



**REPORT
of
SUB-SURFACE
DIRECTIONAL
SURVEY**

SANTA FE ENERGY COMPANY
COMPANY

BILBREY 22 FED. COM WELL NO. 1
WELL NAME

EDDY COUNTY, NEW MEXICO
LOCATION

JOB NUMBER
430-1194
430-1194

TYPE OF SURVEY
GYROSCOPIC MULTI-SHOT SURVEY
MAGNETIC MULTI-SHOT SURVEY

DATE
01/AUG/90
02/AUG/90

SURVEY BY TIM STEPHENS

OFFICE MIDLAND

FOR

[illegible]

EC DISTRICT : WEST TEXAS BASE

SANTA FE ENERGY COMPANY
BILBREY 22 FED. COM 1
EDDY COUNTY, NEW MEXICO

DECLINATION : 10.00 JOB NUMBER :
DATE PRINTED : 02-AUG-90
OUR REF. NO. : S01415.4SF

PAGE NO. 2

MEASURED DEPTH	DRIFT ANGLE D M	DRIFT DIRECTION D M	COURSE LENGTH	TRUE VERTICAL DEPTH	R E C T A N G U L A R C O O R D I N A T E S	DOOLEG SEVERITY
0.00	0 0	N 0 0 E	0.00	0.00	0.00 N 0.00 E	0.00
100.00	0 15	S 44 9 E	100.00	100.00	0.16 S 0.15 E	0.25
200.00	0 30	N 88 40 E	100.00	200.00	0.30 S 0.74 E	0.38
300.00	0 15	S 78 25 E	100.00	300.00	0.34 S 1.39 E	0.
400.00	0 15	S 64 31 E	100.00	399.99	0.47 S 1.80 E	0.06
500.00	0 30	S 32 37 E	100.00	499.99	0.94 S 2.23 E	0.32
600.00	0 30	S 38 42 E	100.00	599.99	1.64 S 2.74 E	0.05
700.00	1 15	N 64 12 E	100.00	699.98	1.51 S 4.00 E	1.24
800.00	1 30	N 65 6 E	100.00	799.95	0.48 S 6.16 E	0.25
900.00	1 30	N 67 1 E	100.00	899.92	0.53 N 8.56 E	0.05
1000.00	1 15	N 70 1 E	100.00	999.89	1.46 N 10.79 E	0.26
1100.00	0 45	N 47 2 E	100.00	1099.87	2.28 N 12.29 E	0.63
1200.00	0 30	N 33 2 E	100.00	1199.87	3.09 N 13.01 E	0.29
1300.00	0 0	N 33 2 E	100.00	1299.86	3.46 N 13.25 E	0.50
1400.00	0 30	N 43 3 E	100.00	1399.86	3.78 N 13.54 E	0.50
1500.00	0 15	S 59 56 E	100.00	1499.86	3.99 N 14.03 E	0.51
1600.00	0 45	S 44 56 E	100.00	1599.86	3.41 N 14.68 E	0.51
1700.00	0 45	S 41 56 E	100.00	1699.85	2.46 N 15.58 E	0.
1800.00	0 45	S 44 53 E	100.00	1799.84	1.51 N 16.48 E	0.04
1900.00	1 0	S 45 53 E	100.00	1899.83	0.44 N 17.57 E	0.25
2000.00	0 45	S 72 52 E	100.00	1999.82	0.36 S 18.82 E	0.48
2100.00	1 0	S 68 52 E	100.00	2099.81	0.87 S 20.26 E	0.26
2200.00	0 45	S 52 51 E	100.00	2199.79	1.58 S 21.59 E	0.35
2300.00	0 45	S 50 51 E	100.00	2299.79	2.38 S 22.62 E	0.03
2400.00	0 45	S 74 51 E	100.00	2399.78	2.97 S 23.76 E	0.31
2500.00	1 15	N 88 10 E	100.00	2499.76	3.10 S 25.49 E	0.58
2600.00	1 30	N 67 15 E	100.00	2599.73	2.56 S 27.78 E	0.56
2700.00	2 15	N 69 24 E	100.00	2699.68	1.37 S 30.83 E	0.75
2800.00	2 30	N 66 34 E	100.00	2799.59	0.19 N 34.67 E	0.28
2900.00	2 45	N 65 44 E	100.00	2899.49	2.05 N 34.67 E	0.25



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MEASURED DEPTH	DRIFT ANGLE D M	DRIFT DIRECTION D M	COURSE LENGTH	TRUE VERTICAL DEPTH	R E C T A N G U L A R C O O R D I N A T E S	DOGLEG SEVERITY
3000.00	3 0	N 66 54 E	100.00	2999.36	4.06 N 43.45 E	0.26
3100.00	3 0	N 71 4 E	100.00	3099.23	5.93 N 48.33 E	0.22
3200.00	3 0	N 69 14 E	100.00	3199.09	7.71 N 53.25 E	0.10
3300.00	2 45	N 74 14 E	100.00	3298.96	9.29 N 58.01 E	0.
3400.00	2 30	N 67 24 E	100.00	3398.86	10.78 N 62.33 E	0.40
3500.00	1 45	N 69 35 E	100.00	3498.79	12.15 N 65.77 E	0.75
3600.00	1 30	N 65 45 E	100.00	3598.75	13.22 N 68.40 E	0.27
3700.00	2 0	N 59 55 E	100.00	3698.70	14.63 N 71.10 E	0.53
3800.00	1 45	N 57 5 E	100.00	3798.65	16.34 N 73.89 E	0.27
3900.00	1 30	N 48 15 E	100.00	3898.61	18.04 N 76.15 E	0.35
4000.00	1 45	N 34 25 E	100.00	3998.57	20.17 N 77.99 E	0.46
4100.00	2 0	N 48 35 E	100.00	4098.51	22.59 N 80.16 E	0.52
4200.00	1 45	N 47 41 E	100.00	4198.46	24.77 N 82.60 E	0.25
4300.00	1 45	N 45 44 E	100.00	4298.41	26.86 N 84.82 E	0.06
4400.00	1 30	N 67 0 E	100.00	4398.37	28.44 N 87.12 E	0.65
4500.00	2 0	N 51 0 E	100.00	4498.33	30.05 N 89.68 E	0.69
4600.00	3 0	N 64 0 E	100.00	4598.23	32.29 N 93.39 E	1.14
4700.00	2 45	N 59 0 E	100.00	4698.11	34.68 N 97.80 E	0.
4800.00	2 30	N 53 0 E	100.00	4798.00	37.22 N 101.60 E	0.37
4900.00	2 15	N 56 0 E	100.00	4897.92	39.64 N 104.96 E	0.28
5000.00	1 45	N 66 0 E	100.00	4997.85	41.35 N 107.99 E	0.61
5100.00	1 30	N 55 0 E	100.00	5097.81	42.73 N 110.45 E	0.40
5200.00	1 15	N 65 0 E	100.00	5197.79	43.94 N 112.51 E	0.35
5300.00	1 45	N 57 0 E	100.00	5297.75	45.23 N 114.78 E	0.54
5400.00	1 30	N 52 0 E	100.00	5397.71	46.87 N 117.10 E	0.29
5500.00	1 15	N 54 0 E	100.00	5497.68	48.31 N 119.01 E	0.25
5600.00	1 15	N 59 0 E	100.00	5597.66	49.52 N 120.83 E	0.11
5700.00	1 0	N 67 0 E	100.00	5697.64	50.42 N 122.57 E	0.29
5800.00	0 30	N 43 0 E	100.00	5797.63	51.08 N 123.67 E	0.58
5900.00	1 0	N 58 0 E	100.00	5897.62	51.84 N 125.53 E	0.53



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MEASURED DEPTH	DRIFT ANGLE D M	DRIFT DIRECTION D M	COURSE LENGTH	TRUE VERTICAL DEPTH	R E C T A N G U L A R C O O R D I N A T E S	DOGLEG SEVERITY
6000.00	0 45	N 64 O E	100.00	5997.61	52.61 N 126.03 E	0.27
6100.00	1 0	N 32 O E	100.00	6097.60	53.64 N 127.08 E	0.54
6200.00	1 0	N 43 O E	100.00	6197.58	55.02 N 128.14 E	0.19
6300.00	0 45	N 29 O E	100.00	6297.57	56.23 N 129.05 E	0.
6400.00	0 30	N 38 O E	100.00	6397.57	57.14 N 129.64 E	0.27
6500.00	0 30	N 15 O E	100.00	6497.56	57.91 N 130.02 E	0.20
6600.00	0 30	N 11 O E	100.00	6597.56	58.76 N 130.22 E	0.03
6700.00	0 30	N 16 O E	100.00	6697.55	59.61 N 130.42 E	0.04
6800.00	0 45	N 5 O E	100.00	6797.55	60.68 N 130.60 E	0.28
6900.00	0 30	N 20 O W	100.00	6897.54	61.74 N 130.51 E	0.36
7000.00	0 30	N 44 O W	100.00	6997.54	62.46 N 130.05 E	0.21
7100.00	0 15	N 40 O W	100.00	7097.54	62.94 N 129.61 E	0.25
7200.00	0 15	S 39 O W	100.00	7197.54	62.94 N 129.33 E	0.39
7300.00	0 30	N 72 O W	100.00	7297.53	62.91 N 128.78 E	0.47
7400.00	0 30	N 78 O W	100.00	7397.53	63.13 N 127.94 E	0.05
7500.00	0 30	N 64 O W	100.00	7497.53	63.41 N 127.12 E	0.12
7600.00	0 45	S 74 O W	100.00	7597.52	63.43 N 126.10 E	0.51
7700.00	0 30	S 45 O W	100.00	7697.51	62.94 N 125.16 E	0.
7800.00	0 45	S 42 O W	100.00	7797.51	62.14 N 124.41 E	0.25
7900.00	0 30	S 50 O W	100.00	7897.50	61.37 N 123.64 E	0.26
8000.00	0 30	S 70 O W	100.00	7997.50	60.94 N 122.90 E	0.17
8100.00	0 45	S 51 O W	100.00	8097.49	60.38 N 121.98 E	0.32
8200.00	0 45	S 51 O W	100.00	8197.48	59.56 N 120.96 E	0.00
8300.00	1 0	S 55 O W	100.00	8297.47	58.65 N 119.74 E	0.26
8400.00	0 45	S 34 O W	100.00	8397.46	57.60 N 118.66 E	0.40
8500.00	0 30	S 5 O W	100.00	8497.46	56.63 N 118.25 E	0.40
8600.00	0 30	S 22 O W	100.00	8597.45	55.79 N 118.05 E	0.15
8700.00	0 45	S 41 O W	100.00	8697.45	54.89 N 117.46 E	0.32
8800.00	0 45	S 36 O W	100.00	8797.44	53.87 N 116.64 E	0.07
8900.00	0 45	S 46 O W	100.00	8897.43	52.88 N 115.64 E	0.13



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MEASURED DEPTH	DRIFT ANGLE D M	DRIFT DIRECTION D M	COURSE LENGTH	TRUE VERTICAL DEPTH	R E C T A N G U L A R C O O R D I N A T E S	DOGLEG SEVERITY
9000.00	0 30	S 74 O W	100.00	8997.42	52.31 N 114.90 E	0.39
9100.00	1 30	N 52 O W	100.00	9097.41	52.99 N 113.45 E	1.27
9200.00	1 15	N 70 O W	100.00	9197.38	54.17 N 111.39 E	0.50
9300.00	1 15	N 50 O W	100.00	9297.36	55.25 N 109.53 E	0.
9400.00	1 0	N 32 O W	100.00	9397.34	56.69 N 108.23 E	0.43
9500.00	0 45	N 88 O W	100.00	9497.33	57.45 N 107.12 E	0.85
9600.00	1 0	S 45 O W	100.00	9597.32	56.86 N 105.85 E	0.73
9700.00	1 30	S 46 O W	100.00	9697.29	55.33 N 104.29 E	0.50
9800.00	1 45	S 28 O W	100.00	9797.25	53.07 N 102.63 E	0.57
9900.00	1 45	S 34 O W	100.00	9897.20	50.46 N 101.06 E	0.18
10000.00	1 30	S 31 O W	100.00	9997.16	48.07 N 99.53 E	0.26
10100.00	1 30	S 39 O W	100.00	10097.13	45.93 N 98.03 E	0.21
10200.00	1 30	S 59 O W	100.00	10197.10	44.24 N 96.09 E	0.52
10300.00	1 45	S 71 O W	100.00	10297.06	43.07 N 93.52 E	0.42
10400.00	1 30	S 69 O W	100.00	10397.02	42.10 N 90.86 E	0.26
10500.00	1 15	S 48 O W	100.00	10496.99	40.90 N 88.82 E	0.56
10600.00	1 15	S 67 O W	100.00	10596.96	39.75 N 87.01 E	0.21
10700.00	1 15	S 66 O W	100.00	10696.94	38.88 N 85.01 E	0.
10800.00	0 45	S 82 O W	100.00	10796.93	38.34 N 83.36 E	0.57
10900.00	0 45	S 64 O W	100.00	10896.92	37.96 N 82.13 E	0.23
11000.00	0 15	S 60 O W	100.00	10996.91	37.57 N 81.35 E	0.50
11100.00	1 0	N 46 O E	100.00	11096.91	38.07 N 81.79 E	1.24
11200.00	1 15	S 52 O E	100.00	11196.90	38.00 N 83.28 E	1.49
11300.00	1 0	S 25 O E	100.00	11296.88	36.54 N 84.50 E	0.58
11400.00	1 15	S 4 O E	100.00	11396.86	34.66 N 84.95 E	0.48
11500.00	1 30	S 1 O E	100.00	11496.83	32.26 N 85.05 E	0.26
11600.00	1 15	S 17 O E	100.00	11596.80	29.91 N 85.39 E	0.46
11700.00	1 0	S 21 O E	100.00	11696.78	28.05 N 86.02 E	0.26
11800.00	0 45	S 11 O W	100.00	11796.77	26.60 N 86.21 E	0.54
11900.00	0 45	S 61 O W	100.00	11896.76	25.64 N 86.43 E	0.63



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MEASURED DEPTH	DRIFT ANGLE D M	DRIFT DIRECTION D M	COURSE LENGTH	TRUE VERTICAL DEPTH	R E C T A N G U L A R C O O R D I N A T E S	DOGLEG SEVERITY
12000.00	0 45	S 54 0 W	100.00	11996.75	24.93 N 84.41 E	0.09
12100.00	0 30	N 85 0 W	100.00	12096.75	24.59 N 83.45 E	0.50

CLOSURE - DISTANCE : 86.99
DIRECTION : N 73 35 E

REPORT UNITS : Feet
SURVEY CALCULATION METHOD : Minimum curvature

Accepted by :
Checked by :

SURVEY RUN INFORMATION

=====

GYROSCOPIC MULTI-SHOT SURVEY 430-1194
SURVEYOR: TIM STEPHENS (0'-4300')
MAGNETIC MULTI-SHOT SURVEY 430-1194
SURVEYOR: TIM STEPHENS (4300'-12100')



2103 Market, Midland, Texas 79703, Phone: (915) 694-9517

SURVEY CERTIFICATION SHEET

STATE OF TEXAS
COUNTY OF MIDLAND

I, TIM STEPHENS, in the employ of Eastman Christensen, Inc. did on the days of AUGUST 1, 19 90 thru AUGUST 1, 1990 conduct or supervise the taking of a GYROSCOPIC MULTI-SHOT survey by the method of magnetic orientation from a depth of 0 feet to 4300 feet, with recordings of inclination and direction being obtained at approximate intervals of 100 feet.

This survey was conducted at the request of SANTA FE ENERGY COMPANY for their BILBREY 22 FED. COM 1, EDDY 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 Christensen, 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 Christensen, Inc.

Before me, the undersigned authority, on this day personally appeared _____, 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 _____ day of _____, 19____

Notary Public in and for the
County of Midland, Texas
My commission expires _____



2103 Market, Midland, Texas 79703, Phone: (915) 694-9517

SURVEY CERTIFICATION SHEET

STATE OF TEXAS
COUNTY OF MIDLAND

I, TIM STEPHENS, in the employ of Eastman Christensen, Inc. did on the days of AUGUST 2, 1990 thru AUGUST 2, 19 90 conduct or supervise the taking of a MAGNETIC MULTI-SHOT survey by the method of magnetic orientation from a depth of 4300 feet to 12100 feet, with recordings of inclination and direction being obtained at approximate intervals of 100 feet.

This survey was conducted at the request of SANTA FE ENERGY COMPANY for their BILBREY 22 FED COM 1, EDDY 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 Christensen, Inc. and is true and correct to the best of my knowledge.

Tin Stephens
Directional Supervisor/Surveyor

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

Before me, the undersigned authority, on this day personally appeared _____, 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 _____ day of _____, 19____

Notary Public in and for the
County of Midland, Texas
My commission expires _____