

REPORT
of the
ORE DRESSING AND METALLURGICAL LABORATORIES

Report No. 247

The concentration of a complex gold and silver ore from Alberni, B.C.

by C. S. Parsons

Shipment: A shipment of ore, one bag weighing 70 pounds, was received from A. L. Smith, Esq., Alberni, B.C. on Jan. 26, 1926

Character & analysis : The sample received was an oxidized ore containing gold, silver, copper, lead, and zinc. Analysis:

Copper	0.92 %	Lead	1.00 %
Zinc	6.54 %	Gold	0.70 oz/ton
Silver	3.52 oz/ton		

The sample contained both iron and arsenical pyrites. The sulphides of iron had in part undergone oxidation and had been leached, leaving the ore in a porous and weathered looking condition. A part of the copper sulphide had been altered to carbonates. The oxidized condition of the sample indicates that the gold, on account of its insolubility, has been concentrated in this weathered material.

Purpose of experimental tests: The following experimental work was undertaken in order to find a method of concentrating the ore.

Experimental Tests:

Test No. 1 - This test was run with the idea of making a selective flotation separation between the copper, lead, and zinc, the copper and lead being floated in one concentrate and the zinc in another. The ore was ground with the following reagents to pass approximately 48 mesh

Lead & copper reagents: 10 lb/ton Soda ash
0.2 " Thiocarbonyl
0.2 " Sodium cyanide

The flotation of a lead-copper concentrate was not successful, the zinc

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tending to float in large amounts. The soluble sulphates in the ore, owing to its oxidized condition, destroyed the cyanide and prevented it from fulfilling its function of having a deadening effect on the zinc sulphides to prevent their floating.

Test No. 2 This test was run to produce a bulk concentrate of the copper, lead, and zinc. The ore was ground to approximately 48 mesh and the following reagents used for flotation:

12 lbs/ton Soda ash
0.08 " Water gas tar

These were ground with the ore, and the following added directly to the flotation cell:

0.3 lb/ton Xanthate
1.0 " Copper sulphate
Sufficient pine oil to froth

The flotation concentrate was recleaned and the middling and tailing combined and tabled.

Test No. 3: This test was also run to produce a bulk concentrate, but under different conditions to test no. 2. The object in this test was to determine the effect of using lime in place of soda ash on the silver and gold values. The ore was ground to approximately 48 mesh and the following used.

10 lb/ton Lime ground with ore
0.3 " Xanthate added to cell
1.0 " Copper sulphate "
sufficient pine oil to froth

The flotation concentrate was recleaned and the middling and tailing combined and tabled

Results:

Test No	Product	Weight %	Assays					Percent of values				
			Cu %	Pb %	Zn %	Au oz	Ag oz	Cu	Pb	Zn	Au	Ag
1	Concentrate	18.5	4.24	5.15	33.54	3.32	18.40	85.0	98.5	94.7	737	833
	Tailing	81.5	0.16	0.02	0.42	0.27	0.71	15.0	1.5	5.3	263	147
2	Flot. conc.	14.4	3.99	5.95	39.11	1.64	16.84	65.6	88.0	86.9	35.0	657
	Table "	5.1	0.70	0.75	1.40	5.16	5.50	4.1	3.8	1.1	387	7.6
	" tailg	80.5	0.33	0.10	0.96	0.22	1.22	30.3	8.2	12.0	263	267
3	Flot. conc.	13.7	5.14	7.12	41.90	4.64	23.36	73.8	96.3	80.4	339	775
	Table "	6.2	0.56	0.50	3.48	3.79	4.01	3.6	3.0	3.0	448	6.0
	" tailg	80.1	0.27	0.06	1.48	0.14	0.35	22.6	0.7	16.6	213	165

Summary and Conclusions: The oxidized condition of the sample makes it practically impossible to effect a selective separation by flotation, between the copper, lead, and zinc. If there is a large tonnage of this type of ore to be treated and a greater profit can be

obtained by marketing a copper-lead concentrate and a zinc concentrate separately, it is possible that the bulk concentrate can be retreated and a selective separation effected between these minerals by flotation in a separate unit. Such a separation remains to be worked out and it will be necessary to conduct some experimental work on a larger scale than used for these tests.

In recleaning the first flotation concentrate to raise the zinc content to a marketable grade, considerable gold is dropped. By the use of tables the greater part of this gold can be recovered in a concentrate of small bulk and high grade. This is shown clearly in tests nos. 2 and 3.

The recoveries of gold and silver are not high, but considering the oxidized condition of the ore they can be considered as fairly satisfactory.