

TR3-191-192 R. 332

NICKEL ORE, LADY BRASSEY MINE, HEAZLEWOOD DISTRICT.**Sample.**

A sample of ore was submitted by Mr. McCormick for analysis and concentration tests. The ore occurs in serpentine and consists mainly of magnetite and heazlewoodite together with minor quantities of other nickel minerals. The nickel sulphide (heazlewoodite) is fairly intimately associated with magnetite, and this association has caused the reported magnetic properties of the mineral. The separated sulphide is not magnetic. Heazlewoodite has a reported composition of Ni_3S_2 which is equivalent to a nickel content of 73.3%. The ore sample is the subject of C.S.I.R.O. Mineragraphic Investigation No. 711.

The sample was assayed as follows:—

Nickel, 12.7%; Cobalt, 0.24%.

Investigation.

Two methods of concentration were investigated.

1. Magnetic separation after reduction to minus $\frac{3}{8}$ -inch size.
2. Flotation.

No responsibility is accepted for the results shown in this report except in so far as they apply to the sample tested.

Summary.

1. Low power magnetic separation of the minus $\frac{3}{8}$ -inch ore resulted in concentrate containing 23.2% of nickel and amounting to 42.5% by weight. The recovery amounted to 78.9% (Test 1).

2. Cleaner flotation with prior flotation of the talcose gangue resulted in a concentrate containing 44.3% of nickel with a recovery of 61.4%. Rougher flotation resulted in a recovery of 87.4% in a concentrate amounting to 49% and containing 22.4% of nickel. The

ore for this test was ground to minus 72 B.S. mesh (Test 4). The ore has naturally frothing properties due to the silicate gangue, and depression or pre-flotation is necessary ahead of sulphide flotation to produce maximum grade concentrate.

Test Results.

Test 1.—Reduction to minus $\frac{3}{8}$ -inch size and magnetic separation with an alnico type permanent magnet.

Product	Percent		Percent Nickel
	Weight	Nickel	Distribution
Magnetic concentrate	42.5	23.2	78.9
Non-Magnetic tailing	57.5	4.6	21.1
Composite head	100.0	12.5	100.0

The plus 18 mesh (B.S.) fraction of the non-magnetic tailing was reduced to minus 18 mesh and re-separated but less than 1% of magnetics was produced.

Test 4. Flotation at minus 72 mesh sizing.—Gangue of a talcy nature was floated ahead of sulphides and the rougher concentrate derived from the cleaner flotation is shown for comparison.

Flotation Conditions.

	Talc float	lbs. ton/minutes	
		Ni Rougher	Ni Cleaner
Aerosol O.T.	0.2		
CuSO ₄ · 5H ₂ O		1/5	0.5/5
Amyl Xanthate		0.6	0.5
M200 frother	0.01		
Cresylic Acid		0.18	
Time, minutes	14	.11	13
pH	8/8	/7	/7

Results.

Product	Percent		Percent Nickel
	Weight	Nickel	Distribution
Cleaner Float Concs.	17.4	44.3	61.4
Cleaner Sink	6.9	15.3	8.4
Rougher Tailing	51.0	3.1	12.6
Talc Float	24.7	8.9	17.6
Composite Head	100.0	12.5	100.0
Rougher Concs.	49.0	22.4	87.4