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DEPARTMENT OF MINES AND RESOURCES

BUREAU OF MINES

CANADA

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Ottawa, January 8, 1947.

REPORT

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 2164.

Gravity and Flotation Concentration of Lead-Zinc Ore from the Van Mer Mines Limited, Tichborne, Ontario.

Note:

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This report relates essentially to the samples as received. It shall not, nor any correspondence connected therewith, be used in part or in full as publicity or advertising matter for the sale of shares in any promotion.

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Mineral Dressing and OF
Metallurgy Division NINES AND RESOURCES

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Mines and Geology Branch

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Shipment:

A shipment of three bags of ore, weight 420 pounds, was received on September 23, 1946. The shipment was sent from Tichborne, Ontario, and was submitted by N. E. DeMers, 2648 Wurtele Street, Montreal, Quebec.

The property of the Van Mer Mines Limited from which the sample was taken was said to be the old Frontenac Lead Mine, located in Loughborough township, Frontenac county, Ontario.

Purpose of the Investigation:

The sample of ore was submitted to determine its response to table concentration and flotation.

Sampling and Analysia:

Who shipment was crushed and sampled by standard methods. A representative portion was found to contain the following:

Gold	6,	None.
Silver	es.	0.49 oz./ton
Arsenic	en	None detected.
Lead	<i>e</i> 1	1.10 per cent
Zinc	471	22,5 ⁸
Iron	en)	7.07
Copper	e2	0.04
Sulphur	est	14.87
olduloeal	وج	37,48 " .

Results of Experimental Tests:

Table concentration did not produce satisfactory grades of concentrates of lead and zinc.

Flotation tests indicated that a cleaner lead concentrate containing 51.75 per cent lead, 7.91 per cent sinc and 22.02 cunces of silver per ton could be obtained from the ore. Recovery in the rougher flotation concentrate was 89.7 per cent of the lead.

The zinc concentrate contained 56.58 per cent zinc, 0.08 per cent lead, 7.45 per cent iron, 1.71 per cent insoluble, with a recovery of 90.1 per cent of the zinc.

Character of the Ore:

Polished sections were prepared from selected specimens of the ore and were examined microscopically.

Gangue -

The gangue material is an assemblage of hard rock silicates with rather abundant, moderately coarse to fine, disseminated carbonate.

(Continued on next page)

(Character of the Ore, contid) -

Motallic Minerals -

Metallic mineralization is strong in the polished sections. It is represented by sphalerite, pyrite, pyrrhotite, chalcopyrite, and galena. The first three of these five sulphides as named above are abundant. Chalcopyrite and galena are present only in minor amounts.

Is disseminated through gangue as coarse to very fine irregular grains with the coarser sizes predominant and, in many places, sufficiently abundant to be called massive.

Most of the sphalerite (zinc sulphide) is almost free of inclusions, but in one section it contains rather numerous small grains of gangue and sulphides, especially pyrrhotite and chalcopyrite. The latter range down to 10 microns or less in size and are too small to be economically released by grinding, but the total quantity tied up in this way appears to be very small.

Pyrite is almost as abundant as sphalorite, with which mineral it is often closely associated. It occurs in gangue and sphalorite, largely as coarse irregular grains and small masses which contain occasional inclusions of gangue and sulphides.

Pyrrhotite is relatively abundant in only one polished section and is present as coarse to fine disseminated grains, small masses and narrow veinlets in gangue, and also as small inclusions in sphalerite and pyrite.

Chalcopyrite and galena are visible in comparatively small amounts as medium coarse to fine scattered grains in gangue, sphalerite and pyrite.

EXPERIMENTAL TESTS:

Test No. L. - Table Concentration of Sized Feed.

For this test a 25-pound sample of the ore was crushed to pass 20 mesh. It was screened on 28-, 35-, 45- and 65-mesh screens. The various screen fractions were tabled on a laboratory Wilfley table. Each screen fraction was treated as a separate test. The products recovered were a concentrate, middling and tailing. Each product was analysed for lead and zinc. The analysis of the feed for each screen fraction was calculated from the analysis of the products.

Results:

Ţ	est lA,	-20 +26	3 Mesh	Ore.		
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Products	per	per cent		per c	ont	Ratio of
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Food Lead and	100.0	0.78	20.61	700°0	100.0	
zine conc. Widdling Tailing	20.8 35,8 43,4	0,50	38.73 22.31 10.55	62,2 82,8 15,0	0,65 8,86 8,88	4,8:1.
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Feed	100.0		21.24	100.0	100.0	
Come. (Lead)	8,9		37,52	47.9	15.7	11.2:1.
Cone. (Zinc)	30,1		33,26	35.1	47.1	3.3:1.
Middling	82,9		22,32	8,0	25,1	
Tailing	38.1	0,18	6,69	9,0	1.2.1	THE PROPERTY AND REPORT AND AND AND A STORE OF SHEAR AND A STORE OF THE STORE OF TH
ψ,	ast lC,	-35 ÷48	deeM S	Ore.		
Feed	100.0	ARMINES IN A PRIMARY DESCRIPTION	23,12	100.0	100,0	STATE TOTAL TOTAL THE HOME MANAGEMENT AND REASONS AND AND AND AND AND
Conc. (Lead)	6,8		33,87	69.4	9,6	15,2:1,
Conc. (Zinc)	20,0		39,61	18.0	48.0	3.3:1.
Middling	15.3		34,58	5.2	22,9	
Tailing	48.1		9,38	8	19.5	
or ampreciation construction and a sum as a sum as of the man	THE CASE OF PERSONS ASSESSED TO SEED STORY	CHAIN THE TOLLERAND CONTRACTIONS	licensumanioners as	Azararen neutza zunea sees	CTANA NO TO SECURE OF SECURITY SECTION AS LA	R SANTAL STATE OF THE PROPERTY OF THE PROPERTY OF STATE OF THE PARTY OF THE PROPERTY OF THE PARTY OF THE PART
TO CONTRACT TO THE PROPERTY OF	est ID	-48 +65	Wesh	Ore	(memuros nosura rescuent)	r gyse dele Schoolegesch web ison a werd energene zweich word wie doubles an
Feed	100.0	0,87	24.38	100.0	1.00.0	-
Comc. (Lead)	೩೧	21.70	24,64	49.6	2,0	50.0:1.
Cone. (Zine)	16.0	1,42	4157	26.1	27.4	6.2:1.
Middling (1)	81.8	0.27	37,21	6,7	33,8	
Middling (2)	8.8\$	0,35	25,06	11.5	29.6	
Talling	31.4	0.17	6,08	6.1	7.8	AND COMMISSION AND ALTERNATIVE STATE OF THE
1,	est 1E,	-65 Mes	sh Ore			•
Feed Conc. (Lead) Conc. (Zinc) Middling Sand Tailing Slime	100.0 6.1 23.9 47.4	1,90 23,10 0,72 0,20 0,90	27,33 32,75 43,60 20,28 23,12 24,03	100.0 74.0 9.1 5.0 6.8 5.1	100.0 7.3 38.1 35.2 12.1	16,4;1,4,2;1.
ቀተነ ባይል ቀላ ይመንተያ ነው ያቀና የቀም መንግስ የመልጣ ቀላ ይህ የነፃ ነው። መንግ ባይል ቀላ ይመንተያ ነው ያቀና የቀም የማስያ ያን የነፃ ነውን የሚመን የላይን የታ ይያንና የረሃ የብ	The transfer of the second of	THE COLUMN THE PARTY OF T	CALLES CONTROLLED TO	ECCAMPANA CES AND ACTUALOS ACTUA	1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,	The state of the s

(Experimental Tests, contid) -

The table concentration did not result in separating zinc from lead

Test No. 2. - Flotation.

Concentration was attempted by selective flotation.

Reagents to the Ball Mill -

Soda ash - 2.0 lb./ton ZnSO4. - 1.0

Grind, 67 per cent minus 200 mesh. Dilution, 4:3.

Reagonts to Lead Flotation - (pH, 8.8)

Pot. ethyl manthate - 0.02 lb./ton Gresylic acid - 0.20

The lead rougher concentrate recovered was recleaned without additional reagents.

The pulp in the flotation machine was now conditioned for zinc.

Heagents to Zine Flotat		(pH, 11.5)
Lîme	TO TO	4.0 lb./ton
CuSO ₄	n/u	1.0
Pot. sthyl xanthate	457	O.B " , stage fed.
Pine oil	#3	

A sinc rougher concentrate was recovered which was recleaned with 0.5 pound line per ton and 0.05 pound potassium ethyl xanthate per ton.

Results:

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Products	per	per cent		per cent		Ratio of
ال ما مؤمد منا حد حد الحرفة و يوزي وياري بي الكون منا يا محمد مناسبيات	cont	Pb	Zx	Pb	Zn	Concentration
Feed Lead conc. Lead middling Zine cone. Zine middling Flot. tailing	54.5 3.6 58.4	36.82 7.94 0.10 0.59 0.08	9,65 59,52 18,45 2,03	100.0 63.7 26.1 0.5 3.0 6.7	100.0 0.6 1,0 90.3 2,9 5.2	82.6:1. 43.5:1. 2.9:1. 2.8:1.

(Experimental Tests, cont'd) -

Test No. 3. - Flotation.

This test was made to attempt to raise the grade of the lead concentrate.

Reagents to Ball Mill -

Soda ash - 1.0 lb./ton 2nS04 - 1.0 " NaCW - 0.2 "

Grind, 78 per cent minus 200 mesh. Dilution, 4:5.

Reagents to Lead Flotation - (pH, 8.5) Butyl manthete - 0.10 lb./ton, stage fed 0.17 " , " "

Reagents to Lead Rougher Concentrate Recleaned - (pH, 9.5)

Soda ash - 0.2 lb./ton
ZnSO4 - 0.2 lb./ton
ZnSO4 - 0.05 m
NaCN - 0.05 m
Sodium silicate - 1.0 m
Butyl manthate - 0.025 m
Cresylic acid - 0.10 m

A lead cloaner concentrate and a lead middling were recovered.

Reagents	for	Zinc	Plo	Light	DIA				(pH _o	10,5)
Lime			₹Ē1	2,0	Rody, df),				
CuSog			1779	1.0	Lü					
Amy'l ze	edtra	t to	exp	0.5	14	Đ	stage	fød.		
Pine of	1		m	0.1	CD					

The sine rougher concentrate obtained was recleaned with 1.0 pound lime and 0.02 pound amyl manthate per ton. A sine cleaner concentrate and a sine middling were recovered.

Results:

Weight, Assays, Distribution,								
	Weight,	BBBA	iys,	Distrik	oution,	,		
Products	per	l per cent		per cent		Ratio of		
	cent	Pb	Zn	Pb	Zn	Concentration		
WANTER AT SANSTER BETTE ABANG TO THE WEST COMMAND THE WASTER AND THE SANSTER AND THE SANSTER AND THE SANSTER A	Contraction of the Contraction o							
Food	1.00.0	0.76	21,97	0.001	100.0			
Lead cono. o	0.7	51,75	7,91	47,6	೦,3	142,8;1.		
Lead middling	2.9	10.98	12.57	42.1	77	34,0:1.		
Zine cone. 00	35,0	0.08	56,58	3.7	90,1	ຂູ່ ອະ 1		
Zine middling	3,8	0.42	18.56	1.2	5,2	26.4:1.		
Flot, tailing	57.6	0.06	3.82	4.5	4.7	and the second policies and place and a confidence of the second of the second		

Dead concentrate contained Ag, 22.02 oz,/ton.

Zinc concentrate contained Fe 7.43 per cent, Ag 0.32 ounce per ton, insoluble 1.71 per cent.

(Experimental Tests, cont'd) --

In continuous operation, the percentage of sinc in the talling would be lowered by the use of scavenger cells.

Additional flotation tests in which various reagents were tried showed that the recovery of lead in the rougher concentrate was not appreciably increased.

In one test the lead concentrate contained lead 35.77 per cent, zinc 7.19 per cent, copper 0.10 per cent, silver 15.2 ounces per ton, and insoluble 34.0 per cent.

Conclusions:

The unfavourable ratio of galena to sphalerite in the feed (1.25:35.5), and the presence of considerable from pyrite, make the table concentration of this ore more complicated than if the separation were only for lead and zinc. The results obtained on a laboratory-size table were unsatisfactory. It is possible that full-sized equipment would effect a better grade of lead concentrate.

Selective flotation of the lead and zinc is the most suitable method for treatment of this ore. By this method the iron pyrite is depressed and passes out in the mill tailing, and marketable grades of lead and zinc concentrates can be produced.

Comparing the results obtained in this investigation with those obtained in 1926, 1928 on ore from the same property leads to the conclusion that this present sample does not represent ore similar to that previously investigated. Former shipments contained a much higher ratio of lead to zine than does this one; jig and table concentration produced high-grade lead concentrates with a low percentage of zine.

The low ratio of lead to zinc and the presence of

(Conclusions, contid) -

much pyrite in the sample on which this present investigation was made leads to the conclusion that the material is from the dump and has had most of the lead removed by previous operations.

The results obtained in this investigation can only be considered to apply to one similar in grade and character to that submitted in the shipment.

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