O T T A W A May 26th, 1943.

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of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1418.

Concentration Tests on a Lead-Zinc Ore from an Aldermac Copper Corporation Property in Dorion Township, Thunder Bay District, Ontario.

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Shipment:

One bag of ore, weighing 28 pounds and designated Sample No. 58092, was received on April 19th, 1943. The shipment was consigned to these Laboratories from Port Arthur, Ontario, by Mr. John W. MacKenzie on behalf of the Aldermac Copper Corporation, Arntfield, Quebec.

Location:

The property of the Aldermac Copper Corporation from which the present sample shipment was received is situated in Dorion township, Thunder Bay district, Western Ontario.

Sampling and Analysis:

After crushing, cutting, and grinding by standard methods, a representative sample of the shipment was obtained which assayed as follows:

Gold	-	0.005 oz./ton.
Silver	-	0.325 "
Copper	-	Nil.
Iron	-	0.84 per cent.
Lead	-	8.14 "
Zinc	-	45.48 "

Characteristics of the Ore:

Six polished sections were prepared and examined under a reflecting microscope for the purpose of determining the character of the ore.

Gangue -

In the polished sections the gangue is highly siliceous and is represented by two types of material: colourless to white vitreous quartz, and reddish-brown, dull cherty rock. The latter is brecciated and veined by the former.

Metallic Minerals -

Massive sphalerite predominates and in three sections forms the whole polished surface of each; a small amount occurs also as irregular grains, coarse to very fine in size, disseminated through gangue. It is very light in colour and contains a little gangue as rare small particles and tiny stringers.

Galena is present in minor quantity, as small masses and coarse to fine grains sporadically distributed through gangue and sphalerite. Its polished surfaces are pitted but are homogeneous in character, and tiny inclusions of gangue and sphalerite are very rare.

Pyrite is visible in very small amount as rare tiny particles in gangue.

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Investigative Work:

Mr. MacKenzie, in his letter of April 14th, 1943, requested an analysis of the sample shipment and a preliminary concentration test.

Owing to the high-grade nature of the shipment, the test-work was confined to a single flotation test in which the lead and zinc minerals were concentrated by selective flotation. The details of this work follow:

DETAILS OF TEST WORK:

A portion of the ore at minus 14 mesh was ground in water in a ball mill, at a 0.75 to 1.0 dilution, to a fineness of grinding of 72 per cent minus 200 mesh. The pulp was then transferred to a Denver flotation cell and a lead concentrate obtained. This concentrate was cleaned in a small machine. Following the removal of the lead concentrate, the pulp was conditioned with lime and a zinc concentrate secured. This concentrate was not cleaned. Reagents were added to the grind and flotations as noted following the table of results.

Results:

Product	Weight, per cent	Assays, per cent Pb	Assays, per cent Zn	Distribution, per cent Pb	Distribution, per cent Zn	Ratio of concentration
Feed	100.00	7.93⊕	46.20⊕	100.0	100.0	
Lead concentrate	4.49	73.25	10.69	41.5	1.0	22:1.
Lead middling	10.25	34.82	36.94	45.0	8.0	1.4:1.
Zinc concentrate	69.32	1.22	60.36	10.7	90.6	
Flot. tailing	15.94	1.42	1.18	2.8	0.4	

⊕ Calculated.

pH of zinc flotation - 9.4.
Total time of flotation, 8 minutes.
Grind, 71.8 per cent minus 200 mesh.

The zinc concentrate assayed 0.75 per cent iron.

(Continued on next page)

(Details of Test Work, cont'd) -

Reagents added, (lb./ton feed):

To the Grind -

Soda ash	-	4.0
NaCN	-	0.4

To the Lead Flotation -

Butyl xanthate	-	0.05
Cresylic acid	-	0.09
NaCN	-	0.10

To the Zinc Flotation -

Lime	-	6.0
Copper sulphate	-	2.0
Amyl xanthate	-	0.20
Pine oil	-	0.20

To the Lead Cleaner Flotation -

NaCN	-	0.05
Lime	-	1.0

An examination of the different products of this test under the binocular microscope showed:

The lead concentrate: Some very fine-grained sphalerite and a little quartz constituted the bulk of impurities.

The lead middling: - The galena crystals appeared free, with little or no visible inclusions. Quartz and fine-grained sphalerite formed the remainder of this product.

The zinc concentrate: The chief impurity was quartz crystals, which appeared to be free of adhering metallics.

The flotation tailings: Nearly all quartz, with a few scattered particles of pyrite, galena, and sphalerite.

SUMMARY AND CONCLUSIONS:

The test work showed that a zinc concentrate assaying over 60 per cent zinc with a recovery of 90 per cent of the zinc in the ore can be obtained without cleaning.

In the lead concentration, while a lead concentrate

(Summary and Conclusions, cont'd) -

assaying 73 per cent lead was made, the large amount of both lead and zinc in the lead middling product suggests that at least two or three cleaning operations would be necessary.

In the microscopic examination of the polished sections, the different minerals were identified and descriptions were given of the inclusions and disseminated material.

This sample ore shipment, assaying 45 per cent zinc and 8 per cent lead, is extremely high grade and it is indicated from the preliminary test work that no great difficulties would be encountered in the milling procedure.

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