

COPY



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

January 5, 2015

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

RE: 8115 JV-P Mesa B 2H
190' FSL & 1050' FEL
Sec. 7, T26S, R33E
Lea County, New Mexico

Dear Sir,

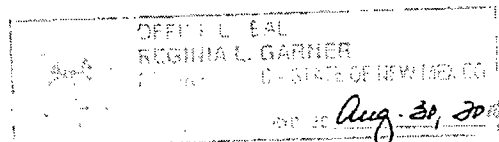
The attached is the Deviation Survey for the above captioned well.

Very truly yours,

Eddie LaRue
Operations Manager

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 5th day of January, 2015.



MAR 02 2015

COPY

8115 JV-P Mesa B 2H

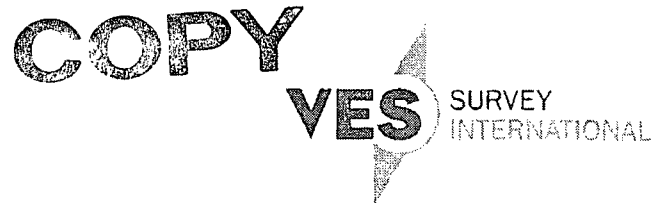
Date	Depth	Deviation	Direction	TVD	Horiz Disp
11/30/2014	250	0.30	0.00	0.00	0.00
12/1/2014	583	0.20	0.00	0.00	0.00
12/1/2014	821	0.50	0.00	0.00	0.00
12/3/2014	979	0.20	0.00	0.00	0.00
12/3/2014	1264	0.20	0.00	0.00	0.00
12/3/2014	1548	0.20	0.00	0.00	0.00
12/3/2014	1834	0.20	0.00	0.00	0.00
12/3/2014	2118	0.40	0.00	0.00	0.00
12/3/2014	2403	0.40	0.00	0.00	0.00
12/3/2014	2687	0.40	0.00	0.00	0.00
12/4/2014	2971	0.20	219.50	0.00	0.00
12/4/2014	3256	0.20	219.20	0.00	0.00
12/4/2014	3541	1.20	0.00	0.00	0.00
12/4/2014	3825	1.20	0.00	0.00	0.00
12/4/2014	4110	0.40	0.00	0.00	0.00
12/4/2014	4395	1.10	0.00	0.00	0.00
12/5/2014	4694	1.10	120.40	0.00	0.00
12/6/2014	5081	0.10	0.00	0.00	0.00
12/6/2014	5524	0.90	0.00	0.00	0.00
12/7/2014	5890	0.20	0.00	0.00	0.00
12/7/2014	6301	0.50	0.00	0.00	0.00
12/7/2014	6713	0.60	0.00	0.00	0.00
12/7/2014	7124	0.40	0.00	0.00	0.00
12/8/2014	7536	0.40	0.00	0.00	0.00
12/8/2014	7947	0.60	0.00	0.00	0.00
12/9/2014	8364	1.10	0.00	0.00	0.00
12/9/2014	8618	1.00	0.00	0.00	0.00
12/9/2014	8822	1.20	0.00	0.00	0.00
12/9/2014	9124	1.50	0.00	0.00	0.00
12/10/2014	9377	0.70	0.00	0.00	0.00
12/10/2014	9662	0.60	0.00	0.00	0.00
12/11/2014	9820	0.20	0.00	0.00	0.00
12/11/2014	10074	0.60	0.00	0.00	0.00
12/11/2014	10326	1.50	0.00	0.00	0.00
12/11/2014	10488	0.30	0.00	0.00	0.00
12/12/2014	10738	1.30	0.00	0.00	0.00
12/12/2014	10990	1.80	0.00	0.00	0.00
12/13/2014	11231	3.80	271.60	0.00	0.00
12/14/2014	11516	2.10	266.40	0.00	0.00
12/14/2014	11800	0.10	233.60	0.00	0.00
12/14/2014	12085	0.50	219.40	0.00	0.00
12/15/2014	12369	0.40	274.40	0.00	0.00
12/15/2014	12654	1.10	272.50	0.00	0.00

COPY

Date	Depth	Deviation	Direction	TVD	Horiz Disp
12/15/2014	12700	1.20	286.90	0.00	0.00
12/20/2014	8691	4.40	9.60	8690.00	11.23
12/20/2014	8722	9.70	9.20	7722.00	17.02
12/21/2014	8754	15.60	7.90	8753.00	10.20
12/21/2014	8785	8.40	7.60	8781.00	27.59
12/21/2014	8817	26.00	7.60	8811.00	40.45
12/21/2014	8849	29.10	7.70	0.00	0.00
12/21/2014	8934	34.90	7.60	0.00	0.00
12/21/2014	8975	38.10	6.70	0.00	0.00
12/21/2014	9006	40.70	6.80	0.00	0.00
12/21/2014	9038	42.90	7.00	0.00	0.00
12/21/2014	9070	45.00	6.60	0.00	0.00
12/21/2014	9101	47.50	6.00	0.00	0.00
12/21/2014	9133	50.90	5.60	0.00	0.00
12/21/2014	9228	60.00	6.90	0.00	0.00
12/22/2014	9260	62.70	7.80	9131.00	324.88
12/22/2014	9292	65.70	8.60	9145.00	253.69
12/22/2014	9323	68.60	8.90	9157.00	382.24
12/22/2014	9355	71.20	8.40	9168.00	412.29
12/22/2014	9387	73.80	8.20	9177.00	442.80
12/22/2014	9417	76.30	7.50	9185.00	0.00
12/22/2014	9512	84.40	6.00	9201.00	0.00
12/22/2014	9576	85.90	5.70	9206.00	0.00
12/23/2014	9607	88.60	5.80	9208.00	660.09
12/23/2014	9671	92.00	0.60	9207.00	724.05
12/23/2014	9766	91.60	7.00	9204.00	818.98
12/23/2014	9861	89.10	6.00	9204.00	913.95
12/23/2014	9956	89.20	6.00	9205.00	1008.90
12/23/2014	10051	90.50	6.40	0.00	0.00
12/23/2014	10143	91.60	5.80	0.00	0.00
12/23/2014	10240	92.00	6.20	0.00	0.00
12/23/2014	10335	91.00	6.10	0.00	0.00
12/23/2014	10430	90.50	5.90	0.00	0.00
12/23/2014	10525	90.70	6.10	0.00	0.00
12/23/2014	10619	91.00	5.40	0.00	0.00
12/23/2014	10715	90.60	5.30	0.00	0.00
12/23/2014	10810	90.20	4.60	0.00	0.00
12/23/2014	10905	91.20	4.80	0.00	0.00
12/23/2014	11000	89.90	5.80	0.00	0.00
12/24/2014	11095	90.50	6.80	0.00	0.00
12/24/2014	11190	90.10	9.20	0.00	0.00
12/24/2014	11285	89.60	9.10	0.00	0.00
12/24/2014	11380	90.70	10.20	0.00	0.00
12/24/2014	11475	91.50	10.00	0.00	0.00
12/24/2014	11570	91.70	9.40	0.00	0.00

COPY

Date	Depth	Deviation	Direction	TVD	Horiz Disp
12/24/2014	11665	89.80	9.70	0.00	0.00
12/24/2014	11760	89.00	9.00	0.00	0.00
12/24/2014	11855	89.60	7.80	0.00	0.00
12/26/2014	11955	89.60	6.50	9187.00	3006.61
12/26/2014	12050	90.30	7.30	0.00	0.00
12/26/2014	12139	90.30	7.20	0.00	0.00
12/27/2014	12235	90.40	6.80	9186.00	3286.39
12/27/2014	12329	92.40	6.50	9183.00	3380.54
12/27/2014	12424	91.70	6.10	91.80	3475.00
12/27/2014	12519	91.00	5.80	9178.00	3570.07
12/27/2014	12614	91.10	5.40	0.00	0.00
12/27/2014	12709	90.80	5.10	0.00	0.00
12/27/2014	12804	90.40	5.40	0.00	0.00
12/27/2014	12899	90.60	5.80	0.00	0.00
12/27/2014	12994	91.70	5.80	0.00	0.00
12/27/2014	13089	97.70	6.10	0.00	0.00
12/27/2014	13184	91.50	5.40	0.00	0.00
12/28/2014	13373	90.30	5.40	9162.67	4423.40
12/28/2014	13469	90.60	5.10	9161.91	0.00
12/28/2014	13563	90.10	4.70	9161.34	4613.42
12/28/2014	13658	88.50	4.40	0.00	0.00
12/28/2014	13676	88.50	4.00	0.00	0.00



December 30, 2014

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

Attn: Kanicia Castillo

RE: Mesa B 8115 JV P Com 2H

Please find enclosed a copy of the survey from 0.00' to 12650.00' 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,

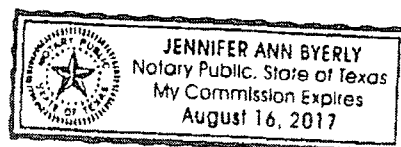
A handwritten signature in black ink, appearing to read "KH", with a horizontal line drawn through it.

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 30 day of December A.D., 2014, by Keith Havelka.

A handwritten signature in black ink, appearing to read "Jennifer Ann Byerly", written over a horizontal line.
Jennifer Ann Byerly
Notary Public, State of Texas





Company: COG Operating
Lease/Well: Mesa B 8115 JV P Com/2H
Location: Sec 7 T26S R33E
Rig Name: Silver Oak 12
State/County: New Mexico/Lea
Latitude: 32.05, Longitude: -103.61
GRID North is 0.39 Degrees East of True North
VS-Azi: 0.00 Degrees

COPY



Depth Reference : RKB = 18 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: 8115 jvp mesa b #2h-de_01.ut

Minimum Curvature Method

Report Date/Time: 12/30/2014 / 13:02

VES Survey International

West Texas

(432) 563-5444

Surveyor: Chris Bankson

Mesa B 8115 JV P Com 2H / API 30-025-42125

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	0.18	31.70	100.00	0.13	0.08	0.13	0.16	31.70	0.18
200.00	0.19	36.87	200.00	0.40	0.26	0.40	0.48	33.45	0.02
300.00	0.25	55.08	300.00	0.65	0.54	0.65	0.84	39.55	0.09
400.00	0.16	83.89	400.00	0.79	0.85	0.79	1.16	47.25	0.13
500.00	0.11	109.48	500.00	0.77	1.09	0.77	1.33	54.57	0.08
600.00	0.37	109.08	600.00	0.63	1.48	0.63	1.61	66.84	0.26
700.00	0.28	155.05	700.00	0.30	1.89	0.30	1.92	80.87	0.27
800.00	0.07	185.46	799.99	0.01	1.99	0.01	1.99	89.58	0.22
900.00	0.20	216.47	899.99	-0.19	1.88	-0.19	1.89	95.70	0.14
1000.00	0.15	224.70	999.99	-0.42	1.69	-0.42	1.74	103.90	0.05
1100.00	0.08	249.91	1099.99	-0.53	1.54	-0.53	1.63	109.14	0.09
1200.00	0.13	254.95	1199.99	-0.59	1.36	-0.59	1.48	113.28	0.06
1300.00	0.15	304.27	1299.99	-0.54	1.14	-0.54	1.26	115.41	0.12
1400.00	0.16	304.06	1399.99	-0.39	0.91	-0.39	0.99	113.01	0.01
1500.00	0.23	292.27	1499.99	-0.23	0.61	-0.23	0.65	110.82	0.08
1600.00	0.06	283.16	1599.99	-0.14	0.37	-0.14	0.40	111.10	0.17
1700.00	0.27	275.97	1699.99	-0.11	0.09	-0.11	0.14	140.84	0.21
1800.00	0.19	291.73	1799.99	-0.02	-0.30	-0.02	0.30	266.13	0.10

COPY

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	0.20	313.23	1899.99	0.16	-0.59	0.16	0.61	285.38	0.07
2000.00	0.16	336.46	1999.99	0.41	-0.77	0.41	0.87	297.91	0.08
2100.00	0.17	23.12	2099.99	0.67	-0.76	0.67	1.01	311.10	0.13
2200.00	0.12	29.55	2199.99	0.89	-0.66	0.89	1.11	323.64	0.05
2300.00	0.25	36.48	2299.99	1.15	-0.48	1.15	1.25	337.63	0.13
2400.00	0.10	35.49	2399.99	1.40	-0.30	1.40	1.43	347.93	0.15
2500.00	0.20	297.88	2499.99	1.55	-0.40	1.55	1.60	345.50	0.23
2600.00	0.10	266.27	2599.99	1.62	-0.64	1.62	1.74	338.60	0.13
2700.00	0.16	270.97	2699.99	1.62	-0.86	1.62	1.83	332.17	0.06
2800.00	0.16	320.66	2799.99	1.73	-1.08	1.73	2.04	328.06	0.13
2900.00	0.17	343.61	2899.99	1.99	-1.21	1.99	2.33	328.59	0.07
3000.00	0.13	317.98	2999.99	2.22	-1.33	2.22	2.59	328.98	0.08
3100.00	0.25	292.66	3099.99	2.39	-1.62	2.39	2.88	325.92	0.14
3200.00	0.16	289.76	3199.98	2.52	-1.95	2.52	3.19	322.23	0.09
3300.00	0.24	287.70	3299.98	2.63	-2.29	2.63	3.49	319.02	0.08
3400.00	0.06	316.06	3399.98	2.74	-2.53	2.74	3.73	317.30	0.19
3500.00	0.46	16.13	3499.98	3.17	-2.45	3.17	4.00	322.25	0.44
3600.00	1.38	38.25	3599.97	4.50	-1.60	4.50	4.77	340.47	0.96
3700.00	1.34	40.47	3699.94	6.33	-0.09	6.33	6.33	359.16	0.06
3800.00	1.46	33.99	3799.91	8.27	1.38	8.27	8.39	9.44	0.20
3900.00	1.14	35.65	3899.89	10.14	2.67	10.14	10.48	14.74	0.32
4000.00	0.75	58.16	3999.87	11.29	3.80	11.29	11.91	18.60	0.53
4100.00	0.50	47.16	4099.87	11.93	4.68	11.93	12.81	21.40	0.27
4200.00	0.73	45.51	4199.86	12.67	5.45	12.67	13.80	23.27	0.23
4300.00	1.04	81.90	4299.85	13.25	6.80	13.25	14.89	27.17	0.62
4400.00	1.44	102.85	4399.83	13.09	8.92	13.09	15.85	34.27	0.60
4500.00	1.78	121.59	4499.79	12.00	11.48	12.00	16.60	43.72	0.62
4600.00	1.45	113.27	4599.75	10.68	13.97	10.68	17.58	52.59	0.41
4700.00	1.23	104.09	4699.72	9.92	16.17	9.92	18.97	58.47	0.31
4800.00	0.80	99.95	4799.70	9.54	17.89	9.54	20.27	61.93	0.44
4900.00	0.92	95.49	4899.69	9.34	19.37	9.34	21.51	64.25	0.14
5000.00	0.87	101.81	4999.68	9.11	20.91	9.11	22.81	66.45	0.11
5100.00	0.64	96.57	5099.67	8.89	22.21	8.89	23.93	68.18	0.24
5200.00	0.71	105.00	5199.66	8.67	23.37	8.67	24.92	69.65	0.12
5300.00	0.60	101.88	5299.66	8.40	24.47	8.40	25.88	71.05	0.11
5400.00	0.67	93.01	5399.65	8.26	25.57	8.26	26.87	72.09	0.12
5500.00	0.79	104.09	5499.64	8.06	26.82	8.06	28.01	73.27	0.18
5600.00	0.63	112.02	5599.64	7.69	28.00	7.69	29.04	74.64	0.19
5700.00	0.58	112.04	5699.63	7.29	28.98	7.29	29.89	75.87	0.04

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	TVS FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5800.00	0.61	115.50	5799.63	6.87	29.93	6.87	30.71	77.07	0.04
5900.00	0.63	111.68	5899.62	6.44	30.92	6.44	31.59	78.23	0.05
6000.00	0.60	106.55	5999.61	6.09	31.94	6.09	32.52	79.21	0.06
6100.00	0.47	83.21	6099.61	5.99	32.85	5.99	33.39	79.67	0.25
6200.00	0.31	75.03	6199.61	6.11	33.53	6.11	34.08	79.68	0.17
6300.00	0.44	65.16	6299.60	6.34	34.14	6.34	34.73	79.48	0.14
6400.00	0.33	67.80	6399.60	6.61	34.76	6.61	35.39	79.23	0.11
6500.00	0.38	83.68	6499.60	6.76	35.36	6.76	36.00	79.18	0.11
6600.00	0.55	86.58	6599.60	6.82	36.17	6.82	36.81	79.32	0.17
6700.00	0.62	93.09	6699.59	6.82	37.19	6.82	37.81	79.60	0.09
6800.00	0.59	74.41	6799.59	6.93	38.23	6.93	38.85	79.72	0.20
6900.00	0.30	72.16	6899.58	7.15	38.97	7.15	39.62	79.60	0.29
7000.00	0.28	63.77	6999.58	7.34	39.44	7.34	40.11	79.46	0.05
7100.00	0.28	58.56	7099.58	7.57	39.86	7.57	40.57	79.24	0.03
7200.00	0.33	78.08	7199.58	7.76	40.35	7.76	41.09	79.11	0.11
7300.00	0.49	87.67	7299.58	7.84	41.05	7.84	41.80	79.19	0.18
7400.00	0.48	93.76	7399.57	7.83	41.90	7.83	42.62	79.42	0.05
7500.00	0.82	100.67	7499.57	7.67	43.02	7.67	43.69	79.90	0.35
7600.00	0.58	110.14	7599.56	7.36	44.19	7.36	44.80	80.55	0.27
7700.00	0.45	121.72	7699.56	6.98	45.00	6.98	45.54	81.19	0.17
7800.00	0.83	130.47	7799.55	6.31	45.88	6.31	46.31	82.18	0.39
7900.00	0.82	128.04	7899.54	5.40	46.99	5.40	47.30	83.45	0.04
8000.00	0.82	126.33	7999.53	4.54	48.13	4.54	48.34	84.61	0.02
8100.00	0.86	127.27	8099.52	3.66	49.30	3.66	49.43	85.75	0.05
8200.00	0.86	134.87	8199.51	2.68	50.43	2.68	50.50	86.96	0.11
8300.00	0.78	145.13	8299.50	1.60	51.34	1.60	51.37	88.22	0.17
8400.00	0.96	144.45	8399.49	0.36	52.22	0.36	52.22	89.61	0.18
8500.00	1.00	163.67	8499.47	-1.16	52.95	-1.16	52.96	91.26	0.33
8600.00	1.01	163.96	8599.46	-2.85	53.44	-2.85	53.51	93.05	0.01
8700.00	0.90	162.35	8699.44	-4.45	53.92	-4.45	54.10	94.72	0.12
8800.00	0.83	140.95	8799.43	-5.76	54.61	-5.76	54.92	96.02	0.33
8900.00	0.52	106.62	8899.42	-6.45	55.51	-6.45	55.88	96.62	0.49
9000.00	0.19	99.90	8999.42	-6.61	56.11	-6.61	56.50	96.71	0.33
9100.00	0.23	90.45	9099.42	-6.64	56.48	-6.64	56.87	96.70	0.05
9200.00	0.53	96.22	9199.42	-6.69	57.15	-6.69	57.54	96.68	0.30
9300.00	0.88	89.30	9299.41	-6.73	58.37	-6.73	58.76	96.58	0.35
9400.00	0.57	61.65	9399.40	-6.48	59.58	-6.48	59.93	96.21	0.45
9500.00	0.61	356.66	9499.40	-5.72	59.99	-5.72	60.26	95.44	0.64
9600.00	0.75	344.74	9599.39	-4.55	59.78	-4.55	59.96	94.36	0.20

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	0.83	341.55	9699.38	-3.24	59.38	-3.24	59.47	93.12	0.09
9800.00	1.10	335.10	9799.37	-1.68	58.75	-1.68	58.77	91.64	0.30
9900.00	0.21	288.67	9899.36	-0.75	58.17	-0.75	58.18	90.74	0.97
10000.00	0.23	256.76	9999.36	-0.74	57.80	-0.74	57.81	90.73	0.12
10100.00	0.68	230.36	10099.36	-1.17	57.15	-1.17	57.16	91.17	0.48
10200.00	1.00	226.79	10199.35	-2.15	56.05	-2.15	56.09	92.19	0.33
10300.00	0.98	233.95	10299.33	-3.25	54.72	-3.25	54.82	93.39	0.13
10400.00	1.43	212.36	10399.31	-4.80	53.37	-4.80	53.58	95.14	0.63
10500.00	0.49	197.03	10499.29	-6.25	52.58	-6.25	52.95	96.78	0.97
10600.00	0.61	189.79	10599.29	-7.18	52.37	-7.18	52.86	97.81	0.14
10700.00	0.66	192.93	10699.28	-8.26	52.15	-8.26	52.80	99.00	0.06
10800.00	0.78	227.75	10799.28	-9.28	51.51	-9.28	52.34	100.21	0.45
10900.00	1.19	226.69	10899.26	-10.45	50.25	-10.45	51.33	101.75	0.40
11000.00	1.45	246.58	10999.24	-11.66	48.34	-11.66	49.73	103.56	0.52
11100.00	2.75	258.53	11099.17	-12.64	44.83	-12.64	46.58	105.75	1.36
11200.00	3.29	268.70	11199.03	-13.18	39.62	-13.18	41.75	108.41	0.78
11300.00	3.99	279.15	11298.83	-12.69	33.31	-12.69	35.65	110.86	0.97
11400.00	3.30	278.51	11398.62	-11.71	27.03	-11.71	29.45	113.43	0.69
11500.00	2.44	268.76	11498.50	-11.33	22.05	-11.33	24.79	117.20	0.99
11600.00	1.76	253.31	11598.43	-11.82	18.46	-11.82	21.92	122.63	0.88
11700.00	1.29	239.54	11698.40	-12.83	16.02	-12.83	20.52	128.69	0.59
11800.00	1.13	228.18	11798.37	-14.06	14.32	-14.06	20.06	134.48	0.29
11900.00	0.81	225.25	11898.36	-15.21	13.08	-15.21	20.06	139.32	0.32
12000.00	0.79	221.83	11998.35	-16.23	12.11	-16.23	20.25	143.27	0.05
12100.00	0.55	223.54	12098.34	-17.09	11.32	-17.09	20.50	146.49	0.25
12200.00	0.46	238.63	12198.34	-17.66	10.63	-17.66	20.61	148.96	0.15
12300.00	0.43	257.84	12298.34	-17.96	9.90	-17.96	20.51	151.14	0.16
12400.00	0.26	264.14	12398.33	-18.06	9.31	-18.06	20.32	152.74	0.18
12500.00	0.44	271.94	12498.33	-18.07	8.70	-18.07	20.06	154.30	0.19
12600.00	0.82	273.35	12598.33	-18.02	7.59	-18.02	19.55	157.15	0.38
12650.00	1.06	267.81	12648.32	-18.01	6.77	-18.01	19.25	159.39	0.51

COPY

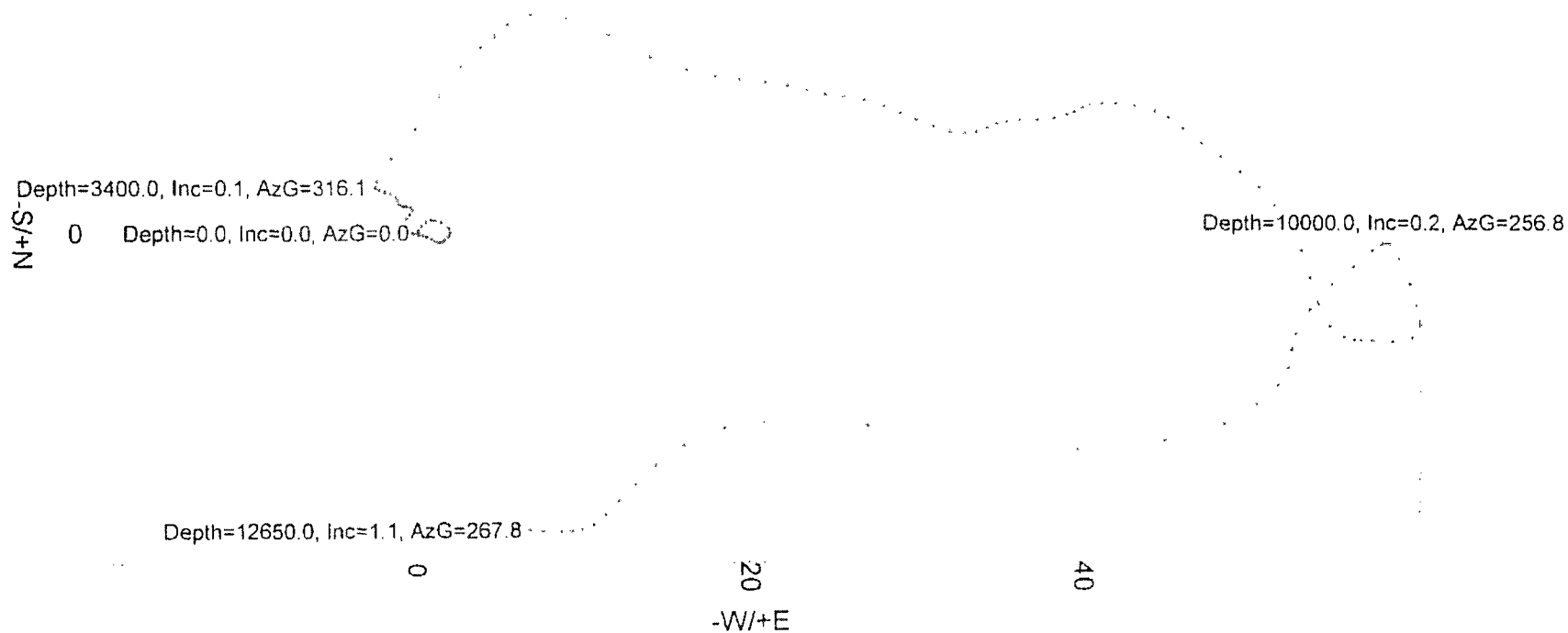


VES Survey International
West Texas
(432) 563-5444
Surveyor: Chris Bankson
Mesa B 8115 JV P Com 2H / API 30-025-42125



COPY

20





COPY

COG Operating LLC

Lea County, NM (NAD27 NME)

8115 JV-P Mesa B

#2H

OH

Survey: MWD #1

Survey Report - Geographic

31 December, 2014



Wellplanning
Survey Report - Geographic

COPY

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	WELL @ 3259.7usft (Original Well Elev)
Site:	8115 JV-P Mesa B	MD Reference:	WELL @ 3259.7usft (Original Well Elev)
Well:	#2H	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	8115 JV-P Mesa B		
Site Position:	Map	Northing:	0.00 usft
From:		Easting:	0.00 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	30° 59' 24.512 N
		Longitude:	105° 55' 44.137 W
		Grid Convergence:	-0.82 "

Well	#2H		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 3' 4.264 N
		Longitude:	103° 36' 20.730 W
		Ground Level:	3,241.7 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
	IGRF2010	9/5/2014	(°)
			7.19
		Dip Angle	(°)
		59.94	
		Field Strength	(nT)
		48,187	

Design	OH		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			7.59

Survey Program	Date 12/31/2014		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.0	8,600.0	GYRO (OH)	MWD
8,722.0	13,728.0	MWD #1 (OH)	MWD
			Description
			MWD - Standard
			MWD - Standard

Survey									
Measured			Vertical			Map	Map		
Depth	Inclination	Azimuth	Depth	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
(usft)	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
8,600.0	1.01	163.98	8,599.5	-2.9	53.5	383,102.85	725,475.18	32° 3' 4.232 N	103° 36' 20.108 W
8,722.0	4.40	9.60	8,721.4	0.7	54.6	383,108.43	725,478.26	32° 3' 4.268 N	103° 36' 20.096 W
8,753.0	9.70	9.20	8,752.1	4.5	55.2	383,110.18	725,478.87	32° 3' 4.305 N	103° 36' 20.088 W
8,785.0	15.60	7.80	8,783.3	11.4	56.2	383,117.11	725,477.90	32° 3' 4.373 N	103° 36' 20.076 W
8,817.0	21.40	7.60	8,813.7	21.5	57.6	383,127.17	725,479.28	32° 3' 4.473 N	103° 36' 20.059 W
8,848.0	26.00	7.60	8,842.0	33.8	59.2	383,139.52	725,480.91	32° 3' 4.595 N	103° 36' 20.039 W
8,880.0	29.10	7.70	8,870.4	48.5	61.2	383,154.18	725,482.88	32° 3' 4.740 N	103° 36' 20.015 W
8,911.0	32.00	7.80	8,897.1	64.1	63.3	383,169.79	725,485.00	32° 3' 4.894 N	103° 36' 19.989 W
8,943.0	34.90	7.80	8,923.8	81.8	65.7	383,187.27	725,487.37	32° 3' 5.067 N	103° 36' 19.960 W
8,975.0	38.10	6.70	8,949.5	100.5	68.0	383,208.16	725,489.73	32° 3' 5.254 N	103° 36' 19.931 W
9,006.0	40.70	6.80	8,973.5	120.0	70.3	383,225.70	725,492.04	32° 3' 5.447 N	103° 36' 19.903 W



Wellplanning
Survey Report - Geographic

COPY

Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: 8115 JV-P Mesa B
Well: #2H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #2H
TVD Reference: WELL @ 3259.7usft (Original Well Elev)
MD Reference: WELL @ 3259.7usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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
9,038.0	42.90	7.00	8,997.3	141.2	72.9	383,246.87	725,494.60	32° 3' 5.656 N	103° 36' 19.871 W
9,070.0	45.00	6.60	9,020.4	183.2	75.5	383,268.92	725,497.23	32° 3' 5.874 N	103° 36' 19.839 W
9,101.0	47.50	6.00	9,041.8	185.5	78.0	383,291.18	725,499.69	32° 3' 6.095 N	103° 36' 19.809 W
9,133.0	50.90	5.60	9,062.7	209.6	80.4	383,315.27	725,502.13	32° 3' 6.333 N	103° 36' 19.779 W
9,165.0	54.50	5.90	9,082.1	234.9	83.0	383,340.60	725,504.68	32° 3' 6.583 N	103° 36' 19.747 W
9,196.0	57.50	6.00	9,099.4	260.5	85.7	383,368.15	725,507.35	32° 3' 6.836 N	103° 36' 19.714 W
9,228.0	60.00	6.90	9,116.0	287.6	88.7	383,393.34	725,510.42	32° 3' 7.105 N	103° 36' 19.676 W
9,260.0	62.70	7.80	9,131.4	315.5	92.3	383,421.18	725,514.02	32° 3' 7.380 N	103° 36' 19.632 W
9,292.0	65.70	8.60	9,145.3	344.0	96.4	383,449.70	725,518.13	32° 3' 7.682 N	103° 36' 19.582 W
9,323.0	68.60	8.90	9,157.3	372.2	100.6	383,477.93	725,522.48	32° 3' 7.941 N	103° 36' 19.530 W
9,355.0	71.20	8.40	9,168.3	401.9	105.3	383,507.63	725,526.99	32° 3' 8.235 N	103° 36' 19.475 W
9,387.0	73.80	8.20	9,177.9	432.1	109.7	383,537.83	725,531.40	32° 3' 8.533 N	103° 36' 19.421 W
9,417.0	76.30	7.50	9,185.7	460.8	113.7	383,566.54	725,535.36	32° 3' 8.817 N	103° 36' 19.373 W
9,448.0	79.10	7.20	9,192.5	491.8	117.7	383,597.55	725,539.36	32° 3' 9.124 N	103° 36' 19.324 W
9,480.0	82.00	6.30	9,197.6	522.2	121.3	383,627.91	725,542.95	32° 3' 9.424 N	103° 36' 19.280 W
9,512.0	84.40	6.00	9,201.4	553.8	124.7	383,659.50	725,546.35	32° 3' 9.736 N	103° 36' 19.238 W
9,544.0	85.50	6.10	9,204.2	585.5	128.0	383,691.20	725,549.71	32° 3' 10.050 N	103° 36' 19.198 W
9,576.0	85.90	5.70	9,206.6	617.2	131.3	383,722.94	725,552.99	32° 3' 10.364 N	103° 36' 19.158 W
9,607.0	88.60	5.80	9,208.1	648.0	134.4	383,753.74	725,556.09	32° 3' 10.688 N	103° 36' 19.117 W
9,671.0	92.00	6.00	9,207.7	711.7	141.0	383,817.39	725,562.67	32° 3' 11.298 N	103° 36' 19.036 W
9,766.0	91.60	7.00	9,204.8	806.0	151.7	383,911.74	725,573.42	32° 3' 12.231 N	103° 36' 18.904 W
9,861.0	89.10	6.00	9,204.2	900.4	162.5	384,006.17	725,584.17	32° 3' 13.184 N	103° 36' 18.771 W
9,956.0	89.20	6.00	9,205.6	994.9	172.4	384,100.58	725,594.10	32° 3' 14.098 N	103° 36' 18.649 W
10,051.0	90.50	6.40	9,205.8	1,089.3	182.7	384,195.03	725,604.36	32° 3' 15.032 N	103° 36' 18.522 W
10,143.0	91.60	5.80	9,204.1	1,180.8	192.4	384,286.49	725,614.14	32° 3' 15.938 N	103° 36' 18.401 W
10,240.0	92.00	6.20	9,201.1	1,277.2	202.6	384,382.91	725,624.27	32° 3' 16.890 N	103° 36' 18.276 W
10,335.0	91.00	6.10	9,198.6	1,371.6	212.7	384,477.33	725,634.44	32° 3' 17.823 N	103° 36' 18.150 W
10,430.0	90.50	5.90	9,197.4	1,466.1	222.7	384,571.80	725,644.37	32° 3' 18.758 N	103° 36' 18.027 W
10,525.0	90.70	6.10	9,196.4	1,560.6	232.6	384,666.27	725,654.30	32° 3' 19.692 N	103° 36' 17.905 W
10,619.0	91.00	5.40	9,195.0	1,654.1	242.0	384,759.79	725,663.72	32° 3' 20.617 N	103° 36' 17.788 W
10,715.0	90.60	5.30	9,193.6	1,749.7	251.9	384,855.36	725,672.57	32° 3' 21.582 N	103° 36' 17.676 W
10,810.0	90.20	4.60	9,193.0	1,844.3	259.2	384,950.00	725,680.87	32° 3' 22.498 N	103° 36' 17.574 W
10,905.0	91.20	4.80	9,191.5	1,939.0	267.0	385,044.68	725,688.85	32° 3' 23.434 N	103° 36' 17.476 W
11,000.0	89.90	5.80	9,190.9	2,033.6	275.7	385,139.26	725,697.43	32° 3' 24.370 N	103° 36' 17.387 W
11,095.0	90.50	6.80	9,190.6	2,128.0	286.2	385,233.69	725,707.95	32° 3' 25.303 N	103° 36' 17.238 W
11,190.0	90.10	9.20	9,190.1	2,222.1	299.4	385,327.75	725,721.07	32° 3' 26.233 N	103° 36' 17.077 W
11,285.0	89.60	9.10	9,190.3	2,315.8	314.5	385,421.54	725,736.18	32° 3' 27.161 N	103° 36' 16.894 W
11,380.0	90.70	10.20	9,190.1	2,409.5	330.4	385,515.20	725,752.10	32° 3' 28.086 N	103° 36' 16.702 W
11,475.0	91.50	10.00	9,188.2	2,503.0	347.1	385,608.71	725,768.78	32° 3' 29.010 N	103° 36' 16.501 W
11,570.0	91.70	9.90	9,185.6	2,596.5	363.5	385,702.24	725,785.17	32° 3' 29.935 N	103° 36' 16.303 W
11,665.0	89.80	9.70	9,184.4	2,690.1	379.6	385,795.84	725,801.33	32° 3' 30.860 N	103° 36' 16.108 W
11,760.0	89.00	9.00	9,185.3	2,783.9	395.1	385,889.57	725,816.77	32° 3' 31.787 N	103° 36' 15.921 W
11,855.0	89.60	7.80	9,183.5	2,877.8	408.9	385,983.55	725,830.64	32° 3' 32.716 N	103° 36' 15.752 W
11,950.0	89.60	6.50	9,187.2	2,972.1	420.6	386,077.80	725,842.47	32° 3' 33.648 N	103° 36' 15.608 W
12,045.0	90.30	7.20	9,187.3	3,066.4	432.1	386,172.12	725,853.90	32° 3' 34.580 N	103° 36' 15.469 W
12,139.0	90.30	7.20	9,186.6	3,159.7	443.9	386,265.38	725,865.58	32° 3' 35.502 N	103° 36' 15.324 W
12,235.0	90.40	6.80	9,186.2	3,255.0	455.6	386,360.68	725,877.28	32° 3' 36.444 N	103° 36' 15.181 W
12,329.0	92.40	6.50	9,183.9	3,348.3	466.5	386,454.00	725,888.16	32° 3' 37.367 N	103° 36' 15.047 W
12,424.0	91.70	6.10	9,180.5	3,442.7	476.9	386,548.36	725,898.58	32° 3' 38.300 N	103° 36' 14.919 W
12,519.0	91.00	5.80	9,178.2	3,537.1	486.7	386,642.83	725,908.42	32° 3' 39.235 N	103° 36' 14.797 W
12,614.0	91.10	5.40	9,176.5	3,631.7	496.0	386,737.36	725,917.69	32° 3' 40.169 N	103° 36' 14.682 W
12,709.0	90.80	5.10	9,174.9	3,726.2	504.7	386,831.94	725,928.38	32° 3' 41.105 N	103° 36' 14.573 W
12,804.0	90.40	5.40	9,173.9	3,820.8	513.4	386,926.54	725,935.08	32° 3' 42.040 N	103° 36' 14.465 W
12,899.0	90.60	5.60	9,173.1	3,915.4	522.6	387,021.08	725,944.35	32° 3' 42.975 N	103° 36' 14.350 W
12,894.0	91.70	5.80	9,171.2	4,009.9	532.2	387,115.58	725,953.84	32° 3' 43.910 N	103° 36' 14.231 W



Wellplanning
Survey Report - Geographic

Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: 8115 JV-P Mesa B
Well: #2H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #2H
TVD Reference: WELL @ 3259.7usft (Original Well Elev)
MD Reference: WELL @ 3259.7usft (Original Well Elev)
North Reference: Grd
Survey Calculation Method: Minimum Curvature
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
13,089.0	92.20	6.10	9,168.0	4,104.3	542.1	387,210.01	725,963.79	32° 3' 44.844 N	103° 36' 14.109 W
13,184.0	91.50	5.40	9,164.9	4,198.8	551.8	387,304.48	725,973.30	32° 3' 45.778 N	103° 36' 13.991 W
13,278.0	90.60	4.70	9,163.2	4,292.4	559.9	387,398.10	725,981.57	32° 3' 46.704 N	103° 36' 13.888 W
13,373.0	90.30	5.40	9,162.4	4,387.0	568.2	387,492.73	725,989.93	32° 3' 47.640 N	103° 36' 13.783 W
13,469.0	90.60	5.10	9,161.7	4,482.6	577.0	387,588.32	725,998.72	32° 3' 48.585 N	103° 36' 13.673 W
13,563.0	90.10	4.70	9,161.1	4,578.3	585.0	387,681.97	726,006.75	32° 3' 49.511 N	103° 36' 13.573 W
13,658.0	88.50	4.40	9,162.3	4,671.0	592.6	387,778.88	726,014.28	32° 3' 50.448 N	103° 36' 13.478 W
13,676.0	88.50	4.00	9,162.7	4,688.9	593.9	387,794.61	726,015.60	32° 3' 50.625 N	103° 36' 13.481 W
13,728.0	88.50	4.00	9,164.1	4,740.8	597.5	387,846.47	726,019.23	32° 3' 51.138 N	103° 36' 13.415 W

PBHL(VP#3)

Checked By: _____

Approved By: _____

Date: _____