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PRELIMINARY EVALUATION REPORT  
YUKON TERRITORY COAL RESOURCES

General

Dr. H. S. Bostock of the Geological Survey of Canada has done most of the recent geological work on coal resources in the Yukon Territory. In his Paper 50-114 "Potential Mineral Resources of the Yukon Territory" he indicates the coal basins occur in the following areas:

Laberge Mesozoic Area	Peel Plateau Area	Old Crow Area
St. Elias Belt	Porcupine River Area	Bell River Area
Tintina Valley Belt	Arctic Coast Area	Old Crow Plain Area
Liard Plateau Area	Bonnet Plume Area	
Liard Plain Area	Snake River Area	

Carmacks Basin

In this report only the Carmacks coal basin contained within the Laberge Mesozoic area will be dealt with, although Dr. Bostock in recent correspondence with Dr. L. H. Green has indicated that there may be a larger tonnage contained in the Big Salmon coal basin. Coal mining has been associated with the general Carmacks area since the Gold Rush. Since coal seams outcrop on the river near Carmacks the early gold seekers operated small mines on the outcrops of these seams. There are three locations where coal has been mined in the past.

- (i) On the south side of the river opposite the present mine
- (ii) The seams where the mine is operating
- (iii) At Five Finger Rapids a location about five miles downstream from Carmacks.

Therefore some technical information is available on the types of coal from this basin. At present the Yukon Coal Company operates the coal mine at Tantalus Butte near the village of Carmacks, Yukon Territory.

Tantalus Butte Coal Mine

The Tantalus Butte coal mine is located adjacent to the Whitehorse-Dawson Highway at Mile 102. Roads from the Highway give access to the townsite and portal areas. This mine is operated by the Yukon Coal Company Limited which is owned by Territorial Supply Company Limited a subsidiary of United Keno Hill Mines Limited, and Cassiar Asbestos Corporation Limited. Management of the mine is carried out by United Keno Hill Mines Limited.

Work started at the present location about 1923 with various interruptions especially during the Second World War. Since the war the present company was formed and yearly production has been carried on. To start the coal mine originally the Federal Government loaned \$294,101.60 to the Yukon Coal Company. The production varies from 4,000 to 14,000 tons per year. Total production for the Yukon is recorded as 261,970 tons up to the end of 1964 which represents a value of \$2,412,505.00. (Figures are from the Bureau of Statistics 1957 and later releases.)

The value of this coal industry to the Yukon is represented by taking the estimated production figures of 1964. Production during last year is reported by the Bureau of Statistics as 6,792 tons. This represents a value of \$91,330.00, which is equal to \$13.50 a ton. The value of the coal represents 0.6% of the total value of the mineral production of the Yukon Territory.

The value of this mine to the village of Carmacks cannot be over-estimated when it is realized that 26% of the total population of Carmacks depends on the local mine as a source of income. The present white and Indian population is approximately 218. The average work force at the mine is two white men and seven Indians. These mine men have 56 dependents. During

the winter season from two to three additional Indians are hired, ~~over the~~ years. The Indians have been quite adaptable to coal mining as long as there is sufficient direction. Carmacks other than the mine does not offer much in the way of employment opportunities. The Territorial roads maintenance crew employs ten men in summer and about five men in the winter. Other sources of casual work are offered by the two trading posts, one hotel, garage, and the Yukon Forest Service. The only other opportunities for income are prospecting, hunting, trapping and fishing, and these at the best of times offer a poor living to both Indian and white. Needless to say the Indians who are not employed in the forementioned activities depend mainly on welfare payments from the Department of Indian Affairs. According to Indian Affairs the mine has enabled two or three Indian families to change from a bush economy to a wage economy in recent years. Efforts have been made recently by the local coal mine management to encourage Indians to improve their living conditions by renting them company houses which contain water and sewer service and one Indian miner has even gone so far as to buy his wife a washing machine.

### Surface

The surface plant itself simply consists of a bankhead built of frame timber about 200 feet long. It is built on a sidehill and contains bin storage used for loading the trucks, hauling the coal to Elsa and Calumet mines. Housed in the bankhead is a mine car tibble and a 8' x 4' single deck screen giving a minus 2" product and a lump coal. Since the sale of lump coal is small a crusher will be added to reduce the lump coal so it can also be used at United Keno Hill Mines as stoker fuel. Near the bankhead is located a compressor house. A Diesel run 300' cubic capacity air compressor supplies the power. There is a standby Diesel run compressor of ancient vintage which provides about the same quantity of air.

At the river level about 350' below the portal a townsite is located. This townsite contains the manager's office and residences occupied by the manager and three other employees. A boilerhouse provides central heating for the residences and office; a commercial size greenhouse is at present being used by the manager and others to provide fresh vegetables during the summer season. Other equipment includes a pickup truck and a three ton stake body truck. Products from the mine are used primarily for the central heating plant in Elsa and there is a small sale of lump coal which represents the present demand for the products of this mine.

### Underground

Access to the coal seam is provided by an adit, located in the footwall of the seam. The adit at elevation 2,056 feet bears north, and on reaching the seam follows it about 2,600 feet. Dr. L. H. Green in his Paper 65-19 "Mineral Industry Yukon Territory" 1964 describes the seam as follows:

"The seam strikes north and dips about 55° W. During 1964, most of the production came from a south-raking block that is bounded by northeast-trending, steep southeasterly dipping faults, which cross the main entry about 1,300 and 1,800 feet from the portal. The seam within this block averages about 11 feet in thickness."

Inside the last fault the coal varies in thickness from 12 to 16 feet. It is the opinion of United Keno Hill Mines that the coal inside the fault is a hanging wall seam displaced by the fault.

During the summer of 1965 development continued in the new seam. The main entry was extended and four raises were mined. Previously mining has been by the room and pillar method. Further work will continue using the room and pillar method but the rooms and pillars will be developed within a panel. If the rooms are hand mined they will be driven on a bearing at an angle to the pitch of the seam so that the rooms will not be steeper than 28 - 30 percent.

The coal is now loaded by hand in the entry and rooms. Coal from the raises is loaded directly into mine cars. In the rooms hand tramping is used to take the coal from the face to the raise. All openings are timbered with fire killed timber (locally obtained) for booms and props.

Present equipment at the mine consists of the following:

- Drilling: Hewood A 1 Compressed Air Rotary Drill  
Five Foot Steel Augers
- Blasting: Monobell # 4 Powder and Delay Blasting Caps
- Tramming: Compressed Air Storage Locomotive  
1½ Ton Mine Cars.

These mine cars are unique and in fact are made at the mine and are constructed chiefly of patented wheels and axles, local lumber for the sills and steel and plywood for the car body itself. The local manager, Mr. Hibbert has made these cars which have replaced the original steel mine cars used when the mine was first opened. There are five of these cars making up a mine trip.

Examination of samples from the Yukon Coal Company's Tantalus Butte Mine is contained in a report prepared by the Fuels and Mining Practice Division - Divisional Report FMP 65/152-PREP. October 1965 (copy attached).

Ore Reserves and Cost

Present ore reserves estimated by this office as of March 19th, 1965 indicate 400,000 tons of proven ore below the present working level. If the present inside working is indeed a hanging wall seam, this indicates a possible and probable ore reserve of three million tons. To prove the ore reserves would require drilling both from underground and surface.

According to the Manager, Mr. Hibbert, the present cost per ton is approximately \$8.00. This includes the \$2.00 repayment on the initial loan from the Federal Government. Costs supplied at random by the mine manager are as follows:

	<u>Per Month</u>
Wages - Mine Manager - per month	\$ 600.00
"    Fire Boss	500.00
2 Indians \$13.60 per day, plus \$3.00 bonus	664.00
4 " " " " " \$1.00 "	1,168.00
Charges for costs - total administration	300.00
Power obtained locally from the Yukon Electric Company approx.	150.00
Shop charges from United Keno Hill Mines "	50.00
Timber charges estimated at \$15.00 to \$16.00 per cord for fire-killed timber	100.00
	<u>\$3,532.00</u>

At an average of 640 tons per month this represents a cost of \$5.52 per ton.

The Status of the Coal Mine

The status of the coal mine is unknown at this time. United Keno Hill Mines are considering replacing the central heating plant at Elsa, which now uses coal, with an oil fired installation. A study by United Keno Hill Mines comparing the value of B.T.U.s between coal delivered at Elsa at \$12.50 a ton, and fuel oil at 21.9¢ per gallon shows they would save \$100,000 a year by using coal. However this saving would be affected by the following considerations:

1. They express concern over replacing Mr. W. Hibbert, the present mine manager, with a competent man experienced in coal mining.
2. They have problems in providing steam engineers to operate their present coal fired plants, and this situation could persist.
3. There would perhaps be a thermo efficiency factor which would reduce the \$100,000 savings by a small amount.

United Ken Hill Mines may be encouraged to continue to use coal if:

1. Sufficient outside markets can be developed to interest them in continuing operation of the coal mine.
2. The possible re-negotiation of the present loan, of which a large amount still remains to be paid.

#### Recommendations

There are indications that coal production in the Carmacks area may be more economical with proper mining techniques than realized previously. The above report gives some figures which indicate the economic value of the coal deposits, the feasibility of mining these deposits, and the importance of the coal mine to the village of Carmacks. It is my recommendation that the Department consider the following:

1. The effect closing down the coal mine will have on the village of Carmacks particularly the Indian population. The effect on the Yukon economy. The unfavourable reactions when the general public realizes this industry will be shut down.
2. The continued operation of this coal mine as an economic source of fuel for heating plants.

I would like to point out that the continued operation of the mine may well depend on the Department. It may be necessary because of the company's stand for the Department to form a policy on coal usage. Two ways in which the Department could assist are:

- A. Encourage the broader use of coal as a fuel for heating by new industries.
- B. Undertake suitable technical studies with a view of improving mining methods and coal preparation to aid in obtaining a cheaper and better product.

#### New Information

The delegation of engineers representing Ralph M. Parsons visited the Cyprus-Dynasty lead-zinc deposits at Ross River. One of the engineers, Mr. Ray Jenkins visited the Tantalus Butte coal mine and was impressed. Mr. Jenkins suggested that a coal thermo plant at Carmacks may be quite an important factor in bringing the lead-zinc deposits at Ross River into production. Mr. Jenkins thought it would require 1,000<sup>tons</sup> per day for a thermal plant and the mining cost for this tonnage would be about \$3.00 per ton. This means using mechanized equipment for development work.

At a cost of \$3.00 per ton it would be quite possible to deliver coal to a pithead thermo electric plant at a cost of 13¢ per million B.T.U.s. The cost of 13¢ per million B.T.U.s compares favourably with the U.S.A. average delivery price of coal to an operating Thermo generation plant of 25¢ per million B.T.U.s. The latter price quote is from "Coal Looks at Atomic Competition" by Stephen F. Dunn, President, National Coal Association, presented at the 1965 Dominion-Provincial Conference on Coal held in Victoria.

During his visit Mr. Jenins took a channel sample, and will be receiving additional samples supplied by Mr. Hibbert. He was also given a copy of the Fuels and Mining Practice Division Report on the samples taken from the Tantalus Butte Mine.

In addition to the above information enclosed is a copy of a report presented to Council ~~during~~ last year by Mr. Robert Choate, local manager of the electrical company in Whitehorse which indicates the estimated cost of a coal fired generating plant in the Carmacks area. You will note that the cost per ton that Mr. Choate showed for a 66 megawatt unit is more than double the suggested mining costs estimated by Mr. Jenkins. Mr. Choate's submission gives a comparison of capital costs between hydro and thermo plants and a guide to the total cost per kilowatt hour.

Long Term Planning

The long term planning I think has been well expressed by both the Department of Mines and Technical Surveys, the Dominion Coal Board and our own Branch. Certainly I agree with the general terms of any of the programs outlined in preliminary discussions with other Departments and within our own Branch. The minimum amount of money spent on an inventory of coal resources can easily be justified during the next few years particularly when mineral resource development may depend upon availability of reasonably priced electrical power.

Dated at Whitehorse, Yukon Territory  
November 29, 1965.



A. D. Oliver,  
Resident Mining Inspector.

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