

Company: COG Operating LLC (Concho)
Lease/Well: Sidemarine 10 Federal/No 002H



Rig Name: UDI 40
State/County: New Mexico/Eddy
Latitude: 32.87, Longitude: -104.04
GRID North is 0.16 Degrees East of True North
VS-Azi: 0.00 Degrees



15-40542

RECEIVED
SEP 30 2013
NMOCD ARTESIA

Depth Reference : RKB = 14'

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: gyro survey.ut

Minimum Curvature Method

Report Date/Time: 5/3/2013 / 15:27

Vaughn Energy Services

Midland, Texas

432-563-5444

Surveyor: Tim Dillon

Sidemarine 10 Federal No 002H / API 30-015-40542

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W 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	****
100.00	0.41	214.59	100.00	-0.29	-0.20	0.35	214.59	0.41
200.00	0.42	219.86	200.00	-0.86	-0.64	1.07	216.38	0.04
300.00	0.43	216.85	299.99	-1.44	-1.10	1.81	217.18	0.02
400.00	0.37	226.40	399.99	-1.97	-1.56	2.51	218.32	0.09
500.00	0.23	164.77	499.99	-2.39	-1.74	2.95	216.06	0.33
600.00	0.31	143.97	599.99	-2.80	-1.53	3.19	208.65	0.12
700.00	0.54	134.58	699.99	-3.34	-1.04	3.50	197.25	0.24
800.00	0.40	133.28	799.98	-3.91	-0.45	3.94	186.57	0.14
900.00	0.33	143.12	899.98	-4.38	-0.02	4.38	180.30	0.09
1000.00	0.23	47.65	999.98	-4.48	0.30	4.49	176.22	0.42
1100.00	0.11	271.69	1099.98	-4.35	0.34	4.36	175.52	0.32
1200.00	0.31	334.07	1199.98	-4.10	0.12	4.10	178.29	0.28
1300.00	0.23	307.96	1299.98	-3.73	-0.16	3.73	182.40	0.14
1400.00	0.40	302.85	1399.98	-3.42	-0.61	3.47	190.06	0.16
1500.00	0.25	296.42	1499.98	-3.13	-1.09	3.32	199.26	0.15
1600.00	0.42	299.30	1599.97	-2.86	-1.61	3.28	209.42	0.16
1700.00	0.34	290.23	1699.97	-2.58	-2.21	3.39	220.57	0.10
1800.00	0.20	258.28	1799.97	-2.51	-2.65	3.65	226.57	0.20

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	0.34	286.36	1899.97	-2.46	-3.10	3.96	231.56	0.19
2000.00	0.47	299.68	1999.97	-2.18	-3.74	4.33	239.81	0.16
2100.00	0.41	310.45	2099.96	-1.74	-4.36	4.70	248.25	0.10
2200.00	0.34	307.13	2199.96	-1.33	-4.87	5.05	254.72	0.07
2300.00	0.41	309.93	2299.96	-0.92	-5.38	5.46	260.27	0.07
2400.00	0.28	292.14	2399.96	-0.60	-5.88	5.91	264.16	0.17
2500.00	0.26	319.64	2499.96	-0.34	-6.25	6.26	266.91	0.13
2600.00	0.26	327.97	2599.96	0.03	-6.52	6.52	270.26	0.04
2700.00	0.32	322.08	2699.95	0.44	-6.82	6.83	273.73	0.06
2800.00	0.19	343.84	2799.95	0.82	-7.03	7.08	276.64	0.16
2900.00	0.21	334.82	2899.95	1.14	-7.16	7.25	279.06	0.04
3000.00	0.18	10.67	2999.95	1.46	-7.21	7.35	281.48	0.12
3100.00	0.19	4.20	3099.95	1.78	-7.16	7.38	283.97	0.02
3200.00	0.22	39.97	3199.95	2.09	-7.03	7.33	286.59	0.13
3300.00	0.20	56.25	3299.95	2.34	-6.76	7.15	289.08	0.06
3400.00	0.21	65.54	3399.95	2.51	-6.44	6.92	291.30	0.04
3500.00	0.18	20.92	3499.95	2.74	-6.22	6.79	293.77	0.15
3600.00	0.14	52.58	3599.95	2.96	-6.06	6.75	296.05	0.10
3700.00	0.14	4.15	3699.95	3.16	-5.95	6.74	297.94	0.12
3800.00	0.04	241.29	3799.95	3.26	-5.97	6.80	298.61	0.16
3900.00	0.19	308.43	3899.95	3.35	-6.13	6.99	298.62	0.18
3993.00	0.26	190.30	3992.95	3.24	-6.29	7.08	297.21	0.42



Archer Directional Drilling Services.
12101 Cutten Road
Houston, Texas 77066
Tel: 281-301-2600
Fax: 281-301-2795

COG Operating, LLC
One Concho Center
600 W. Illinois Avenue
Midland, Texas 79701

May 16, 2013

Re: COG Operating, LLC
Sidemarine 10 Fed Com 2H
Field: Wildcat
Rig: United 40
Eddy County, New Mexico
API # 30-015-40542

Enclosed please find the original of the surveys performed on the referenced well by Archer Directional Drilling Services. Other information required by your office is as follows:

<u>Name & Title Of Surveyor</u>	<u>Wellhole Number</u>	<u>Survey Depths</u>	<u>Dates Performed</u>	<u>Type Survey</u>
Justin Warnack Field Engineer	Original Hole	4085-9076	05/01/13-05/08/13	MWD

If additional information is required, please contact the undersigned at the letterhead address and phone number.



Amador Baggerly
MWD Coordinator

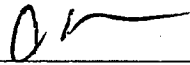
Archer

Archer Directional Drilling Services.
12101 Cullen Road
Houston, Texas 77066
Tel: 281-301-2600
Fax: 281-301-2795

MWD Survey Certification

State of New Mexico
County of Eddy

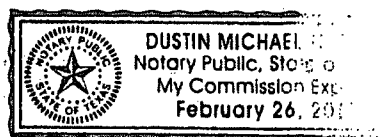
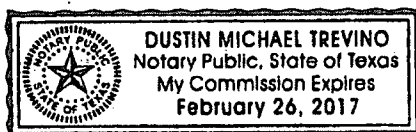
I, Amador Baggerly, certify that; I am employed by Archer Directional Drilling Services; that I did on the day(s) of 05/01/13 through 05/08/13, conduct or supervise the taking of MWD surveys from a depth of 4085 feet to a depth of 9076 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Archer Directional Drilling Services; that I am authorized and qualified to make this report; that these surveys were conducted at the request of COG Operating, LLC for the Sideline 10 Fed Com 2H (API # 30-015-40542), Well located in Eddy County, New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by Archer Directional Drilling Services


Amador Baggerly
MWD Coordinator

State of Texas
County of Harris

Before me, a notary public, on this day personally appeared Amador Baggerly, on this 17 day of May, 2013, known to me to be the person whose name is subscribed to the foregoing document and, being by me first duly sworn, declared that the statement therein contained are true and correct.


Notary Public's Signature





Company: COG Operating, LLC

Well: Sidemarine 10 Fed Com 2H

Location: Eddy County, New Mexico

Rig: UDI 40

Job Date: 05/01/13 - 05/08/13

Job Number: 04236-433-22

Mag Decl.: 7.49

Dir Driller: Cody Styles

MWD Eng: Justin Warnack

Calculation Method

Proposed Azimuth

Depth Reference

Tie Into: Gyro Survey

Minimum Curvature

359.7

KBG

Survey Number	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates		Closure		Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
							N/S (ft)	E/W (ft)	Distance (ft)	Direction Azimuth			
Tie In	3993.00	0.26	190.3	0	3992.95	3.27	3.24 N	6.31 W	0.00	0.00	0	0	0
1	4085	0.4	191.6	92	4084.95	2.75	2.72 N	6.41 W	6.96	292.99	0.15	0.15	1.41
2	4117	0.4	228.5	32	4116.95	2.57	2.54 N	6.52 W	6.99	291.26	0.79	0.00	115.31
3	4148	1.8	348.6	31	4147.94	2.97	2.94 N	6.70 W	7.31	293.72	6.55	4.52	387.42
4	4180	5.0	355.4	32	4179.88	4.86	4.83 N	6.91 W	8.43	304.94	10.06	10.00	21.25
5	4212	8.2	356.2	32	4211.67	8.53	8.49 N	7.17 W	11.11	319.83	10.00	10.00	2.50
6	4243	11.8	358.8	31	4242.19	13.90	13.87 N	7.38 W	15.71	331.97	11.70	11.61	8.39
7	4275	15.6	358.2	32	4273.27	21.48	21.44 N	7.59 W	22.75	340.52	11.88	11.88	-1.88
8	4309	20.0	355.7	34	4305.64	31.86	31.82 N	8.17 W	32.85	345.61	13.13	12.94	-7.35
9	4341	23.0	354.3	32	4335.41	43.54	43.50 N	9.20 W	44.46	348.06	9.51	9.38	-4.37
10	4373	26.1	353.0	32	4364.51	56.76	56.71 N	10.68 W	57.70	349.34	9.83	9.69	-4.06
11	4404	29.4	352.2	31	4391.94	71.08	71.02 N	12.54 W	72.12	349.99	10.71	10.65	-2.58
12	4436	32.9	352.6	32	4419.33	87.49	87.42 N	14.73 W	88.66	350.44	10.96	10.94	1.25
13	4468	36.2	353.6	32	4445.68	105.52	105.44 N	16.90 W	106.78	350.89	10.46	10.31	3.13
14	4500	39.1	354.7	32	4471.01	124.97	124.88 N	18.89 W	126.30	351.40	9.30	9.06	3.44
15	4531	42.3	355.8	31	4494.51	145.12	145.02 N	20.55 W	146.47	351.93	10.58	10.32	3.55
16	4563	45.6	356.0	32	4517.55	167.28	167.17 N	22.14 W	168.63	352.46	10.32	10.31	0.62
17	4594	48.8	355.5	31	4538.61	189.96	189.85 N	23.83 W	191.34	352.85	10.39	10.32	-1.61
18	4626	52.2	355.0	32	4558.96	214.58	214.46 N	25.88 W	216.01	353.12	10.69	10.63	-1.56
19	4658	55.5	355.2	32	4577.83	240.33	240.20 N	28.08 W	241.83	353.33	10.32	10.31	0.62
20	4689	58.4	355.6	31	4594.74	266.23	266.10 N	30.16 W	267.80	353.53	9.42	9.35	1.29
21	4721	61.1	356.2	32	4610.86	293.81	293.66 N	32.14 W	295.42	353.75	8.59	8.44	1.87
22	4753	64.0	356.2	32	4625.61	322.15	322.00 N	34.02 W	323.79	353.97	9.06	9.06	0.00
23	4785	66.6	356.5	32	4638.98	351.17	351.01 N	35.87 W	352.84	354.17	8.17	8.12	0.94
24	4816	69.2	356.5	31	4650.64	379.85	379.67 N	37.62 W	381.53	354.34	8.39	8.39	0.00
25	4848	71.7	356.6	32	4661.35	409.95	409.77 N	39.44 W	411.67	354.50	7.82	7.81	0.31
26	4880	74.2	357.0	32	4670.73	440.50	440.32 N	41.14 W	442.23	354.66	7.90	7.81	1.25
27	4911	76.4	357.5	31	4678.59	470.46	470.26 N	42.58 W	472.19	354.83	7.27	7.10	1.61
28	4943	79.1	357.6	32	4685.38	501.71	501.50 N	43.92 W	503.42	355.00	8.44	8.44	0.31
29	4975	81.6	357.5	32	4690.75	533.23	533.02 N	45.27 W	534.94	355.15	7.82	7.81	-0.31
30	5006	84.0	357.0	31	4694.63	563.95	563.74 N	46.74 W	565.67	355.26	7.91	7.74	-1.61
31	5038	85.9	356.7	32	4697.45	595.79	595.56 N	48.49 W	597.54	355.34	6.01	5.94	-0.94
32	5067	87.9	356.1	29	4699.02	624.69	624.46 N	50.31 W	626.49	355.39	7.20	6.90	-2.07
33	5099	89.8	356.0	32	4699.66	656.62	656.38 N	52.52 W	658.48	355.43	5.95	5.94	-0.31
34	5162	90.3	355.9	63	4699.60	719.48	719.22 N	56.97 W	721.47	355.47	0.81	0.79	-0.16
35	5258	91.2	356.0	96	4698.35	815.26	814.97 N	63.75 W	817.46	355.53	0.94	0.94	0.10
36	5353	91.8	355.7	95	4695.86	910.01	909.69 N	70.62 W	912.43	355.56	0.71	0.63	-0.32

Archer

Company: COG Operating, LLC

Well: Sidmarine 10 Fed Com 2H

Location: Eddy County, New Mexico

Rig: UDI 40

Job Date: 05/01/13 - 05/08/13

Job Number: 04236-433-22

Mag Decl.: 7.49

Dir Driller: Cody Styles

MWD Eng: Justin Warnack

Calculation Method

Proposed Azimuth

Depth Reference

Tie Into: Gyro Survey

Minimum Curvature

359.7

KBG

Survey Number	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates		Closure		Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
							N/S (ft)	E/W (ft)	Distance (ft)	Direction Azimuth			
37	5448	90.9	356.8	95	4693.62	1004.81	1004.46 N	76.83 W	1007.39	355.63	1.50	-0.95	1.16
38	5543	91.5	357.0	95	4691.63	1099.67	1099.30 N	81.97 W	1102.35	355.74	0.67	0.63	0.21
39	5638	91.1	357.4	95	4689.48	1194.55	1194.16 N	86.60 W	1197.30	355.85	0.60	-0.42	0.42
40	5733	89.6	357.3	95	4688.90	1289.47	1289.05 N	91.00 W	1292.26	355.96	1.58	-1.58	-0.11
41	5829	89.8	357.1	96	4689.40	1385.37	1384.94 N	95.69 W	1388.24	356.05	0.29	0.21	-0.21
42	5924	90.2	357.0	95	4689.40	1480.27	1479.81 N	100.58 W	1483.23	356.11	0.43	0.42	-0.11
43	6019	90.7	356.9	95	4688.65	1575.15	1574.67 N	105.63 W	1578.21	356.16	0.54	0.53	-0.11
44	6114	91.4	356.9	95	4686.91	1670.02	1669.52 N	110.77 W	1673.19	356.20	0.74	0.74	0.00
45	6209	91.7	357.1	95	4684.34	1764.88	1764.35 N	115.74 W	1768.15	356.25	0.38	0.32	0.21
46	6304	91.1	356.7	95	4682.02	1859.73	1859.19 N	120.87 W	1863.11	356.28	0.76	-0.63	-0.42
47	6400	91.6	356.4	96	4679.76	1955.56	1954.98 N	126.65 W	1959.08	356.29	0.61	0.52	-0.31
48	6495	90.4	356.0	95	4678.10	2050.36	2049.76 N	132.94 W	2054.07	356.29	1.33	-1.26	-0.42
49	6590	90.9	355.8	95	4677.03	2145.14	2144.51 N	139.73 W	2149.06	356.27	0.57	0.53	-0.21
50	6685	91.7	356.4	95	4674.87	2239.93	2239.26 N	146.19 W	2244.03	356.26	1.05	0.84	0.63
51	6780	90.8	356.2	95	4672.80	2334.73	2334.04 N	152.32 W	2339.01	356.27	0.97	-0.95	-0.21
52	6875	91.1	355.6	95	4671.22	2429.51	2428.79 N	159.11 W	2433.99	356.25	0.71	0.32	-0.63
53	6970	91.5	355.2	95	4669.07	2524.21	2523.45 N	166.73 W	2528.96	356.22	0.60	0.42	-0.42
54	7065	91.1	356.2	95	4666.91	2618.95	2618.16 N	173.85 W	2623.93	356.20	1.13	-0.42	1.05
55	7161	91.5	356.4	96	4664.73	2714.75	2713.94 N	180.05 W	2719.90	356.20	0.47	0.42	0.21
56	7256	91.1	356.5	95	4662.58	2809.57	2808.73 N	185.93 W	2814.88	356.21	0.43	-0.42	0.11
57	7351	91.3	356.3	95	4660.59	2904.39	2903.52 N	191.89 W	2909.86	356.22	0.30	0.21	-0.21
58	7446	92.0	356.4	95	4657.85	2999.19	2998.29 N	197.94 W	3004.82	356.22	0.74	0.74	0.11
59	7541	90.9	356.6	95	4655.45	3094.01	3093.08 N	203.73 W	3099.78	356.23	1.18	-1.16	0.21
60	7636	91.1	358.0	95	4653.79	3188.90	3187.96 N	208.21 W	3194.75	356.26	1.49	0.21	1.47
61	7731	90.9	359.3	95	4652.13	3283.87	3282.91 N	210.45 W	3289.65	356.33	1.38	-0.21	1.37
62	7827	90.2	0.7	96	4651.21	3379.86	3378.91 N	210.45 W	3385.45	356.44	1.63	-0.73	-373.54
63	7922	90.8	3.1	95	4650.38	3474.78	3473.84 N	207.30 W	3480.02	356.59	2.60	0.63	2.53
64	8017	91.6	5.5	95	4648.39	3569.45	3568.55 N	200.18 W	3574.16	356.79	2.66	0.84	2.53
65	8112	91.2	7.8	95	4646.07	3663.72	3662.87 N	189.18 W	3667.76	357.04	2.46	-0.42	2.42
66	8207	91.6	8.1	95	4643.75	3757.72	3756.93 N	176.04 W	3761.05	357.32	0.53	0.42	0.32
67	8302	91.0	9.2	95	4641.60	3851.55	3850.83 N	161.76 W	3854.22	357.59	1.32	-0.63	1.16
68	8398	91.5	9.6	96	4639.50	3946.16	3945.51 N	146.08 W	3948.22	357.88	0.67	0.52	0.42
69	8493	90.5	9.5	95	4637.84	4039.75	4039.18 N	130.33 W	4041.28	358.15	1.06	-1.05	-0.11
70	8588	90.9	9.6	95	4636.68	4133.35	4132.86 N	114.57 W	4134.45	358.41	0.43	0.42	0.11
71	8683	91.8	9.3	95	4634.44	4226.96	4226.54 N	98.97 W	4227.70	358.66	1.00	0.95	-0.32
72	8778	91.2	9.7	95	4631.96	4320.55	4320.21 N	83.30 W	4321.01	358.90	0.76	-0.63	0.42
73	8873	91.6	10.2	95	4629.64	4414.01	4413.75 N	66.89 W	4414.26	359.13	0.67	0.42	0.53
74	8969	92.3	10.2	96	4626.37	4508.36	4508.18 N	49.90 W	4508.45	359.37	0.73	0.73	0.00

ArcherCompany: COG Operating, LLCWell: Sidmarine 10 Fed Com 2HLocation: Eddy County, New MexicoRig: UDI 40Job Date: 05/01/13 - 05/08/13Job Number: 04236-433-22Mag Decl.: 7.49Dir Driller: Cody StylesMWD Eng: Justin Warnack

Calculation Method

Proposed Azimuth

Depth Reference

Tie Into: Gyro Survey

Minimum Curvature

359.7KBG

Survey Number	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates		Closure		Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
							N/S (ft)	E/W (ft)	Distance (ft)	Direction Azimuth			
75	9012	92.8	10.5	43	4624.46	4550.58	4550.43 N	42.18 W	4550.63	359.47	1.36	1.16	0.70
Proj.	9076	92.8	10.5	64	4621.33	4613.38	4613.29 N	30.53 W	4613.39	359.62	0.00	0.00	0.00



COG Operating, LLC

Eddy County(NM27E)

Sec.10-T17S-R29E

Sideline 10 Federal #2H

Wellbore #1

Survey: Survey #2-Archer MWD

Standard Survey Report

13 May, 2013

Archer

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Sidemarine 10 Federal #2H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3588.00usft
Site:	Sec.10-T17S-R29E	MD Reference:	WELL @ 3586.00usft
Well:	Sidemarine 10 Federal #2H	North Reference:	Gnd
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Project	Eddy County (NM27E)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Sec.10-T17S-R29E		
Site Position:		Northing:	674,215.100 usft
From:	Map	Easting:	585,900.600 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"
		Latitude:	32° 51' 11.480 N
		Longitude:	104° 3' 12.993 W
		Grid Convergence:	0.15"

Well	Sidemarine 10 Federal #2H		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 50' 33.542 N
		Longitude:	104° 4' 3.151 W
		Ground Level:	3,572.00 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010	2013/04/17	7.64
			Dip Angle
			(°)
			Field Strength
			(nT)
			60.63
			48,749

Design	Wellbore #1		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie-On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			359.73

Survey Program	Date 2013/05/13		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.00	3,993.00	Survey #1-VES Gyro (Wellbore #1)	GYD_DP_MS
4,085.00	9,076.00	Survey #2-Archer MWD (Wellbore #1)	MWD
			Description
			Gyrodatta gyro-compassing and drop
			MWD - Standard

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
Tie-In/VES Survey										
3,993.00	0.26	190.30	3,992.95	3.24	-6.31	3.27	0.00	0.00	0.00	
First Archer Survey										
4,085.00	0.40	191.60	4,084.95	2.72	-6.41	2.75	0.15	0.15	1.41	
4,117.00	0.40	228.50	4,116.95	2.53	-6.52	2.56	0.79	0.00	115.31	
4,148.00	1.80	348.60	4,147.94	2.94	-6.69	2.97	6.55	4.52	387.42	
4,180.00	5.00	355.40	4,179.88	4.82	-6.90	4.85	10.06	10.00	21.25	
4,212.00	8.20	356.20	4,211.66	8.49	-7.17	8.52	10.00	10.00	2.50	
4,243.00	11.80	358.80	4,242.19	13.87	-7.38	13.90	11.70	11.61	8.39	
4,275.00	15.60	358.20	4,273.27	21.44	-7.58	21.48	11.88	11.87	-1.87	
4,309.00	20.00	355.70	4,305.64	31.81	-8.16	31.85	13.13	12.94	-7.35	
4,341.00	23.00	354.30	4,335.41	43.49	-9.20	43.54	9.51	9.37	-4.37	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well Sidemarine-10 Federal #2H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3586'00usft
Site:	Sec 10-T17S-R29E	MD Reference:	WELL @ 3586'00usft
Well:	Sidemarine 10 Federal #2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,373.00	26.10	353.00	4,364.51	56.70	-10.67	56.75	9.83	9.69	-4.06
4,404.00	29.40	352.20	4,391.94	71.01	-12.54	71.07	10.71	10.65	-2.58
4,436.00	32.90	352.60	4,419.32	87.42	-14.73	87.49	10.96	10.94	1.25
4,468.00	36.20	353.60	4,445.68	105.43	-16.90	105.51	10.46	10.31	3.12
4,500.00	39.10	354.70	4,471.01	124.88	-18.88	124.97	9.30	9.06	3.44
4,531.00	42.30	355.80	4,494.51	145.02	-20.55	145.12	10.58	10.32	3.55
4,563.00	45.60	356.00	4,517.54	167.17	-22.14	167.27	10.32	10.31	0.62
4,594.00	48.80	355.50	4,538.60	189.85	-23.83	189.96	10.39	10.32	-1.61
4,626.00	52.20	355.00	4,558.96	214.45	-25.87	214.57	10.69	10.62	-1.56
4,658.00	55.50	355.20	4,577.83	240.19	-28.08	240.33	10.32	10.31	0.62
4,689.00	58.40	355.60	4,594.74	266.09	-30.16	266.23	9.42	9.35	1.29
4,721.00	61.10	356.20	4,610.85	293.66	-32.14	293.81	8.59	8.44	1.87
4,753.00	64.00	356.20	4,625.60	321.99	-34.02	322.15	9.06	9.06	0.00
4,785.00	66.60	356.50	4,638.97	351.00	-35.87	351.17	8.17	8.12	0.94
4,816.00	69.20	356.50	4,650.64	379.67	-37.62	379.85	8.39	8.39	0.00
4,848.00	71.70	356.60	4,661.34	409.77	-39.43	409.95	7.82	7.81	0.31
4,880.00	74.20	357.00	4,670.73	440.31	-41.14	440.50	7.90	7.81	1.25
4,911.00	76.40	357.50	4,678.59	470.26	-42.58	470.46	7.27	7.10	1.61
4,943.00	79.10	357.60	4,685.38	501.50	-43.92	501.70	8.44	8.44	0.31
4,975.00	81.60	357.50	4,690.74	533.02	-45.26	533.23	7.82	7.81	-0.31
5,006.00	84.00	357.00	4,694.63	563.73	-46.74	563.95	7.91	7.74	-1.61
5,038.00	85.90	356.70	4,697.45	595.56	-48.49	595.78	6.01	5.94	-0.94
5,067.00	87.90	356.10	4,699.01	624.46	-50.31	624.69	7.20	6.90	-2.07
5,099.00	89.80	356.00	4,699.66	656.37	-52.51	656.62	5.95	5.94	-0.31
5,162.00	90.30	355.90	4,699.60	719.22	-56.96	719.48	0.81	0.79	-0.16
5,258.00	91.20	356.00	4,698.35	814.97	-63.74	815.26	0.94	0.94	0.10
5,353.00	91.80	355.70	4,695.86	909.69	-70.62	910.01	0.71	0.63	-0.32
5,448.00	90.90	356.80	4,693.62	1,004.45	-76.83	1,004.81	1.50	-0.95	1.16
5,543.00	91.50	357.00	4,691.63	1,099.29	-81.96	1,099.67	0.67	0.63	0.21
5,638.00	91.10	357.40	4,689.48	1,194.16	-86.60	1,194.56	0.60	-0.42	0.42
5,733.00	89.60	357.30	4,688.90	1,289.05	-90.99	1,289.47	1.58	-1.58	-0.11
5,829.00	89.80	357.10	4,689.40	1,384.93	-95.68	1,385.38	0.29	0.21	-0.21
5,924.00	90.20	357.00	4,689.40	1,479.81	-100.57	1,480.27	0.43	0.42	-0.11
6,019.00	90.70	356.90	4,688.65	1,574.67	-105.63	1,575.16	0.54	0.53	-0.11
6,114.00	91.40	356.90	4,686.91	1,669.51	-110.76	1,670.03	0.74	0.74	0.00
6,209.00	91.70	357.10	4,684.34	1,764.35	-115.73	1,764.88	0.38	0.32	0.21
6,304.00	91.10	356.70	4,682.02	1,859.18	-120.87	1,859.74	0.76	-0.63	-0.42
6,400.00	91.60	356.40	4,679.76	1,954.98	-126.65	1,955.56	0.61	0.52	-0.31
6,495.00	90.40	356.00	4,678.10	2,049.75	-132.94	2,050.37	1.33	-1.26	-0.42
6,590.00	90.90	355.80	4,677.02	2,144.50	-139.73	2,145.15	0.57	0.53	-0.21
6,685.00	91.70	356.40	4,674.87	2,239.26	-146.19	2,239.93	1.05	0.84	0.63
6,780.00	90.80	356.20	4,672.80	2,334.04	-152.32	2,334.74	0.97	-0.95	-0.21
6,875.00	91.10	355.60	4,671.22	2,428.78	-159.11	2,429.52	0.71	0.32	-0.63
6,970.00	91.50	355.20	4,669.06	2,523.45	-166.73	2,524.22	0.60	0.42	-0.42
7,065.00	91.10	356.20	4,666.91	2,618.16	-173.85	2,618.96	1.13	-0.42	1.05
7,161.00	91.50	356.40	4,664.73	2,713.93	-180.04	2,714.76	0.47	0.42	0.21
7,256.00	91.10	356.50	4,662.58	2,808.72	-185.93	2,809.58	0.43	-0.42	0.11
7,351.00	91.30	356.30	4,660.59	2,903.52	-191.89	2,904.40	0.30	0.21	-0.21
7,446.00	92.00	356.50	4,657.85	2,998.29	-197.85	2,999.20	0.77	0.74	0.21
7,541.00	90.90	356.60	4,655.45	3,093.09	-203.57	3,094.03	1.16	-1.16	0.11
7,636.00	91.10	358.00	4,653.79	3,187.96	-208.04	3,188.92	1.49	0.21	1.47
7,731.00	90.90	359.30	4,652.13	3,282.92	-210.28	3,283.89	1.38	-0.21	1.37
7,827.00	90.20	0.70	4,651.21	3,378.91	-210.28	3,379.88	1.63	-0.73	1.46
7,922.00	90.80	3.10	4,650.38	3,473.85	-207.13	3,474.80	2.60	0.63	2.53

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Sidemarine 10 Federal #2H
Project:	Eddy County(NM27E)	TVD Reference:	WELL @ 3586.00usft
Site:	Sec.10-T17S-R29E	MD Reference:	WELL @ 3586.00usft
Well:	Sidemarine 10 Federal #2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,017.00	91.60	5.50	4,648.39	3,568.55	-200.01	3,569.47	2.66	0.84	2.53
8,112.00	91.20	7.80	4,646.07	3,662.88	-189.01	3,663.74	2.46	-0.42	2.42
8,207.00	91.60	8.10	4,643.75	3,756.94	-175.88	3,757.74	0.53	0.42	0.32
8,302.00	91.00	9.20	4,641.59	3,850.83	-161.59	3,851.56	1.32	-0.63	1.16
8,398.00	91.50	9.60	4,639.50	3,945.52	-145.92	3,946.17	0.67	0.52	0.42
8,493.00	90.50	9.50	4,637.84	4,039.19	-130.16	4,039.76	1.06	-1.05	-0.11
8,588.00	90.90	9.60	4,636.68	4,132.86	-114.40	4,133.36	0.43	0.42	0.11
8,683.00	91.80	9.30	4,634.44	4,226.55	-98.80	4,226.97	1.00	0.95	-0.32
8,778.00	91.20	9.70	4,631.96	4,320.21	-83.13	4,320.56	0.76	-0.63	0.42
8,873.00	91.60	10.20	4,629.63	4,413.75	-66.72	4,414.02	0.67	0.42	0.53
8,969.00	92.30	10.20	4,626.37	4,508.18	-49.73	4,508.37	0.73	0.73	0.00
Last Archer Survey									
9,012.00	92.80	10.50	4,624.45	4,550.44	-42.01	4,550.59	1.36	1.16	0.70
PTB									
9,076.00	92.80	10.50	4,621.33	4,613.29	-30.36	4,613.39	0.00	0.00	0.00

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Sidemarine 10 Fed #2H	0.00	0.00	4,621.33	4,613.29	-30.36	674,983.493	581,601.237	32° 51' 19.193 N	104° 4' 3.371 W
- survey hits target center									
- Point									

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
3,993.00	3,992.95	3.24	-6.31	Tie-In / VES Survey
4,085.00	4,084.95	2.72	-6.41	First Archer Survey
9,012.00	4,624.45	4,550.44	-42.01	Last Archer Survey
9,076.00	4,621.33	4,613.29	-30.36	PTB

Checked By: _____ Approved By: _____ Date: _____