612001

Q37 No 11.

01-005

OIL
BEARING SHALE
Mersey River

Oil-Bearing Shale, Mersey
R. District. (Tas Shale - Oil Syn)
by
T. Easdale 24/10/1901

612

000

October 24th, 1901.

To,

The Committee of Management,

THE TASMANIAN SHALE & OIL SYNDICATE,

Adelaide.

Gentlemen,

I have the honour to submit the following interim report on the oil-bearing shale occurring in your lease in the Mersey River District, Latrobe, Tasmania.

The shale appears to me to represent the primitive form of petroleum shales, and hence also the probable origin of the subterranean reservoirs of petroleum oil occurring in various parts of the earth's crust.

It consists of the spores (and spore cases) of lycopods, a low form of plant life. These spores consist of complex hydrocarbons which, when heated, break up into simpler hydrocarbon gases and oils, with a proportion of higher hydrocarbons and various tarry and resinous matters which I have not so far had time to investigate. All these products being volatile, are obtained as a crude distillate when the shale is treated by a distillation process. The distillate also contains various sulphur compounds but this, at the present day, presents no difficulty in the refinery process, although a few years ago it would have been regarded as a serious difficulty in the utilization of the deposit, and in fact led to the abandonment of several attempts to work the deposit.

The experimental plant which you have authorized me to provide for investigating the valuable constituents of the shale is now nearly complete, and, in a few days, I shall be in a position to report more fully on the subject. I forward with this twelve samples of oils obtained from the shale showing the crude distillate and oils at the various stages of the refining process, and, also samples of separated oils obtained by fructionation. These latter are already marketable products and may be sold in their present form, or may be further refined and sold at a higher price. I have not yet had time to produce the

more highly refined oils. The products so far obtained are :-

I. A mixture of light oils commonly described as petroleum benzine.

II. An illuminating oil corresponding to the kerosene oil of the United States but differing from it in having a milder odour and much higher flashing point - an absolutely safe burning oil.

III. A heavy illuminating oil with a very high flashing point, suitable for lamps in which large flames are used and the great heat makes the use of ordinary kerosene unsafe. This oil will be especially suitable for lighthouse lamps. It will also be suitable as a lubricant for machines requiring a specially light running oil.

IV. (A) A light lubricating oil suitable for sewing machines, and other light running machinery, also for light rapidly running machinery of all kinds.

(B) Heavier than A., suitable for rock drills and other quick motion machinery.

V. (A) Medium lubricating oil, a good ordinary bearing oil.

(B) Medium lubricating oil, heavier than A. suitable for heavier machinery not exposed to external heat.

VI. (A) Heavy lubricating oil, suitable for engines and all machinery in which the bearings are exposed to moderate warmth.

(B) Heavy lubricating oil, heavier than A. suitable for heavy machinery of moderate speed and warm bearings.

VII. Heaviest lubricating oil, used for engines cylinders, and similar work, corresponding to the "vacuum" oil" of the United States refiners.

I enclose samples of I, II III and IVA, and several grades of VB, the others have only been prepared in small quantities. Besides the light oils already obtained I have evidence of the existence of various light oils in the gases produced during the distillation process. These require refrigerating appliances for their condensation and would be useful

612004 27 36

for oil engines and for various manufacturing purposes as in the preparation of varnishes &c.

Regarding the amount of saleable products which the shale is capable of producing - Samples have now been tested from all parts of the lease and the poorest so far tested gives 22 % of crude oil and 5½ % of hydrocarbon gases while the richest sample gave 32 % of crude oil and 12 % of hydrocarbon gases, and vapours of light oils. The sample which gave the lowest return was weather washed stuff from the surface. Taking the average of the various samples of shale treated to date, the yield indicated is 25.6 % of crude oil and 9.1 % of gases which latter will furnish a large proportion of the fuel required for carrying on the operations, hence allowing of very cheap working. The refinery losses will not exceed 40 % and as a minimum estimate of refined saleable products I cannot place it lower than 18 gallons per ton of lighter oils, viz., I, II, III and IVA, and 22 gallons of heavier oils, viz. IVB, to VII, per ton of shale treated. Comparing this yield with those of the Scotch oil shales now being so profitably worked, the latter yield 13 to 17½ gallons of refined oils of all kinds per ton of shale; further the Scotch shales can only be obtained by underground mining, costing 4/- to 6/- per ton, while the Tasmanian deposit is on the surface and 6d. per ton is a fair estimate for the cost of procuring it. In Scotland the cost of obtaining illuminating oils and partly refined lubricating oils, is stated at 2½d per gallon (Mineral Industry 1898), after deducting the profit made from sulphate of ammonia from the cost of production. I have not had time to examine quantitatively for by-products in your shale but have ascertained the presence of ammonium compounds in considerable quantity in the distillation water and a production of sulphate of ammonia equal to that from the average of the Scotch shales may be confidently looked for.

To summarize :- The Tasmanian shale is about 2½ times as rich as the Scotch shale and yields a larger proportion of the more valuable lubricating oils, and the advantages for economic working are

612005

37

decidedly in favour of the Tasmanian shales on every point except the cost of labour, and the less cost of procuring the shale alone will wipe out that difference.

As there is every probability of the use of liquid fuel for steamships coming into extensive use, the crude oil of the Tasmanian shales could be sold at a low price for this purpose, even 30/- per ton would leave a margin of profit. The profit per ton of shale would be small in this case, but the lessened profit would be compensated by the large sale and through put.

Yours faithfully,

THOS. ESDAILE, A.O.S.M.,

R.C.M.E. Univ. N.Z.

Analyst.