

selective scheelite flotation process

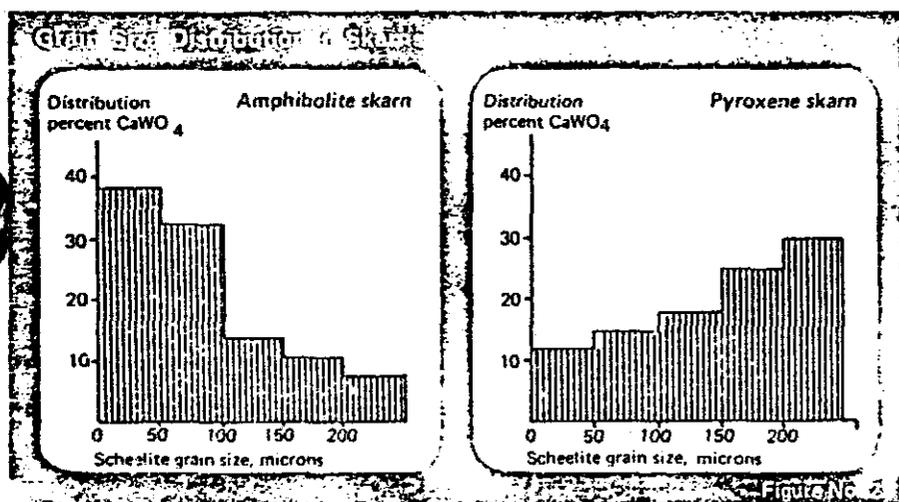
from fluor spar, and calcite-bearing ore gave only low grade concentrate or unacceptable recoveries. The new flowsheet described here has successfully solved these problems.

From the copper circuit rejects fluor spar and fine-grained scheelite were floated with tall oil as a collector. Scheelite in the final concentrate and some of the cleaner stage middling was recovered by three-stage tabling and then dried, roasted, and treated as described above.

In spite of great efforts to improve efficiency by adjusting the process, scheelite concentration results re-

tation methods were developed in bench and pilot plant tests and introduced at the concentrator. These modifications allowed steady progress and together with rising prices helped operations to become profitable. Of particular importance in the development was replacing the three-deck shaking tables by Reichert cone concentrators. This measure raised recovery in the gravity circuit from about 60 percent to about 80

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mained unsatisfactory for a long time. In 1974 overall scheelite recovery in concentrate assaying 68 to 70 percent WO₃ was still less than 50 percent. Due to this fact, and low tungsten prices, the mine was operating at loss. Therefore a project team with members from AB Statsgruvor and LKAB was appointed in order to develop a beneficiation process for more efficient recovery of scheelite.

Two different approaches were chosen aiming at short and long term improvements respectively. The former comprised modified gravity processes later to be combined with or replaced by flotation, depending on how selective such a process could be made.

Various modifications of the original flowsheet by gravity, magnetic, and flo-

percent. However, the overall scheelite recovery was increased by only some 2 percent. The flowsheet in operation at Yxsjöberg the last year before the switch-over to all flotation is shown in Figure No. 3.

The three-decked tables were originally installed in order to reduce space requirements, but have proven troublesome to operate. Due to their excessive need for mechanical service and the difficulties to control the process, both grade and recovery were inconsistent, thus causing disturbances along the production chain. Replacing the tables with Reichert cone concentrators was a success because the latter stabilized the process, despite the fact that the cone theoretically falls short of tables as a concentrating machine.

Scheelite Flotation Process

For many years attempts have been made to concentrate scheelite by flotation in the presence of fluor spar, calcite, and apatite, which have very similar flotation properties. Until recently, however, it was considered impossible to separate it from fluor spar and only low-grade concentrate or by far unacceptable recoveries were achieved from calcite-bearing ores. Apatite seems to cause comparatively minor troubles.

The primary objective of the flotation tests in this study was to find a method to produce a saleable scheelite concentrate assaying at least 65 percent WO₃ at the highest possible recovery. Otherwise, it was to be investigated