



**REPORT  
of  
SUB-SURFACE  
DIRECTIONAL  
SURVEY**

AMOCO PRODUCTION COMPANY  
COMPANY

SOUTH HOBBS UNIT COOP. WELL NO. 191  
WELL NAME

LEA COUNTY, NEW MEXICO BD2-131  
LOCATION

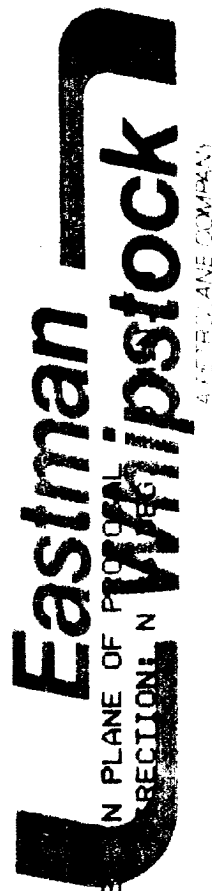
| <u>JOB NUMBER</u> | <u>TYPE OF SURVEY</u>      | <u>DATE</u> |
|-------------------|----------------------------|-------------|
| WT1084-S0070      | MAGNETIC MULTI SHOT SURVEY | 30-OCT-84   |
| WT1084-S0070      | MAGNETIC MULTI SHOT SURVEY | 4-NOV-84    |
| OD-MA-40112       | MAGNETIC MULTI SHOT SURVEY | 7-NOV-84    |

SURVEY BY  
GARY DeSPAIN  
STEVE COVINGTON  
THOMAS P. GALLEY

OFFICE  
WEST TEXAS

AMOCO PRODUCTION COMPANY  
SOUTH HOBBS UNIT COOP. WELL NO. 191  
LEA COUNTY, NEW MEXICO BD2-131  
OCTOBER 30, 1984

|                            |               |
|----------------------------|---------------|
| EASTMAN WHIPSTOCK, INC.    |               |
| MAGNETIC MULTI SHOT SURVEY | WT1084-S0070  |
| SURVEYOR: GARY DESPAIN     | (0-1491')     |
| MAGNETIC MULTI SHOT SURVEY | WT1084-S0070  |
| SURVEYOR: STEVE COVINGTON  | (1491'-3378') |
| SPERRY-SUN                 |               |
| MAGNETIC MULTI SHOT SURVEY | OD-MA-40112   |
| SURVEYOR: THOMAS P. GALLEY | (3378'-4319') |



VERTICAL SECTION CALCULATED IN PLANE OF PRODUCTION  
SECTION: N

RECORD OF SURVEY

RADIUS OF CURVATURE METHOD

AMOCO PRODUCTION COMPANY  
SOUTH HOBBS UNIT COOP. WELL NO. 191  
LEA COUNTY, NEW MEXICO BD2-131

COMPUTATION PAGE NO. 1  
TIME DATE  
16:46:43 14-NOV-84

| MEASURED<br>DEPTH<br>FEET | DRIFT<br>ANGLE<br>D M | DRIFT<br>DIRECTION<br>D | COURSE<br>LENGTH<br>FEET | TRUE<br>VERTICAL<br>DEPTH<br>FEET | VERTICAL<br>SECTION<br>FEET | R E C T A N G U L A R |         | DOGLEG<br>SEVERITY<br>DG/100FT |
|---------------------------|-----------------------|-------------------------|--------------------------|-----------------------------------|-----------------------------|-----------------------|---------|--------------------------------|
|                           |                       |                         |                          |                                   |                             | C O O R D I N A T E S | FEET    |                                |
| 0.                        | 0 0                   | 0                       | 0.                       | 0.00                              | 0.00                        | 0.00                  | 0.00    | 0.00                           |
| 85.                       | 1 15                  | N 56 E                  | 85.                      | 84.99                             | -0.73                       | 0.52 N                | 0.77 E  | 1.47                           |
| 116.                      | 1 0                   | N 27 E                  | 31.                      | 115.99                            | -1.10                       | 0.97 N                | 1.17 E  | 1.98                           |
| 207.                      | 1 0                   | N 25 E                  | 91.                      | 206.97                            | -1.69                       | 2.40 N                | 1.86 E  | 0.04                           |
| 299.                      | 1 0                   | N 33 E                  | 92.                      | 298.96                            | -2.37                       | 3.80 N                | 2.64 E  | 0.15                           |
| 391.                      | 1 0                   | N 24 E                  | 92.                      | 390.95                            | -3.04                       | 5.21 N                | 3.41 E  | 0.17                           |
| 482.                      | 0 30                  | N 40 E                  | 91.                      | 481.94                            | -3.59                       | 6.22 N                | 4.04 E  | 0.59                           |
| 574.                      | 0 30                  | N 84 E                  | 92.                      | 573.93                            | -4.26                       | 6.58 N                | 4.73 E  | 0.41                           |
| 666.                      | 0 30                  | S 80 E                  | 92.                      | 665.93                            | -5.06                       | 6.56 N                | 5.53 E  | 0.15                           |
| 757.                      | 1 0                   | S 89 E                  | 91.                      | 756.92                            | -6.24                       | 6.44 N                | 6.71 E  | 0.56                           |
| 849.                      | 1 0                   | S 53                    | 92.                      | 848.91                            | -9.05                       | 8.93 N                | 8.20 E  | 0.67                           |
| 941.                      | 1 15                  | S 30                    | 92.                      | 940.99                            | -9.05                       | 8.58 N                | 9.39 E  | 0.56                           |
| 1033.                     | 1 0                   | S 9                     | 92.                      | 1032.99                           | -9.05                       | 8.89 N                | 9.99 E  | 0.52                           |
| 1124.                     | 1 0                   | S 2 W                   | 91.                      | 1123.99                           | -9.05                       | 1.31 N                | 10.09 E | 0.21                           |
| 1216.                     | 1 0                   | S 16 W                  | 92.                      | 1215.84                           | -9.83                       | 0.28 S                | 9.84 E  | 0.26                           |
| 1308.                     | 1 0                   | S 18 W                  | 92.                      | 1307.83                           | -9.47                       | 1.81 S                | 9.37 E  | 0.04                           |
| 1399.                     | 1 0                   | S 30 W                  | 91.                      | 1398.82                           | -8.93                       | 3.26 S                | 8.73 E  | 0.23                           |
| 1491.                     | 1 15                  | S 41 W                  | 92.                      | 1490.80                           | -7.99                       | 4.73 S                | 7.68 E  | 0.36                           |
| 1538.                     | 0 30                  | S 42 W                  | 47.                      | 1537.79                           | -7.55                       | 5.27 S                | 7.20 E  | 1.60                           |
| 1631.                     | 0 15                  | S 22 E                  | 93.                      | 1630.79                           | -7.49                       | 5.84 S                | 7.10 E  | 0.48                           |
| 1724.                     | 0 30                  | S 2 E                   | 93.                      | 1723.79                           | -7.66                       | 6.43 S                | 7.23 E  | 0.30                           |
| 1817.                     | 0 45                  | S 42 E                  | 93.                      | 1816.78                           | -8.09                       | 7.35 S                | 7.60 E  | 0.52                           |
| 1910.                     | 1 15                  | S 72 E                  | 93.                      | 1909.77                           | -9.50                       | 8.22 S                | 8.95 E  | 0.76                           |
| 2003.                     | 1 15                  | S 85 E                  | 93.                      | 2002.75                           | -11.50                      | 8.63 S                | 10.93 E | 0.30                           |
| 2096.                     | 1 30                  | N 65 E                  | 93.                      | 2095.72                           | -13.64                      | 8.24 S                | 13.10 E | 0.81                           |
| 2189.                     | 1 45                  | N 56 E                  | 93.                      | 2188.68                           | -15.84                      | 6.95 S                | 15.39 E | 0.38                           |
| 2282.                     | 2 15                  | N 59 E                  | 93.                      | 2281.63                           | -18.45                      | 5.20 S                | 18.13 E | 0.55                           |
| 2375.                     | 3 0                   | N 56 E                  | 93.                      | 2374.53                           | -21.87                      | 2.91 S                | 21.72 E | 0.82                           |
| 2468.                     | 3 15                  | N 60 E                  | 93.                      | 2467.39                           | -25.98                      | 0.23 S                | 26.02 E | 0.36                           |
| 2561.                     | 3 0                   | N 56 E                  | 93.                      | 2560.25                           | -30.08                      | 2.46 N                | 30.32 E | 0.36                           |

IMOCO PRODUCTION COMPANY  
SOUTH HOBBS UNIT COOP. WELL NO. 191  
EA COUNTY, NEW MEXICO BD2-131

COMPUTATION PAGE NO. 2  
TIME DATE  
16:46:43 14-NOV-84

| MEASURED<br>DEPTH<br>FEET | DRIFT<br>ANGLE<br>D M | DRIFT<br>DIRECTION<br>D | COURSE<br>LENGTH<br>FEET | TRUE<br>VERTICAL<br>DEPTH<br>FEET | VERTICAL<br>SECTION<br>FEET | RECTANGULAR<br>COORDINATES<br>FEET | DOGLEG<br>SEVERITY<br>DG/100FT |
|---------------------------|-----------------------|-------------------------|--------------------------|-----------------------------------|-----------------------------|------------------------------------|--------------------------------|
| 2654.                     | 2 45                  | N 55 E                  | 93.                      | 2653.13                           | -33.73                      | 5.10 N 34.17 E                     | 0.27                           |
| 2747.                     | 2 30                  | N 50 E                  | 93.                      | 2746.04                           | -36.92                      | 7.69 N 37.55 E                     | 0.36                           |
| 2840.                     | 1 45                  | N 33 E                  | 93.                      | 2838.97                           | -39.01                      | 10.27 N 39.82 E                    | 1.05                           |
| 2933.                     | 4 45                  | N 25 W                  | 93.                      | 2931.81                           | -39.01                      | 15.30 N 40.18 E                    | 4.41                           |
| 3026.                     | 4 15                  | S 73 W                  | 93.                      | 3024.52                           | -32.72                      | 18.03 N 34.06 E                    | 6.36                           |
| 3119.                     | 4 45                  | S 68 W                  | 93.                      | 3117.24                           | -26.03                      | 15.59 N 27.19 E                    | 0.68                           |
| 3212.                     | 5 45                  | S 71 W                  | 93.                      | 3209.85                           | -18.29                      | 12.61 N 19.22 E                    | 1.11                           |
| 3305.                     | 5 30                  | S 71 W                  | 93.                      | 3302.40                           | -9.90                       | 9.64 N 10.60 E                     | 0.27                           |
| 3337.                     | 5 30                  | S 72 W                  | 32.                      | 3334.25                           | -7.07                       | 8.67 N 7.69 E                      | 0.30                           |
| 3378.                     | 5 45                  | S 71 W                  | 3375.05                  | 3375.05                           | -3.35                       | 7.39 N 3.88 E                      | 0.65                           |
| 3456.                     | 6 0                   | S 76 W                  | 78.                      | 3456.11                           | -12.12                      | 5.13 N 3.77 W                      | 0.73                           |
| 3548.                     | 6 20                  | S 78 W                  | 72.                      | 3548.11                           | -13.37                      | 2.90 N 13.40 W                     | 0.43                           |
| 3641.                     | 7 0                   | S 79 W                  | 93.                      | 3636.48                           | -23.98                      | 0.75 N 23.98 W                     | 0.73                           |
| 3734.                     | 7 55                  | N 81 W                  | 93.                      | 3728.69                           | 35.94                       | 0.54 N 35.99 W                     | 2.94                           |
| 3827.                     | 9 50                  | N 81 W                  | 93.                      | 3820.58                           | 50.24                       | 2.79 N 50.16 W                     | 2.06                           |
| 3920.                     | 10 45                 | N 82 W                  | 93.                      | 3912.08                           | 66.80                       | 5.24 N 66.60 W                     | 1.00                           |
| 4012.                     | 12 0                  | N 83 W                  | 92.                      | 4002.27                           | 84.91                       | 7.61 N 84.59 W                     | 1.38                           |
| 4105.                     | 13 0                  | N 83 W                  | 93.                      | 4093.06                           | 105.01                      | 10.06 N 104.56 W                   | 1.08                           |
| 4198.                     | 14 45                 | N 82 W                  | 93.                      | 4183.35                           | 127.27                      | 12.97 N 126.67 W                   | 1.90                           |
| 4229.                     | 15 0                  | N 81 W                  | 31.                      | 4213.31                           | 135.20                      | 14.15 N 134.54 W                   | 1.16                           |
| 4260.                     | 15 55                 | N 82 W                  | 31.                      | 4243.19                           | 143.44                      | 15.37 N 142.72 W                   | 3.08                           |
| 4301.                     | 16 20                 | N 82 W                  | 41.                      | 4282.57                           | 154.80                      | 16.96 N 153.99 W                   | 1.02                           |
| 4319.                     | 16 20                 | N 82 W                  | 18.                      | 4299.85                           | 159.85                      | 17.66 N 159.00 W                   | 0.00                           |

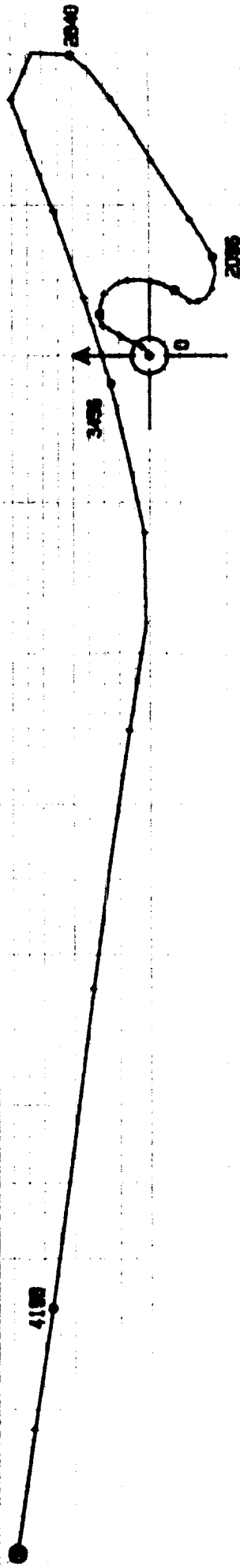
FINAL CLOSURE - DIRECTION: N 83 DEGS 40 MINS W  
DISTANCE: 159.98 FEET

ARCO PRODUCTION COMPANY  
 SOUTH HOBBS UNIT CAMP: WELL NO. 191  
 LEA COUNTY, NEW MEXICO BOX-191

HORIZONTAL PROJECTION  
 SCALE 1 IN. = 20 FEET  
 DEPTH INDICATOR: MD

ERSTWEN WILPSTOCK, INC.

FINAL STATION:  
 DEPTH 4319 MD. 4288.84 TVD  
 NORTH 17.66 WEST 158.00  
 CLOSURE 159.98 N 83 39 43 W





P.O. Box 6341/Midland, Texas 79711-0341/(915) 563-0511

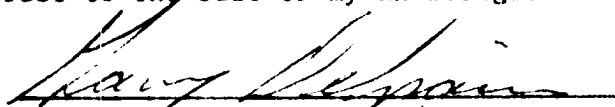
SURVEY CERTIFICATION SHEET

STATE OF TEXAS  
COUNTY OF MIDLAND

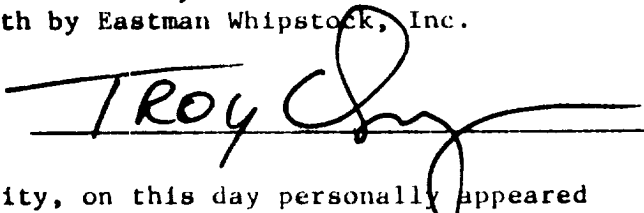
I, Gary DeSpain, in the employ of Eastman Whipstock, Inc., did on the days of October 29, 19 84 thru October 30, 19 84 conduct or supervise the taking of a Magnetic Multi Shot survey by the method of magnetic orientation from a depth of 0 feet to 1491 feet, with recordings of inclination and direction being obtained at approximate intervals of 92 feet.

This survey was conducted at the request of Amoco Production Company for their South Hobbs Unit Coop. Well #191 Lea County, State of New Mexico, in the \_\_\_\_\_ field.

This data for this survey and the calculation were obtained and performed by me according to standards and procedures as set forth by Eastman Whipstock, Inc. and is true and correct to the best of my knowledge.

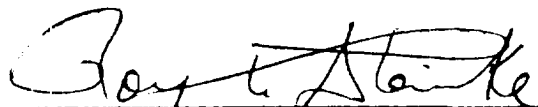
  
Directional Supervisor/Surveyor

The data for this survey has been examined by me and confirms to principles and procedures set forth by Eastman Whipstock, Inc.



Before me, the undersigned authority, on this day personally appeared Gary DeSpain, known to me to be the person whose name is subscribed to this instrument, who after being by me duly sworn on oath, states that he has knowledge of all the facts stated above and that this information is a true statement of facts therein recited.

Subscribed and sworn to before me on this 15<sup>TH</sup> day of NOV., 19 84.

  
Notary Public in and for the  
County of Midland, Texas



ROY L. STEINKE  
Notary Public, State of Texas  
My Commission Expires July 8, 1985



P.O. Box 6341/Midland, Texas 79711-0341/(915) 563-0511

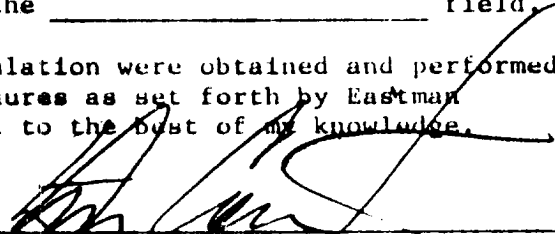
# SURVEY CERTIFICATION SHEET

STATE OF TEXAS  
COUNTY OF MIDLAND

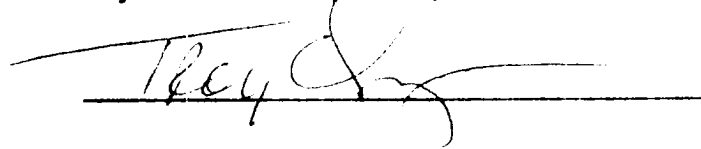
I, STEVE COVINGTON, in the employ of Eastman Whipstock, Inc., did on the days of NOVEMBER 4, 1984 thru NOVEMBER 4, 1984 conduct or supervise the taking of a MAGNETIC MULTI-SHOT survey by the method of magnetic orientation from a depth of 1491 feet to 3378 feet, with recordings of inclination and direction being obtained at approximate intervals of 93 feet.

This survey was conducted at the request of AMOCO PRODUCTION COMPANY for their SOUTH HOBBS UNIT COOP. #191, LEA County, State of NEW MEXICO, in the \_\_\_\_\_ field.


This data for this survey and the calculation were obtained and performed by me according to standards and procedures as set forth by Eastman Whipstock, Inc. and is true and correct to the best of my knowledge.

  
\_\_\_\_\_  
Directional Supervisor/Surveyor

The data for this survey has been examined by me and confirms to principles and procedures set forth by Eastman Whipstock, Inc.

  
\_\_\_\_\_  
Before me, the undersigned authority, on this day personally appeared STEVE COVINGTON, known to me to be the person whose name is subscribed to this instrument, who after being by me duly sworn on oath, states that he has knowledge of all the facts stated above and that this information is a true statement of facts therein recited.

Subscribed and sworn to before me on this 15<sup>th</sup> day of NOV, 1984.

  
\_\_\_\_\_  
Notary Public in and for the  
County of Midland, Texas



ROY L. STEINKE  
Notary Public, State of Texas  
My Commission Expires July 9, 1985

Notary Public in and for Midland Cty, TX