

## BEAVERLODGE MILL

The Beaverlodge leaching plant, in operation since 1953, had an original capacity of 500 tons of ore per day. Subsequently two additions were made to the plant which increased the capacity to a rate of 700 tons per day in 1954 and 2,000 tons per day in 1957. The production rate was curtailed in 1960 to 1,700 tons per day as a result of the stretch-out arrangement described elsewhere in this brief.

Current ore is obtained from the Ace-Fay orebodies and from the Verna mine.

The ore contains pitchblende finely dispersed in gangue. The common vein minerals are carbonates, hematite, chlorite and sulphides. The wall rock is a silicified feldspathic rock. Clay seams of varying width follow the main vein in the Ace orebody. The ore can be crushed at normal rates but requires higher than average power for fine grinding.

Development of the leaching process has been described under research and development operations. A brief description of the process and equipment is given below to supplement the flowsheets in Figures 1 to 5.

The master diagram (Fig. 1) shows the principal sections of the mill.

*Crushing (Fig. 2)*

The mine ore is crushed to minus 4 inches in an underground jaw crusher. The product goes through a 4. 1/4" cone crusher, then to screens in closed circuit with a 5. 1/2" shorthead crusher. The product from the crushing plant is minus 3 mesh and is conveyed through a sampling plant to a fine ore bin, capacity 7,000 tons.

*Grinding (Fig. 2)*

The grinding is done in two rod mills 9 ft. x 12 ft. in open circuit, followed by four ball mills—two 9 ft. x 9 ft. and two 9 ft. x 12 ft.—in closed circuit with classifiers. The grinding is done in mill solution which contains about 6% sodium carbonate and 8% sodium sulphate. The sulphate represents build-up in recycled solution of the reaction products from leaching of sulphide minerals. The ore is reduced in size so that the classifier overflow solids contain 75%-80% which will pass a sieve with 200 openings to the inch.

*Flotation (Fig. 2)*

The classifier overflow is pumped to the sulphide flotation section, where pyrite and some graphite are removed for separate treatment by acid leaching. About 40 tons of pyrite concentrate are produced per day. The equipment consists of 32 flotation cells—24 for roughing, 6 for cleaning and 2 for recleaning flotation. Isopropyl xanthate is the only reagent used.

The flotation of sulphide reduces reagent cost in the subsequent leaching of ore with sodium carbonate and is an essential pre-treatment for Verna ore which contains a considerable amount of sulphides.