F.R.L. NO. 81

REPORT ON
EXAMINATION OF TANTALUS BUTTE MINE
CARMACKS, Y.T.

By

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October, 1947.

REPORT ON EXAMINATION OF TANTALUS BUTTE [illegible], CARMACKS, Y.T.

Object of Visit:

The property is described in the following bibliography:

D.D. Cairnes, Geological Survey Memoir #5

H.S. Bostock, Geological Survey Memoir #189 and Memo with Plan (Nov. 15, 1946)

B.F. Hake, Report of Dec. 11, 1942

D.C. Birch, Report of February, 1943

W.J. Dick, Report of Aug. 2, 1947

It was visited by me on October 6th to 8th, 1947.

The object of this visit was to make a survey in connection with a proposed plan of developing and mining a coal seam which has been opened up by an entry and "rise" workings some 350 feet above the level of the Lewes River. A contour map scale 800 feet to 1 inch made from an air survey of the district is attached as a sketch plan to show the location and strike of the seam exposed by these prior operations.

Geology:

Though the general structure and petrography have been described in the references cited above, a few observations in relation to the prospects and development plan may be opportune.

The coal seam under review occurs in thick beds of coarse and fine conglomerates and sandstones and with occasional partings of shales (with which coal seams are associated) referred to by the geologists as the Tantalus formation of Jurassic or early Cretaceous period.

Three coal seams were apparently identified by Cairnes who gives sampling results, from seams 8 feet 10 inches, 9 feet 10 inches and 7 feet thick in descending order. While a second seam about 2 feet thick and approximately 25 feet above the main seam is exposed in a level some 135 feet above the principal seam entry, and also an outcrop of shales and carbonaceous material about 4 feet thick is seen on the eastern slope of the Butte above the 2 foot seam, evidence could not be found of the existence of the other two moderately thick seams referred to

by Cairnes. The two secondary seams from their exposures near or at the surface do not appear to be commercially exploitable and in any case they do not come within the scope of the present survey.

The conglomerates form the prominent ridge (the highest point is about 900 feet above river level) of the Butte and they also can be seen to outcrop on the eastern slopes, at lower horizons through the river gravels which cover the base of the Butte up to 400 feet or so above the river. The strike of the conglomerate beds is approximately north-south and their dip is variable, up to 70° to the west. In a northerly direction they disappear under the cover of a more recent lava formation while to the south they outcrop at the site of the disued Tantalus mine (about 2 miles from the Butte), the intervening country of the Lewes River Valley being filled with gravels and drift.

Owing to the variable erosion of the beds, the exact contact of the river gravels etc., with the conglomerate and coal formation at any given location and horizon on the slopes of the Butte would be difficult to determine. There is trenching to indicate that attempts were made to locate the coal seams through the gravels but without apparent success.

According to Cairnes the conglomerate beds of the Butte represent the east limb of a synchinal fold, the west limb being eroded away at this location, but it outcrops at the old Tantalus mine where the coal seams dip in the opposite direction to those observed at the Butte. Observation on the terrain would indicate that the two exposures of coal bearing strata are not on the same strike. While the dip of the main seam and strata from the top of the Butte to about the 2050 feet contour (the horizon of the existing main entry), appears to average about 50° to the west, change of dip in depth through effect of folding should not be discounted.

The coal seam which forms the subject of the present survey cannot be traced on the outcrop. It has been opened up

by a tunnel about 100 feet in drift followed by a crosscut in measures about 130 feet long and by an entry some 550 feet long (only about 500 feet cleaned out since the date of W.J. Dick's report, could be examined as owing to caved material from upper workings the north end of the entry could not be visited).

The seam strikes about 355° and dips at the entry horizon about 50° to the west. The normal thickness is about 9 feet and it is quite clean with only a few thin bone partings. It appears to be naturally friable. The hanging wall is conglomerate and the footwall shale; these walls should give good mining conditions provided proper pillar support is maintained. As no mining operations have taken place recently and with close proximity of the surface, no samples, representative of the seam can be presently taken; sampling could be undertaken as soon as the slope operations referred to later have advanced.

The only observable disturbance is at the southern ends of the two seams exposed in the entries. There appears to be a fault at about 30° in an easterly direction to the strike of the seam with a nearly vertical dip to the west, affecting both seams. While there is little displacement there is pronounced thinning of the main seam at the southern end where the crosscut enters the seam. The persistence of this disturbance in depth coupled with the possible erosion of the seam and/or a change in dip would enhance the difficulty of locating the seam by driving through the river drift and gravels from a lower horizon.

Mine Workings:

The main coal seam has been worked above the main existing entry from a point some 200 feet from the crosscut mentioned above to an extent difficult of assessment as in the later stages of operations the entry pillars have been robbed and caving resulted.

In W.J. Dick's report of August 2nd, it was suggested that coal could be made available during the remainder of the of the 1947 navigation season from the Systematic Working "by the angle and back angle" method (room and pillar method adapted to pitch mining) of the "lift" from the extension of the north

end of the entry to the surface. It was subsequently considered inadvisable to pursue this program owing to the dangerous condition of the level due to the rubbing of the main pillars. Moreover, the "lift" of coal above the present entry horizon to the surface is relatively small and this coal is always available after the seam is proved in depth. As it is, some 300 tons have been recovered from the old workings and already some 200 tons have been shipped.

Hence from an aspect of long term planning, the development and mining of the seam is to take place below the present level.

Natural ventilation is good; the upper seam level is connected to the main seam by a cross measure raise.

Plan of Development:

It will be noted that some of the engineers who previously visited the property (vide: Hake's and Birch's reports) advocate the proving of the seam in depth by sinking from a point on the seam relatively close to the southern end of the main entry, an inclined shaft (or winze) to a lower horizon to be used as a tramming level.

This procedure appears to be inadvisable as this inclined shaft would not prove the extension of the seam in strike in depth nor would it develop for mining the lower "lift" of coal. The pitch of about 50° is too steep for safe and efficient full pitch mining; the "angle and back angle" system, as proposed by W.J. Dick, giving about a 30° inclination in the chutes for the coal flow appears to be the only reasonable method of working the seam for the eventual mining of the coal employing gravity. Furthermore, for safe working, it is necessary to maintain an additional drivage (by way of a "counter") for ventilation and escape purposes as practised in coal mining. Though inflamable gas has apparently not been found in the upper workings, it must not be assumed that no gas will be encountered in depth and when a larger area of coal is opened up.

All the engineers who examined the property seemingly

agree that it would be unwise to drive an adit tunnel at a lower horizon with a view to intersecting the seam. While there is favourable indication that the seam will persist at uniform pitch to say the 1750 foot horizon (where it is proposed to establish a main tramming level about 50 feet above the Lewes River) it should not be assumed, for reasons mentioned above, that the seam would be found at the contact of the river drift and the measures, indicated by a survey. Much expenditure may be incurred by tunnelling and crosscutting in attempts to locate the southern end of the seam.

The advantages of following W.J. Dick's program of development and mining the "lift" of coal from the river to the present entry can be summarized as follows:-

1. The driving of the main slope and auxiliary workings (counter slope and crosscuts) would determine the continuity of the coal in depth and in strike, and if the regularity of the seam is proved, develop a block of coal reserves amounting to some 100,000 short tons to be mined by a system suitable for the conditions.

2. The development stage would provide all the coal now needed, estimated at 7500 - 10,000 tons per annum. If larger quantities are required, additional coal can be easily and quickly obtained from the angles and back angles as soon as the slope operations are sufficiently advanced.

3. Drifting south on the seam from the bottom of the slope would complete the development of the coal block referred to above and enable the straightest and cheapest exit to be driven through the river drift for a portal to be established for a main tramming level. It would probably be possible to dispense with the counter when driving in the talus. To enable the drift to be driven with precision as to level and grade, an accurate survey will have to be made and correct levels established. Drifting north on the seam from the slope would develop about 20,000 tons for every 100 foot advance.

It is recognized that in the initial development work, coal will have to be raised by hoisting from the slope operations and from the level below so long as there is no connection to the surface at the lower horizon. This will, of course, result in an initial higher operating cost but, as stated above, it would be unwise to attempt locating the seam by driving

through the river drift from the south, in any event, until the seam is proved by slope operations to continue to the required horizon. Any tunnels or crosscuts driven from the south would have to be accompanied by counters for ventilation and safety.

Aside from the main slope, in all other slope operations the coal can be loaded by gravitation as the crosscuts and counter will be driven to the rise, thus, mining cost should not be excessive. The coal from this property has no competitive market to contend with except for cordwood which is an extremely high priced fuel in the principal centres of the Yukon Territory (the price equivalent in coal being about $50.00 per ton). It would seem that a somewhat higher initial operating cost would be preferable to the risk of expending substantial sums in unnecessary tunnelling through barren drift and rock.

The gasoline driven compressor of 100 cubic feet per minute capacity, now installed, for supplying power to the air hoist and percussive drills may prove to be insufficient for the purpose. There is a boiler and steam hoist on the site which possibly could be reconditioned though my understanding is that Mr. Dick had provided for the hire of a 200 cubic foot compressor which unfortunately did not become available.

Within the short period from the start of operations, much has been achieved on the property. A 10% grade road has been constructed to enable the coal which is bagged at the portal of the main seam entry to be trucked to a new wharf site. The main level has been cleared out apparently to within 50 feet of the face. A small but useful tonnage has been bagged and a large proportion has been shipped to Mayo. A bunkhouse (with cookhouse included) and compressor building have been erected.

It would seem that the course that recommends itself is to pursue the slope operations as vigorously as possible with the small team of six trained miners and foreman, reviewing the position in about six months' time.

I would like to acknowledge the assistance given me in my examination by W J. Dick, M.Sc., Consulting Mining Engineer, Edmonton, and by Dr. W V. Smitheringale of the Keno Hill Mining Company Limited, Mayo, Yukon Territories.

Respectfully submitted,

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Ottawa, October 31, 1947.