

Results of Directional Survey

API number:	30-025-41689		
OGRID:		Operator:	COG OPERATING LLC
		Property:	SEBASTIAN FEDERAL COM # 4H

surface	ULSTR:	A	18	T 24S	R 34E
				190 FNL	380 FEL

BH Loc	ULSTR:	P	18	T 24S	R 34E
15376 MD		10877.0	TVD	333 FSL	333 FEL
				4947 FNL	

Top Perf/OH	ULSTR:	A	18	T 24S	R 34E
10969 MD		10743.9	TVD	548 FNL	370 FEL

Bot Perf/OH	ULSTR:	P	18	T 24S	R 34E
15260 MD		10875.0	TVD	449 FSL	338 FEL
				4831 FNL	

	MD	N/S	E/W	VD
	10938	-328.40	12.90	10735.6
TOP PERFS/OH	10969	-358.10	10.40	10743.90
	10969	-358.10	10.40	10743.90
	15176	-4557.30	38.20	10873.00
BOT PERFS/OH	15260	-4641.21	41.83	10874.95
	15271	-4652.20	42.30	10875.20

NEXT TO LAST	15310.00	-4691.10	44.10	10875.90
LAST READING	15356.00	-4737.10	46.40	10876.70
TD	15376	-4757.10	47.40	10877.05

Surface Location	190	FN	380	FE
Projected BHL	4947	FN	333	FE
Location of				
Top Perfs/OH	548	FN	370	FE
Bottom Perfs/OH	4831	FN	338	FE

SUMMARY of Subsurface Locations

Surface Location	A-18-24S-34E	190	FN	380	FE	Vert. Depth
Top Perfs/OH	A-18-24S-34E	548	FN	370	FE	10743.90
Bottom Perfs/OH	P-18-24S-34E	4831	FN	338	FE	10874.95
Projected TD	P-18-24S-34E	4947	FN	333	FE	10877.05

NOV 18 2014

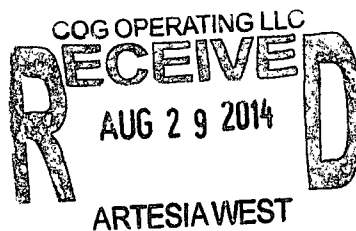


HOBBS OCD

NOV 06 2014

RECEIVED

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



August 5, 2014

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

RE: Sebastian Federal Com #4H
190' FNL & 380' FEL
Sec. 18, T24S, R34E
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 5th day of August, 2014.

Notary Public

Sebastian Federal Com #4H

Date	Depth	Deviation	Direction	TVD	Horiz Disp
7/2/2014	123	0.20	0.00	0.00	0.00
7/3/2014	366	1.20	0.00	0.00	0.00
7/3/2014	639	0.10	0.00	0.00	0.00
7/3/2014	882	0.40	0.00	0.00	0.00
7/3/2014	1135	0.30	0.00	0.00	0.00
7/3/2014	1350	0.80	0.00	0.00	0.00
7/5/2014	1459	0.40	0.00	0.00	0.00
7/5/2014	1743	0.40	0.00	0.00	0.00
7/5/2014	2028	0.20	300.40	2027.98	0.00
7/5/2014	2313	0.50	327.60	2312.97	0.00
7/6/2014	2882	0.80	327.80	2881.90	0.00
7/6/2014	3167	0.70	0.00	0.00	0.00
7/6/2014	3452	0.70	0.00	0.00	0.00
7/6/2014	3737	0.70	0.00	0.00	0.00
7/6/2014	4022	0.30	0.00	0.00	0.00
7/7/2014	4307	0.50	30.30	4306.83	0.00
7/7/2014	4591	1.50	0.00	0.00	0.00
7/7/2014	4875	1.90	0.00	0.00	0.00
7/7/2014	5124	1.10	89.30	0.00	0.00
7/9/2014	5336	1.00	0.00	0.00	0.00
7/9/2014	5779	1.00	0.00	0.00	0.00
7/10/2014	6222	0.70	0.00	0.00	0.00
7/10/2014	6665	0.90	0.00	0.00	0.00
7/10/2014	7108	1.00	0.00	0.00	0.00
7/10/2014	7520	0.30	0.00	0.00	0.00
7/11/2014	7868	0.40	0.00	0.00	0.00
7/11/2014	8310	0.50	0.00	0.00	0.00
7/12/2014	8754	0.90	0.00	0.00	0.00
7/12/2014	9196	1.00	0.00	0.00	0.00
7/13/2014	9640	1.30	0.00	0.00	0.00
7/13/2014	10083	2.50	0.00	0.00	0.00
7/14/2014	10273	2.20	0.00	0.00	0.00
7/14/2014	10368	2.40	0.00	0.00	0.00
7/14/2014	10463	1.60	0.00	0.00	0.00
7/14/2014	10557	1.20	0.00	0.00	0.00
7/14/2014	10652	0.90	0.00	0.00	0.00
7/14/2014	11002	1.40	0.00	0.00	0.00
7/15/2014	11223	1.80	0.00	0.00	0.00
7/15/2014	11666	1.80	0.00	0.00	0.00
7/15/2014	12108	1.20	0.00	0.00	0.00
7/23/2014	10243	1.10	269.90	10241.59	0.00
7/23/2014	10338	9.80	189.20	10336.00	0.00
7/23/2014	10433	20.40	188.70	10427.00	0.00

Date	Depth	Deviation	Direction	TVD	Horiz Disp
7/23/2014	10591	38.70	184.50	10564.00	0.00
7/23/2014	10622	42.50	184.40	10588.19	0.00
7/23/2014	10686	50.60	184.00	10632.15	0.00
7/23/2014	10749	58.70	183.70	10668.61	0.00
7/24/2014	10781	62.90	183.90	10684.00	0.00
7/24/2014	10813	67.50	184.10	10697.00	0.00
7/24/2014	10844	70.90	184.20	10708.00	0.00
7/24/2014	10938	74.60	184.30	10735.52	0.00
7/24/2014	10974	73.10	184.10	10717.91	0.00
7/25/2014	10969	74.40	185.30	10743.00	0.00
7/25/2014	11056	81.10	185.40	10771.00	0.00
7/25/2014	11065	78.80	185.20	10766.00	0.00
7/25/2014	11128	82.60	185.40	1775.44	0.00
7/25/2014	11286	87.80	185.00	10788.15	0.00
7/25/2014	11381	89.70	183.40	10790.00	0.00
7/25/2014	11571	88.40	181.60	10794.10	0.00
7/26/2014	11666	89.30	180.70	1796.00	10489.00
7/26/2014	11855	88.70	178.80	10299.00	12329.00
7/26/2014	12045	88.70	178.60	10803.54	0.00
7/26/2014	12235	88.20	178.20	10808.40	0.00
7/26/2014	12520	88.10	177.90	10816.77	0.00
7/26/2014	12615	88.60	171.20	10819.50	0.00
7/27/2014	12898	89.80	178.60	10823.00	2280.00
7/27/2014	12993	89.30	178.20	10823.00	2375.00
7/27/2014	13088	89.30	118.20	10825.00	2470.32
7/27/2014	13278	88.40	178.80	0.00	0.00
7/27/2014	13373	87.90	178.30	0.00	0.00
7/27/2014	13468	88.40	179.00	0.00	0.00
7/27/2014	13658	88.20	179.00	10841.00	0.00
7/27/2014	13753	89.30	179.10	10843.40	0.00
7/27/2014	13943	90.20	179.70	10845.34	0.00
7/28/2014	14038	90.00	179.70	10845.00	3419.00
7/28/2014	14132	89.80	180.10	10845.00	3513.98
7/28/2014	14277	89.80	179.70	10845.00	3608.90
7/28/2014	14417	88.10	179.30	0.00	0.00
7/28/2014	14512	88.10	179.40	0.00	0.00
7/28/2014	14607	88.00	179.30	0.00	0.00
7/29/2014	14701	88.30	178.90	0.00	0.00
7/29/2014	14797	88.90	179.40	0.00	0.00
7/29/2014	14892	88.70	179.20	10864.81	0.00
7/29/2014	14986	88.20	178.20	10867.35	0.00
7/29/2014	15176	88.50	177.70	10876.91	0.00
7/30/2014	15271	88.80	177.40	10875.00	4652.00
7/30/2014	15310	89.00	177.20	11875.00	4691.00



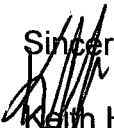
July 25, 2014

Concho Resources, Inc.
One Concho Center
600 W. Illinois Avenue
Midland, Texas 79701

Attn: Kanicia Castillo

RE: **Sebastian Federal Com 4H**

Please find enclosed a copy of the survey from 0.00' to 12,075.00' ran on the above referenced well.

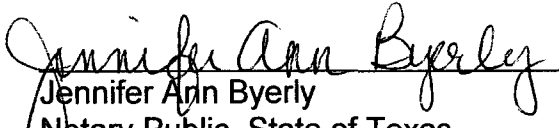
Sincerely,

Keith Havelka
Operations

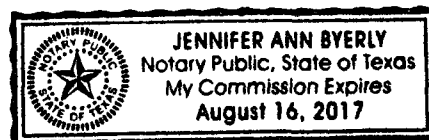
STATE OF TEXAS §

§

COUNTY OF NUECES §

This instrument was acknowledged before me on the 25 day of July, A.D., 2014, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas





Company: COG Operating
Lease/Well: SEBASTIAN FEDERAL COM/4H

Rig Name: SILVEROAK 12
State/County: NEW MEXICO/LEA
Latitude: 32.22, Longitude: -103.50
GRID North is 0.44 Degrees East of True North
VS-Azi: 0.00 Degrees



Depth Reference : RKB =18 FEET

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: gyro survey.ut
Minimum Curvature Method
Report Date/Time: 7/25/2014 / 14:55

VES Survey International
West Texas
432-563-5444
Surveyor: Jordan Shelleby
Sebastian Federal Com 4H / API 30-025-41689

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	0.15	168.97	100.00	-0.13	0.02	-0.13	0.13	168.97	0.15
200.00	0.19	200.65	200.00	-0.41	-0.01	-0.41	0.41	181.23	0.10
300.00	0.05	214.44	300.00	-0.60	-0.09	-0.60	0.61	188.70	0.14
400.00	0.11	142.39	400.00	-0.71	-0.06	-0.71	0.71	184.70	0.10
500.00	0.11	147.14	500.00	-0.86	0.05	-0.86	0.87	176.69	0.01
600.00	0.09	163.82	600.00	-1.02	0.12	-1.02	1.02	173.17	0.03
700.00	0.16	175.27	700.00	-1.23	0.15	-1.23	1.24	172.84	0.08
800.00	0.19	147.70	800.00	-1.51	0.25	-1.51	1.53	170.46	0.09
900.00	0.22	193.68	900.00	-1.84	0.29	-1.84	1.86	170.89	0.16
1000.00	0.22	105.14	1000.00	-2.08	0.44	-2.08	2.13	168.16	0.31
1100.00	0.36	129.24	1100.00	-2.33	0.87	-2.33	2.48	159.60	0.18
1200.00	0.37	122.80	1199.99	-2.70	1.38	-2.70	3.03	152.98	0.04
1300.00	0.51	79.36	1299.99	-2.79	2.08	-2.79	3.48	143.25	0.35
1400.00	0.15	92.67	1399.99	-2.71	2.65	-2.71	3.79	135.66	0.37
1500.00	0.29	27.96	1499.99	-2.50	2.90	-2.50	3.83	130.74	0.26
1600.00	0.35	40.55	1599.99	-2.04	3.22	-2.04	3.81	122.44	0.09
1700.00	0.45	2.81	1699.98	-1.42	3.43	-1.42	3.72	112.52	0.27
1800.00	0.42	13.18	1799.98	-0.68	3.54	-0.68	3.60	100.81	0.08

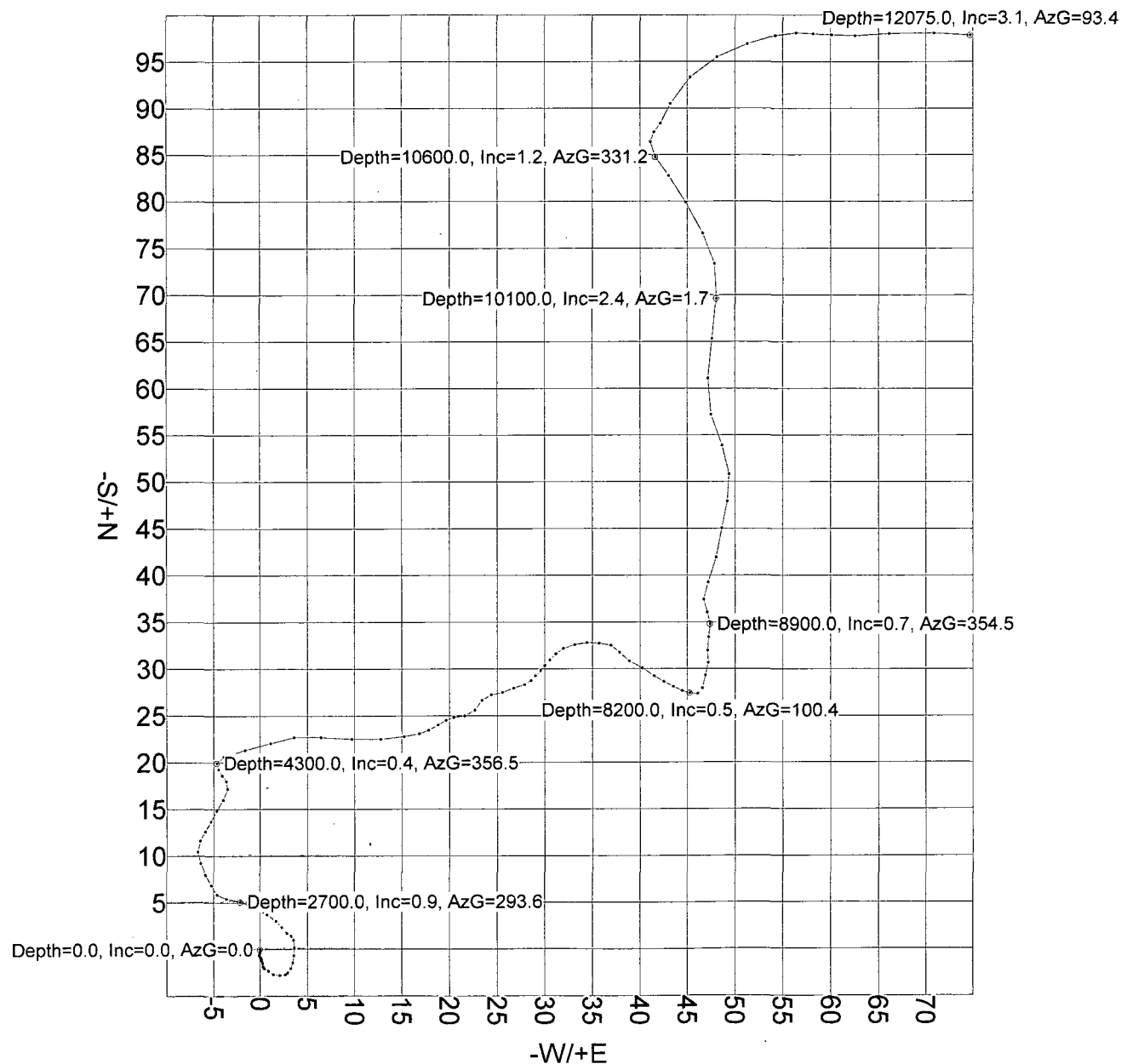
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	0.59	359.42	1899.98	0.20	3.62	0.20	3.62	86.90	0.20
2000.00	0.33	340.09	1999.97	0.98	3.51	0.98	3.65	74.42	0.29
2100.00	0.24	317.31	2099.97	1.41	3.27	1.41	3.56	66.71	0.14
2200.00	0.42	299.63	2199.97	1.74	2.81	1.74	3.31	58.18	0.20
2300.00	0.54	334.25	2299.97	2.35	2.29	2.35	3.28	44.27	0.31
2400.00	0.55	302.75	2399.96	3.03	1.68	3.03	3.47	28.94	0.30
2500.00	0.79	308.90	2499.96	3.73	0.73	3.73	3.80	11.12	0.25
2600.00	0.98	290.63	2599.95	4.46	-0.60	4.46	4.51	352.32	0.33
2700.00	0.92	293.56	2699.93	5.09	-2.13	5.09	5.52	337.23	0.07
2800.00	0.92	269.76	2799.92	5.40	-3.67	5.40	6.53	325.80	0.38
2900.00	0.56	337.71	2899.91	5.85	-4.66	5.85	7.48	321.47	0.88
3000.00	0.78	324.25	2999.91	6.86	-5.24	6.86	8.63	322.60	0.27
3100.00	0.71	338.58	3099.90	7.99	-5.87	7.99	9.91	323.69	0.20
3200.00	0.85	333.75	3199.89	9.22	-6.42	9.22	11.23	325.16	0.15
3300.00	0.66	2.33	3299.88	10.46	-6.72	10.46	12.43	327.27	0.41
3400.00	0.71	22.25	3399.87	11.61	-6.46	11.61	13.29	330.91	0.24
3500.00	0.60	36.17	3499.87	12.62	-5.92	12.62	13.93	334.88	0.19
3600.00	0.80	25.27	3599.86	13.67	-5.31	13.67	14.66	338.78	0.23
3700.00	0.69	30.68	3699.85	14.82	-4.70	14.82	15.54	342.39	0.13
3800.00	0.90	29.56	3799.84	16.02	-4.01	16.02	16.51	345.95	0.21
3900.00	0.56	6.56	3899.83	17.19	-3.56	17.19	17.55	348.29	0.44
4000.00	0.44	329.66	3999.83	18.01	-3.70	18.01	18.38	348.38	0.34
4100.00	0.41	322.95	4099.83	18.62	-4.11	18.62	19.07	347.55	0.06
4200.00	0.45	335.09	4199.82	19.26	-4.49	19.26	19.78	346.88	0.10
4300.00	0.39	356.55	4299.82	19.96	-4.68	19.96	20.50	346.81	0.17
4400.00	0.98	64.54	4399.81	20.67	-3.92	20.67	21.04	349.25	0.91
4500.00	1.74	78.70	4499.79	21.33	-1.66	21.33	21.40	355.55	0.82
4600.00	1.54	70.26	4599.74	22.08	1.09	22.08	22.11	2.83	0.31
4700.00	1.43	81.49	4699.71	22.72	3.59	22.72	23.00	8.98	0.31
4800.00	1.86	97.28	4799.67	22.70	6.43	22.70	23.59	15.81	0.62
4900.00	1.91	88.51	4899.62	22.54	9.70	22.54	24.54	23.29	0.29
5000.00	1.61	91.83	4999.57	22.54	12.77	22.54	25.91	29.54	0.32
5100.00	1.25	75.18	5099.54	22.77	15.23	22.77	27.40	33.78	0.55
5200.00	0.61	87.23	5199.53	23.08	16.82	23.08	28.55	36.08	0.67
5300.00	0.67	53.56	5299.52	23.45	17.81	23.45	29.45	37.23	0.37
5400.00	0.65	67.24	5399.51	24.01	18.81	24.01	30.50	38.07	0.16
5500.00	0.48	50.26	5499.51	24.50	19.66	24.50	31.41	38.73	0.23
5600.00	0.55	84.43	5599.50	24.82	20.46	24.82	32.17	39.50	0.31
5700.00	0.73	80.18	5699.50	24.98	21.56	24.98	33.00	40.81	0.18

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	0.77	42.58	5799.49	25.58	22.64	25.58	34.16	41.52	0.48
5900.00	0.73	26.97	5899.48	26.64	23.39	26.64	35.45	41.28	0.21
6000.00	0.77	87.85	5999.47	27.23	24.35	27.23	36.53	41.80	0.76
6100.00	0.67	64.96	6099.47	27.51	25.55	27.51	37.54	42.89	0.30
6200.00	0.78	72.40	6199.46	27.96	26.72	27.96	38.68	43.71	0.14
6300.00	0.61	73.21	6299.45	28.32	27.88	28.32	39.73	44.55	0.17
6400.00	0.37	28.96	6399.45	28.76	28.54	28.76	40.51	44.79	0.43
6500.00	0.42	52.13	6499.45	29.26	28.99	29.26	41.19	44.73	0.16
6600.00	0.48	39.08	6599.44	29.81	29.54	29.81	41.97	44.73	0.12
6700.00	0.33	41.74	6699.44	30.35	29.99	30.35	42.67	44.66	0.16
6800.00	0.57	41.41	6799.44	30.94	30.51	30.94	43.45	44.60	0.24
6900.00	0.52	46.38	6899.43	31.62	31.17	31.62	44.40	44.58	0.07
7000.00	0.57	59.38	6999.43	32.19	31.92	32.19	45.33	44.76	0.13
7100.00	0.89	78.23	7099.42	32.60	33.11	32.60	46.46	45.44	0.39
7200.00	0.65	86.71	7199.41	32.79	34.43	32.79	47.54	46.40	0.26
7300.00	0.81	96.79	7299.40	32.74	35.70	32.74	48.43	47.48	0.21
7400.00	0.63	102.16	7399.39	32.54	36.94	32.54	49.23	48.63	0.19
7500.00	0.84	150.55	7499.39	31.78	37.84	31.78	49.42	49.98	0.63
7600.00	0.84	114.69	7599.38	30.83	38.87	30.83	49.61	51.58	0.52
7700.00	0.99	121.64	7699.36	30.07	40.27	30.07	50.26	53.25	0.19
7800.00	0.73	126.65	7799.35	29.24	41.52	29.24	50.78	54.84	0.27
7900.00	0.64	114.63	7899.35	28.63	42.53	28.63	51.27	56.05	0.17
8000.00	0.66	121.14	7999.34	28.10	43.53	28.10	51.81	57.15	0.08
8100.00	0.51	110.50	8099.33	27.65	44.44	27.65	52.34	58.11	0.18
8200.00	0.46	100.40	8199.33	27.42	45.25	27.42	52.91	58.79	0.10
8300.00	0.50	91.10	8299.33	27.34	46.08	27.34	53.58	59.32	0.08
8400.00	0.69	6.96	8399.32	27.93	46.59	27.93	54.32	59.06	0.81
8500.00	0.93	16.92	8499.31	29.30	46.90	29.30	55.30	58.00	0.27
8600.00	0.69	5.82	8599.30	30.67	47.19	30.67	56.29	56.98	0.28
8700.00	0.80	349.92	8699.30	31.96	47.13	31.96	56.94	55.86	0.23
8800.00	0.90	16.64	8799.28	33.40	47.24	33.40	57.85	54.74	0.41
8900.00	0.75	354.50	8899.27	34.80	47.40	34.80	58.80	53.71	0.35
9000.00	0.77	337.10	8999.27	36.07	47.07	36.07	59.31	52.54	0.23
9100.00	0.87	352.54	9099.26	37.44	46.72	37.44	59.87	51.29	0.24
9200.00	1.39	28.37	9199.24	39.26	47.19	39.26	61.39	50.24	0.85
9300.00	1.87	9.32	9299.20	41.93	48.03	41.93	63.76	48.88	0.72
9400.00	1.78	12.70	9399.15	45.06	48.64	45.06	66.30	47.19	0.14
9500.00	1.55	9.49	9499.10	47.91	49.20	47.91	68.68	45.76	0.25
9600.00	1.80	359.58	9599.06	50.82	49.42	50.82	70.88	44.20	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
9700.00	1.94	333.67	9699.01	53.91	48.65	53.91	72.62	42.07	0.85
9800.00	2.10	347.24	9798.95	57.21	47.50	57.21	74.36	39.70	0.50
9900.00	2.42	2.01	9898.87	61.11	47.17	61.11	77.19	37.67	0.66
10000.00	2.49	9.73	9998.78	65.35	47.61	65.35	80.86	36.07	0.34
10100.00	2.43	1.71	10098.69	69.61	48.04	69.61	84.58	34.61	0.35
10200.00	1.90	350.48	10198.62	73.36	47.83	73.36	87.57	33.10	0.68
10300.00	2.13	329.62	10298.56	76.60	46.61	76.60	89.66	31.32	0.77
10400.00	2.20	332.82	10398.49	79.91	44.80	79.91	91.61	29.28	0.14
10500.00	1.66	321.76	10498.43	82.75	43.03	82.75	93.27	27.47	0.65
10600.00	1.16	331.15	10598.40	84.77	41.64	84.77	94.45	26.16	0.54
10700.00	0.83	356.45	10698.38	86.39	41.11	86.39	95.67	25.45	0.54
10800.00	0.61	54.59	10798.38	87.43	41.50	87.43	96.78	25.39	0.73
10900.00	0.78	21.69	10898.37	88.37	42.18	88.37	97.92	25.52	0.43
11000.00	1.93	28.03	10998.34	90.49	43.23	90.49	100.28	25.53	1.15
11100.00	2.13	43.46	11098.28	93.32	45.30	93.32	103.73	25.89	0.58
11200.00	2.01	62.21	11198.21	95.49	48.13	95.49	106.94	26.75	0.69
11300.00	1.96	70.62	11298.15	96.88	51.30	96.88	109.62	27.90	0.30
11400.00	1.57	75.24	11398.11	97.79	54.23	97.79	111.82	29.01	0.41
11500.00	0.99	95.22	11498.08	98.06	56.42	98.06	113.14	29.91	0.72
11600.00	1.02	89.82	11598.07	97.99	58.17	97.99	113.95	30.69	0.10
11700.00	1.26	96.42	11698.05	97.87	60.15	97.87	114.87	31.57	0.27
11800.00	1.53	87.58	11798.02	97.80	62.57	97.80	116.11	32.61	0.35
11900.00	2.57	85.49	11897.95	98.04	66.14	98.04	118.26	34.01	1.04
12000.00	2.86	93.22	11997.84	98.07	70.86	98.07	120.99	35.85	0.46
12075.00	3.06	93.36	12072.74	97.85	74.73	97.85	123.12	37.37	0.27



VES Survey International
West Texas
432-563-5444
Surveyor: Jordan Shelleby
Sebastian Federal Com 4H / API 30-025-41689



VES Survey Date: 07/15/2014



COG Operating LLC

Lea County, NM (NAD27 NME)

Sebastian Fed Com

#4H

OH

Survey: MWD #1

Survey Report - Geographic

30 July, 2014



Wellplanning
Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	WELL @ 3598.6usft (Original Well Elev)
Site:	Sebastian Fed Com	MD Reference:	WELL @ 3598.6usft (Original Well Elev)
Well:	#4H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Project	Lea County, NM (NAD27 NME)		
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	Sebastian Fed Com				
Site Position:		Northing:	446,271.70 usft	Latitude:	32° 13' 27.044 N
From:	Map	Easting:	757,317.50 usft	Longitude:	103° 30' 4.480 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.44 °

Well	#4H					
Well Position	+N/-S	0.0 usft	Northing:	446,271.70 usft	Latitude:	32° 13' 27.044 N
	+E/-W	0.0 usft	Easting:	757,317.50 usft	Longitude:	103° 30' 4.480 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,580.6 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/16/2014	7.17	60.12	48,314

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	179.51	

Survey Program	Date 7/30/2014				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	10,200.0	GYRO (OH)	MWD	MWD - Standard	
10,200.0	15,356.0	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
10,200.0	1.90	350.48	10,198.6	73.4	47.9	446,345.08	757,365.36	32° 13' 27.767 N	103° 30' 3.916 W
10,243.0	1.10	269.90	10,241.6	74.1	47.3	446,345.78	757,364.83	32° 13' 27.774 N	103° 30' 3.923 W
10,274.0	3.30	200.20	10,272.6	73.2	46.7	446,344.94	757,364.22	32° 13' 27.765 N	103° 30' 3.930 W
10,306.0	6.30	192.70	10,304.5	70.7	46.0	446,342.36	757,363.52	32° 13' 27.740 N	103° 30' 3.938 W
10,338.0	9.80	189.20	10,336.1	66.3	45.2	446,337.96	757,362.70	32° 13' 27.696 N	103° 30' 3.948 W
10,369.0	13.20	188.30	10,366.5	60.2	44.3	446,331.85	757,361.77	32° 13' 27.636 N	103° 30' 3.959 W
10,401.0	16.70	188.50	10,397.4	52.0	43.1	446,323.69	757,360.56	32° 13' 27.555 N	103° 30' 3.974 W
10,433.0	20.40	188.70	10,427.8	41.9	41.5	446,313.62	757,359.03	32° 13' 27.456 N	103° 30' 3.993 W
10,464.0	24.20	187.90	10,456.4	30.3	39.8	446,301.98	757,357.34	32° 13' 27.341 N	103° 30' 4.014 W
10,496.0	27.70	186.10	10,485.2	16.4	38.2	446,288.09	757,355.65	32° 13' 27.203 N	103° 30' 4.035 W
10,528.0	31.20	184.50	10,513.1	0.7	36.7	446,272.42	757,354.21	32° 13' 27.049 N	103° 30' 4.053 W



Wellplanning
Survey Report - Geographic

Company: COG Operating LLC	Local Co-ordinate Reference: Well #4H
Project: Lea County, NM (NAD27 NME)	TVD Reference: WELL @ 3598.6usft (Original Well Elev)
Site: Sebastian Fed Com	MD Reference: WELL @ 3598.6usft (Original Well Elev)
Well: #4H	North Reference: Grid
Wellbore: OH	Survey Calculation Method: Minimum Curvature
Design: OH	Database: EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,559.0	34.90	184.30	10,539.1	-16.1	35.4	446,255.57	757,352.91	32° 13' 26.882 N	103° 30' 4.069 W
10,591.0	38.70	184.50	10,564.7	-35.2	33.9	446,236.46	757,351.44	32° 13' 26.693 N	103° 30' 4.088 W
10,622.0	42.50	184.40	10,588.2	-55.3	32.4	446,216.35	757,349.88	32° 13' 26.494 N	103° 30' 4.108 W
10,654.0	46.50	184.40	10,611.0	-77.7	30.7	446,193.99	757,348.16	32° 13' 26.273 N	103° 30' 4.130 W
10,686.0	50.60	184.00	10,632.2	-101.6	28.9	446,170.08	757,346.40	32° 13' 26.036 N	103° 30' 4.153 W
10,717.0	54.50	183.70	10,651.0	-126.2	27.3	446,145.53	757,344.75	32° 13' 25.794 N	103° 30' 4.174 W
10,749.0	58.70	183.70	10,668.7	-152.8	25.5	446,118.88	757,343.03	32° 13' 25.530 N	103° 30' 4.197 W
10,781.0	62.90	183.90	10,684.3	-180.7	23.7	446,091.01	757,341.18	32° 13' 25.254 N	103° 30' 4.221 W
10,813.0	67.50	184.10	10,697.7	-209.7	21.7	446,062.04	757,339.15	32° 13' 24.968 N	103° 30' 4.247 W
10,844.0	70.90	184.20	10,708.7	-238.6	19.6	446,033.14	757,337.05	32° 13' 24.682 N	103° 30' 4.274 W
10,874.0	73.10	184.10	10,718.0	-267.0	17.5	446,004.68	757,334.99	32° 13' 24.401 N	103° 30' 4.301 W
10,906.0	74.20	184.40	10,727.0	-297.6	15.2	445,974.06	757,332.71	32° 13' 24.098 N	103° 30' 4.330 W
10,938.0	74.60	184.30	10,735.6	-328.4	12.9	445,943.33	757,330.38	32° 13' 23.794 N	103° 30' 4.360 W
10,969.0	74.40	185.30	10,743.9	-358.1	10.4	445,913.56	757,327.88	32° 13' 23.500 N	103° 30' 4.392 W
11,001.0	76.00	185.40	10,752.0	-388.9	7.5	445,882.76	757,324.99	32° 13' 23.195 N	103° 30' 4.428 W
11,033.0	77.30	185.40	10,759.4	-419.9	4.6	445,851.77	757,322.06	32° 13' 22.889 N	103° 30' 4.465 W
11,065.0	78.80	185.20	10,766.0	-451.1	1.7	445,820.59	757,319.17	32° 13' 22.580 N	103° 30' 4.501 W
11,096.0	81.10	185.40	10,771.5	-481.5	-1.1	445,790.20	757,316.35	32° 13' 22.280 N	103° 30' 4.537 W
11,128.0	82.60	185.40	10,776.0	-513.0	-4.1	445,758.67	757,313.37	32° 13' 21.968 N	103° 30' 4.574 W
11,159.0	83.70	185.60	10,779.7	-543.7	-7.1	445,728.03	757,310.42	32° 13' 21.665 N	103° 30' 4.612 W
11,191.0	84.90	185.30	10,782.9	-575.4	-10.1	445,696.33	757,307.40	32° 13' 21.352 N	103° 30' 4.650 W
11,222.0	86.20	185.10	10,785.3	-606.1	-12.9	445,665.55	757,304.60	32° 13' 21.047 N	103° 30' 4.685 W
11,254.0	87.70	184.90	10,787.0	-638.0	-15.7	445,633.72	757,301.81	32° 13' 20.732 N	103° 30' 4.720 W
11,286.0	87.80	185.00	10,788.2	-669.8	-18.4	445,601.87	757,299.05	32° 13' 20.417 N	103° 30' 4.755 W
11,381.0	89.70	183.40	10,790.3	-764.5	-25.4	445,507.15	757,292.10	32° 13' 19.481 N	103° 30' 4.845 W
11,476.0	88.60	182.10	10,791.7	-859.4	-30.0	445,412.27	757,287.54	32° 13' 18.542 N	103° 30' 4.906 W
11,571.0	88.40	181.60	10,794.2	-954.3	-33.0	445,317.36	757,284.47	32° 13' 17.603 N	103° 30' 4.951 W
11,666.0	89.30	180.70	10,796.1	-1,049.3	-34.9	445,222.40	757,282.57	32° 13' 16.664 N	103° 30' 4.981 W
11,760.0	89.20	179.30	10,797.3	-1,143.3	-34.9	445,128.41	757,282.57	32° 13' 15.734 N	103° 30' 4.990 W
11,855.0	88.70	178.80	10,799.1	-1,238.3	-33.4	445,033.44	757,284.14	32° 13' 14.794 N	103° 30' 4.980 W
11,951.0	88.40	178.80	10,801.5	-1,334.2	-31.3	444,937.49	757,286.15	32° 13' 13.844 N	103° 30' 4.965 W
12,045.0	88.70	178.60	10,803.9	-1,428.2	-29.2	444,843.54	757,288.28	32° 13' 12.914 N	103° 30' 4.949 W
12,140.0	88.80	178.70	10,806.0	-1,523.1	-27.0	444,748.59	757,290.52	32° 13' 11.975 N	103° 30' 4.931 W
12,235.0	88.20	178.20	10,808.4	-1,618.0	-24.4	444,653.66	757,293.09	32° 13' 11.035 N	103° 30' 4.910 W
12,330.0	88.40	178.10	10,811.3	-1,712.9	-21.3	444,558.75	757,296.16	32° 13' 10.096 N	103° 30' 4.883 W
12,425.0	88.40	177.90	10,813.9	-1,807.9	-18.0	444,463.85	757,299.47	32° 13' 9.156 N	103° 30' 4.853 W
12,520.0	88.10	177.90	10,816.8	-1,902.7	-14.5	444,368.95	757,302.95	32° 13' 8.217 N	103° 30' 4.821 W
12,615.0	88.60	178.20	10,819.6	-1,997.7	-11.3	444,274.05	757,306.18	32° 13' 7.278 N	103° 30' 4.792 W
12,709.0	88.60	178.00	10,821.9	-2,091.6	-8.2	444,180.13	757,309.30	32° 13' 6.348 N	103° 30' 4.764 W
12,804.0	90.00	179.20	10,823.0	-2,186.5	-5.9	444,085.17	757,311.62	32° 13' 5.408 N	103° 30' 4.746 W
12,898.0	89.80	178.60	10,823.2	-2,280.5	-4.1	443,991.19	757,313.42	32° 13' 4.478 N	103° 30' 4.733 W
12,993.0	89.30	178.20	10,823.9	-2,375.5	-1.4	443,896.23	757,316.07	32° 13' 3.538 N	103° 30' 4.711 W
13,088.0	89.30	178.20	10,825.1	-2,470.4	1.6	443,801.28	757,319.06	32° 13' 2.598 N	103° 30' 4.685 W
13,183.0	88.90	178.10	10,826.6	-2,565.4	4.6	443,706.34	757,322.12	32° 13' 1.659 N	103° 30' 4.658 W
13,278.0	88.40	178.80	10,828.8	-2,660.3	7.2	443,611.40	757,324.69	32° 13' 0.719 N	103° 30' 4.636 W
13,373.0	87.90	178.30	10,831.9	-2,755.2	9.6	443,516.48	757,327.10	32° 12' 59.780 N	103° 30' 4.617 W
13,468.0	88.40	179.00	10,834.9	-2,850.1	11.8	443,421.56	757,329.33	32° 12' 58.840 N	103° 30' 4.599 W
13,563.0	87.80	178.60	10,838.1	-2,945.1	13.8	443,326.64	757,331.32	32° 12' 57.901 N	103° 30' 4.585 W
13,658.0	88.20	179.00	10,841.4	-3,040.0	15.8	443,231.71	757,333.31	32° 12' 56.961 N	103° 30' 4.570 W
13,753.0	89.30	179.10	10,843.5	-3,134.9	17.4	443,136.75	757,334.88	32° 12' 56.022 N	103° 30' 4.560 W
13,848.0	89.10	178.80	10,844.8	-3,229.9	19.1	443,041.78	757,336.62	32° 12' 55.082 N	103° 30' 4.549 W
13,943.0	90.20	179.70	10,845.4	-3,324.9	20.4	442,946.79	757,337.87	32° 12' 54.142 N	103° 30' 4.543 W
14,038.0	90.00	179.70	10,845.2	-3,419.9	20.9	442,851.79	757,338.37	32° 12' 53.201 N	103° 30' 4.546 W
14,132.0	89.80	180.10	10,845.4	-3,513.9	21.0	442,757.79	757,338.53	32° 12' 52.271 N	103° 30' 4.552 W
14,227.0	89.80	179.70	10,845.7	-3,608.9	21.2	442,662.79	757,338.70	32° 12' 51.331 N	103° 30' 4.559 W



Wellplanning
Survey Report - Geographic

Company: COG Operating LLC	Local Co-ordinate Reference: Well #4H
Project: Lea County, NM (NAD27 NME)	TVD Reference: WELL @ 3598.6usft (Original Well Elev)
Site: Sebastian Fed Com	MD Reference: WELL @ 3598.6usft (Original Well Elev)
Well: #4H	North Reference: Grid
Wellbore: OH	Survey Calculation Method: Minimum Curvature
Design: OH	Database: EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,322.0	87.80	179.40	10,847.7	-3,703.9	21.9	442,567.82	757,339.44	32° 12' 50.391 N	103° 30' 4.559 W
14,417.0	88.10	179.30	10,851.1	-3,798.8	23.0	442,472.89	757,340.52	32° 12' 49.452 N	103° 30' 4.555 W
14,512.0	88.10	179.40	10,854.3	-3,893.8	24.1	442,377.95	757,341.60	32° 12' 48.512 N	103° 30' 4.551 W
14,607.0	88.00	179.30	10,857.5	-3,988.7	25.2	442,283.01	757,342.67	32° 12' 47.573 N	103° 30' 4.547 W
14,701.0	88.30	178.90	10,860.5	-4,082.6	26.7	442,189.07	757,344.15	32° 12' 46.643 N	103° 30' 4.538 W
14,797.0	88.90	179.40	10,862.9	-4,178.6	28.1	442,093.11	757,345.57	32° 12' 45.693 N	103° 30' 4.530 W
14,892.0	88.70	179.20	10,864.9	-4,273.6	29.2	441,998.14	757,346.73	32° 12' 44.754 N	103° 30' 4.525 W
14,986.0	88.20	178.20	10,867.4	-4,367.5	31.4	441,904.20	757,348.86	32° 12' 43.824 N	103° 30' 4.509 W
15,081.0	88.30	177.90	10,870.3	-4,462.4	34.6	441,809.30	757,352.09	32° 12' 42.885 N	103° 30' 4.480 W
15,176.0	88.50	177.70	10,873.0	-4,557.3	38.2	441,714.40	757,355.74	32° 12' 41.945 N	103° 30' 4.446 W
15,271.0	88.80	177.40	10,875.2	-4,652.2	42.3	441,619.52	757,359.80	32° 12' 41.006 N	103° 30' 4.407 W
15,310.0	89.00	177.20	10,875.9	-4,691.1	44.1	441,580.57	757,361.64	32° 12' 40.620 N	103° 30' 4.389 W
15,356.0	89.00	177.20	10,876.7	-4,737.1	46.4	441,534.63	757,363.88	32° 12' 40.166 N	103° 30' 4.367 W
PBHL(SF#4H)									

Checked By: _____	Approved By: _____	Date: _____
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