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REVIEW OF CONDITIONS IN THE LANCE CREEK OIL FIELD,  
NIOBRARA COUNTY, WYOMING.

The Lance Creek oil and gas field lies about 25 miles due north of Manville, Wyoming, and occupies all or portions of Sections 25, 26, 27, 28, 32, 33, 34, 35, and 36, T. 36 N., R. 65 W., and Sections 1, 2, 3, 4, 5, 6, 7, 8, and 9, T. 35 N., R. 65W. The Lance Creek anticline also extends through the southern portion of T. 36 N., R. 64 W. Lance Creek runs in a northerly direction through the center of the dome and Little Lightning Creek runs in a northeasterly direction, paralleling the northern escarpment and joining Lance Creek to the north of the Structure. The northern escarpment is a low and discontinuous ridge which practically bounds the field on the west and north. It extends in a northeasterly direction from Section 1, T. 35 N., R. 66 W. on the west to Section 23, T. 36 N., R. 64 W., where it is crossed by Buck Creek near the eastern limits of the anticline.

Stratigraphy and Structure

The rocks forming the escarpment belong to the Fox Hills formation of Montana Age (Upper Cretaceous). This formation is the key to the structure and to the underlying strata and corresponds in a general way to the Mesaverde formation of other Wyoming fields. The Pierre shale is ex-

posed in the center of the field except where it is covered by Tertiary deposits. It is a soft and easily weathered shale characteristic for low relief and gumbo soil. The Pierre shale beds are brown and dark gray in color and easily distinguished from the light gray, white, and flesh colored sandy clays of the overlying Tertiary. The Lance Creek field is largely covered and the structure to a great extent is concealed by these unconformable Tertiary (White River) deposits. These beds lie practically flat with possibly a slight dip to the south or southeast. The Niobrara formation and the Benton Group of shales and sands underlies the Pierre formation. The following is a columnar section of the stratification beginning at the surface and ending in the oil sands of the Graneros formation (lower Benton). This is a generalized section obtained for the logs of the different wells.

System	Formation	Description	Thickness ft.
Cretaceous	Pierre	Shale, containing Shannon ? sand near surface (15 ft.)	1800-2000
	Niobrara	shale, lime and slate	150-200
	Benton Group	Carlile shale Greenhorn limestone Graneros shale and sandstones (containing upper Wall Creek sand 10 ft., First Muddy sand 25 ft., Second Muddy sand 10 ft. 1)	600-800 20 1000 1

Note. - Near the apex of the structure the Wall Creek sand is found at a depth of about 2700 ft. and the First Muddy at 3660 to 3685 ft., and the second Muddy at 3690 to 3700 ft.

The major axis of the dome bears about N. 45 degrees E. in the western end of the structure, but swings to the right and bears about N. 10 degrees E. in Sections 35 and 36, T. 36 N., R. 65 W. The dips to the north and northwest average about 25 degrees, but those on the southern limb are much less, ranging from five to seven degrees.

The Lance Creek structure is apparently the result of a doming action on the so-called Buck Creek or Lance Creek anticline, which has formed a trap for the oil and gas of a vertical dimension of about 350 feet. It is not at all improbable that future development will disclose other producing structures on this field, especially to the east of the Lance Creek dome.

The extent of the oil producing area in this structure has not yet been definitely determined. However, borings in Sections 25 and 36, T. 36 N., R. 65 W., and in Sections 30 and 31, T. 36 N., R. 64 W., indicate that the area of commercial production will not be extended east of the north and south center line running through Sections 25 and 36, T. 36 N., R. 65 W. On the other hand small production in a well near the center of Section 28, T. 36 N., R. 64 W., which is east of the non-producing area, indicates a possibility of another producing structure in the Buck Creek area. The well going down in the SE<sup>1</sup>/<sub>4</sub> of Section 23, T. 36 N., R. 64 W., will undoubtedly test out the eastern extension of the Lance Creek anticline. As to the western limits of the producing zone, an estimate at this time would be merely guess work. From available data at hand it would not be unreasonable to assume that the territory containing oil and

gas in commercial quantities is from five to six miles long and from two to two and a half miles wide across the center of the dome. Development has been very slow on the north and west and these limits can be by no means safely estimated.

#### Development and Production.

As indicated above, development has pretty clearly outlined the eastern and southeastern limits of the field, but not the southwestern, western, or northern limits. The gas area in the center of the field has not yet been clearly defined, although it probably occupies from 1000 to 1200 acres of land. Development in the west end has also drawn attention to the possibilities of the Wall Creek sand. A well in the SE<sup>1</sup>/<sub>4</sub> Section 32 T. 36 N., R. 65 W., at a depth of 2915 feet has a reported commercial production from this sand and two other wells in Section 33 of this township also contain a fine showing of oil from this sand and possibly may be made producers. The Wall Creek sand appears to get thicker toward the west and consequently to contain more oil. It is believed that it might be present in the form of lenses rather than as a sheet sand, which lenses would naturally be sealed off by the enclosing shale beds. This sand does not appear in all of the logs of the wells in this field, but where it does appear showings of oil are noted. Prospects are very good for producing wells from the Wall Creek sand in the west end of the field. Development has also revealed the fact that the Muddy sand is a loose sand, which give up the oil easily, and that it is not the gas in the oil which causes the oil to flow so much as it is the water pressure behind the oil. It has also been demonstrated

that the upper lentil of the Muddy sand is making more or less water, especially in the eastern end of the field, and that the lower lentil is the principal oil-bearing sand. An attempt is now being made to test out lower formations below the Muddy sand in Well No. 2 of Section 36, T. 36 N., R. 65 W. At the present time this well has passed through the second sand and 25 feet of shale and into a third sand for distance of five feet. On account of the water in the well it has not yet been determined whether or not the third sand is oil-bearing. The following table give a list of producing wells, showing their locations and estimated daily production. Production figures are not represented as being absolutely correct, but are estimates based upon observations in the field.

T. 36 N., R. 65 W.

Number of of well.	Location	Estimated production bbls. per day.
1	Sec. 36, NW $\frac{1}{4}$ NW $\frac{1}{4}$	Cleaning out
3	Sec. 36, NW $\frac{1}{4}$ NW $\frac{1}{4}$	225
5	Sec. 36, SW $\frac{1}{4}$ NW $\frac{1}{4}$	225
28	Sec. 35, NE $\frac{1}{4}$ NE $\frac{1}{4}$	175
7	Sec. 35, SE $\frac{1}{4}$ NW $\frac{1}{4}$	75
30	Sec. 34, SE $\frac{1}{4}$ SE $\frac{1}{4}$	unknown
27	Sec. 34, SW $\frac{1}{4}$ NW $\frac{1}{4}$	gas
1	Sec. 34, NE $\frac{1}{4}$ SW $\frac{1}{4}$	gas
1	Sec. 32, SW $\frac{1}{4}$ SE $\frac{1}{4}$	180
1	Sec. 27, SE $\frac{1}{4}$ SW $\frac{1}{4}$	gas
4	Sec. 26, SE $\frac{1}{4}$ SE $\frac{1}{4}$	600

T. 35 N., R. 65 W.

1	Sec. 3, NW $\frac{1}{4}$ NW $\frac{1}{4}$	cleaning out
3	Sec. 3, NW $\frac{1}{4}$ SW $\frac{1}{4}$	intermittent
2	Sec. 4, SE $\frac{1}{4}$ NE $\frac{1}{4}$	1650
3	Sec. 4, NE $\frac{1}{4}$ SW $\frac{1}{4}$	3000
1	Sec. 4, NW $\frac{1}{4}$ NE $\frac{1}{4}$	gas

The above indicates that the average daily production of the Lance Creek Field is about 6,000 barrels. Three of the early wells in the field are not now producing.

It has also been observed that some of the wells in this field have a rather rapid rate of decline in production. The pressure of the gas in the gas wells of this field is about 935 pounds. There are four such wells, - one in Section 27, two in Section 34, T. 36 N., R. 65 W., and one in Section 4, T. 35 N., R. 65 W. The estimated total capacity of these wells is about 100,000,000 cubic feet per day. There is no market at the present time for the dry gas. However, an absorption plant is in process of construction by the Hope Natural Gas Company and the Ohio Oil Company for the purpose of extracting the gasoline from the casing head gas which is trapped from the oil wells.

The principal producing companies in this field are the Ohio Oil Company, the Buck Creek Oil Company, and the Midwest Refining Company. Other companies drilling are the Texas Company, Western States Oil Company, Union Oil Company, Carter Oil Company, and the Glenrock Oil Company.

There are several wells in the Lance Creek area reported to be very close to the sand and expected to come in momentarily. Well No. 1 in the NE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> Section 9, T. 35 N., R. 65 W., is 3700 feet deep with good showings of oil and gas. A well in Section 36, T. 35 N., R. 66 W., is down to a depth of 4070 feet, and another in Section 35, T. 34 N., R. 67 W., is 3500 feet deep.