REPORT

on

KYANITE DEPOSITS - KINBASKET LAKE, B.C.

YELLOW CREEK MICA, LTD.

Frank Eichelberger

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PROPERTY AND LOCATION

This property consists of four mining claims lying near the confluence of the Sullivan and Columbia Rivers at Kinbasket Lake, 65 miles north of the town of Golden, British Columbia, Canada. Canadian National Highway No. 1, passes through the west side line of the Ruby No. 1 Claim.

The nearest settlement is at the south end of Kinbasket Lake, 7 miles distance by highway where accomodations for any size crew can be had. The nearest railway station is Donald, B.C., a small logging town on the Canadian Pacific Railway, 48 miles up river. Some supplies can be purchased there, but the nearest town for banking, general supplies and labor market is Golden.

Vancouver is 420 miles by railroad, and milling and mining machinery and supplies of every kind are available there.

Highway No. 1 is kept clear of snow until about the first of December and is opened for traffic in early May. The road is kept open all the year from Golden to Donald and as the snow fall is not heavy there would be no problem to keep the road clear from Donald to the property if it was desirable to work throughout the year.

The property is well situated for water, highway transportation and hydro-electric power. There are three millsites available which have not been staked. One is on the hillside at the outlet of Sullivan River -- another is a swamp near this point where the tailings can be disposed of and a half mile further on is a good millsite with outlet to a large swamp. However, the best millsite is 1.8 miles up the river where there is plenty of gravity water for the mill and a wonderful water power stream approximately 4 miles from the outcrop of the dyke. I, personally, favor the up stream millsite because of the availability of water power, a good place to dispose of the tailings and it is closer to the railroad.

GEOLOGY

A large mass of schist and gneiss outcrops along the Columbia River intermittently for about a mile -- but on the Ruby No. 1 Claim, the outcrop is almost continuous and forms, in places, a sheer bluff rising over 100 feet vertically.

The country rock is practically all schist and when schistosity is well developed it shows heavy sericite and many garnets. In some places the garnets make up over 50 percent of the rock. Where the schistosity and sericitization is the heaviest the kyanite is best developed. Quartz in fairly large masses is also generally present and seems to have some bearing on the abundance of kyanite.

There is a favorable dyke striking north 10 degrees west and dipping sharply to the west conformable to the apparent bedding. The average dip is 60 degrees or even steeper, with some folding having a tendency to steepen the dip of the dyke. This favorable dyke outcrops on the road, 600 feet south of the final post 6248 of the Ruby No. 1 Claim and rises as a bluff almost 100 feet vertically. The characteristic blue kyanite is everywhere apparent and where some few shots have been put in and fresh surface exposed, is visible from the road. Some of the kyanite is colorless and well may be considered Sillimanite. The other claims have not been prospected sufficiently to prove up any other veins but the evidence of kyanite is shown by the presence of boulders of float, some very large, above this dyke.

PROPERTIES OF KYANITE

Kyanite, also spelled Cyanite, is an aluminum silicate, Al_2SiO_5 or Al_2O_3-SiO_2. Its color is blue with lighter margins but can also be any other color, or even white. The blue color with lighter margins is characteristic. It is very difficult to distinguish this mineral from Sillimanite, except mineralogically or microscopically, as the two minerals have exactly the same chemical composition and when kyanite is heated to a white heat it changes to the crystal system of Sillimanite.

It is used in the manufacture of porcelain because of its very high fusing point, up to Seger cone 36. High heat electric furnaces use Kyanite bricks as covers and linings. There are, of course, many other uses because of its heat resistant characteristics. The mineral is considered strategic in the United States and was on the critical list for many months.

The price of Kyanite varies quite widely, depending on its purity and for 98% runs $100 or more per ton. Different manufacturers require different grades of kyanite as well as different meshes, depending upon the uses to which it is to be put. Some users like the natural crystals in as large sizes as can be procured. It is quite possible that if the demand is great enough for coarse specimen, a sorting belt could be installed and large pieces of pure Kyanite could be picked off for different trades.

DIAMOND DRILLING

During September 1,000 feet of diamond drill holes were drilled across the dyke to determine the extent and the amount of kyanite in the dyke. The large map accompanying this report shows the location of these drill holes and the logs of these drill holes give a good idea of the variation of the occurences of the kyanite in the dyke. These cores were split and were taken to the Washington Technical Laboratories at Pullman, Washington for analyses. These analyses were made by Dr. William C. Aitkenhead and his assistant, Jim Crosby. Under my directions, the metallurgy of the ore was pretty well worked out and a flow sheet of the mill for recovery of the kyanite and garnets accompanies this report.

METHOD OF ANALYSES

A weighed portion was thoroughly mixed into bromoform, a heavy liquid with specific gravity of 2.89. The float material was discarded. The sink material was dried and put over a magnetic separator with a strong magnetic field. This was to remove the magnetic material consisting entirely of garnets of the variety almandite. This variety is the one most commonly used for abrasives, and when large and deep red in color, as a semi-precious stone. It has a hardness of 7 in Mohs scale and is in great demand on the Pacific Coast for sand blasting and garnet paper.

After the garnets were removed by electro-magnetic machine the principal gangue mineral, Pyrophyllite, was removed from the kyanite by fine crushing and screening. The pyrophyllite being soft was easily discarded. A final analyses was made by analyzing for alumina and silica. Kyanite is essentially 63% Al_2O_3 and 37% SiO_2. Analysis sheet is attached hereto showing percentage of kyanite and garnets in each of the samples tested.

METALLURGY

Part of the split cores were put through a 4" x 6" laboratory jaw crusher and a set of 9" x 10" rolls so that all material passed a 4-mesh screen. In the first test these samples were put over a jig -- the garnets were removed on the first cell and the impure kyanite on the second cell. The tailings were afterwards put over a Wilfley Table after first classifying. The results of work on each sample are appended hereto.

The second test was made by putting the split cores through a Hammer Mill and all of the minus 48 materials discarded as it was found that none of the kyanite and practically no garnets were in this fine material. A test made with bromoform showed that less than 1/2 of 1% of the material would sink. The plus 48 material was jigged and tabled as in the former experiment and then the kyanite was further ground and floated to give a high grade product.

From this work a flow sheet was worked out for a mill. This mill will be quite simple in that the quarried ore would be fed directly to a Hammer Mill, with 1/4" grate bar openings, and the minus 48 mesh material immediately discarded by classification. The plus 48 mesh material will go over jigs which should make a clean garnet concentrate on the first two cells, and a mixed kyanite-garnet concentrate on the second and third cells. The tailings from the jig will be further treated by being ground and put over tables for the recovery of garnets and kyanite. These mixed table concentrates with the mixed jig concentrates will be sent to magnetic cleaners for the removal of the garnets. The kyanite concentrates will be further treated by being cleaned on tables and flotation. Both the garnets and the kyanite concentrates will be graded by screening, dried and bagged. The attached flow sheet shows this mill circuit.

POWER PLANT

Four miles up the Columbia River from the property, a nice stream enters the Columbia River from the east and a power plant location has been staked and and the water rights appropriation applied for.

Depending on the head taken, this stream could produce anywhere from 500 to 1000 H.P. which would be sufficient for a 500 ton mill and the necessary mining machinery. We could not find any records of the flow of this stream during winter weather and I doubt if any records have been made but on September 20th, there was sufficient stream flow to produce 750 H.P. at 150' head.

If a six months operation per year is contemplated, this electric plant would be cheaper and better than a diesel plant but unquestionably in severe winter weather this stream would freeze up and an auxiliary diesel power plant would have to be put in so the decision as to whether a hydro-electric plant or diesel plant is to be used, would depend on whether year round operation is contemplated or only a six months operation.

PRICES

There seems to be a very steady market for garnets and material brokers in the United States offer an average of $60 per ton for graded and sacked garnets, fob railroad. The coarser sizes bring less money but finer sizes if properly graded by screening, would be in great demand and now sell for over $100 per ton.

It is hard to tell what the market on kyanite is, but high grade, that is, 96% kyanite in bags, sells from $100 to $135, at points of consumption. There is no duty on kyanite into the United States, and I believe a very good freight rate could be obtained from the Canadian Pacific Railway on shipments to the Atlantic Coast or Great Lakes ports as well as to Vancouver.

COSTS

The dyke is so wide and as it carries no overburden, the all out costs of mining and delivery to the mill should not exceed $1.50 per ton. Milling on a scale of 400 to 500 tons per day, and using flotation to clean up the kyanite concentrates would be from $2.50 to $3.50, depending on whether hydro-electric or diesel power were used.

The concentrates will have to be hauled to Donald for loading on railroad cars, a distance from contemplated millsite of 45 miles, and this haul by company truck should not exceed $5.00 per ton, perhaps somewhat less — and all supplies could be brought back from the railroad at a very nominal expense.

The principal per ton cost of this whole project would be amortization of the plant, depending upon the time in which it is desired to do so. I would favor 5 years amortization, but in no case over 10 years.

CONCLUSION

While the drilling which has been done may not be enough to adequately determine the amount of kyanite and garnets in the dyke, yet I believe it is a fair sample of at least 1,000,000 tons because of the fact the kyanite and garnets seem to exist in about the same proportion to the gangue rock, in all the holes drilled.

If a 75% saving is used as a basis of calculation for the kyanite and 85% for the garnets, this ore has a net profit of $6.80 per ton before income taxes, figuring garnets at $50 and kyanite at $60, fob railroad.

As the cost of equipping the property to production, plus $100,000, working capital is $325,000, the investment would be repaid in two years at the rate of 400 tons per day or 70,000 tons of ore treated per season. If the property is operated the entire year, the profit figure per ton would be increased at least 50%. For the purpose of this report the six months season is contemplated.

This is a most meritorious project and if adequately financed it should become a great money maker.

Respectfully,

FRANK EICHELBERGER & ASSOCIATES

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