

GENERAL COMMENT

All the specimens were etched by being immersed in HF for 15 seconds, then stained with a saturated solution of sodium cobalti-nitrite to determine the content of potassic feldspar.

X-RAY RESULTS

Sample

- HIH Pink ..... The sample is a pink zeolite vein. The X-ray data indicate that it is a member of the laumontite-leonhardite series with composition  $\text{Ca Al}_2 \text{Si}_4 \text{O}_{12} \cdot 4 - 3 \frac{1}{2} \text{H}_2\text{O}$ . Laumontite has 4  $\text{H}_2\text{O}$ , leonhardite  $3 \frac{1}{2} \text{H}_2\text{O}$ . Spectrographic analysis of the powder indicates high Si, Al and Ca with traces of Mn, Fe, Na, Sr, Mg, Cu, Ag in decreasing order of abundance.
- E ..... The sample is a white powdery alteration along joints. Preliminary results suggest that it is montmorillonite mixed with kaolinite. Further tests will be carried out to confirm this data. Spectrographic analysis shows Si > 10%, Al > 10%, Ca 8%, Mg 2.5%, Fe 1% with traces of Mn, Na and Sr. The spectrographic analysis virtually confirms montmorillonite.
- H 157-130 ..... The chalky pale green alteration of feldspar is kaolinite with perhaps a trace of dolomite in it. The dolomite is very uncertain. Spectrographic results show Si > 10%, Al > 10%, Mg 4%, Ca 0.8%, Fe 0.8%, Na 0.1%, Cu 0.03% with traces of Mn and B.
- G 163-270 ..... The mineral is a pale green alteration of feldspar. It is sericite. Spectrographic analysis shows Si > 10%, Al > 15%, K 2.5%, Fe 0.8%, Mg 0.4%, Cu 0.2% with traces of B, Ti, Mn and V.

HIGHMONT (SAMPLES AND THIN-SECTIONS)

Note: Percentages given were estimated by eye.

Sample

68-10-146	Mineralogy: quartz _____ 15%	
	plagioclase _____ 40%	Phenocrysts
	biotite _____ 3%	
	matrix _____ 4.2%	

Textures

1. Quartz phenocrysts are subhedral to rounded
2. Plagioclase phenocrysts are subhedral and either complexly zoned or pervasively clouded by sericite-carbonate alteration
3. Chlorite forms ragged pseudomorphs after biotite. It is pleochroic in green
4. The groundmass is quartzo-feldspathic and somewhat altered to sericite-carbonate. Slight staining by sodium cobalt-imtrite outlines more altered zones in the groundmass (sericite is stained).
5. Sericite-quartz-carbonate veins cut the rock

Name - Quartz Plagioclase Porphyry

Genesis - Dike or Sill

Sample

68-25-240	Mineralogy: plagioclase _____ 75%
	quartz _____ 20%
	"biotite" _____ 5%

Accessory zircon  
apatite

Textures

1. Quartz has an "open interstitial" texture - that is, the grains are interstitial to plagioclase laths and form interlocking networks of grains. In appearance, the feldspar seems to be "swimming" in quartz
2. Plagioclase - pervasively altered to mats of intergrown sericite and carbonate
3. Intergrowths of sericite-carbonate and opaque mineral form pseudomorphous crystals which were probably biotite initially

- 4. Chalcopyrite occurs as veinlets and blebs in the quartz-sericite veins
- 5. Pyrite occurs as lenses in the quartz-sericite veins
- 6. No K-feldspar is present

Name - Veined, altered leucocratic  
Bethlehem (Skeena) Quartz  
Diorite

Sample

68-27-468

Mineralogy: quartz

plagioclase

Textures

- 1. Plagioclase was replaced by carbonate-sericite intergrowths
- 2. The rock is apparently a breccia which contains rounded quartz-rich fragments. Some of the fragments are mineralized with chalcopyrite and molybdenite
- 3. When it is wetted, one side of the saw-cut face is tan coloured and porous looking. In thin-section this zone is seen to be pebble-sized fragments in a kaolinitic (?) matrix
- 4. Quartz veins in the rock are also brecciated

Name - Kaolinized (?) Breccia

Sample

68-27-520

Mineralogy: quartz \_\_\_\_\_ 20%

plagioclase \_\_\_\_\_ 53%

K feldspar (perthitic) \_\_\_\_\_ 15%

hornblende \_\_\_\_\_ 8%

biotite \_\_\_\_\_ 4%

Accessory sphene  
magnetite

Textures

- 1. Plagioclase is zoned and sericitized
- 2. K feldspar is interstitial to plagioclase. It is perthitic
- 3. Quartz forms distinct anhedral grains which tend to interlock to produce an open interstitial texture. Quartz grains are crossed by shear zones indicated by trains of fine fragments
- 4. Hornblende is green and faintly pleochroic. It is partially altered to chlorite - magnetite - epidote intergrowths
- 5. Biotite is golden brown to tan and often partially chloritized

- 6. The rock is cut by a 1/8-inch carbonate - zoisite - clinzoisite (epidote) - chlorite (two kinds?) - apatite-quartz vein which is richly mineralized with bornite. Small blebs of K feldspar occur in the vein

Name - Veined, altered Bethlehem Granodiorite

Sample

68-29-35

Note: The rough surface was etched and stained on this specimen

Mineralogy: plagioclase \_\_\_\_\_ 75%  
 quartz \_\_\_\_\_ 15%  
 mafic \_\_\_\_\_ 10%

Textures

- 1. Hornblende was present, sometimes as large subrectangular laths, but has altered to chlorite and epidote
- 2. Biotite has altered to sericite
- 3. Quartz forms fairly large anhedral crystals and overall has open interstitial texture. Crystals are brecciated and strained
- 4. Clots of fine fibrous epidote crystals are localized along fractures
- 5. Plagioclase is pervasively altered to sericite-chlorite
- 6. The section is crossed by shear zones along which quartz is reduced to small elongated fragments and the comminuted zones in the feldspar crystals are more intensely altered. Sericite-carbonate veinlets cross the shear zones
- 7. Bornite and chalcopyrite occur in quartz veins which also contain chlorite and apatite

Name - Veined, altered Bethlehem Quartz Diorite

Sample

68-37-439

The specimen is a somewhat sheared-looking carbonate-sericite-quartz rock which is crossed by carbonate-sericite-quartz veins which contain chalcopyrite and molybdenite. The host rock contains disseminated chalcopyrite and bornite. Tan coloured areas are caused by very fine-grained sericite-carbonate intergrowths. The carbonate has been submitted for X-ray analysis.

Name - Veined sericite-quartz rock

Sample

68-37-559

No hand specimen - thin-section only

Mineralogy: plagioclase  
 quartz

Alteration Minerals - sericite  
- carbonate

- Textures
1. Sericite crystals are large enough to be visible under low power
  2. Feldspar is pervasively altered although remnants of twins are visible locally
  3. The section is crossed by quartz-carbonate veins

Name - Uncertain

Sample

68-39-152

The rock is dark grey and seemingly fragmental. It is crossed by an early, meandering quartz-carbonate-chalcopyrite vein which is in turn cut by a network of thin quartz veins with occasional chalcopyrite pods along them. The matrix of the rock is primarily untwinned plagioclase which has suffered sericite alteration. Fine-grained sericite also composes scattered rounded areas in the matrix. The "fragments" and "matrix" are the same composition but the fragments are finer grained.

Name - Fine-grained plagioclase rock

Genesis - A dike (?)

Sample

68-52-20

Mineralogy: quartz \_\_\_\_\_ 25%  
plagioclase \_\_\_\_\_ 50%  
K feldspar \_\_\_\_\_ 10%  
mafic \_\_\_\_\_ 15%

Accessory apatite  
magnetite  
sphene

- Textures
1. Mafic minerals outline an ill-defined foliation. Both biotite and hornblende were present but both were replaced by chlorite
  2. K feldspar is interstitial to and replaces plagioclase. It is perthitic
  3. Plagioclase is zoned and clouded by sericite alteration
  4. Sericite occurs locally in relatively coarse-grained patches with carbonate and chlorite, and with quartz in veins which follow irregular paths through the rock
  5. Veins of quartz-carbonate-sericite cross the rock

Name - Veined, altered Bethlehem Granodiorite

Sample

68-63-73

Thin-section only

Mineralogy: quartz

plagioclase

"biotite"

Textures

1. Quartz has open interstitial texture
2. Plagioclase extensively altered to sericite (talc?)
3. Biotite is replaced by chlorite
4. Sericite veins cross the rock and replace anything in their paths. Chalcopyrite and molybdenite are intergrown in the sericite

Name - Uncertain

Sample

68-68-180

Mineralogy: quartz \_\_\_\_\_ 20%

plagioclase \_\_\_\_\_ 71%

mafic \_\_\_\_\_ 8%

K feldspar \_\_\_\_\_ 1%

Accessory magnetite  
apatite

Textures

1. On a fresh surface plagioclase is green as a result of carbonate-sericite alteration
2. Quartz contains small blebs of K feldspar. Quartz grains are up to 1/8-inch across but have uneven edges. Perhaps the edges are overgrowths on earlier quartz crystals. Later quartz overgrowths would also explain the open interstitial texture of the quartz away from the large crystals
3. Mafic (biotite?) altered to interlayered brown carbonate (siderite ??) and a colourless micaceous mineral (a variety of chlorite ??) with or without quartz
4. The rock is crossed by carbonate (calcite) veinlets which are mantled by yellowish-brown carbonate (the carbonate has been submitted for X-ray analysis)

Name - Veined, altered Bethlehem (?) Quartz Diorite



4. K feldspar occurs as large areas between and enclosing plagioclase laths and as blebs in quartz grains
5. The rock is crossed by quartz-pyrite veins

Name - Biotite Hornblende Bethlehem Granodiorite

Sample

69-121-707

The sample is Bethlehem Granodiorite cut by a quartz-K-feldspar-plagioclase aplite dike. The aplite is crossed by a K-feldspar vein and the granodiorite, aplite and K feldspar vein are cut by a quartz-epidote-vein which carries some chlorite, bornite and chalcopryrite and has a quartz-sericite halo. The drill hole is apparently subparallel to the dip of the dike and the dike is about an inch wide. In the aplite, quartz and feldspar have subgraphic texture. K feldspar replaces plagioclase along grain contacts. In the Bethlehem Granodiorite country rock, mafic minerals were chloritized.

Name - Bethlehem Granodiorite cut by aplite dike

Sample

69-124-210

Note: The zone which did not stain may be spurious (the specimen was sprayed with plastic) or may be caused by leaching along fractures.

The sample is similar to 69-121-707 with the exception that the grain size of the aplitic dike is widely variable in 69-124-210.

Mafic minerals in the country rock were replaced by chlorite-epidote intergrowths and clots of thin, pale green actinolite needles.

The aplitic dike has a micrographic texture with local areas of graphic texture.

The dike-country rock contact is sharp to the eye but diffuse on millimetre scale.

Name - Bethlehem Granodiorite cut by aplitic dike

Comment - The range in grain size of the dike is probably related to higher volatile content away from the borders of the dike

Sample

HU 10 210 and 215

Mineralogy: phenocrysts - quartz \_\_\_\_\_ 15%  
plagioclase \_\_\_\_\_ 20%



matrix - quartz \_\_\_\_\_ 30%

plagioclase \_\_\_\_\_ 35%

- Textures
1. Quartz phenocrysts are intergrown at their borders with interstitial quartz
  2. Plagioclase is pervasively sericitized
  3. The matrix feldspar is "swimming" in quartz. The texture is similar to that in the K feldspar-poor aplitic dikes
  4. The rock is crossed by quartz veins containing bornite and chalcocite (?) which are mantled by sericitized zones
  5. The rock is also crossed by brown carbonate veins

Name - Altered Quartz Plagioclase Porphyry