SUB-SURFACE DIRECTIONAL SURVEY REPORT

AMOCO PRODUCTION COMPANY
COMPANY

SHU #146
WELL NAME

LEA COUNTY, NEW MEXICO
STATE AND COUNTY

CERTIFIED REPORT

USTOMER :AMOCO PRODUCTION COMPANY

ELL # :SHU NO. 146

OCATION :LEA COUNTY, NEW MEXICO

ATE :11-23-83,11-25-83,(EW)11-29-83

OB TYPE :MMS, MMS, (EW)MMS

OB # :MS-1327,MS-1332,(EW)S0166

URVEYOR :A.HARBERT,R. RICE,(EW)G. DESPAIN

EPTHS :0'-1503',1503'-3441',3441'-4261'

ECL. :10 DEGREES EAST

LEV. :0'

ILE # :WT-F9S

ETHOD :RADIUS OF CURVATURE

ECTION :N58.24E

THIS SURVEY IS CORRECT TO THE BEST OF MY KNOWLEDGE AND IS SUPPORTED BY ACTUAL FIELD DATA.

Larry Massey

DIG REPRESENTATIVE

INAL STATION DATA!

MEASURED DEPTH FEET	INCL. ANGLE DEGS.	HOLE DIRECTION DEGS.	COURSE LENGTH FEET	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES N/S feet E/W	CLOSURE DISTANCE FEET	CLOSURE DIRECTION DEGS.	DOG-LEG SEVERITY DG/100FT
4261.00	4.75	N 60.00 E	62.00	4257.06	126.79	70.02 N 105.78 E	126.85	at N 56.49 E	.40

EASURED DEPTH FEET	INCL. ANGLE DEGS.	HOLE DIRECTION DEGS.	COURSE LENGTH FEET	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES N/S feet E/W	CLOSURE DISTANCE FEET	CLOSURE DIRECTION DEGS.	DOG-LEG SEVERITY DG/100FT
0.00	0.00	N 00.00 E	0.00	0.00	0.00	0.00 N 0.00 E	0.00at	N 00.00 E	0.00
81.00	0.00	N 00.00 E	81.00	81.00	0.00	0.00 N 0.00 E	0.00at	N 00.00 E	0.00
142.00	0.00	N 00.00 E	61.00	142.00	0.00	0.00 N 0.00 E	0.00at	N 00.00 E	0.00
204.00	.50	N 44.00 W	62.00	204.00	-.06	.19 N .19 W	.27at	N 44.00 W	.81
266.00	.50	N 21.00 E	62.00	266.00	.12	.70 N .29 W	.75at	N 22.60 W	.87
328.00	.50	N 14.00 E	62.00	327.99	.53	1.21 N .13 W	1.22at	N 06.00 W	.10
390.00	1.00	N 10.00 W	62.00	389.99	.98	2.02 N .10 W	2.02at	N 02.82 W	.94
452.00	.75	N 58.00 E	62.00	451.98	1.72	2.83 N .26 E	2.84at	N 05.31 E	1.61
513.00	.75	N 38.00 E	61.00	512.98	2.50	3.36 N .85 E	3.47at	N 14.24 E	.43
575.00	.50	N 35.00 E	62.00	574.97	3.12	3.91 N 1.26 E	4.10at	N 17.81 E	.41
637.00	.50	N 09.00 E	62.00	636.97	3.56	4.41 N 1.46 E	4.64at	N 18.30 E	.36
699.00	.25	N 13.00 E	62.00	698.97	3.83	4.80 N 1.53 E	5.04at	N 17.71 E	.41
761.00	0.00	N 00.00 E	62.00	760.97	3.93	4.94 N 1.56 E	5.18at	N 17.59 E	.40
823.00	0.00	N 00.00 E	62.00	822.97	3.93	4.94 N 1.56 E	5.18at	N 17.59 E	0.00
885.00	.25	N 40.00 E	62.00	884.97	4.06	5.04 N 1.65 E	5.30at	N 18.15 E	.40
946.00	.75	N 14.00 E	61.00	945.97	4.51	5.51 N 1.89 E	5.82at	N 18.94 E	.88
1008.00	.75	N 39.00 E	62.00	1007.96	5.19	6.23 N 2.25 E	6.62at	N 19.86 E	.52
1070.00	1.00	N 36.00 E	62.00	1069.95	6.08	6.98 N 2.83 E	7.53at	N 22.04 E	.41
1132.00	1.00	N 26.00 E	62.00	1131.94	7.04	7.91 N 3.38 E	8.60at	N 23.16 E	.28
1194.00	.75	N 50.00 E	62.00	1193.94	7.92	8.65 N 3.96 E	9.51at	N 24.61 E	.71
1256.00	1.00	N 50.00 E	62.00	1255.93	8.86	9.20 N 4.73 E	10.35at	N 27.10 E	.45
1317.00	.50	N 22.00 E	61.00	1316.92	9.61	9.81 N 5.23 E	11.11at	N 28.08 E	1.09
1379.00	.75	N 57.00 E	62.00	1378.92	10.24	10.32 N 5.66 E	11.77at	N 28.72 E	.72
1441.00	1.00	N 83.00 E	62.00	1440.91	11.16	10.64 N 6.54 E	12.49at	N 31.56 E	.75
1503.00	1.00	S 72.00 E	62.00	1502.90	12.01	10.54 N 7.61 E	13.00at	N 35.82 E	.70

(0'-1503' RESULT OF DIG SURVEY MS-1327)

(1503'-3441' RESULT OF DIG SURVEY MS-1332)

MEASURED DEPTH FEET	INCL. ANGLE DEGS.	HOLE DIRECTION DEGS.	COURSE LENGTH FEET	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES N/S feet	E/W	CLOSURE DISTANCE FEET	DIRECTION DEGS.	DOG-LEG SEVERITY DG/100FT
1579.00	.75	S 78.00 E	76.00	1578.89	12.81	10.24 N	8.73 E	13.45at	N 40.44 E	.35
1641.00	.75	S 66.00 E	62.00	1640.89	13.33	9.99 N	9.50 E	13.78at	N 43.56 E	.25
1703.00	.50	S 78.00 E	62.00	1702.89	13.77	9.78 N	10.14 E	14.09at	N 46.03 E	.45
1765.00	.75	S 82.00 E	62.00	1764.88	14.27	9.66 N	10.81 E	14.49at	N 48.20 E	.41
1827.00	.25	N 90.00 E	62.00	1826.88	14.71	9.62 N	11.34 E	14.88at	N 49.69 E	.81
1889.00	.50	S 68.00 E	62.00	1888.88	15.01	9.55 N	11.74 E	15.13at	N 50.88 E	.46
1951.00	.25	S 71.00 E	62.00	1950.88	15.26	9.40 N	12.12 E	15.34at	N 52.19 E	.40
2013.00	.75	S 87.00 E	62.00	2012.87	15.65	9.30 N	12.65 E	15.70at	N 53.67 E	.83
2075.00	.50	N 62.00 E	62.00	2074.87	16.28	9.45 N	13.30 E	16.31at	N 54.62 E	.66
2137.00	1.00	N 65.00 E	62.00	2136.86	17.09	9.81 N	14.03 E	17.12at	N 55.04 E	.81
2200.00	1.50	N 65.00 E	63.00	2199.85	18.46	10.39 N	15.27 E	18.47at	N 55.77 E	.79
2262.00	1.75	N 62.00 E	62.00	2261.82	20.21	11.17 N	16.85 E	20.22at	N 56.44 E	.43
2324.00	2.00	N 60.00 E	62.00	2323.79	22.23	12.16 N	18.62 E	22.24at	N 56.86 E	.42
2386.00	2.50	N 61.00 E	62.00	2385.74	24.66	13.36 N	20.74 E	24.67at	N 57.22 E	.81
2448.00	2.25	N 64.00 E	62.00	2447.69	27.23	14.54 N	23.02 E	27.23at	N 57.71 E	.45
2510.00	2.25	N 65.00 E	62.00	2509.64	29.65	15.59 N	25.22 E	29.65at	N 58.27 E	.06
2572.00	2.75	N 63.00 E	62.00	2571.58	32.34	16.77 N	27.65 E	32.34at	N 58.75 E	.82
2634.00	2.75	N 65.00 E	62.00	2633.51	35.30	18.08 N	30.32 E	35.30at	N 59.19 E	.15
2696.00	2.25	N 56.00 E	62.00	2695.45	38.00	19.41 N	32.67 E	38.00at	N 59.28 E	1.02
2758.00	2.00	N 59.00 E	62.00	2757.41	40.29	20.64 N	34.61 E	40.30at	N 59.18 E	.44
2820.00	1.75	N 59.00 E	62.00	2819.38	42.32	21.69 N	36.35 E	42.33at	N 59.17 E	.40
2882.00	1.75	N 51.00 E	62.00	2881.35	44.21	22.77 N	37.90 E	44.21at	N 58.99 E	.39
2944.00	1.50	N 47.00 E	62.00	2943.32	45.95	23.93 N	39.22 E	45.95at	N 58.61 E	.44
3006.00	1.50	N 44.00 E	62.00	3005.30	47.53	25.06 N	40.38 E	47.53at	N 58.17 E	.13
3069.00	1.50	N 36.00 E	63.00	3068.28	49.09	26.33 N	41.44 E	49.10at	N 57.57 E	.33

MEASURED DEPTH FEET	INCL. ANGLE DEGS.	HOLE DIRECTION DEGS.	COURSE LENGTH FEET	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES N/S feet	E/W	CLOSURE DISTANCE FEET	DIRECTION DEGS.	DOG-LEG SEVERITY DG/100FT
3131.00	1.25	N 34.00 E	62.00	3130.26	50.46	27.55 N	42.29 E	50.47at	N 56.92 E	.41
3193.00	1.25	N 28.00 E	62.00	3192.25	51.66	28.70 N	42.99 E	51.69at	N 56.26 E	.21
3255.00	1.25	N 29.00 E	62.00	3254.23	52.84	29.89 N	43.64 E	52.89at	N 55.58 E	.04
3317.00	1.50	N 27.00 E	62.00	3316.21	54.12	31.21 N	44.33 E	54.22at	N 54.85 E	.41
3379.00	1.25	N 26.00 E	62.00	3378.20	55.39	32.54 N	45.00 E	55.53at	N 54.12 E	.41
3441.00	1.25	N 20.00 E	62.00	3440.18	56.49	33.78 N	45.53 E	56.69at	N 53.42 E	.21
(1503'-3441' RESULT OF DIG SURVEY MS-1332)										
(3441'-4261' RESULT OF EASTMAN WHIPSTOCK SURVEY S0166)										
3512.00	5.00	N 58.00 E	71.00	3511.06	60.08	36.73 N	47.92 E	60.38at	N 52.52 E	5.76
3575.00	6.00	N 60.00 E	63.00	3573.77	66.12	39.84 N	53.09 E	66.38at	N 53.11 E	1.62
3637.00	5.75	N 62.00 E	62.00	3635.45	72.45	42.92 N	58.64 E	72.67at	N 53.79 E	.52
3699.00	5.50	N 58.00 E	62.00	3697.15	78.53	45.96 N	63.91 E	78.72at	N 54.27 E	.75
3762.00	5.00	N 62.00 E	63.00	3759.88	84.29	48.84 N	68.90 E	84.45at	N 54.66 E	.98
3824.00	5.25	N 63.00 E	62.00	3821.64	89.81	51.40 N	73.81 E	89.94at	N 55.14 E	.43
3887.00	5.00	N 58.00 E	63.00	3884.38	95.43	54.17 N	78.71 E	95.54at	N 55.46 E	.81
3949.00	5.00	N 60.00 E	62.00	3946.15	100.84	56.95 N	83.34 E	100.94at	N 55.65 E	.28
4011.00	5.00	N 59.00 E	62.00	4007.91	106.24	59.69 N	87.99 E	106.33at	N 55.84 E	.14
4074.00	4.75	N 58.00 E	63.00	4070.68	111.59	62.49 N	92.56 E	111.68at	N 55.97 E	.42
4136.00	4.75	N 61.00 E	62.00	4132.47	116.72	65.10 N	96.98 E	116.80at	N 56.12 E	.40
4199.00	4.50	N 61.00 E	63.00	4195.27	121.80	67.56 N	101.42 E	121.87at	N 56.33 E	.40
(3441'-4261' RESULT OF EASTMAN WHIPSTOCK SURVEY S0166)										
4261.00	4.75	N 60.00 E	62.00	4257.06	126.79	70.02 N	105.78 E	126.85at	N 56.49 E	.42

CLOSURE DISTANCE = 126.85 FEET.
CLOSURE DIRECTION = N 56.50 E

AMOCO PRODUCTION COMPANY

WELL # :
SHU NO. 146

LOCATION :
LEA COUNTY, NEW MEXICO

DATE :
11-23-83, 11-25-83, (EW) 11-20-83

JOB TYPE :
MMS, MMS, (EW) MMS

JOB # :
MS-1327, MS-1332, (EW) S0166

SURVEYOR :
A. HARBERT, R. RICE, (EW) G. DESPAIN

DEPTHS :
0'-1503', 1503'-3441', 3441'-4261'

DECL. :
10 DEGREES EAST

ELEV. :
0'

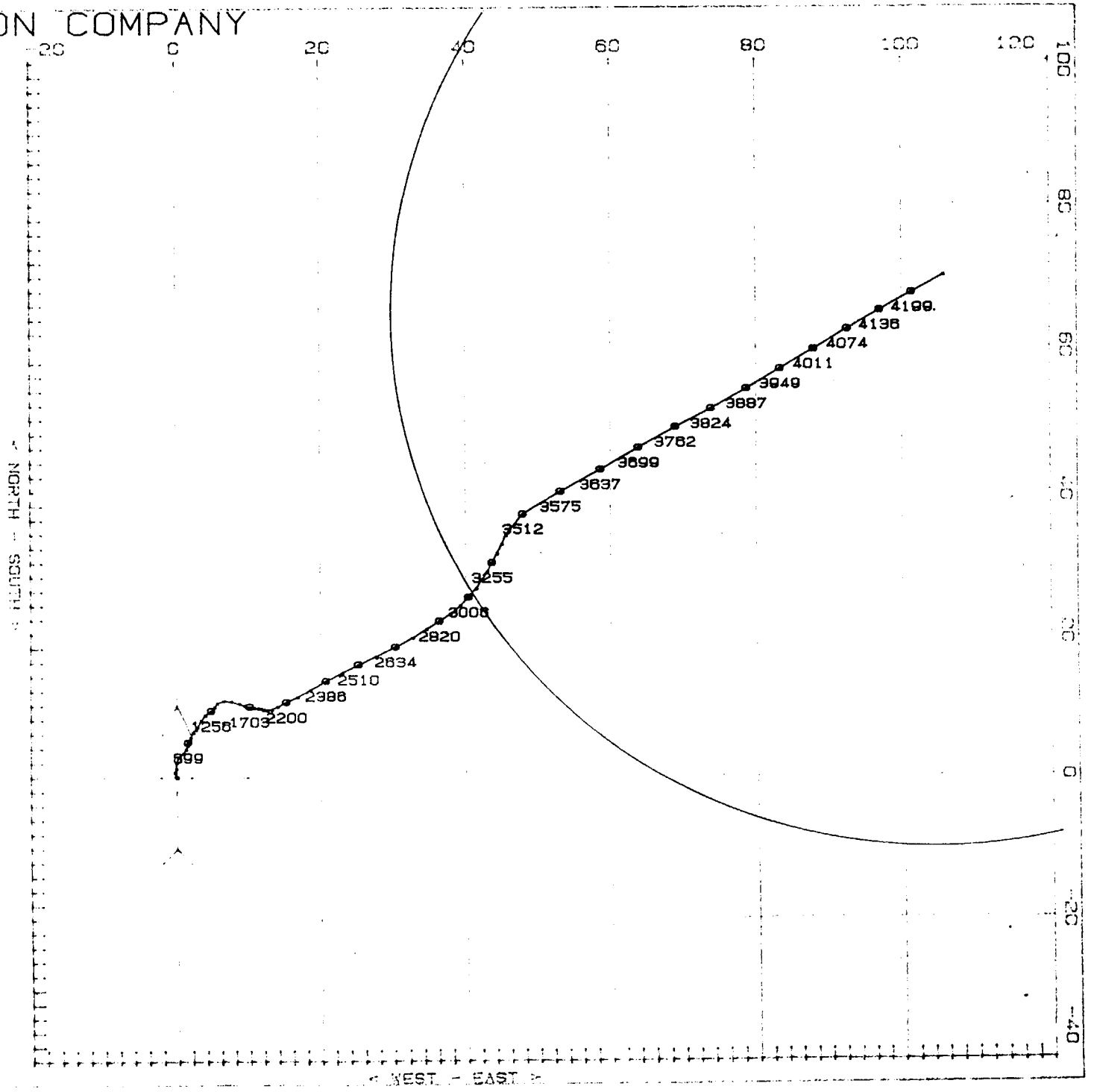
FILE # :
WT-F9S

****
FINAL STATION DATA:

MD.	4261.00
TVD.	4257.06
N/S	70.02
E/W	105.78

CLOSURE DISTANCE
126.85 FEET
CLOSURE DIRECTION
N 56.50 E

1 IN. = 20 FT.



DIRECTIONAL INVESTMENT GUIDANCE, INC.

SURVEY CERTIFICATION

STATE TEXAS

COUNTY OF MIDLAND

I, D. A. HARBERT, in the employ of D.I.G., Inc., did on the days of 11-23, 1983 through 11-23, 1983 conduct or supervise the taking of a MAGNETIC MULTISHOT survey by the method of magnetic orientation from a depth of 0 feet to 1503 feet, with recordings of inclination being obtained at approximately intervals of 62 feet.

This survey was conducted at the request of AMOCO PRODUCTION COMPANY for their SHU #146, LEA County, State of NEW MEXICO in the SOUTH HOBBS field.

The data for this survey were obtained by me according to standards and procedures as set forth by D.I.G., Inc., and is true and correct to the best of my knowledge.

D. A. HARBERT

The data for this survey has been examined by me and conforms to the principles and procedures as set forth by D.I.G., Inc.

Larry Massey

LARRY MASSEY

DIRECTIONAL INVESTMENT GUIDANCE, INC. DIG

SURVEY CERTIFICATION

STATE TEXAS

COUNTY OF MIDLAND

I, RALPH RICE, in the employ of D.I.G., Inc., did on the days of 11-25, 19 83 through 11-25, 19 83 conduct or supervise the taking of a MAGNETIC MULTISHOT survey by the method of magnetic orientation from a depth of 1503 feet to 3441 feet, with recordings of inclination being obtained at approximately intervals of 62 feet.

This survey was conducted at the request of AMOCO PRODUCTION COMPANY for their SHU #146, LEA County, State of NEW MEXICO in the SOUTH HOBBS field.

The data for this survey were obtained by me according to standards and procedures as set forth by D.I.G., Inc., and is true and correct to the best of my knowledge.

Ralph Rice

RALPH RICE

The data for this survey has been examined by me and conforms to the principles and procedures as set forth by D.I.G., Inc.

Larry Massey

LARRY MASSEY

Eastman Whipstock
A PETROLANE COMPANY
P. O. Box 5577/Midland, Texas 79704/(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 November 29, 19 83 thru November 29, 1983 conduct or supervise the taking of a Magnetic Multi Shot survey by the method of magnetic orientation from a depth of 3441' feet to 4261' feet, with recordings of inclination and direction being obtained at approximate intervals of 62' feet.

This survey was conducted at the request of Amoco Production Company for their South Hobbs Unit Well No. 146 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.

Gary DeSpain
Directional Supervisor/ Surveyor

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

Tim Stephens

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 instrument is a true statement of facts therein recited.

Subscribed and sworn to before me on this 30TH day of NOV, 19 83

Gay L. Steinke
Notary Public in and for the
County of Midland, Texas
My commission expires 7/9/85

NOTARY PUBLIC, STATE OF TEXAS AND FOR MIDLAND COUNTY