

OILFIELD RESEARCH LABORATORIES

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

November 20, 1981

KLI Petroleum
P. O. Box 1159
Henderson, Kentucky 42420

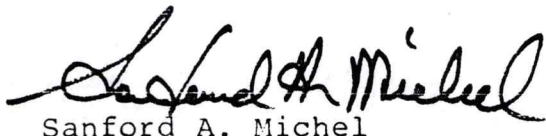
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Nelson Lease, Well No. KW-10, located in Allen County, Kansas and submitted to our laboratory on November 10, 1981.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES



Sanford A. Michel

SAM/mkf

- 3 c to Henderson, Ky.
- 2 c to Evansville, Ind.
- 1 c to Mike Powell, P. O. Box 43
Elsmore, Ks.
- 1 c to Russell Engineering
Abilene, Tx.
- 2 c to James E. Russell Petroleum, Inc.
Chanute, Ks.

Oilfield Research Laboratories
GENERAL INFORMATION & SUMMARY

Company KLI Petroleum Lease Nelson Well No. KW-10
 Location 1130' FNL & 850' FEL SW $\frac{1}{4}$
 Section 21 Twp. 26S Rge. 21E County Allen State Kansas

Elevation, Feet

Name of Sand..... BARTLESVILLE

Top of Core 612.0

Bottom of Core 721.5

Top of Sand 612.0

Bottom of Sand 716.1

Total Feet of Permeable Sand 15.6

Total Feet of Floodable Sand 8.3

| Distribution of Permeable Sand: Permeability Range Millidarcys | Feet | Cum. Ft. |
|--|------|----------|
| 0 - 1 | 6.6 | 6.6 |
| 1 - 8 | 2.8 | 9.4 |
| 13 - 20 | 3.4 | 12.8 |
| 27 - 51 | 2.8 | 15.6 |

Average Permeability Millidarcys 10.8

Average Percent Porosity 12.9

Average Percent Oil Saturation 27.1

Average Percent Water Saturation 66.6

Average Oil Content, Bbls./A. Ft. 297.

Total Oil Content, Bbls./Acre 11,367.

Average Percent Oil Recovery by Laboratory Flooding Tests 13.9

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. 184.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre 1,525.

Total Calculated Oil Recovery, Bbls./Acre See "Calculated Recovery"
 Section

The core was sampled and the samples sealed in plastic bags by a representative of Oilfield Research Laboratories. Fresh water mud was used as a drilling fluid. The core was reported to be from a non-virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

| <u>Depth Interval,</u> <u>Feet</u> | <u>Description</u> |
|---------------------------------------|---|
| 612.0 - 613.6 | Sandstone, very shaly, slightly calcareous, gray. |
| 613.6 - 616.0 | Shale, gray. |
| 616.0 - 620.0 | Sandstone, shaly, slightly calcareous, gray. |
| 620.0 - 627.3 | Shale, gray. |
| 627.3 - 628.7 | Coal. |
| 628.7 - 633.5 | Shale, gray. |
| 633.5 - 634.0 | Shale, slightly sandy, gray. |
| 634.0 - 637.0 | Shale, gray. |
| 637.0 - 638.7 | Shale, slightly sandy, gray. |
| 638.7 - 640.2 | Sandstone, shaly, gray. |
| 640.2 - 641.0 | Sandstone, very shaly, gray. |
| 641.0 - 644.4 | Shale, gray, containing a vertical fracture. |
| 644.4 - 645.0 | Sandstone, shaly, grayish brown. |
| 645.0 - 652.0 | Shale, gray, containing two vertical fractures. |
| 652.0 - 657.1 | Shale and sandstone, laminated, gray and light brown. |
| 657.1 - 657.5 | Sandstone, brown, with shale partings. |
| 657.5 - 658.3 | Shale and sandstone, laminated, gray and brown. |
| 658.3 - 658.6 | Sandstone, brown, with shale partings. |

| | |
|---------------|---|
| 658.6 - 659.4 | Shale and sandstone, laminated, gray and brown. |
| 659.4 - 659.7 | Sandstone, brown with shale partings. |
| 659.7 - 662.5 | Shale and sandstone, laminated, gray and brown. |
| 662.5 - 663.7 | Sandstone, brown. |
| 663.7 - 666.3 | Sandstone, shaly, grayish brown. |
| 666.3 - 668.8 | Sandstone, brown. |
| 668.8 - 670.0 | Shale, gray. |
| 670.0 - 671.0 | Sandstone, shaly, gray. |
| 671.0 - 674.7 | Shale, gray. |
| 674.7 - 678.7 | Sandstone, shaly, gray. |
| 678.7 - 681.0 | Shale, gray. |
| 681.0 - 686.4 | Shale, slightly sandy, gray. |
| 686.4 - 688.1 | Sandstone and shale, laminated, gray. |
| 688.1 - 692.2 | Shale, gray, containing a vertical fracture. |
| 702.0 - 706.8 | Shale, gray. } <i>what happened?</i> |
| 706.8 - 707.3 | Shale, slightly sandy, gray. |
| 707.3 - 712.0 | Shale, gray. |
| 712.0 - 716.1 | Sandstone, shaly, grayish light brown. |
| 716.1 - 720.5 | Shale, gray. |
| 720.5 - 721.0 | Coal. |
| 721.0 - 721.5 | Shale, gray. |

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 1525 barrels of oil per acre was obtained from 8.3 feet of sand. The weighted average percent oil saturation was reduced from 49.2 to 35.3, or represents an average recovery of

13.9 percent. The weighted average effective permeability of the samples is 1.90 millidarcys, while the average initial fluid production pressure is 26.5 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 42 samples tested, 10 produced water and oil. This indicates that approximately 24 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 1970 barrels of oil per acre. This is an average recovery of 237 barrels per acre foot from 8.3 feet of floodable sand analyzed in this core.

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

| | |
|--|------|
| Original formation volume factor, estimated | 1.05 |
| Reservoir water saturation, percent, estimated | 25.0 |
| Average porosity, percent | 16.9 |
| Oil saturation after flooding, percent | 35.3 |
| Performance factor, percent, estimated | 50.0 |
| Net floodable sand, feet | 8.3 |

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company KLI Petroleum Lease Nelson Well No. KW-10

| 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 | 612.4 | 8.7 | 3 | 95 | 98 | 20 | Imp. | 1.0 | 1.0 | 20 | 0.00 |
| 2 | 613.4 | 8.2 | 13 | 83 | 96 | 83 | Imp. | 0.6 | 1.6 | 50 | 0.00 |
| 3 | 616.2 | 8.4 | 4 | 93 | 97 | 26 | 0.48 | 1.3 | 2.9 | 34 | 0.62 |
| 4 | 618.5 | 9.4 | 17 | 80 | 97 | 124 | Imp. | 1.3 | 4.2 | 161 | 0.00 |
| 5 | 633.6 | 4.6 | 26 | 72 | 98 | 93 | 4.7 | 0.5 | 4.7 | 47 | 2.35 |
| 6 | 637.3 | 11.6 | 10 | 75 | 85 | 90 | Imp. | 1.0 | 5.7 | 90 | 0.00 |
| 7 | 638.5 | 10.6 | 3 | 93 | 96 | 25 | Imp. | 0.7 | 6.4 | 18 | 0.00 |
| 8 | 640.6 | 10.9 | 13 | 77 | 90 | 110 | Imp. | 0.8 | 7.2 | 88 | 0.00 |
| 9 | 644.7 | 9.8 | 14 | 84 | 98 | 106 | Imp. | 0.6 | 7.8 | 64 | 0.00 |
| 10 | 652.4 | 13.0 | 19 | 70 | 89 | 192 | Imp. | 1.0 | 8.8 | 192 | 0.00 |
| 11 | 653.7 | 16.8 | 37 | 50 | 87 | 482 | 6.8 | 1.0 | 9.8 | 482 | 6.80 |
| 12 | 654.5 | 13.1 | 22 | 74 | 96 | 224 | 0.57 | 1.0 | 10.8 | 224 | 0.57 |
| 13 | 655.3 | 12.4 | 31 | 66 | 97 | 298 | Imp. | 1.0 | 11.8 | 298 | 0.00 |
| 14 | 656.7 | 12.2 | 48 | 50 | 98 | 454 | Imp. | 1.1 | 12.9 | 499 | 0.00 |
| 15 | 657.4 | 17.9 | 49 | 46 | 95 | 680 | 19. | 0.4 | 13.3 | 272 | 7.60 |
| 16 | 658.5 | 18.0 | 32 | 58 | 90 | 447 | 28. | 0.3 | 13.6 | 134 | 8.40 |
| 17 | 659.6 | 16.4 | 49 | 42 | 91 | 623 | 16. | 0.3 | 13.9 | 187 | 4.80 |
| 18 | 660.4 | 13.1 | 47 | 51 | 98 | 478 | 15. | 1.5 | 15.4 | 717 | 22.50 |
| 19 | 661.8 | 16.3 | 46 | 43 | 89 | 582 | 7.2 | 1.3 | 16.7 | 757 | 9.36 |
| 20 | 662.7 | 18.2 | 57 | 36 | 93 | 805 | 13. | 0.6 | 17.3 | 483 | 7.80 |
| 21 | 663.4 | 18.0 | 53 | 41 | 94 | 740 | 14. | 0.6 | 17.9 | 444 | 8.40 |
| 22 | 664.8 | 15.0 | 51 | 47 | 98 | 594 | 0.65 | 1.2 | 19.1 | 713 | 0.78 |
| 23 | 666.5 | 20.9 | 39 | 53 | 92 | 632 | 28. | 0.7 | 19.8 | 442 | 19.60 |
| 24 | 667.5 | 18.3 | 64 | 23 | 87 | 909 | 27. | 1.0 | 20.8 | 909 | 27.00 |
| 25 | 668.5 | 18.7 | 44 | 43 | 87 | 638 | 50. | 0.8 | 21.6 | 510 | 40.00 |
| 26 | 670.2 | 10.7 | 55 | 42 | 97 | 457 | Imp. | 1.0 | 22.6 | 457 | 0.00 |
| 27 | 675.4 | 12.7 | 45 | 48 | 93 | 443 | 0.27 | 1.0 | 23.6 | 443 | 0.27 |
| 28 | 676.5 | 11.9 | 10 | 85 | 95 | 92 | Imp. | 1.0 | 24.6 | 92 | 0.00 |
| 29 | 677.5 | 10.8 | 15 | 81 | 96 | 126 | Imp. | 1.0 | 25.6 | 126 | 0.00 |
| 30 | 678.5 | 12.0 | 21 | 75 | 96 | 196 | Imp. | 1.0 | 26.6 | 196 | 0.00 |

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company KLI Petroleum Lease Nelson Well No. KW-10

| Sample No. | Depth, Feet | Effective Porosity Percent | Percent Saturation | | | Oil Content Bbbs. / A Ft. | Perm., Mill. | Feet of Sand | | Total Oil Content | Perm. Capacity Ft. X md. |
|------------|-------------|----------------------------|--------------------|-------|-------|---------------------------|--------------|--------------|----------|-------------------|--------------------------|
| | | | Oil | Water | Total | | | Ft. | Cum. Ft. | | |
| 31 | 681.5 | 14.2 | 19 | 75 | 94 | 209 | Imp. | 1.0 | 27.6 | 209 | 0.00 |
| 32 | 682.5 | 15.0 | 45 | 46 | 91 | 524 | 0.78 | 1.0 | 28.6 | 524 | 0.78 |
| 33 | 683.5 | 12.6 | 28 | 65 | 93 | 274 | Imp. | 1.0 | 29.6 | 274 | 0.00 |
| 34 | 684.6 | 10.5 | 11 | 86 | 97 | 90 | Imp. | 1.0 | 30.6 | 90 | 0.00 |
| 35 | 685.4 | 10.9 | 18 | 80 | 98 | 152 | Imp. | 1.4 | 32.0 | 213 | 0.00 |
| 36 | 686.5 | 13.0 | 5 | 90 | 95 | 50 | Imp. | 0.9 | 32.9 | 45 | 0.00 |
| 37 | 687.4 | 12.3 | 13 | 84 | 97 | 124 | Imp. | 0.8 | 33.7 | 99 | 0.00 |
| 38 | 707.2 | 8.3 | 19 | 79 | 98 | 122 | Imp. | 0.5 | 34.2 | 61 | 0.00 |
| 39 | 712.6 | 10.6 | 17 | 60 | 77 | 140 | Imp. | 1.0 | 35.2 | 140 | 0.00 |
| 40 | 713.7 | 11.8 | 17 | 79 | 96 | 156 | Imp. | 1.0 | 36.2 | 156 | 0.00 |
| 41 | 714.5 | 14.5 | 14 | 80 | 94 | 158 | Imp. | 1.0 | 37.2 | 158 | 0.00 |
| 42 | 715.6 | 15.3 | 19 | 71 | 90 | 226 | 0.20 | 1.1 | 38.3 | 249 | 0.22 |

Oilfield Research Laboratories

SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company KLI Petroleum Lease Nelson Well No. KW-10

| Depth Interval, Feet | Feet of Core Analyzed | Average Permeability, Millidarcys | Permeability Capacity Ft. x Md. |
|-------------------------|--------------------------|---|---------------------------------------|
| 612.0 - 657.5 | 4.2 | 4.3 | 17.94 |
| 658.3 - 668.8 | 8.3 | 17.9 | 148.64 |
| 670.0 - 716.1 | 3.1 | 0.41 | 1.27 |
| 612.0 - 716.1 | 15.6 | 10.8 | 167.85 |

| Depth Interval, Feet | Feet of Core Analyzed | Average Percent Porosity | Average Percent Oil Saturation | Average Percent Water Saturation | Average Oil Content Bbl./A. Ft. | Total Oil Content Bbl./Acre |
|-------------------------|--------------------------|--------------------------------|--------------------------------------|--|---------------------------------------|-----------------------------------|
| 612.0 - 657.5 | 13.3 | 11.2 | 19.8 | 74.5 | 191 | 2,539 |
| 658.3 - 668.8 | 8.3 | 16.7 | 49.2 | 43.3 | 638 | 5,296 |
| 670.0 - 716.1 | 16.7 | 12.3 | 22.0 | 71.8 | 211 | 3,532 |
| 612.0 - 716.1 | 38.3 | 12.9 | 27.1 | 66.6 | 297 | 11,367 |

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company KLI Petroleum Lease Nelson Well No. KW-10

| 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 | Bbls./A. Ft. | | | |
| 1 | 612.4 | 8.6 | 3 | 20 | 0 | 0 | 3 | 95 | 20 | 0 | Imp. | - |
| 2 | 613.4 | 8.1 | 13 | 82 | 0 | 0 | 13 | 84 | 82 | 0 | Imp. | - |
| 3 | 616.2 | 8.5 | 4 | 26 | 0 | 0 | 4 | 94 | 26 | 0 | Imp. | - |
| 4 | 618.5 | 9.6 | 17 | 127 | 0 | 0 | 17 | 81 | 127 | 0 | Imp. | - |
| 5 | 633.6 | 4.7 | 26 | 95 | 0 | 0 | 26 | 72 | 95 | 0 | Imp. | - |
| 6 | 637.3 | 11.1 | 11 | 95 | 0 | 0 | 11 | 85 | 95 | 0 | Imp. | - |
| 7 | 638.5 | 10.7 | 3 | 25 | 0 | 0 | 3 | 94 | 25 | 0 | Imp. | - |
| 8 | 640.6 | 10.8 | 13 | 109 | 0 | 0 | 13 | 78 | 109 | 0 | Imp. | - |
| 9 | 644.7 | 9.9 | 14 | 108 | 0 | 0 | 14 | 84 | 108 | 0 | Imp. | - |
| 10 | 652.4 | 13.1 | 19 | 193 | 0 | 0 | 19 | 71 | 193 | 0 | Imp. | - |
| 11 | 653.7 | 16.3 | 38 | 481 | 0 | 0 | 38 | 50 | 481 | 0 | Imp. | - |
| 12 | 654.5 | 13.0 | 22 | 222 | 0 | 0 | 22 | 75 | 222 | 0 | Imp. | - |
| 13 | 655.3 | 12.5 | 31 | 301 | 0 | 0 | 31 | 67 | 301 | 0 | Imp. | - |
| 14 | 656.7 | 12.1 | 48 | 451 | 0 | 0 | 48 | 50 | 451 | 0 | Imp. | - |
| 15 | 657.4 | 17.8 | 49 | 677 | 0 | 0 | 49 | 47 | 677 | 0 | Imp. | - |
| 16 | 658.5 | 18.2 | 32 | 452 | 3 | 42 | 29 | 62 | 410 | 24 | 0.45 | 45 |
| 17 | 659.6 | 16.5 | 49 | 627 | 12 | 154 | 37 | 55 | 473 | 3 | 0.08 | 25 |
| 18 | 660.4 | 13.3 | 47 | 485 | 13 | 134 | 34 | 64 | 351 | 98 | 1.87 | 20 |
| 19 | 661.8 | 16.5 | 46 | 589 | 10 | 128 | 36 | 61 | 461 | 4 | 0.15 | 25 |
| 20 | 662.7 | 18.1 | 57 | 800 | 16 | 225 | 41 | 53 | 575 | 14 | 0.22 | 30 |
| 21 | 663.4 | 18.2 | 53 | 748 | 11 | 155 | 42 | 53 | 593 | 24 | 0.45 | 30 |
| 22 | 664.8 | 15.1 | 51 | 597 | 13 | 152 | 38 | 60 | 445 | 220 | 4.42 | 30 |
| 23 | 666.5 | 12.1 | 39 | 638 | 12 | 196 | 27 | 66 | 442 | 156 | 2.92 | 20 |
| 24 | 667.5 | 18.4 | 64 | 914 | 28 | 400 | 36 | 52 | 514 | 12 | 0.37 | 20 |
| 25 | 668.5 | 18.8 | 44 | 642 | 13 | 190 | 31 | 62 | 452 | 292 | 5.62 | 20 |
| 26 | 670.2 | 11.0 | 54 | 461 | 0 | 0 | 54 | 44 | 461 | 0 | Imp. | - |
| 27 | 675.4 | 12.8 | 45 | 447 | 0 | 0 | 45 | 50 | 447 | 0 | Imp. | - |
| 28 | 676.4 | 12.0 | 10 | 93 | 0 | 0 | 10 | 86 | 93 | 0 | Imp. | - |
| 29 | 677.5 | 10.6 | 15 | 123 | 0 | 0 | 15 | 82 | 123 | 0 | Imp. | - |

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.

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company KLI Petroleum Lease Nelson Well No. KW-10

| 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 | Bbls./A. Ft. | | | |
| 30 | 678.3 | 12.1 | 21 | 197 | 0 | 0 | 21 | 76 | 197 | 0 | Imp. | - |
| 31 | 681.5 | 14.7 | 18 | 205 | 0 | 0 | 18 | 76 | 205 | 0 | Imp. | - |
| 32 | 682.5 | 15.1 | 45 | 527 | 0 | 0 | 45 | 47 | 527 | 0 | Imp. | - |
| 33 | 683.5 | 12.7 | 28 | 276 | 0 | 0 | 28 | 66 | 276 | 0 | Imp. | - |
| 34 | 684.6 | 10.6 | 11 | 90 | 0 | 0 | 11 | 87 | 90 | 0 | Imp. | - |
| 35 | 685.4 | 11.4 | 17 | 150 | 0 | 0 | 17 | 81 | 150 | 0 | Imp. | - |
| 36 | 686.5 | 13.2 | 5 | 51 | 0 | 0 | 5 | 91 | 51 | 0 | Imp. | - |
| 37 | 687.4 | 12.1 | 13 | 122 | 0 | 0 | 13 | 85 | 122 | 0 | Imp. | - |
| 38 | 707.2 | 8.5 | 19 | 125 | 0 | 0 | 19 | 79 | 125 | 0 | Imp. | - |
| 39 | 712.6 | 10.7 | 17 | 141 | 0 | 0 | 17 | 62 | 141 | 0 | Imp. | - |
| 40 | 713.7 | 11.3 | 18 | 158 | 0 | 0 | 18 | 79 | 158 | 0 | Imp. | - |
| 41 | 714.5 | 14.4 | 14 | 156 | 0 | 0 | 14 | 81 | 156 | 0 | Imp. | - |
| 42 | 715.6 | 15.4 | 19 | 227 | 0 | 0 | 19 | 72 | 227 | 0 | Imp. | - |

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.

Oilfield Research Laboratories
SUMMARY OF LABORATORY FLOODING TESTS

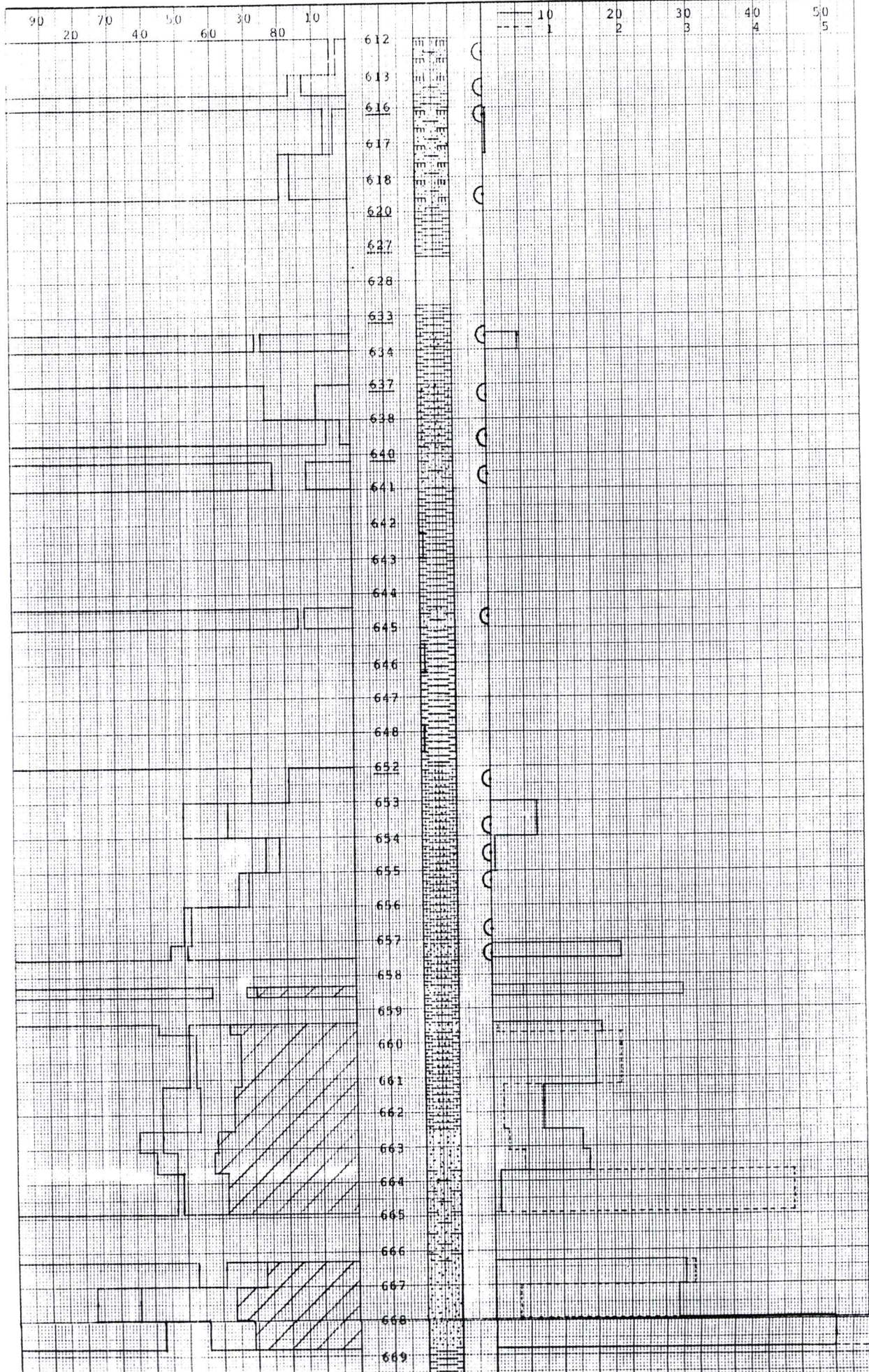
TABLE V

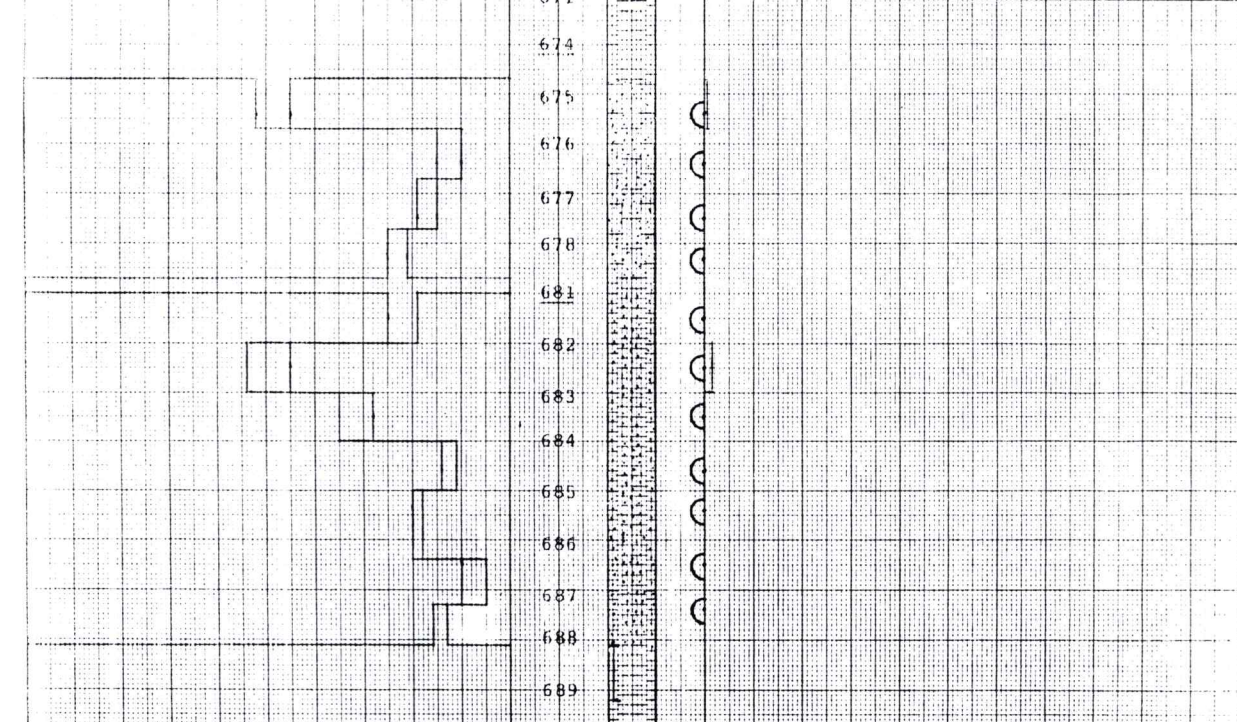
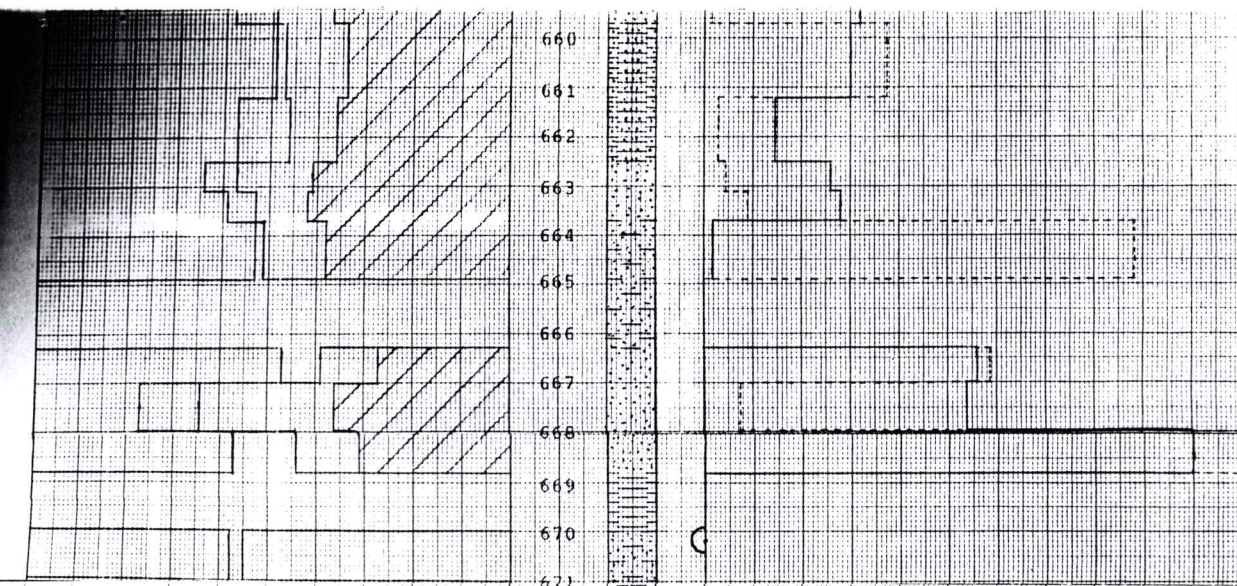
| | | | | | |
|---|---------------|-------|--------|----------|-------|
| Company | KLI Petroleum | Lease | Nelson | Well No. | KW-10 |
| Depth Interval, Feet | 658.3 - 668.8 | | | | |
| Feet of Core Analyzed | 8.3 | | | | |
| Average Percent Porosity | 16.9 | | | | |
| Average Percent Original Oil Saturation | 49.2 | | | | |
| Average Percent Oil Recovery | 13.9 | | | | |
| Average Percent Residual Oil Saturation | 35.3 | | | | |
| Average Percent Residual Water Saturation | 59.5 | | | | |
| Average Percent Total Residual Fluid Saturation | 94.8 | | | | |
| Average Original Oil Content, Bbls./A. Ft. | 643. | | | | |
| Average Oil Recovery, Bbls./A. Ft. | 184. | | | | |
| Average Residual Oil Content, Bbls./A. Ft. | 459. | | | | |
| Total Original Oil Content, Bbls./Acre | 5,336. | | | | |
| Total Oil Recovery, Bbls./Acre | 1,525. | | | | |
| Total Residual Oil Content, Bbls./Acre | 3,811. | | | | |
| Average Effective Permeability, Millidarcys | 1.90 | | | | |
| Average Initial Fluid Production Pressure, p.s.i. | 26.5 | | | | |

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

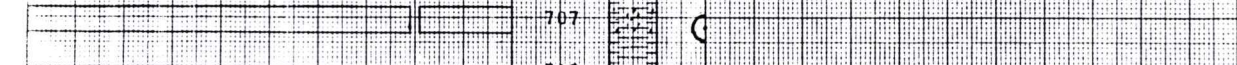
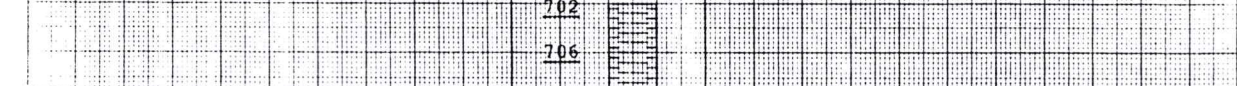
WATER SAT., PERCENT ← OIL SAT., PERCENT

PERMEABILITY, IN MILLIDARCYs
EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYs







692 NO CORE



KEY:


 SANDSTONE


 SHALE

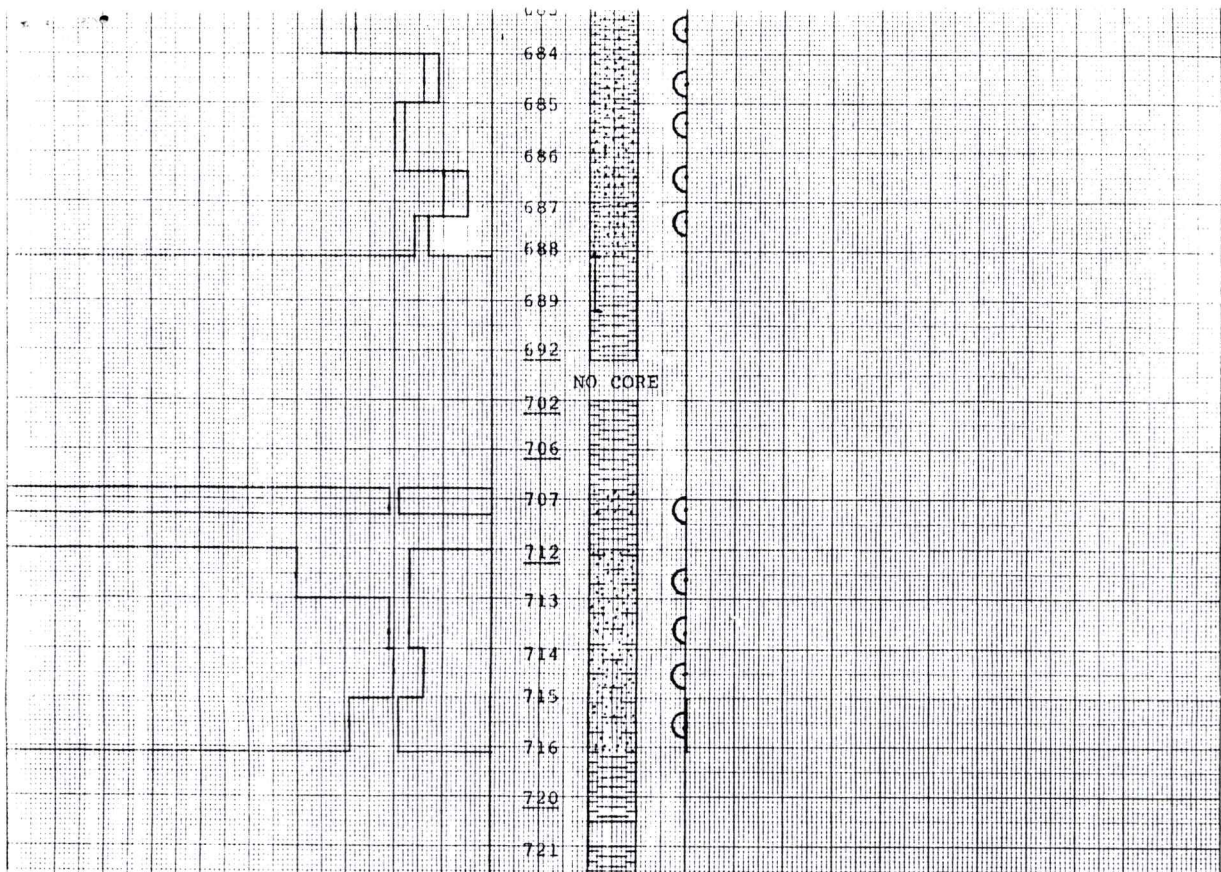
 LAMINATED SANDSTONE AND SHALE

 COAL

 CALCAREOUS SHALY SANDSTONE

 SANDSTONE WITH SHALE PARTINGS

 FORMATION CONTAINING A VERTICAL FRACTURE



- | | |
|---|---|
| <ul style="list-style-type: none"> □ SANDSTONE ▨ SHALE ▧ LAMINATED SANDSTONE AND SHALE ▩ SANDY SHALE ▪ SHALY SANDSTONE | <ul style="list-style-type: none"> □ COAL ▨ CALCAREOUS SHALY SANDSTONE ▧ SANDSTONE WITH SHALE PARTINGS ▩ FORMATION CONTAINING A VERTICAL FRACTURE ▪ FLOODPOT RESIDUAL OIL SATURATION ○ IMPERMEABLE TO WATER |
|---|---|

KLI PETROLEUM

NELSON LEASE

WELL NO. KW-10

ALLEN COUNTY, KANSAS

| DEPTH INTERVAL, FEET | FEET OF CORE ANALYZED | AVERAGE PERCENT POROSITY | AVG. OIL SATURATION PERCENT | AVG. WATER SATURATION PERCENT | AVERAGE PERMEABILITY, MILLIDARCYs | CALCULATED OIL RECOVERY BBLs. / ACRE |
|-------------------------|--------------------------|--------------------------------|-----------------------------------|-------------------------------------|---|--|
| 612.0 - 657.5 | 13.3 | 11.2 | 19.8 | 74.5 | 4.3 | |
| 658.3 - 668.8 | 8.3 | 16.7 | 49.2 | 43.3 | 17.9 | |
| 670.0 - 716.1 | 16.7 | 12.3 | 22.0 | 71.8 | 0.41 | |
| 612.0 - 716.1 | 38.3 | 12.9 | 27.1 | 66.6 | 10.8 | 1970 (PRIMARY AND WATERFLOODING) |

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
NOVEMBER, 1981