



# OILFIELD RESEARCH LABORATORIES

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

January 2, 1981

Midas International, Inc.  
P. O. Box 334  
Mound City, Kansas 66056

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Whitcomb Lease, Well No. 1 new, located in Anderson County, Kansas and submitted to our laboratory on October 31, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/kas

5 c to Mound City, Kansas

# Oilfield Research Laboratories

## GENERAL INFORMATION & SUMMARY

Company Midas International, Inc. Lease Whitcomb Well No. 1 new  
 Location 150' FNL & 150' FEL - W $\frac{1}{2}$  - NW $\frac{1}{4}$   
 Section 9 Twp. 23S Rge. 21E County Anderson State Kansas

Elevation, Feet - - - - -  
 Name of Sand - - - - -  
 Top of Core - - - - - 712.0  
 Bottom of Core - - - - - 732.0  
 Top of Sand - - - - - 712.0  
 Bottom of Sand - - - - - 732.0  
 Total Feet of Permeable Sand - - - - - 16.0  
 Total Feet of Floodable Sand - - - - - 7.0

| Distribution of Permeable Sand:<br>Permeability Range<br>Millidarcys | Feet | Cum. Ft. |
|----------------------------------------------------------------------|------|----------|
| 0 - 7                                                                | 7.0  | 7.0      |
| 25 - 110                                                             | 2.0  | 9.0      |
| 125 - 200                                                            | 3.0  | 12.0     |
| 250 & Above                                                          | 4.0  | 16.0     |

Average Permeability Millidarcys - - - - - 119.1  
 Average Percent Porosity - - - - - 18.7  
 Average Percent Oil Saturation - - - - - 39.4  
 Average Percent Water Saturation - - - - - 46.3  
 Average Oil Content, Bbls./A. Ft. - - - - - 573.  
 Total Oil Content, Bbls./Acre - - - - - 11,469.  
 Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 6.7  
 Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 112.  
 Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 783.

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

-2-

The core was sampled and the samples sealed in plastic bags by a representative of the client. Since samples only were delivered to the laboratory by the client, it is assumed that each sample represents one foot. Fresh water mud was used as a drilling fluid.

#### FORMATION CORED

The detailed log of the formation cored is as follows:

| <u>Depth Interval,<br/>Feet</u> | <u>Description</u>                                                      |
|---------------------------------|-------------------------------------------------------------------------|
| 712.0 - 715.0                   | Brown slightly calcareous sandstone.                                    |
| 715.0 - 717.0                   | Light brown and gray laminated slightly calcareous sandstone and shale. |
| 717.0 - 721.0                   | Brown slightly calcareous sandstone.                                    |
| 721.0 - 723.0                   | Grayish light brown very shaly sandstone.                               |
| 723.0 - 724.0                   | Brown slightly calcareous sandstone.                                    |
| 724.0 - 727.0                   | Brown and gray laminated slightly calcareous sandstone and shale.       |
| 727.0 - 728.0                   | Brown slightly calcareous sandstone.                                    |
| 728.0 - 732.0                   | Gray slightly carbonaceous slightly calcareous shaly sandstone.         |

#### LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 783 barrels of oil per acre was obtained from 7.0 feet of sand. The weighted average percent oil saturation was reduced from 41.1 to 34.4, or represents an average recovery of 6.7 percent. The weighted average effective permeability of the samples is 20.22 millidarcys, while the average initial fluid production pressure is 12.1 pounds per square inch (See Table V).

-3-

By observing the data given in Table IV, you will note that of the 20 samples tested, 7 produced water and oil, and 1 sample produced water only. This indicates that approximately 35 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 1,920 barrels of oil per acre. This is an average recovery of 274 barrels per acre foot from 7.0 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 | 30.0 |
| Average porosity, percent                      | 21.9 |
| Oil saturation after flooding, percent         | 34.4 |
| Performance factor, percent, estimated         | 50.0 |
| Net floodable sand, feet                       | 7.0  |

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## RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Midas International, Inc.

Lease Whitcomb

Well No. 1 new

| 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          | 712.5       | 22.7                       | 43                 | 47    | 90    | 757                       | 384.         | 1.0          | 1.0      | 757               | 384.00                   |
| 2          | 713.5       | 23.9                       | 30                 | 53    | 83    | 556                       | 253.         | 1.0          | 2.0      | 556               | 253.00                   |
| 3          | 714.5       | 18.6                       | 51                 | 45    | 96    | 736                       | 288.         | 1.0          | 3.0      | 736               | 288.00                   |
| 4          | 715.5       | 17.1                       | 21                 | 36    | 57    | 279                       | Imp.         | 1.0          | 4.0      | 279               | 0.00                     |
| 5          | 716.5       | 17.6                       | 21                 | 42    | 63    | 287                       | 0.89         | 1.0          | 5.0      | 287               | 0.89                     |
| 6          | 717.5       | 22.6                       | 48                 | 31    | 79    | 842                       | 324.         | 1.0          | 6.0      | 842               | 324.00                   |
| 7          | 718.5       | 21.7                       | 43                 | 33    | 76    | 724                       | 192.         | 1.0          | 7.0      | 724               | 192.00                   |
| 8          | 719.5       | 21.5                       | 39                 | 47    | 86    | 651                       | 189.         | 1.0          | 8.0      | 651               | 189.00                   |
| 9          | 720.5       | 21.6                       | 34                 | 51    | 85    | 570                       | 127.         | 1.0          | 9.0      | 570               | 127.00                   |
| 10         | 721.5       | 15.6                       | 9                  | 81    | 90    | 109                       | 0.57         | 1.0          | 10.0     | 109               | 0.57                     |
| 11         | 722.5       | 17.4                       | 43                 | 48    | 91    | 581                       | 4.9          | 1.0          | 11.0     | 581               | 4.90                     |
| 12         | 723.5       | 16.9                       | 40                 | 43    | 83    | 524                       | 28.          | 1.0          | 12.0     | 524               | 28.00                    |
| 13         | 724.5       | 15.6                       | 36                 | 55    | 91    | 436                       | Imp.         | 1.0          | 13.0     | 436               | 0.00                     |
| 14         | 725.5       | 14.4                       | 49                 | 40    | 89    | 547                       | Imp.         | 1.0          | 14.0     | 547               | 0.00                     |
| 15         | 726.5       | 13.7                       | 41                 | 57    | 98    | 436                       | 0.29         | 1.0          | 15.0     | 436               | 0.29                     |
| 16         | 727.5       | 17.6                       | 52                 | 33    | 85    | 710                       | 105.         | 1.0          | 16.0     | 710               | 105.00                   |
| 17         | 728.5       | 18.8                       | 56                 | 31    | 87    | 817                       | 6.1          | 1.0          | 17.0     | 817               | 6.10                     |
| 18         | 729.5       | 17.9                       | 44                 | 51    | 95    | 611                       | Imp.         | 1.0          | 18.0     | 611               | 0.00                     |
| 19         | 730.5       | 18.5                       | 56                 | 41    | 97    | 804                       | 2.1          | 1.0          | 19.0     | 804               | 2.10                     |
| 20         | 731.5       | 19.8                       | 32                 | 61    | 93    | 492                       | 0.24         | 1.0          | 20.0     | 492               | 0.24                     |

**Oilfield Research Laboratories**  
**SUMMARY OF PERMEABILITY & SATURATION TESTS**

**TABLE III**

| Company | Midas International, Inc. | Lease                    | Whitcomb                                | Well No.                              | 1 new |
|---------|---------------------------|--------------------------|-----------------------------------------|---------------------------------------|-------|
|         | Depth Interval,<br>Feet   | Feet of Core<br>Analyzed | Average<br>Permeability,<br>Millidarcys | Permeability<br>Capacity<br>Ft. x Md. |       |
|         | 712.0 - 721.0             | 8.0                      | 219.7                                   | 1757.89                               |       |
|         | 721.0 - 732.0             | 8.0                      | 18.4                                    | 147.20                                |       |
|         | 712.0 - 732.0             | 16.0                     | 119.1                                   | 1905.09                               |       |

|  | Depth Interval,<br>Feet | Feet of Core<br>Analyzed | Average<br>Percent<br>Porosity | Average<br>Percent Oil<br>Saturation | Average<br>Percent Water<br>Saturation | Average<br>Oil Content<br>Bbl./A. Ft. | Total Oil<br>Content<br>Bbbl./Acre |
|--|-------------------------|--------------------------|--------------------------------|--------------------------------------|----------------------------------------|---------------------------------------|------------------------------------|
|  | 712.0 - 721.0           | 9.0                      | 20.8                           | 36.7                                 | 42.8                                   | 600                                   | 5,402                              |
|  | 721.0 - 732.0           | 11.0                     | 16.9                           | 41.6                                 | 49.2                                   | 552                                   | 6,067                              |
|  | 712.0 - 732.0           | 20.0                     | 18.7                           | 39.4                                 | 46.3                                   | 573                                   | 11,469                             |

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## RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

| Midas International, Inc. |             |                            | Lease                   |               | Whitcomb     |               | Well No.            |         | 1 new                         |                                      |                                                |    |
|---------------------------|-------------|----------------------------|-------------------------|---------------|--------------|---------------|---------------------|---------|-------------------------------|--------------------------------------|------------------------------------------------|----|
| 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. |    |
|                           |             |                            | %                       | Bbbls./A. Ft. | %            | Bbbls./A. Ft. | % Oil               | % Water |                               |                                      |                                                |    |
| 1                         | 712.5       | 22.8                       | 43                      | 761           | 7            | 124           | 36                  | 58      | 637                           | 248                                  | 32.24                                          | 10 |
| 2                         | 713.5       | 23.8                       | 30                      | 554           | 2            | 37            | 28                  | 70      | 517                           | 310                                  | 15.49                                          | 10 |
| 3                         | 714.5       | 18.6                       | 51                      | 736           | 12           | 173           | 39                  | 49      | 563                           | 262                                  | 21.29                                          | 10 |
| 4                         | 715.5       | 17.2                       | 21                      | 280           | 0            | 0             | 21                  | 38      | 280                           | 0                                    | Imp.                                           | -  |
| 5                         | 716.5       | 17.1                       | 22                      | 292           | 0            | 0             | 22                  | 43      | 292                           | 0                                    | Imp.                                           | -  |
| 6                         | 717.5       | 23.0                       | 48                      | 856           | 12           | 214           | 36                  | 54      | 642                           | 360                                  | 32.39                                          | 10 |
| 7                         | 718.5       | 21.8                       | 43                      | 727           | 8            | 135           | 35                  | 54      | 592                           | 314                                  | 23.24                                          | 15 |
| 8                         | 719.5       | 21.5                       | 39                      | 651           | 4            | 67            | 35                  | 62      | 584                           | 382                                  | 10.00                                          | 10 |
| 9                         | 720.5       | 21.5                       | 34                      | 567           | 2            | 33            | 32                  | 63      | 534                           | 183                                  | 6.91                                           | 20 |
| 10                        | 721.5       | 15.6                       | 9                       | 109           | 0            | 0             | 9                   | 82      | 109                           | 0                                    | Imp.                                           | -  |
| 11                        | 722.5       | 17.9                       | 42                      | 583           | 0            | 0             | 42                  | 49      | 583                           | 0                                    | Imp.                                           | -  |
| 12                        | 723.5       | 16.9                       | 40                      | 524           | 0            | 0             | 40                  | 56      | 524                           | 151                                  | 2.70                                           | 25 |
| 13                        | 724.5       | 15.2                       | 37                      | 436           | 0            | 0             | 37                  | 56      | 436                           | 0                                    | Imp.                                           | -  |
| 14                        | 725.5       | 14.3                       | 49                      | 544           | 0            | 0             | 49                  | 41      | 544                           | 0                                    | Imp.                                           | -  |
| 15                        | 726.5       | 14.1                       | 40                      | 438           | 0            | 0             | 40                  | 58      | 438                           | 0                                    | Imp.                                           | -  |
| 16                        | 727.5       | 17.7                       | 52                      | 714           | 0            | 0             | 52                  | 35      | 714                           | 0                                    | Imp.                                           | -  |
| 17                        | 728.5       | 18.6                       | 56                      | 808           | 0            | 0             | 56                  | 33      | 808                           | 0                                    | Imp.                                           | -  |
| 18                        | 729.5       | 18.4                       | 43                      | 614           | 0            | 0             | 43                  | 52      | 614                           | 0                                    | Imp.                                           | -  |
| 19                        | 730.5       | 18.0                       | 57                      | 796           | 0            | 0             | 57                  | 40      | 796                           | 0                                    | Imp.                                           | -  |
| 20                        | 731.5       | 19.7                       | 32                      | 489           | 0            | 0             | 32                  | 62      | 489                           | 0                                    | Imp.                                           | -  |

Company Midas International, Inc.

Lease

Whitcomb

Well No. 1 new

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                                           | Midas International, Inc. | Lease | Whitcomb | Well No. | 1 new |
|---------------------------------------------------|---------------------------|-------|----------|----------|-------|
| Depth Interval, Feet                              | 712.0 - 732.0             |       |          |          |       |
| Feet of Core Analyzed                             | 7.0                       |       |          |          |       |
| Average Percent Porosity                          | 21.9                      |       |          |          |       |
| Average Percent Original Oil Saturation           | 41.1                      |       |          |          |       |
| Average Percent Oil Recovery                      | 6.7                       |       |          |          |       |
| Average Percent Residual Oil Saturation           | 34.4                      |       |          |          |       |
| Average Percent Residual Water Saturation         | 58.6                      |       |          |          |       |
| Average Percent Total Residual Fluid Saturation   | 93.0                      |       |          |          |       |
| Average Original Oil Content, Bbls./A. Ft.        | 693.                      |       |          |          |       |
| Average Oil Recovery, Bbls./A. Ft.                | 112.                      |       |          |          |       |
| Average Residual Oil Content, Bbls./A. Ft.        | 581.                      |       |          |          |       |
| Total Original Oil Content, Bbls./Acre            | 4,852.                    |       |          |          |       |
| Total Oil Recovery, Bbls./Acre                    | 783.                      |       |          |          |       |
| Total Residual Oil Content, Bbls./Acre            | 4,069.                    |       |          |          |       |
| Average Effective Permeability, Millidarcys       | 20.22                     |       |          |          |       |
| Average Initial Fluid Production Pressure, p.s.i. | 12.1                      |       |          |          |       |

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