Mineralogy: chromite ores in a massive to densely disseminated chromite hosted within a peridotitic to pyroxenitic country rock. Gangue mineralogy is very rich, comprising ortho- and clinopyroxenes, tremolite to actinolite amphiboles, neopilin, olivine, talc and minor paragonite, pyroxferite, thorianite, rutile and dolomite. The mineralogical studies were carried out on four different grainsizes of feed (33F).

As the Cr2O3 content of the concentrate depends on the ore mineralogy and texture but also on the enrichment plant efficiency, a Separation Efficiency (SE), as defined by Schulz (1970), was introduced:

\[
SE = \frac{C_{\text{t}} - C_{\text{w}}}{C_{\text{t}}} \times 100
\]

where \( C_{\text{t}} \) is the recovery of the valuable mineral and \( R_i \) is the % recovery of the gangue into the concentrate.

Previous equation can be used practically in the following form (Wills, 1978):

\[
SE = \frac{C - C_{\text{w}}}{C} \times 100
\]

where \( C \) is the fraction of the total feed weight that reports to the concentrate, in the % Cr2O3 content of the valuable mineral, is the % Cr2O3 content of the concentrate and \( C_{\text{w}} \) the % Cr2O3 content of the feed.

As Brieville separation efficiency (SE) was calculated for three shaking tables and total plant results are shown in the tables below.

<table>
<thead>
<tr>
<th>TABLE 57</th>
<th>Parameters</th>
<th>Value</th>
<th>TABLE 62</th>
<th>Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cr2O3</td>
<td>54.12</td>
<td>56.31</td>
<td>Cr2O3</td>
<td>54.12</td>
<td></td>
</tr>
<tr>
<td>SiO2</td>
<td>6.79</td>
<td>5.94</td>
<td>SiO2</td>
<td>6.79</td>
<td></td>
</tr>
<tr>
<td>Fe2O3</td>
<td>22.72</td>
<td>20.71</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss</td>
<td>6.95</td>
<td>6.95</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mineralogy & Chemistry

Chromite sand enrichment is achieved by crushing and tabling, as a mixture of primary concentrate and a second concentrate from re-tabling of the primary concentrate.

If we compare the different tables and the final product the values of the most important commercial parameters, that are total recovery (C and Cr2O3 content) (figure above to the left), we get embedding results in table 57 shows the best performance, but not in accordance with the lowest efficiency (figure above to the right) and is related to pre-enrichment of its feed in the hydroclassifiers.

Conclusions

- Brieville feed chromite sand has a very heterogeneous mineralogy, comprising primary and secondary minerals, but devoid of olivine. Differential separation of gangue minerals could reasonably occur and be tested.
- Hydroclassification operates a pre-selection of chromite sand, and as a consequence, tables used and with sand different not only to proper alluvial type to the mineralogical and chemical.
- The main parameter affecting the quality of the final product is the degree of liberation of chromite. As more than half of SiO2 content of final product is found in middlings.
- Grinding of ore cannot efficiently separate chromite due to very high middlings content.
- Slow sorting of sands feeding tables negatively affect its efficiency.
- Tables working on ore have lower efficiency, but this trend is hindered by the pre-concentration operated by the hydroclassifiers.
- Crushing below 1 mm and substitution of hydroclassifiers with screens could increase tables efficiency and improve quality and/or recovery of final product.