

Eastman Whipstock

REPORT of SUB-SURFACE DIRECTIONAL SURVEY

GRACE PETROLEUM CORPORATION
COMPANY

FELMONT FEDERAL WELL NO. 2
WELL NAME

LEA COUNTY, NEW MEXICO
LOCATION

JOB NUMBER

WT-879 G-2066
WT-879 S-2060
WT-1279 S-0836

TYPE OF SURVEY

Gyroscopic Multi Shot
Magnetic Multi Shot
Magnetic Multi Shot

DATE

8-26-79
8-26-79
12-23-79

SURVEY BY

Larry Massey
Tim Stephens
Mike Teaff

OFFICE

West Texas

GRACE PETROLEUM CORPORATION
FELMONT FEDERAL WELL NO. 2
LEA COUNTY, NEW MEXICO

EASTMAN WHIPSTOCK, INC.

GYROSCOPIC MULTI SHOT

SURVEYOR: LARRY MASSSEY

MAGNETIC MULTI SHOT

SURVEYOR: TIM STEPHENS

WT-879 6-2066

8-26-79

WT-879 9-2060

8-26-79

MAGNETIC MULTIPLE SHOT SURVEY WT1279-S0836

SURVEYOR: MIKE TEAFF

PLANE OF PROPOSED DIRECTION IS N 80 DEG. 8 MIN. W

RECORD OF SURVEY

RADIUS OF CURVATURE METHOD

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	R E C T A N G U L A R C O O R D I N A T E S FEET	DOG LEG SEVERITY DEG/100FT
0.	0 0	0	0.00	0.00	0.00	0.0
100.	0 30	S 44 E	100.00	-0.35	0.31 S	0.5
200.	0 15	S 2 E	200.00	-0.70	0.90 S	0.4
300.	0 0	0	300.00	-0.74	1.12 S	0.2
400.	0 30	S 50 E	399.99	-1.12	1.40 S	0.5
500.	1 15	S 29 E	499.98	-2.27	2.57 S	0.8
600.	1 30	S 25 E	599.95	-3.71	4.71 S	0.3
700.	1 15	S 23 E	699.92	-5.05	6.90 S	0.3
800.	1 15	S 28 E	799.90	-6.31	8.87 S	0.1
900.	1 15	S 32 E	899.88	-7.71	10.76 S	0.1
1000.	1 15	S 29 E	999.85	-9.12	12.64 S	0.1
1100.	1 15	S 18 E	1099.83	-10.32	14.63 S	0.2
1200.	1 15	S 13 E	1199.80	-11.26	16.74 S	0.1
1300.	1 0	S 24 E	1299.79	-12.19	18.59 S	0.3
1400.	0 45	S 49 E	1399.77	-13.28	19.81 S	0.5
1500.	0 30	S 78 E	1499.77	-14.32	20.29 S	0.4
1600.	0 45	S 66 E	1599.76	-15.39	20.63 S	0.3
1700.	0 45	S 68 E	1699.75	-16.67	21.14 S	0.0
1800.	0 30	S 85 E	1799.75	-17.75	21.39 S	0.3
1900.	0 15	S 37 E	1899.74	-18.35	21.70 S	0.4
2000.	0 15	N 77 E	1999.74	-18.76	21.84 S	0.3
2100.	0 30	N 49 E	2099.74	-19.28	21.55 S	0.3
2200.	0 30	N 51 E	2199.74	-19.84	20.99 S	0.0
2300.	1 0	N 72 E	2299.73	-20.86	20.36 S	0.6
2400.	0 45	N 80 E	2399.71	-22.26	20.00 S	0.3
2500.	0 45	N 72 E	2499.71	-23.45	19.68 S	0.1
2600.	0 45	N 68 E	2599.70	-24.59	19.23 S	0.1
2700.	1 0	N 57 E	2699.68	-25.80	18.53 S	0.3
2800.	1 0	N 48 E	2799.67	-26.98	17.47 S	0.2
2900.	1 0	N 54 E	2899.65	-28.13	16.37 S	0.1

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	R E C T A N G U L A R C O O R D I N A T E S FEET	D O G L E G S E V E R I T Y D E G / 1 0 0 F T
3000.	1 0	N 78 E	2999.64	-29.57	15.66 S 27.29 E	0.4
3100.	0 45	N 77 E	3099.63	-30.98	15.33 S 28.78 E	0.3
3200.	0 45	N 33 E	3199.62	-31.88	14.60 S 29.82 E	0.6
3300.	1 0	N 33 E	3299.60	-32.48	13.32 S 30.65 E	0.3
3400.	1 0	N 48 E	3399.59	-33.37	12.00 S 31.78 E	0.3
3500.	1 0	N 50 E	3499.57	-34.47	10.85 S 33.10 E	0.0
3600.	0 30	N 38 E	3599.56	-35.20	9.91 S 34.01 E	0.5
3700.	0 30	N 21 E	3699.56	-35.50	9.15 S 34.44 E	0.1
3800.	0 30	N 24 E	3799.56	-35.69	8.35 S 34.77 E	0.0
3900.	1 0	N 44 E	3899.55	-36.22	7.27 S 35.50 E	0.6
4000.	0 45	N 65 E	3999.53	-37.29	6.39 S 36.73 E	0.4
4100.	0 30	N 67 E	4099.53	-38.19	5.94 S 37.73 E	0.3
4200.	0 45	N 39 E	4199.52	-38.93	5.29 S 38.59 E	0.4
4300.	0 45	N 36 E	4299.51	-39.54	4.25 S 39.39 E	0.0
4400.	0 45	N 47 E	4399.50	-40.22	3.28 S 40.26 E	0.1
4500.	0 30	N 60 E	4499.50	-40.97	2.63 S 41.13 E	0.3
4600.	0 30	N 30 E	4599.49	-41.47	2.02 S 41.74 E	0.3
4700.	0 45	N 16 E	4699.49	-41.72	1.02 S 42.17 E	0.3
4800.	0 30	N 23 E	4799.48	-41.90	0.01 N 42.53 E	0.3
4900.	0 45	N 51 E	4899.47	-42.39	0.87 N 43.18 E	0.4
5000.	0 30	N 27 E	4999.47	-42.92	1.71 N 43.86 E	0.4
5100.	0 30	N 12 E	5099.46	-43.06	2.53 N 44.15 E	0.1
5200.	0 15	N 19 E	5199.46	-43.13	3.16 N 44.32 E	0.3
5227.	0 45	N 4 W	5226.46	-43.12	3.40 N 44.36 E	2.0
5321.	1 0	N 5 W	5320.45	-42.76	4.83 N 44.24 E	0.3
5415.	1 15	N 15 W	5414.43	-42.13	6.64 N 43.92 E	0.3
5509.	1 0	N 16 W	5508.41	-41.34	8.42 N 43.43 E	0.3
5603.	1 0	N 12 W	5602.39	-40.68	10.01 N 43.03 E	0.1
5697.	1 15	N 2 E	5696.38	-40.21	11.85 N 42.87 E	0.4
5791.	1 0	N 14 W	5790.36	-39.70	13.68 N 42.68 E	0.4

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	R E C T A N G U L A R C O O R D I N A T E S F E E T	D O G S E V E R I T Y D E G / 1 0 0 F T	L E G
5865.	0 45	N 14 W	5884.34	-39.12	15.07 N 42.33 E	0.3	0.3
5980.	0 45	N 49 W	5979.34	-38.31	16.11 N 41.69 E	0.5	0.5
6034.	3 30	N 47 W	6033.29	-36.62	17.45 N 40.20 E	5.1	5.1
6126.	5 30	N 73 W	6125.00	-29.90	21.03 N 34.01 E	3.1	3.1
6219.	7 30	N 79 W	6217.40	-19.41	23.58 N 23.80 E	2.3	2.3
6312.	9 15	N 82 W	6309.41	-5.86	25.81 N 10.44 E	1.9	1.9
6405.	10 0	N 83 W	6401.09	9.67	27.84 N 4.98 W	0.8	0.8
6497.	10 30	N 84 W	6491.63	26.02	29.70 N 21.24 W	0.6	0.6
6590.	11 15	N 85 W	6582.96	43.51	31.38 N 38.71 W	0.8	0.8
6683.	13 30	S 89 W	6673.79	63.24	32.07 N 58.61 W	2.8	2.8
6776.	14 0	S 88 W	6764.12	84.92	31.49 N 80.71 W	0.6	0.6
6868.	15 0	S 86 W	6853.19	107.37	30.29 N 103.71 W	1.2	1.2
6961.	15 45	S 86 W	6942.86	131.31	28.57 N 128.31 W	0.8	0.8
7054.	17 0	S 82 W	7032.09	156.52	25.83 N 154.38 W	1.8	1.8
7147.	18 15	S 78 W	7120.72	183.00	20.94 N 182.11 W	1.9	1.9
7239.	17 45	S 86 W	7208.21	210.04	16.99 N 210.24 W	2.7	2.7
7332.	17 30	N 84 W	7296.85	237.82	17.48 N 238.35 W	3.3	3.3
7425.	19 45	N 85 W	7384.97	267.43	20.32 N 267.91 W	2.4	2.4
7518.	22 0	N 81 W	7471.86	300.52	24.36 N 300.80 W	2.9	2.9
7610.	21 30	N 82 W	7557.31	334.61	29.40 N 334.52 W	0.7	0.7
7703.	22 0	N 79 W	7643.69	369.06	35.09 N 368.50 W	1.3	1.3
7796.	23 0	N 79 W	7729.61	404.64	41.88 N 403.44 W	1.1	1.1
7889.	23 45	N 80 W	7814.97	441.54	48.60 N 439.72 W	0.9	0.9
7981.	24 45	N 79 W	7898.86	479.32	55.49 N 476.87 W	1.2	1.2
8074.	25 45	N 80 W	7982.97	518.99	62.72 N 515.88 W	1.2	1.2
8167.	26 15	N 80 W	8066.56	559.76	69.80 N 556.03 W	0.5	0.5
8260.	27 0	N 80 W	8149.69	601.44	77.03 N 597.07 W	0.8	0.8
8352.	27 30	N 80 W	8231.48	643.56	84.35 N 638.56 W	0.5	0.5
8445.	28 0	N 81 W	8313.79	686.86	91.49 N 681.26 W	0.7	0.7
8538.	27 30	N 82 W	8396.09	730.15	97.89 N 724.09 W	0.7	0.7

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	R E C T A N G U L A R C O O R D I N A T E S FEET	DOG LEG SEVERITY DEG/100FT
8631.	26 0	N 81 W	8479.13	772.00	104.08 N 765.49 W	1.7
8723.	24 45	N 82 W	8562.25	811.42	109.91 N 804.48 W	1.4
8816.	23 0	N 84 W	8647.29	849.01	114.50 N 841.84 W	2.1
8909.	22 0	N 85 W	8733.21	884.49	117.91 N 877.26 W	1.2
9002.	22 45	N 86 W	8819.20	919.74	120.68 N 912.56 W	0.9
9094.	23 30	N 86 W	8903.81	955.68	123.20 N 948.60 W	0.8
9187.	24 0	N 88 W	8988.93	992.87	125.16 N 986.01 W	1.0
9280.	24 30	N 88 W	9073.73	1030.71	126.50 N 1024.18 W	0.5
9373.	25 0	N 89 W	9158.18	1069.22	127.52 N 1063.10 W	0.7
9465.	26 0	N 89 W	9241.22	1108.36	128.21 N 1102.70 W	1.1
9558.	27 0	S 89 W	9324.45	1149.24	128.21 N 1144.19 W	1.4
9651.	27 0	S 89 W	9407.31	1190.70	127.47 N 1186.41 W	0.0
9744.	28 30	N 89 W	9489.61	1233.36	127.47 N 1229.71 W	1.9
9836.	26 45	N 83 W	9571.12	1275.78	130.44 N 1272.24 W	3.6
9929.	27 0	N 82 W	9654.07	1317.78	135.93 N 1313.92 W	0.6
10022.	27 15	N 77 W	9736.84	1360.17	143.66 N 1355.60 W	2.5
10115.	24 0	N 74 W	9820.68	1400.25	153.72 N 1394.53 W	3.8
10207.	22 0	N 71 W	9905.37	1435.87	164.53 N 1428.81 W	2.5
10300.	19 30	N 70 W	9992.32	1468.35	175.53 N 1459.87 W	2.7
10393.	18 15	N 71 W	10080.32	1498.01	185.57 N 1488.23 W	1.4
10486.	19 45	N 74 W	10168.25	1528.02	194.67 N 1517.10 W	1.9
10578.	21 0	N 76 W	10254.49	1559.92	202.96 N 1548.04 W	1.6
10671.	21 30	N 77 W	10341.17	1593.56	210.83 N 1580.81 W	0.7
10764.	21 0	N 77 W	10427.84	1627.21	218.42 N 1613.65 W	0.5
10857.	20 0	N 76 W	10514.95	1659.71	226.02 N 1645.32 W	1.1
10949.	20 45	N 77 W	10601.20	1691.68	233.50 N 1676.46 W	0.9
11042.	22 0	N 78 W	10687.79	1725.54	240.83 N 1709.56 W	1.4
11135.	22 45	N 79 W	10773.79	1760.93	247.89 N 1744.25 W	0.9
11228.	23 30	N 80 W	10859.32	1797.45	254.55 N 1780.16 W	0.9
11320.	24 30	N 81 W	10943.36	1834.86	260.72 N 1817.06 W	1.2

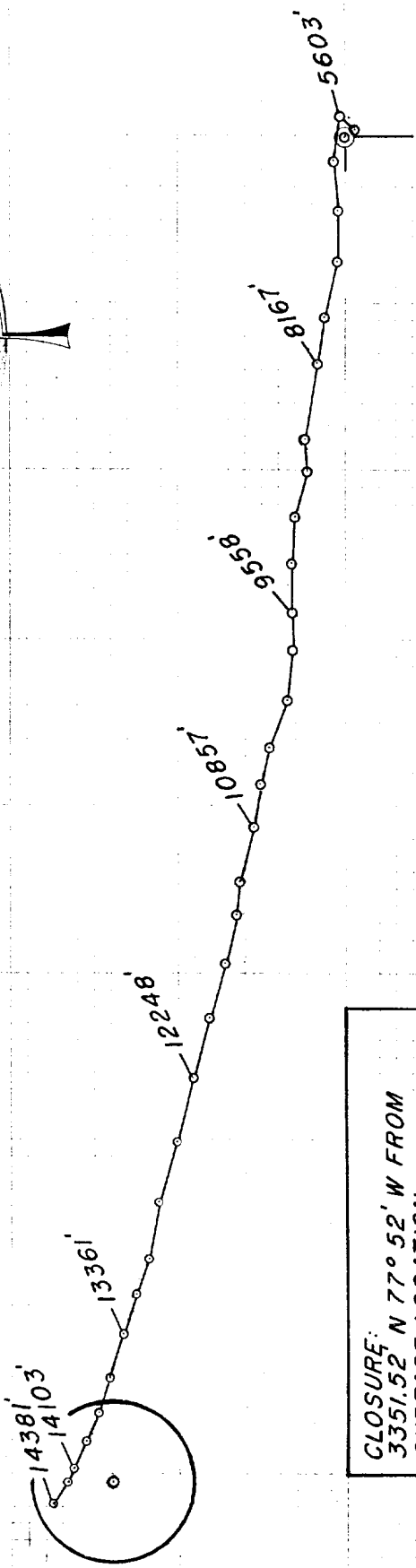
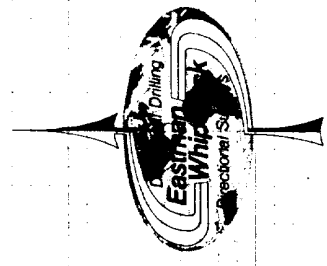
MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	R E C T A N G U L A R C O O R D I N A T E S FEET	DOG LEG SEVERITY DEG/100FT
11413.	25 0	N 82 W	11027.82	1873.79	266.48 N 1855.57 W	0.7
11506.	25 30	N 83 W	11111.93	1913.43	271.65 N 1894.91 W	0.7
11599.	26 0	N 78 W	11195.70	1953.82	278.32 N 1934.74 W	2.4
11691.	28 0	N 74 W	11277.66	1995.47	288.42 N 1975.26 W	2.9
11784.	28 45	N 75 W	11359.49	2039.45	300.23 N 2017.85 W	1.0
11877.	30 0	N 76 W	11440.53	2084.92	311.65 N 2062.02 W	1.4
11970.	31 15	N 76 W	11520.55	2132.17	323.11 N 2107.98 W	1.3
12062.	32 0	N 75 W	11598.89	2180.25	335.19 N 2154.69 W	1.0
12155.	33 0	N 74 W	11677.32	2229.98	348.55 N 2202.84 W	1.2
12248.	33 30	N 74 W	11755.10	2280.68	362.60 N 2251.85 W	0.5
12341.	34 0	N 75 W	11832.42	2332.10	376.41 N 2301.65 W	0.8
12433.	34 15	N 75 W	11908.58	2383.51	389.77 N 2351.50 W	0.3
12526.	35 0	N 74 W	11985.11	2436.10	403.89 N 2402.42 W	1.0
12619.	35 0	N 74 W	12061.29	2489.13	418.59 N 2453.70 W	0.0
12712.	35 30	N 76 W	12137.24	2542.59	432.48 N 2505.54 W	1.4
12804.	36 15	N 75 W	12211.78	2596.33	445.98 N 2557.74 W	1.0
12897.	36 15	N 75 W	12286.78	2651.10	460.22 N 2610.86 W	0.0
12990.	36 0	N 75 W	12361.90	2705.71	474.41 N 2663.82 W	0.3
13083.	35 30	N 75 W	12437.37	2759.83	488.47 N 2716.30 W	0.5
13175.	36 0	N 74 W	12512.04	2813.32	502.83 N 2768.10 W	0.8
13268.	36 0	N 74 W	12587.28	2867.67	517.90 N 2820.65 W	0.0
13361.	35 45	N 74 W	12662.63	2921.86	532.92 N 2873.04 W	0.3
13454.	34 45	N 73 W	12738.58	2975.17	548.17 N 2924.50 W	1.2
13546.	32 0	N 72 W	12815.40	3025.33	563.38 N 2972.76 W	3.0
13639.	28 0	N 70 W	12895.92	3071.23	578.52 N 3016.72 W	4.4
13732.	25 15	N 69 W	12979.05	3112.19	593.11 N 3055.75 W	3.0
13825.	24 15	N 68 W	13063.50	3150.32	607.38 N 3091.98 W	1.2
13917.	23 15	N 66 W	13147.71	3186.40	621.86 N 3126.08 W	1.4
14010.	23 0	N 65 W	13233.24	3221.74	637.00 N 3159.32 W	0.5
14103.	21 30	N 64 W	13319.31	3255.65	652.16 N 3191.10 W	1.7

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	R E C T A N G U L A R C O O R D I N A T E S FEET	DOG LEG SEVERITY DEG/100FT
14196.	21 15	N 60 W	13405.91	3287.86	668.07 N 3221.02 W	1.6
14288.	21 0	N 57 W	13491.72	3318.67	685.40 N 3249.29 W	1.2
14381.	20 45	N 55 W	13578.62	3348.91	703.93 N 3276.76 W	0.8

FINAL CLOSURE - DIRECTION: N 77 DEGS 52 MINS 33 SECS W
 DISTANCE: 3351.52 FEET

GRACE PETROLEUM CORPORATION
FELMONT FEDERAL WELL NO.2
LEA COUNTY, NEW MEXICO

SCALE: 1" = 400'



CLOSURE:
3351.52' N 77° 52' W FROM
SURFACE LOCATION
NORTH 703.93' WEST 3276.76'
1438' MD 13578.62' TVD



P. O. Box 5577/Midland, Texas 79701/(915) 563-0511
TWX 910-881-5066/Cable: EASTCO

SURVEY CERTIFICATION SHEET

STATE OF TEXAS
COUNTY OF MIDLAND

I, Larry Massey, in the employ of Eastman Whipstock, Inc., did on the days of August 26, 19 79 thru August 26, 19 79 conduct or supervise the taking of a Gyroscopic Multi Shot survey by the method of magnetic orientation from a depth of 0 feet to 5227 feet, with recordings of inclination and direction being obtained at approximate intervals of 100 feet.

This survey was conducted at the request of Grace Petroleum Corporation for their Felmont Federal Well No.2, Lea County, State of New Mexico, in the _____ field.

The data for this survey and the calculations 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.

Larry Massey
Directional Supervisor/Surveyor

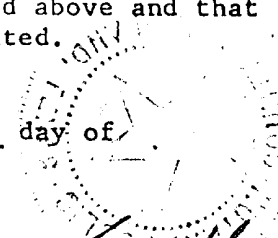
The data for this survey has been examined by me and conforms to principles and procedures set forth by Eastman Whipstock, Inc.

Mike Zeff

Before me, the undersigned authority, on this day personally appeared Larry Massey, 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 4th day of January, 19 80.

Anna M. Smith
Notary Public in and for the County of Midland, Texas
My commission expires 5-24-80





P. O. Box 5577/Midland, Texas 79701/(915) 563-0511
TWX 910-881-5066/Cable: EASTCO

SURVEY CERTIFICATION SHEET

STATE OF TEXAS
COUNTY OF MIDLAND

I, Tim Stephens, in the employ of Eastman Whipstock, Inc., did on the days of August 26, 19 79 thru August 26, 19 79 conduct or supervise the taking of a Magnetic Multi Shot survey by the method of magnetic orientation from a depth of 5227 feet to 5980 feet, with recordings of inclination and direction being obtained at approximate intervals of 94 feet.

This survey was conducted at the request of Grace Petroleum Corporation for their Felmont Federal Well No. 2, Lea County, State of New Mexico, in the _____ field.

The data for this survey and the calculations 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.

Tim Stephens
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.

Larry Massey

Before me, the undersigned authority, on this day personally appeared Tim Stephens, 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 4th day of January, 19 80.

Anna M. Smith
Notary Public in and for the County of
Midland, Texas
My commission expires 5-24-80



P. O. Box 5577/Midland, Texas 79701/(915) 563-0511
TWX 910-881-5066/Cable: EASTCO

SURVEY CERTIFICATION SHEET

STATE OF TEXAS
COUNTY OF MIDLAND

I, Mike Teaff, in the employ of Eastman Whipstock, Inc., did on the days of December 23, 19 79 thru December 23, 19 79 conduct or supervise the taking of a Magnetic Multi Shot survey by the method of magnetic orientation from a depth of 5980 feet to 14381 feet, with recordings of inclination and direction being obtained at approximate intervals of 93 feet.

This survey was conducted at the request of Grace Petroleum Corporation for their Felmont Federal Well No.2, Lea County, State of New Mexico, in the _____ field.

The data for this survey and the calculations 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.

Mike Teaff
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.

Larry Massey

Before me, the undersigned authority, on this day personally appeared Mike Teaff, 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 4th day of January, 19 80.

Anna M. Smith
Notary Public in and for the County of Midland, Texas
My commission expires 5-24-80