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DEPARTMENT OF MINES AND RESOURCES

BUREAU OF MINES

CANADA

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Ottawa, February 6, 1947.

R E P O R T

of the

MINERAL DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 2174.

Sizing, Concentration and Microscopic Tests on Silver-
Lead-Zinc Ore and Tailings Shipments from the Golden
Manitou Mines Limited, Val d'Or, Quebec.

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Note:

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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Bureau of Mines
Mineral Dressing and
Metallurgy Division

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OF
MINES AND RESOURCES

Mines and Geology Branch

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Shipment:

Nineteen pounds of ore and 11 pounds of tailing
were received from Mr. D. A. Livingstone, Mill Superintendent,
Golden Manitou Mines Limited, Val d'Or, Quebec, on December
4, 1946.

Location of Property:

The property of the Golden Manitou Mines Limited from
which the shipments were received is situated in Bourlamaque
township, Abitibi county, northwestern Quebec.

Purpose of Investigation:

Mr. Livingstone, in his letter of November 28, 1946, desired to ascertain the occurrence and nature of the silver mineral which was responsible for the increased silver loss in the zinc tailing in recent weeks. This mineral is apparently located in a new underground stope which is higher in pyrite than the current mill feed, and the sample shipment of ore is from this stope. The tailings sample was accumulated during several days when the silver loss in the tailings was particularly high.

Sampling and Analysis:

The ore sample was crushed to minus 14 mesh and a representative portion was obtained by standard methods.

This sample assayed as follows:

Gold	-	0.025	oz./ton
Silver	-	13.51	"
Arsenic	-	0.07	per cent
Antimony	-	None	detected.
Lead	-	0.30	per cent
Zinc	-	0.95	"
Iron	-	38.58	"

The tailing sample assayed as follows:

Silver	-	1.80	oz./ton
Lead	-	0.39	per cent
Zinc	-	0.89	"
Iron	-	19.37	"

Results of Investigation:

The results obtained from the test work on the ore and tailing samples indicate that native silver, although not in close association with the pyrite, is responsible for the high tailing losses.

Investigative Procedure:

On the Ore Sample: A portion was crushed to minus 48 mesh and the different sized materials were separated by screening. These products were then treated on the Haultain superpanner and the resultant concentrates were made into polished sections and examined microscopically. Hand specimens

(Results of Investigation, cont'd) -

of this ore sample were also examined under the binocular microscope. In addition, four polished sections of the ore were examined under the reflecting microscope.

On the Tailing Sample: A screen analysis was made on the plus 200 mesh material and an infralyzer test was conducted on the minus 200 mesh portion. The products were assayed for silver and iron. In addition, a superpanner test was run and the resultant concentrate made into a polished section and examined under the microscope. These microscopic examinations are described in some detail under "Microscopic Examination" and as a result several particles of native silver were found to occur in both the ore and tailing samples.

Microscopic Examination:

The Ore.

Metallic mineralization is heavy in the sections examined and, megascopically, the samples appear to be composed entirely of massive granular pyrite. Under the microscope, however, small amounts of sphalerite and galena are also visible.

Pyrite preponderates as small masses and coarse to fine anhedral grains which are sufficiently abundant in most places to be called massive. The iron mineral contains numerous inclusions of gangue and other sulphides.

Sphalerite is common as small scattered grains in gangue and in pyrite but its total quantity is relatively small. A few grains contain tiny inclusions

(Microscopic Examination, cont'd) -

of chalcopyrite and/or pyrite which are scattered at random and are not in alignment along some crystallographic direction of the host. The largest particle of sphalerite seen in the sections measures 0.120 millimeter in size.

Galena is present in small amounts as occasional small grains in pyrite. The largest one observed is about 0.084 x 0.036 mm. in size.

Next, several hand specimens of the ore were examined under a binocular microscope, with negative results as regards a silver mineral. In one specimen, however, two fine-grained masses of galena, each five or six millimetres in diameter, were observed. This piece, weighing approximately 45 grams, was analysed with the following result:

Silver	-	10.92 oz./ton
Lead	-	1.00 per cent
Zinc	-	1.30 "
Arsenic	-	None detected.
Antimony	-	" "

Concentration Products.

As no silver mineral was found in the polished sections or hand specimens of the ore, five polished sections of five sized superpanner concentrates from the ore and one polished section of a superpanner concentrate from the mill tailing as received were prepared and examined microscopically.

Particles of pyrite preponderate in each of the polished surfaces, together with occasional grains and crystals of sphalerite and galena, all embedded in the mounting medium (bakelite). The zinc and lead

(Microscopic Examination, cont'd) -

sulphides are free in bakelite, attached to each other or to pyrite, and sometimes entirely within dense iron sulphide. A comparatively few crystals of arsenopyrite, a mineral not noticed in the ore sections, are also visible in several of the polished surfaces, especially in the one made from the mill tailing.

In addition to the minerals mentioned above, six particles of native silver were observed in the polished sections. One occurs in each of three different sizes of the ore concentrates and three are in the mill tailing. All of them vary as to size, the largest being about 216 microns (-48+65 Tyler mesh) and the smallest 16 microns (-800 Tyler mesh) in diameter. The largest one was seen in the biggest size of ore concentrates, the smallest in the mill tailing. Most of the particles are very irregular in shape, especially those in the mill tailing which have ragged corroded edges. All six particles are free in bakelite.

Details of the Test Work:

Ore Sample.

A portion of the ore was crushed to minus 48 mesh and screened to the following mesh sizes: -48+65, -65+100, -100+150, -150+200, and -200 mesh.

These different sized products were then treated on the Haultain superpanner and polished sections were made of the resulting concentrates. These sections were then examined as described under "Microscopic Examination."

Other portions of the ore were examined megascopically under the binocular microscope.

Tailing Sample.

A portion of the tailing sample was concentrated on the superpanner and the concentrate made into a polished section. This section was then examined microscopically, as described under "Microscopic Examination."

On another portion of the tailing sample a screen analysis was made on the plus 200 mesh size and an infrasizer test on the minus 200 mesh portion. The different sized products were weighed and assayed for silver and iron.

Results were as follows:

Screen Analysis on the Plus 200 Mesh Size.

Mesh	Weight, :		A S S A Y S		Distribution,	
	per	Oz./ton	Per Cent	per cent	Ag	Fe
:	cent	:	Ag	Fe	:	:
+48	3.2	1.15	4.44	2.0	0.7	
-48 +65	4.4	1.25	5.58	3.0	1.3	
-65 +100	6.1	1.78	9.86	6.0	3.1	
-100+150	11.5	2.20	19.72	14.1	11.7	
-150+200	11.7	2.11	27.13	13.7	16.4	
:	:	:	:	:	:	:

(Continued on next page)

(Details of the Test Work, cont'd) -

Infrasizer Test on the Minus 200 Mesh Size.

Nominal Microns	:Weight, per cent	: A s s a y s		:Distribution, per cent	
		:Oz./ton : Ag	:Per cent : Fe	: Ag	: Fe
Above 56	: 8.4	: 2.35	: 45.28	: 11.0	: 19.7
56 to 40	: 9.7	: 1.50	: 27.84	: 9.1	: 13.9
40 to 28	: 9.3	: 1.07	: 18.96	: 5.5	: 9.1
28 to 20	: 8.1	: 1.05	: 15.90	: 4.7	: 6.7
20 to 14	: 5.6	: 1.25	: 15.12	: 3.9	: 4.4
14 to 10	: 5.2	: 1.60	: 12.94	: 4.6	: 3.5
-10	: 16.8	: 2.50	: 10.96	: 23.4	: 9.5
Totals	:	:	:	:	:
(Screen and: Infrasizer)	:100.0	: 1.80	: 19.37	:100.0	: 100.0

It is apparent from the above screen analysis that the silver is more or less uniformly distributed throughout all the various sizes, with a slight concentration in the minus 65 mesh to 28 micron sizes. There is a decided concentration in the minus 10 micron sizes.

There appears to be no close relation between the pyrite and silver values. It can be assumed that the silver is freed from the pyrite in the grinding circuit.

Summary:

On the ore sample the microscopic examination of the polished sections did not show any silver minerals. This negative result was duplicated by examination under the binocular microscope. This later examination included a portion of the ore sample which contained considerable galena. A series of superpanner tests on the crushed and sized material succeeded in definitely locating some native silver in the ensuing concentrates, when these concentrates were made into polished sections and examined microscopically.

On the tailing sample, a screen and infrasizer test showed no close association of the pyrite and silver in the

(Summary, cont'd) -

different sized products. A superpanner test on this tailing sample showed native silver in the resultant concentrate.

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