Record Report #111

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REPORT - 34

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THE WASHAKIE HYDRO-CARBON - 14

MINING COMPANY. - 24

WIND RIVER INDIAN RESERVATION, - 10

FREMONT COUNTY, - 24

WYOMING. - 30

By 37

C. E. Jamison,
State Geologist, 29

1911

C. E. JAMISON
STATE GEOLOGIST AND
EX-OFFICIO INSPECTOR OF MINES

The State of Wyoming

Office of State Geologist

Cheyenne

July 6th, 1911,

Mr. Russell Thorp,

Lusk, Wyo.

Dear Sir:-

In accordance with your instructions of recent date, I have made an examination of the Washakie Hydro-Carbon Mining Company's lease on the Wind River Indian Reservation, and herewith submit my report.

Very respectfully,

_____,
State Geologist,

LMT.

THE WASHAKIE HYDRO-CARBON MINING COMPANY.

GENERAL DESCRIPTION.

The lands which are the subject of this report are situated between Sage Creek and Little Wind River on the Wind River Indian Reservation, about one and one-half miles north-east of the Wind River post office, and about sixteen miles north of Lander, the western terminus of the Chicago & North-western railway, which is the nearest railway point.

The holdings of this company are readily reached over good wagon roads, a stage coach making the round trip from Lander to Wind River daily. The altitude at Lander, taken from a bench-mark of the United States Geological Survey, is 5345 feet, while near the "Tar Spring", on these lands, it is 5500 feet, as determined by aneroid barometer.

The property, consisting of 1980 acres, described as

the W½ of the SW¼ of Sec. 25 T.1 N, R. 1 W. and the SE¼ and the E½ of the SW¼ of the NW¼ of the SW¼ and the W½ of the SW¼ of the NW¼ of Sec. 26 T.1 N, R. 1W. and the W½ of the NE¼ and the SE¼ of the NE¼ and the E½ of NW¼ and the NW¼ of the NW¼ and the SW¼ of the SW¼ of Sec. 27 T.1 N, R. 1W. and the S½ and the S½ of the N½ and the NW¼ of the NW¼ of Sec. 34 T.1 N, R. 1W. and the SE¼ and the E½ of the NE¼ and the SW¼ pf the NE¼ and the SW¼ of the NW¼ and the W½ of the SW¼ and the W½ of the SE¼ pf the SW¼ of Sec. 35 T.1 N. R. 1W. and the E½ fo the E½ and the NW¼ of the NE¼ and the N½ of the NW¼ and the SW¼ of the SE¼ and the SE¼ of the SW¼ of Sec. 36 T.1 N, R. 1W. and the N½ of the NE¼ of the NE¼ of Sec.1 T.1 S, R. 1W.,

is held under lease secured from the Shoshone and Arapahoe Indians Council, subject to the rules and regulations of the Department of the Interior.

GEOLOGY.

The oldest rocks exposed on this lease are the "Red Beds" of Triassic age which occupy the crest of an anticlinal fold. On the eastern and western flanks sandstones and limestones of Jurassic age appear, followed by the Morrison shales, the Dakota Sandstones and the Fort Benton shales and sandstones, which are members of the Cretaceous system.

About eight miles west of this lease the Triassic formation is shown in its entire thickness, overlying the Embar limestones of Carboniferous age. The thickness of the Triassic formation as exposed there is about 2000 feet, consisting principally of red and yellow sandstones and shales, with ~~their~~ thin limestone layers near the top and bottom and a thick bed of gypsum near the top. A section of the Embar formation, which is probably the source of the oil found in this district, is given below:

TRIASSIC.

6 feet cherty beds

20 feet gray and yellow sandy limestone

36 feet white limestone with thin cherty beds, gray on weathered surfaces. Contains many fossils including Spiriferina pulchra and Chonetes

84 feet masked, Probably the sandstome which is the source of the oil.

20 feet gray and buff cherty limestone. Contains many fossils, principally Spiriferina pulchra

20 feet white limestone with some chert. Weathers light buff.

60 feet masked. Probably limestone.

15 feet massive gray limestone. Many fossils, Sedgwickia concava, Myalina permiana, Aviculopecten occidentalis.

2 feet chert.

263 feet

TENSLEEP SANDSTONE

The anticlinal fold, which traverses this lease is the direct result of lateral pressure, exerted from the direction of the Wind River Mountains, and due to the upheaval of that range. The center of pressure, in this immediate vicinity, was in the Little Wind River valley, causing extensive northeast-southwest faulting and northwest-southeast shearing,

and slightly overturning the anticline. (See map No. 4)

The fault system consists of a large number of fractures, with as a rule, no apparent vertical displacement, and but slight horizontal movement in each case, although the total horizontal movement was sufficent to change the strike of the strata, on the westward limb of the anticline, from N. 50°W. to N 83°E. Shearing has occurred along the strike of the anticline, with slight vertical movement in the crest.

As a direct result of this faulting and fracturing the crest of the anticline has ~~fallen an easy prey~~ readily succumbed to the forces of erosion, and an anticlinal valley has been formed, the greater part of which is occupied by the lease of the Washakie Hydro-Carbon Mining Company. In the central part of this valley the crest of the anticline has been removed by erosion nearly to the base of the Triassic formation.

In the northwestern portion of the anticlinal valley, and of this lease, the movement was not so great as in the eastern portion, due to relief of pressure by the faulting in the Wind River valley, and the anticline is there shown in its normal form, the strata dipping 40° to the south-west and 20° to the north-east.

OIL.

The existance of oil in this district, as indicated by the "Tar Spring", has been known for many years. The product of this spring, which reaches the surface through a fracture near the center of the anticlinal basin, is a thick, black, tarry substance, asphaltum--the residue remaining after the evaporation of the lighter and more volatile hydro-carbons, which have escaped through the fractures caused by faulting. A circular bed of asphaltum, some three or four feet in thickness and about 300 feet in diameter, has been deposited on the surface at this point. Oil saturated sandstone was found about one-half mile north and one-fourth mile south of the "Tar Spring", and about two miles south-east, across the Little Wind River valley. Globules of oil were also noted arising in Trout Creek, about one and one-half miles southeast. However, these saturated sandstones are not the source of the oil, the oil having reached them through fissures.

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About one and one-half miles north of the "Tar Spring" liquid asphaltum, containing 75 per cent hydrocarbons, was encountered at a depth of 1400 feet and was found to be 65 feet in thickness.

RECOMMENDATIONS.

The well sunk by the Washakie Hydro-Carbon Minign Company was very unfortunately located, as it was drilled on the steeply dipping westward limb of the anticline, and at a point above the "Tar Spring" (See sketch). At this point it is probable that the strata would be passed through twice, if drilling were continued.

The log of the well is as follows:

Feet		Remarks.
0-25	Soil some gravel,	
25-65	Red Rock	
65-165	Blue clay, very soft,	
165-171	Lime formation, cold sulphur water,	
171-300	Blue clay, very soft, oil present, artesian flow warm sulphur water, 1450 barrels per day at 300 feet.	
300-350	Blue slate,	
350-355	Lime, Warm sulphur water,	
355-405	Blue slate,	
405-420	Brown sandstone	Bottom of Triassic
420-425	Quartz and flint	Top of Embar
425-500	Slate	Probably shaly limestone
500-540	Lime, Slight conglomerate, Warm sulphur water, formation hard.	
540-555	Soft blue clay, oil present	
555-570	Lime	
570-575	Flint	

Feet		Remarks.
575-600	Sand carrying oil	Probably oil sand stone
600-620	Lime	
620-625	Same	Probable dip of strata 60°
625-650	Sand some crystalline formation,	Actual thickness of oil sandstone about 50 feet.
650-670	Sand, additional and stronger flow of oil.	
670-675	Same, additional flow of oil.	
675-800	Very hard white, gritty formation.	

This well has, no doubt, passed through the oil sand and would again encounter it at a depth of about 1500 feet, at a point below the "Tar Spring" However, it is not advisable to continue drilling at this point, as the strata in the immediate vicinity are fractured, the lighter oils have escaped through the fractures, and the location is so near the crest of the anticline that the well would have but little storage above, stratigraphically, upon which to draw.

I would recommend that wells be drilled on that portion of the lease which lies in Sections 25,26 and 27, preferably in section 27, where the depth to the oil sand is about 1000 feet, though I

have no doubt that either petroleum or asphaltum would be encountered on any of the sections mentioned.

It is not advisable to drill on the lands lying in section 34, as on account of the dip of the strata, the Embar formation would be reached in the trough of the syncline, which lies between the anticline and the Wind River Mountains. The lands in sections35 and 36 are in the center of the faulted region, and for that reason drilling is not recommended on them, though the northeastern portion of section 35 and the whole of the leased lands in section 36 may prove to be of value.

Oil can probably be obtained on the small tract lying in T.1 S, R. 1W.

CONCLUSIONS.

The greater part of the lands held by the Washakie Hydro-Carbon Mining Company will, in all probability, prove to be of value. The well already drilled proves nothing, as its location is very poor. The well drilled on the adjoining lease, which encountered asphaltum at a depth of 1400 feet, proves the existance of a pool of asphaltum, and when taken in conjuction with the "Tar Spring", determines the width of the pool, on the eastward limb of the anticline, to be at least one mile.

The first wells drilled by this company should be located near the eastern rim of the anticlinal valley, a short distance either to the east or the west. Wells drilled east of the rim should encounter the oil sand at depths ranging from 1200 feet to 1400 feet, depending on the location, while those drilled west of the rim should reach the source of the asphaltum at 800feet to 1000 feet below the surface.

Respectfully submitted,

State Geologist,

Cheyenne, Wyo.
July 6th, 1911.