

TR 10-133-134

## R. 512

MAGNETIC SEPARATOR TESTS ON ABERFOYLE  
WOLFRAM-SIDERITE CONCENTRATE*Sample*

A sample of wolfram-siderite concentrate was obtained by the Chief Chemist and Metallurgist from Aberfoyle Tin, N.L., Rossarden. This material is not amenable to magnetic separation as practised at the mill and is currently treated by sulphuric acid leaching to completely remove the siderite.

The object of the investigation was to determine whether any sensible separation of wolfram from siderite could be obtained by treatment in a Gill rotary high intensity wet magnetic separator. The machine has been adequately described in previously published reports (see above, page 123).

*Investigation*

Several preliminary qualitative tests were undertaken to assess what conditions might be favourable to a separation.

The results from these were not encouraging and a series of three tests ranging from a field current of 2 amps to one of 10 amps was performed to confirm the preliminary observations. Little selectivity was obtained in any case.

A further test involving roasting the sample for 10 minutes at 700°C in the presence of charcoal, followed by wet-magnetic separation, was undertaken. Field current was kept low ( $\frac{1}{2}$  amp) and a good separation was obtained, the wolfram being in the non-magnetic fraction.

One pole only of the four pole machine was used in the experimental work.

*Summary*

Subjection of the material to a reducing roast for 10 minutes at 700°C followed by wet magnetic separation resulted in a recovery of 86.7 per cent of the  $WO_3$  in the non-magnetic fraction. The wolfram product assayed 60.8 per cent  $WO_3$  from a feed containing 31.9 per cent  $WO_3$ .

This procedure is of interest and possibly worth further study, but its usefulness is governed by practical and economic consideration in comparison with the leaching process currently employed for treatment of the material.

No effective separation of wolfram from siderite, in the "As received" condition, was achieved by treatment of the material in a Gill high intensity wet magnetic separator.

*Separation Conditions*

	Test 1	Test 2	Test 3	Test 4 (Roast)
Field amps. ....	5	10	2	$\frac{1}{2}$
Rotor Speed R.P.M. ....	11	11	11	11
Wash water gal./min./pole. ....	1	1	1	1
Scour Water gal./min./pole. ....	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$
Feed rate lbs./min./pole. ....	2	2	2	$1\frac{1}{2}$

Test No.	Product	Per Cent		
		Weight	WO <sub>2</sub>	WO <sub>3</sub> Dist.
1.	Magnetic	70.5	32.3	71.6
	Non-Magnetic	29.5	30.7	28.4
	Composite Head	100.0	31.8	100.0
2.	Magnetic	84.0	29.1	80.4
	Non-Magnetic	16.0	37.2	19.6
	Composite Head	100.0	30.4	100.0
3.	Magnetic	21.9	25.0	17.6
	Non-Magnetic	78.1	32.9	82.4
	Composite Head	100.0	31.2	100.0
4. (Roast)	Magnetic	42.6	12.6	13.3
	Non-Magnetic	57.4	60.8	86.7
	Composite Head	100.0	40.3	100.0