

THE KINGS MOUNTAIN STORY

by

PHILIP N. SALES

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During the past fifty years many of the nonmetallic mineral producers of North Carolina and other areas have faced the need to find an economical use for all the products of their operation. This is the story of how one company has met this problem.

In the late 1940's F. B. Hendricks Construction Company began operating a small "jigmica plant" northwest of Kings Mountain, North Carolina at a location called the Patterson Plant. The operation consisted of a series of roll crushers and screens to differentially grind mica and sand. The mica was recovered on the screens and was sold to both wet and dry grinding plants. All of the minus one-eighth-inch material was classified and sent to a sand tailings pile or fines pond. In many cases the tailings contained fifty percent or more of the mica in the feed to the plant. Multiple forces of water scarcity and potential value of the minus one-eighth-inch tailing led the company to stockpile the sand and retain the fines in an impounding lake. The principal minerals in the sand were mica, feldspar and quartz. The fines contained clay, mica, quartz and feldspar.

Early in 1950 F. B. Hendricks Construction Company, The English Mica Company, and U. S. Mica Company, Inc. formed and chartered The Kings Mountain Mica Company, Inc. They entered into a larger and more efficient operation at the Patterson location. In October 1949 the Minerals Research Laboratory published Report of Investigation No. 1 "A New Method For Recovery of Flake Mica From Washing Plant Tailings" (Preliminary Report) by Ralph Adair, W. T. McDaniel, and W. R. Hudspeth.* As a result of this work, the Kings Mountain Mica Company, Inc. and the Minerals Research Laboratory entered into a test program to recover their mica by means of the Humphreys spiral. The results led the Kings Mountain Mica Company, Inc. to construct a Humphreys spiral plant to recover the mica from their jig tailings. With this installation, most of the high quality delaminated mica in the plus 60 mesh range was recovered. The sand tailings from this operation contained mica, feldspar and quartz. The fines contained mica, feldspar, quartz and clay.

Mica operations were greatly expanded in the 1950's. During this time Kings Mountain Mica Company, Inc. reworked the original minus one-eighth-inch sand tailings along with additional mining operations at Patterson. During this

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From 1949 to 1951 W. T. McDaniel and J. R. LeGrand, staff members with the Minerals Research Laboratory, developed and patented a wet grinding procedure. With this basic information and the proven effectiveness of the Humphreys spiral, Kings Mountain Mica Company, Inc. built and placed into operation a new Humphreys spiral mica recovery plant and a wet grinding operation southwest of Kings Mountain, North Carolina, called the Moss Plant. With increased operation the storage of sand and fines soon became a major problem.

In early 1960 the Advisory Committee of the Minerals Research Laboratory recommended that it begin an intensive program to assist in the tailings disposal problems of the mineral industries. As one of the projects the Minerals Research Laboratory in cooperation with Kings Mountain Mica Company, Inc. conducted considerable research on the sand fraction of their tailings. The object of the investigation was to develop an economic process for producing glass grade quartz. The investigation found that the sand contained mica of good to intermediate grade which could be used for dry ground mica, ten to twenty-five percent feldspar which was very high in potassium and fifty to sixty percent quartz.

In the 1960's an overlapping project was entered into between Kings Mountain Mica Company, Inc., the Minerals Research Laboratory, and the Pyrochemical Section of the Department of Engineering Research of North Carolina State, to produce and evaluate a clay product from the fine tailings. The ceramic testing was conducted by Mr. George Winchester under direction of Dr. R. F. Stoops. As a result of this work, it was concluded that a good grade brick clay could be produced and a Clay Recovery Unit was built at the Moss Plant. This has led recently to the organization of the Kings Mountain Brick, Inc., which is constructing a plant two miles south of the Moss Plant to initially produce approximately twenty million bricks per year. This Company will use the product of the Clay Recovery Unit as one of its raw materials.

After careful economic evaluation of the Minerals Research Laboratory report on their sand tailings from the Humphreys spiral, Kings Mountain Mica Company, Inc. and the Laboratory entered into a program to determine the most economical process to produce mica, high quality potash feldspar and glass or foundry grade quartz. During this time the Bureau of Mines published R. I. 6589, "Anionic-Cationic Flotation of Mica Ores From Alabama and North Carolina", by James S. Browning, Frank W. Millsaps and Paul E. Bennett. As part of the batch investigation, Mr. Dean Van Dyk of the Minerals Research Laboratory found that scrubbing at very thick pulp (70 percent or greater) improved the selectivity of the sulfonated petroleum oil flotation of iron minerals.

Batch testing was conducted and a continuous pilot plant was operated at the Minerals Research Laboratory. The pilot plant used thick pulp scrubbing, the mica float developed by Bureau of Mines, sulfonated petroleum oil flotation of iron minerals and hydrofluoric acid, amine acetate flotation of feldspar from quartz. The test results were quite encouraging. Kings Mountain Silica, Inc. was organized to process the sand tailings from Kings Mountain Mica Company, Inc. and a plant built to produce mica, feldspar and quartz.

At the Moss Plant of Kings Mountain Mica Company, Inc. we now have a three-fold operation which recovers almost all of the mineral values of their ore. High quality mica for wet grinding is produced by Humphreys spirals, medium quality mica is produced by flotation for dry grinding, high potash feldspar is sold to the glass industry, brick quality clay is recovered and foundry or glass grade quartz is available. Water is recovered for re-use from settling ponds and the small amount of iron flotation material has several market potentials as filler or low priced flux.

From a very modest beginning the combination of wise leadership, available technical services and development of suitable markets has resulted in a small operation growing into a multimillion dollar investment employing approximately one-hundred people and recovering almost all of the mineral values in the ore.

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