



**REPORT  
of  
SUB-SURFACE  
DIRECTIONAL  
SURVEY**

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DEC 22 1986

O. C. D.  
ARTESIA, OFFICE

SANTA FE ENERGY COMPANY  
COMPANY

H.B. STATE NO. 1  
WELL NAME

2-24-29

EDDY COUNTY, NEW MEXICO  
LOCATION

JOB NUMBER

TYPE OF SURVEY

DATE

430-0413

GYROSCOPIC MULTI SHOT SURVEY

12-11-86

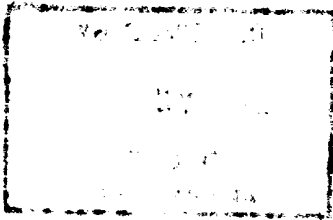
430-0413

MAGNETIC MULTI SHOT SURVEY

12-11-86

SURVEY BY  
GARY DESPAIN, TIM STEPHENS

OFFICE  
WEST TEXAS BASE



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DEC 19 1986  
OCD  
HOBBS OFFICE

## FOR

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* * * * *
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OPERATOR : SANTA FE ENERGY COMPANY

WELL NAME : H.B. STATE NO. 1

LOCATION : EDDY COUNTY, NEW MEXICO

JOB NUMBER :

RIG : WILLBROS RIG 11

DECLINATION : 10.00 E

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EC DISTRICT : WEST TEXAS BASE

SANTA FE ENERGY COMPANY  
H.B. STATE NO. 1  
EDDY COUNTY, NEW MEXICO

DATE PRINTED : 10-DEC-86  
OUR REF. NO. : S01168.4SF  
DECLINATION : 10.00 JOB NUMBER :

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	DOGLEG SEVERITY
0.00	0 0	N 0 0 E	0.00	0.00	0.00 N 0.00 E	0.00
100.00	0 30	S 21 0 E	100.00	100.00	0.41 S 0.16 E	0.50
200.00	0 45	S 7 0 W	100.00	199.99	1.48 S 0.29 E	0.39
300.00	0 45	S 12 0 W	100.00	299.98	2.77 S 0.07 E	0.07
400.00	0 45	S 22 0 W	100.00	399.98	4.02 S 0.31 W	0.15
500.00	0 45	S 33 0 W	100.00	499.97	5.18 S 0.91 W	0.14
600.00	1 0	S 34 0 W	100.00	599.96	6.45 S 1.76 W	0.25
700.00	1 0	S 16 0 W	100.00	699.94	8.03 S 2.49 W	0.31
800.00	0 45	S 34 0 W	100.00	799.93	9.41 S 3.13 W	0.37
900.00	0 30	S 18 0 W	100.00	899.92	10.39 S 3.61 W	0.30
1000.00	0 30	S 77 0 E	100.00	999.92	11.06 S 3.23 W	0.74
1100.00	0 30	S 8 0 E	100.00	1099.91	11.67 S 2.67 W	0.57
1200.00	0 30	S 47 0 W	100.00	1199.91	12.46 S 2.95 W	0.46
1300.00	1 0	S 59 0 W	100.00	1299.90	13.24 S 4.00 W	0.52
1400.00	1 45	N 85 0 W	100.00	1399.87	13.77 S 6.30 W	1.11
1500.00	1 0	S 77 0 W	100.00	1499.84	13.94 S 8.68 W	0.86
1600.00	1 0	S 88 0 W	100.00	1599.83	14.17 S 10.41 W	0.19
1700.00	0 45	S 57 0 W	100.00	1699.82	14.62 S 11.85 W	0.53
1800.00	0 45	S 18 0 W	100.00	1799.81	15.64 S 12.63 W	0.5
1900.00	1 15	S 0 0 W	100.00	1899.79	17.36 S 12.90 W	0.58
2000.00	1 30	S 0 0 W	100.00	1999.76	19.76 S 12.90 W	0.25
2100.00	1 45	S 3 0 W	100.00	2099.72	22.59 S 12.97 W	0.26
2200.00	1 15	S 4 0 E	100.00	2199.69	25.21 S 12.95 W	0.53
2300.00	1 0	S 9 0 W	100.00	2299.67	27.16 S 13.04 W	0.36
2400.00	1 15	S 22 0 E	100.00	2399.65	29.09 S 12.82 W	0.65
2500.00	2 0	S 38 0 E	100.00	2499.61	31.54 S 11.40 W	0.87
2600.00	2 15	S 43 0 E	100.00	2599.54	34.36 S 9.00 W	0.31
2700.00	2 0	S 45 0 E	100.00	2699.47	37.03 S 6.42 W	0.26
2800.00	3 45	S 44 0 E	100.00	2799.34	40.60 S 2.91 W	1.75
2900.00	4 30	S 39 0 E	100.00	2899.08	45.99 S 0.86 E	0.83

CONTINUED ON NEXT PAGE ...



SANTA FE ENERGY COMPANY  
H.B. STATE NO. 1  
EDDY COUNTY, NEW MEXICO

DATE PRINTED : 10-DEC-86  
OUR REF. NO. : 801168.4SF  
DECLINATION : 10.00 JOB NUMBER :

PAGE NO. 3

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	4 15	S 42 O E	100.00	2998.79	51.79 S 6.81 E	0.34
3100.00	3 15	S 55 O E	100.00	3098.57	56.11 S 11.70 E	1.31
3200.00	2 30	S 50 O E	100.00	3198.45	59.16 S 15.68 E	0.79
3300.00	2 15	S 45 O E	100.00	3298.36	61.96 S 18.73 E	0.32
3400.00	2 45	S 42 O E	100.00	3398.27	65.13 S 21.73 E	0.57
3500.00	2 0	S 39 O E	100.00	3498.18	68.28 S 24.42 E	0.76
3600.00	1 45	S 37 O E	100.00	3598.13	70.85 S 26.44 E	0.26
3700.00	2 0	S 27 O E	100.00	3698.07	73.63 S 28.17 E	0.41
3800.00	1 30	S 25 O E	100.00	3798.03	76.37 S 29.51 E	0.50
3900.00	1 15	S 21 O E	100.00	3898.00	78.58 S 30.45 E	0.27
4000.00	1 30	S 22 O E	100.00	3997.97	80.81 S 31.33 E	0.25
4100.00	1 15	S 26 O E	100.00	4097.94	83.00 S 32.30 E	0.27
4200.00	1 15	S 12 O E	100.00	4197.92	85.06 S 33.01 E	0.30
4300.00	1 30	S 16 O E	100.00	4297.89	87.39 S 33.59 E	0.27
4400.00	1 30	S 15 O E	100.00	4397.85	89.91 S 34.29 E	0.03
4500.00	1 45	S 2 O E	100.00	4497.81	92.71 S 34.71 E	0.44
4600.00	1 30	S 1 O E	100.00	4597.77	95.54 S 34.78 E	0.25
4700.00	1 15	S 11 O W	100.00	4697.74	97.93 S 34.57 E	0.38
4800.00	1 0	S 14 O W	100.00	4797.72	99.84 S 34.15 E	0.2
4900.00	1 0	S 25 O W	100.00	4897.71	101.49 S 33.57 E	0.19
5000.00	1 15	S 34 O W	100.00	4997.69	103.19 S 32.60 E	0.31
5100.00	1 15	S 30 O W	100.00	5097.66	105.04 S 31.44 E	0.09
5200.00	1 30	S 46 O W	100.00	5197.64	106.93 S 29.97 E	0.46
5300.00	1 15	S 42 O W	100.00	5297.61	108.65 S 28.31 E	0.27
5400.00	1 30	S 54 O W	100.00	5397.58	110.26 S 26.53 E	0.38
5500.00	1 30	S 53 O W	100.00	5497.54	111.81 S 24.42 E	0.03
5600.00	1 45	S 48 O W	100.00	5597.50	113.62 S 22.23 E	0.29
5700.00	1 45	S 49 O W	100.00	5697.46	115.64 S 19.95 E	0.03
5800.00	1 45	S 39 O W	100.00	5797.41	117.83 S 17.83 E	0.30
5900.00	1 45	S 39 O W	100.00	5897.36	120.21 S 15.91 E	0.00

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SANTA FE ENERGY COMPANY  
H.B. STATE NO. 1  
EDDY COUNTY, NEW MEXICO

DATE PRINTED : 10-DEC-86  
OUR REF. NO. : S01168.4SF  
DECLINATION : 10.00 JOB NUMBER :

PAGE NO. 4

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	1 45	S 35 O W	100.00	5997.32	122.65 S 14.07 E	0.12
6100.00	1 30	S 44 O W	100.00	6097.28	124.83 S 12.27 E	0.36
6200.00	1 45	S 38 O W	100.00	6197.24	126.97 S 10.41 E	0.30
6300.00	1 30	S 35 O W	100.00	6297.20	129.25 S 8.72 E	0.26
6400.00	1 30	S 39 O W	100.00	6397.16	131.34 S 7.15 E	0.10
6500.00	1 30	S 32 O W	100.00	6497.13	133.47 S 5.63 E	0.18
6600.00	1 30	S 40 O W	100.00	6597.09	135.59 S 4.09 E	0.21
6700.00	1 45	S 29 O W	100.00	6697.05	137.92 S 2.49 E	0.40
6800.00	1 30	S 28 O W	100.00	6797.01	140.41 S 1.13 E	0.25
6900.00	1 30	S 36 O W	100.00	6896.98	142.63 S 0.25 W	0.21
7000.00	2 0	S 38 O W	100.00	6996.93	145.07 S 2.09 W	0.50
7100.00	1 45	S 33 O W	100.00	7096.88	147.73 S 3.99 W	0.30
7200.00	1 45	S 37 O W	100.00	7196.83	150.23 S 5.74 W	0.12
7300.00	2 30	S 19 O W	100.00	7296.76	153.49 S 7.48 W	1.00
7400.00	2 15	S 18 O W	100.00	7396.68	157.42 S 8.79 W	0.25
7500.00	2 45	S 27 O W	100.00	7496.58	161.45 S 10.46 W	0.63
7600.00	3 30	S 26 O W	100.00	7596.43	166.33 S 12.89 W	0.75
7700.00	3 0	S 35 O W	100.00	7696.27	171.21 S 15.76 W	0.71
7800.00	2 45	S 61 O W	100.00	7796.14	174.54 S 19.46 W	1.30
7900.00	2 45	S 50 O W	100.00	7896.03	177.25 S 23.41 W	0.53
8000.00	2 45	S 54 O W	100.00	7995.91	180.20 S 27.19 W	0.19
8100.00	2 45	S 53 O W	100.00	8095.80	183.06 S 31.05 W	0.05
8200.00	3 0	S 58 O W	100.00	8195.67	185.90 S 35.18 W	0.35
8300.00	2 45	S 57 O W	100.00	8295.55	188.59 S 39.41 W	0.25
8400.00	2 0	S 51 O W	100.00	8395.46	191.03 S 42.76 W	0.79
8500.00	2 15	S 46 O W	100.00	8495.39	193.48 S 45.53 W	0.31
8600.00	2 15	S 35 O W	100.00	8595.31	196.46 S 48.08 W	0.43
8700.00	1 30	S 38 O W	100.00	8695.26	199.09 S 50.03 W	0.76
8800.00	1 15	S 26 O W	100.00	8795.23	201.12 S 51.30 W	0.38
8900.00	1 0	S 9 O W	100.00	8895.21	202.99 S 51.88 W	0.41



SANTA FE ENERGY COMPANY  
H.B. STATE NO. 1  
EDDY COUNTY, NEW MEXICO

DECLINATION : 10.00 JOB NUMBER :  
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OUR REF. NO. : S01168.48F

PAGE NO. 5

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	1 30	S 35 0 E	100.00	8995.19	205.06 S 51.41 W	1.04
9100.00	1 30	S 33 0 E	100.00	9095.15	207.23 S 49.94 W	0.05
9200.00	1 45	S 10 0 E	100.00	9195.11	209.85 S 48.91 W	0.69
9300.00	2 15	S 4 0 W	100.00	9295.05	213.33 S 48.73 W	0.70
9400.00	2 0	S 35 0 E	100.00	9394.98	216.83 S 47.76 W	1.47
9500.00	2 15	S 38 0 E	100.00	9494.91	219.81 S 45.55 W	0.27
9600.00	1 45	S 30 0 E	100.00	9594.85	222.70 S 43.60 W	0.57
9700.00	1 45	S 25 0 E	100.00	9694.80	225.41 S 42.19 W	0.15
9800.00	1 45	S 11 0 E	100.00	9794.76	228.31 S 41.25 W	0.43
9900.00	2 0	S 3 0 E	100.00	9894.70	231.55 S 40.85 W	0.36
10000.00	2 0	S 0 0 W	100.00	9994.64	235.04 S 40.76 W	0.10
10100.00	2 0	S 6 0 W	100.00	10094.58	238.53 S 40.94 W	0.21
10200.00	1 45	S 19 0 W	100.00	10194.53	241.71 S 41.65 W	0.49
10300.00	2 0	S 23 0 W	100.00	10294.47	244.77 S 42.82 W	0.28
10400.00	2 15	S 31 0 W	100.00	10394.40	248.07 S 44.50 W	0.39
10430.00	2 15	S 27 0 W	30.00	10424.38	249.10 S 45.07 W	0.52

CLOSURE - DISTANCE : 253.14  
DIRECTION : S 10 15 W

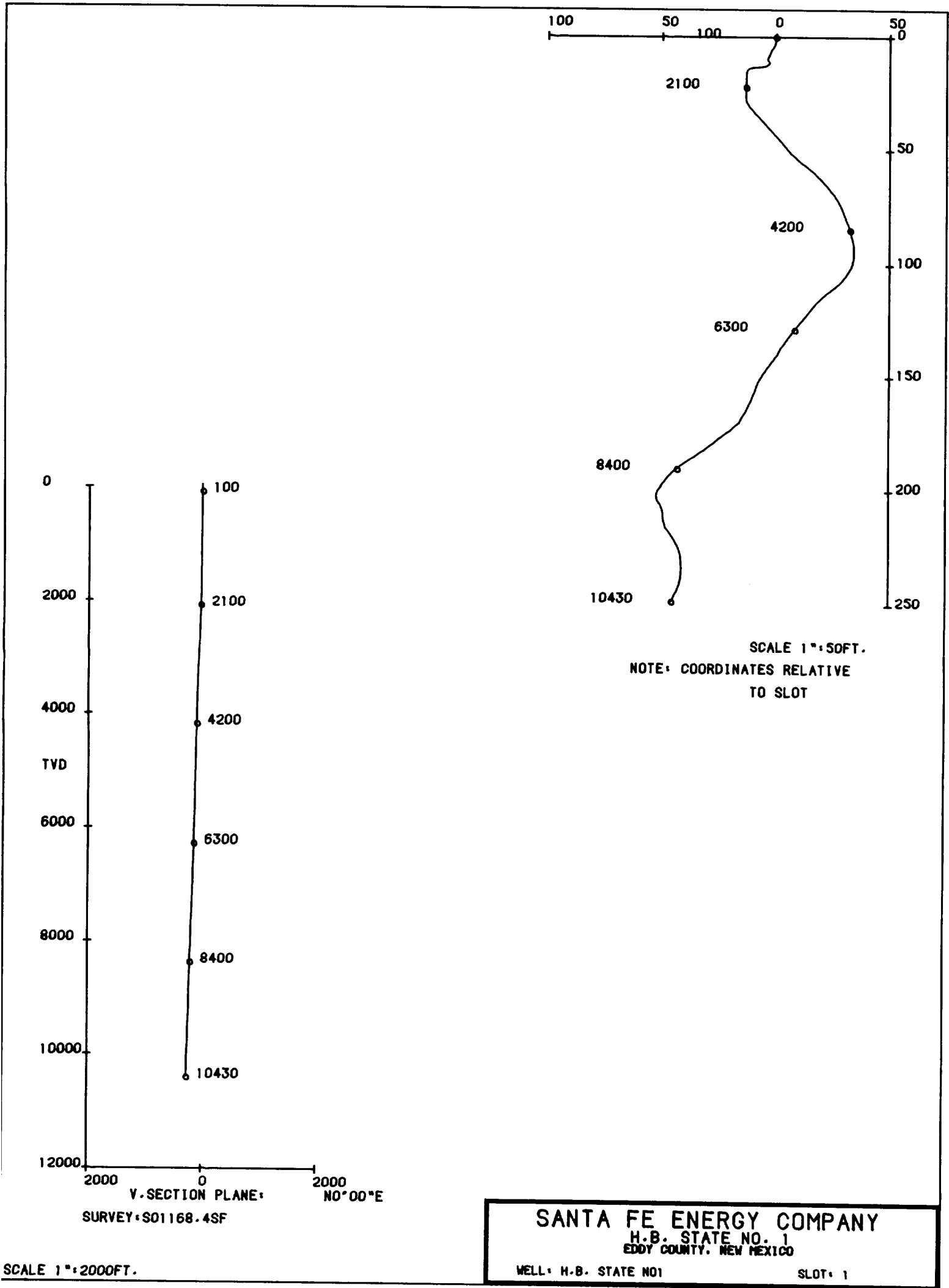
REPORT UNITS : Feet  
SURVEY CALCULATION METHOD : Radius of curvature

# SURVEY RUN INFORMATION

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GYROSCOPIC MULTI SHOT SURVEY 430-0413  
SURVEYOR: GARY DESPAIN (0-3000')  
MAGNETIC MULTI SHOT SURVEY 430-0413  
SURVEYOR: TIM STEPHENS (3000'-10,430')





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

### SURVEY CERTIFICATION SHEET

STATE OF TEXAS  
COUNTY OF MIDLAND

I, Gary DeSpain, in the employ of Eastman Whipstock, Inc., did on the days of December 11, 1986 thru December 12, 1986 conduct or supervise the taking of a Gryscopic Multi Shot survey by the method of magnetic orientation from a depth of 0 feet to 3000 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 H.B. State No. 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 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.

Amy Harner

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 117 day of December, 1986



Timothy R. Stephens  
Notary Public, State of Texas  
My Commission Expires 4-1-89

Timothy R. Stephens  
Notary Public in and for the  
County of Midland, Texas  
My commission expires \_\_\_\_\_

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(915) 563-0511

P.O. Box 6341/Terminal Station/Midland, TX 79711-0341

### SURVEY CERTIFICATION SHEET

STATE OF TEXAS  
COUNTY OF MIDLAND

I, Tim Stephens, in the employ of Eastman Whipstock, Inc., did on the days of December 11, 19 86 thru December 12, 19 86 conduct or supervise the taking of a Magnetic Multi Shot survey by the method of magnetic orientation from a depth of 3000 feet to 10,430 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 H.B. State No. 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 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.

[Signature]

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 \_\_\_\_\_

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