RB H.W. File

Vancouver Petrographics Ltd.

Cataract 842050

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NOTE: SAMPLES FROM CATARACT OBTAINED FROM JMT

Report for: Ragnar Bruaset,
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Project: M-518 (Cataract)

Samples: Cat 1B,1C; Cat 2 ~~EAST ZONE~~ AREA

Summary:

The samples are breccias with angular to subrounded fragments dominated by quartz grains and vein material of quartz-garnet-sulfides-biotite-(apatite)-chlorite. Other fragment types are siltstone to mudstone and their metamorphic equivalents, quartz diorite to granodiorite, dacite, and biotite. Minor fragments are of accessory minerals: apatite and zircon.

Quartz fragments are of three types; detrital sedimentary grains, with or without secondary quartz overgrowths; metamorphic quartzites, and vein material.

The fragments are contained in a groundmass dominated by sericite with patches of biotite-(garnet), quartz, and sulfides.

Sulfides are dominated by red-brown sphalerite and pyrrhotite, with minor pyrite and trace chalcopyrite and galena. No native gold or other gold-rich phase were seen.

John Payne

John Payne,
June 1982.

Cat 1 Sedimentary ± Tuffaceous Breccia with fragments of Sulfide-Silicate Vein

The rock contains fragments of a wide variety of rock types, dominated by quartz grains, many of which appear to be detrital sand grains. Abundant fragments consist of sulfide-silicate aggregates. A few are of plutonic and metamorphic rocks, and moderately abundant ones are of fine grained siliceous clastic sedimentary rocks. A few dacite fragments are present.

fragments	
quartz grains	20-25%
sil.clastic seds.	5- 7
sulfide-silicate	15-17
metamorphic aggreg.	4-5
dacite	2- 3
plutonic rocks	2- 3
groundmass	
sericite	30-35
biotite	7- 8
quartz	4- 5
sulfides	2- 3

Many fragments are of single quartz grains or of aggregates of a few quartz grains. Some of these show rounded to subrounded detrital grains partly rimmed or cemented by secondary quartz overgrowths. A few fragments are of very fine grained sandstone with quartz grains cemented by quartz. Other sedimentary fragments are siltstone to mudstone, and are dominated by quartz with trace to minor amounts of sericite, muscovite, and/or biotite.

Numerous larger fragments consist of aggregates of sulfides (red brown sphalerite and pyrrhotite dominating) intergrown intimately with micas (biotite and muscovite), garnet, and locally chlorite and quartz. Grain size is fine to medium for sulfides and micas. Garnet forms equant subrounded to subhedral grains averaging 0.1-0.15 mm in size; most have colorless rims and pale green interiors. Chlorite occurs in a few fragments intergrown with biotite and opaque (pyrrhotite).

Several fragments consist of metamorphic aggregates dominated by quartz. Some are fine to medium grained with irregular intergrowths of secondary quartz grains, typical of a quartzite. Others show a moderate to strong foliation and generally are finer grained; these contain a variable amount of micas, mainly muscovite.

Dacite forms a few small fragments; these consist of equant aggregates of very fine to fine grained plagioclase, slightly altered to sericite.

Plutonic rocks consist of aggregates of quartz with plagioclase completely altered to sericite (quartz diorite), and containing moderately abundant opaque. One fragment appears to be of K-feldspar and plagioclase with lesser quartz.

The groundmass is dominated by extremely fine grained sericite with irregular patches of biotite ranging up to fine grained. Sulfides commonly are associated with biotite. Some biotite-rich patches contain garnet as in the fragments, and in places it is impossible to determine if the patch is a fragment or just part of the groundmass. Quartz appears to be present as extremely fine grained aggregates intergrown with sericite.

In the polished sections pyrrhotite and sphalerite, along with minor pyrite, chalcopyrite, and galena were recognized. No native gold or other gold minerals were seen.

(continued)

Cat 1 (continued)

Pyrrhotite and sphalerite each form fine to locally medium grained patches with anhedral outlines. These commonly contain minor to locally moderately abundant inclusions and irregular intergrowths of the other mineral, and some contain minor to locally moderately abundant irregular inclusions of chalcopyrite and of galena. Pyrite occurs as patches of subhedral to subrounded aggregates of grains averaging 0.05-0.15 mm in size. Sphalerite is reddish brown in color.

Cat 2 Sedimentary ± Tuffaceous Breccia with abundant fragments of Quartz-Garnet-Sulfide-Biotite vein

The rock contains a wide variety of fragments dominated by those of fine to medium grained quartz, some of which are detrital sand grains showing secondary quartz overgrowths and by those of a quartz-garnet?-sphalerite-pyrrhotite-biotite vein. These are set in a groundmass dominated by sericite, with patches rich in quartz and others containing abundant biotite and/or opaque-sphalerite.

fragments		
quartz grains	20-25%	
vein (qz-gar-sl-bi-po)	15-17	
sediments	4- 5	(quartz-rich siltstone-mudstone)
biotite	3- 5	(some with sericite, chlorite, opaque)
dacite	3- 4	
apatite	0.3	
zircon	minor	
groundmass		
sericite	35-40	
quartz	10-12	
biotite	3- 5	
sulfides	2- 3	(po,sl; possibly cpy,py,gl)

The most abundant fragments are single, angular grains of quartz ranging from 0.1 to 1.5 mm in size. Some have thin secondary overgrowths, indicating that they are detrital sand grains. Others have a recrystallized texture suggesting that they are quartzite or a quartz vein.

Many fragments consist of quartz intergrown with irregular patches of pale brown garnet?, with lesser deep red-brown sphalerite and opaque (pyrrhotite). Some fragments consist of sphalerite with chlorite or biotite, and some consist mainly of opaque-biotite or opaque-chlorite.

A few quartz-rich aggregates contain numerous tiny acicular rutile grains. One contains a fine grain of apatite. Apatite also forms grains up to 0.8 mm in size; the texture suggests that it is part of the vein material.

A few fragments consist of siliceous siltstone or mudstone. Grain size ranges from 0.05 mm in coarser siltstones to aphanitic in cherty mudstone. Sericite and minor calcite are interstitial minerals in some fragments.

Some fragments? consist of elongate flakes of biotite in irregular aggregates; some of these contain sericite-muscovite, chlorite, and/or sulfides. They may be part of the vein material.

A few fragments consist of fine to very fine grained aggregates of equant plagioclase grains in submosaic texture. These are slightly altered to extremely fine grained dusty sericite. These are dacite.

Zircon forms moderately abundant angular fragments of grains from 0.05-0.1 mm in average size. These probably are of detrital origin, and may be associated with the quartz-rich sandstones.

The groundmass is dominated by extremely fine grained, equant flakes of sericite. Biotite and chlorite each form patches of extremely fine to fine grains, scattered through the groundmass, and in part associated with irregular patches of opaque and sphalerite.

Quartz occurs in the groundmass as fine to very fine grains and clusters of grains intergrown with more or less sericite.

(continued)

At one end of the section is a large fragment or separate layer of different composition; the main distinction being that it does not contain abundant large fragments.

It contains moderately abundant anhedral to prismatic apatite grains up to 0.5 mm long and scattered patches up to 0.1 mm in size of very fine grained quartz, commonly rimmed by a thin zone of chlorite.

These are set in a groundmass of extremely fine grained sericite as in the main rock, with scattered patches of very fine to extremely fine grained biotite and chlorite, and recrystallized patches of very fine to locally fine grained sericite-muscovite. Opaque (pyrite and pyrrhotite) forms very fine grained, irregular patches. Pyrite is subhedral in some patches and single grains.