathered out giving it a vuggy appearance in places. Minerals are:

plagioclase	44%	
quartz	10	
calcite	22	
chlorite	17	
Fe-Ti oxide	2	
opaque	3	(mainly chalcopyrite,some pyrite)
sericite	1	(includes some clay?)
apatite	minor	
zircon	trace	

Plagioclase forms shapeless to subhedral interlocking grains 0.2 to 0.8mm in size, averaging about 0.5mm. The smaller grains tend to be partly included within the larger ones. Fine chlorite and specks of calcite occur crowded along the cleavages.

Calcite and chlorite occur in an interconnected patchwork within the mass of plagioclase grains. The chlorite forms flakes about 0.2mm in size and the patches are several millimeters in size. Small plagioclase grains are often included within the patches.Fine chlorite occurs between the plagioclase grains in places Fine ragged grains of Fe-Ti oxide are scattered within the chlorite and are often concentrated in thin streaky aggregates. These also occur within the calcite and the plagioclase. Some rutile grains occur along with the Fe-Ti oxide mixture. The calcite and chlorite are not usually intergrown; rather the calcite tends to occur in separate patches or partly surrounding the chlorite. Some calcite patches contain small aggregates of chlorite flakes. Fine sericite occurs in small ragged aggregates at the edges of the calcite patches. A fine clay(?) is intimately intergrown with the sericite in places.

Quartz forms subrounded to subidiomorphic grains 0.5 to 1.0mm in size which are intergrown with the plagioclase in places. It often contains small aggregates of chlorite and the chlorite within the cleavages of the plagioclase sometimes continues across the grain boundaries. Much of the quartz is concentrated in vein-like patches which may be several millimeters in length. In these it is intergrown with chalcopyrite and some pyrite (recognisable in the hand specimen). Chlorite and calcite occur at the edges of the vein-like patches within the mass of plagicolase. Subcubic sulphide grains up to 0.4mm in size are scattered about the rock,usually in clusters of a few grains.

A few rounded zircon grains about 0.05mm in size are scattered about the rock. Apatite forms prismatic grains up to 0.1mm in size which occur within the plagioclase. Some more rounded grains occur within the calcite and chlorite patches.

5c Quartz andesite porphyry

This sample is a fine to coarse grained porphyritic intrusive/subvolcanic rock consisting of plagioclase and some quartz phenocrysts set in a fine grained plagioclase groundmass. Moderate pervasiive sericite-calcite, minor chlorite alteration has occured in the groundmass and the plagioclase phenocrysts. There are also a few small amphibole phenocrysts which have been completely altered to chlorite,sericite and calcite. Rare tremolite has also formed from these. Minerals are:

plagioclase phenocrysts	25%	(30% altered to sericite,some calcite)
quartz phenocrysts	5	
amphibole phenocrysts	3	(100% altered to calcite,chlorite, minor sericite,tremolite)
plagioclase groundmass	40	
sericite	14	
calcite	8	
chlorite	3	
quartz	1	
Fe-Ti oxide	1	
apatite	minor	

Plagioclase phenocrysts are euhedral and vary in size from 0.8 to 1.5mm. There are also a few smaller ones less than 0.5mm in size which grade into the groundmass. Sericite is the dominant alteration of the phenocrysts,forming small patches of fine flakes within the grains. Small patches of fine chlorite flakes sometimes occur at the edges of the phenocrysts. Patches of calcite are sometimes intergrown with the sericite,but most contain little calcite.

Quartz phenocrysts are rounded and range in size from 1 to 3mm. There are also rounded grains of quartz 0.05 to 0.2mm in size which are intergrown with the plagioclase in the groundmass.

There are scattered altered amphibole phenocrysts within the groundmass. These form bladed,subidiomorphic "grains" about 0.6mm in size. They have been completely replaced by calcite,chlorite and some sericite. Calcite is dominant and the chlorite tends to occur within the core of the "grain" where it may be intergrown with sericite. A few of the smaller altered amphiboles consist of a mass of fine tremolite grains.

The groundmass consists of a mass of subrounded plagioclase grains about 0.05mm in size. Very fine sericite and some calcite occurs disseminated between the plagioclase grains. Most of the calcite occurs in ragged patches less than 1.0mm in size. These sometimes consist of a large single grain surrounded by a narrow zone of very fine calcite. Small chlorite patches sometimes occur within the calcite. Chlorite occurs also in small patches less than 0.5mm in size which are scattered about the groundmass. Some patches consist of an intergrowth of chlorite and calcite. Fine ragged grains of Fe-Ti oxide occur within and around the chlorite and the calcite patches. These usually occur in clusters. Some rutile grains were recognised within the Fe-Ti oxide mixture.

Apatite forms rounded grains about 0.1mm in size which are scattered within the groundmass.

12 Andesite porphyry

This sample is a fine to coarse grained porphyritic intrusive/subvolcanic rock consisting of large plagioclase phenocrysts set within a fine grained plagioclase groundmass. Small amphibole phenocrysts also occur and these have been completely altered to sericite and chlorite. Moderate pervasive calcite-sericite alteration has occured in the groundmass and the plagioclase phenocrysts. Minerals are:

plagioclase phenocrysts	25%	(15% altered to calcite,sericite)
quartz phenocrysts	2	
amphibole phenocrysts	8	(100% altered to chlorite,sericite)
plagioclase groundmass	45	
calcite	8	
sericite	4	
chlorite	5	
quartz	1	
Fe-Ti oxide	1	
apatite	1	
opaque (sulphide?)	trace	

Plagioclase phenocrysts are euhedral and vary in size fronm 1 to 5mm, averaging about 2mm. They are moderately altered with fine sericite and calcite with calcite dominating. Fine clay is intimately mixed with the sericite in places. Minor quartz occurs in small patches in some of them. A few quartz phenocrysts are preent and these are rounded and from 0.4 to 1.5mm in size. The edges of these are being replaced by calcite.

Small amphibole phenocrysts were present in the unaltered rock but these have all been replaced by very fine chlorite and sericite. Some quartz is also present in a few of the larger "grains". Chlorite is dominant and occurs in the core of the altered phenocryst. These "grains" form thin,ragged,bladed aggregates with an amphibole outline ranging in size from 0.3 to 1.0mm, averaging about 0.5mm. There is a crude alignment to these. The chlorite within the core is often crowded with fine Fe-Ti oxide grains. Some of the finer,thinner "grains" may have been biotite rather than amphibole,but I am not sure about this.

The groundmass of the rock consists of a mass of rounded plagioclase grains about 0.05mm in size. Extremely fine sericite and calcite is disseminated between the plagioclase grains. Calcite sometimes occurs in small ragged patches. Fine clay (kaolinite) is intimately mixed with the sericite and there are a few thin streaky patches of sericite cutting through the groundmass. Small patches of chlorite also occur within the groundmass and these are often full of fine Fe-Ti oxide grains. These are also scattered about the plagioclase. The chloritic patches are somtimes intergrown with sericite, calcite and quartz. Calcite also occurs in veinlets up to 0.3mm thick. There is a quartz veinlet 0.1mm thick.

Apatite forms prismatic to rounded grains 0.1 to 0.5mm in size which are scattered about the groundmass. A few subcubic opaque grains (probably sulphide) are scattered about the groundmass,usually in or near chloritic patches.

10 Dacite porphyry

This sample is a coarse to fine grained porphyritic intrusive/subvolcanic rock consisting of large quartz and plagioclase phenocrysts set within a fine grained plagioclase matrix. Pervasive sericite-calcite-chlorite alteration has occured within the groundmass and the phenocrysts. There are a few amphibole phenocrysts which have been completely replaced by chlorite,calcite and quartz. Minerals are:

plagioclase phenocrysts	30%	(15% altered to sericite,calcite)
quartz phenocrysts	18	
amphibole phenocrysts	2	(100% altered to chlorite,calcite)
plagioclase groundmass	17	
sericite	13	
calcite	10	
chlorite	6	
quartz	3	
Fe-Ti oxide	1	
apatite	trace	

Plagioclase phenocrysts are euhedral and vary in size from 1.0 to 3.0mm, averaging about 2.0mm. Fine sericite and calcite are disseminated within them. Sericite is dominant and in places it is intimately intergrown with a fine clay (kaolinite?). Quartz phenocrysts are rounded to squat idiomorphic and vary in size from 0.5 to 3.5mm, averaging about 2.0mm. There are also a few idiomorphic phenocrysts of an amphibole,from 0.4 to 1.0mm in size,which have been completely replaced by chlorite,calcite and some quartz.

The groundmass consists of a mass of shapeless plagioclase grains about 0.05mm in size. Fine sericite and calcite are disseminated within the mass of plagioclase grains. Calcite tends to occur in ragged patches up to 1.0mm in size and in places in concentrated in a thin zone at the edges of the phenocrysts. There are also a few veinlets of calcite about 0.2mm wide.

Chlorite forms flakes about 0.2mm in size which occur in small aggregates which are scattered about the rock. Sometimes these are intergrown with quartz and/or calcite. Some of the chlorite-quartz-calcite aggregates are replacements of amphibole but many have grown within the plagioclase grounmdmass. There is one large patch which includes plagioclase grains and these appear to have been recrystallised to coarser grains about 0.3mm in size. Fine ragged grains of Fe-Ti oxide are scattered within and around the chlorite. These usually occur in aggregates of several grains.

Apatite forms rounded grains about 0.1mm in size which are scattered about the groundmass within the plagioclase.

3: Altered (K-spar,calcite,quartz,tremolite) andesite

This sample is a medium grained,massive,dark green volcanic rock,originally of andesitic composition,which has been highly altered. The dominant alteration is the pervasive replacement of the plagioclase by fine grained K-spar. The original mafic minerals have altered to tremolite. Calcite replaces the tremolite and also occurs in patches within the mass of feldspars. Calcite is associated with quartz which occurs in a system of veinlets and vein-like patches. The original rock was porphyritic but most of the phenocrysts (plagioclase) have been replaced. Minerals are:

plagioclase	25%	
K-spar	20	
tremolite	20	
calcite	20	
quartz	7	
Fe-Ti oxide	3	
epidote	2	
opaque	3	(mainly pyrrhotite)
chlorite	minor	

Plagioclase forms irregularly shaped interlocking grains 0.05 to 0.2mm in size. Size distribution is rather patchy. Much of the original plagioclase has been pevasively replaced by fine K-spar with minor amounts of very fine sericite. Alteration has occured in large diffuse patches. There are small amounts of plagioclase phenocrysts,forming subhedral grains about 1.0mm in size. They have been partly replaced by sericite and patches of K-spar;calcite also occurs within them. I suspect that some (or all?) of the plagioclase has been recrystallised during the alteration for it is untwinned and the patchy distribution of the grain size suggests some remobilisation.

Tremolite forms ragged bladed grains 0.2 to 0.6mm in size which occur in aggregates and clusters within the mass of feldspars. It is inhomogeneous - some is green and some is brown. Some of the tremolite has been replaced by calcite which forms pseudomorphs or occurs in a zone within the outer part of the tremolite. In some cases where calcite has partly replaced the tremolite, chlorite has formed within the core. A few small patches of fine chlorite occur within the mass of feldspar grains. Calcite also occurs within the mass of feldspar and forms ragged patches up to 0.8mm in size.

Quartz forms irregularly shaped to subhedral grains of variable size up to 0.4mm. It occurs in vein-like patches where it is intergrown with (recrystallised?) plagioclase. There are also veinlets of quartz cutting through the rock and these also contain calcite intergrown witn the quartz. Veinlets are about 0.2mm wide and they sometimes grade into the patches. Minor chlorite is also intergrown with the quartz in the veinlets.

Fe-Ti oxides form rounded grains less than 0.05mm in size which occur crowded together in large patches around and within the tremolite aggregates. It is associated with fine grains of epidote. Some patches of this mixture occur within calcite.

Opaques appear to mainly pyrrhotite (from hand specimen) and form cubic grains up to 1mm in size occuring in aggregates of a few grains which are scattered about the rock. Clusters of tremolite commonly occur surrounding the opaques. These may be replaced by calcite. Much finer, ragged opaque grains (Fe-oxide? chalcopyrite??) occur in small aggregates around the larger grains. The opaques usually occur within or near a patch or vein of quartz.

DDH 1c: Altered (K-spar,calcite,epidote,quartz,chlorite) andesite

This sample is a massive heterogeneous sample which origianlly was a volcanic rock of andesitic composition. Alteration has been quite intense and consists of pervasive replacememt of the plagicolase by K-spar,development of patches of chlorite and/or epidote within the mass of feldspars,quartz-calcite veining and replacement of the other minerals. Pyrite (minor chalcopyrite) is associated with the quartz veining. Minerals are:

plagioclase	16%
K-spar	30
quartz	17
calcite	9
epidote	13
chlorite	5
pyrite	9
Fe-Ti oxides	minor
chalcopyrite	minor

Plagioclase forms irregualrly shaped to subrounded interlocking grains 0.05 to 0.2mm in size. There is a patchy distribution to the grain size and I suspect that it has been recrystallised during the alteration. Pervasive K-spar alteration occurs throughout the mass of plagioclase and in small patches there are grains of K-spar up to 0.4mm in size. Epidote is associated with the K-spar and forms rounded grains less than 0.05mm in size occuring in large patches within the mass of feldspars. Minor amounts of fine Fe-Ti oxides (including some hematite) are intergrown with the epidote.

Chlorite also occurs intergrown with the feldspar,forming flakes less than 0.5mm in size. These occur in small patches scattered about the rock. A few large patches of massive chlorite are also present and these are crowded with fine epidote. Some of the chlorite may have formed after tremolite during alteration by calcite (see sample #3).

Calcite occurs as very fine grains which are disseminted throughout the mass of feldspars. Some occurs in ragged patches less than 0.5mm in size which are scattered about the rock.Some patches contain small chlorite aggregates.Most of the calcite occurs associated with quartz in veinlets and vein-like patches which form a network cutting through the other minerals. The quartz forms shapeless to subidiomorphic grains of variable size up to 0.4mm. Veins are up to 0.5mm wide,grading into larger patches. The calcite occurs in the core of the veins. In the patches it is intergrown with the quartz. Some of the more quartzitic patches are intergrown with the feldspars. There are a few very thin veinlets of calcite alone.

Pyrite occurs intergrown with quartz in the veinlets and vein-like patches. It forms cubic grains of variable size from 0.1 to 1.0mm which occur in small aggregates and clusters. Some grains are disseminated within the rock.They have a cheesy texture due to the presence of small silicate inclusions. A few small pyrrhotite inclusions are present in the larger grains. The smaller pyrites tend to cluster around the larger ones. Chalcopyrite is associated with the pyrite and forms angualar grains less than 0.1mm in size which occur within the rock

!c: Altered mafic dyke(?)

This sample is a fine to coarse grained dark green massive rock which is probably a dyke. It consisted of large hornblende grains (phenocrysts?) crowded within a plagioclase(?) groundmass. The plagioclase(?) has been completely altered to sericite. The hornblede has been partly altered to tremolite-actinolite and fine grains of this have formed within the sericite. Minerals are:

hornblende	57%	(40% altered to tremolite)
tremolite	10	
sericite	30	(includes minor clay)
calcite	2	
Fe-Ti oxide	1	
opaque	trace	

Hornblende forms rounded to subidiomorphic grains 0.5 to 2.5mm,averaging about 1.5mm. It is inhomogeneous in composition and it varies in colour from bright green to colourless in diffuse patches within each grain. Fine colourless tremolite grains have been formed within some of the large hornblendes. Feathery to bladed tremolite grains up to 0.5mm in size occur in small clusters within the sericite around the hornblende.

The amphibole grains are set within a groundmass which consists of a mass of fine sericite flakes less than 0.02mm in size. It is stained light brown in places. In places slightly coarser sericite occurs in rounded aggregates up to 0.5mm in size. These may be altered plagioclase. There are also a few rounded aggregates of extremely fine sericite intimately mixed with clay. These are up to 2.0mm in size and are most like altered plagioclase phenocrysts. Very fine ragged grains of Fe-Ti oxide are disseminated within the mass of sericite.

Calcite has been introduced later than the main alteration and forms very fine grains occuring in small diffuse patches within the sericite and the altered hornblende.

There are a few opaque grains (pyrite?) forming cubes about 0.1mm in size which occur in small vein-like patches within the sericite. Clusters of finer, ragged grains also occur.

DDH 11: Altered (chlorite,tremolite,calcite) mafic volcanic with sulphides

This sample is a heterogenous dark green rock consisting of a mass of chlorite and tremolite with patches of greyish-green material which contains partly replaced plagicolase. A sytem of calcite veins and patches cuts through the rock. Sulphides (mainly pyrite) occur intimately intergrown with altered plagioclase, tremolite and chlorite and also in vein-like patches. Carbonate alteration cuts through the sulphides. Minerals are:

tremolite	29%	
chlorite	20	
calcite	30	
plagioclase	5	
sulphides	7	(mainly pyrite)
quartz	2	
clay	2	(montmorillonite?)
Fe-Ti oxide	minor	

Chlorite and tremolite form an intergrowth of flakes and bladed grains about 0.1mm in size. Chlorite tends to occur between the tremolite. These occur in large dark green patches. Lighter coloured patches originally consisted of an intergrowth of tremolite and plagicolase. The plagioclase forms shapeless grains about 0.2mm in size which occur between ragged bladed grains of tremolite about 0.3mm in size. These tremolites have been completely replaced by fine calcite. Fine calcite also occurs in small patches within the mass of chlorite and tremolite. This fine calcite in intimately mixed with a pale brown clay mineral (probably montmorillonite) in places. Very fine ragged grains of Fe-Ti oxide are disseminated within the masses of chlorite and tremolite.

Calcite also occurs in a system of criss-crossing veins up to 2mm wide. In these the calcite is much coarser,forming subrounded grains up to 0.5mm. In one of the veins there are remnant plagioclase grains occuring along the edges. Minor amounts of quartz are intergrown with the calcite.

Pyrite forms angular to shapeless grains less than 0.3mm in size which are crowded within the patches of altered (calcite) tremolite and remnant plagioclase. They were intergrown with the tremolite before the addition of calcite. Smaller patches occur within the masses of tremolite and chlorite and these small patches are usually surrounded by fine calcite. The pyrite also occurs in vein-like patches up to 1mm wide where it forms massive grains which appear to have been fractured and fine calcite and quartz occur within the network of closely spaced fractures. The coarser calcite veins cut through the patches of fine calcite and pyrite.

2: Altered (chlorite,tremolite,quartz,calcite) mafic volcanic with sulphides.

This is a highly altered mafic volcanic rock in which the original fabric and mineralogy have been obscured by the alteration. Distribution of the minerals is patchy and sulphides (chalcopyrite,pyrite) occur in a discontinuous vein-like patch associated with quartz. The main alteration is the formation of tremolite-actinolite from hornblende;chlorite is associated with this. Pervasive calcite alteration is later. Minerals are:

tremolite	40%
chlorite	32
calcite	17
quartz	6
chalcopyrite	4
pyrite	1
goethite	1
plagioclase	trace

Tremolite forms subhedral,pale green to colourless,subidiomorphic grains of variable size up to 1.0mm which occur crowded together in patches. These are probably altered hornblende grains. There has been a small amount of movement within the rock for many of the larger grains appear granulated. There are also more feathery grains of tremolite 0.1 to 0.4mm in size which occur at the edges of the altered hornblendes and are disseminated (sometimes in clusters) within the mass of chlorite and are included within small patches of quartz. The chlorite forms masses of flakes about 0.1mm in size which occur between the altered hornblende and in large patches which have replaced plagioclase. There are traces of remnant plagioclase within the mass of chlorite flakes.

Quartz forms subrounded grains 0.2 to 0.5mm in size which occur in aggregates of several grains within the mass of chlorite. Vein-like patches of quartz up to 2mm wide are intergrown with chalcopyrite and pyrite. The chalcopyrite forms large shapeless grains which are full of quartz and amphibole inclusions. The pyrite forms smaller grains and patches which are included within the masses of chalcopyrite. Fine ragged grains of chalcopyrite are disseminated throughout the rock and commonly occur within the cleavages of the altered hornblendes.

Calcite forms very fine grains occuring in diffuse ragged patches 0.4 to 1.2mm in size which are scattered throughout the rock. It is replacing the large amphiboles and the edges of the quartz-chalcopyrite aggregates. In places the calcite patches contain fine tremolite and chalcopyrite.

Goethite occurs in thin veinlets and stringers within the amphibole and chlorite. It also occurs rimming the sulphide aggregates and a few of the pyrites have been altered to goethite.

APPENDIX C

ICP GEOCHEMICAL ANALYSIS

ACME ANALYTICAL LABORATORIES LTD. 852 E. HASTINGS, VANCOUVER B.C. PH:253-3158 TELEX:04-53124

ICP GEOCHEMICAL ANALYSIS

A .500 GRAM SAMPLE IS DIGESTED WITH 3 ML OF 3:1:3 HCL TO HNO3 TO H2O AT 90 DEG.C. FOR 1 HOUR. THE SAMPLE IS DILUTED TO 10 MLS WITH WATER.
THIS LEACH IS PARTIAL FOR: Ca,P,Mg,Al,Ti,La,Na,K,W,Ba,Sr,Sr,Cr AND B. Au DETECTION 3 ppm.
AU## ANALYSIS FROM 10 GRAM FA+AA. AG# ANALYSIS BY AA. HG# ANALYSIS BY FLAMELESS AA FROM .500 GRAM SAMPLE. SAMPLE TYPE - ROCK CHIPS

DATE RECEIVED AUG 8 1983 DATE REPORTS MAILED Aug 16/83 ASSAYER D. Toye DEAN TOYE, CERTIFIED B.C. ASSAYER

ASARCO EXPLORATION FILE # 83-1523 Project # BLUE - FIRE PAGE # 1

SAMPLE #	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au## ppb	Hg# ppb	Ag# ppm
76828	1	1588	9	45	.8	22	91	478	16.37	13	2	ND	2	6	1	2	2	58	1.15	.07	2	57	.94	17	.06	4	1.70	.10	.23	2	14	20	.8
76829	1	1994	17	120	3.2	7	9	911	5.45	151	2	ND	2	45	2	2	2	116	5.38	.06	2	22	3.48	444	.01	7	3.59	.01	.04	2	23	10	3.5
76830	1	20387	14	421	16.3	59	54	1305	14.15	74	5	ND	2	34	10	11	15	142	2.72	.06	2	332	2.74	19	.11	2	4.05	.06	.17	2	2306	80	16.2
76831	4	4630	12	127	9.7	65	140	747	20.96	136	3	ND	2	38	2	2	2	122	3.62	.07	2	56	1.06	11	.08	2	3.12	.02	.06	2	545	110	9.7
76832	1	886	14	130	3.6	25	62	666	14.79	383	2	ND	2	21	2	2	2	186	3.81	.09	11	30	2.19	6	.01	2	4.65	.01	.10	2	51	10	3.6
76833	1	104	11	103	.3	6	6	492	1.71	30	2	ND	2	54	1	2	2	12	4.41	.05	2	5	.23	304	.01	5	.65	.01	.29	2	18	5	.6
76834	12	187	15	20	2.9	7	9	1607	6.73	2967	2	ND	2	291	2	26	3	26	18.92	.01	2	9	2.91	130	.01	8	.45	.01	.05	2	82	40	3.1
STD A-1/FA-GU	1	30	39	187	.3	36	12	1015	2.84	10	2	ND	2	36	1	2	2	59	.58	.10	7	76	.76	282	.07	8	2.04	.01	.21	2	52	50	.3

APPENDIX D

STATEMENT OF QUALIFICATIONS

I Robert E. Gale of 4338 Ruth Crescent, North Vancouver B.C. hereby certify that:

1. I graduated from Stanford University in June 1965 with a PhD in Geology.

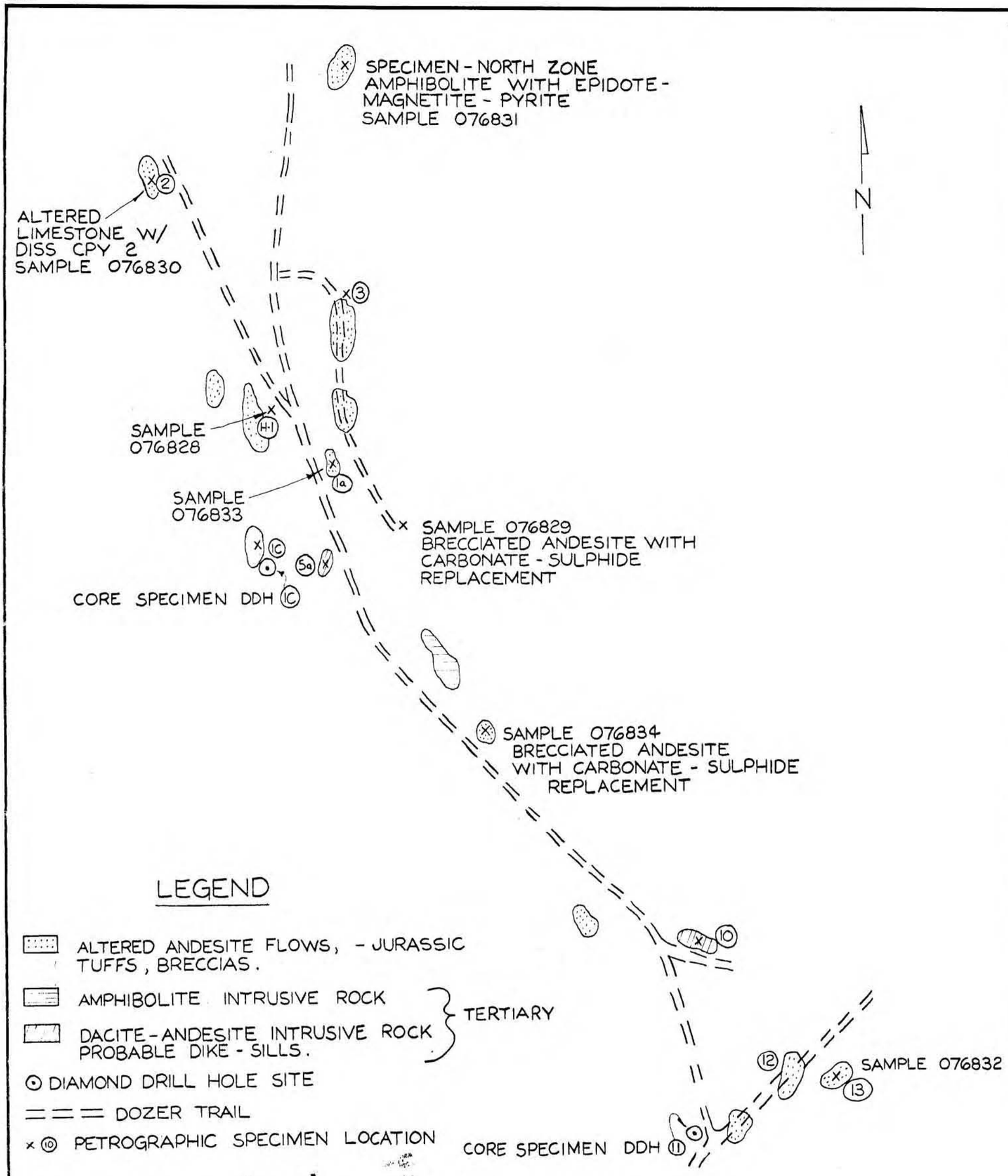
2. I have been continuously employed in geological exploration in British Columbia since that time.

3. I am and have been a registered Professional Engineer in the British Columbia Society of Professional Engineers since June 1966.

Robert E. Gale

July 4, 1984

Robert E. Gale



LEGEND

- ALTERED ANDESITE FLOWS, - JURASSIC TUFFS, BRECCIAS.
- AMPHIBOLITE INTRUSIVE ROCK } TERTIARY
- DACITE - ANDESITE INTRUSIVE ROCK PROBABLE DIKE - SILLS. } TERTIARY
- ⊙ DIAMOND DRILL HOLE SITE
- = = = DOZER TRAIL
- × ⑩ PETROGRAPHIC SPECIMEN LOCATION

50 M SCALE

ASARCO	Vancouver
FIGURE THREE MAIN SHOWING BLUE CLAIM, KAZA LAKE AREA OMINECA M.D.	
Drawn by: R.G.	Date: JULY 84
N.T.S.: 93 M 16	1 : 2000