

TR20-376-377

R.705. Heavy liquid separation of Khaki lode material from the Cleveland Mine

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Cleveland Tin N.L. requested that a heavy liquid separation be conducted on a large sample of Khaki lode material supplied for tin concentration tests.

The sample used in this investigation was obtained by taking a 160 kg grab sample from a stockpile of -50 mm khaki lode ore. The ore was crushed in a laboratory jaw crusher to -12.7 mm and riffled to produce a head sample for analysis and a 20 kg sample for heavy liquid separation.

The twenty kilogram -12.7 mm sample was wet and dry screened into the following fractions.

|     |                   |     |                   |
|-----|-------------------|-----|-------------------|
| (1) | -12.7 mm +6.35 mm | (4) | -2.36 mm +1.18 mm |
| (2) | -6.35 mm +4.75 mm | (5) | -1.18 mm +0.6 mm  |
| (3) | -4.75 mm +2.36 mm | (6) | -0.6 mm           |

These fractions (with the exception of the -0.6 mm fraction) were subjected to heavy liquid separation at a density of 2.95 t/m<sup>3</sup>, using tetrabromoethane (TBE).

## RESULTS

## Overall balance

| Fraction            | % Mass | % Sn   | % Sn Distribution |
|---------------------|--------|--------|-------------------|
| H/L F/T 2.95        | 19.9   | 0.11   | 2.5               |
| H/L S/K 2.95        | 31.7   | (1.36) | 48.2              |
| -12.7 mm +6.35 mm F | 51.6   | (0.88) |                   |
| H/L F/T 2.95        | 2.9    | 0.14   | 0.5               |
| H/L S/K 2.95        | 4.6    | (1.46) | 7.5               |
| -6.35 mm +4.75 mm F | 7.5    | (0.95) |                   |
| H/L F/T 2.95        | 6.3    | 0.13   | 0.9               |
| H/L S/K 2.95        | 9.2    | (1.45) | 15.0              |
| -4.75 mm +2.36 mm F | 15.5   | (0.91) |                   |
| H/L F/T 2.95        | 3.9    | 0.18   | 0.8               |
| H/L S/K 2.95        | 5.1    | (1.40) | 7.9               |
| -2.36 mm +1.18 mm F | 9.0    | (0.87) |                   |
| H/L F/T 2.95        | 2.1    | 0.19   | 0.4               |
| H/L S/K 2.95        | 2.6    | (1.36) | 4.0               |
| -1.18 mm +0.60 mm F | 4.7    | 0.84   |                   |
| -0.60 mm Head       | 11.7   | 0.94   | 12.3              |
| Head                | 100.0  | (0.89) | 100.0             |
| Head assay          | -      | 0.89   | -                 |

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*Summary of heavy liquid float fractions*

| Fraction           | % Mass | % Sn   | % Sn Distribution |
|--------------------|--------|--------|-------------------|
| -12.7 mm +6.35 mm  | 19.9   | 0.11   | 2.5               |
| -6.35 mm +4.75 mm  | 2.9    | 0.14   | 0.5               |
| -4.75 mm +2.36 mm  | 6.3    | 0.13   | 0.9               |
| -2.36 mm +1.18 mm  | 3.9    | 0.18   | 0.8               |
| -1.18 mm +0.60 mm  | 2.1    | 0.19   | 0.4               |
| Total H/L F/T 2.95 | 35.1   | (0.13) | 5.1               |

*Summary of heavy liquid sink fractions*

| Fraction           | % Mass | % Sn   | % Sn Distribution |
|--------------------|--------|--------|-------------------|
| -12.7 mm +6.35 mm  | 31.7   | (1.36) | 48.2              |
| -6.35 mm +4.75 mm  | 4.6    | (1.46) | 7.5               |
| -4.75 mm +2.36 mm  | 9.2    | (1.45) | 15.0              |
| -2.36 mm +1.18 mm  | 5.1    | (1.40) | 7.9               |
| -1.18 mm +0.60 mm  | 2.6    | (1.36) | 4.0               |
| Total H/L S/K 2.95 | 53.2   | (1.39) | 82.6              |

*Summary of overall separation*

| Fraction           | % Mass | % Sn   | % Sn Distribution |
|--------------------|--------|--------|-------------------|
| Total H/L F/T 2.95 | 35.1   | (0.13) | 5.1               |
| Total H/L S/K 2.95 | 53.2   | (1.39) | 82.6              |
| -0.60 mm Head      | 11.7   | 0.94   | 12.3              |
| Head               | 100.0  | (0.89) | 100.0             |

*Summary of heavy liquid separation*

| Fraction           | % Mass | % Sn   | % Sn Distribution |
|--------------------|--------|--------|-------------------|
| Total H/L F/T 2.95 | 39.8   | (0.13) | 5.8               |
| Total H/L S/K 2.95 | 60.2   | (1.39) | 94.2              |
| Total H/L H        | 100.0  | (0.89) | 100.0             |

CONCLUSIONS

Heavy liquid separation at 2.95 t/m<sup>3</sup> of the +600  $\mu$ m fraction of -50 mm Khaki lode ore laboratory crushed to -12.7 mm, showed that a mass rejection of 35% could be obtained with a consequent loss of only 5% of the tin. The total heavy liquid float fraction was found to contain 0.13% Sn.

[1 August 1975]