



# Vancouver Petrographics Ltd.

JAMES VINNELL, Manager  
JOHN G. PAYNE, Ph. D. Geologist

P.O. BOX 39  
8887 NASH STREET  
FORT LANGLEY, B.C.  
VOX 1J0

Report for: Angie Stanta,  
c/o J.C. Stephen Expl.,  
General Delivery,  
Vanderhoof, B.C.

PHONE (604) 888-1323

Invoice 1644

copy to: J.C. Stephen Expl.,  
1124 West 15th Street,  
North Vancouver, B.C. V7P 1M9

Samples: 5A, 18, 19, 30, R

The samples may represent three phases of a major near-surface intrusion; they are grouped as follows:

- 1) Coarse Graphic Quartz Monzonite (K-feldspar alteration)  
coarse grained groundmass and coarse graphic intergrowths;  
plagioclase almost completely replaced by K-feldspar  
samples 19, 18
- 2) Porphyritic Fine Graphic Quartz Monzonite  
finer grained groundmass and fine graphic intergrowths  
plagioclase phenocrysts have distinctive K-feldspar rims, and  
are partly altered to K-feldspar in the interiors  
samples 5A, 30
- 3) Porphyritic Granodiorite - Quartz Monzonite  
no graphic intergrowths  
plagioclase phenocrysts have partial rims of K-feldspar, weak  
alteration to K-feldspar in interiors  
sample R

Other distinctive features are biotite distribution and pyrite-iron oxide relations.

Biotite forms slender lathy phenocrysts in samples 5A and R; biotite is rare in samples 18 and 19.

Pyrite is abundant in sample R, and occurs in a vein in sample 18; in the latter it is strongly replaced by hematite, possibly of weathering origin. In other samples, and in sample 18 away from the vein, the opaque minerals are probably magnetite and hematite; all samples are slightly magnetic except sample R.

Feldspars are altered by abundant dusty semiopaque, possibly Ti-oxide; in some samples this alteration is described as opaque, but re-examination under bright light at high power shows that it is slightly translucent.

A fine grained secondary mineral occurs in cavities in some rocks; it cannot be positively identified because of the fine grain size, but the most probable mineral is clay (kaolinite). In some samples the identification of the mineral is hindered by dusty to fine grained limonite.

*John Payne*  
John Payne,  
June, 1979.

Sample 19      K-altered Graphic Quartz Monzonite

plagioclase?	15-20%	(mainly altered to K-feldspar)
quartz	10-15	
K-feldspar	10-15	(possibly in part after plagioclase)
graphic K-feldspar,		
quartz	45-50	
opaque	1- 2	
biotite	minor	
sericite? (clay?)	1	(see description of sample 30)
Ti-oxide	minor	
zircon, limonite	trace	
cavities	1- 2	

Plagioclase forms subhedral crystals up to 3 mm long; most are slightly elongate prisms, but one is 3 X 0.2 mm. Some have thin rims of K-feldspar, and most are strongly altered to K-feldspar. Dusty opaque is superimposed on all K-feldspar and plagioclase, rendering their distinction difficult in thin section; relations are better seen in the stained block.

Quartz and K-feldspar form discrete grains mainly from 0.2-0.5 mm in size; these are intergrown with graphic K-feldspar-quartz grains.

Graphic intergrowths are in grains ranging from 0.2 to 1.5 mm in size, with a wide variety of textures. Percentages of phases ranges from 30 to 70. In a given grain, each mineral is in optical continuity.

The opaque is a black oxide, some of which is magnetite. A polished section description of Sample 18 probably is similar to that of Sample 19; i.e., magnetite and hematite are present. Opaque forms patches of fine anhedral grains intergrown with quartz and K-feldspar, and a few coarser grains up to 0.4 mm across.

Biotite forms a few ragged grains, mostly 0.1-0.2 mm in length, with one lath 1.5 mm long. Pleochroism is from pale straw to medium brown. Some grains, including the coarse grain, are partly replaced by finer grained secondary biotite-sericite and dusty opaque and Ti-oxide.

Sericite? occurs as partial filling of interstitial cavities. Its properties are: light brown color (possibly caused by limonite), low birefringence, low to moderate relief, elongate laths and flaky aggregates 0.01-0.02 mm in grain size, length-fast. The mineral resembles sericite, but the birefringence seems too low.

Ti-oxide occurs as fine grained aggregates with opaque.

Zircon forms two grains 0.05-0.1 mm across enclosed in opaque.

Limonite forms one bright orange lens 0.3 mm long, consisting of an extremely fine grained aggregate.

Sample 18      K-altered Graphic Quartz Monzonite

plagioclase ?	10-15%	(mainly phenocrysts altered to K-feldspar)
K-feldspar	15	
quartz	15	
graphic quartz-K-spar	45-50	
pyrite	1	(rimmed by secondary hematite)
magnetite-hematite	1- 2	
biotite	0.5	
Ti-oxide, leucoxene	minor	
sericite? (clay?)	minor	(in cavities) (see description of sample 30)
zircon	minor	
apatite, muscovite	trace	

The sample is similar to sample 19.

Plagioclase forms coarse grains from 1 to 2.5 mm in size; most are subhedral slightly elongated prisms. A few grade into graphic quartz-K feldspar intergrowths near their ends. All are completely or almost completely altered to K-feldspar. Dusty opaque alteration occurs in all K-feldspar, and masks primary textures.

K-feldspar and quartz form finer grains 0.3 to 1.0 mm in size as irregular aggregates. A few phenocrysts? of quartz are up to 1.5 mm across. Quartz-K-feldspar intergrowths locally grade into graphic intergrowths.

Graphic quartz-K feldspar form anhedral grains 0.3 to 1.5 mm in size, with each mineral in optical continuity within the grain. Quartz forms rounded to lensey blebs in K-feldspar, ranging in size from 0.05 to 0.2 mm.

Scattered through the rock are anhedral to subhedral opaque grains 0.05-0.2 mm in size. In polished section these are seen to be hematite (2/3) and magnetite (1/3), commonly intergrown in coarse aggregates.

Biotite forms irregular laths up to 0.7 mm long, with pleochroism from light straw to medium greenish brown. Associated with biotite is subhedral to euhedral zircon grains from 0.05 to 0.1 mm in size.

Ti-oxide and leucoxene form scattered patches up to 0.2 mm across, in part with a brown color, probably caused by minor limonite.

Apatite forms one corroded grain 0.5 mm long.

Muscovite forms a few grains up to 0.05 mm long with opaque.

The rock contains a few interstitial patches of sericite? as in sample 19, with grain size 0.005-0.02 mm.

The rock is cut by a wispy vein containing coarse to fine pyrite, partly altered to hematite; the latter mineral forms concentric alteration zones around irregular cores of pyrite. Possibly finer grained hematite in the vein and in the rock represents completely replaced pyrite.

Sample 5A

## Porphyritic Graphic Quartz Monzonite

phenocrysts	
plagioclase	20%
biotite	2- 3
groundmass	
plagioclase	5
quartz	15
K-feldspar	25-30
graphic K-feldspar,	
quartz	25-30
opaque	2- 3
biotite	1- 2
muscovite	minor
Ti-oxide	trace

Plagioclase phenocrysts are from 1 to 4 mm in size. Many have thin rims (0.05 mm) of K-feldspar, and a few are partly altered to K-feldspar. Grains are mainly moderately altered to dusty sericite and Fe-oxide; minor clay may be present. Patches in some grains contain abundant limonite.

Biotite forms delicate laths up to 1.5 mm long; pleochroism is from light straw to medium reddish brown.

The groundmass felsic minerals are mainly 0.15 to 0.5 mm in size. Plagioclase forms scattered subhedral grains with minor dusty alteration. Quartz forms anhedral grains, including a few coarse grains up to 1.5 mm. K-feldspar forms subhedral to euhedral rectangular grains from 0.3 to 0.5 mm in size; some may be replacement of original plagioclase. All have dusty alteration to opaque.

Graphic K-feldspar-quartz intergrowths are from 0.15 to 0.3 mm in grain size, with quartz lenses in K-feldspar commonly as fine as 0.02-0.05 mm. These intergrowths are similar in texture but much finer than those in samples 19 and 18.

Opaque forms irregular grains from very fine up to 0.5 mm; they are in part magnetite, and probably the rest is hematite. Ti-oxide forms tiny grains with opaque.

Biotite forms ragged laths and irregular grains with similar pleochroism to phenocrysts. Muscovite forms ragged grains, some with fine grained disseminated opaque and Ti-oxide, probably a replacement of biotite.

One triangular patch 0.2 mm across of sericite? as in samples 18 and 19 occurs interstitial to quartz and graphic quartz-K-feldspar. In sample 30 this mineral is tentatively identified as clay.

Sample 30

## Porphyritic Graphic Quartz Monzonite

phenocrysts	
plagioclase	25%
groundmass	
plagioclase	5-10
K-feldspar	25-30
quartz	10-15
graphic K-feldspar,	
quartz	15-20
biotite	1- 2
opaque	2- 3
clay	2- 3
Ti-oxide	minor

The sample is similar in many respects to sample 5A, but contains many fewer biotite phenocrysts.

Plagioclase phenocrysts from 1 to 4 mm are euhedral to subhedral. Some show broad concentric zones with different alteration patterns. Some cores are very strongly altered to a very fine grained aggregate of sericite, limonite, and calcite?; other cores are relatively fresh and cut by coarse fractures with these minerals along the fractures. Most grains are moderately altered to sericite and variable limonite. Many have thin rims of K-feldspar, and some are partly altered to K-feldspar.

In the groundmass plagioclase crystals are less strongly altered to sericite, but contain dusty opaque. Quartz forms angular to rounded grains from 0.05 to 0.3 mm in size. K-feldspar forms some euhedral rectangular grains 0.3-0.5 mm in size, surrounded by quartz or graphic K-feldspar-quartz intergrowths. All K-feldspar has abundant dusty opaque alteration.

Biotite forms scattered grains up to 0.5 mm in size; many are partly to completely altered to muscovite with Ti-oxide and opaque; and minor zircon occurs with biotite.

Opaque is partly magnetite and partly hematite; it forms irregular to rounded grains and a few elongate laths from 0.1 to 0.3 mm in size. Ti-oxide forms very fine grained (0.02-0.05 mm) aggregates with opaque.

Clay forms interstitial patches up to 0.3 mm across of very fine grained felty aggregates; the mineral has the following properties: light yellow color, low to moderate relief (R.I. greater than that of quartz), very low birefringence. It is free of limonite. It probably is the same mineral described in samples 18, 19, and 5A as sericite?

Sample R Poprhyritic Granodiorite - Quartz Monzonite

phenocrysts	
plagioclase	20-25%
biotite	1
groundmass	
plagioclase	20-25
K-feldspar	30-35
quartz	10-15
biotite	2- 3
pyrite	3- 5
Ti-oxide	1- 2
rock inclusion	1

Plagioclase phenocrysts are subhedral to euhedral, equant to elongate, averaging 1-1.5 mm, with the largest being 3.5 mm long. They are slightly to moderately altered to dusty to fine grained sericite and semiopaque (Ti-oxide?). Some have partial rims of K-feldspar, and K-feldspar forms patchy replacement zones.

Biotite forms a few delicate laths from 0.5 to 1.5 mm long and 0.05 mm across; pleochroism is from light straw to medium reddish brown.

The groundmass consist of lathy to irregular feldspars from 0.1 to 0.3 mm long and anhedral interstitial quartz, mainly 0.1 mm in size with a few grains up to 0.3 mm. Feldspars are altered to dusty semi-opaque and minor opaque. No graphic intergrowths are present.

Biotite forms irregular grains and thin laths from 0.05 to 0.3 mm long scattered in the groundmass; pleochroism is from pale straw to light brown. A few coarser grains up to 1 mm across have a deeper reddish-brown color similar to that of the phenocrysts.

Pyrite forms rounded to subhedral grains 0.05-0.15 mm in size, commonly in interstitial clusters with feldspars and quartz. The rock is cut by thin opaque and semiopaque veinlets, possibly pyrite and Ti-oxide.

Ti-oxide forms clusters of fine to very fine grains, commonly with pyrite.

The rock contains an inclusion? of an equigranular rock 2 mm across. Mineralogy is mainly quartz, plagioclase, and K-feldspar, with 30% quartz (much more than in main rock). Grain size is 0.2 to 0.3 mm.