O T T A W A August 19th, 1941.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1072.

Concentration of Scheelite from the Ores of the Petosa and Manley Mines, in Northwestern Quebec.

BUREAU OF MINES
DIVISION OF METALLIC MINERALS
ORE DRESSING AND
METALLURGICAL LABORATORIES

CANADA
DEPARTMENT
OF
MINES AND RESOURCES
MINES AND GEOLOGY BRANCH

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Shipment:

The shipment, received on June 30th, 1941, consisted of the following three samples of ore:

For concentration of the scheelite -

Sample No. 1, Petosa, 12 pounds, and
Sample No. 2, Manley, 54 pounds.

For assay only -

Sample No. 2-A, weight 45 pounds.

The shipment was submitted by Mr. E. Wood, 177 Marlborough Avenue, Ottawa, Ontario.

Locations of Properties:

The property of the Manley Gold Mines Limited is located 6 miles from the C. N. R. station of Dupuy, in the township of La Reine, Abitibi district, Quebec.

The Petosa property is located about 30 miles due east of Ville Marie, in the Timiskaming district, Quebec.

Purpose of the Investigation:

The samples were submitted to determine their scheelite content and its amenability to concentration.

Characteristics of the Ore:

No microscopic examination of the ore was made but from examination of hand specimens the following characteristics were noted:

Sample No. 1. - Petosa.

This sample consisted mainly of white quartz and medium-textured pink-to-brown rock, carrying disseminated pyrite. The pink material appears to be felspathic in nature, while the brown colouration is due to the presence of "limonite" probably arising from weathering of iron minerals.

Examination under the ultra-violet light shows the presence of bands of scheelite some of which are buff-coloured. The bands of scheelite do not appear wider than 1/8 inch and are often present as several layers separated by gangue minerals.

Sample No. 2. - Manley.

This ore consists largely of white quartz, with some sericite, and sparsely disseminated chalcopyrite, pyrite and galena.

(Continued on next page)

(Characteristics of the Ore, cont'd) -

Under the ultra-violet light the scheelite showed as occasional bands and patches. Much of the quartz showed no indication of scheelite. This sample appeared to contain less scheelite than the first sample.

Investigative Test Work:

The samples were crushed to pass a 14-mesh screen and were then sampled. Analysis showed them to contain:

	PETOSA	MANLEY	
	Sample No. 1.	Sample No. 2.	Sample No. 2-A.
Gold (Au), oz./ton	0.005	0.99	1.06
Tungsten trioxide (WO_3), per cent	5.16	3.58	0.27
Sulphur (S), per cent	0.19	0.09	
Iron (Fe), "	1.67	1.62	
Copper (Cu), "	0.02	0.05	
Arsenic (As), "	None detected	None detected	

Samples Nos. 1 and 2 were screened on 35-mesh and 65-mesh screens, with the following results:

Sample No. 1. - PETOSA.

Mesh	Weight, pounds	Weight, per cent
-14 +35	5.73	53.3
-35 +65	2.53	23.6
-65	2.48	23.1
	10.74	100.0

(Results of Sample No. 2 follow on next page)

(Investigative Test Work, cont'd) -

Sample No. 2. - MANLEY.

Mesh	Weight, pounds	Weight, per cent
-14 +35	29.25	54.2
-35 +65	12.25	22.7
-65	12.50	23.1
	54.00	100.0

Each size was then concentrated separately. The table tailings from all sizes coarser than minus 65 mesh were reground to pass 65 mesh and concentrated with the original minus 65 mesh portion.

The resulting concentrates from the Manley sample were then ground and floated to remove sulphides.

Results:

Table Concentration.

Sample No. 1. - PETOSA.

(-14+35 mesh)

Product	Weight, grams	Weight, per cent	Assay, WO_3, per cent
Feed (Cal.)	2,585.3	100.0	
Concentrate	173.0	6.7	57.85
Tailing	2,412.3	93.3	0.75

(-35+65 mesh)

Feed (Cal.)	1,135.8	100.0	
Concentrate	81.0	7.1	63.32
Tailing	1,054.8	92.9	0.47

(-65 mesh)

Feed (Cal.)	4,086.5	100.0	
Concentrate	105.3	2.6	56.76
Middling	667.3	16.3	1.69
Tailing	3,313.9	81.1	0.44

The results of table concentration after regrinding the coarser table tailing are as follows:

(Investigative Test Work, cont'd) -

PETOSA - Test No. 1.

Product	Weight, grams	Weight, per cent	Assay, WO_3, per cent	Pounds of WO_3 contained	Distribution of WO_3, per cent
Feed	4,367.1	100.00	5.54	0.5355	100.00
-14+35 conc.	173.0	3.96	57.85	0.2206	41.35
-35+65 "	81.0	1.85	63.32	0.1131	21.20
-65 "	105.3	2.41	56.76	0.1318	24.70
-65 middling	667.3	15.28	1.69	0.0249	4.67
-65 tailing	2,680.5	61.38	0.32	0.0189	3.54
Slime	660.0	15.12	1.66	0.0242	4.54
Total conc.	359.3	8.22	58.76	0.4655	87.25

The table concentrates were not floated in this test.

87.25 per cent of the tungsten trioxide in the sample was recovered in a combined concentrate assaying 58.76 per cent WO_3. This concentrate contained considerable sulphides and would require cleaning by flotation.

Microscopic Examination of the Concentrates under Ultra-violet Light:

-14+35 mesh concentrate. - This examination shows the concentrate to contain particles of scheelite, free gangue and a mixture of gangue and scheelite. The metallic minerals are present as sulphides and magnetite.

-35+65 mesh concentrate. - This concentrate appeared similar to the coarser concentrate.

-65 mesh concentrate. - This concentrate contains free particles of scheelite, gangue minerals, and particles with scheelite attached to gangue. The results indicate that part of the scheelite is very finely divided.

(Investigative Test Work, cont'd) -

Results of Table Concentration.

Sample No. 2. - MANLEY.

Product	Weight, grams	Weight, per cent	Assay, WO_3, per cent
(-14+35 mesh)			
Feed (Cal.)	13,157.2	100.0	
Concentrate	573.7	4.4	63.50
Tailing	12,583.5	95.6	0.30
(35+65 mesh)			
Feed (Cal.)	5,515.1	100.0	
Concentrate	319.7	5.8	63.16
Tailing	5,195.4	94.2	0.11
(-65 mesh)			
Feed (Cal.)	20,660.4	100.0	
Concentrate	273.7	1.3	51.41
Middling	400.0	1.9	15.58
Tailing	19,986.7	96.8	0.18

The results of table concentration after regrinding the coarse table tailing are as follows:

MANLEY - Test No. 2.

Product	Weight, grams	Weight, per cent	Assay WO_3, per cent	Pounds of WO_3 contained	Distribution of WO_3, per cent
Feed	21,690.6	100.00	3.73	1.7843	100.0
-14+35 conc.	573.7	2.65	63.50	0.8031	45.0
-35+65 "	319.7	1.47	63.16	0.4452	24.9
-65 "	273.7	1.26	51.41	0.3102	17.4
-65 middling	400.0	1.84	15.58	0.1374	7.7
-65 tailing	12,218.8	56.34	0.05	0.0135	0.8
Slime	7,904.7	36.44	0.43	0.0749	4.2
Total conc.	1,167.1	5.38	60.57	1.5585	87.3

Flotation of Table Concentrates.

All the table concentrates were ground to about 65 mesh and floated with 8.8 pounds sulphuric acid, 0.2 pound amyl xanthate, 0.1 pound aerofloat No. 25, and 0.1 pound of pine oil per ton. This removed the major amount of the

(Investigative Test Work, cont'd)

sulphides.

Results:

Product	Weight, per cent	Assays, oz./ton Au	Assays, per cent WO_3	Assays, per cent S	Distribution of WO_3, per cent
Feed (Cal.)	100.00	3.21	59.53	1.56	100.00
Rough sulphide conc.	8.35	37.89	38.19		5.36
Cleaner sulphide conc.	3.68	80.26	1.72		0.11
Cleaner tailing	4.67	4.51	66.94		5.25
WO_3 conc. flotation tailing	91.65	0.05	61.47	0.15	94.64

94.6 per cent of the tungsten trioxide in the table concentrates was recovered. This represents a recovery of 82.6 per cent of the tungsten in a concentrate assaying 61.47 per cent WO_3.

It is to be noted that continuous tests with full-size tables give better results than can be expected with a small sample.

The results indicate that a commercial grade of concentrate can be expected in large-scale tests.

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