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BRITTON RESEARCH LIMITED
Consulting Metallurgists
1612 WEST THIRD AVENUE
VANCOUVER 9, B. C.
CANADA

JOHN W. BRITTON, A.R.S.M., B.Sc., P.ENG.
PRESIDENT

PHONE: 738-7195
AREA CODE: 604

April 21, 1971.

J.H.S.
P.M.K.
G.M.H.
R.D.S.
B.C.B.
I.D.B.
M.D.R.
J.H.F.
E.C.J.

Mr. J.H. Stovel, President,
Kerr Addison Mines Limited,
1600, 44 King Street West,
Toronto 1, Ontario.

Dear Mr. Stovel,

Re: B.C. Molybdenum concentrate leaching

We attach a report giving the results of our leaching tests on a sample of molybdenite concentrate from British Columbia Molybdenum Limited. A copy of the report has also been forwarded to Mr. Lyall Ames.

Please let us know if we can be of any further assistance.

Yours sincerely,

BRITTON RESEARCH LIMITED

John W. Britton

John W. Britton, P.Eng.
Consulting Metallurgist

Copy to: Mr. H.L. Ames

JWB/ls

APR 23 1971

BRITTON RESEARCH LIMITED

Acid leaching tests on molybdenite concentrate
from British Columbia Molybdenum Limited

A. Assay of concentrate before leaching: 84.5% MoS_2
0.37% Pb

(See attached copy of letter from Mr. N. Hopland)

B. Size distribution of concentrate:

	Concentrate as received Weight %	Reground concentrate Weight %
+325 mesh	1.8	1.4
-325 +500 mesh	23.4	20.7
-500 mesh	74.8	77.9
	100.0	100.0

C. Leaching methods

(a) Cold leaches: In open rolling bottle.

(b) Hot leaches: In open beaker with continuous stirring.

A pulp density of 40% solids was used throughout.

In all cases, wet concentrate equivalent to a dry weight of 200 grams was used. At the end of the leaching period, the pulp was filtered under vacuum and the residue was washed to give a total filtrate volume of 1500 ml.

D. Test results: See attached table.

Comments: The lowest lead assay obtained in the cold leaching tests with mixtures of hydrochloric acid and calcium chloride was 0.062% (test L1). A higher acid strength apparently reduced the lead extraction but regrinding had a slightly beneficial effect. The addition of ferric chloride reduced the residue assay to 0.051%.

Hot (70°C) leaching of reground concentrate (test L5) with 10% hydrochloric acid -10% calcium chloride solution gave the lowest lead assay obtained in any of the tests (0.029% Pb).

(cont.)

The lowest lead assay obtained in hot leaching tests with a mixture of hydrochloric acid and ferric chloride was 0.039% (test L10), using a mixture of 5% HCl and 5% $FeCl_3.6H_2O$ and leaching for 4 hours at 70°C; leaching for 2 hours gave a residue with a slightly higher lead assay (0.040%). Regrinding had no beneficial effect. Assays of screen fractions of test L11 residue showed that the minus 500 mesh fraction had a higher lead assay (0.044%) than the 500 mesh fraction (0.030%).

It is evident that a portion of the lead is either extremely closely associated (possibly chemically) with the molybdenite or is present as a mineral (not galena) which resists solution in dilute acids, even in the presence of ferric chloride. If it is present as a separate mineral, it is possible that some reagent could be found for dissolving it.

In assessing the results, the high lead assay of the concentrate before leaching should be taken into account. If part of the lead is present as a separate refractory mineral, it is likely that some of this would be depressed in cleaning and that leaching of the concentrate would give a product with a lower lead assay. (This could be checked by re-floating the molybdenite in the presence of a depressant such as Nokes reagent or sodium sulphide and leaching the concentrate).

Respectfully submitted,
BRITTON RESEARCH LIMITED

John W. Britton, P.Eng.
Consulting Metallurgist

Kerr Addison Mines Limited (Mo project)

Leaching tests on Mo concentrate

Test No.	Leaching period-Hours	Temp. °C	HCl %(a)	$CaCl_2.2H_2O$ %	$FeCl_3.6H_2O$ %	Reground	Residue assay %Pb
L1	8	20	5	10	-	No	0.062
L2	"	"	10	10	-	"	0.068
L3	"	"	"	10	-	Yes	0.063
L4	"	"	"	10	5	"	0.051
L5	"	70	"	10	-	"	0.029
L6	2	"	5	-	-	No	0.058
L7	"	"	"	-	-	Yes	0.123
L8	"	"	"	-	5	No	0.040
L9	"	"	"	-	5	Yes	0.043
L10	4	"	"	-	5	No	0.039
L11	"	"	"	-	5	Yes	0.040

(a) By volume of concentrated HCl (1.19 specific gravity)