

the collector dosage was increased to maintain the similar high recovery. For the coarse feed grind, high collector dosage and long flotation time were essential to achieve similar high recovery. It is interesting to note that the coarse grind feed produced an overall higher grade of tin flotation rougher concentrate. This may be seen as an indication that both free and composite cassiterite were floated selectively particularly in the middle of flotation time period examined. Some of these features can be seen in the plots of recovery and grade versus flotation time for Tests PC2/F2 to F7 in Figs 2 and 3 respectively.

The flotation performance of tin collectors CA540 and SPA used in Tests PC2/F9 and F11 respectively is also shown in Figs 2 and 3. Although only one sighter test was carried out with each collector, it can be seen that SPA exhibited similar flotation behaviour to that of the PTAA counterpart and it is probable that similar relationships of grind/flotation time/collector dosage would exist. For the collector CA540, a rather poor flotation selectivity was experienced with the conditions used in Test PC2/F9 in which a high tin recovery was obtained into a very low grade tin flotation rougher concentrate. This collector may have to be applied in very small amounts together with appropriate depressants in order to achieve flotation selectivity. Further testwork would be required to evaluate this collector under optimum conditions of application.

Tests PC2/F8 and F10 showed that it was feasible to up-grade the classified tin flotation rougher concentrate by superpanning. The finer grind feed ($-75 \mu\text{m}$) of Test PC2/F8 gave a $-75 +38 \mu\text{m}$ tin flotation rougher concentrate of 43.1% Sn at 39.0% recovery which was up-graded by superpanning to 70.5% Sn at 30.2% (or 77.5% absolute) recovery. The same test gave a $-38 \mu\text{m}$ tin flotation rougher concentrate of 1.61% Sn at 42.0% recovery and this was up-graded by superpanning to 29.2% Sn at 25.9% (or 61.7% absolute) recovery. In the case of the coarser grind feed ($-150 \mu\text{m}$) of Test PC2/F10, a $-150 +38 \mu\text{m}$ tin flotation rougher concentrate which assayed 16.1% Sn at 49.09% recovery was up-graded by superpanning to 41.2% Sn at 31.1% (or 63.3% absolute) recovery. The same test also gave a $-38 \mu\text{m}$ tin flotation rougher concentrate of 1.03% Sn at 34.2% recovery and this product consisted of an enriched cyclosizer Cone 1 fraction which assayed 37.7% Sn at 14.0% recovery (or 40.9% absolute).

The tin which reported in the sulphide rougher concentrate averaged about 0.33% Sn at 11% recovery in a series of 14 tests conducted on Composite PC2. This distribution figure was higher than that obtained for similar