

CALCULATION OF VALUE OF VANGORDA CREEK ORE BASED ON SEPTEMBER, 1954 CALCULATIONS BY C. L. COLEMAN AND ON CONCENTRATING RESULTS OF TEST NO. 18 BY THE MINERAL DRESSING LABORATORY OF THE BUREAU OF MINES, OTTAWA.

Assume average grade of Vangorda Creek ore will be: Pb - 3.05%
Zn - 4.84%
Cu - 0.30%
Ag - 1.84 oz/ton
Au - 0.02 oz/ton

and that there will be some dilution with graphitic schist.

Further assume that 50% of the Cu is recoverable in the lead concentrate and that the various concentrates will be as follows:

Lead Concentrate 40% Pb - with 75% Pb recovery
& 50% Cu "
Zinc Concentrate 48% Zn - with 63% Zn "

Assume 60% silver and 75% gold recoveries.

Lead

Lead content of ore 3.05% - 61 lbs. per ton
Recovery in lead concentrate 75% - 45.75 lbs. per ton of ore
Assume 40% lead concentrate - 800 lbs. per ton of concentrate
Rates of concentration 800 = 17.5
45.75

Lead paid for in concentrate .925 x 800 lbs. = 740 lbs.
= 740 = 42.3 lbs. per ton of ore
17.5

ZINC

Zinc content of ore 4.84% - 96.8 lbs. per ton
Recovery in zinc concentrate 63% - 61.0 lbs. per ton of ore
Assume a 48% zinc concentrate - 960 lbs. per ton of concentrate
Rates of concentration 960 = 15.74
61.0

Zinc paid for in concentrate .82 x 960 = 787.2 lbs. per ton of concentrate
= 787.2 = 50.0 lbs. per ton of ore
15.74

COPPER

Copper content of ore 0.30% - 6 lbs. per ton
Recovery in Pb concentrate 50% - 3 lbs. per ton of ore
Copper in Pb concentrate = 17.50 x 3.0 = 52.5 lbs. per ton of concentrate

Copper paid for in concentrate = (52.5-20) = 32.5 lbs. per ton of concentrate,
= 1.86 lbs. per ton of ore.

SILVER

Silver content of ore = 1.84 oz. per ton
Total recovery 60% = 1.104 oz. per ton
Paid for in lead concentrate (.95 x 1.104 x 17.5) - 1 = .99 oz. per ton
17.5 of ore.

GOLD

Gold content of ore 0.02 oz. per ton
 Total recovery 75% = .015 oz/ton
 Paid for in lead concentrate (.95 x .015) = .0142 oz. per ton

Smelter, Transportation, etc. Costs

Lead -

Treatment charge (C.L.C.)	\$ 12.00	?	per	ton	of	concentrate
Refinery 2.70¢/lb.	21.60	"	"	"	"	"
Sampling & assaying	.30	"	"	"	"	"
Road transportation	15.75	"	"	"	"	"
Rail & ocean transport	<u>27.50</u>	"	"	"	"	"
	77.10	"	"	"	"	"
Credit 5 units of silica at 14¢	<u>.70</u>	"	"	"	"	"
	76.40	"	"	"	"	"

Cost/ton of ore = $\frac{\$76.40}{17.5} = \4.36

Zinc -

Treatment charge (C.L.C.)	12.00	per	ton	of	concentrate
Iron penalty - say 3 units at 50¢	1.50	"	"	"	"
Refinery 4¢/lb.	31.49	"	"	"	"
Sampling & assaying	.30	"	"	"	"
Road transportation	15.75	"	"	"	"
Rail & ocean transport	<u>27.50</u>	"	"	"	"
	\$ 88.54	"	"	"	"

Cost per ton of ore = $\frac{\$88.54}{15.74} = \5.42

Copper ?

Marketing ?

Total transportation, smelter & refinery charges = \$9.78 per ton of ore

Mining Costs

C. I. Coleman has estimated Operating Costs of a large scale operation at \$3.50 per ton

Ore Valuation

In calculating the value of ore, the following metal prices have been used:

- Copper at 24, 27, 30, 33 & 36¢ per lb.
- Lead at 12, 13, 14, 15 & 16¢ per lb.
- Zinc at 9, 10, 11, 12 & 13¢ per lb.
- Gold at \$34.00 per ounce.
- Silver at 85¢ per ounce.

Value Per Ton of Ore

		Cu - 24¢	27¢	30¢	33¢	36¢
Recoveries Per		Pb - 12	13	14	15	16
Ton of Ore		Zn - 9	10	11	12	13
Copper	1.86 lbs.	\$.45	\$.50	\$.56	\$.61	\$.67
Lead	42.3 lbs.	5.08	5.50	5.92	6.34	6.77
Zinc	50.0 lbs.	4.50	5.00	5.50	6.00	6.50
Gold	0.0142 oz. at \$34.00	.48	.48	.48	.48	.48
Silver	0.99 ounces at 85¢	.84	.84	.84	.84	.84
TOTALS		\$ 11.35	\$ 12.32	\$ 13.30	\$ 14.27	\$ 15.26
Total Transportation						
Smelter & Refinery Charges		\$ 9.78	\$ 9.78	\$ 9.78	\$ 9.78	\$ 9.78
Margin available to cover all operating charges		\$ 1.57	\$ 2.54	\$ 3.52	\$ 4.49	\$ 5.48

SUMMARY

In the one test run with graphitic schist as dilution with the ore, the graphite had a very serious effect on the results. In actual operations there would no doubt be some dilution by both graphite schist and sericite schist, both of which could be harmful in a flotation circuit.

However, in a plant no doubt much of such gangue could be eliminated in the mill circuit ahead of flotation thru the use of sink-float and other methods. Sink-float might be used on the + $\frac{1}{4}$ " material and Dorrclones might eliminate much of the lighter gangue from the finer products.

I was recently informed that much graphite can be depressed in a base metal flotation circuit thru the use of special reagents. In Test No. 18 apparently no such special reagents were used. It would seem reasonable to expect that further test work might produce much better results even if dilution rock contained both graphite and sericite schists.

This calculation was done to ascertain what results might be expected if no solution could be found to a bad metallurgical character of the ore.

Signed.....*W. S. Row*.....
W. S. Row

WSR/PLT.

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