

821532

Petrography
Ramsey Cr. Property
093C, D

Spec. for thin section study:

DDH Spec.

4 - Qdi at 725'

2.

Re spec.

Thin sect. # mt Jones

JCL 24 - latite porph.

B 8a - hfls.

JCL 30 - grayd Qdi.

B 2 - grayd dyke

'

Re # R52 - basic flow w native Cu.

Re R30 - " " strongly mg^t.

R29 - basic rock re. specs chpy.
weakly or non mg^t.

want to know - if biotite present and if it
is hydrothermal or primary.

RAMSEY CREEK

JANUARY 16, 1969

BEAR JOHN

ENCLOSED IS THE REPORT FOR THE SIX THIN SECTIONS AND ROCK SPECIMENS
GIVEN TO ME LAST DECEMBER. FOR THE THIN SECTIONS, ED WILL SEND IN HIS BILL
SEPARATELY. ENCLOSED HERE IS THE BILL FOR THE SIX THIN SECTION DESCRIPTIONS.
WILL SEND YOU THE ROCKS AND SECTIONS LATER.

GOOD LUCK

Tom Richards

RECEIVED
JAN 21 1969

KERR ADDISON MINES LTD.

Per.....

SPECIMEN - R 24 *should be R 29 location Near Ramsey Cr. E of Camp.*

MINERALOGY

ACTINOLITE-- GREEN TO GREENISH BLUE LATHS, GENERALLY AS FINE GRAINED CRYSTALS WITH ABUNDANT MAGNETITE INCLUSIONS

BIOTITE-- VERY FINE GRAINED ANHEDRAL AGGREGATES WITH GREEN TO PALE GREEN PLEOCHROISM.. OCCURS BOTH AS MASSES AND AS VEINS

PLAGIOCLASE--ESTIMATED COMPOSITION AN-40, SOME PHENOCRYSTS ALTERED TO ALBITE

DESCRIPTION

THE ROCK IS AN ALTERED SUB-OPHITIC BASALT-BASALTIC ANDESITE. IN ITS PRESENT STATE THE ROCK IS COMPOSED OF FINE GRAINED NEEDLES OF ACTINOLITE FINE GRAINED MOSAICS OF BIOTITE (80% OF THE ROCK), MINOR WEDGE SHAPED QUARTZ, VEINS AND REPLACEMENTS BY CALCITE AND IRREGULAR CRYSTALS OF FINE GRAINED EPIDOTE. OPAQUES CONSIST OF ABOUT 1% OF THE ROCK IN THE FORM OF PYRITE AND CHALCOPYRITE.

THE ROCK MAY BE CLASSIFIED AS A METABASALT METAMORPHOSED IN THE UPPER PART OF THE ALBITE EPIDOTE HORNFELS FACIES

SPECIMEN R-30

outer rim of Mag High. E.S.E of Camp.

THE ROCK IS A VESICULAR PORPHYRITIC BASALTIC ANDESITE. THE ROCK HAS BEEN ALTERED IN THE LOWER PART OF THE ALBITE EPIDOTE HORNFELS FACIES TO A MOSAIC OF BLUE GREEN PLEOCHROIC ACTINOLITE CLOUDED WITH MAGNETITE INCLUSIONS, FINE GRAINED GREEN BIOTITE, CHLORITE. PLAGIOCLASE LATHS ARE GENERALLY PRESERVED AS CALCIC (AN-40) PLAGIOCLASES WITH PHENOCRYSTS ALTERED TO ALBITIC SAUSSURITES. QUARTZ IN THE GROUNDMASS AS WEDGE SHAPED CRYSTALS BETWEEN PLAGIOCLASE LATHS SUGGEST AN ORIGINAL MINERAL PHASE, ALTHOUGH ABUNDANT SECONDARY QUARTZ IS EVIDENT FROM MINOR QUARTZ VEINS, AND VESICLES FILLED WITH QUARTZ AND CHLORITE. CALCITE OCCURS THROUGH OUT THE ROCK AS VEINS CUTTING AND REPLACING PLAGIOCLASE LATHS. OPAQUES IN THE FORM OF MAGNETITE CONSTITUTE BETWEEN 5 TO 10% OF THE SECTION.

SPECIMEN-52

near Base line SE of Camp near inner fringe of mag high.

THE SPECIMEN APPEARS TO BE A BASIC VOLCANIC BRECCIA OR AGGLOMERATE LITHIC TUFF, ALTERED TO A GREENSTONE. IT IS CHARACTERIZED BY MEDIUM TO FINE GRAINED ROUNDED VOLCANIC FRAGMENTS OF DIFFERING ROCK TYPES SET IN A FINER GRAINED MATRIX. IN GENERAL FRAGMENTS ARE ANDESITE TO BASALTIC ANDESITE IN COMPOSITION WITH MICROCRYSTS OF FELDSPAR (AN-40). TWO TYPES OF FRAGMENTS DOMINATE. THE MOST ABUNDANT ARE VESICULAR SUBOPHITIC ALTERED BASALTIC ANDESITES WITH AMYGDULES FILLED WITH SILICA. THE SECOND TYPE CONSISTS OF ALTERED REPLACED FINE GRAINED NEAR GLASSY FRAGMENTS WITH VERY FINE MICROCRYSTS OF PLAGIOCLASE. IN THIS LATTER TYPE THE GROUNDMASS HAS BEEN REPLACED BY MAGNETITE AND SOME ASSOCIATED NATIVE COPPER. (COPPER ALSO OCCURS MORE RARELY AS FINE GRAINED SPECKS IN SILICA AMYGDULES AND PLAGIOCLASE LATHS).

THE SPECIMEN HAS BEEN HORNFELSED IN THE UPPER GREENSCHIST-BIOTITE HORNFELS FACIES. FELDSPAR APPEARS ONLY MILDLY ALTERED, EPIDOTE IS COMMON AND VERY FINE GRAINED GREEN BIOTITE (60% OF THE SECTION) ARE THE DOMINANT MINERAL SPECIES. CHLORITE CALCITE AND ACTINOLITE WERE NOT SEEN. MUCH QUARTZ IS SECONDARY AS IN AMYGDULES FILLINGS AND AS IRREGULAR PATCHES IN THE GROUNDMASS, ALTHOUGH SOME ROUNDED TO ANGULAR FRAGMENTS MAY BE PART OF THE ORIGINAL BRECCIA.

SUMMARY

OF THE THREE SPECIMENS ^{R-29} R-24, R30, AND R52, R-30 SHOWS THE LOWEST GRADE METAMORPHIC FEATURES. THE LACK OF SULPHIDES AND THE PRESENCE OF CHLORITE DISTINGUISH THIS SPECIMEN FROM THE OTHER TWO. THE CHANGE FROM CHLORITE PLUS BIOTITE TO BIOTITE ONLY SUGGESTS AX PROGRADE METAMORPHISM. IT IS SUGGESTED THAT SPECIMEN R-30 MARKS NEAR THE OUTER BOUNDARY OF CONTACT METAMORPHISM.

SPECIMEN 725

DDH 4

PLAGIOCLASE: COMPLEXLY ZONED AN-20-24, ALTERED BY VEINS AND REPLACEMENTS OF CALCITE, SERICITE AND CLINOZOISITE.

QUARTZ

BIOTITE: MEDIUM TO FINE GRAINED MOSAICS, ALTERED PARTLY TO CHLORITE. INCLUSIONS OF ZIRCON ABUNDANT

HORNBLLENDE: FINE GRAINED PALE GREEN ANHEDRAL CRYSTALS

SPHENE: MEDIUM GRAINED ANHEDRAL TO EUHEDRAL CRYSTALS, ABOUT 1-2% OF THE ROCK, CRYSTALS GENERALLY CONTAIN CORES OF TITANMAGNETITE AND ARE ALTERED TO LEUCOXENE.

APATITE: GENERALLY ASSOCIATED WITH MAFICS

CALCITE: ALTERATION OF PLAGIOCLASE AND AS MINOR INTERSTITIAL FILLINGS

THE ROCK IS NONFOLIATED FRESH TO WEAKLY ALTERED PORPHYRITIC BIOTITE OLIGOCLASE TRONJHEMITE (LEUCOCRATIC OLIGOCLASE QUARTZ DIORITE) CONTAINING MINOR MIAROLITIC CAVITIES. THE PHENOCRYSTS CONSIST OF COARSE GRAINED OSCILLATORY ZONED PLAGIOCLASE, LARGE ROUNDED EMBAYED QUARTZ AND BIOTITE IN A MATRIX OF PLAGIOCLASE, GRANULAR QUARTZ AND 5-7% MAFICS. SPHENE, APATITE AND MAGNETITE FORM ABUNDANT ACCESSORIES.

SPECIMEN B-2

Dyke Rc.

PLAGIOCLASE: COARSE GRAINED FRESH WEAKLY ZONED OLIGOCLASE; AN 20-24

QUARTZ; LARGE ROUNDED CRYSTALS, PARTLY CORRODED BY K-FELDSPAR

K-FELDSPAR: FINE GRAINED INTERSTITIAL, WEAKLY PERTHITIC

BIOTITE: FRESH COARSE GRAINED BOOKLETS, MOST WITH INCLUSIONS OF ZIRCON, SMALLER CRYSTALS SHOW ALTERATION TO CHLORITE

SPHENE: COARSE GRAINED FRESH WEDGE SHAPED CRYSTALS, MOST WITH MAGNETITE CORES.

APATITE: MINOR ACCESSORY

OPAGUE: PROBABLY TITANMAGNETITE DUE TO ITS INTIMATE ASSOCIATION WITH SPHENE AND ITS ALTERATION PRODUCT LEUCOXENE.

THE SPECIMEN IS A COARSE GRAINED SILICEOUS (30-35% QUARTZ) BIOTITE SUBPORPHYRITIC GRANODIORITE (NEAR QUARTZ MONZONITE IN COMPOSITION THE HAND SPECIMEN SHOWS NO ORIENTATION FABRIC.

SPECIMEN DDH 2

line 28N.

PLAGIOCLASE: FRESH CRYSTALS GIVE A COMPOSITION OF AN 20-24, MOST OF THE CRYSTALS ARE ALTERED TO ALBITE, SERICITE AND CALCITE

QUARTZ: ROUNDED CORRODED PHENOCRYSTS

K-FELDSPAR: FINELY PERTHITIC, OFTEN AS PHENOCRYSTS

BIOTITE: COARSE TO MEDIUM GRAINED, WEAK TO STRONG ALTERATION BY CHLORITE, MUSCOVITE, CALCITE AND NEEDLES OF RUTILE

APATITE: ESTIMATED ABOUT 3%

SPHENE: ALTERED TO LEUCOXENE

MAGNETITE: ASSOCIATED WITH SPHENE

THE SPECIMEN MAY BE CALLED A NONFOLIATED MIAROLITIC PORPHYRITIC BIOTITE ACIDIC GRANODIORITE (OR QUARTZ MONZONITE). PARTLY ALBITIZED OLIGOCLASE, IRREGULAR PATCHES OF ORTHOCLASE, AND ROUNDED CORRODED QUARTZ COMPRISE THE PHENOCRYSTS. THE GROUND MASS CONSISTS OF A RANDOMLY ORIENTATED MOSAIC OF FINE GRAINED ROUNDED QUARTZ AND INTERSTIAL K-FELDSPAR. BIOTITE COMPRISING ABOUT 3-5% OF THE ROCK IS ALTERED AS ABOVE. ACCESSORIES ARE ABUNDANT APATITE, AND SPHENE ALTERED TO LEUCOXENE.

SUMMARY

ALL SPECIMENS ARE PORPHYRITIC, ACIDIC AND NONFOLIATED. SPHENE WITH MAGNETITE CORES, ABUNDANT APATITE AND ZIRCON IN BIOTITE ARE UBIQUITOUS ACCESSORIES. 725 AND DDH 2 SHOW VERY SIMILAR TEXTURES OF PHENOCRYSTS OF PLAGIOCLASE (AN 20-24) AND CORRODED QUARTZ IN A GRANULAR QUARTZ-FELDSPAR MATRIX. THEY DIFFER ONLY IN THAT THE FORMER CONTAINS HORNBLende AND NO K-FELDSPAR, WHILE THE LATTER CONTAINS K-FELDSPAR AND NO HORNBLende.

B-2 IS THE MOST HIGHLY ALTERED, WITH A STRONG DEVELOPMENT OF ALBITE, CHLORITE, MUSCOVITE AND CALCITE. THIS DIFFERENCE IN ALTERATION FROM OTHER SPECIMENS MAY ONLY REFLECT THE THIN SECTIONS PROXIMITY TO A PROMINENT QUARTZ VEIN.

ALL THREE SHOW HIGH LEVEL EPIZONAL FEATURES. TWO SHOW MIAROLITIC CAVITIES, ALL A WHOLLY OR PARTLY PORPHYRITIC. THIS IN CONJUNCTION WITH A GOOD HORNFELS DEVELOPMENT SUGGESTS A HIGH LEVEL EMPLACEMENT.

~~From~~
FROM THE SIMILARITIES IN MINERALOGY AND TEXTURE IT IS SUGGESTED THAT THE THREE SPECIMENS ARE CO-MAGMATIC.

Tom Richards

SPECIMEN R-28

*→ undifferentiated
pyrox + amphib*

THE SPECIMEN IS A FINE GRAINED DARK GREEN FELDSPAR PYROBLE PORPHYRY. 1-2MM EPIDOTE VEINS CUT THE SPECIMEN.

MINERALOGY

ACTINOLITE: COARSE GRAINED ACICULAR CRYSTALS

BIOTITE: AS FINE GRAINED CRYSTALS OCCURRING IN COARSE GRAINED AGGREGATES AND AS DISSEMINATED CRYSTALS THROUGH THE GROUND MASS.

X EPIDOTE: ANHEDRAL TO EUHEDRAL CRYSTALS

ALBITE: PHENOCRYSTS AND GROUNDMASS CRYSTALS , COMPOSITION ABOUT AN-10

CALCITE: IRREGULAR CRYSTALS IN THE GROUNDMASS AND ASSOCIATED WITH EPIDOTE IN VEINS.

THE ROCK WAS PROBABLY INITIALLY A PLAGIOCLASE-AUGITE BASALTIC PORPHYRY, ~~WITH AN OGP~~ WITH AN OOPHITIC GROUNDMASS OF PLAGIOCLASE AND AUGITE. THE ROCK IS NOW A GREENSTONE; PHENOCRYSTS OF PLAGIOCLASE ARE NOW ALL SUBHEDRAL TO EUHEDRAL ALBITE, AUGITE PHENOCRYSTS HAVE ALL GONE TO A CRYSTALLINE MOSAIC OF GREEN BIOTITE (50-70%), ACTINOLITE (10-30%) AND EPIDOTE (0-20%). THE GROUNDMASS HAS GONE TO A SIMILAR MINERAL ASSEMBLAGE IN SIMILAR PROPORTIONS, WITH THE MINOR DEVELOPMENT OF ~~MENCK~~ CALCITE. LATE VEINS OF EPIDOTE (70%), CALCITE (20%), CHLORITE (5%) AND ACTINOLITE (ACICULAR NEEDLES ASSOCIATED WITH THE CALCITE) CUT THE SPECIMEN. CHLORITE WAS ONLY SEEN IN THIS OCCURRENCE.

OPAGUES ARE NOT ABUNDANT COMPRISING ABOUT 1-2% OF THE SPECIMEN. MUCH OF THE OPAGUES OCCUR AS PRIMARY CUBES OF MAGNETITE, ALTHOUGH THE BULK OF THE OPAGUE APPEARS TO BE SECONDARY DERIVED FROM THE BREAKDOWN OF AUGITE TO BIOTITE, EPIDOTE AND ACTINOLITE. MOST OF THE OPAGUES HAVE ALTERED TO LEUCOXENE. NO EVIDENCE WAS AVAILABLE FOR REPLACEMENT MAGNETITE. PYRITE OCCURS IN ONLY DISSEMINATED TRACE AMOUNTS.

SPECIMEN R-53

THE HAND SPECIMEN IS A MASSIVE COARSE GRAINED SILICEOUS BRECCIA CUT BY MO-CU QUARTZ VEINS. FRAGMENTS VARY FROM FRACTIONS OF INCHES IN DIAMETER TO GREATER THAN 2" ACROSS. INCLUDED IN SOME OF THE FRAGMENTS ARE VERY FINE GRAINED WHITE OPAQUE SUBHEDRAL RECTANGULAR CRYSTALS, THESE APPEAR TO BE FELDSPAR CRYSTALS.

MINERALOGY

QUARTZ: AS VEINS, PATCHES AND IN THE GROUNDMASS (70%)

ALBITE: RELICT PHENOCRYSTS IN THE FRAGMENTS AND IN THE GROUNDMASS (25%)

ORTHOCLASE: SOME FINE GRAINED CRYSTALS IN QUARTZ VEINS (LESS THAN 1%)

EPIDOTE: MINOR COARSE GRAINED CRYSTALS IN THE SELVAGE OF QUARTZ VEINS

CALCITE: IN VEINS AND DISSEMINATIONS IN FRAGMENTS (LESS THAN 1%)

APATITE: VERY MINOR CRYSTALS IN THE QUARTZ VEINS (LESS THAN 1%)

CHLORITE: IN COARSE GRAINED QUARTZ VEINS WITH CALCITE.

AMPHIBOLE: PROBABLY ACTINOLITE, FINE GRAINED FIBROUS PALE GREEN PLEOCHROIC, IN IRREGULAR LATHS AND POIKILITIC CRYSTALS IN QUARTZ VEIN (LESS THAN 1%)

GROUND MASS: FELSIC VERY FINE GRAINED, WITH ESSENTIALLY NO MAFICS. PHENOCRYSTS OF ALBITE COMPRISE ABOUT 1-2% OF THE GROUNDMASS, THE REMAINDER CONSISTING OF A MOSAIC OF QUARTZ (40-60%) AND ALBITE. MINOR CALCITE IS PRESENT.

THE SPECIMEN IS MOST DEFINITELY A BRECCIA, CONSISTING OF VERY FINE GRAINED PORPHYRYTIC FELSIC FRAGMENTS CUT BY ABUNDANT VEINS AND STRINGERS OF GRANULAR VEIN QUARTZ. THERE DOES NOT APPEAR TO BE ANY WELL DEVELOPED COMMINUTED ROCK FRAGMENTS.

FRAGMENTS CONSIST OF A FINE GRAINED MOSAIC OF QUARTZ AND ALBITE WITH MINOR PHENOCRYSTS OF ALBITE. THAT THE PLAGIOCLASE IS PROBABLY A PRIMARY FEATURE AND NOT METASOMATIC IS ATTESTED BY SOME PHENOCRYST HAVING BEEN TRUNCATED BY QUARTZ VEINS. MUCH OF THE GROUNDMASS QUARTZ APPEARS TO SECONDARY (THIN VEINLETS AND IRREGULAR MASSES AND APOPHYSE FROM VEIN QUARTZ.) THE ORIGINAL COMPOSITION OF THE FRAGMENTS IS VAGUE: THEY ~~ARE~~ NOW CONTAIN NO MAFICS AND 40-60% QUARTZ, MUCH OF WHICH IS SECONDARY. THE LACK OF ANY RECOGNIZEABLE RELICT TEXTURES EXCEPT FOR THE FINE GRAINED PHENOCRYSTS ~~ARE~~ ^{in A} FINE GRAINED QUARTZ-PLAGIOCLASE MOSAIC (WHICH RESEMBLES A CHILLED

GROUND MASS) SUGGESTS THAT THE ORIGINAL ROCK WAS PROBABLY AN ACID VOLCANIC AND A MORE REMOTE POSSIBILITY THAT IT WAS A CHILLED BORDER OF AN ACIDIC PLUTONIC.

THE VEIN SYSTEM IS COMPLEX. QUARTZ RICH SULPHIDE VEINS WITH MINOR CALCITE, BIOTITE AND CHLORITE PREDOMINATE. THESE ARE EITHER ASSOCIATED WITH CUT OR ARE CUT BY MORE MAFIC RICH QUARTZ VEINS CONTAINING BIOTITE, AMPHIBOLE, CHLORITE, CALCITE, APATITE AND SULPHIDES. THESE VEINS VARY IN WIDTH FROM GREATER THAN 3MM TO MICROSCOPIC HAIR LINE FRACTURES.

KERR ADDISON MINES LIMITED

SUITE 405 - 1112 WEST PENDER STREET

VANCOUVER 1, B.C.

PHONE 682-7401

PETROLOGY - RAMSEY CREEK PROPERTY

Four thin sections, one cut from each of the three granitic rock types found on Groyd Creek and one of the hornfels, were very briefly studied. The coarse grained rocks were stained using HF and Na-cobaltinitrate to confirm or determine K-feldspar, plagioclase, and quartz content.

Groyd Intrusion: (Spec JCL-30)

This is a medium-grained, grey, phaneritic rock. Weathered surface is pitted; brown limonite lines cavities. Some sericite alteration is apparent but not abundant.

Texture in thin section is hypidiomorphic-granular. Anhedral to subhedral plagioclase crystals comprise 56% of the rock. Near a small quartz vein plagioclase show a marked oscillatory zoning. These are untwinned or twinned only on rims. Refractive index suggests that the composition is near or greater than that of quartz and should be in the oligoclase-andesine range. Away from the vein plagioclase is twinned but twins are poorly developed. These untwinned plagioclase are likely of secondary origin related in time to quartz veining. Some of these later feldspar crystals are clouded with dark inclusions. K-feldspar and quartz occur interstitial to plagioclase. Biotite is the only mafic mineral. Accessory minerals include pyrite, chalcopyrite and molybdenite. Pockets of sericite (?) alteration occur along plagioclase boundaries, cleavage and fracture planes.

Page 2...

Composition:	Plagioclase	- 56%
	K-feldspar	- 18%
	Quartz	- 20%
	Biotite	- 3%
	Pyrite)
)
	Chalcopyrite) - 2%
)
	Molybdenite)
	Alteration Minerals	- 1%

Rock is a quartz diorite.

cont. Page 3...

Groyd Dyke: (Spec B 2)

The dyke cuts volcanic rocks in lower Groyd Creek. It is a medium to coarse-grained granitic rock, pale amber to grey in colour. Only mafic mineral is biotite which forms books up to 7 mm. in diameter. Quartz occurs as glassy equant grains up to 4 mm. in size - average size is much less. Rarely large phenocrysts of pink K-feldspar occur in crystals 7 - 12 mm. in size. The rock is not uniform in texture or composition.

Chalcopyrite and pyrite occur on fracture surfaces and as disseminated grains throughout the rock. Light to dark chocolate brown limonite - oxidation products of both chalcopyrite and pyrite is evident on fractured surfaces and quartz veins.

Texture is hypidiomorphic-granular. Plagioclase (An₂₉) crystals are twinned, some show zoning. Boundaries are serrated or corroded, often ragged with pockets of sericite (?) alteration along boundaries. K-feldspar, in part perthitic, form irregular to equant crystals as part of an interlocking mosaic with quartz. A few large subhedral K-feldspar phenocrysts occur in random orientation. Biotite forms ragged laths and subhedral plates interstitial to plagioclase. Quartz, in areas of greatest concentration of plagioclase crystals tend to be small irregular shaped grains. Quartz and untwinned feldspar (K-feldspar (?)) were noted poikilitically enclosed in a large plagioclase crystal. Accessory minerals sphene and apatite comprise less than 1% of the rock. Opaque minerals include magnetite, pyrite,

Page 4...

and chalcopyrite. Main alteration mineral is sericite (?) - some plagioclase grains are extensively altered to sericite (?).

Composition:	Plagioclase	- 58%
	K-feldspar	- 20%
	Quartz	- 17%
	Biotite	- 3%
	Opaque mins	- 1%
	Accessory mins.	- 1% (less than 1%)
	Alteration mins.	- 1% (less than 1%)

Rock is a Quartz Monzonite.

cont. Page 5...

Feldspar Porphyry Dyke (Spec JCL-24)

This is a light grey porphyritic dyke cutting mineralized volcanic rock. It consists of large phenocrysts of plagioclase (up to 6 mm) occasional "eye" of quartz and small books of biotite enclosed in a fine-grained grey matrix.

In thin section, the rock is composed of clusters of zoned and twinned plagioclase (An₂₆) and individual phenocrysts enclosed in a fine-grained quartz-feldspar matrix. Staining with Na-cobaltinitrate suggests that much of the fine grained matrix may be K-feldspar. K-feldspar also occurs sparingly as large phenocrysts. Some plagioclase crystals have been almost completely destroyed by alteration to Kaolin (?) and sericite. One K-feldspar (?) phenocryst with brown alteration halo poikilitically encloses euhedral sphene twinned plagioclase, biotite and chlorite. Biotite and sphene tend to form along cleavage planes. Biotite occurs as euhedral and lathlike plates partly altered to chlorite. Accessory minerals are apatite, sphene, magnetite, chalcopryrite, and hematite. Alteration minerals are mainly sericite, chlorite and kaolinite (?).

Composition:	Plagioclase phenocrysts	- 20%
	K-feldspar "	- 2% or less
Rock is a biotite-	Quartz-feldspar groundmass	- 74%
feldspar-porphyry or	Biotite	- 2%
latite porphyry.	Alteration minerals	- 1%
	Chalcopryrite, hem, mag, pyrite	- 1% (less than)
	Shene, apatite	- 1% (less than)

Biotite-Hornblende Hornfels (Spec B8-a)

This is a dark non-descript looking rock that weathers to a rough surface. It is composed of 55% plagioclase (An₄₀), 22% hornblende and 18% biotite, with 3% chlorite. Accessory minerals pyrite and magnetite comprise about 2% of the rock.

The specimen comes from within the thermal aureole adjacent to the Groyd intrusion. It is a biotite-hornblende-hornfels.

Discussion:

From this brief study it is apparent that more K-feldspar exists in all the intrusive rocks than what is apparent in hand specimen. How much of this K-feldspar is secondary and how much primary is at this stage purely speculation. Most certainly some, particularly in the Groyd dyke as evidenced by the irregular or patchy distribution over the outcrop, would suggest a metasomatic origin. In a specimen from the Groyd Intrusion, the Na-cobaltinitrate stain as well as thin section examination shows a concentration of K-feldspar adjacent to a small quartz vein. This also suggests a later origin to some of the K-feldspar. A more comprehensive study is needed on the thin sections.

Sericite and kaolinite alteration is not extensive. Chlorite is a minor constituent of some but not all rocks examined.