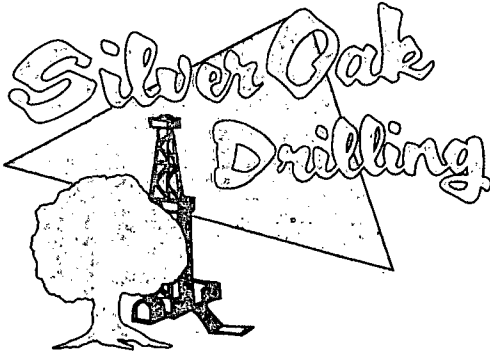




PO Box 1370
Artesia, NM 88211-1370
(575) 748-1288

30-05-40414

April 22, 2013

COG, LLC
One Concho Center
600 W. Illinois Ave.
Midland, TX 79701

RE: Hogan State Com #3H
990' FSL & 330' FEL
Sec. 2, T17S, R29E
Eddy County, New Mexico

Dear Sir,

The attached is the Deviation Survey for the above captioned well.

Very truly yours,

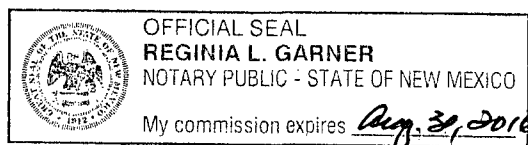
A handwritten signature in cursive script, appearing to read "Chris Graham", is written below the "Very truly yours," text.

Chris Graham
Drilling Superintendent

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 22nd day of April, 2013.

A handwritten signature in cursive script, appearing to read "Regina L. Garner", is written above a horizontal line. Below the line, the words "Notary Public" are printed.



Hogan State Com #3H

Date	Depth	Dev/Incl	Dir/Azm
4/3/2013	143.00	0.10	
4/3/2013	284.00	0.90	
4/5/2013	510.00	0.60	
4/6/2013	751.00	1.10	
4/6/2013	991.00	1.10	
4/6/2013	1295.00	0.60	
4/8/2013	1520.00	0.50	
4/8/2013	2021.00	0.60	
4/8/2013	2271.00	0.70	
4/8/2013	2520.00	1.50	
4/9/2013	2771.00	0.80	
4/9/2013	3021.00	1.10	
4/9/2013	3271.00	0.60	
4/9/2013	3521.00	0.50	
4/9/2013	3771.00	1.00	
4/9/2013	4021.00	0.90	
4/10/2013	4270.00	0.50	
4/11/2013	4667.00	5.26	227.57
4/11/2013	4698.00	7.61	226.27
4/11/2013	4729.00	4.84	228.13
4/11/2013	4760.00	12.89	234.57
4/11/2013	4791.00	16.10	237.94
4/11/2013	4823.00	19.20	239.33
4/11/2013	4854.00	22.26	242.98
4/11/2013	4885.00	25.61	244.00
4/11/2013	4916.00	29.24	246.46
4/11/2013	4948.00	32.84	249.61
4/12/2013	4978.00	35.32	253.60
4/12/2013	5009.00	37.41	258.27
4/12/2013	5041.00	40.48	261.55
4/12/2013	5073.00	43.38	263.63
4/12/2013	5104.00	46.26	266.12
4/12/2013	5135.00	48.94	267.50
4/12/2013	5198.00	55.36	270.58
4/12/2013	5447.00	80.67	274.64
4/12/2013	5478.00	83.36	273.93
4/12/2013	5509.00	87.10	273.54
4/12/2013	5540.00	90.06	273.40
4/13/2013	5696.00	91.11	271.08
4/13/2013	5727.00	91.14	271.41
4/13/2013	5821.00	91.85	271.22
4/13/2013	5914.00	92.07	270.72
4/14/2013	6008.00	92.62	270.18

Date	Depth	Dev/Incl	Dir/Azm
4/14/2013	6102.00	91.60	370.11
4/14/2013	6195.00	90.80	270.69
4/14/2013	6570.00	90.92	270.42
4/14/2013	6663.00	91.60	270.18
4/14/2013	6756.00	90.52	271.51
4/15/2013	6851.00	90.83	271.48
4/15/2013	6944.00	91.35	271.91
4/15/2013	7038.00	90.80	271.08
4/16/2013	7093.00	91.29	270.61
4/16/2013	7187.00	90.40	269.80
4/16/2013	7281.00	91.30	269.27
4/16/2013	7469.00	90.89	268.84
4/16/2013	7657.00	90.99	269.12

Company: COG Operating LLC (Concho)

Lease/Well: Hogan State Com/No 003H



Rig Name: Silver Oak #3

State/County: New Mexico/Eddy

Latitude: 32.86, Longitude: -104.04

GRID North is 0.16 Degrees East of True North

VS-Azi: 0.00 Degrees



RECEIVED

SEP 30 2013

NMOCD ARTESIA

Depth Reference : RKB=17 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: hogan st com #3h gyro survey.ut

Minimum Curvature Method

Report Date/Time: 4/15/2013 / 09:42

Vaughn Energy Services

Midland, Texas

432-563-5444

Surveyor: Logan Henry

Hogan State Com No 003H / API 30-015-40414

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.26	163.33	100.00	-0.22	0.07	-0.22	0.23	163.33	0.26
200.00	0.49	176.02	200.00	-0.86	0.16	-0.86	0.88	169.51	0.25
300.00	0.32	185.70	299.99	-1.57	0.16	-1.57	1.58	174.12	0.18
400.00	0.17	182.89	399.99	-2.00	0.13	-2.00	2.00	176.37	0.16
500.00	0.28	175.30	499.99	-2.39	0.14	-2.39	2.39	176.66	0.11
600.00	0.41	164.79	599.99	-2.97	0.25	-2.97	2.98	175.14	0.15
700.00	0.33	85.12	699.99	-3.29	0.63	-3.29	3.35	169.09	0.48
800.00	0.53	89.64	799.99	-3.26	1.38	-3.26	3.54	157.02	0.20
900.00	0.77	93.92	899.98	-3.31	2.52	-3.31	4.16	142.73	0.25
1000.00	0.79	70.89	999.97	-3.13	3.84	-3.13	4.95	129.16	0.31
1100.00	0.63	81.23	1099.96	-2.82	5.03	-2.82	5.77	119.24	0.21
1200.00	0.30	72.47	1199.96	-2.66	5.82	-2.66	6.40	114.51	0.33
1300.00	0.12	15.75	1299.96	-2.48	6.10	-2.48	6.59	112.10	0.26
1400.00	0.21	359.93	1399.96	-2.19	6.13	-2.19	6.51	109.68	0.11
1500.00	0.28	339.67	1499.96	-1.78	6.04	-1.78	6.30	106.39	0.11
1600.00	0.26	310.11	1599.96	-1.41	5.79	-1.41	5.96	103.65	0.14
1700.00	0.59	337.56	1699.95	-0.78	5.42	-0.78	5.47	98.21	0.38
1800.00	0.61	326.55	1799.95	0.14	4.93	0.14	4.93	88.40	0.12

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	0.32	343.94	1899.95	0.85	4.56	0.85	4.64	79.46	0.31
2000.00	0.57	301.98	1999.94	1.38	4.06	1.38	4.29	71.21	0.39
2100.00	0.64	311.65	2099.94	2.02	3.22	2.02	3.80	57.98	0.12
2200.00	0.69	318.90	2199.93	2.84	2.41	2.84	3.72	40.27	0.10
2300.00	0.73	311.78	2299.92	3.72	1.53	3.72	4.03	22.40	0.10
2400.00	0.82	308.63	2399.91	4.59	0.50	4.59	4.62	6.25	0.10
2500.00	0.92	316.74	2499.90	5.62	-0.61	5.62	5.66	353.84	0.16
2600.00	0.95	318.29	2599.89	6.83	-1.71	6.83	7.04	345.94	0.03
2700.00	0.88	314.90	2699.88	7.99	-2.80	7.99	8.46	340.67	0.09
2800.00	0.84	317.95	2799.87	9.07	-3.83	9.07	9.84	337.10	0.06
2900.00	0.82	296.17	2899.85	9.92	-4.96	9.92	11.09	333.44	0.31
3000.00	0.88	300.00	2999.84	10.62	-6.27	10.62	12.34	329.45	0.09
3100.00	0.68	294.01	3099.83	11.25	-7.48	11.25	13.51	326.38	0.22
3200.00	0.60	290.90	3199.83	11.68	-8.52	11.68	14.46	323.90	0.09
3300.00	0.45	311.50	3299.82	12.13	-9.30	12.13	15.29	322.51	0.24
3400.00	0.56	272.38	3399.82	12.41	-10.08	12.41	15.99	320.90	0.35
3500.00	0.85	287.26	3499.81	12.65	-11.28	12.65	16.94	318.27	0.34
3600.00	0.62	276.43	3599.80	12.93	-12.52	12.93	18.00	315.91	0.27
3700.00	0.71	260.34	3699.80	12.88	-13.67	12.88	18.78	313.30	0.21
3800.00	0.87	254.10	3799.79	12.57	-15.01	12.57	19.58	309.95	0.18
3900.00	0.66	283.19	3899.78	12.50	-16.29	12.50	20.53	307.48	0.43
4000.00	0.62	286.43	3999.77	12.78	-17.37	12.78	21.56	306.34	0.05
4100.00	0.70	276.50	4099.77	13.00	-18.49	13.00	22.61	305.11	0.14
4200.00	0.70	278.26	4199.76	13.16	-19.70	13.16	23.69	303.73	0.02
4300.00	0.74	275.43	4299.75	13.31	-20.95	13.31	24.82	302.42	0.06
4400.00	0.65	273.13	4399.74	13.40	-22.16	13.40	25.90	301.15	0.10
4500.00	0.59	268.48	4499.74	13.42	-23.24	13.42	26.84	299.99	0.07
4508.00	0.60	259.74	4507.74	13.41	-23.33	13.41	26.91	299.89	1.13

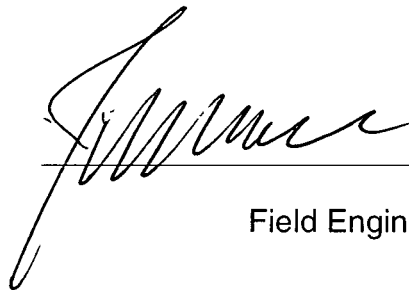
HALLIBURTON

3950 Interwood S. Parkway • Houston, TX 77032

PHONE 281.986.4400 • FAX 281.986.4499

State of New Mexico, Eddy County

I, Jeffrey Moriarty, certify that I am employed by Halliburton Energy Services, Inc. (aka Sperry Drilling Services) and that on the dates of 10 April-13 through 21-April-13, I did conduct or supervise the taking of DWD directional surveys for the Hogan State Com 3H well from a depth of 4573' MD to a depth of 9501' MD. This data is true, correct, complete and within the limitations of the tools as set forth by Halliburton Energy Services, Inc. (aka Sperry Drilling). I am authorized and qualified to make this report and these surveys were conducted at the request of COG Operating LLC for the Hogan State Com 3H, API No. 30-015-40414-0000 in Eddy County, NM. I have reviewed this report and find that it conforms to the principles and procedures as set forth by Halliburton Energy Services, Inc. (aka Sperry Drilling Services).



Field Engineer

COG Operating LLC:

Hogan State Com 3H

Eddy Co., NM

SilverOak #3

API# 30-015-40414-0000

April 9, 2013 To April 20, 2013

HD-MJ-0900331419

Sperry Drilling

MWD SURVEY Report

Submitted by Jeffrey Moriarty

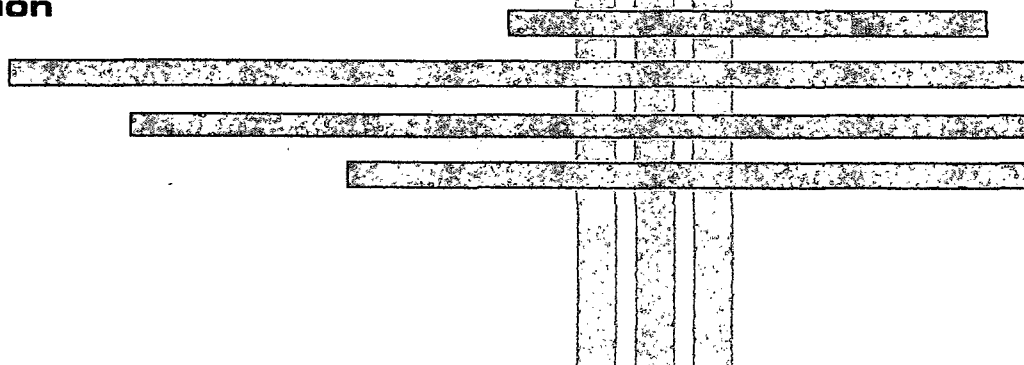
3950 Interwood S. Pkwy

Houston, TX 77032

Ph: 281.986.4400

HALLIBURTON

**Drilling and Formation
Evaluation**



Survey Report for COG Operating LLC.

Rig : SilverOak #3
Well Name : Hogan State Com 3H
Field Name : Yesa
Country : USA
Job Number : HD-XX-0900331419
Job Start Date : 09-Apr-13
API Number : 30-015-40414-0000

TABLE OF CONTENTS

1. General Information
2. Directional Survey Data

GENERAL INFORMATION

Company	: COG Operating LLC
Rig	: SilverOak #3
Well	: Hogan State Com 3H
Field	: Yesa
Lease Name	: Hogan State Com
State	: New Mexico
County	: Eddy County
Country	: USA
API Number	: 30-015-40414-0000
Sperry Drilling Job Number	: HD-XX-0900331419
Job Start Date	: 09-Apr-13
Job End Date	: 20-Apr-13
North Reference	: Grid
Total Correction (deg)	: 7.575
Dip Angle (deg)	: 60.611
Total Magnetic Field (nT)	: 48736
Date of Magnetic Data	: 10 April, 2013
Well Head coordinates N	: 32 deg. 51 min 32.1 sec North
Well Head coordinates E	: 104 deg. 2 min 14.67 sec West
Vertical section direction (deg)	: 269.96
Unit Number	: 11310664
MWD Engineers	: Jeff Moriarty, Logan Tucker
Company Representatives	: David Brinkly
Company Geologist:	:



DIRECTIONAL SURVEY DATA

Tie-in

0.00

0.00

0.00

0.00

0.00 N

0.00 E

Measured Depth (ft)	Inclination (deg)	Direction (deg)	Vertical Depth (ft)	Latitude (ft)	Departure (ft)	Vertical Section (ft)	Dogleg (°/100')
100.00	0.26	163.33	100.00	0.22 S	0.07 E	-0.06	0.26
200.00	0.49	176.02	200.00	0.86 S	0.16 E	-0.16	0.24
300.00	0.32	185.70	299.99	1.57 S	0.16 E	-0.16	0.18
400.00	0.17	182.89	399.99	1.99 S	0.13 E	-0.13	0.15
500.00	0.28	175.30	499.99	2.38 S	0.14 E	-0.14	0.11
600.00	0.41	164.79	599.99	2.97 S	0.25 E	-0.25	0.14
700.00	0.33	85.12	699.99	3.29 S	0.63 E	-0.63	0.48
800.00	0.53	89.64	799.99	3.27 S	1.38 E	-1.38	0.20
900.00	0.77	93.92	899.98	3.31 S	2.52 E	-2.51	0.24
1000.00	0.79	70.89	999.97	3.13 S	3.84 E	-3.84	0.31
1100.00	0.63	81.23	1,099.96	2.82 S	5.03 E	-5.03	0.20
1200.00	0.30	72.47	1,199.96	2.66 S	5.83 E	-5.82	0.34
1300.00	0.12	15.75	1,299.96	2.48 S	6.10 E	-6.10	0.25
1400.00	0.21	359.93	1,399.96	2.19 S	6.13 E	-6.13	0.10
1500.00	0.28	339.67	1,499.96	1.78 S	6.05 E	-6.05	0.11
1600.00	0.26	310.11	1,599.96	1.41 S	5.79 E	-5.79	0.14
1700.00	0.59	337.56	1,699.96	0.78 S	5.42 E	-5.42	0.38
1800.00	0.61	326.55	1,799.95	0.14 N	4.93 E	-4.93	0.12
1900.00	0.32	343.94	1,899.95	0.85 N	4.56 E	-4.56	0.32
2000.00	0.57	301.98	1,999.94	1.38 N	4.06 E	-4.06	0.40
2100.00	0.64	311.65	2,099.94	2.02 N	3.22 E	-3.22	0.12
2200.00	0.69	318.90	2,199.93	2.84 N	2.41 E	-2.41	0.10
2300.00	0.73	311.78	2,299.92	3.72 N	1.54 E	-1.54	0.10
2400.00	0.82	308.63	2,399.91	4.59 N	0.50 E	-0.50	0.10
2500.00	0.92	316.74	2,499.90	5.62 N	0.61 W	0.60	0.16
2600.00	0.95	318.29	2,599.89	6.82 N	1.71 W	1.70	0.04
2700.00	0.88	314.90	2,699.88	7.99 N	2.81 W	2.80	0.09
2800.00	0.84	317.95	2,799.87	9.07 N	3.84 W	3.83	0.06
2900.00	0.82	296.17	2,899.86	9.93 N	4.97 W	4.97	0.31
3000.00	0.88	300.00	2,999.84	10.63 N	6.28 W	6.27	0.08
3100.00	0.68	294.01	3,099.83	11.26 N	7.49 W	7.48	0.22
3200.00	0.60	290.90	3,199.83	11.69 N	8.52 W	8.51	0.09
3300.00	0.45	311.50	3,299.82	12.13 N	9.30 W	9.29	0.24
3400.00	0.56	272.38	3,399.82	12.41 N	10.08 W	10.08	0.35
3500.00	0.85	287.26	3,499.81	12.65 N	11.28 W	11.27	0.34
3600.00	0.62	276.43	3,599.81	12.93 N	12.53 W	12.52	0.27
3700.00	0.71	260.34	3,699.80	12.89 N	13.68 W	13.67	0.21
3800.00	0.87	254.10	3,799.79	12.58 N	15.02 W	15.01	0.18
3900.00	0.66	283.19	3,899.78	12.50 N	16.31 W	16.30	0.43
4000.00	0.62	286.43	3,999.77	12.79 N	17.39 W	17.38	0.05
4100.00	0.70	276.50	4,099.77	13.01 N	18.51 W	18.50	0.14

DIRECTIONAL SURVEY DATA

Measured Depth (ft)	Inclination (deg)	Direction (deg)	Vertical Depth (ft)	Latitude (ft)	Departure (ft)	Vertical Section (ft)	Dogleg (%/100)
4200.00	0.70	278.26	4,199.76	13.17 N	19.72 W	19.72	0.02
4300.00	0.74	275.43	4,299.75	13.31 N	20.97 W	20.96	0.05
4400.00	0.65	273.13	4,399.74	13.41 N	22.18 W	22.17	0.09
4500.00	0.59	268.48	4,499.74	13.42 N	23.26 W	23.25	0.08
4508.00	0.60	259.74	4,507.74	13.42 N	23.34 W	23.34	1.14
4573.00	0.98	251.54	4,572.73	13.18 N	24.21 W	24.20	0.61
4604.00	0.58	242.99	4,603.73	13.02 N	24.60 W	24.59	1.34
4635.00	2.16	221.92	4,634.72	12.52 N	25.13 W	25.12	5.25
4667.00	5.26	227.57	4,666.65	11.08 N	26.61 W	26.60	9.75
4698.00	7.61	226.67	4,697.45	8.71 N	29.15 W	29.15	7.60
4729.00	9.84	228.13	4,728.09	5.54 N	32.62 W	32.62	7.23
4760.00	12.89	234.57	4,758.48	1.76 N	37.41 W	37.41	10.65
4791.00	16.10	237.04	4,788.49	2.58 S	43.84 W	43.84	10.53
4823.00	19.20	239.33	4,818.98	7.68 S	52.09 W	52.09	9.92
4854.00	22.26	242.98	4,847.97	12.95 S	61.71 W	61.72	10.72
4885.00	25.61	244.00	4,876.30	18.56 S	72.96 W	72.98	10.89
4916.00	29.24	246.46	4,903.81	24.52 S	85.93 W	85.95	12.27
4948.00	32.84	249.61	4,931.23	30.67 S	101.24 W	101.26	12.33
4979.00	35.32	253.60	4,956.90	36.13 S	117.72 W	117.74	10.76
5010.00	37.41	258.27	4,981.87	40.57 S	135.54 W	135.57	11.20
5041.00	40.48	261.55	5,005.98	43.97 S	154.72 W	154.75	11.91
5073.00	43.38	263.63	5,029.79	46.72 S	175.92 W	175.95	10.04
5104.00	46.26	266.12	5,051.77	48.66 S	197.68 W	197.71	10.90
5135.00	48.94	267.52	5,072.68	49.92 S	220.53 W	220.57	9.25
5167.00	51.66	269.34	5,093.11	50.59 S	245.14 W	245.18	9.58
5198.00	55.36	270.58	5,111.55	50.60 S	270.06 W	270.10	12.35
5228.00	59.22	271.38	5,127.75	50.16 S	295.30 W	295.33	13.06
5260.00	63.28	272.15	5,143.14	49.30 S	323.33 W	323.37	12.85
5291.00	66.51	273.52	5,156.29	47.91 S	351.36 W	351.40	11.18
5322.00	69.06	273.86	5,168.01	46.06 S	380.00 W	380.03	8.26
5353.00	71.51	275.16	5,178.47	43.76 S	409.09 W	409.12	8.85
5385.00	74.52	275.20	5,187.81	41.00 S	439.57 W	439.60	9.41
5415.00	77.13	274.51	5,195.16	38.54 S	468.55 W	468.57	8.98
5447.00	80.67	274.64	5,201.32	36.03 S	499.84 W	499.87	11.07
5478.00	83.36	273.93	5,205.62	33.74 S	530.45 W	530.48	8.94
5509.00	87.10	273.54	5,208.20	31.73 S	561.28 W	561.30	12.14
5540.00	90.06	273.40	5,208.97	29.85 S	592.21 W	592.23	9.57
5571.00	92.68	274.24	5,208.23	27.79 S	623.13 W	623.14	8.88
5602.00	93.36	274.15	5,206.59	25.52 S	654.00 W	654.02	2.21
5633.00	93.67	273.55	5,204.69	23.44 S	684.87 W	684.89	2.16
5665.00	92.15	272.45	5,203.07	21.77 S	716.78 W	716.80	5.85
5696.00	91.11	271.80	5,202.19	20.62 S	747.75 W	747.76	3.98
5727.00	91.14	271.47	5,201.58	19.74 S	778.73 W	778.74	1.07
5821.00	91.85	271.22	5,199.13	17.53 S	872.67 W	872.68	0.80
5914.00	92.07	270.72	5,195.95	15.96 S	965.60 W	965.62	0.59

DIRECTIONAL SURVEY DATA

Measured Depth (ft)	Inclination (deg)	Direction (deg)	Vertical Depth (ft)	Latitude (ft)	Departure (ft)	Vertical Section (ft)	Dogleg (°/100)
6008.00	92.62	270.18	5,192.10	15.22 S	1,059.52 W	1059.53	0.82
6102.00	91.60	270.11	5,188.64	14.99 S	1,153.46 W	1153.47	1.09
6195.00	90.80	270.69	5,186.69	14.34 S	1,246.43 W	1246.44	1.07
6290.00	90.96	270.64	5,185.23	13.23 S	1,341.42 W	1341.42	0.17
6383.00	91.08	269.75	5,183.58	12.92 S	1,434.40 W	1434.41	0.97
6476.00	90.43	270.92	5,182.36	12.38 S	1,527.39 W	1527.40	1.44
6570.00	90.92	270.42	5,181.25	11.28 S	1,621.37 W	1621.38	0.74
6663.00	91.60	270.18	5,179.20	10.80 S	1,714.35 W	1714.36	0.78
6756.00	90.52	271.51	5,177.47	9.42 S	1,807.32 W	1807.33	1.85
6851.00	90.83	271.48	5,176.35	6.94 S	1,902.28 W	1902.29	0.33
6944.00	91.35	271.91	5,174.58	4.19 S	1,995.22 W	1995.23	0.72
7038.00	90.80	271.08	5,172.81	1.74 S	2,089.17 W	2089.17	1.06
7093.00	91.29	270.61	5,171.81	0.93 S	2,144.16 W	2144.16	1.23
7187.00	90.40	269.80	5,170.42	0.60 S	2,238.14 W	2238.15	1.28
7281.00	91.29	269.27	5,169.03	1.37 S	2,332.13 W	2332.13	1.11
7374.00	90.55	269.38	5,167.53	2.47 S	2,425.11 W	2425.11	0.80
7469.00	90.89	268.84	5,166.33	3.94 S	2,520.09 W	2520.09	0.67
7562.00	91.70	268.43	5,164.22	6.15 S	2,613.04 W	2613.04	0.97
7657.00	90.99	269.12	5,162.00	8.18 S	2,707.99 W	2708.00	1.04
7751.00	90.56	269.73	5,160.74	9.13 S	2,801.98 W	2801.98	0.79
7844.00	90.55	269.37	5,159.83	9.86 S	2,894.97 W	2894.98	0.38
7938.00	90.56	270.01	5,158.92	10.37 S	2,988.96 W	2988.97	0.67
8031.00	89.78	270.56	5,158.65	9.91 S	3,081.96 W	3081.97	1.02
8125.00	90.55	271.52	5,158.37	8.21 S	3,175.94 W	3175.95	1.31
8219.00	91.27	271.00	5,156.88	6.14 S	3,269.91 W	3269.91	0.93
8311.00	91.97	270.03	5,154.28	5.31 S	3,361.87 W	3361.87	1.30
8405.00	91.29	271.52	5,151.60	4.03 S	3,455.82 W	3455.82	1.74
8499.00	91.73	271.27	5,149.12	1.74 S	3,549.75 W	3549.76	0.54
8592.00	90.65	269.70	5,147.20	0.95 S	3,642.73 W	3642.73	2.05
8686.00	91.08	270.27	5,145.78	0.98 S	3,736.72 W	3736.72	0.76
8780.00	91.42	270.17	5,143.73	0.62 S	3,830.69 W	3830.69	0.38
8874.00	91.66	269.87	5,141.20	0.58 S	3,924.66 W	3924.66	0.42
8969.00	91.70	269.53	5,138.42	1.08 S	4,019.62 W	4019.62	0.36
9062.00	92.13	269.77	5,135.32	1.64 S	4,112.56 W	4112.56	0.53
9093.00	91.88	269.87	5,134.23	1.74 S	4,143.54 W	4143.54	0.88
9124.00	92.10	269.61	5,133.16	1.88 S	4,174.52 W	4174.53	1.10
9156.00	90.37	269.59	5,132.47	2.10 S	4,206.52 W	4206.52	5.40
9188.00	90.31	269.70	5,132.28	2.30 S	4,238.51 W	4238.52	0.38
9219.00	90.06	269.23	5,132.18	2.59 S	4,269.51 W	4269.51	1.70
9250.00	90.22	269.04	5,132.10	3.06 S	4,300.51 W	4300.51	0.80
9345.00	90.71	268.91	5,131.34	4.76 S	4,395.49 W	4395.49	0.54
9439.00	90.95	268.64	5,129.97	6.77 S	4,489.46 W	4489.46	0.38
9501.00	90.92	268.30	5,128.96	8.42 S	4,551.43 W	4551.43	0.56
9568.00	90.92	268.30	5,127.88	10.41 S	4,618.39 W	4618.40	0.00

SURVEY FOOTER

SURVEYS CALCULATED USING LONG COLLAR METHOD.
TIE-ON ASSUMED VERTICAL AT SURFACE.
SURVEYS FROM 100.00' MD TO 4508' MD PROVIDED BY VAUGHN ENERGY SERVICE.
SURVEYS FROM 4573' MD TO 9501' MD PROVIDED BY SPERRY DRILLING SERVICES.
SURVEY 9501' MD IS PROJECTED TO BIT AT 9568' MD.
SPERRY ENGINEERS: J. MORIARTY, L TUCKER

DIRECTIONAL SURVEY DATA NOTES

- Calculation based on minimum curvature method.
- Survey coordinates relative to well system reference point.
- TVD values given relative to drilling measurement point.
- Vertical section relative to well head.
- Vertical section is computed along a direction of 269.96 degrees (Grid)
- A total correction of 7.58 deg from Magnetic north to Grid north has been applied
- Horizontal displacement is relative to the well head.
- Horizontal displacement (closure) at 9,568.00 feet is 4,618.40 feet along 269.87 degrees (Grid)

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