

30-015-41283

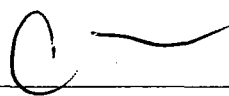
Archer

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

MWD Survey Certification

State of New Mexico
County of Eddy

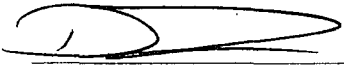
I, Amador Baggerly, certify that; I am employed by Archer Directional Drilling Services; that I did on the day(s) of 05/11/13 through 06/14/13, conduct or supervise the taking of MWD surveys: **Original Hole:** from a depth of 360 feet to a depth of 1990 feet; **Curve:** from a depth of 6944 feet to a depth of 11904 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 Barn Owl Federal 3H (API # 30-015-41283), 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 1 day of July, 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

Job Number:

04247-433-22

Well: Barn Owl Federal 3H-OH

Mag Decl.:

7.62

Location: Eddy County, New Mexico

Dir. Driller:

Levi Galvin

Rig: Patriot 2

MWD Eng:

Geo Davila

Calculation Method

Minimum Curvature

Proposed Azimuth

359.2

Depth Reference

KBG

Tie Into:

Assumed Vertical

Job Date: 05/11/13 - 06

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	0.00	0	0	0	0	0	0.00 0	0.00 0					
1	360	1.0	128.7	360	359.98	-2.00	1.96 S	2.45 E	3.14	128.70	0.28	0.28	35.75
2	431	1.1	122.4	71	430.97	-2.76	2.72 S	3.51 E	4.44	127.73	0.21	0.14	-8.87
3	516	1.2	118.9	85	515.95	-3.65	3.58 S	4.98 E	6.13	125.75	0.14	0.12	-4.12
4	603	1.5	121.0	87	602.93	-4.70	4.61 S	6.75 E	8.18	124.33	0.35	0.34	2.41
5	687	2.9	115.3	84	686.86	-6.22	6.09 S	9.62 E	11.38	122.33	1.68	1.67	-6.79
6	782	3.3	110.6	95	781.73	-8.27	8.07 S	14.35 E	16.46	119.37	0.50	0.42	-4.95
7	878	3.0	110.1	96	877.58	-10.17	9.91 S	19.29 E	21.69	117.19	0.31	-0.31	-0.52
8	972	3.1	111.0	94	971.45	-11.99	11.67 S	23.98 E	26.66	115.95	0.12	0.11	0.96
9	1068	3.1	104.4	96	1067.31	-13.63	13.24 S	28.91 E	31.80	114.61	0.37	0.00	-6.87
10	1162	2.9	106.4	94	1161.18	-15.00	14.55 S	33.66 E	36.67	113.37	0.24	-0.21	2.13
11	1258	3.2	108.9	96	1257.04	-16.62	16.10 S	38.52 E	41.75	112.68	0.34	0.31	2.60
12	1353	3.0	99.0	95	1351.90	-17.94	17.35 S	43.49 E	46.82	111.75	0.60	-0.21	-10.42
13	1448	2.0	95.0	95	1446.81	-18.53	17.88 S	47.59 E	50.84	110.59	1.07	-1.05	-4.21
14	1543	2.2	83.3	95	1541.75	-18.51	17.81 S	51.06 E	54.07	109.23	0.50	-0.21	-12.32
15	1638	2.8	75.1	95	1636.66	-17.75	17.00 S	55.11 E	57.67	107.15	0.73	0.63	-8.63
16	1733	3.1	71.3	95	1731.53	-16.39	15.58 S	59.78 E	61.78	104.61	0.38	0.32	-4.00
17	1828	2.3	58.5	95	1826.43	-14.63	13.76 S	63.84 E	65.31	102.17	1.05	-0.84	-13.47
18	1940	2.2	14.8	112	1938.35	-11.41	10.51 S	66.31 E	67.14	99.01	1.50	-0.09	-39.02
Proj.	1990	2.2	14.8	50	1988.31	-9.56	8.65 S	66.80 E	67.36	97.38	0.00	0.00	0.00



Company: COG Operating, LLC

Job Number: 04247-433-22

Calculation Method

Minimum Curvature

Well: Barn Owl Federal 3H-Lat

Mag Decl.: 7.62

Proposed Azimuth

359.2

Location: Eddy County, New Mexico

Dir Driller: Levi Galvin

Depth Reference

KBG

Rig: Patriot 2

MWD Eng: Geo Davila

Tie Into: Gyro Survey

Job Date: 05/11/13 - 06/14/13

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	6900.00	1.35	267.79	0	6896.64	32.72	32.48 S	17.90 E	0.00	0.00	0	0	0
1	6944	1.4	314.0	44	6940.63	-32.35	32.13 S	17.00 E	36.35	152.12	2.45	0.11	105.02
2	6976	4.7	348.1	32	6972.58	-30.79	30.57 S	16.44 E	34.71	151.73	11.33	10.31	106.56
3	7008	10.5	351.5	32	7004.29	-26.61	26.40 S	15.74 E	30.74	149.19	18.17	18.13	10.62
4	7040	16.4	0.2	32	7035.40	-19.20	18.99 S	15.33 E	24.41	141.10	19.44	18.44	-1097.81
5	7071	20.5	5.5	31	7064.80	-9.42	9.21 S	15.86 E	18.34	120.14	14.28	13.23	17.10
6	7103	23.1	5.3	32	7094.51	2.39	2.62 N	16.98 E	17.18	81.22	8.13	8.13	-0.63
7	7135	25.5	4.8	32	7123.67	15.49	15.74 N	18.14 E	24.01	49.05	7.53	7.50	-1.56
8	7167	28.2	4.5	32	7152.22	29.88	30.14 N	19.31 E	35.79	32.64	8.45	8.44	-0.94
9	7199	29.8	4.6	32	7180.21	45.32	45.61 N	20.54 E	50.02	24.24	5.00	5.00	0.31
10	7230	30.6	6.4	31	7207.00	60.82	61.13 N	22.03 E	64.98	19.82	3.90	2.58	5.81
11	7262	31.8	7.3	32	7234.37	77.25	77.58 N	24.01 E	81.22	17.20	4.02	3.75	2.81
12	7294	36.1	7.0	32	7260.91	94.95	95.31 N	26.23 E	98.86	15.39	13.45	13.44	-0.94
13	7326	40.0	7.6	32	7286.10	114.47	114.87 N	28.74 E	118.41	14.05	12.24	12.19	-1.88
14	7357	43.1	4.7	31	7309.30	134.88	135.31 N	30.93 E	138.80	12.88	11.77	10.00	-9.35
15	7389	45.0	4.5	32	7332.30	157.03	157.49 N	32.71 E	160.85	11.74	5.95	5.94	-0.63
16	7421	48.4	3.3	32	7354.24	180.23	180.72 N	34.29 E	183.94	10.74	10.97	10.63	-3.75
17	7452	53.1	1.9	31	7373.85	204.19	204.69 N	35.37 E	207.72	9.80	15.56	15.16	-4.52
18	7484	55.4	2.2	32	7392.55	230.13	230.64 N	36.30 E	233.48	8.94	7.23	7.19	0.94
19	7516	57.4	1.7	32	7410.26	256.75	257.28 N	37.21 E	259.95	8.23	6.38	6.25	-1.56
20	7547	59.4	0.1	31	7426.50	283.14	283.68 N	37.62 E	286.16	7.55	7.81	6.45	-5.16
21	7579	62.1	357.4	32	7442.14	311.05	311.58 N	37.00 E	313.77	6.77	11.20	8.44	1116.56
22	7611	64.8	356.3	32	7456.44	339.65	340.16 N	35.42 E	342.00	5.94	8.98	8.44	-3.44
23	7642	68.6	355.8	31	7468.70	368.07	368.56 N	33.46 E	370.08	5.19	12.35	12.26	-1.61
24	7674	73.0	356.3	32	7479.22	398.24	398.70 N	31.38 E	399.93	4.50	13.83	13.75	1.56
25	7706	74.9	356.5	32	7488.07	428.95	429.39 N	29.45 E	430.40	3.92	5.97	5.94	0.62
26	7737	76.5	357.2	31	7495.72	458.96	459.38 N	27.80 E	460.23	3.46	5.61	5.16	2.26
27	7769	78.5	358.6	32	7502.65	490.19	490.60 N	26.66 E	491.33	3.11	7.57	6.25	4.38
28	7801	81.7	358.8	32	7508.15	521.71	522.11 N	25.94 E	522.76	2.84	10.02	10.00	0.62
29	7832	86.0	358.9	31	7511.47	552.53	552.92 N	25.32 E	553.50	2.62	13.87	13.87	0.32
30	7864	90.2	358.4	32	7512.53	584.50	584.89 N	24.57 E	585.40	2.41	13.22	13.13	-1.56
31	7896	92.7	358.7	32	7511.72	616.49	616.87 N	23.76 E	617.32	2.21	7.87	7.81	0.94
32	7927	92.9	358.7	31	7510.21	647.45	647.82 N	23.06 E	648.23	2.04	0.65	0.65	0.00
33	8022	93.5	358.7	95	7504.90	742.29	742.65 N	20.91 E	742.94	1.61	0.63	0.63	0.00
34	8116	92.8	358.7	94	7499.74	836.15	836.48 N	18.78 E	836.69	1.29	0.74	-0.74	0.00
35	8212	89.5	359.3	96	7497.81	932.11	932.43 N	17.10 E	932.59	1.05	3.49	-3.44	0.63
36	8306	87.1	358.5	94	7500.60	1026.06	1026.37 N	15.30 E	1026.48	0.85	2.69	-2.55	-0.85



Company: COG Operating, LLC

Job Number: 04247-433-22

Calculation Method

Minimum Curvature

Well: Barn Owl Federal 3H-Lat

Mag Decl.: 7.62

Proposed Azimuth

359.2

Location: Eddy County, New Mexico

Dir Driller: Levi Galvin

Depth Reference

KBG

Rig: Patriot 2

MWD Eng: Geo Davila

Tie Into: Gyro Survey

Job Date: 05/11/13 - 06/14/13

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	8401	87.3	358.6	95	7505.24	1120.94	1121.22 N	12.90 E	1121.30	0.66	0.24	0.21	0.11
38	8496	87.5	359.1	95	7509.55	1215.84	1216.11 N	10.99 E	1216.16	0.52	0.57	0.21	0.53
39	8591	87.9	358.9	95	7513.36	1310.77	1311.01 N	9.34 E	1311.05	0.41	0.47	0.42	-0.21
40	8686	89.9	359.2	95	7515.19	1405.74	1405.98 N	7.76 E	1406.00	0.32	2.13	2.11	0.32
41	8782	92.1	358.4	96	7513.51	1501.72	1501.94 N	5.75 E	1501.95	0.22	2.44	2.29	-0.83
42	8877	92.9	358.0	95	7509.37	1596.61	1596.80 N	2.77 E	1596.80	0.10	0.94	0.84	-0.42
43	8972	90.9	357.8	95	7506.22	1691.53	1691.68 N	0.71 W	1691.68	359.98	2.12	-2.11	-0.21
44	9067	91.2	357.4	95	7504.48	1786.48	1786.58 N	4.69 W	1786.58	359.85	0.53	0.32	-0.42
45	9138	90.3	357.9	71	7503.55	1857.44	1857.51 N	7.60 W	1857.53	359.77	1.45	-1.27	0.70
46	9233	89.0	358.7	95	7504.13	1952.43	1952.46 N	10.41 W	1952.49	359.69	1.61	-1.37	0.84
47	9328	89.7	358.8	95	7505.21	2047.42	2047.44 N	12.49 W	2047.47	359.65	0.74	0.74	0.11
48	9423	89.2	359.0	95	7506.12	2142.41	2142.41 N	14.31 W	2142.46	359.62	0.57	-0.53	0.21
49	9518	89.4	359.1	95	7507.28	2237.40	2237.39 N	15.89 W	2237.45	359.59	0.24	0.21	0.11
50	9613	89.8	359.0	95	7507.94	2332.40	2332.38 N	17.46 W	2332.44	359.57	0.43	0.42	-0.11
51	9708	89.8	358.8	95	7508.27	2427.40	2427.36 N	19.28 W	2427.44	359.54	0.21	0.00	-0.21
52	9803	90.0	358.1	95	7508.44	2522.39	2522.32 N	21.85 W	2522.42	359.50	0.77	0.21	-0.74
53	9898	90.5	357.3	95	7508.02	2617.35	2617.25 N	25.67 W	2617.37	359.44	0.99	0.53	-0.84
54	9993	90.9	356.7	95	7506.86	2712.27	2712.11 N	30.64 W	2712.28	359.35	0.76	0.42	-0.63
55	10088	90.6	356.3	95	7505.62	2807.16	2806.92 N	36.44 W	2807.16	359.26	0.53	-0.32	-0.42
56	10183	90.1	355.9	95	7505.04	2902.01	2901.70 N	42.90 W	2902.02	359.15	0.67	-0.53	-0.42
57	10278	89.2	355.3	95	7505.62	2996.82	2996.42 N	50.19 W	2996.84	359.04	1.14	-0.95	-0.63
58	10373	89.7	355.2	95	7506.53	3091.59	3091.09 N	58.05 W	3091.63	358.92	0.54	0.53	-0.11
59	10469	89.5	355.0	96	7507.20	3187.34	3186.73 N	66.25 W	3187.42	358.81	0.29	-0.21	-0.21
60	10564	88.6	355.6	95	7508.78	3282.10	3281.40 N	74.04 W	3282.23	358.71	1.14	-0.95	0.63
61	10658	89.1	355.8	94	7510.66	3375.91	3375.11 N	81.08 W	3376.09	358.62	0.57	0.53	0.21
62	10752	88.5	356.5	94	7512.63	3469.75	3468.88 N	87.39 W	3469.98	358.56	0.98	-0.64	0.74
63	10847	88.8	356.9	95	7514.87	3564.63	3563.70 N	92.86 W	3564.91	358.51	0.53	0.32	0.42
64	10943	88.7	357.2	96	7516.97	3660.54	3659.55 N	97.80 W	3660.85	358.47	0.33	-0.10	0.31
65	11038	88.6	357.4	95	7519.20	3755.46	3754.41 N	102.27 W	3755.81	358.44	0.24	-0.11	0.21
66	11133	90.1	358.2	95	7520.28	3850.42	3849.33 N	105.92 W	3850.79	358.42	1.79	1.58	0.84
67	11228	90.2	358.2	95	7520.03	3945.40	3944.29 N	108.90 W	3945.79	358.42	0.11	0.11	0.00
68	11323	90.5	359.2	95	7519.45	4040.40	4039.26 N	111.06 W	4040.79	358.43	1.10	0.32	1.05
69	11419	90.7	360.0	96	7518.45	4136.39	4135.25 N	111.73 W	4136.76	358.45	0.86	0.21	0.83
70	11514	91.4	2.9	95	7516.71	4231.29	4230.19 N	109.33 W	4231.61	358.52	3.14	0.74	-375.89
71	11610	89.8	4.0	96	7515.70	4327.02	4326.01 N	103.55 W	4327.25	358.63	2.02	-1.67	1.15
72	11705	90.4	4.4	95	7515.53	4421.66	4420.75 N	96.59 W	4421.81	358.75	0.76	0.63	0.42
73	11800	88.3	3.6	95	7516.61	4516.32	4515.51 N	89.97 W	4516.41	358.86	2.37	-2.21	-0.84
74	11857	88.4	3.4	57	7518.25	4573.13	4572.38 N	86.49 W	4573.20	358.92	0.39	0.18	-0.35



Company: COG Operating, LLC

Job Number: 04247-433-22

Calculation Method

Minimum Curvature

Well: Barn Owl Federal 3H-Lat

Mag Decl.: 7.62

Proposed Azimuth

359.2

Location: Eddy County, New Mexico

Dir Driller: Levi Galvin

Depth Reference

KBG

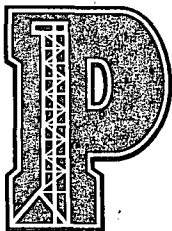
Rig: Patriot 2

MWD Eng: Geo Davila

Tie Into: Gyro Survey

Job Date: 05/11/13 - 06/14/13

Survey Number	Survey Depth (ft)	Inclina- tion (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			
Proj.	11904	88.4	3.4	47	7519.57	4619.99	4619.28 N	83.70 W	4620.04	358.96	0.00	0.00	0.00



PATRIOT DRILLING, LLC

OPERATOR: COG Operating, LLC
WELL/LEASE: Barn Owl Federal # 3 H.
COUNTY: Eddy Co., New Mexico
Sec. 18, T26S, R27E

RECEIVED

JUL 24 2013

NMOCD ARTESIA

**STATE OF NEW MEXICO
DEVIATION REPORT**

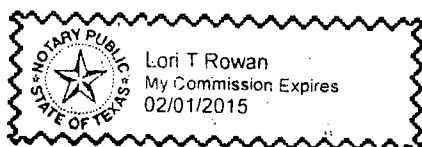
<u>Depth</u>	<u>Deviation</u>	<u>Depth</u>	<u>Deviation</u>
345	1 1/2	4,609	1 1/2
516	1 1/4	5,081	1 1/4
687	3	5,554	3
909	3	5,756	3
1,162	3	6,029	2
1,638	3	6,342	2 1/2
1,940	2 1/4	6,500	2 1/2
2,050	2 1/4	6,688	1 1/2
2,196	2	7,100	1
2,682	1 1/2	7,532	2 1/2
3,190	1 1/2	7,788	2
3,555	1	8,277	1
3,758	3/4		
4,201	1		

Patriot Drilling, LLC

M. Leroy Peterson, Executive Vice-
President

The foregoing instrument was acknowledged before me on this 17th day of June, 2013 by M. Leroy Peterson, Executive Vice-President of Patriot Drilling, LLC.

My Commission Expires: 02/01/2015



Lori T. Rowan
Notary Public for Ector Co., Texas



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



June 7, 2013

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

Attn: Kanicia Castillo

Re: **Barn Owl Federal No 003H**

Please find enclosed a copy of the survey from 0' to 7,000' 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 7th day of June
A.D. 2013, by Keith Havelka




Laura Ballew
Notary Public, State of Texas



Company: COG OPERATING, LLC (CONCHO)

Lease/Well: BARN OWL FEDERAL/NO 003H

Rig Name: PATRIOT #2

State/County: NEW MEXICO/EDDY

Latitude: 32.04, Longitude: -104.23

GRID North is 0.05 Degrees East of True North

VS-Azi: 0.00 Degrees



Depth Reference : RKB=16'

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: gyrobarnowlfed#3h.ut

Minimum Curvature Method

Report Date/Time: 6/7/2013 / 14:43

Vaughn Energy Services

Conway, AR

501-730-0602

Surveyor: Michael Komarek

Barn Owl Federal No 003H / API 30-015-41283



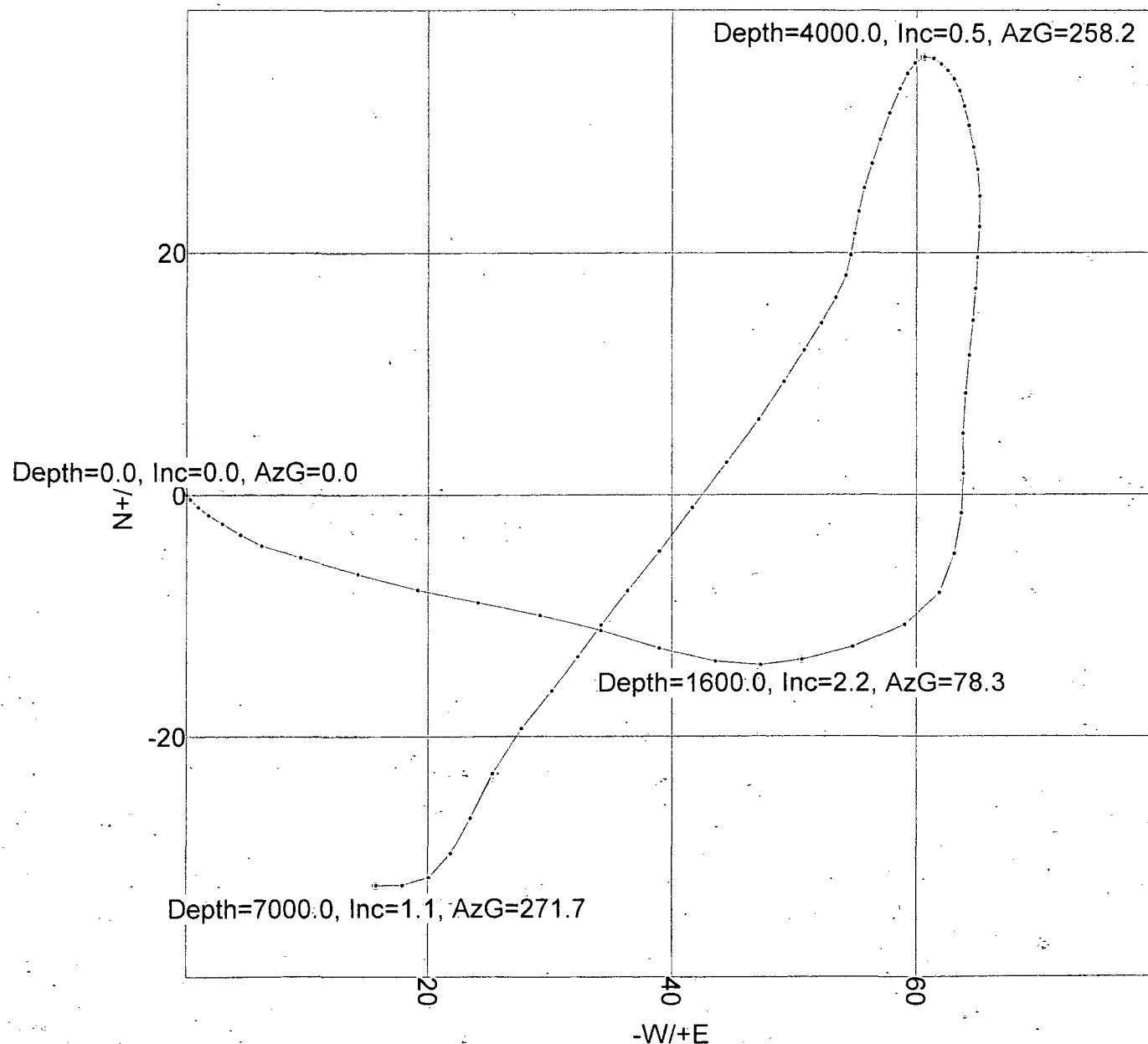
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.54	137.53	100.00	-0.35	0.32	-0.35	0.47	137.53	0.54
200.00	0.49	132.96	199.99	-0.99	0.95	-0.99	1.37	136.10	0.06
300.00	0.75	125.68	299.99	-1.66	1.80	-1.66	2.45	132.77	0.27
400.00	0.82	117.19	399.98	-2.37	2.97	-2.37	3.80	128.64	0.14
500.00	1.18	123.81	499.96	-3.28	4.47	-3.28	5.54	126.27	0.38
600.00	1.11	109.13	599.94	-4.17	6.24	-4.17	7.50	123.75	0.30
700.00	2.74	105.92	699.88	-5.14	9.45	-5.14	10.76	118.55	1.64
800.00	2.97	106.28	799.76	-6.53	14.24	-6.53	15.67	114.62	0.23
900.00	2.86	103.17	899.63	-7.82	19.16	-7.82	20.69	112.20	0.20
1000.00	2.93	100.59	999.50	-8.86	24.09	-8.86	25.67	110.18	0.15
1100.00	3.05	102.36	1099.37	-9.89	29.20	-9.89	30.83	108.72	0.15
1200.00	2.86	106.47	1199.23	-11.17	34.18	-11.17	35.96	108.10	0.28
1300.00	2.89	107.90	1299.11	-12.65	38.97	-12.65	40.98	107.98	0.08
1400.00	2.53	98.50	1399.00	-13.75	43.56	-13.75	45.68	107.52	0.57
1500.00	1.72	88.43	1498.93	-14.04	47.24	-14.04	49.28	106.55	0.89
1600.00	2.20	78.28	1598.87	-13.61	50.62	-13.61	52.41	105.05	0.59
1700.00	2.72	73.18	1698.78	-12.53	54.77	-12.53	56.19	102.89	0.57
1800.00	2.64	60.09	1798.67	-10.69	59.04	-10.69	60.00	100.27	0.62

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	1.96	29.11	1898.59	-8.05	61.87	-8.05	62.39	97.41	1.39
2000.00	2.02	12.21	1998.53	-4.83	63.08	-4.83	63.26	94.38	0.59
2100.00	1.86	7.55	2098.47	-1.50	63.66	-1.50	63.68	91.35	0.23
2200.00	1.86	358.10	2198.42	1.74	63.82	1.74	63.85	88.44	0.31
2300.00	1.97	0.90	2298.37	5.09	63.80	5.09	64.00	85.44	0.15
2400.00	1.86	5.99	2398.31	8.43	63.99	8.43	64.55	82.50	0.20
2500.00	1.73	5.26	2498.26	11.55	64.30	11.55	65.33	79.82	0.13
2600.00	1.57	6.69	2598.22	14.42	64.60	14.42	66.19	77.42	0.17
2700.00	1.45	2.17	2698.18	17.04	64.81	17.04	67.01	75.27	0.17
2800.00	1.49	3.55	2798.15	19.60	64.94	19.60	67.83	73.20	0.06
2900.00	1.43	3.29	2898.12	22.15	65.09	22.15	68.75	71.21	0.06
3000.00	1.44	358.84	2998.09	24.65	65.14	24.65	69.64	69.27	0.11
3100.00	1.08	350.35	3098.06	26.83	64.95	26.83	70.28	67.55	0.40
3200.00	1.07	348.41	3198.04	28.68	64.60	28.68	70.69	66.06	0.04
3300.00	1.02	349.04	3298.03	30.47	64.25	30.47	71.11	64.62	0.05
3400.00	0.87	345.10	3398.01	32.09	63.88	32.09	71.49	63.33	0.16
3500.00	0.68	340.54	3498.01	33.38	63.49	33.38	71.73	62.26	0.21
3600.00	0.55	328.76	3598.00	34.35	63.04	34.35	71.79	61.42	0.18
3700.00	0.45	318.19	3698.00	35.05	62.53	35.05	71.69	60.73	0.13
3800.00	0.41	311.99	3797.99	35.58	62.01	35.58	71.49	60.15	0.06
3900.00	0.47	302.34	3897.99	36.04	61.39	36.04	71.19	59.58	0.10
4000.00	0.48	258.24	3997.99	36.18	60.63	36.18	70.61	59.18	0.36
4100.00	0.64	221.38	4097.98	35.68	59.86	35.68	69.68	59.20	0.38
4200.00	0.61	208.43	4197.98	34.79	59.24	34.79	68.70	59.57	0.14
4300.00	1.02	204.09	4297.97	33.51	58.62	33.51	67.52	60.24	0.41
4400.00	1.47	202.32	4397.94	31.52	57.77	31.52	65.81	61.38	0.45
4500.00	1.19	196.83	4497.92	29.34	56.99	29.34	64.10	62.75	0.31
4600.00	1.22	199.45	4597.89	27.35	56.33	27.35	62.62	64.10	0.06
4700.00	1.19	195.15	4697.87	25.35	55.71	25.35	61.20	65.54	0.10
4800.00	1.09	191.85	4797.85	23.42	55.24	23.42	60.00	67.03	0.12
4900.00	1.06	189.17	4897.83	21.57	54.90	21.57	58.99	68.55	0.06
5000.00	1.00	191.34	4997.82	19.81	54.58	19.81	58.06	70.05	0.07
5100.00	0.99	195.25	5097.80	18.12	54.18	18.12	57.14	71.50	0.07
5200.00	1.31	208.65	5197.78	16.29	53.41	16.29	55.84	73.03	0.42
5300.00	1.44	210.78	5297.75	14.21	52.22	14.21	54.12	74.77	0.14
5400.00	1.61	213.61	5397.72	11.97	50.80	11.97	52.19	76.75	0.18
5500.00	1.93	212.02	5497.67	9.37	49.13	9.37	50.02	79.20	0.33
5600.00	2.38	214.30	5597.60	6.23	47.07	6.23	47.48	82.46	0.46
5700.00	2.71	218.40	5697.50	2.67	44.44	2.67	44.52	86.56	0.38

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
5800.00	2.63	215.53	5797.39	-1.05	41.64	-1.05	41.65	91.45	0.15
5900.00	2.51	217.81	5897.29	-4.65	38.96	-4.65	39.24	96.81	0.16
6000.00	2.23	219.59	5997.21	-7.88	36.38	-7.88	37.22	102.22	0.29
6100.00	1.89	215.04	6097.14	-10.72	34.19	-10.72	35.84	107.41	0.38
6200.00	1.83	216.28	6197.09	-13.36	32.30	-13.36	34.96	112.47	0.07
6300.00	2.23	217.63	6297.03	-16.19	30.17	-16.19	34.24	118.23	0.40
6400.00	2.37	219.15	6396.95	-19.34	27.68	-19.34	33.76	124.94	0.15
6500.00	2.76	206.91	6496.85	-23.09	25.28	-23.09	34.24	132.40	0.67
6600.00	1.98	205.63	6596.76	-26.79	23.44	-26.79	35.60	138.81	0.79
6700.00	1.85	211.16	6696.70	-29.73	21.86	-29.73	36.90	143.68	0.22
6800.00	1.30	237.41	6796.67	-31.73	20.07	-31.73	37.54	147.69	0.90
6900.00	1.35	267.79	6896.64	-32.38	17.94	-32.38	37.02	151.02	0.70
7000.00	1.11	271.74	6996.62	-32.40	15.79	-32.40	36.04	154.01	0.25



Vaughn Energy Services
Conway, AR
501-730-0602
Surveyor: Michael Komarek
Barn Owl Federal No 003H / API 30-015-41283



VES Survey Date: 06/05/2013



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

July 1, 2013

Re: COG Operating, LLC
Barn Owl Federal 3H
Field: Welch
Rig: Patriot 2
Eddy County, New Mexico
API # 30-015-41283

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>
Geo Davila Field Engineer	Original Hole	360-1990	05/11/13-06/14/13	MWD
	Curve - Lateral	6944-11904		

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

Amador Baggerly
MWD Coordinator