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SUQUASH COAL PROSPECT

VANCOUVER ISLAND

BRITISH COLUMBIA

M. J. Fitzgerald
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INTRODUCTION

The Suquash Prospecting Syndicate, a group of individual investors, has recently applied for 26 square miles of coal licences in an area of Cretaceous sediments located between Port McNeil and Port Hardy on the northern end of Vancouver Island. Field work in the area of the licences has been minimal to date and acquisition of the licences has been based on the history of past production from the area, the favorable location on tidewater, and the apparent amenity to low cost production due to the flat-lying nature of the coal seams.

Old reports available on the coal seams indicate that the coal would be ranked as high volatile bituminous with ash content within acceptable limits. Sulfur analyses are not available but high sulfur content is usually not a problem in British Columbia Cretaceous coals. Old tests on the coal from various near-surface seams indicate that a tender to firm coke can be produced. Coal seam thickness ranged from 7-1/2 feet to 8-1/2 feet in the early operations with a clean coal thickness of 4 to 4-1/2 feet. The waste rock present within the seams should not be a problem with modern coal washing techniques.

HISTORY

Coal was first discovered on the beach at Suquash in 1835 and as such was the first coal deposit discovered on Vancouver Island. Approximately 10,000 tons were mined from the exposed seams at Suquash by the Hudson's Bay Company between 1849 and 1853 for naval and freighter shipping use before coal mining was shifted to the now exhausted deposits near Nanaimo. The coal mined was from two seams 1-2 feet and 6 inches thick which are separated by 1-foot of soft shale. Pacific Coal Mines Limited drilled several holes at Suquash in 1908 discovering the No. 2 seam at 173 feet and the No. 3 seam at 445 feet. The seams are 4 to 8 feet and 4 feet thick, respectively. Between 1909 and 1914 Pacific Coal sunk a two-compartment shaft and drove about 10,000 feet of development openings. An 800-foot long longwall face was opened to the south of the shaft on the landward side and 2 pairs of slopes were advanced to the northeast, the longest of which extended 1,140 feet beyond the shoreline. Approximately 12,000 tons of coal were mined during this period before the cessation of operations with the outbreak of World War I.

The workings were dewatered in 1920 and some work was done on surface installations, but production was not resumed and work ceased in 1922. The workings were again re-opened in 1952 by Suquash Collieries Ltd. and, although samples

were taken from the south side workings, no production was undertaken. No exploration activity is known to have taken place in the area since 1952.

GEOLOGY

The known coal in the licence area occurs on the south-west flank of a Cretaceous basin which appears to extend out under the Queen Charlotte Strait as Cretaceous strata are known on several of the islands within the Strait. The Cretaceous rocks, which consist largely of sandstone and interbedded shale, appear to underly an area at least 13 miles long by 2 to 4 miles wide. Although soil and vegetation cover is heavy, coal seams are described in old reports from at least seven different localities over the length of 13 miles. The seams exposed at several of the known localities may be one and the same, but it seems evident from the old drill hole results that the occurrence of coal is repetitive through the Cretaceous sequence.

The dip reported at each of the known outcrops is less than 10° and that at the shaft at Suquash is 3° indicating substantial quantities of stripping coal may be present in the mainland portion of the basin where the gentle topography extending inland from the beach would favor an operation of this type.

EXPLORATION POTENTIAL

Two main seams are presently known which would be targets in an exploration program; a) the 4 to 8-foot seam

encountered at 173 feet in the Suquash shaft which was mined in the 1909-1914 period, and, b) the 4-foot seam encountered at 445 feet in the old drilling at Suquash. If the dip recorded in the old workings persists to the southwest away from the shore, the main seam (173 feet at the shaft) would rise to the surface within one to two miles. The main seam may, then, be present within 100 feet of the surface over a width of 1,500 to 3,000 feet. In this instance, potential strippable coal reserves would be in the 30 million ton range if the seam were persistant throughout the basin. In turn, the underground coal potential in the two seams would be in the range of 175 million tons if both were persistent throughout the basin.

There appear to be a number of other coal seams present within the basin but all of those exposed are less than two feet in thickness. The exploration to date is so limited, however, that considerable potential remains for discovery of other seams with a thickness similar to that of the two seams known at Suquash.

COAL QUALITY

Data on the quality of the coal from the two target seams is meager. A report by C. H. Clapp in 1911[1] describes coal from the main seam as being "of good quality, burning with a long flame and little smoke." A report by C. M. Dawson in 1886[2] gives the following analyses from surface samples in the area:

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1 Summary Report Geol. Surv. Can., 1911, p106
2 Ann. Rept. Geol. Surv. Can., Vol. II, 1886, pp61-70B

1. Small seam about 3/4 mile south of mouth of Cluxewe

Water	3.65%
Volatile matter	42.23%
Fixed carbon	39.84%
Ash	14.28% ← Too high

Produced a "coherent but tender coke".

2. From Suquash (seam mined in 1849-53)

Water	5.03%
Volatile matter	41.51%
Fixed carbon	46.52%
Ash	6.94%

Produced a "moderately firm coke".

3. From a small seam on the Keogh River

Water	3.68%
Volatile matter	39.29%
Fixed carbon	47.03%
Ash	10.00%

Produced a "firm, coherent coke".

The coking quality of the deeper seams at Suquash (173 and 445 feet) is unknown and even though the three seams tested at the surface appear to be of coking quality, coking and non-coking coals are known in alternate seams in many coal fields. In addition, coking tests on surface or near-surface coal exposures are generally not reliable although it is definitely encouraging that coke was produced in the tests.

On the basis of the analyses listed above, the coal would be classed as high volatile bituminous with an ash content that is acceptable in the case of samples 2 and 3. If the

coal is amenable to coking, it would be most similar to that produced in Japan and in a portion of the Australian production.

The main coal seam mined at Suquash in the 1909-1914 era has a number of persistant shale partings. At one face measured in 1952, the seam was 7 feet 6 inches thick and contained seven shaly bands totalling 3 feet 1 inch, leaving a clean coal thickness of 4 feet 5 inches. The seam was also reported to improve to the south. The waste rock partings increase the cost of mining and to some extent washing as compared to operations with a thicker section of clean coal, but no problems are foreseen which would affect the viability of an operation. The location of the prospect in relation to that in central and southeastern British Columbia is such that a competitive edge of $3.50 to $4.50 per ton is evident for similar types of coal due to the lack of necessity for rail transportation.

COAL MARKETS

The rapid increase in demand for coal in the past five years has largely been due to the tremendous expansion of the Japanese steel industry and to a lesser extent to the revival of the European steel industry. The prime customer for coal from Suquash would be the Japanese market as Japanese steel production is estimated to grow from 96 million tons in 1970 to 180 million tons by 1978. At present, the Japanese are buying low volatile Western Canadian coal to mix

with the high volatile coal mined domestically in Japan and imported from Australia to achieve a standardized coke which is used throughout the steel industry. This mix has a medium volatility of 27%, a restrained ash content of 7.3% and a relatively low sulfur content of 0.6% maximum. Richardson Securities, in a recent research on coal,[3] estimates that, given the current Japanese furnace technology, indications are that the above coking coal specifications will be maintained for at least the next decade. Japanese domestic coal production (high volatile) has been declining rapidly in recent years and productivity of the mines is low suggesting that coal from Suquash should find a ready market in Japan if it is of coking quality.

The market for non-coking coal (steam coal) from Suquash would be largely for thermal power generation. There is a definite market for steam coal on Vancouver Island itself and the consistent resistance to the introduction of nuclear power generation by Island residents suggests that a considerable local market could be developed. Coal from Suquash would certainly be in a strong competitive position in this instance. Other markets for steam coal would include the west coast of the United States and Japan. The lag in construction of nuclear power plants in the United States has strongly expanded the demand for steam coal and the price rise in the past several years has been dramatic.

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3 Coal, Richardson Securities of Canada, Research Dept., December, 1970.

COAL PRICES

Coking Coal

The average contract price to date for Western Canadian coking coals is approximately $13.85 per ton (FOB Vancouver). It is expected that a re-negotiated price on the Kaiser Resources contract will substantially increase this price in 1971.

High volatile coking coal from Suquash would probably not command the same price as the lower volatile coking coals of southeastern B. C. and Alberta, but a selling price of $10 to $12 per ton is not unreasonable.

Steam Coal

I was unable to obtain average prices of Western Canadian steam coal but United States prices were averaging $7 to $8 per ton FOB mine site during 1970. The delivered price to west coast ports would be considerably higher due to the necessity for rail transportation from sources of supply in Utah and Arizona. It is expected that Suquash coal could command $9 to $10 per ton FOB mine site and still be delivered to west coast ports at a lower price than Western U.S. coal.

POSSIBLE OPERATING ECONOMICS

It is presumptious to attempt to project operating costs at the exploration stage in any project but a tentative projection can be made based on data available from feasibility studies of the coal operations in Alberta and southeastern British Columbia. Operating costs for underground mining in these operations, where dip of the seams ranges from 15° to 22° and the strata are locally folded and crumpled, has been variously estimated at $4.03 to $5.49 per ton of clean coal recovered. Operation size for these costs ranges from 1,000,000 to 3,000,000 tons per year. Amortization of capital and provision for taxes for these size ranges was estimated $0.95 to $1.91 per ton. Capital costs would range from $12,000,000 to $20,000,000. These operations must bear a rail freight burden of $3.50 to $4.50 per ton of clean coal so it is estimated that total costs would range from $9 to $11 per ton.

The low dip of the coal seams and the location on tide water at Suquash suggests strongly that the extra cost of washing interbedded shale partings would be more than offset by the lower mining cost and lack of rail freight burden. As a consequence, it is estimated that operating costs of $5 to $6 per ton and total costs of $7 to $8 per ton are not unreasonable. Costs for strip coal would probably be about $1 per ton lower.

CONCLUSIONS

I believe that the past history of production, location, and amenity to low cost mining make the Suquash Coal prospect a very attractive exploration venture with an excellent chance of success.

M. J. Fitzgerald