

OILFIELD RESEARCH LABORATORIES

536 NORTH HIGHLAND - CHANUTE, KANSAS 66720 - PHONE (316) 431-2650

November 13, 1980

Oaks Petroleum, Inc.
c/o Calvin T. Oaks, Jr.
R R # 2
Stoystown, PA 15563

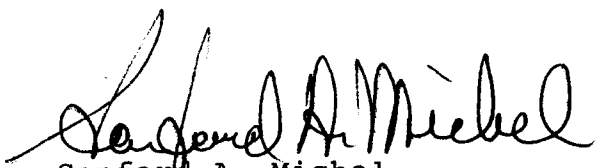
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary cores taken from the Collins Lease, Well No. C-3, located in Franklin County, Kansas and submitted to our laboratory on October 27, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Sanford A. Michel

SAM/kas

2 c to Stoystown, PA
3 c to Paola, KS

- REGISTERED ENGINEERS -

CORE ANALYSIS - WATER ANALYSIS - REPRESSURING ENGINEERING - SURVEYING & MAPPING - PROPERTY EVALUATION & OPERATION

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GENERAL INFORMATION & SUMMARY

Company Oaks Petroleum, Inc. Lease Collins Well No. C-3

Location -

Section 16 Twp. 17S Rge. 21E County Franklin State Kansas

Elevation, Feet - - - - -

| | | |
|------------------------------|-------|--------------|
| Name of Sand | Peru | 1st Squirrel |
| Top of Core | 360.0 | 489.5 |
| Bottom of Core | 363.0 | 500.0 |
| Top of Sand | 360.0 | 492.2 |
| Bottom of Sand | 362.7 | 500.0 |
| Total Feet of Permeable Sand | 2.2 | 5.1 |
| Total Feet of Floodable Sand | 1.5 | 5.1 |

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

PERU SAND

50 - 60 0.7 0.7

120 - 170 1.5 2.2

1st SQUIRREL SAND

0 - 1 1.0 1.0

10 - 50 3.0 4.0

50 - 100 0.7 4.7

100 - 110 0.4 5.1

| | | |
|-----------------------------------------------------------------|-----------------------------------|--------|
| Average Permeability Millidarcys | 109.9 | 38.2 |
| Average Percent Porosity | 17.5 | 18.4 |
| Average Percent Oil Saturation | 40.5 | 40.9 |
| Average Percent Water Saturation | 29.4 | 42.6 |
| Average Oil Content, Bbls./A. Ft. | 528. | 600. |
| Total Oil Content, Bbls./Acre | 1,162. | 3,661. |
| Average Percent Oil Recovery by Laboratory Flooding Tests | 5.7 | 12.9 |
| Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. | 85. | 199. |
| Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre | 128. | 1,015. |
| Total Calculated Oil Recovery, Bbls./Acre | See "Calculated Recovery" Section | |

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The core was sampled and the samples sealed in plastic bags by a representative of the client. Fresh water mud was used as a drilling fluid.

FORMATION CORED

The detailed log of the formation cored is as follows:

| <u>Depth Interval, Feet</u> | <u>Description</u> |
|---------------------------------|-----------------------------|
| | <u>PERU SAND</u> |
| 360.0 - 361.5 | Brown calcareous sandstone. |
| 361.5 - 362.0 | Hard gray limestone. |
| 362.0 - 362.7 | Brown calcareous sandstone. |
| 362.7 - 363.0 | Hard gray limestone. |

1st SQUIRREL SAND

| | |
|---------------|-------------------------------------------------------------------|
| 489.5 - 491.5 | Gray sandy shale. |
| 491.5 - 492.2 | Hard gray limestone. |
| 492.2 - 494.1 | Brown and gray laminated slightly calcareous sandstone and shale. |
| 494.1 - 496.2 | Brown slightly calcareous sandstone. |
| 496.2 - 497.0 | Hard gray limestone. |
| 497.0 - 498.9 | Brown and gray laminated slightly calcareous sandstone and shale. |
| 498.9 - 500.0 | Brown slightly calcareous sandstone. |

LABORATORY FLOODING TESTS

PERU SAND

The Peru sand in this core responded to laboratory flooding tests, as a total recovery of 128 barrels of oil per acre was obtained from 1.5 feet of sand. The weighted average percent oil saturation was reduced from 33.7 to 28.0, or represents an average recovery of 5.7 percent. The weighted average effective permeability of the samples is 5.25 millidarcys, while the average initial fluid production pressure is 20 pounds per square inch (See Table V).

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By observing the data given in Table IV, you will note that of the 3 samples tested, 2 produced water and oil. This indicates that approximately 66 percent of the sand represented by these samples is floodable pay sand.

LABORATORY FLOODING TESTS

1st SQUIRREL SAND

The 1st Squirrel sand in this core responded to laboratory flooding tests, as a total recovery of 1015 barrels of oil per acre was obtained from 5.1 feet of sand. The weighted average percent oil saturation was reduced from 43.6 to 30.7, or represents an average recovery of 12.9 percent. The weighted average effective permeability of the samples is 6.13 millidarcys, while the average initial fluid production pressure is 22.5 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 7 samples tested, 6 produced water and oil. This indicates that approximately 86 percent of the sand represented by these samples is floodable pay sand.

CALCULATED RECOVERY

It would appear from a study of the core data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 490 barrels of oil per acre from the Peru sand, and approximately 1640 barrels of oil per acre from the 1st Squirrel sand. This is an average recovery of 329 barrels per acre foot from 1.5 feet of floodable sand from the Peru sand, and an average recovery of 321 barrels per acre foot from 5.1 feet of floodable sand from the 1st Squirrel sand.

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These recovery values were calculated using the following data and assumptions:

| | <u>Peru Sand</u> | <u>1st Squirrel Sand</u> |
|---------------------------------------------------|----------------------|------------------------------|
| Original formation volume factor, estimated | 1.03 | 1.04 |
| Reservoir water saturation, percent, estimated | 30.0 | 25.0 |
| Average porosity, percent | 19.3 | 20.0 |
| Oil saturation after flooding, percent | 28.0 | 30.7 |
| Performance factor, percent, estimated | 55.0 | 50.0 |
| Net floodable sand, feet | 1.5 | 5.1 |

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Oaks Petroleum, Inc. Lease Collins Well No. C-3

| Sample No. | Depth, Feet | Effective Porosity Percent | Percent Saturation | | | Oil Content Bbls. / A Ft. | Perm., Mill. | Feet of Sand | | Total Oil Content | Perm. Capacity Ft. X md. |
|------------|-------------|----------------------------|--------------------|-------|-------|---------------------------|--------------|--------------|----------|-------------------|--------------------------|
| | | | Oil | Water | Total | | | Ft. | Cum. Ft. | | |
| 1 | 360.4 | 20.2 | 33 | 40 | 73 | 517 | 118. | 1.0 | 1.0 | 517 | 118.00 |
| 2 | 361.4 | 17.3 | 35 | 17 | 52 | 470 | 169. | 0.5 | 1.5 | 235 | 84.50 |
| 3 | 362.3 | 13.7 | 55 | 23 | 78 | 585 | 56. | 0.7 | 2.2 | 410 | 39.20 |
| 4 | 492.7 | 19.8 | 44 | 31 | 75 | 676 | 0.24 | 1.0 | 1.0 | 676 | 0.24 |
| 5 | 494.3 | 15.8 | 38 | 60 | 98 | 466 | 105. | 0.4 | 1.4 | 186 | 42.00 |
| 6 | 495.0 | 20.2 | 52 | 30 | 82 | 815 | 41. | 1.0 | 2.4 | 815 | 41.00 |
| 7 | 496.0 | 21.6 | 41 | 42 | 83 | 687 | 78. | 0.7 | 3.1 | 481 | 54.60 |
| 8 | 497.4 | 19.3 | 45 | 36 | 81 | 674 | 18. | 0.9 | 4.0 | 607 | 16.20 |
| 9 | 498.2 | 10.4 | 27 | 70 | 97 | 218 | Imp. | 1.0 | 5.0 | 218 | 0.00 |
| 10 | 499.5 | 20.9 | 38 | 39 | 77 | 616 | 37. | 1.1 | 6.1 | 678 | 40.70 |

1st SQUIRREL SAND

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Oaks Petroleum, Inc. Lease Collins Well No. C-3

Company

| Sample No. | Depth, Feet | Effective Porosity Percent | Original Oil Saturation | | Oil Recovery | | Residual Saturation | | Volume of Water Recovered cc* | Effective Permeability Millidarcys** | Initial Fluid Production Pressure Lbs./Sq./In. |
|------------|-------------|----------------------------|-------------------------|--------------|--------------|--------------|---------------------|---------|-------------------------------|--------------------------------------|------------------------------------------------|
| | | | % | Bbls./A. Ft. | % | Bbls./A. Ft. | % Oil | % Water | | | |
| 1 | 360.4 | 20.1 | 33 | 515 | 6 | 94 | 27 | 66 | 101 | 2.20 | 20 |
| 2 | 361.4 | 17.5 | 35 | 475 | 5 | 68 | 30 | 64 | 221 | 11.33 | 20 |
| 3 | 362.3 | 14.1 | 54 | 591 | 0 | 0 | 54 | 40 | 0 | Imp. | - |
| 4 | 492.7 | 20.0 | 44 | 683 | 15 | 233 | 29 | 63 | 14 | 0.20 | 30 |
| 5 | 494.3 | 15.9 | 38 | 469 | 10 | 123 | 28 | 69 | 243 | 11.66 | 20 |
| 6 | 495.0 | 20.1 | 52 | 811 | 20 | 312 | 32 | 66 | 422 | 9.20 | 20 |
| 7 | 496.0 | 21.7 | 41 | 690 | 9 | 152 | 32 | 64 | 351 | 8.80 | 20 |
| 8 | 497.4 | 19.0 | 45 | 663 | 13 | 192 | 32 | 63 | 486 | 11.40 | 20 |
| 9 | 498.2 | 10.9 | 26 | 220 | 0 | 0 | 26 | 70 | 0 | Imp. | - |
| 10 | 499.5 | 20.8 | 38 | 613 | 8 | 129 | 30 | 68 | 34 | 0.70 | 25 |

Notes: cc—cubic centimeter.

*—Volume of water recovered at the time of maximum oil recovery.

**—Determined by passing water through sample which still contains residual oil.

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

| Company | Lease | Collins | Well No. |
|---------------------------------------------------|---------------|---------|-------------------|
| Oaks Petroleum, Inc. | PERU SAND | | 1st SQUIRREL SAND |
| Depth Interval, Feet | 360.0 - 362.7 | | 492.2 - 500.0 |
| Feet of Core Analyzed | 1.5 | | 5.1 |
| Average Percent Porosity | 19.3 | | 20.0 |
| Average Percent Original Oil Saturation | 33.7 | | 43.6 |
| Average Percent Oil Recovery | 5.7 | | 12.9 |
| Average Percent Residual Oil Saturation | 28.0 | | 30.7 |
| Average Percent Residual Water Saturation | 65.3 | | 65.3 |
| Average Percent Total Residual Fluid Saturation | 93.3 | | 96.0 |
| Average Original Oil Content, Bbls./A. Ft. | 501. | | 674. |
| Average Oil Recovery, Bbls./A. Ft. | 85. | | 199. |
| Average Residual Oil Content, Bbls./A. Ft. | 416. | | 475. |
| Total Original Oil Content, Bbls./Acre | 753. | | 3,435. |
| Total Oil Recovery, Bbls./Acre | 128. | | 1,015. |
| Total Residual Oil Content, Bbls./Acre | 625. | | 2,420. |
| Average Effective Permeability, Millidarcys | 5.25 | | 6.13 |
| Average Initial Fluid Production Pressure, p.s.i. | 20.0 | | 22.5 |

NOTE: Only those samples which recovered oil were used in calculating the above averages.