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3255 South Acoma
Inglwood
Colorado
Zip 80110

February 1, 1990

Dear Jim:

Subsequent to our telephone conversation last month, I visited the Samatosum deposit and collected the samples for the initial phase of the fluid inclusion study. Please find enclosed 14 samples - 8 from diamond drill core and 6 from the open pit, as well as sample descriptions and a brief geological description of the deposit itself.

Our interpretation is in a state of flux at the moment, having gone originally from a volcanogenic massive sulphide model to that of a predeformational epigenetic mesothermal vein system. More recent thoughts, based on relogging of the core, involve introduction of the silver (and therefore deposition of the tetrahedrite) by post-deformational ferroan dolomite-rich hydrothermal solutions that were channelled along late brittle structures which intersected an early zone of base metal-rich sulphide "seams". The structural evidence for this is so far scant, but, nevertheless, we're taking the possibility seriously in view of possible implications with respect to future exploration of the property.

These "end-member" models are reflected in the questions which I have posed at the end of the deposit description. I am sure that some of these questions will persist long after the deposit has been mined out, but I hope they provide a focus for the study.

I am still continuing my role as a consultant for Minnova and would be pleased to field any questions you might have regarding the deposit, particularly with respect

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to the structure. Your communications, however, should be directed toward Ian Pirie, senior exploration geologist for the company. His address is:

Minnova Inc.
3rd Floor, 311 Water Street
Vancouver, British Columbia
V6B 1B8

Tel.: (604) 681 3771

I hope that you can do something with the samples and look forward to the results of your study.

Yours sincerely,

J.K. Glover

Geological Consultant

SAMATOSUM DEPOSIT: SAMPLES FOR FLUID INCLUSION STUDY

SAMPLES TAKEN FROM DIAMOND DRILL CORE

FISAM 01 DDH RG 64: 108.0 metres

Yellow sericitized sediments, updip from the high silver zone: milky to clear quartz with creamy ferrodolomite and associated deformed galena and trace sphalerite.

FISAM 02 DDH RG 112: 137.0 metres

Yellow sericite + ferrodolomite altered sediments, in hanging wall of high silver zone, proximal to late brittle faulting:
Early quartz-ferrodolomite vein with zone of contact strain in ferrodolomitized country rock.

FISAM 03 DDH RG 86: 326.5 metres

Footwall of the sulphide seam; boundary between silver grey sericitized sediments above and pervasively ferrodolomitized sediments below; fuchsite occurs along the contact:
Early creamy carbonate vein with stockwork-type quartz stringers crosscutting the vein internally. Both mineral phases are early relative to the penetrative deformation.

FISAM 04 DDH RG 85: 249.0 metres

Sulphide seam within silver grey sericitized sediments:
Predeformation mineralization - pyrite, sphalerite with trace chalcopyrite; within intersection that contained 0.28% Cu, 2.9% Zn, 2.6% Pb, 43.5 gm Ag, 0.2 gm Au. Gangue - smokey quartz and (later) bull quartz.

FISAM 05 DDH RG 85: 261.5 metres

Sulphide seam within silver grey sericitized sediments:
Predeformation quartz veins: bull quartz is later than smokey quartz; minor creamy carbonate stringer, possibly ferrodolomite.

FISAM 06 DDH RG 124: 59.3 metres

Ferrodolomitized mafic volcanics (hanging wall of the ore zone):
Bull quartz vein with ferrodolomite and pyrite, chalcopyrite, galena; vein crosscuts the foliation in the mafics (late relative to the penetrative deformation). Sulphides possibly remobilized from the ore zone.

FISAM 07 DDH RG 123: 97.3 metres

Yellow sericitized and carbonatized sediments in the hanging wall of the high silver zone:
Vein of white/clear quartz with branching ferrodolomite stringers (stained blue) and smokey quartz with euhedral pyrite.

FISAM 08 DDH RG 123: 110.4 metres

High silver zone in yellow sericitized sediments:
Smokey quartz vein cut by stringers of white quartz and carbonate, and (possibly later) planar veinlets of white quartz with carbonate margins.

SAMPLES TAKEN FROM THE OPEN PIT*

FISAM 09: 1297.5 metre bench

Footwall of the ore zone (4 metres): grey smokey quartz cut by stringers and veins of white quartz.

FISAM 10: 1297.5 metre bench

Footwall of the ore zone (2 metres): fuchsitic silver grey sericitized sediments cut by carbonate vein.

FISAM 11: 1297.5 metre bench

Footwall part of the ore zone: white quartz vein with tetrahedrite, sphalerite, galena and chalcopyrite in yellow sericitized sediments.

FISAM 12: 1297.5 metre bench

Ore zone in silver grey sericitized sediments, immediately below the contact with overlying yellow sericitized sediments: white quartz with minor carbonate and tretrahedrite, chalcopyrite, sphalerite and galena.

FISAM 13: 1297.5 metre bench

Yellow sericitized sediments in immediate hanging wall of ore zone: barren white quartz vein.

* N.B. All the above samples were taken from veins that were folded and/or boudined during the penetrative deformation of the country rock, i.e. they are early.

FISAM 14: 1390.0 metre bench

Hanging wall mafic volcanics: white quartz vein cut by stockwork of clear quartz stringers with chalcopyrite and pyrite, and minor sphalerite. Vein margins concordant with foliation in the country rock, but the vein was not visibly boudined or folded - late?

GENERALIZED DESCRIPTION OF THE GEOLOGY OF THE DEPOSIT

The Samatosum deposit comprises about 600,000 tonnes grading 1100 g/t Ag, 1.8 g/t Au, 1.2% Cu, 3.5% Zn and 1.7% Pb. The main sulphides are tetrahedrite (the principal silver mineral), sphalerite, galena, chalcopyrite and pyrite. They are hosted by folded and boudined bull quartz veins and are commonly associated with minor creamy coloured ferroan dolomite inclusions and stringers within the quartz. Some parts of the ore deposit, however, do have a more massive appearance, and a barite zone has been recognized in the upper part of the sequence to the west of the deposit.

The deposit consists of a tabular to lensoid shaped body (the high silver zone) that dips at 30 to 40 degrees toward the northeast and plunges at a shallow angle toward the east-southeast. It is hosted by an upright (?) sedimentary sequence comprising argillite, siltstone, and quartz and lithic wackes, sedimentary structures within which indicate deposition as distal turbidites. These host rocks are structurally (?) overlain by a mafic volcanic sequence that contains lapilli tuff, pillow lava and ash tuff.

The whole succession is assigned to the Paleozoic Eagle Bay Formation, which was regionally deformed and metamorphosed during the Jura-Cretaceous Columbian Orogeny - both the volcanic rocks and sedimentary rocks were penetratively deformed to produce a pervasive, shallow to moderate, northeasterly dipping foliation. This fabric is defined by chlorite in the volcanics and sericite in the sediments, indicative of lowermost greenschist facies metamorphism.

Within the sediments, the foliation is axial planar to small-scale northwesterly plunging tight to isoclinal asymmetric folds. Fold vergence is toward the southeast. Folds of the ore-bearing quartz veins have a similar geometry (although their plunges are commonly shallow toward the east-southeast). Zones of contact strain adjacent to the veins are reflected by both the intensity and geometry of the foliation in the wall rock. The sulphides exhibit both brittle and ductile deformation - e.g., intensely deformed and dislocated crystals of galena define a fabric around boudined layers of sphalerite. Therefore, it seems clear that at least the main phase of mineralization to be due to reaction of the hydrothermal solutions with the wall rock as a consequence of a change in P-T conditions at the silver-grey sericite "front". Zones of silicification may have acted as ground preparation for the development of brittle fractures, along which the later hydrothermal fluids passed.

The distribution of ferroan dolomite alteration is still poorly understood - diamond drill core from only a few drill sections through the ore body has been stained to date. But so far it appears that at least two phases of ferrodolomitization are represented: an early phase that occurred synchronously with the main phase of mineralization and alteration, i.e., prior to the penetrative deformation of the host rocks; and a late phase that followed brittle fault zones which cross-cut the foliation. Pervasive, finely disseminated ferrodolomitization of the country rock occurs in some places, particularly within the lower part of the mafic sequence and, to a lesser extent in the footwall of the silver grey sericite zone. Whether this is partly a function of primary lithology is not known.

Questions to be answered:

1. Is there a syngenetic component to the mineralized system - could the deposit be a structurally dismembered feeder zone to a volcanogenic massive sulphide?

2. Are the lowest parts of the mineralized system, i.e., the sulphide seams and associated quartz-carbonate veins, the deeper, higher temperature parts of an epigenetic system? Is this gradient reflected by lower temperatures and/or differing fluid compositions in the higher parts of the system, i.e., quartz-carbonate veins from the deposit itself?

3. Is there any evidence for structural juxtaposition and imbrication of strikingly different parts of the mineralized system within the ore body itself - are there any marked gradients from footwall to hanging wall recorded by comparison of samples taken from the pit?

4. Is there any evidence to suggest that late, lower temperature (?) solutions played a significant role in deposition of the ore bearing minerals, especially tetrahedrite?

5. Is there any evidence from fluid inclusion data to suggest that remobilization of the ore occurred along late brittle fractures (especially FISAM ~~08~~ 06 from the mafics)?

occurred prior to this deformation.

Small-scale (?) southwesterly directed thrust faults that are subparallel to the foliation occur throughout the sedimentary sequence and appear to imbricate the ore zone. These faults are believed to have developed late in the same period of deformation that produced the foliation.

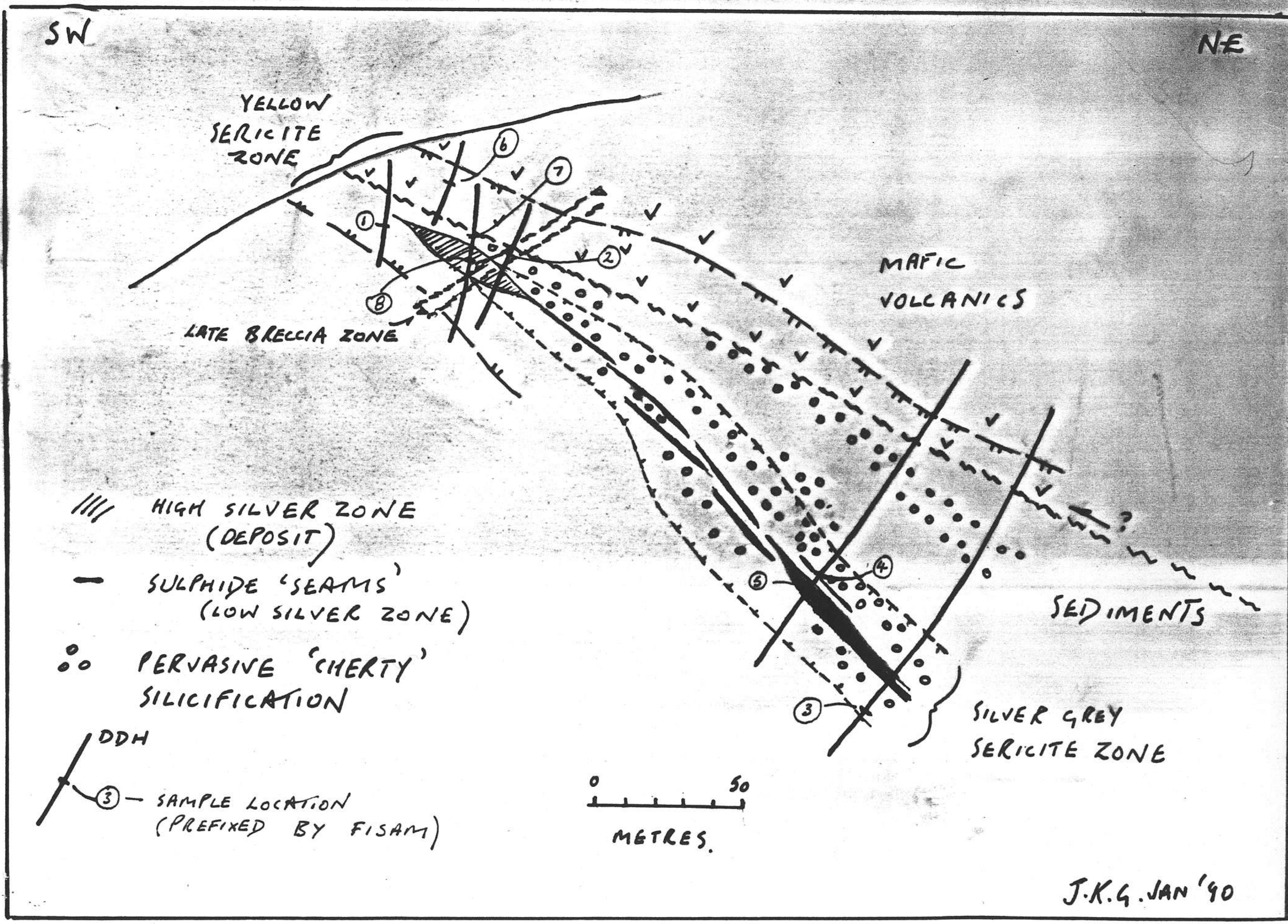
Two types of sericite - silver grey and yellow - occur within the sediments close to the ore zone. These give the host rocks a phyllitic sheen that is not present away from the mineralized system. The distribution of these micas is schematically shown on the cross section, but in detail the contact between them is much more irregular. Preliminary probe and XRD analyses suggest relict biotite and K-spar in the silver grey sericite zone but not in the yellow sericite zone, although this has yet to be substantiated.

The silver grey sericite zone is in part the host for the ore deposit, but extends downdip at a slightly steeper angle. In addition to the sericite, this zone also contains 10 to 40% finely disseminated pyrite. The quartz content varies from about 20% to 80% in the form of pervasive grey cherty quartz with ghosted white veins and stockworks. Many of the quartz veinlets contain significant amounts of pyrite, sphalerite, galena and chalcopyrite within them and in semi-massive seams along their margins. In areas of intense stockworking these seams may coalesce to form "massive" low silver sulphides in a bull quartz matrix. These zones were originally thought to be volcanogenic and syngenetic in origin. The preferred model at the moment is that these represent the deeper levels of the same mineralizing system that produced the high silver zone that defines the Samatosum deposit, and are therefore epigenetic.

The yellow sericite zone appears to surround the silver grey sericite zone, although it is not always present on the footwall side. It commonly contains abundant folded and boudined bull quartz veins and stringers. Pyrite is associated with the sericite in the wall rock of these veins.

Zones of intense silicification commonly (but not always) occur within and peripheral to the silver grey sericite. These comprise pervasive grey "chert", cut by a stockwork of coalescing and ghosted bull quartz veins and stringers. Individual zones of this type are poorly defined in three dimensions, but appear to be shoots or pipes, based on their surface expression as resistant knobs with no strike extent.

The ore body occurs close to the contact between the silver grey sericite zone and the outer zone of yellow sericite. Therefore, deposition of the sulphides is thought


SW
NE
YELLOW SERICITE ZONE
LATE BRECCIA ZONE
MAFIC VOLCANICS
SEDIMENTS
SILVER GREY SERICITE ZONE
HIGH SILVER ZONE (DEPOSIT)
SULPHIDE 'SEAMS' (LOW SILVER ZONE)
PERVASIVE 'CHERTY' SILICIFICATION
DDH
SAMPLE LOCATION (PREFIXED BY FISAM)
0
50
METRES.
J.K.G. JAN '90