

Results of Directional Survey

API number:	30-025-41026		
OGRID:		Operator:	COG OPERATING LLC
		Property:	TRYELL FEE # 1H

surface	ULSTR:	A	14	T 24S	R 33E
				190 FNL	660 FEL

BH Loc	ULSTR:	P	14	T 24S	R 33E
15475	MD	10950.8	TVD	345 FSL	553 FEL
				4935 FNL	

Top Perf/OH	ULSTR:	A	14	T 24S	R 33E
11017	MD	10870.3	TVD	484 FNL	637 FEL

Bot Perf/OH	ULSTR:	P	14	T 24S	R 33E
15372	MD	10947.6	TVD	447 FSL	564 FEL
				4833 FNL	

	MD	N/S	E/W	VD
	10985	-263.60	25.90	10860.9
TOP PERFS/OH	11017	-294.10	22.90	10870.30
	11017	-294.10	22.90	10870.30
	15304	-4575.20	87.90	10945.30
BOT PERFS/OH	15372	-4642.77	95.63	10947.59
	15399	-4669.60	98.70	10948.50

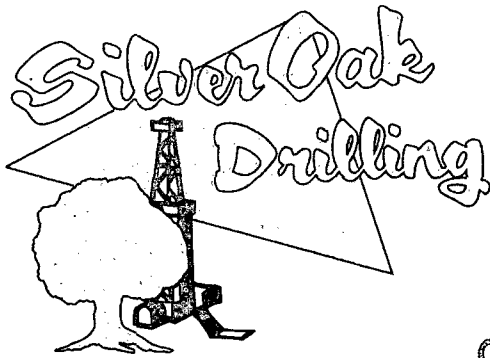
NEXT TO LAST	15474.3	-4744.30	107.30	10950.70
LAST READING	15475	-4745.00	107.40	10950.80
TD	15475	-4745.00	107.40	10950.80

Surface Location	190	FN	660	FE
Projected BHL	4935	FN	553	FE
Location of				
Top Perfs/OH	484	FN	637	FE
Bottom Perfs/OH	4833	FN	564	FE

SUMMARY of Subsurface Locations

Surface Location	A-14-24S-33E	190	FN	660	FE	Vert. Depth
Top Perfs/OH	A-14-24S-33E	484	FN	637	FE	10870.30
Bottom Perfs/OH	P-14-24S-33E	4833	FN	564	FE	10947.59
Projected TD	P-14-24S-33E	4935	FN	553	FE	10950.80

NOV 05 2013



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

COG OPERATING, L.
RECEIVED
JUN 10 2013
ARTESIA WEST

May 27, 2013

HOBBS OCD

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

AUG 13 2013

RECEIVED

RE: Tyrell Fee #1H
190' FNL & 660' FEL
Sec. 14, T24S, R33E
Lea County, New Mexico

Dear Sir,

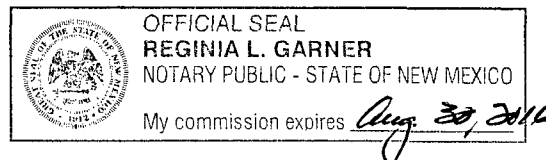
The attached is the Deviation Survey for the above captioned well.

Very truly yours,

Eddie LaRue
Operations Manager

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 27th day of May, 2013.

Notary Public

Tyrell Fee #1H

Date	Depth	Dev	Dir	TVD	Horiz Disp
4/24/2013	250	1.00			
4/24/2013	540	0.20			
4/25/2013	980	0.80			
4/25/2013	1340	1.70			
4/27/2013	1627	0.40	268.60		
4/27/2013	1659	0.20	241.00		
4/27/2013	1690	0.30	242.50		
4/27/2013	1785	1.80	57.40		
4/27/2013	1881	2.20	72.20		
4/27/2013	1977	2.20	69.70		
4/28/2013	2167	1.50	78.40		
4/28/2013	2262	1.20	74.30		
4/28/2013	2358	1.10	90.80		
4/28/2013	2451	1.30	77.70		
4/28/2013	2546	1.30	71.60		
4/28/2013	2641	1.40	87.00		
4/28/2013	2737	1.90	87.90		
4/28/2013	2832	0.90	104.00		
4/28/2013	2927	0.80	109.90		
4/28/2013	3118	1.10	94.40		
4/28/2013	3213	0.10	166.40		
4/28/2013	3308	0.30	280.20		
4/29/2013	3594	1.00	2.30		
4/29/2013	3689	1.10	43.30		
4/29/2013	3785	1.00	82.30		
4/29/2013	3880	0.80	108.80		
4/29/2013	4071	2.40	174.00		
4/30/2013	4167	1.50	208.50	4212.00	
4/30/2013	4262	1.60	217.80	4307.00	
4/30/2013	4357	1.50	218.00	4402.00	
4/30/2013	4452	1.80	211.40	4497.00	
4/30/2013	4452	1.80	211.40		
4/30/2013	4738	1.30	188.00		
4/30/2013	4834	0.30	283.90		
4/30/2013	4929	0.40	158.00		
5/1/2013	5025	0.70	148.40	5070.00	
5/1/2013	5080	0.90	128.00	5125.00	
5/2/2013	5175	0.60			
5/2/2013	5592	0.20			
5/3/2013	5973	0.30			
5/3/2013	6384	0.40			
5/3/2013	6796	0.40			
5/3/2013	7176	0.70			

Tyrell Fee #1H

Date	Depth	Dev	Dir	TVD	Horiz Disp
5/3/2013	7588	0.30			
5/4/2013	7938	1.80			
5/4/2013	8070	2.10			
5/4/2013	8165	2.70			
5/4/2013	8445	2.20			
5/5/2013	8572	1.70			
5/5/2013	8667	1.40			
5/5/2013	8802	1.60			
5/5/2013	9022	1.10			
5/5/2013	9236	1.30			
5/6/2013	9396	1.10			
5/6/2013	9634	2.90			
5/6/2013	9730	2.50			
5/7/2013	9872	1.20	327.70		
5/8/2013	10063	0.50	208.50	10116.00	
5/8/2013	10158	0.60	713.30		
5/9/2013	10380	3.80			
5/9/2013	10476	15.60	179.20		
5/9/2013	10508	16.90	176.50		
5/9/2013	10539	19.40	176.00		
5/10/2013	10603	23.80	174.30	10591.80	10.09
5/10/2013	10634	26.20	174.60	10619.97	23.14
5/10/2013	10729	38.60	178.50		
5/12/2013	10667	29.50	174.50		
5/13/2013	10699	34.50	176.70		
5/13/2013	10731	34.60	181.10		
5/13/2013	10763	36.20	188.70		
5/13/2013	10794	40.30	193.60		
5/14/2013	10889	54.80	189.00		
5/14/2013	10921	60.00	186.70		
5/14/2013	10953	65.00	185.50		
5/14/2013	10985	70.30	185.20		
5/14/2013	11017	75.60	186.00		
5/14/2013	11048	80.90	184.40		
5/15/2013	11081	87.80	182.90		
5/15/2013	11113	90.80	182.30		
5/15/2013	11211	90.90	182.20		
5/15/2013	11307	90.20	181.50		
5/15/2013	11447	88.50	182.00		
5/15/2013	11779	87.90	181.50		
5/15/2013	11875	88.40	181.10		
5/16/2013	11972	88.00	181.10		
5/16/2013	12160	87.90	180.60		

Tyrell Fee #1H

Date	Depth	Dev	Dir	TVD	Horiz Disp
5/16/2013	12255	86.30	179.90		
5/16/2013	12352	87.60	180.60		
5/17/2013	12543	89.80	179.40		
5/17/2013	12638	90.12	178.80		
5/17/2013	12733	90.70	178.80		
5/17/2013	12829	90.60	177.10		
5/17/2013	12924	90.20	176.90	10911.66	2198.50
5/17/2013	13020	89.70	178.30	10911.75	2294.49
5/17/2013	13114	89.80	178.50	10912.60	2383.40
5/17/2013	13304	87.40	179.20		
5/17/2013	13400	87.10	179.00		
5/17/2013	13495	86.70	178.60		
5/18/2013	13686	88.20	179.20		
5/18/2013	13781	89.90	180.20		
5/18/2013	13876	90.40	180.40		
5/18/2013	13971	90.40	179.40		
5/18/2013	14067	90.10	178.60	10931.70	3340.91
5/18/2013	14162	90.10	178.10	10931.53	3435.88
5/19/2013	14352	89.50	177.80	10931.30	3625.70
5/19/2013	14448	90.30	177.10		
5/19/2013	14638	89.50	178.60		
5/19/2013	14733	90.80	177.80		
5/19/2013	14828	90.50	176.40		
5/20/2013	14923	88.30	176.00		
5/20/2013	15027	87.90	175.30		
5/20/2013	15113	87.90	174.80		
5/20/2013	15208	87.40	174.10		
5/20/2013	15304	87.80	173.60	10964.25	4575.68
5/20/2013	15399	88.30	173.40	10949.48	4670.09



A GYRO TECHNOLOGIES INC. COMPANY

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

May 10, 2013

MOZES OCD

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

AUG 13 2013

RECEIVED

Attn: Kanicia Castillo

Re: **Tyrell Fee No 001H**

Please find enclosed a copy of the survey from 0' to 9,656' ran on the above referenced well.

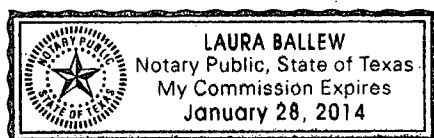
If I can be of any further service, please do not hesitate to call me at 800-606-4976.

Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 10th day of May, A.D., 2013, by Keith Havelka.



Laura Balley
Notary Public, State of Texas



Company: COG Operating LLC (Concho)
Lease/Well: Tyrell Fee /No 001H
Location: S14 T24s R33e
Rig Name: Silver Oak 12
State/County: New Mexico/Lea
Latitude: 32.22, Longitude: -103.54
GRID North is 0.43 Degrees East of True North
VS-Azi: 0.00 Degrees



RKB : 18 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: tyrell fee #001h gyro survey.ut

Minimum Curvature Method

Report Date/Time: 5/10/2013 / 12:17

Vaughn Energy Services

(432) 563-5444

Gardendale, TX

Surveyor: Dustin Wedel

Tyrell Fee No 001H / API 30-025-41026

HOEBS OCD

AUG 13 2013

RECEIVED

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	0.52	307.08	100.00	0.28	-0.36	0.46	307.08	0.52
200.00	0.49	319.87	199.99	0.88	-1.01	1.34	311.18	0.12
300.00	0.44	312.00	299.99	1.47	-1.57	2.15	313.07	0.09
400.00	0.41	299.38	399.99	1.89	-2.16	2.87	311.25	0.10
500.00	0.43	300.17	499.99	2.26	-2.80	3.59	308.93	0.03
600.00	0.33	299.92	599.98	2.59	-3.37	4.26	307.54	0.10
700.00	0.50	283.77	699.98	2.84	-4.05	4.95	305.04	0.21
800.00	0.65	282.26	799.98	3.07	-5.03	5.89	301.37	0.14
900.00	0.76	271.68	899.97	3.21	-6.25	7.02	297.17	0.17
1000.00	0.97	257.55	999.96	3.04	-7.74	8.31	291.47	0.30
1100.00	1.30	250.78	1099.94	2.49	-9.63	9.95	284.48	0.35
1200.00	1.56	258.16	1199.91	1.84	-12.03	12.17	278.67	0.32
1300.00	1.64	260.42	1299.87	1.32	-14.78	14.83	275.10	0.10
1400.00	1.71	257.62	1399.82	0.76	-17.64	17.66	272.47	0.11
1500.00	1.66	258.61	1499.78	0.16	-20.52	20.52	270.44	0.06
1600.00	0.59	264.21	1599.76	-0.18	-22.45	22.45	269.54	1.07
1700.00	0.24	24.38	1699.76	-0.04	-22.87	22.87	269.90	0.74
1800.00	1.90	62.81	1799.74	0.91	-21.30	21.32	272.45	1.72

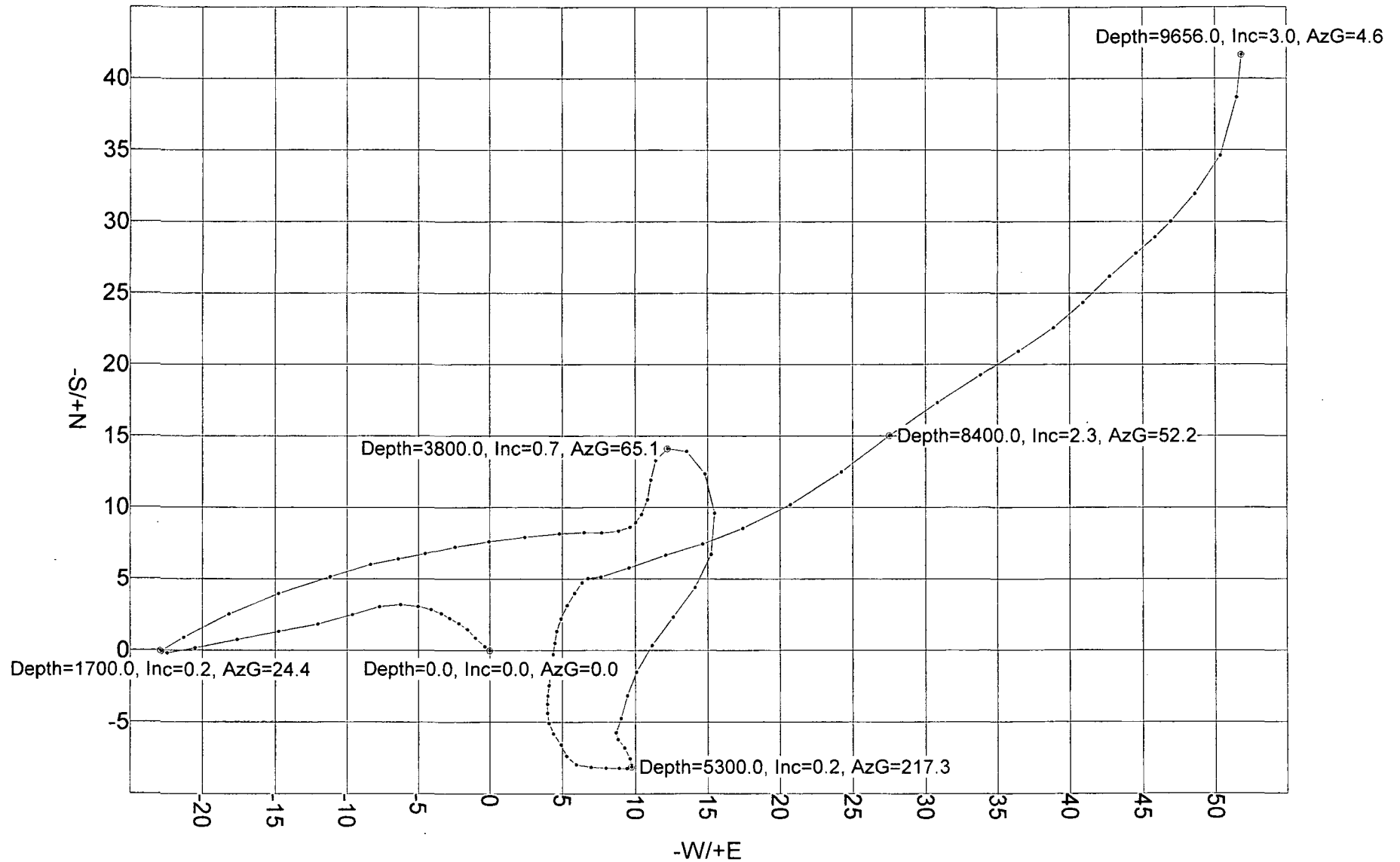
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	2.11	62.07	1899.68	2.53	-18.20	18.38	277.92	0.21
2000.00	2.16	72.21	1999.61	3.97	-14.78	15.30	285.05	0.38
2100.00	2.18	71.85	2099.54	5.14	-11.17	12.30	294.71	0.02
2200.00	1.19	75.05	2199.49	6.00	-8.37	10.30	305.64	0.99
2300.00	1.10	82.89	2299.47	6.39	-6.41	9.05	314.87	0.18
2400.00	1.14	74.63	2399.45	6.77	-4.51	8.13	326.32	0.17
2500.00	1.32	79.68	2499.43	7.24	-2.42	7.63	341.49	0.21
2600.00	1.41	82.33	2599.40	7.61	-0.07	7.61	359.46	0.11
2700.00	1.46	83.53	2699.37	7.91	2.41	8.27	16.96	0.06
2800.00	1.28	84.86	2799.34	8.16	4.79	9.46	30.45	0.18
2900.00	0.67	92.04	2899.33	8.24	6.49	10.49	38.24	0.62
3000.00	0.68	89.76	2999.32	8.22	7.67	11.24	43.02	0.03
3100.00	0.68	78.86	3099.31	8.34	8.84	12.15	46.69	0.13
3200.00	0.30	52.76	3199.31	8.61	9.63	12.91	48.21	0.43
3300.00	0.28	47.73	3299.31	8.93	10.02	13.42	48.29	0.03
3400.00	0.53	28.94	3399.31	9.50	10.43	14.11	47.65	0.28
3500.00	0.75	16.71	3499.30	10.54	10.84	15.12	45.81	0.25
3600.00	0.87	3.89	3599.29	11.92	11.08	16.27	42.91	0.22
3700.00	0.74	24.42	3699.28	13.26	11.40	17.49	40.67	0.31
3800.00	0.71	65.11	3799.27	14.12	12.23	18.68	40.90	0.51
3900.00	1.02	121.01	3899.26	13.92	13.56	19.43	44.24	0.86
4000.00	1.39	156.18	3999.24	12.35	14.81	19.28	50.17	0.81
4100.00	1.91	174.20	4099.20	9.59	15.47	18.20	58.20	0.73
4200.00	1.47	198.36	4199.16	6.71	15.23	16.64	66.21	0.83
4300.00	1.50	212.15	4299.12	4.39	14.13	14.80	72.74	0.36
4400.00	1.43	220.42	4399.09	2.33	12.62	12.84	79.54	0.22
4500.00	1.40	212.81	4499.06	0.35	11.15	11.16	88.20	0.19
4600.00	1.06	206.80	4599.04	-1.51	10.07	10.18	98.51	0.37
4700.00	0.97	194.32	4699.02	-3.15	9.44	9.95	108.46	0.24
4800.00	0.93	195.46	4799.01	-4.75	9.02	10.19	117.80	0.04
4900.00	0.27	213.34	4899.00	-5.73	8.67	10.39	123.48	0.68
5000.00	0.44	136.66	4999.00	-6.21	8.80	10.77	125.20	0.46
5100.00	0.41	148.97	5099.00	-6.80	9.25	11.48	126.31	0.09
5200.00	0.56	157.39	5199.00	-7.56	9.62	12.24	128.15	0.17
5300.00	0.16	217.30	5298.99	-8.13	9.73	12.67	129.87	0.50
5400.00	0.27	270.54	5398.99	-8.24	9.41	12.50	131.21	0.22
5500.00	0.34	272.37	5498.99	-8.22	8.87	12.10	132.82	0.07
5600.00	0.69	271.31	5598.99	-8.20	7.98	11.44	135.78	0.35
5700.00	0.50	274.02	5698.98	-8.15	6.94	10.71	139.58	0.19

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
5800.00	0.67	285.31	5798.98	-7.97	5.94	9.94	143.28	0.21
5900.00	0.51	347.84	5898.97	-7.38	5.28	9.07	144.40	0.63
6000.00	0.54	323.04	5998.97	-6.57	4.90	8.20	143.25	0.23
6100.00	0.50	329.08	6098.96	-5.81	4.39	7.29	142.92	0.07
6200.00	0.41	345.18	6198.96	-5.09	4.08	6.52	141.31	0.16
6300.00	0.42	359.06	6298.96	-4.38	3.98	5.92	137.73	0.10
6400.00	0.29	355.56	6398.96	-3.76	3.95	5.45	133.53	0.13
6500.00	0.38	9.01	6498.95	-3.17	3.99	5.10	128.52	0.12
6600.00	0.44	4.92	6598.95	-2.46	4.07	4.76	121.10	0.07
6700.00	0.41	7.88	6698.95	-1.71	4.15	4.49	112.43	0.04
6800.00	0.43	8.15	6798.95	-0.99	4.26	4.37	103.07	0.02
6900.00	0.40	8.94	6898.94	-0.28	4.36	4.37	93.63	0.03
7000.00	0.52	8.22	6998.94	0.51	4.48	4.51	83.46	0.13
7100.00	0.42	11.29	7098.94	1.32	4.62	4.81	74.02	0.10
7200.00	0.65	22.56	7198.93	2.21	4.91	5.38	65.81	0.25
7300.00	0.52	26.88	7298.93	3.13	5.33	6.18	59.56	0.14
7400.00	0.61	33.35	7398.92	3.99	5.83	7.06	55.64	0.11
7500.00	0.42	37.21	7498.92	4.72	6.35	7.91	53.33	0.20
7600.00	0.21	87.87	7598.92	5.02	6.75	8.41	53.34	0.33
7700.00	0.81	81.52	7698.91	5.13	7.63	9.19	56.06	0.60
7800.00	1.54	67.12	7798.89	5.76	9.57	11.17	58.94	0.79
7900.00	1.54	73.97	7898.85	6.66	12.10	13.81	61.19	0.18
8000.00	1.52	71.87	7998.82	7.44	14.66	16.44	63.08	0.06
8100.00	1.90	65.51	8098.77	8.54	17.43	19.41	63.89	0.43
8200.00	2.30	61.39	8198.71	10.19	20.71	23.08	63.79	0.43
8300.00	2.50	52.68	8298.62	12.48	24.20	27.23	62.73	0.41
8400.00	2.30	52.21	8398.53	15.03	27.52	31.36	61.36	0.20
8500.00	2.32	58.09	8498.45	17.33	30.83	35.36	60.66	0.24
8600.00	1.77	55.87	8598.39	19.27	33.83	38.93	60.34	0.56
8700.00	1.78	59.47	8698.34	20.92	36.44	42.02	60.14	0.11
8800.00	1.61	52.71	8798.29	22.56	38.90	44.96	59.89	0.26
8900.00	1.49	45.04	8898.26	24.33	40.93	47.61	59.27	0.24
9000.00	1.49	44.94	8998.22	26.16	42.77	50.14	58.54	0.00
9100.00	1.27	50.56	9098.20	27.79	44.54	52.50	58.04	0.25
9200.00	0.71	47.01	9198.18	28.92	45.85	54.21	57.76	0.57
9300.00	1.08	43.67	9298.17	30.02	46.95	55.73	57.41	0.37
9400.00	1.82	38.74	9398.14	31.94	48.60	58.15	56.69	0.76
9500.00	1.87	28.33	9498.08	34.62	50.37	61.12	55.50	0.34
9600.00	3.04	7.76	9597.99	38.69	51.50	64.41	53.09	1.45

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
9656.00	3.04	4.61	9653.91	41.64	51.82	66.48	51.21	0.30



Vaughn Energy Services
(432) 563-5444
Gardendale, TX
Surveyor: Dustin Wedel
Tyrell Fee No 001H / API 30-025-41026



VES Survey Date: 05/06/2013



COG Operating LLC

Lea County, NM

Tyrell Fee

#1H

OH

HOBBS OCD

AUG 13 2013

RECEIVED

Survey: MWD #2 St01

Survey Report - Geographic

23 May, 2013



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Lea County, NM	TVD Reference:	WELL @ 3625.8usft (Silver Oak #12 - 18' KB)
Site:	Tyrell Fee	MD Reference:	WELL @ 3625.8usft (Silver Oak #12 - 18' KB)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	test

Project	Lea County, NM		
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		Tyrell Fee			
Site Position:		Northing:	446,201.60 usft	Latitude:	32° 13' 27.163 N
From:	Map	Easting:	746,488.90 usft	Longitude:	103° 32' 10.535 W
Position Uncertainty:	2.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.43 °

Well	#1H					
Well Position	+N/-S	0.0 usft	Northing:	446,201.60 usft	Latitude:	32° 13' 27.163 N
	+E/-W	0.0 usft	Easting:	746,488.90 usft	Longitude:	103° 32' 10.535 W
Position Uncertainty	0.0 usft		Wellhead Elevation:	usft	Ground Level:	3,607.8 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/10/2013	7.34	60.15	48,429

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	179.55	

Survey Program	Date 5/20/2013			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	10,761.0	MWD#1 (OH)	MWD	MWD - Standard

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	446,201.60	746,488.90	32° 13' 27.163 N	103° 32' 10.535 W
100.0	0.52	307.08	100.0	0.3	-0.4	446,201.87	746,488.53	32° 13' 27.166 N	103° 32' 10.539 W
200.0	0.49	319.87	200.0	0.9	-1.0	446,202.47	746,487.90	32° 13' 27.172 N	103° 32' 10.546 W
300.0	0.44	312.00	300.0	1.5	-1.6	446,203.06	746,487.34	32° 13' 27.178 N	103° 32' 10.553 W
400.0	0.41	299.38	400.0	1.9	-2.2	446,203.49	746,486.74	32° 13' 27.182 N	103° 32' 10.560 W
500.0	0.43	300.17	500.0	2.3	-2.8	446,203.85	746,486.10	32° 13' 27.185 N	103° 32' 10.567 W
600.0	0.33	299.92	600.0	2.6	-3.4	446,204.19	746,485.53	32° 13' 27.189 N	103° 32' 10.574 W
700.0	0.50	283.77	700.0	2.8	-4.0	446,204.43	746,484.86	32° 13' 27.191 N	103° 32' 10.582 W
800.0	0.65	282.26	800.0	3.1	-5.0	446,204.66	746,483.88	32° 13' 27.194 N	103° 32' 10.593 W
900.0	0.76	271.68	900.0	3.2	-6.2	446,204.80	746,482.66	32° 13' 27.195 N	103° 32' 10.607 W
1,000.0	0.97	257.55	1,000.0	3.0	-7.7	446,204.64	746,481.17	32° 13' 27.194 N	103° 32' 10.625 W
1,100.0	1.30	250.78	1,099.9	2.5	-9.6	446,204.08	746,479.27	32° 13' 27.188 N	103° 32' 10.647 W



Survey Report - Geographic



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Lea County, NM	TVD Reference:	WELL @ 3625.8usft (Silver Oak #12 - 18' KB)
Site:	Tyrell Fee	MD Reference:	WELL @ 3625.8usft (Silver Oak #12 - 18' KB)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	test

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,200.0	1.56	258.16	1,199.9	1.8	-12.0	446,203.43	746,476.87	32° 13' 27.182 N	103° 32' 10.675 W
1,300.0	1.64	260.42	1,299.9	1.3	-14.8	446,202.91	746,474.13	32° 13' 27.177 N	103° 32' 10.707 W
1,400.0	1.71	257.62	1,399.8	0.8	-17.6	446,202.35	746,471.26	32° 13' 27.172 N	103° 32' 10.740 W
1,500.0	1.66	258.61	1,499.8	0.1	-20.5	446,201.75	746,468.38	32° 13' 27.166 N	103° 32' 10.774 W
1,600.0	0.59	264.21	1,599.8	-0.2	-22.4	446,201.41	746,466.45	32° 13' 27.163 N	103° 32' 10.796 W
1,700.0	0.24	24.38	1,699.8	-0.1	-22.9	446,201.55	746,466.02	32° 13' 27.164 N	103° 32' 10.801 W
1,800.0	1.90	62.81	1,799.7	0.9	-21.3	446,202.49	746,467.58	32° 13' 27.173 N	103° 32' 10.783 W
1,900.0	2.11	62.07	1,899.7	2.5	-18.2	446,204.11	746,470.68	32° 13' 27.189 N	103° 32' 10.747 W
2,000.0	2.16	72.21	1,999.6	4.0	-14.8	446,205.55	746,474.11	32° 13' 27.203 N	103° 32' 10.707 W
2,100.0	2.18	71.85	2,099.5	5.1	-11.2	446,206.72	746,477.71	32° 13' 27.214 N	103° 32' 10.665 W
2,200.0	1.19	75.05	2,199.5	6.0	-8.4	446,207.58	746,480.52	32° 13' 27.223 N	103° 32' 10.632 W
2,300.0	1.10	82.89	2,299.5	6.4	-6.4	446,207.97	746,482.47	32° 13' 27.226 N	103° 32' 10.609 W
2,400.0	1.14	74.63	2,399.5	6.8	-4.5	446,208.35	746,484.39	32° 13' 27.230 N	103° 32' 10.587 W
2,500.0	1.32	79.68	2,499.4	7.2	-2.4	446,208.82	746,486.48	32° 13' 27.235 N	103° 32' 10.562 W
2,600.0	1.41	82.33	2,599.4	7.6	-0.1	446,209.19	746,488.83	32° 13' 27.238 N	103° 32' 10.535 W
2,700.0	1.46	83.53	2,699.4	7.9	2.4	446,209.50	746,491.32	32° 13' 27.241 N	103° 32' 10.506 W
2,800.0	1.28	84.86	2,799.3	8.1	4.8	446,209.74	746,493.69	32° 13' 27.243 N	103° 32' 10.478 W
2,900.0	0.67	92.04	2,899.3	8.2	6.5	446,209.82	746,495.39	32° 13' 27.244 N	103° 32' 10.459 W
3,000.0	0.68	89.76	2,999.3	8.2	7.7	446,209.80	746,496.57	32° 13' 27.244 N	103° 32' 10.445 W
3,100.0	0.68	78.86	3,099.3	8.3	8.8	446,209.92	746,497.74	32° 13' 27.245 N	103° 32' 10.431 W
3,200.0	0.30	52.76	3,199.3	8.6	9.6	446,210.19	746,498.53	32° 13' 27.247 N	103° 32' 10.422 W
3,300.0	0.28	47.73	3,299.3	8.9	10.0	446,210.52	746,498.92	32° 13' 27.250 N	103° 32' 10.417 W
3,400.0	0.53	28.94	3,399.3	9.5	10.4	446,211.09	746,499.33	32° 13' 27.256 N	103° 32' 10.413 W
3,500.0	0.75	16.71	3,499.3	10.5	10.8	446,212.12	746,499.74	32° 13' 27.266 N	103° 32' 10.408 W
3,600.0	0.87	3.89	3,599.3	11.9	11.1	446,213.50	746,499.98	32° 13' 27.280 N	103° 32' 10.405 W
3,700.0	0.74	24.42	3,699.3	13.2	11.4	446,214.85	746,500.30	32° 13' 27.293 N	103° 32' 10.401 W
3,800.0	0.71	65.11	3,799.3	14.1	12.2	446,215.70	746,501.13	32° 13' 27.302 N	103° 32' 10.391 W
3,900.0	1.02	121.01	3,899.3	13.9	13.6	446,215.50	746,502.45	32° 13' 27.299 N	103° 32' 10.376 W
4,000.0	1.39	156.18	3,999.2	12.3	14.8	446,213.93	746,503.71	32° 13' 27.284 N	103° 32' 10.361 W
4,100.0	1.91	174.20	4,099.2	9.6	15.5	446,211.16	746,504.36	32° 13' 27.256 N	103° 32' 10.354 W
4,200.0	1.47	198.36	4,199.2	6.7	15.2	446,208.29	746,504.13	32° 13' 27.228 N	103° 32' 10.357 W
4,300.0	1.50	212.15	4,299.1	4.4	14.1	446,205.96	746,503.03	32° 13' 27.205 N	103° 32' 10.370 W
4,400.0	1.43	220.42	4,399.1	2.3	12.6	446,203.90	746,501.52	32° 13' 27.185 N	103° 32' 10.388 W
4,500.0	1.40	212.81	4,499.1	0.3	11.2	446,201.93	746,500.05	32° 13' 27.165 N	103° 32' 10.405 W
4,600.0	1.06	206.80	4,599.0	-1.5	10.1	446,200.07	746,498.97	32° 13' 27.147 N	103° 32' 10.418 W
4,700.0	0.97	194.32	4,699.0	-3.2	9.4	446,198.43	746,498.35	32° 13' 27.131 N	103° 32' 10.425 W
4,800.0	0.93	195.46	4,799.0	-4.8	9.0	446,196.83	746,497.92	32° 13' 27.115 N	103° 32' 10.430 W
4,900.0	0.27	213.34	4,899.0	-5.8	8.7	446,195.85	746,497.57	32° 13' 27.105 N	103° 32' 10.434 W
5,000.0	0.44	136.66	4,999.0	-6.2	8.8	446,195.37	746,497.71	32° 13' 27.101 N	103° 32' 10.433 W
5,100.0	0.41	148.97	5,099.0	-6.8	9.3	446,194.78	746,498.16	32° 13' 27.095 N	103° 32' 10.428 W
5,200.0	0.56	157.39	5,199.0	-7.6	9.6	446,194.03	746,498.53	32° 13' 27.087 N	103° 32' 10.423 W
5,300.0	0.16	217.30	5,299.0	-8.1	9.7	446,193.46	746,498.63	32° 13' 27.082 N	103° 32' 10.422 W
5,400.0	0.27	270.54	5,399.0	-8.2	9.4	446,193.36	746,498.31	32° 13' 27.081 N	103° 32' 10.426 W
5,500.0	0.34	272.37	5,499.0	-8.2	8.9	446,193.37	746,497.78	32° 13' 27.081 N	103° 32' 10.432 W
5,600.0	0.69	271.31	5,599.0	-8.2	8.0	446,193.40	746,496.88	32° 13' 27.081 N	103° 32' 10.443 W
5,700.0	0.50	274.02	5,699.0	-8.2	6.9	446,193.44	746,495.84	32° 13' 27.082 N	103° 32' 10.455 W
5,800.0	0.67	285.31	5,799.0	-8.0	5.9	446,193.63	746,494.84	32° 13' 27.084 N	103° 32' 10.466 W
5,900.0	0.51	347.84	5,899.0	-7.4	5.3	446,194.22	746,494.19	32° 13' 27.090 N	103° 32' 10.474 W
6,000.0	0.54	323.04	5,999.0	-6.6	4.9	446,195.03	746,493.81	32° 13' 27.098 N	103° 32' 10.478 W
6,100.0	0.50	329.08	6,099.0	-5.8	4.4	446,195.78	746,493.30	32° 13' 27.105 N	103° 32' 10.484 W
6,200.0	0.41	345.18	6,199.0	-5.1	4.1	446,196.50	746,492.99	32° 13' 27.112 N	103° 32' 10.488 W
6,300.0	0.42	359.06	6,299.0	-4.4	4.0	446,197.21	746,492.89	32° 13' 27.119 N	103° 32' 10.489 W
6,400.0	0.29	355.56	6,399.0	-3.8	4.0	446,197.83	746,492.86	32° 13' 27.125 N	103° 32' 10.489 W
6,500.0	0.38	9.01	6,499.0	-3.2	4.0	446,198.41	746,492.90	32° 13' 27.131 N	103° 32' 10.489 W
6,600.0	0.44	4.92	6,599.0	-2.5	4.1	446,199.12	746,492.98	32° 13' 27.138 N	103° 32' 10.488 W

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Lea County, NM	TVD Reference:	WELL @ 3625.8usft (Silver Oak #12 - 18' KB)
Site:	Tyrell Fee	MD Reference:	WELL @ 3625.8usft (Silver Oak #12 - 18' KB)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	test

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,700.0	0.41	7.88	6,698.9	-1.7	4.2	446,199.86	746,493.06	32° 13' 27.145 N	103° 32' 10.487 W
6,800.0	0.43	8.15	6,798.9	-1.0	4.3	446,200.58	746,493.16	32° 13' 27.153 N	103° 32' 10.485 W
6,900.0	0.40	8.94	6,898.9	-0.3	4.4	446,201.30	746,493.27	32° 13' 27.160 N	103° 32' 10.484 W
7,000.0	0.52	8.22	6,998.9	0.5	4.5	446,202.09	746,493.39	32° 13' 27.168 N	103° 32' 10.483 W
7,100.0	0.42	11.29	7,098.9	1.3	4.6	446,202.90	746,493.53	32° 13' 27.176 N	103° 32' 10.481 W
7,200.0	0.65	22.56	7,198.9	2.2	4.9	446,203.78	746,493.82	32° 13' 27.184 N	103° 32' 10.477 W
7,300.0	0.52	26.88	7,298.9	3.1	5.3	446,204.71	746,494.24	32° 13' 27.193 N	103° 32' 10.472 W
7,400.0	0.61	33.35	7,398.9	4.0	5.8	446,205.56	746,494.74	32° 13' 27.202 N	103° 32' 10.467 W
7,500.0	0.42	37.21	7,498.9	4.7	6.4	446,206.30	746,495.25	32° 13' 27.209 N	103° 32' 10.461 W
7,600.0	0.21	87.87	7,598.9	5.0	6.8	446,206.60	746,495.66	32° 13' 27.212 N	103° 32' 10.456 W
7,700.0	0.81	81.52	7,698.9	5.1	7.6	446,206.71	746,496.54	32° 13' 27.213 N	103° 32' 10.446 W
7,800.0	1.54	67.12	7,798.9	5.7	9.6	446,207.33	746,498.48	32° 13' 27.219 N	103° 32' 10.423 W
7,900.0	1.54	73.97	7,898.9	6.6	12.1	446,208.23	746,501.01	32° 13' 27.228 N	103° 32' 10.393 W
8,000.0	1.52	71.87	7,998.8	7.4	14.7	446,209.01	746,503.56	32° 13' 27.235 N	103° 32' 10.364 W
8,100.0	1.90	65.51	8,098.8	8.5	17.4	446,210.11	746,506.33	32° 13' 27.246 N	103° 32' 10.331 W
8,200.0	2.30	61.39	8,198.7	10.2	20.7	446,211.76	746,509.60	32° 13' 27.262 N	103° 32' 10.293 W
8,300.0	2.50	52.68	8,298.6	12.4	24.2	446,214.04	746,513.09	32° 13' 27.284 N	103° 32' 10.252 W
8,400.0	2.30	52.21	8,398.5	15.0	27.5	446,216.59	746,516.41	32° 13' 27.309 N	103° 32' 10.213 W
8,500.0	2.32	58.09	8,498.5	17.3	30.8	446,218.89	746,519.72	32° 13' 27.332 N	103° 32' 10.175 W
8,600.0	1.77	55.87	8,598.4	19.2	33.8	446,220.83	746,522.71	32° 13' 27.351 N	103° 32' 10.140 W
8,700.0	1.78	59.47	8,698.3	20.9	36.4	446,222.49	746,525.33	32° 13' 27.367 N	103° 32' 10.109 W
8,800.0	1.61	52.71	8,798.3	22.5	38.9	446,224.13	746,527.79	32° 13' 27.383 N	103° 32' 10.080 W
8,900.0	1.49	45.04	8,898.3	24.3	40.9	446,225.90	746,529.82	32° 13' 27.400 N	103° 32' 10.056 W
9,000.0	1.49	44.94	8,998.2	26.1	42.8	446,227.73	746,531.66	32° 13' 27.418 N	103° 32' 10.035 W
9,100.0	1.27	50.56	9,098.2	27.8	44.5	446,229.36	746,533.44	32° 13' 27.434 N	103° 32' 10.014 W
9,200.0	0.71	47.01	9,198.2	28.9	45.8	446,230.49	746,534.74	32° 13' 27.445 N	103° 32' 9.999 W
9,300.0	1.08	43.67	9,298.2	30.0	47.0	446,231.59	746,535.85	32° 13' 27.456 N	103° 32' 9.986 W
9,400.0	1.82	38.74	9,398.1	31.9	48.6	446,233.51	746,537.49	32° 13' 27.475 N	103° 32' 9.966 W
9,500.0	1.87	28.33	9,498.1	34.6	50.4	446,236.18	746,539.26	32° 13' 27.502 N	103° 32' 9.946 W
9,600.0	3.04	7.76	9,598.0	38.6	51.5	446,240.25	746,540.39	32° 13' 27.542 N	103° 32' 9.932 W
9,656.0	3.04	4.61	9,653.9	41.6	51.8	446,243.20	746,540.71	32° 13' 27.571 N	103° 32' 9.928 W
9,777.0	2.90	348.60	9,774.8	47.8	51.5	446,249.40	746,540.37	32° 13' 27.632 N	103° 32' 9.932 W
9,872.0	1.20	327.70	9,869.7	51.0	50.5	446,252.60	746,539.36	32° 13' 27.664 N	103° 32' 9.943 W
9,968.0	0.40	106.80	9,965.7	51.7	50.2	446,253.35	746,539.14	32° 13' 27.671 N	103° 32' 9.946 W
10,063.0	0.50	208.50	10,060.7	51.3	50.4	446,252.89	746,539.26	32° 13' 27.667 N	103° 32' 9.944 W
10,158.0	0.60	213.30	10,155.7	50.5	49.9	446,252.11	746,538.79	32° 13' 27.659 N	103° 32' 9.950 W
10,254.0	0.70	216.30	10,251.7	49.6	49.3	446,251.22	746,538.17	32° 13' 27.650 N	103° 32' 9.957 W
10,349.0	0.60	167.60	10,346.7	48.7	49.0	446,250.26	746,537.93	32° 13' 27.641 N	103° 32' 9.960 W
10,380.0	3.80	200.30	10,377.6	47.5	48.7	446,249.14	746,537.61	32° 13' 27.630 N	103° 32' 9.964 W
10,412.0	6.80	189.20	10,409.5	44.7	48.0	446,246.27	746,536.94	32° 13' 27.602 N	103° 32' 9.972 W
10,444.0	10.90	183.20	10,441.1	39.8	47.6	446,241.38	746,536.47	32° 13' 27.553 N	103° 32' 9.978 W
10,476.0	15.60	179.20	10,472.3	32.5	47.5	446,234.05	746,536.36	32° 13' 27.481 N	103° 32' 9.980 W
10,508.0	16.90	176.50	10,503.0	23.5	47.8	446,225.11	746,536.70	32° 13' 27.392 N	103° 32' 9.976 W
10,540.0	19.40	176.00	10,533.4	13.6	48.5	446,215.16	746,537.36	32° 13' 27.294 N	103° 32' 9.970 W
10,571.0	21.90	174.60	10,562.4	2.7	49.4	446,204.27	746,538.26	32° 13' 27.186 N	103° 32' 9.960 W
10,603.0	23.80	174.30	10,591.9	-9.7	50.6	446,191.90	746,539.46	32° 13' 27.063 N	103° 32' 9.947 W
10,634.0	26.20	174.60	10,620.0	-22.7	51.8	446,178.86	746,540.73	32° 13' 26.934 N	103° 32' 9.934 W
10,666.0	30.10	175.10	10,648.2	-37.8	53.2	446,163.83	746,542.08	32° 13' 26.785 N	103° 32' 9.919 W
10,699.0	34.50	176.70	10,676.1	-55.4	54.4	446,146.25	746,543.33	32° 13' 26.611 N	103° 32' 9.906 W
10,731.0	34.60	181.11	10,702.4	-73.5	54.8	446,128.11	746,543.67	32° 13' 26.432 N	103° 32' 9.904 W
10,763.0	36.20	188.70	10,728.5	-91.9	53.2	446,109.68	746,542.06	32° 13' 26.249 N	103° 32' 9.924 W
10,795.0	40.30	193.60	10,753.7	-111.3	49.3	446,090.26	746,538.20	32° 13' 26.058 N	103° 32' 9.971 W
10,826.0	45.50	193.10	10,776.4	-131.9	44.4	446,069.74	746,533.33	32° 13' 25.855 N	103° 32' 10.029 W
10,858.0	50.10	190.80	10,797.8	-155.0	39.5	446,046.55	746,528.44	32° 13' 25.626 N	103° 32' 10.088 W
10,889.0	54.80	189.00	10,816.7	-179.3	35.3	446,022.35	746,524.23	32° 13' 25.387 N	103° 32' 10.139 W

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Lea County, NM	TVD Reference:	WELL @ 3625.8usft (Silver Oak #12 - 18' KB)
Site:	Tyrell Fee	MD Reference:	WELL @ 3625.8usft (Silver Oak #12 - 18' KB)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	test

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,921.0	60.00	186.70	10,834.0	-205.9	31.7	445,995.65	746,520.57	32° 13' 25.123 N	103° 32' 10.184 W
10,953.0	65.00	185.50	10,848.7	-234.2	28.7	445,967.44	746,517.56	32° 13' 24.844 N	103° 32' 10.222 W
10,985.0	70.30	185.20	10,860.9	-263.6	25.9	445,937.98	746,514.80	32° 13' 24.552 N	103° 32' 10.256 W
11,017.0	75.60	186.00	10,870.3	-294.1	22.9	445,907.54	746,511.81	32° 13' 24.251 N	103° 32' 10.294 W
11,048.0	80.90	184.40	10,876.6	-324.3	20.2	445,877.33	746,509.07	32° 13' 23.953 N	103° 32' 10.328 W
11,084.0	87.80	182.90	10,880.1	-360.0	17.9	445,841.60	746,506.79	32° 13' 23.599 N	103° 32' 10.358 W
11,116.0	90.80	182.30	10,880.5	-392.0	16.4	445,809.64	746,505.34	32° 13' 23.283 N	103° 32' 10.377 W
EOC @ 11116.0°MD, 90.80°INC, 182.30°AZI									
11,211.0	90.90	182.20	10,879.1	-486.9	12.7	445,714.72	746,501.61	32° 13' 22.344 N	103° 32' 10.429 W
11,307.0	90.20	181.50	10,878.2	-582.8	9.6	445,618.78	746,498.51	32° 13' 21.395 N	103° 32' 10.473 W
11,402.0	89.80	181.60	10,878.2	-677.8	7.0	445,523.81	746,495.94	32° 13' 20.455 N	103° 32' 10.511 W
11,497.0	88.50	182.00	10,879.6	-772.7	4.1	445,428.87	746,492.96	32° 13' 19.516 N	103° 32' 10.554 W
11,592.0	88.10	181.50	10,882.4	-867.6	1.2	445,333.96	746,490.06	32° 13' 18.577 N	103° 32' 10.596 W
11,687.0	88.20	181.60	10,885.5	-962.6	-1.4	445,239.04	746,487.49	32° 13' 17.638 N	103° 32' 10.634 W
11,782.0	87.90	181.50	10,888.7	-1,057.5	-4.0	445,144.13	746,484.92	32° 13' 16.699 N	103° 32' 10.672 W
11,878.0	88.40	181.10	10,891.8	-1,153.4	-6.2	445,048.21	746,482.75	32° 13' 15.750 N	103° 32' 10.706 W
11,972.0	88.50	181.10	10,894.4	-1,247.3	-8.0	444,954.26	746,480.94	32° 13' 14.821 N	103° 32' 10.735 W
12,068.0	88.40	181.10	10,897.0	-1,343.3	-9.8	444,858.31	746,479.10	32° 13' 13.871 N	103° 32' 10.765 W
12,163.0	87.90	180.60	10,900.0	-1,438.2	-11.2	444,763.37	746,477.69	32° 13' 12.932 N	103° 32' 10.790 W
12,258.0	86.30	179.90	10,904.8	-1,533.1	-11.6	444,668.50	746,477.28	32° 13' 11.993 N	103° 32' 10.803 W
12,352.0	87.60	180.60	10,909.8	-1,627.0	-12.0	444,574.64	746,476.87	32° 13' 11.064 N	103° 32' 10.815 W
12,448.0	89.30	180.80	10,912.4	-1,722.9	-13.2	444,478.68	746,475.69	32° 13' 10.115 N	103° 32' 10.837 W
12,543.0	89.80	179.40	10,913.2	-1,817.9	-13.4	444,383.69	746,475.53	32° 13' 9.175 N	103° 32' 10.847 W
12,638.0	90.20	178.80	10,913.2	-1,912.9	-11.9	444,288.70	746,477.02	32° 13' 8.235 N	103° 32' 10.838 W
12,733.0	90.70	178.80	10,912.4	-2,007.9	-9.9	444,193.72	746,479.01	32° 13' 7.295 N	103° 32' 10.823 W
12,829.0	90.60	177.10	10,911.3	-2,103.8	-6.5	444,097.80	746,482.44	32° 13' 6.345 N	103° 32' 10.792 W
12,924.0	90.20	176.90	10,910.7	-2,198.7	-1.5	444,002.93	746,487.42	32° 13' 5.406 N	103° 32' 10.742 W
13,020.0	89.70	178.30	10,910.8	-2,294.6	2.5	443,907.02	746,491.44	32° 13' 4.457 N	103° 32' 10.703 W
13,114.0	89.80	178.50	10,911.2	-2,388.5	5.2	443,813.05	746,494.06	32° 13' 3.527 N	103° 32' 10.681 W
13,210.0	90.00	178.10	10,911.3	-2,484.5	8.0	443,717.10	746,496.91	32° 13' 2.577 N	103° 32' 10.656 W
13,304.0	87.40	179.20	10,913.5	-2,578.4	10.2	443,623.16	746,499.12	32° 13' 1.647 N	103° 32' 10.639 W
13,400.0	87.10	179.00	10,918.1	-2,674.3	11.7	443,527.28	746,500.63	32° 13' 0.699 N	103° 32' 10.629 W
13,495.0	86.70	178.60	10,923.2	-2,769.2	13.7	443,432.44	746,502.62	32° 12' 59.760 N	103° 32' 10.614 W
13,591.0	88.20	179.90	10,927.5	-2,865.1	15.0	443,338.55	746,503.87	32° 12' 58.811 N	103° 32' 10.608 W
13,686.0	88.20	179.20	10,930.5	-2,960.0	15.7	443,241.60	746,504.62	32° 12' 57.871 N	103° 32' 10.608 W
13,781.0	89.90	180.20	10,932.0	-3,055.0	16.2	443,146.62	746,505.11	32° 12' 56.931 N	103° 32' 10.610 W
13,876.0	90.40	180.40	10,931.8	-3,150.0	15.7	443,051.62	746,504.62	32° 12' 55.991 N	103° 32' 10.624 W
13,971.0	90.40	179.40	10,931.1	-3,245.0	15.9	442,956.62	746,504.78	32° 12' 55.051 N	103° 32' 10.630 W
14,067.0	90.10	178.60	10,930.7	-3,341.0	17.6	442,860.64	746,506.46	32° 12' 54.101 N	103° 32' 10.619 W
14,162.0	90.10	178.10	10,930.6	-3,435.9	20.3	442,765.68	746,509.19	32° 12' 53.162 N	103° 32' 10.595 W
14,257.0	90.30	177.40	10,930.2	-3,530.8	24.0	442,670.75	746,512.92	32° 12' 52.222 N	103° 32' 10.560 W
14,352.0	89.50	177.80	10,930.4	-3,625.8	28.0	442,575.84	746,516.90	32° 12' 51.282 N	103° 32' 10.522 W
14,448.0	90.30	177.10	10,930.6	-3,721.7	32.3	442,479.93	746,521.17	32° 12' 50.333 N	103° 32' 10.481 W
14,543.0	89.80	178.10	10,930.5	-3,816.6	36.3	442,385.02	746,525.15	32° 12' 49.394 N	103° 32' 10.442 W
14,638.0	89.50	178.60	10,931.1	-3,911.5	39.0	442,290.06	746,527.88	32° 12' 48.454 N	103° 32' 10.419 W
14,733.0	90.80	177.80	10,930.8	-4,006.5	42.0	442,195.11	746,530.87	32° 12' 47.514 N	103° 32' 10.392 W
14,828.0	90.50	176.40	10,929.7	-4,101.4	46.8	442,100.24	746,535.67	32° 12' 46.575 N	103° 32' 10.345 W
14,923.0	88.30	176.00	10,930.7	-4,196.1	53.1	442,005.46	746,541.97	32° 12' 45.636 N	103° 32' 10.279 W
15,017.0	87.90	175.30	10,933.8	-4,289.8	60.2	441,911.78	746,549.10	32° 12' 44.709 N	103° 32' 10.205 W
15,113.0	87.90	174.80	10,937.4	-4,385.4	68.5	441,816.21	746,557.37	32° 12' 43.763 N	103° 32' 10.117 W
15,208.0	87.40	174.10	10,941.2	-4,479.9	77.7	441,721.73	746,566.55	32° 12' 42.827 N	103° 32' 10.018 W
15,304.0	87.80	173.60	10,945.3	-4,575.2	87.9	441,626.37	746,576.83	32° 12' 41.883 N	103° 32' 9.906 W
15,399.0	88.30	173.40	10,948.5	-4,669.6	98.7	441,532.03	746,587.58	32° 12' 40.948 N	103° 32' 9.790 W
15,474.3	88.30	173.40	10,950.7	-4,744.3	107.3	441,457.26	746,596.23	32° 12' 40.208 N	103° 32' 9.695 W
PBHL (T#1H)									



Survey Report - Geographic



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Lea County, NM	TVD Reference:	WELL @ 3625.8usft (Silver Oak #12 - 18' KB)
Site:	Tyrell Fee	MD Reference:	WELL @ 3625.8usft (Silver Oak #12 - 18' KB)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	test

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
15,475.0	88.30	173.40	10,950.8	-4,745.0	107.4	441,456.57	746,596.31	32° 12' 40.201 N	103° 32' 9.694 W
TD @ 15475.0°MD, 88.30°INC, 173.40°AZI									

Design Targets									
Target Name									
- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL (T#1H)	0.00	0.00	10,950.0	-4,752.5	37.0	441,449.10	746,525.90	32° 12' 40.132 N	103° 32' 10.515 W
- survey misses target center by 70.8usft at 15474.3usft MD (10950.7 TVD, -4744.3 N, 107.3 E)									
- Point									

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
11,116.0	10,880.5	-392.0	16.4	EOC @ 11116.0°MD, 90.80°INC, 182.30°AZI	
15,475.0	10,950.8	-4,745.0	107.4	TD @ 15475.0°MD, 88.30°INC, 173.40°AZI	

Checked By: _____ Approved By: _____ Date: _____