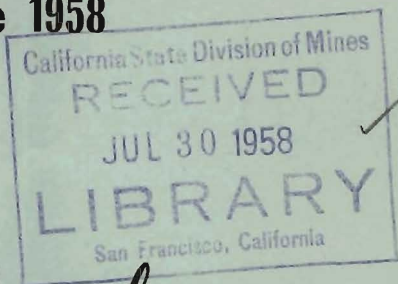


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BARITE AT KINGS CREEK

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The Barite industry is perhaps one of the oldest continuing mineral industries in South Carolina and presently occupies a position which holds promise of a solid future in the mineral economy of the state.

The Carolina Barite Belt is a mineralized zone that extends in a northeasterly direction from about five miles southeast of Gaffney, S.C., to about four miles southeast of Kings Mountain, N.C., in the vicinity of Crowder's Mountain; the length is nearly twenty-five miles. Van Horn et al (1949) give strike and dip of the formation as averaging N 45° E, 60° SE, but this is modified locally to the extent that on either end of the zone the dip is much steeper. The dip approaches the vertical in places and the zone is very narrow; it has a width of little more than a hundred feet and the ore occurs as veins of massive barite in heavily stained schist. In the central portion of the zone, however, the dip flattens out to about 30° in places; the belt is much broader, having in some places a width of nearly one-half mile. Here the country rock is largely a nearly white silicious sericite schist.

While portions of the zone have been worked for barite over the years, the Kings Creek District, which lies in the central portion of the zone, is the only portion which has been in continuous production since the mineral was first worked. This discussion is mainly concerned with the Kings Creek District.

As mentioned above, the country rock of the Kings Creek District is a sericite schist, which ranges from almost pure white silicious schist

through reddish, iron-stained phases, to a dark brown and in places almost black, heavily stained schist. The white and pink phases are laminated, foliated schist, sometimes quite hard, whereas the dark brown and black phases usually are heavily cross-bedded and quite soft and friable and weather easily.

Mineralization of the Kings Creek district comprises three types: 1) massive barite of 80-90% BaSO_4 in veins ranging from a few inches to many feet in thickness, and in pods of varying size, one of which is estimated to have yielded well over thirty thousand tons of barite; 2) disseminated barite consisting of small nodules that range in size from a fraction of an inch up to several inches; and 3) impregnated schist. This latter fades in the degree of impregnation as it recedes from the massive zones and ranges from 50% or more in close proximity to the veins of massive ore to as little as 8 or 10% as it nears the barren zones between mineralizations. The disseminated ore is almost always associated with the impregnated schist.

In the white schist and in a single thin layer of light green chlorite schist, which is included in the white schist, the ore is nearly white and is very low in iron. Also the ore which occurs on the contact between the overlying black and brown blocky schist and the white sericite schist, is heavy and white and low in iron. The ore in the pink schists varies from light pink to brick red in some phases, and has iron to 1%; this darker phase is apparently confined to a narrow band.

While no systematic drilling program has been undertaken to prove the thickness of the formation, it is quite possible that it may be several hundred feet thick and more heavily mineralized at depth.

The ore, with gangue of silicious sericite schist and some quartz inclusions and small and economically unimportant inclusions of galena, has been proved to be readily amenable to concen-

tration by flotation to a high grade product. Although over the period of years of operation, several hundred thousand tons of massive barite have been removed and shipped, it is felt that the real future of the development of this ore will come about through the preparation of a high grade and readily marketable product through flotation.

The first production of barite from the Kings Creek District took place about 1885. Through weathering, innumerable outcrops of massive barite had been exposed and were readily recoverable from small handworked pits.

The ore was first hauled by wagon to rail at Blacksburg, six miles away, where it was loaded for shipment to industry. At about the turn of the century, however, the rail line, which was being extended to the northwest, passed through Kings Creek, and at that time a real commercial development began to take shape.

In 1908 a Baltimore group commenced to acquire mineral leases in the district, and in 1910 a plant was completed by the Cherokee Chemical Company for the production of an acid-leached, millstone ground barite, which was sold to the trade for the adulteration of sugar and flour. This steam-powered plant operated on an expanding basis until about 1923, when the passage of the Pure Food and Drug Act forced the discontinuance of adulteration of foods. The product of the plant was then offered in the filler trade.

In the early 20's a substantial interest in the operation was acquired by Mr. Henry N. Hanna, of Baltimore, and a program of modernization and expansion was embarked upon through the issuance of \$50,000 of bonds: the plant was converted to electric power. The crash of 1929 and the depression which followed forced the company into bankruptcy in the early 30's and Mr. Hanna's company, The Clinchfield Sand & Feldspar Corporation of Baltimore, leased the property and continued the operation on a leased basis.

Although production fell to a very low ebb during the depression years, the operation never ceased completely. World War II again placed great demands on the barite producing facilities of the nation, and the operation took a new lease on life.

Up to this time, all ore from the property had been produced by underground mining. In 1943, as a result of the gradual depletion of the local labor supply through the demands of the military and as a result of the high wages being paid elsewhere in war industries, mining was discontinued at Kings Creek and the plant operated merely as a grinding plant on ore shipped in from Tennessee from another property of the Clinchfield Company.

At the end of World War II, with business again settling back into a peacetime pattern of requirements and specifications, the business of the plant fell off sharply and the property was practically non-operative. In 1949, however, it was transferred to the ownership of Industrial Minerals, Inc, the present owner and operator, which commenced a program of rehabilitation and development through modern methods to realize the full mineral potential of the property.

Early development was slow; markets and equipment had to be rebuilt and mine development had to be accomplished to a point at which the operation would be self-supporting without the importation of outside ores. In 1953, after a period of several years of transitional operation using both underground and open pit methods, the mining operation was converted to a completely open-pit mining operation.

Open pit development has so far been confined to something less than 20 acres, but ores developed therein should be sufficient to support the operation with no difficulty until further exploration and mine development can be accomplished. With a property exceeding 1,000 acres in extent, all lying on strike, it is felt that there will be no shortage of ore.

From 1910 up to the time of conversion in 1953 to open-pit operation, most of the mining had been underground and the tonnage produced, amounting to approximately 400,000 tons over the entire period of operation, had been removed principally from four large pods, all lying on strike within a distance of less than 1,800 feet. It is not felt that the depletion of these four pods has exhausted the reserves of massive ore. In addition, the presently operated formation, which has been developed through the removal of some half-million yards of overburden, has exposed what is estimated to be many thousands of tons of disseminated and impregnated ores of the lower grades, sufficient to support a substantial concentrating plant over a period of many years.

Ore is presently extracted by selective mining and handcobbing of the massive ore for raw-grinding in the plant. It is presently processed through primary jaw crusher and secondary roll crusher, thence through a rotary dryer, and into a Raymond roller mill in closed circuit with a Sturtevant 14-foot air separator, producing a product of 99% passing 325-mesh. This is bagged in 50# and 100# multiwall paper bags for the trade.

Upon completion of a small flotation unit this summer, the market for higher grades of barite can be served. This latter operation will call for processing 80-100 tons of the lower grades of ore per day and will require mechanical loading of the ore in the pit, hauling by truck to the mill, and processing by orthodox froth flotation methods. The flotation will include, an addition to the crushing and grinding above mentioned, preparation by rod milling, and concentration in flotation cells, to produce a crude concentrate which can be further processed by drying and grinding.

All of the elements for a continuing production of a substantial annual tonnage of product seem to be present, including ample ore supply, strategic location with respect to markets, rail and highway transportation at hand, and ample

power, water and labor to support the operation. It is hoped that the industry can continue to contribute to South Carolina's economy for many years to come.

References

Van Horn, E.C.; LeGrand, J.R.; and McMurray, L.L.; 1949, Geology and Preliminary Ore Dressing Studies of the Carolina Barite Belt: South Carolina State Development Board Bulletin No. 18.

