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REPORT ON THE OIL POSSIBILITIES  
OF THE LANDS ADJACENT TO  
QUESNEL, B.C.

B.W. DUNN

June 5<sup>th</sup> 1930

GEOLOGICAL BRANCH  
ASSESSMENT REPORT

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R E P O R T  
ON THE  
OIL POSSIBILITIES OF  
THE LANDS ADJACENT TO QUESNEL, B.C.

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B.W.DUNN, B.Sc., E.M. - Seattle, Washington.

June 5th.1930.

REPORT ON THE OIL POSSIBILITIES  
OF THE  
SECTION FROM QUESNEL TO AUSTRALIAN, B.C.

June 5th. 1930.

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GENERAL

Acting under instructions from Frank A. Patrick of Vancouver, B.C., I have examined the Geological conditions of the Fraser River formation as exposed along the Fraser river from Australian Ranch, to a mile or two above Quesnel, a distance of about twenty-five miles, more or less. I was accompanied by Mr. A.J. Arland and Mr. R.M. Sanderson, both of whom rendered me valuable assistance and expedited my examinations. I did not examine the Southern end of the area closely, as I assumed from the report of Dr. S.J. Schofield that the structure here was definitely closed.

TOPOGRAPHY

The area under consideration is the valley of the Fraser river, about twenty-five miles in length and three miles in width. THE FOLDING OF THE FORMATION IN AN APPROXIMATELY SYMMETRICAL ANTICLINE HAS AFFORDED THE RIVER AN OPPORTUNITY TO TRAVERSE ITS MAIN AXIS. The banks on both sides of the river consist of sand and gravel, DIATOMACEOUS EARTH and glacial drift on gentle terraces to abrupt cliffs that are all overlain with lava.

GEOLOGY

Primarily I was asked to see if the structure

was closed on the Norther end. I CAN STATE POSITIVELY THAT THE STRUCTURE IS SO CLOSED as an exposure on the Baker Creek East of the Canyon gives a strike N 45 degrees East and a dip of 14 degrees to the North West, this with the East and West strike and dip to the North above Quesnel and the other data given me by Mr. Arland ties up the structural closure. The flanks of the anticline dip to the East and West at averages of 20 degrees.

The Fraser river formation is of TERTIARY age and consists of a series of blue clays, shales, sandstones of grey to greenish color, lignites, limestones and calcareous breccias ALSO EXTENSIVE BEDS OF DIATOMACEOUS EARTH with some intrusions of volcanics of the same age. Depth of series exposed 700 feet.

The conditions are rather typical of this period throughout the world. ALMOST ONE HALF OF THE WORLDS OIL PRODUCTION has come from the reservoirs of this Tertiary division or younger rocks. Much more than half was originated there and forced into the Cretaceous below and other formations that it happened to be overlying. The literature on the Geology and petroliferous nature of the Tertiary rocks is voluminous and I will not take up the time or space to list it; but I will the various countries and some of the conditions the oil is found in.

BAKU fields of Russia, heavy asphaltic. Burma, Persia, Egypt, Galicia, Roumania, Turkey, Baluchistan, India, China,

Japan. Oil of paraffin and Olefin basis are found in each of these countries. In Egypt and Jemash fields yield a light paraffin oil with little or no asphalt, while the Hurghada field, much lower down in the series and representing the main oil source of the area is high in asphalt and light in paraffin. Trinidad yields both bases of oil in the Tertiary. Venezuela, Colombia, Panama and Ecuador have many outcrops of Tertiary age that give evidence of large oil accumulations, THOUGH THE ACCESSIBLE AREAS afford few structures. Peru, Mexico, California, the Gulf area of Texas and Louisiana, ARE VERY LARGE PRODUCERS OF OIL FROM THE TERTIARY ROCKS. The U.S.G.S. is the authority for the statement that the oil of tertiary in California and the Gulf area of Louisiana and Texas comes from the DIATOMS and foraminifera. The Green river formation of the Uinta Basin, Utah, contains 80 beds of oil shale estimated to contain 42,000,000 bbls. of oil and 500 million tons of ammonium sulphate. Alaska has oil in the tertiary and in some cases it has migrated to the Cretaceous below, it also has a case or two of the oil being found in porous and creviced igneous rocks as in Japan, California and Mexico. This pretty well covers the localities, though it might not be out of place to mention that the contemplated development in Oregon, Washington and South-Western B.C. will have to reckon with the Tertiary as a primary source of its migration to the Cretaceous below.

THIS TERTIARY HAS PRODUCED OIL FROM EVERY CONCEIVABLE STRUCTURE KNOWN TO THE GEOLOGIST THAT COULD TRAP THE OIL. In Galicia one well out the oil sands (the same One) three times and had production in each contact. Borneo, Java, and Sumatra have been big producers and have produced some freak wells.

The Furber field of Mexico about 60 miles South of Tuxpam is the real gusher area of the whole district and the tremendous production of California, reaching at times to OVER HALF THE U.S. PRODUCTION and the Baku fields of Russia represent the Tertiary at its best.

#### CONCLUSIONS AND RECOMMENDATIONS

There are at least five necessary conditions for the accumulation of oil or gas in commercial quantities:

- First: The raw material that furnishes the hydro carbons that could produce the oil;
- Second: Formations that could absorb the oil,
- Third: A structure that could trap the oil;
- Fourth: The hydrostatic or other pressure that could force it into the trapping structure;
- Fifth: The salt water or other agency that could cover and prevent its oxidation (some shales take care of this in many localities).

ALL FIVE OF THESE CONDITIONS EXIST IN THIS AREA. No matter what theory one may lean toward as to the origin of the oil, the conditions here are such as he could take no exceptions.

Some authorities believe that when the coal areas of an embryo oil field exceed 65% fixed carbon there is little likelihood of commercial oil. YOUR LIGNITES RANGE FROM 49 to 55% FIXED CARBON so this can be no objection. If one leans toward the "volcanic" origin certainly he can find no objection here.

I did not find any fossils in place of a marine animal, but found fragments of *Phynconella* and *Spirifer* (brachyapods) that might indicate that the series as exposed here are close to the cretaceous that underlay them. The latter formation is pretty well developed both North and South of this area and described by Dawson, McEvoy and other of the G.G.S.

I HAVE NO HESITATION IN RECOMMENDING THE PROPERTY AS AN EXCELLENT OPPORTUNITY TO DRILL FOR OIL WITH EVERY PROSPECT FOR SUCCESS, as only the hazards of drilling are against you, with the exceptions that a structure that can contain oil may also be favorable for water or gas. A hazard of drilling even in a proven field is the tightness in the productive sand or shale that it may not contain oil or gas AT THE SPECIFIC POINT where the bit penetrates, but from the character of the formation where exposed I do not think this will bother as the CLOSED FEATURE OF THE STRUCTURE WOULD INDICATE A PRESSURE THAT WOULD SEND THE OIL THROUGH THE LOOSE SANDS AND SHALES OF THIS FORMATION.

I DO NOT KNOW OF ANY CLOSED STRUCTURE WITH THE CONDITIONS AS THEY ARE ON THIS PROPERTY THAT HAS FAILED OF PRODUCTION.

For the first well site I would select a point on the main axis of the fold between Australian Ranch and Quesnel, paying particular attention to the transport problem. About half way between these points and a few hundred feet East or West of the axis is all right for the first well. It is possible to have gas here and if one is off slightly to one side or the other you may not encounter it if there is oil present.

From my memory and not from any data I secured on this examination I am inclined to think of production at or near sea level at a depth of 1600 to 1700 feet, though the shale covering might be sufficient to protect the product in which case shallower production might be expected.

I would like to see a standard outfit or combination rotary set to work and a real test made of such a structure even to the formations below the Tertiary, if it was necessary, though this is not likely.

Respectfully submitted,

(Signed)

B.W.Dunn, B.Sc., E.M.