



OPEN FILE

HOPE ENGINEERING LIMITED
ENGINEERS - MANAGERS

STOCK EXCHANGE BUILDING

VANCOUVER 1, B. C.

TELEPHONE TATLOW 2351

July 8, 1958.

Mr. H.C. Estabrook, Pres.
Squash Collieries Ltd.
1007 Stock Exchange Building,
Vancouver, B. C.

Dear Sir:

Interim Report as of July 8, 1958.

The unwatering of the Squash mine is completed and the pumping equipment has been moved to the counter level at the head of the first slope, at a point about ten feet below the bottom of the main workings, thus insuring dry workings for all points above. There seems to be little water seepage into the mine since the unwatering has been completed.

Such inspection of the workings as we have been able to make to date indicates that the general condition of the mine is better than we expected. There has been some spalling off of the roof, at a point about 250 feet south of the present shaft. Wicking is now being done between the shaft and the cave-in which does not appear to be serious.

One sample of coal has been secured and a proximate analysis made. This analysis indicates that it is of high grade and amenable to suitable beneficiation treatment. Based on previous records we are lead to believe that additional samples should be at least as good as the first

sample taken - or better:

EXPENDITURES

Our estimate of the cost of unwatering the mine was, as of January 31, 1952, \$20,000.00. The total cost as of June 30, 1952, was \$32,345.00 an increase of about \$12,345.00 or about 62%. This increase is almost entirely due to the increase in the length of time required due to weather conditions and equipment breakdown.

CAMP SITE

The present camp site has been adequate to date, but is now being moved to a point further away from the shaft and surrounding workings.

ENGINEERING NOTE

The shaft was re-timbered for a distance of fifteen feet down from the top, and the head frame, which had to be built new, has proven adequate. In fact with very little modification will adapt itself to future plans.

INDUSTRY

For the purpose of simply generating the mine the present air compressor, though somewhat smaller than desirable, was the only one obtainable and has proven reasonably satisfactory. Now that the operations have been extended underground more power is required for hoisting, blowers, pumps, etc., for exploratory development. The air compressor is therefore being replaced by a steam boiler which will make a considerable saving in rental charges and provide a more reliable and flexible unit, and save fuel oil by using Squash coal.

Retimbering the upper part of the shaft has been mentioned above. The shaft itself in what is known as a crib pattern is in remarkable condition after such a long water immersion. There is some drip from surface drainage and we are surveying the possibilities of heap caulking to make it watertight and eliminate seepage during the rainy season.

Some of the big holding timbers on the bottom cut will need replacement. We anticipated this and timbers are on the ground and ready to be installed.

TIMBERING

Referring to the mine plan you will note drifts and counters are driven north from the bottom of the shaft. As far as we have been able to explore at this date these entries were formerly timbered. Near the shaft some of these timber sets have been broken or loosened and rock material has cluttered up the drift way, however, we expect to enter these workings shortly as we know that they have been pumped dry, however, for the present we prefer to confine our exploration to the area south of the shaft as it was here that the greatest amount of coal was extracted during former operations.

The workings south of the shaft are rather extensive; no timbering was used to any extent, but we believe posts should be placed along the drift to make the workings safe for the miners. This work is already under way and progressing rapidly.

UNDERGROUND MAINTENANCE

Our objective is to clear a passage into the long wall area to permit us to examine the entire face of the long wall. We do not expect to encounter any difficulties that cannot be solved quickly and safely no matter which plan we may adopt.

As soon as we have entrance to the long wall and we are able to cut proper samples we will be ready to co-ordinate the findings with our exploratory work above ground and in the surrounding area. Much of the latter has already been tabulated.

Ditches in the underground workings are being opened so that the haulage ways and cross cuts can be kept comparatively dry. With the new system of pumping, we feel that it will require little pump operation per day to keep the mine dry.

Gas

A gas-free mine could hardly be expected to result from the continuous flooded condition of the mine over the past years. Some gas has resulted and we have been compelled to blow out each section of the mine as we move forward to the long wall area. Blowers and vent tube are being used. Already the main haulage way is practically free of gas. Once cleared of the present accumulation of gas the mine can be easily kept free of gas as its record in past operation has indicated.

TIMBER AVAILABLE

We are using timber for mine props from trees growing adjacent to the shaft. There is plenty available timber of suitable types and sizes. This represents a big saving as the cost of timber used in other Vancouver Island mines accounts for a major part of their mining costs.

INDICATED SAMPLE

We have taken one out sample at a point about 75 feet south of the shaft. The height of the seam from which the sample was taken was - roof to floor - (5'-6"). There was one sandstone parting of 17" in thickness. The actual coal exposed at this point was 80".

Proximate analysis of this sample was as follows:-

Moisture	6.73
(Volatile) (Combustible) (matter)	38.23
Fixed Carbon	47.15
ash	<u>11.04</u>
	<u>100.00</u>
Sulphur	0.995
Calorific Value	11,330 B.T.U.'s.

GENERAL OBSERVATIONS

In our opinion this coal seam as we saw it plus the analysis proves that the reports of previous engineers of the existence of a seam of coal running from 5 to 3 feet in thickness is correct. The analysis of the sample of coal taken also confirms our early opinion that the Luquash is a good potential producer of marketable coal. The quantity and the ultimate grade of run of mine coal is still to be determined from future sampling, and development.

We have also concluded that the Luquash coal must be washed and treated to produce marketable grades. As this is purely a matter of technical beneficiation and one which we know from past experience is possible and practical, we recommend it. From our years of experience in processing coal we think Luquash coal can be made a better than average grade of bituminous coal and that our exploration program as now mapped out will bear out our opinion that the mine can be made one of large tonnage.

COAL RESOURCES

Quite early in our investigation it became apparent to us that additional land should be procured west of the original leases.

The coal resources of the Suquamish field are relatively flat. In order to develop large coal resources to the benefit of the company we recommended that additional leases be secured to the north and to the west. Subsequent to this recommendation the Company has applied to the government for such additional leased acreage. Should our findings underground and the log of the bore holes prove the tonnage resources, this additional acreage should prove of great value.

Unlike the tilted coal seams on other parts of the island, where tonnage can only be developed at depths, the Suquamish tonnage is developed on a large acreage basis.

RECOMMENDATIONS

It is recommended that four diamond drill holes be put down to determine the presence of the seam at points one mile to one and a half miles west of the foreshore. The proposed sites have been tentatively selected. Three of the holes will be to a depth of 250 feet and one hole for 500 feet, a total of 1,250 lineal feet of drilling. The deep hole is for the purpose of determining the reported presence of a third seam of coal at about 450 feet from the surface. It is recommended the drilling be started as soon as the sampling of the long wall is finished.

SYNOPSIS

The geology of the Caguash area has been studied by a number of reputable engineers. Most of the data has to do with the formation of the Caguash coal series. We have therefore reviewed the geological findings of others in the light of coal mine operations as we propose.

Our preliminary investigation leads us to believe that the former operators of the mine had no intention of mining coal under the sea beyond the barrier reefs of Caguash anchorage. The study of the record of an old boring on Malcolm Island indicates this.

The foreshore along Caguash anchorage lends itself to study of the coal series as it is exposed at low tide. We find the sandstone with layers of coal and shale above it in place. The gently rolling exposure gives credence to an opinion that the series in a flat plain have the same position below. That the coal seam below (170 ft.) is present is proven by the underground development already done.

Lone Tree point and the point directly south of Caguash Creek are in a line of fault planes. The barrier reef to the east of Caguash Creek has every indication of a northerly and easterly break or fault. From this we feel that the mineable reserves under the water that can be reached from the present workings is questionable at this time.

We are inclined to agree with the opinion of other geologists and engineers that the Luquash coal field has suffered little distortion from the horizontal. Our final report will cover the Luquash coal reserves from both the economic standpoint and the geological phases.

ENTRANCE DEVELOPMENT (REMOVED)

On the basis of present knowledge we feel justified in considering the question of using slope entrances at Squash as the most economical. Whether a slope should be driven to the coal to the north or to the south of the present workings cannot be decided at this time. In any case they will be back some distance from the waterfront.

We do know that the terrain lends itself to a 18 to 17½° modern slope equipped with belt conveyors. The length of the slopes will be about 650 feet if the vertical depth to the coal is 170 feet.

METHOD OF MINING REMAINING COALS

For reasons touched upon in other parts of this report, we feel, at this time, that mining of the present workings will be concentrated in developing tonnage reserves to the west or land side of the mine. Tentative drifts and counters have been laid out to carry on this work.

The long-wall method carried on by the old company was known as an advance long-wall method and we recommend that this method be abandoned and converted into a retreating long-wall; i.e. we drift in on the coal and extract backwards. This is the modern method and with mechanization will lower mining costs. We have discussed this proposed method of extraction with the proper authorities in Victoria and have their tentative concurrence.

We recommend that the old slope under the sea be not unmined at the present time. The disposition or plan of developing tonnage under the sea will be set forth in our final report. That it should be extracted eventually is without question, as it constitutes a large volume of partially developed coal reserves.

We believe that the present shaft can be used for temporary mining and in the event of an extensive mining program this shaft will be converted into

an airway.

The old company started sinking a large shaft at a point south of the present shaft. In the event that the underwater reserves are mined the completion of the shaft may be desirable. I recommend that nothing be done to it at present.

DISCUSSION

We believe that the use of the foreshore at Anquash for anything but temporary ingress and egress is impractical.

We have made preliminary surveys of the various methods of transportation which will lead to detailed studies after further information is obtained.

From Anquash to Port Hardy and the air port the terrain is rolling forested hills, often swampy. We have found however that there extends from Lone Tree Point to the Nech River (south end of air port) a wide ridge of sand and gravel having a general level of from 17 to 25 feet above high tide. This ridge practically parallels the beach and can be graded by a bulldozer for either a road or railway road bed.

From Anquash south to Union Point the ridge is rather uneven with an elevation of about 60 feet at the mine.

We have explored the possibilities of transporting coal to a deep-sea loading plant to be located at Bear Cove on Hardy Bay. Because of its economic possibilities and after examining the site we recommended that the officers of Anquash file application with the Government for the necessary acreage. We understand that this has been done.

We have also investigated the possibility of

scow or barge loading at old Fort Rupert. Decision as to the use of this site is being held in abeyance until other factors have been considered.

We are not able to determine at this time whether transportation of coal between Squash and Bear Cove should be made by highway or rail. We have worked out preliminary costs for various methods however, in anticipation of the development of a large tonnage at Squash.

As to the movement of coal south, there is the possibility that Fort McNeil would be suitable for a loading terminal located at the North shore. Here there are suitable docks and a logging road extends to a point near Squash.

We have determined that a small bay north of Point Allen could probably be used for barge loading. This location is protected from sea storms and can be connected with Squash by either rail or highway.

Our investigation of the transportation situation indicates that there are no serious problems involved and the method used will depend on a further analysis of costs, maintenance, markets and revenue.

COAL TERMINALS

We are unable to decide at this time just what type of terminal will be required at Bear Cove. There is sufficient depth of water to dock ocean going tonnage up to 10,000 tons at the terminal. Coal loading would of course be easily provided. The question of export business would be a deciding factor and this of course at the present time is unknown. The above also governs the design of terminals at either Fort McNeil or Ellen Point.

WATER

We have investigated the possible sources of fresh water for domestic and colliery use. Squash Creek is comparatively small and inadequate in the dry season. The Gluxene and Leach rivers are also potential sources of good water and adequate supply. Where to tap these rivers will depend upon the final location of principal mining operations.

In order to protect the use of Squash Creek for the present shaft use and camp we recommended that water rights on Squash be staked to the benefit of the Company. This has been done and filings made.

CONFIDENTIAL

We feel that this interim report on progress at Squash, made to the officers and directors of the Company is desirable at this time and stage of development.

The tentative conclusions indicated above must be backed up by supporting data before definite conclusions and recommendations can be made by us. The preparation of our final report is now under way.

We recommend that no part of this report be used publicly.

Yours very truly,

ROE ENGINEERING CO.

Harry M. Hope
President

James S. Lott
Vice President