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Saskatchewan Mining Development Corporation

MEMO

From L. A. Clark

Date 1980 March 14

To Files

Your Ref. 826041 Kutcho Creek

Re GAC CORDILLERAN SECTION MEETING - JAN. 26, 1980

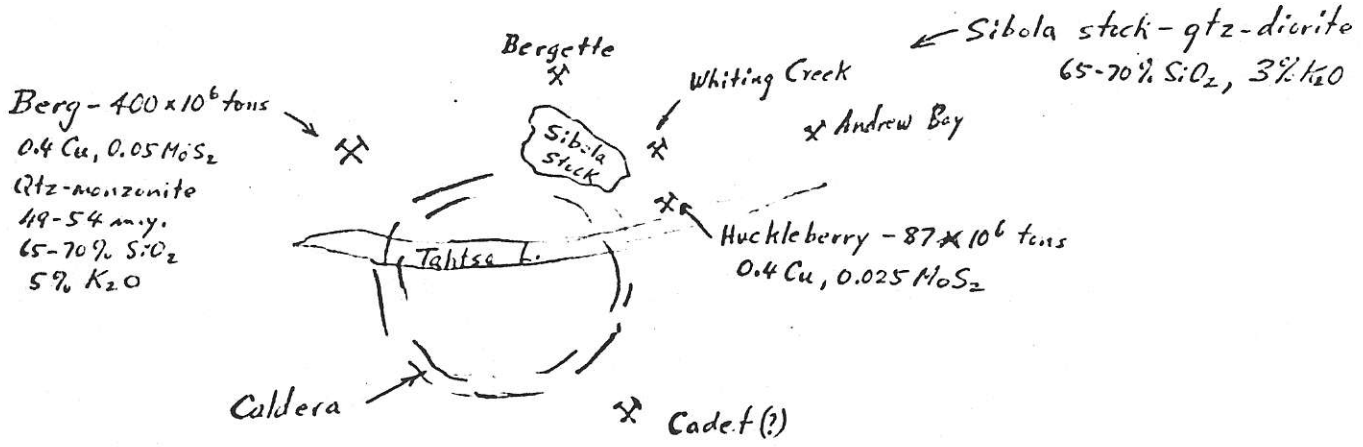
Our File

The 1980 symposium was entitled "Volcanogenic Deposits & Their Regional Setting in the Canadian Cordillera". While I was unable to attend the January 25th session, the following notes are from some of the more interesting papers on the Saturday session with abstracts for these appended. Massive sulphide deposits of the Anyox area were reviewed by Bob Sharp. These deposits were mined out prior to 1936 and were considered to be the products of selective hydrothermal replacement but now are considered to be volcanogenic. The deposits included the Hidden Creek which contained 21.7 million tonnes of 1.5% copper and two other deposits of less than one million tonnes each. Most rocks in the area are pillowed basalts and the Hidden Creek deposit lies between these and an overlying argillite. The basalts are chloritized, cut by quartz-albite veinlets and contain disseminated pyrite. There are some siliceous sinter deposits along the ore horizon and alteration in the basalts is probably a good exploration guide, but copper dispersion into the altered volcanics is very restricted and a broad copper halo should not be expected.

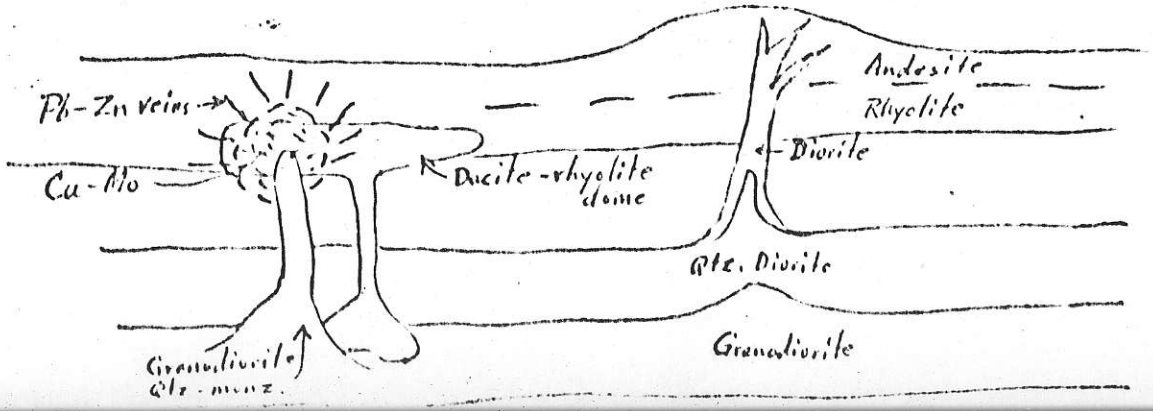
The Kutcho Creek massive sulphide deposits southeast of Dease Lake were described by Dane Bridge. The deposits occur along a strike length of 3½ kilometres and the various deposits are owned either by Esso Minerals or Sumac Mines. The ore horizon occurs at the top of a rhyolite lapilli tuff unit. The deposits occur along a suttle ridge or dome which appears to have had an affect on volcanic accumulations stratigraphically above the deposits. Hanging wall rocks extending in opposite directions are lapilli crystal tuff and quartz-feldspar crystal tuff which undergo a facies change in the general vicinity of the deposits. Irregular and discontinous basaltic flows of limited lateral extent also occur in this facies change zone above the ore deposits. Dolomite-sericite alteration is ubiquitous in the footwall rocks

and dolomite-quartz lenses occur in the ores and hanging wall rocks. Mg-chlorite is a minor component of footwall schists. Both hanging and footwall rocks are depleted in Na_2O and enriched in K_2O, MgO , and SiO_2. Footwall schists average 79.3% SiO_2 compared with 74.6% where believed to be unaltered - obviously these are very siliceous volcanic rocks. A halo of disseminated hematite occurs in the hanging wall units immediately above the ore bodies.

A history of plutonism, volcanism, and hydrothermal activity in the Tahtsa Lake porphyry copper-moly district was given by Don MacIntyre. He described the large scale caldera feature in the vicinity of several porphyry Cu-Mo deposits as shown in the following sketch:



He noted that the Sibola stock near which the Whiting Creek and Bergette sulphide systems occur is a quartz diorite-granodiorite pluton containing 3% K_2O and 65 to 70% SiO_2 and was intruded at 83 to 87 m.y. between the time of the 87 m.y. caldera collapse and the 74 to 83 m.y. eruption of porphyritic intrusives and volcanics. A later resurgence at 49 to 54 m.y. gave rise to the quartz monzonite pluton with which the Berg deposit is associated. These relations are shown schematically below.



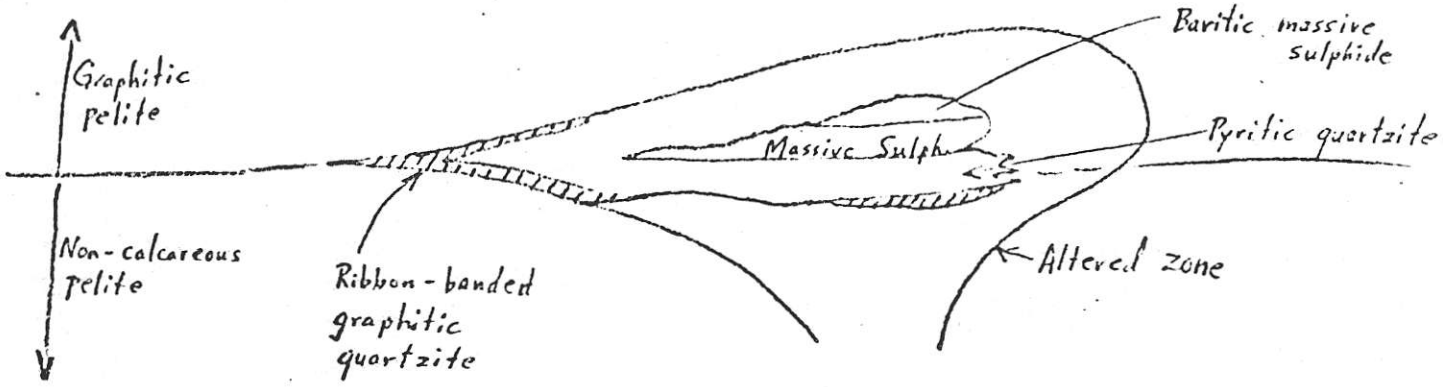
This sounds interesting
Where is it?

Chua massive sulphide deposit in the Barriere Lake area was described
cMillan. He reported that Craigmont Mines Limited has outlined
...llion tonnes of 2% copper, 0.4% zinc, 0.4 grams gold per ton and 8 grams silver per ton. Discovery involved tracing a major stream and soil copper anomaly up slope to a smaller copper anomaly associated with a massive magnetite lens. The host rocks are pillowed basalt with the massive sulphide deposit occurring in association with magnetite loads along a cherty siliceous horizon and with the basalts being altered on one side of this horizon (it sounds very much like the Anyox setting). The chert is feldspathic and contains some interbedded argillite. Other nearby rocks for which the association was not clear to me included something called "conglomerate" containing chert pebbles and breccia fragments of "quartz eyes" rhyolite, and a quartz porphyritic rhyolite breccia occurs farther east. The basalts are tholeiitic.

Noranda's Gold Stream deposit was described by Brian Hughes. It occurs 70 km north of Revelstoke along the Big Bend highway and was found where a new logging road exposed malachite and azurite. He reported 3.4 million tonnes at 4.49% copper, 3.24% zinc, and 19 grams silver per ton. Two deposits of similar material called Standard and Montgomery were evidently mined out in the 1890's. Graphitic phyllites host the Gold Stream deposit and the hanging wall contains a banded chert within which metamorphism has developed abundant manganese garnets. Rocks adjacent to the ore are silicified and sericitic phyllite with disseminated sulphides. Massive sulphides contain pyrrhotite, calcopyrite, sphalerite, and minor pyrite and galena together with glassy quartz eyes. Photographs showed small inclusions of quartz and other rocks in the massive sulphides and evidence of strong plastic deformation reminiscent of that seen in the Snow Lake district, Manitoba.

Volcanic rocks in the area of the Anvil deposit were described by Dave Jennings et al. Six massive sulphide deposits and two prospects totalling 225 million tonnes occur along a slightly curved line over a

distance of several kilometres. While volcanic rocks occur interlayered in some of the deposits, they appear to bear no genetic relationship. More extensive basic volcanic rocks called the Mackenzie Creek volcanics occur to the northeast but again are believed to be unrelated to the mineralization. A simple composite diagram was shown to illustrate the Anvil-type deposit but not all of the deposits show each of the features illustrated in the following sketch:



He noted that the base of the deposits were characteristically zinc-rich while the tops are lead-silver rich. He gave a speculative genetic model involving circulation of hydrothermal fluids within the thick Windermere grit or sandstone formation. These solutions periodically break through the overlying Mount Mye shale which acts as a cap rock depositing massive sulphides in the overlying Vangorda Formation. He suggests that the Mackenzie Creek volcanics which generally correlate with the Road River formation may have erupted upwards through similar structures which channel the hydrothermal fluids. Indeed a magma chamber deep in the crust beneath the Windermere Formation, or a sub-volcanic chamber within the Windermere Formation may have provided a heat source to drive the convecting hydrothermal cells. He speculated that graben structures at the base of the Windermere may have given rise to similar zones of weakness in the overlying formations which channelled hydrothermal solutions and magmas.

LAC/mam
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