TR12-169-171

R. 554

PICKANDS MATHER & CO INTERNATIONAL—HEAVY MINERAL SAMPLES

Introduction

Pickands Mather & Co of Burnie requested samples of rutile, zircon, ilmenite and chromite from beach sands of Tasmanian origin, preferably from King Island.

Sample

The following Mount Costigan beach sand samples were halved and one half from each sample was bulked to form a composite heavy mineral concentrate. The samples used were—

Reg. No.	
654438	Table concentrate
654788	Table concentrate
660153	Table concentrate
660159	Table concentrate.

Method

The heavy mineral concentrate was passed over the 2-disc dry magnetic separator. The gap between each disc and the belt was set so that the particles were subject to increasing magnetic force as they proceeded along the conveyor belt.

A high grade ilmenite concentrate was produced from the feed end of the first disc. No further processing was carried out on this concentrate.

The concentrate from the tail end of the first disc was predominantly ilmenite mixed with garnet. This product was set aside. The concentrate from both sides of the second disc was predominantly garnet, with a black mineral present. These fractions were re-treated over the magnetic separator after adjusting the settings on the first disc to give a stronger magnetic field. On the second pass, high grade garnet concentrate was removed by the first disc, and the black mineral (which was taken to be chromite) was predominant on the second disc.

The weakly magnetic black material was then passed over the Carpco electrostatic separator a large number of times, each pass removing a small amount of brown material. The black mineral was assayed for Cr_2O_3.

The non-magnetics from the first magnetic separation were placed on the super-panner. A small amount of cassiterite was removed. A zircon concentrate was produced, which was dried and passed over the dry magnetic separator twice. Small amounts of weakly magnetic material were removed. The final non-magnetic fraction was assayed for zircon.

Silica was also removed during the super-panning operation. The remainder—a mixture predominantly of zircon and rutile—was dried and passed over the dry magnetic separator a large number of times. Each pass removed small quantities of weakly magnetic materials. The final non-magnetic fraction was then passed over the Carpco electrostatic separator a large number of times. Each pass removed a small amount of zircon. The operation ceased when only minor amounts of zircon were being removed. The remaining rutile was assayed for TiO_2.

Results

Rutile concentrate	70.0%	TiO_2
Zircon concentrate	91.6%	$ZrSiO_4$
Ilmenite concentrate	38.5%	TiO_2
'Chromite' concentrate ..	4.7%	Cr_2O_3

A TiO_2 determination on this last concentrate showed 47.0% TiO_2. This result indicates that the black mineral was ilmenite.

Some chromite from an alluvial wash deposit near Beaconsfield was passed over the dry magnetic separator. The concentrates from both sides of the first disc was submitted for assay. The result was 42.0% Cr_2O_3. This concentrate together with the rutile, zircon and ilmenite concentrates shown above were forwarded to Pickands Mather & Co.