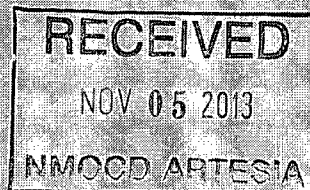




PO Box 261021
Corpus Christi, Texas 78426
(361) 767-0602 • (800) 606-GYRO • Fax (361) 767-0612

A GYRO TECHNOLOGIES INC. COMPANY

May 30, 2013



COG Operating LLC (Concho)
One Concho Center
600 W. Illinois Avenue
Midland, TX 79701

30-015-40970

Attn: Kanicia Castillo

Re: **Burch Keely Unit No 933H**

Please find enclosed a copy of the survey from 0' to 4,253' ran on the above referenced well.

If I can be of any further service, please do not hesitate to call me at 800-606-4976.

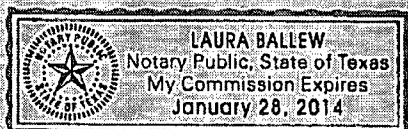
Sincerely,


Keith Havelka
Operations

STATE OF TEXAS §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 30th day of May, A.D., 2013, by Keith Havelka.

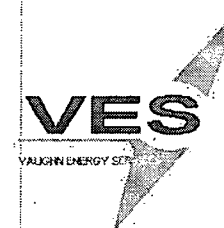

Laura Ballew
Notary Public, State of Texas





Company: COG Operating LLC (Concho)
Lease/Well: Burch Keely Unit/No 933H
Location: Sec 13 T17S R29E
Rig Name: Silver Oak #3
State/County: New Mexico/Eddy
Latitude: 32.84, Longitude: -104.04
GRID North is 0.16 Degrees East of True North
VS-Azi: 0.00 Degrees

015-40970



Depth Reference : RKB 17 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: burch keely unit #933h-de_01.ut
Minimum Curvature Method
Report Date/Time: 5/30/2013 / 12:26

Vaughn Energy Services
Gardendale, Texas
Surveyor: Chris Bankson
432-563-5444

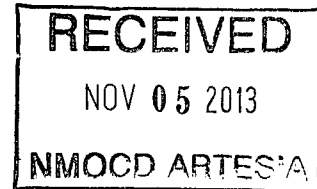
Burch Keely Unit No 933H / API 30-015-40970

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	0.46	317.34	100.00	0.30	-0.27	0.30	0.40	317.34	0.46
200.00	0.22	320.37	200.00	0.74	-0.67	0.74	0.99	317.92	0.24
300.00	0.30	331.47	300.00	1.11	-0.91	1.11	1.44	320.68	0.09
400.00	0.34	334.21	399.99	1.61	-1.17	1.61	1.99	324.11	0.05
500.00	0.41	358.49	499.99	2.24	-1.31	2.24	2.59	329.70	0.17
600.00	0.74	359.51	599.99	3.23	-1.32	3.23	3.49	337.76	0.33
700.00	0.60	24.02	699.98	4.35	-1.11	4.35	4.49	345.62	0.31
800.00	0.86	30.38	799.97	5.47	-0.53	5.47	5.49	354.51	0.27
900.00	0.84	38.82	899.96	6.68	0.31	6.68	6.69	2.67	0.13
1000.00	0.96	39.35	999.95	7.90	1.30	7.90	8.01	9.37	0.12
1100.00	0.69	41.78	1099.94	9.00	2.24	9.00	9.27	13.95	0.28
1200.00	0.31	48.07	1199.93	9.63	2.84	9.63	10.04	16.42	0.38
1300.00	0.32	58.12	1299.93	9.95	3.27	9.95	10.48	18.19	0.06
1400.00	0.25	84.32	1399.93	10.12	3.72	10.12	10.78	20.20	0.14
1500.00	0.39	123.75	1499.93	9.96	4.22	9.96	10.81	22.98	0.25
1600.00	0.34	140.23	1599.93	9.54	4.69	9.54	10.63	26.20	0.11
1700.00	0.40	140.42	1699.93	9.04	5.11	9.04	10.38	29.45	0.06
1800.00	0.32	147.17	1799.92	8.54	5.48	8.54	10.14	32.70	0.09

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	0.39	154.13	1899.92	7.99	5.78	7.99	9.86	35.90	0.08
2000.00	0.57	180.47	1999.92	7.18	5.93	7.18	9.32	39.54	0.28
2100.00	0.47	183.30	2099.92	6.28	5.90	6.28	8.62	43.23	0.10
2200.00	0.29	202.12	2199.91	5.63	5.78	5.63	8.07	45.76	0.22
2300.00	0.65	204.89	2299.91	4.88	5.45	4.88	7.31	48.15	0.36
2400.00	0.67	208.34	2399.90	3.85	4.93	3.85	6.25	52.03	0.04
2500.00	0.90	203.74	2499.89	2.62	4.34	2.62	5.06	58.90	0.23
2600.00	0.70	202.30	2599.88	1.33	3.79	1.33	4.02	70.60	0.20
2700.00	0.66	203.90	2699.88	0.24	3.33	0.24	3.33	85.82	0.04
2800.00	0.75	215.31	2799.87	-0.82	2.71	-0.82	2.83	106.82	0.17
2900.00	0.84	216.46	2899.86	-1.95	1.89	-1.95	2.72	135.79	0.09
3000.00	0.66	215.36	2999.85	-3.01	1.12	-3.01	3.21	159.50	0.19
3100.00	0.44	223.34	3099.85	-3.76	0.53	-3.76	3.79	172.00	0.23
3200.00	0.46	208.77	3199.84	-4.39	0.07	-4.39	4.39	179.06	0.11
3300.00	0.34	189.46	3299.84	-5.02	-0.17	-5.02	5.03	181.91	0.18
3400.00	0.20	168.79	3399.84	-5.48	-0.18	-5.48	5.48	181.90	0.17
3500.00	0.21	162.01	3499.84	-5.82	-0.09	-5.82	5.83	180.90	0.03
3600.00	0.21	160.81	3599.84	-6.18	0.03	-6.18	6.18	179.76	0.00
3700.00	0.14	179.27	3699.84	-6.47	0.09	-6.47	6.47	179.21	0.09
3800.00	0.06	192.06	3799.84	-6.65	0.08	-6.65	6.65	179.32	0.08
3900.00	0.07	204.82	3899.84	-6.76	0.04	-6.76	6.76	179.65	0.02
4000.00	0.19	228.46	3999.84	-6.93	-0.11	-6.93	6.93	180.93	0.13
4100.00	0.29	297.16	4099.84	-6.93	-0.46	-6.93	6.94	183.82	0.28
4200.00	0.41	323.07	4199.83	-6.53	-0.90	-6.53	6.59	187.84	0.19
4253.00	0.23	335.08	4252.83	-6.28	-1.06	-6.28	6.37	189.54	0.36



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



May 31, 2013

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

30-015-40970

RE: Burch Keely Unit #933H
2310' FNL & 330' FWL
Sec. 13, T17S, R29E
Eddy County, New Mexico

Dear Sir,

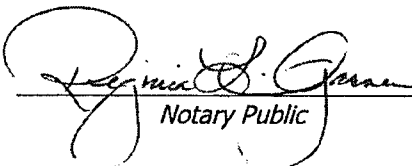
The attached is the Deviation Survey for the above captioned well.

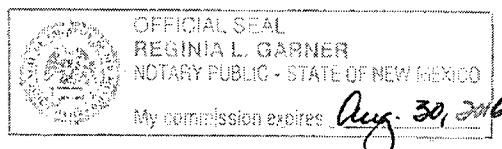
Very truly yours,


Eddie LaRue
Operations Manager

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 31st day of May, 2013.


Notary Public



Burch Keely Unit #933H

Date	Depth	Dev/Incl	Dir/Azm
5/15/2013	52.00	0.20	
5/15/2013	144.00	0.70	
5/15/2013	237.00	0.60	
5/16/2013	451.00	0.90	
5/17/2013	722.00	0.50	
5/17/2013	962.00	0.50	
5/17/2013	1053.00	0.60	
5/18/2013	1519.00	0.30	
5/19/2013	2014.00	0.50	
5/19/2013	2516.00	0.80	
5/19/2013	2984.00	0.70	
5/20/2013	3483.00	0.25	
5/20/2013	3953.00	0.25	
5/21/2013	4287.00	0.48	8.02
5/21/2013	4318.00	0.72	347.34
5/21/2013	4349.00	0.83	11.19
5/21/2013	4381.00	2.13	67.18
5/21/2013	4412.00	5.03	73.31
5/21/2013	4443.00	8.43	73.86
5/21/2013	4475.00	11.99	73.46
5/21/2013	4506.00	14.97	75.18
5/21/2013	4527.00	18.21	78.00
5/21/2013	4569.00	20.86	82.23
5/21/2013	4600.00	23.90	85.38
5/21/2013	4621.00	26.15	87.72
5/22/2013	4819.00	46.15	87.49
5/22/2013	4913.00	54.37	87.45
5/22/2013	5006.00	62.72	88.50
5/23/2013	5350.00	89.35	89.82
5/23/2013	5443.00	91.54	89.93
5/23/2013	5536.00	91.85	89.91
5/23/2013	5631.00	92.03	89.86
5/23/2013	5724.00	90.46	89.66
5/23/2013	5818.00	89.94	89.64
5/23/2013	5911.00	90.86	90.28
5/23/2013	6005.00	91.29	90.00
5/23/2013	6098.00	91.62	89.56
5/23/2013	6191.00	91.17	90.00
5/23/2013	6285.00	91.17	90.45
5/24/2013	6379.00	91.60	90.11
5/24/2013	6472.00	91.88	89.98
5/24/2013	6566.00	90.04	91.32
5/24/2013	6660.00	90.95	90.29

Date	Depth	Dev/Incl	Dir/Azm
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5/24/2013	6754.00	91.48	90.43
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5/24/2013	6848.00	92.07	90.55
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5/24/2013	6942.00	91.01	90.52
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5/24/2013	7035.00	90.99	89.58
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5/24/2013	7128.00	91.30	89.07
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5/25/2013	7221.00	91.08	88.96
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5/25/2013	7315.00	91.08	88.91
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5/25/2013	7409.00	90.56	89.12
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5/25/2013	7502.00	90.43	90.02
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5/25/2013	7596.00	90.59	89.96
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5/25/2013	7690.00	90.68	89.80
-----------	---------	-------	-------

5/25/2013	7784.00	90.03	89.72
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5/25/2013	7877.00	89.69	88.92
-----------	---------	-------	-------

5/25/2013	7970.00	89.32	89.93
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5/26/2013	8065.00	90.03	90.46
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5/26/2013	8159.00	90.40	90.35
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5/26/2013	8252.00	90.65	91.12
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5/26/2013	8347.00	91.79	90.09
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5/26/2013	8441.00	92.34	90.76
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5/27/2013	8534.00	91.26	90.61
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5/27/2013	8628.00	90.77	89.64
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5/28/2013	8815.00	90.37	89.04
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5/28/2013	8908.00	91.42	89.84
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5/28/2013	9003.00	91.45	90.05
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5/28/2013	9096.00	91.45	90.59
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5/28/2013	9221.00	91.02	90.99
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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 20-May-13 through 28-May-13, I did conduct or supervise the taking of DWD directional surveys for the Burch Keely Unit 933H well from a depth of 4287' MD to a depth of 9221' 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 Burch Keely Unit 933H, API No. 30-015-40970-0000 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.

Burch Keely Unit 933H

Eddy Co., NM

SilverOak #3

API# 30-015-40970-0000

May 20, 2013 To May 28, 2013

HD-MJ-0900420626

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 : HDXX900420626
Field Name : CR215-(Yesa formation)
Country : USA
Job Number : HD-XX-0900420626
Job Start Date : 20-May-13
API Number : 30-015-40970-0000

TABLE OF CONTENTS

1. General Information
2. Directional Survey Data

GENERAL INFORMATION

Company : COG Operating LLC
Rig : SilverOak #3
Well : HDXX900420626
Field : CR215 (Yesa formation)
Lease Name : Burch Keely Unit 933H
State : New Mexico
County : Eddy County
Country : USA
API Number : 30-015-40970-0000
Sperry Drilling Job Number : HD-XX-0900420626
Job Start Date : 20-May-13
Job End Date : 28-May-13
North Reference : Grid
Total Correction (deg) : 7.561
Dip Angle (deg) : 60.585
Total Magnetic Field (nT) : 48735
Date of Magnetic Data : 20 May, 2013
Well Head coordinates N : 32 deg. 50 min 7.19 sec North
Well Head coordinates E : 104 deg. 2 min 6.97 sec West
Vertical section direction (deg) : 89.87
Unit Number : 11164419
MWD Engineers : Jeff Moriarty, Kevin Stolarski

Company Representatives : David Foster
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)	Depth (ft)	Vertical Depth (ft)	Latitude (ft)	Departure (ft)	Vertical Section (ft)	Tool Joint (ft)
100.00	0.46	317.34	100.00	0.30 N	0.27 W	-0.27	0.46
200.00	0.22	320.37	200.00	0.74 N	0.67 W	-0.66	0.24
300.00	0.30	331.47	300.00	1.12 N	0.91 W	-0.91	0.09
400.00	0.34	334.21	399.99	1.61 N	1.17 W	-1.16	0.04
500.00	0.41	358.49	499.99	2.24 N	1.31 W	-1.30	0.17
600.00	0.74	359.51	599.99	3.24 N	1.32 W	-1.31	0.33
700.00	0.60	24.02	699.98	4.37 N	1.11 W	-1.10	0.32
800.00	0.86	30.38	799.97	5.49 N	0.52 W	-0.51	0.27
900.00	0.84	38.82	899.96	6.71 N	0.32 E	0.33	0.13
1000.00	0.96	39.35	999.95	7.93 N	1.31 E	1.33	0.12
1100.00	0.69	41.78	1,099.94	9.03 N	2.24 E	2.26	0.27
1200.00	0.31	48.07	1,199.94	9.66 N	2.84 E	2.87	0.38
1300.00	0.32	58.12	1,299.93	9.98 N	3.28 E	3.30	0.06
1400.00	0.25	84.32	1,399.93	10.15 N	3.74 E	3.76	0.15
1500.00	0.39	123.75	1,499.93	9.99 N	4.24 E	4.26	0.25
1600.00	0.34	140.23	1,599.93	9.57 N	4.71 E	4.73	0.12
1700.00	0.40	140.42	1,699.93	9.07 N	5.12 E	5.14	0.06
1800.00	0.32	147.17	1,799.92	8.57 N	5.49 E	5.51	0.09
1900.00	0.39	154.13	1,899.92	8.03 N	5.79 E	5.81	0.08
2000.00	0.57	180.47	1,999.92	7.22 N	5.94 E	5.96	0.28
2100.00	0.47	183.30	2,099.92	6.32 N	5.91 E	5.93	0.10
2200.00	0.29	202.12	2,199.91	5.67 N	5.79 E	5.81	0.22
2300.00	0.65	204.89	2,299.91	4.92 N	5.46 E	5.47	0.36
2400.00	0.67	208.34	2,399.90	3.89 N	4.94 E	4.95	0.04
2500.00	0.90	203.74	2,499.89	2.66 N	4.35 E	4.35	0.24
2600.00	0.70	202.30	2,599.88	1.38 N	3.80 E	3.80	0.20
2700.00	0.66	203.90	2,699.88	0.28 N	3.34 E	3.34	0.04
2800.00	0.75	215.31	2,799.87	0.78 S	2.72 E	2.72	0.17
2900.00	0.84	216.46	2,899.86	1.90 S	1.91 E	1.91	0.09
3000.00	0.66	215.36	2,999.85	2.96 S	1.14 E	1.13	0.18
3100.00	0.44	223.34	3,099.85	3.71 S	0.54 E	0.54	0.23
3200.00	0.46	208.77	3,199.84	4.34 S	0.09 E	0.08	0.12
3300.00	0.34	189.46	3,299.84	4.98 S	0.15 W	-0.17	0.18
3400.00	0.20	168.79	3,399.84	5.45 S	0.17 W	-0.18	0.17
3500.00	0.21	162.01	3,499.84	5.79 S	0.08 W	-0.09	0.03
3600.00	0.21	160.81	3,599.84	6.14 S	0.04 E	0.02	0.00
3700.00	0.14	179.27	3,699.84	6.44 S	0.10 E	0.09	0.09
3800.00	0.06	192.06	3,799.84	6.61 S	0.09 E	0.08	0.08
3900.00	0.07	204.82	3,899.84	6.72 S	0.05 E	0.04	0.02
4000.00	0.19	228.46	3,999.84	6.88 S	0.10 W	-0.11	0.13
4100.00	0.29	297.16	4,099.84	6.88 S	0.45 W	-0.46	0.28

DIRECTIONAL SURVEY DATA

Measured Depth (ft)	Inclination (deg)	Direction (deg)	Vertical Depth (ft)	Latitude (ft)	Departure (ft)	Vertical Section (ft)	Angle (deg)
4200.00	0.41	323.07	4,199.83	6.47 S	0.89 W	-0.90	0.20
4253.00	0.23	335.08	4,252.83	6.23 S	1.04 W	-1.06	0.36
4287.00	0.48	8.02	4,286.83	6.02 S	1.05 W	-1.07	0.92
4318.00	0.72	347.34	4,317.83	5.71 S	1.08 W	-1.09	1.03
4349.00	0.83	11.19	4,348.83	5.30 S	1.08 W	-1.09	1.09
4381.00	2.13	67.18	4,380.82	4.84 S	0.48 W	-0.50	5.62
4412.00	5.03	73.31	4,411.76	4.23 S	1.35 E	1.34	9.42
4443.00	8.43	73.86	4,442.54	3.20 S	4.83 E	4.82	10.97
4475.00	11.99	73.96	4,474.03	1.63 S	10.28 E	10.28	11.13
4506.00	14.92	75.69	4,504.17	0.24 N	17.24 E	17.24	9.54
4537.00	18.21	78.00	4,533.88	2.24 N	25.85 E	25.85	10.84
4569.00	20.66	83.34	4,564.06	3.93 N	36.35 E	36.36	9.43
4600.00	23.90	85.38	4,592.74	5.07 N	48.04 E	48.05	10.76
4631.00	26.15	87.73	4,620.83	5.85 N	61.13 E	61.14	7.93
4662.00	29.98	87.27	4,648.18	6.49 N	75.70 E	75.71	12.39
4694.00	33.64	87.30	4,675.37	7.29 N	92.55 E	92.56	11.45
4725.00	36.72	87.67	4,700.70	8.07 N	110.39 E	110.41	9.95
4757.00	40.32	87.29	4,725.73	8.95 N	130.29 E	130.31	11.26
4788.00	43.14	87.51	4,748.87	9.88 N	150.90 E	150.93	9.11
4819.00	46.15	87.49	4,770.92	10.83 N	172.66 E	172.69	9.72
4850.00	48.95	87.95	4,791.84	11.74 N	195.52 E	195.54	9.09
4881.00	51.76	87.59	4,811.62	12.67 N	219.37 E	219.39	9.10
4913.00	54.37	87.45	4,830.85	13.78 N	244.92 E	244.95	8.17
4944.00	57.43	87.47	4,848.23	14.91 N	270.56 E	270.59	9.87
4975.00	59.98	88.06	4,864.33	15.95 N	297.03 E	297.06	8.40
5006.00	62.72	88.50	4,879.19	16.76 N	324.22 E	324.25	8.92
5038.00	65.18	88.77	4,893.24	17.45 N	352.96 E	352.99	7.73
5068.00	67.71	88.72	4,905.23	18.05 N	380.45 E	380.49	8.43
5100.00	70.70	88.36	4,916.59	18.81 N	410.35 E	410.39	9.39
5131.00	73.72	88.23	4,926.06	19.69 N	439.85 E	439.89	9.75
5163.00	76.46	88.89	4,934.29	20.47 N	470.76 E	470.81	8.81
5194.00	79.41	89.35	4,940.77	20.94 N	501.07 E	501.11	9.63
5225.00	82.31	89.83	4,945.69	21.15 N	531.67 E	531.72	9.45
5257.00	85.38	90.08	4,949.13	21.18 N	563.48 E	563.53	9.63
5288.00	88.77	90.02	4,950.71	21.15 N	594.44 E	594.48	10.94
5319.00	89.23	89.90	4,951.25	21.18 N	625.43 E	625.48	1.54
5350.00	89.35	89.82	4,951.64	21.25 N	656.43 E	656.48	0.47
5443.00	91.54	89.93	4,950.91	21.45 N	749.42 E	749.47	2.36
5536.00	91.85	89.91	4,948.16	21.59 N	842.38 E	842.43	0.33
5631.00	92.03	89.86	4,944.94	21.78 N	937.33 E	937.37	0.20
5724.00	90.46	89.66	4,942.91	22.16 N	1,030.30 E	1030.35	1.71
5818.00	89.94	89.84	4,942.58	22.57 N	1,124.30 E	1124.35	0.59
5911.00	90.86	90.28	4,941.93	22.47 N	1,217.29 E	1217.34	1.10
6005.00	91.29	90.00	4,940.16	22.23 N	1,311.28 E	1311.32	0.54
6098.00	91.63	89.56	4,937.79	22.59 N	1,404.25 E	1404.29	0.60

DIRECTIONAL SURVEY DATA

Measured Depth (ft)	Incl. Ang. (deg)	Direction (deg)	Vertical Depth (ft)	Latitude (N)	Longitude (E)	Vertical Section (ft)	Dip (deg)
6191.00	91.38	90.09	4,935.34	22.87 N	1,497.21 E	1497.26	0.63
6285.00	91.17	90.45	4,933.24	22.43 N	1,591.19 E	1591.23	0.45
6379.00	91.60	90.11	4,930.97	21.96 N	1,685.16 E	1685.20	0.59
6472.00	91.88	89.98	4,928.14	21.89 N	1,778.12 E	1778.16	0.33
6566.00	91.04	91.32	4,925.75	20.82 N	1,872.08 E	1872.12	1.68
6660.00	90.95	90.29	4,924.11	19.50 N	1,966.05 E	1966.09	1.11
6754.00	91.48	90.43	4,922.11	18.91 N	2,060.03 E	2060.07	0.58
6848.00	92.07	90.55	4,919.20	18.10 N	2,153.98 E	2154.01	0.64
6942.00	91.01	90.52	4,916.68	17.23 N	2,247.94 E	2247.97	1.12
7035.00	90.99	89.58	4,915.05	17.14 N	2,340.92 E	2340.96	1.01
7128.00	91.30	89.07	4,913.20	18.24 N	2,433.90 E	2433.93	0.65
7221.00	91.08	88.96	4,911.28	19.84 N	2,526.87 E	2526.90	0.26
7315.00	91.08	88.91	4,909.51	21.59 N	2,620.83 E	2620.88	0.06
7409.00	90.56	89.12	4,908.17	23.20 N	2,714.81 E	2714.85	0.60
7502.00	90.43	90.02	4,907.37	23.90 N	2,807.80 E	2807.85	0.97
7596.00	90.59	89.76	4,906.53	24.08 N	2,901.80 E	2901.85	0.32
7690.00	90.68	89.88	4,905.50	24.37 N	2,995.79 E	2995.84	0.16
7784.00	90.03	89.72	4,904.91	24.70 N	3,089.79 E	3089.84	0.71
7877.00	89.69	88.92	4,905.14	25.80 N	3,182.78 E	3182.83	0.94
7970.00	89.32	89.93	4,905.94	26.73 N	3,275.77 E	3275.82	1.16
8065.00	90.03	90.46	4,906.48	26.40 N	3,370.77 E	3370.82	0.93
8159.00	90.40	90.35	4,906.12	25.74 N	3,464.77 E	3464.82	0.41
8252.00	90.65	91.12	4,905.27	24.54 N	3,557.75 E	3557.80	0.87
8347.00	91.79	90.90	4,903.25	22.86 N	3,652.71 E	3652.76	1.23
8441.00	92.34	90.76	4,899.86	21.50 N	3,746.64 E	3746.68	0.61
8534.00	91.26	90.61	4,896.94	20.39 N	3,839.59 E	3839.63	1.17
8628.00	90.77	89.64	4,895.27	20.18 N	3,933.57 E	3933.61	1.16
8722.00	90.40	89.25	4,894.30	21.09 N	4,027.56 E	4027.60	0.57
8815.00	90.37	89.04	4,893.68	22.48 N	4,120.55 E	4120.59	0.23
8908.00	91.42	89.84	4,892.23	23.39 N	4,213.53 E	4213.58	1.41
9003.00	91.45	90.05	4,889.86	23.49 N	4,308.50 E	4308.55	0.22
9096.00	91.45	90.59	4,887.50	22.97 N	4,401.47 E	4401.51	0.58
9189.00	91.11	90.84	4,885.43	21.81 N	4,494.44 E	4494.48	0.46
9221.00	91.02	90.99	4,884.83	21.30 N	4,526.43 E	4526.47	0.54
9290.00	91.02	90.99	4,883.61	20.11 N	4,595.41 E	4595.44	0.01

SURVEY FOOTER

SURVEYS CALCULATED USING LONG COLLAR METHOD.
 TIE-ON ASSUMED VERTICAL AT SURFACE.
 SURVEYS FROM 100.00' MD TO 4253' MD PROVIDED BY VAUGHN ENERGY SERVICE.
 SURVEYS FROM 4287' MD TO 9221 MD PROVIDED BY SPERRY DRILLING SERVICES.
 SURVEY 9221' MD IS PROJECTED TO BIT AT 9290' MD.
 SPERRY ENGINEERS: J. MORIARTY, K. STOLARSKI

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 89.87 degrees (Grid)
- A total correction of 7.56 deg from Magnetic north to Grid north has been applied
- Horizontal displacement is relative to the well head.
- Horizontal displacement (closure) at 9,290.00 feet is 4,595.45 feet along 89.75 degrees (Grid)

WARRANTY

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