

TR6-198-199

R. 376

CHROMITE FROM NICKELIFEROUS CLAY, BEACONSFIELD

Sample

The Ben Lomond Mining Company submitted a sample of nickeliferous clay from the Beaconsfield area. The sample weighed approximately 40 lbs., and was stated to be from the vicinity of peg F25 of the recent Consolidated Zinc Company investigation. The Ben Lomond Mining Company requested that concentration tests be carried out to determine the possibility of producing a chromite concentrate from the deposit.

The sample, as received, contained some conglomerate up to about two inch size. The sample was screened through a half inch screen, and the screen oversize reduced minus half inch in a jaw crusher. The sample also contained some leaves and small twigs; as far as possible these were discarded.

The sample contains a highly magnetic, heavy dark red-black mineral, assumed to be magnetite. Some chromium appears to be associated with this magnetite.

A second heavy mineral (or minerals) is reddish-brown, feebly magnetic, and contains appreciable chromium oxide. It is assumed that this mineral is chromite, which is a term embracing a wide range of chromium-bearing spinel-group minerals. The non-magnetic tailings and the gravity tailings are lighter in colour, generally off white to light brown.

The sample also contains over 30% by weight of clay-like slimes.

Summary

Gravity and magnetic concentration will yield a magnetite concentrate comparatively low in chromium, and a "chromite" concentrate containing about 20% Cr_2O_3 .

The proportion of concentrate with the higher chromium content seems too small to allow economic production of chromite from the deposit.

Test 1

A sample of the minus half inch material was agitated for a quarter of an hour in a Denver conditioner with sodium silicate to disperse the clay. The pulp was then wet screened on 10, 60 and 200 mesh screens, and decanted to give a ± 30 micron separation.

The different sized fractions were then treated to give a gravity concentrate and a gravity tailing. Each of the gravity concentrates was then magnetically separated into a magnetic concentrate and a non-magnetic tailing. The plus 200 mesh and the plus 30 micron fractions were combined for assay.

Size Fraction	Products	Weight	Percent Cr_2O_3	Fe
+ 10 Mesh	Magnetics	14.0	3.9	49.7
	Non-Magnetics ..	3.1	4.9	37.5
	Gravity Tailings	12.5	....	....
+ 60 Mesh	Magnetics	3.5	23.9	34.2
	Non-Magnetics ..	3.1	12.0	28.3
	Gravity Tailings	7.0	....	....
+ 30 Microns	Magnetics	1.8	5.3	49.7
	Non-Magnetics ..	3.3	9.6	8.0
	Gravity Tailings	14.9	....	....
- 30 Microns	Slimes ..	36.8	....	....
		100.0	....	....

A sample of the minus half inch material was wet screened on a 20 mesh screen. The plus 20 mesh material was staged crushed in rolls until the sample was all minus 20 mesh. The pulp was then agitated for a quarter of an hour with sodium silicate to disperse the clay. The pulp was then wet screened on 60 plus 200 mesh screens, and the slimes removed by decantation. The various sized fractions were then treated to give a gravity concentrate and a gravity tailing. The gravity concentrates were then magnetically separated into a magnetite concentrate, a second magnetic concentrate, and a non-magnetic tailing. The various sized similar products were grouped for assay.

Product	Weight	Percent Cr_2O_3	Fe
Magnetite Concentrate	12.5	5.7	54.7
Second Magnetic Concentrate	8.7	16.1	31.6
Non-Magnetic Tailing	6.3	0.8	3.0
Gravity Tailing	41.8	3.6	22.5
Slimes ..	30.7	....	....
		100.0	....

Marketable chromite grades usually stipulate 48% Cr_2O_3 . It may be possible to further upgrade portion of the second magnetic concentrate to approach this grade, but the weight recovery would be very small. Chromite is a comparatively low value product, and it is unlikely that chromite could be produced economically from the sample tested.

Previous work aimed at the recovery of the nickel content of the deposit is contained in ore dressing investigations R.349, R.350 and R.352.