

TR3-161-162. R. 317

**DORSET TIN DREDGING****Samples.**

Two small samples of heavy mineral concentrates were received from the Department of Supply. Samples weighed one and eight pounds. The samples appeared to be of similar grain size, and the smaller sample (A) was sized with the following results.

B.S. Size	% Weight	
+ 44	Trace	
+ 60	6.3	The monazite content appeared to be similar in all sizings.
+ 85	28.5	
+100	3.7	
-100	1.5	

The samples are typical of seconds obtained from dressing shed operations to produce sale grade tin concentrates. In addition to monazite and cassiterite they contained ilmenite, magnetite and zircon. Samples were analysed as follows.

	% Monazite	% Tin
A (Small)	61.2	13.35
B (Large)	44.9	3.62

**Investigation**

Investigation was desired to produce high grade monazite concentrates by electro-magnetic treatment. Treatment for concentration of the tin was also desired.

**Summary.**

1. The minerals of economic interest are monazite and cassiterite, and the samples submitted contained 61.2 and 44.9 percent of monazite, and 13.35 and 3.62 percent of tin.

2. Electro-magnetic separation with one retreatment resulted in production of high grade monazite concentrates. These concentrates contained 93.2 (A) and 95.2 percent of monazite with recoveries of 99.8 and 97.8 percent.

The thorium oxide content of the concentrates was 6.4 (A) and 6.5 (B).

The electro-magnetic separator used is a "Laboro" Rapid Separator which has to be very closely adjusted to separate and make a high recovery of the monazite. Consequently it is considered that impurities, such as cassiterite and zircon, in the monazite concentrates may be less in operation of commercial sized separators.

3. The non-magnetic fractions of the samples contained 57.9 and 22.6 percent of tin. The former is marketable and the latter was too small to re-concentrate by hydraulic means. The recoveries of tin in the non-magnetic products amounted to 87.2 (A) and 91.8 (B) percent.

**Test Results.**

Electro-magnetic separation in a "Laboro" 4-inch Rapid Separator. Maximum amperage and minimum spacing were necessary to effectively separate the monazite. The highly magnetic products consisted mainly of ilmenite and magnetite.

Product	<i>Sample A.</i>					
	% Weight	% Monazite	% Tin	% ThO <sub>2</sub>	% Distribution	
					Monazite	Tin
Highly Magnetic	14.4	0.32	1.0		0.1	0.1
Monazite	65.5	93.2	2.4	6.4	99.8	11.7
Non-Magnetic	20.1	0.36	57.9		0.1	87.2
Composite Feed	100.0	61.2	13.35		100.0	100.0
		<i>Sample B.</i>				
Highly Magnetic	38.7	1.1	0.1		0.9	1.0
Middling	0.5	67.0	1.83		0.7	0.2
Monazite	46.1	95.2	0.55	6.5	97.8	7.0
Non-Magnetic	14.7	1.72	22.6		0.6	91.8
Composite Feed	100.0	44.9	3.62		100.0	100.0