Cyprus Anvil Mining Corporation

Interoffice Correspondence

006969

File 8-7-80 4

To Distribution

Copy to J. Levanaho

From P. Taggart

Date January 5, 1983

Subject

MICROSCOPIC EXAMINATION OF LEAD CONCENTRATES

Samples of lead concentrates originating from locked cycle tests (KMIII 29 [EF], 30 [CD] and 32 [A]) were sent to Vancouver Petrographics in December 1982 for microscopic, mineralogical examination. Analysis was performed upon cyclosizer fractions of the concentrates.

The results of this work are attached and indicate certain interesting trends.

1. In no case does there appear to be a significant "middlings problem" since 90% of the grains observed in all products consisted of single minerals.

2. Silica was only observed in significant quantities in A-type ores. Amounts of silica in CD concentrates are lower than might have been expected.

3. The occurrence of galena;

   a) remains relatively constant throughout the size range of CD concentrates.

   b) increases as the sizing decreases in EF concentrates.

   c) dramatically decreases as the size decreases in A concentrates. A corresponding significant increase in the number of free silica grains is noted.

   The attached curves serve to illustrate the above and should be reviewed in conjunction with recovery by size data. For example the use of gravity separation techniques (multiple, small diameter hydroclones) may be a viable alternative to post-flotation circuits in our efforts to upgrade the lead concentrates generated from A-type ores. Such an arrangement may be very compatible with current plans to cyclone concentrates prior to the thickening process.

4. Chalcopyrite was most evident in the samples derived from CD ore and accounts in part for the lower concentrate grade produced. It is noted also that chalcopyrite occurs as sub-micron sized inclusions in grains of sphalerite.

5. No evidence of graphite could be found. It is therefore assumed that this soft material was preferentially ground to such a degree of fineness that it was beyond the limit of detection using the techniques employed.

6. No evidence of silver or gold was reported.

The quality of the photomicrographs was most disappointing. In fact, due to the difficulty in differentiating between the pyrite, chalcopyrite and galena grains, the prints are virtually of no value. Since it obviously is possible to obtain useful photographs Lee Pigage (CAMC Vancouver) has offered to do some work in this regard on the same samples.

There is no doubt that more work should be done in this regard as an integral part of the program in progress to investigate the effects of fine grinding of lead and zinc metallurgy. Such work should be modelled in part on the studies carried out by David Carson in his "Geological and Mineralogical Investigation of the Metallurgy of the Grum Orebody".

PT/mw

P. Taggart

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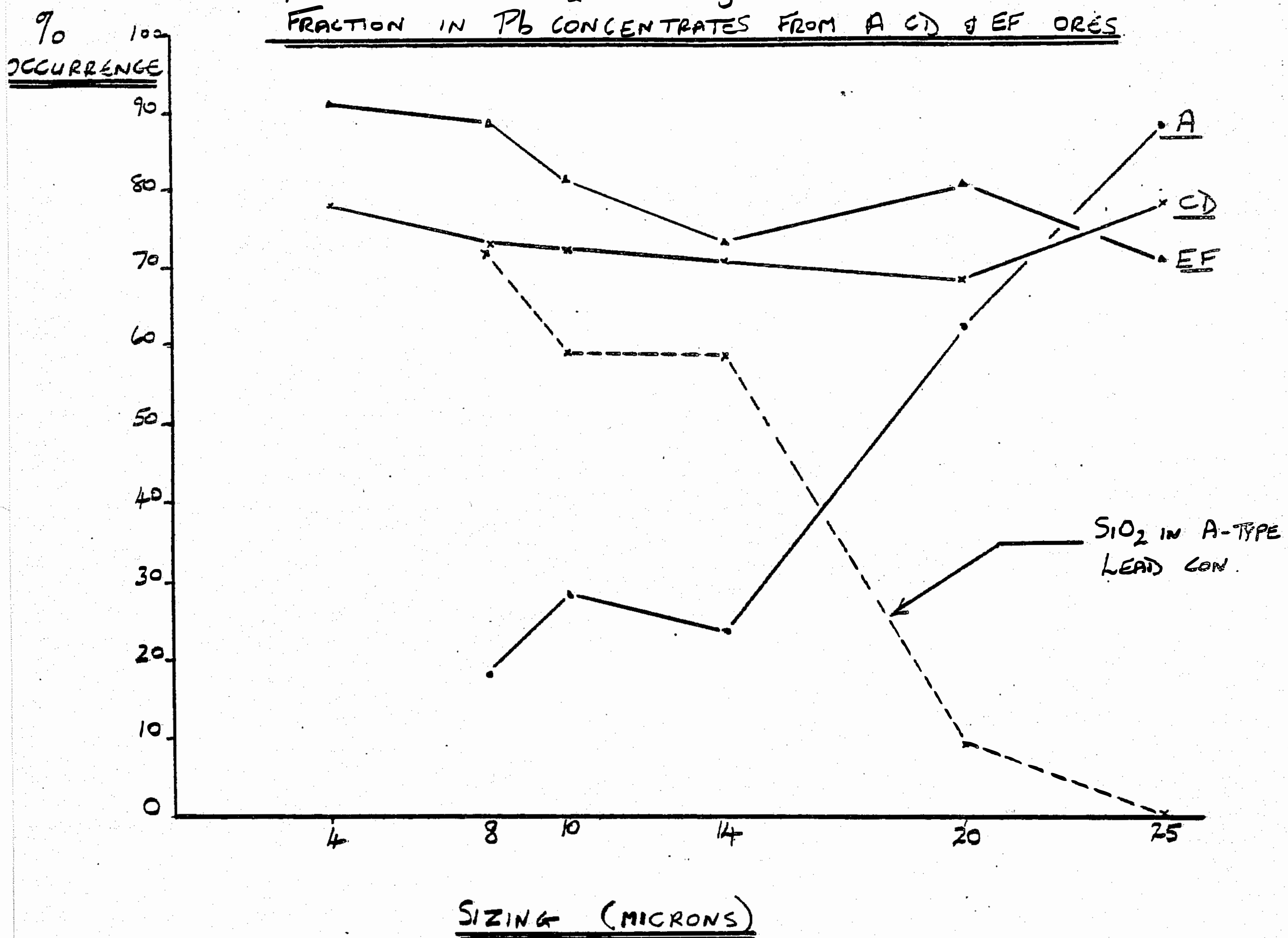
% OCCURRENCE OF GALENA GRAINS BY SIZE FRACTION IN Pb CONCENTRATES FROM A CD & EF ORES



NB the −8 μ FRACTION IS ARBITARILY PLOTTED AT 4 μ
+ 25 μ IS ARBITARILY PLOTTED AT 25 μ

Vancouver Petrographics Ltd.

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

29- EF
30 - CD
32 - A

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Report for: L. P. Taggart,
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December 16, 1982

Samples: 17 concentrate samples of various size fractions from three tests labelled KM111-29,KM111-30,KM111-32. Submitted by Kamloops Research and Assay Laboratory Ltd.

The results of the examination of these samples is presented in three tables - TEST 29,TEST 30,TEST 32 which list the percentages of each mineral and mineral aggregate in each size fraction. The samples were examined under a reduced field of view and each grain counted; up to 35 random spots on the sections were examined. At least 1000 grains were counted in each case.

Over 90% of the grains consisted of single mineral grains in each TEST and all size fractions. The minerals are galena,pyrite,sphalerite,chalcopyrite and silicates. Only TEST 32 contained significant silicates. The silicates were not identified because of the small grain size.(A normal thin section is 30µm thick.)

Silicate-sulphide aggregates are uncommon,only exceeding 1% of the grains in the +14µm fraction of TEST 32.

Aggregates of more than two sulphides are very rare and only occured in the medium fractions of TEST 29 and TEST 30. They are not included in the tables.

Sulphide pairs are listed in the order of the dominant mineral. Thus each mineral pair is listed twice. In the great majority of cases the second mineral forms less than 20% of the total area in the aggregate. A grain was only counted as a mineral pair if the adhering mineral exceeded 2µm in one dimension. Discounted "pairs" were rare.

About half of the mineral pairs in all TESTS and all size fractions are sphalerite-galena or galena-sphalerite aggregates with sphalerite-galena dominant. Pyrite-galena pairs are common;all others are minor.

Particle locking is simple. In most cases the grain boundary is a straight line or an arc of a circle. Aggregates of more than two grains,ie. more than one grain of each mineral, are uncommon. Complex intergrowths or inclusions of one mineral in another are rare.Sphalerite often contains submicron sized inclusions of chalcopyrite; these were not counted as aggregates. Larger grains of chalcopyrite partly included in sphalerite were counted. Mineral aggregates will be illustrated in photomicrographs which will be submitted in the next week or so.

A. L. Littlejohn

A. L. Littlejohn, M.Sc.

TEST 30

	+25 µm	+20 µm	+14 µm	+10 µm	+8 µm	-8 µm
ga	78.44	68.42	70.19	72.44	72.89	78.15
sp	2.57	6.35	7.02	7.11	7.80	7.84
py	9.91	11.52	8.32	5.81	5.04	4.51
cpy	1.74	4.72	6.30	9.45	8.90	6.53
sil	0.18	0.73	0.97	1.30	1.02	-
total	92.84	91.74	92.80	96.11	95.65	97.03
ga - sp	1.56	1.54	1.05	0.69	0.63	-
ga - py	0.28	0.18	0.08	0.09	0.08	-
ga - cpy	-	0.09	-	-	-	-
sp - ga	2.57	3.90	3.23	2.43	1.97	1.78
sp - py	-	0.09	-	0.09	-	-
sp - cpy	0.37	0.27	0.40	0.09	0.24	0.12
py - ga	1.38	1.30	0.65	0.17	0.39	0.48
py - sp	0.28	0.45	0.16	-	-	0.36
py - cpy	0.09	-	0.08	-	-	-
cpy - ga	0.28	0.18	0.16	0.17	0.16	-
cpy - sp	0.28	-	0.81	-	0.79	0.24
cpy - py	-	0.09	-	-	0.08	-
sil - sul	0.18	0.09	0.36	0.34	-	-
total	8.08	8.18	6.98	4.07	4.34	2.98

TEST 29 EF

	+25 μm	+20 μm	+14 μm	+10 μm	+8 μm	-8 μm
ga	70.62	80.40	73.72	81.68	88.38	91.12
sp	3.74	1.53	4.62	4.48	4.26	2.91
py	16.13	10.25	11.14	7.99	4.05	1.64
cpy	0.43	0.45	1.38	1.11	1.15	3.09
sil	0.43	0.09	0.13	0.20	0.27	-
total	91.32	92.72	90.99	95.46	98.99	99.56
ga - sp	0.96	1.08	1.75	0.72	0.27	0.45
ga - py	0.86	0.72	0.88	0.20	0.14	-
ga - cpy	0.11	-	0.25	0.13	-	0.09
sp - ga	2.03	2.25	3.25	1.82	0.74	0.55
sp - py	-	-	-	-	-	-
sp - cpy	0.32	0.27	0.25	0.20	0.14	-
py - ga	4.12	2.52	2.38	1.24	0.27	-
py - sp	0.21	0.09	-	-	0.20	0.09
py - cpy	-	-	0.25	-	-	-
cpy - ga	-	0.09	0.25	0.20	-	-
cpy - sp	-	0.09	0.13	-	0.07	-
cpy - py	-	-	-	-	-	-
sil - sul	-	0.18	-	0.07	0.14	-
total	8.29	7.02	9.39	4.58	1.97	1.18

TEST 32 A

	+25 µm	+20 µm	+14 µm	+10 µm	+8 µm	-8 µm
ga	88.28	62.18	24.26	28.15	18.63	no sample
sp	3.13	11.33	8.88	7.87	5.31	
py	4.69	8.61	3.87	0.72	1.31	
cpy	0.22	1.12	1.37	1.23	1.39	
sil	0.11	9.46	57.97	58.93	72.44	
total	96.43	92.40	96.35	96.90	98.90	

ga - sp	1.23	1.03	0.23	-	-
ga - py	-	0.09	-	0.04	-
ga - cpy	0.22	0.47	0.11	-	-
sp - ga	1.34	2.99	1.71	0.80	0.38
sp - py	-	0.19	0.11	0.04	-
sp - cpy	0.11	0.19	0.46	0.20	0.08
py - ga	1.11	0.84	0.11	0.20	-
py - sp	-	0.19	0.23	0.08	-
py - cpy	-	-	-	-	-
cpy - ga	0.33	0.28	-	0.04	-
cpy - sp	-	-	-	-	-
cpy - py	-	-	-	-	-
sil - sul	0.44	0.83	1.14	0.04	0.46
total	4.78	7.10	4.10	1.44	0.92