



A GYRO TECHNOLOGIES INC. COMPANY

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

RECEIVED

DEC 05 2012

NMOCD ARTESIA

August 29, 2012

30-015-38236

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

Attn: Kánicia Castillo

Re: Lizard Pot Federal Com 4

Please find enclosed a copy of the survey from 0' to 8,751' 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

Company: COG Operating LLC (Concho)

Lease/Well: Lizard Pot Federal Com/4

Location: S36 T19s R31e

Rig Name: Basic 46

State/County: New Mexico/Eddy

Latitude: 32.61

GRID North is 0.28 Degrees East of True North

VS-Azi: 0.00 Degrees



RECEIVED
DEC 05 2012
NMOCD ARTESIA

RKB : 22 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: ...ederal com #4h gyro survey.ut

Minimum Curvature Method

Report Date/Time: 8/29/2012 / 14:01

Vaughn Energy Services

Gardendale, TX

(432) 563-5444

Surveyor: Dustin Wedel

Lizard Pot Federal Com 4 / API 30-015-38236

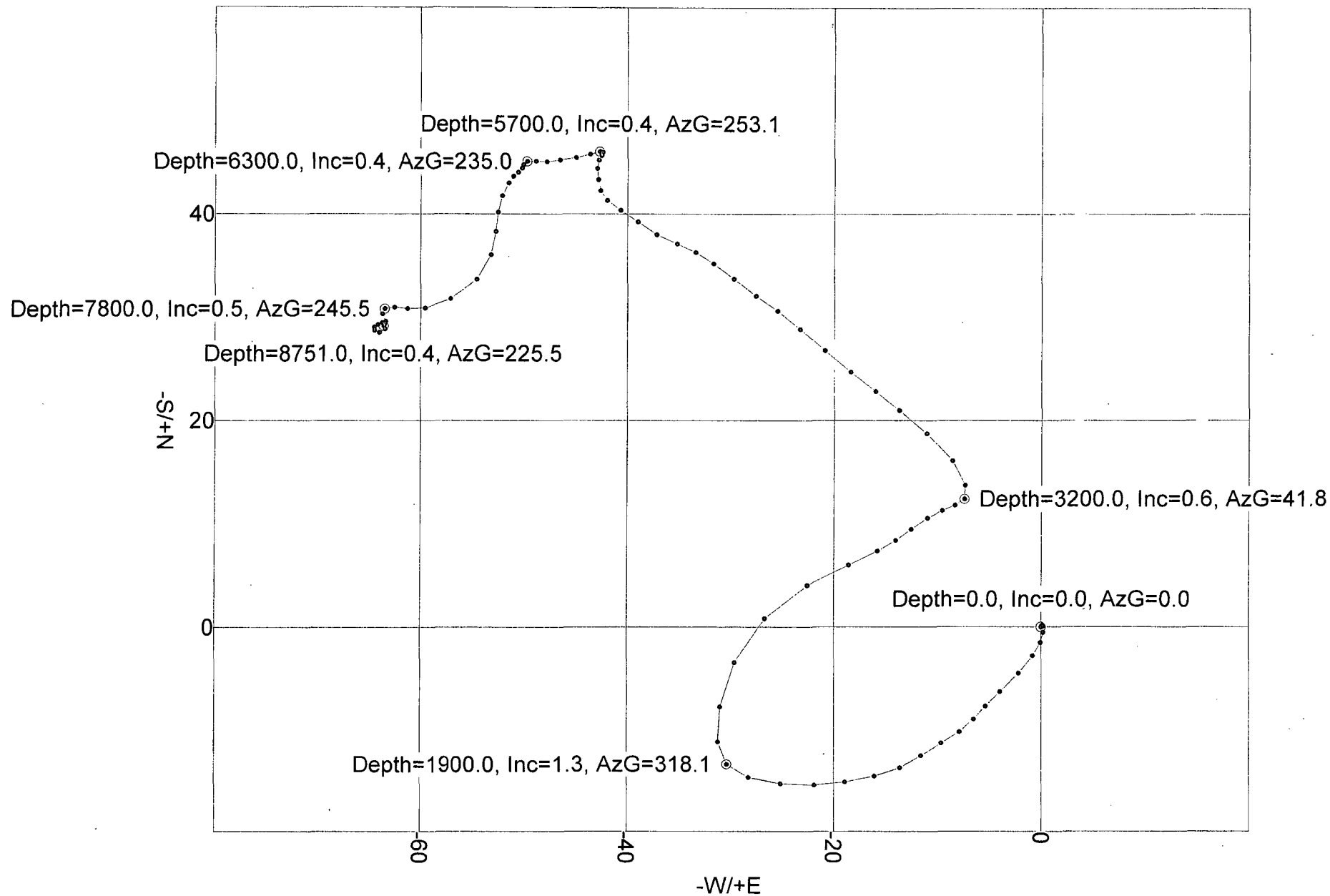
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.16	28.42	100.00	0.13	0.07	0.14	28.42	0.16
200.00	0.20	164.97	200.00	0.09	0.18	0.20	64.73	0.34
300.00	0.49	184.76	300.00	-0.51	0.19	0.54	159.27	0.31
400.00	0.66	201.52	399.99	-1.47	-0.06	1.47	182.15	0.24
500.00	1.05	215.34	499.98	-2.75	-0.80	2.87	196.16	0.44
600.00	1.49	221.45	599.96	-4.47	-2.19	4.98	206.06	0.46
700.00	1.42	228.39	699.92	-6.27	-3.97	7.42	212.36	0.19
800.00	0.91	218.29	799.90	-7.71	-5.39	9.41	214.94	0.55
900.00	1.08	222.31	899.89	-9.03	-6.51	11.13	215.80	0.18
1000.00	1.08	233.55	999.87	-10.28	-7.90	12.97	217.54	0.21
1100.00	1.29	241.36	1099.85	-11.38	-9.65	14.92	220.29	0.27
1200.00	1.35	234.41	1199.82	-12.61	-11.60	17.14	222.61	0.17
1300.00	1.36	244.59	1299.80	-13.81	-13.63	19.40	224.64	0.24
1400.00	1.63	256.97	1399.76	-14.64	-16.09	21.75	227.71	0.42
1500.00	1.68	259.91	1499.72	-15.21	-18.92	24.28	231.20	0.10
1600.00	1.75	268.74	1599.68	-15.51	-21.89	26.83	234.69	0.27
1700.00	1.97	275.72	1699.62	-15.37	-25.13	29.46	238.55	0.32
1800.00	1.63	288.42	1799.57	-14.75	-28.19	31.82	242.39	0.52

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	1.30	318.10	1899.54	-13.45	-30.30	33.15	246.06	0.82
2000.00	1.59	355.33	1999.51	-11.23	-31.17	33.13	250.19	0.96
2100.00	2.43	8.20	2099.45	-7.75	-30.98	31.93	255.95	0.94
2200.00	2.87	25.88	2199.34	-3.40	-29.58	29.78	263.44	0.93
2300.00	3.08	43.13	2299.21	0.81	-26.65	26.67	271.75	0.92
2400.00	2.95	61.49	2399.08	4.00	-22.55	22.91	280.07	0.97
2500.00	2.12	66.96	2498.98	5.96	-18.58	19.52	287.78	0.87
2600.00	1.40	59.83	2598.93	7.30	-15.82	17.43	294.76	0.75
2700.00	0.94	59.16	2698.91	8.34	-14.06	16.34	300.67	0.46
2800.00	1.17	50.19	2798.89	9.41	-12.57	15.70	306.83	0.28
2900.00	1.03	61.67	2898.87	10.49	-10.99	15.20	313.66	0.26
3000.00	0.81	64.68	2998.86	11.22	-9.56	14.74	319.56	0.22
3100.00	0.72	69.67	3098.85	11.74	-8.33	14.40	324.63	0.12
3200.00	0.58	41.78	3198.84	12.33	-7.41	14.39	329.00	0.34
3300.00	1.13	343.45	3298.83	13.66	-7.36	15.52	331.70	0.97
3400.00	1.99	327.04	3398.80	16.07	-8.58	18.22	331.89	0.96
3500.00	2.27	308.05	3498.73	18.75	-11.09	21.78	329.39	0.76
3600.00	1.70	311.94	3598.67	20.96	-13.76	25.07	326.73	0.59
3700.00	1.64	306.48	3698.63	22.80	-16.01	27.86	324.93	0.17
3800.00	1.86	309.50	3798.58	24.69	-18.41	30.80	323.28	0.24
3900.00	1.85	310.35	3898.53	26.77	-20.90	33.96	322.02	0.03
4000.00	1.78	311.26	3998.48	28.84	-23.30	37.07	321.07	0.08
4100.00	1.44	306.23	4098.44	30.61	-25.48	39.83	320.22	0.37
4200.00	1.45	303.22	4198.40	32.04	-27.55	42.26	319.31	0.08
4300.00	1.63	312.08	4298.37	33.69	-29.66	44.89	318.63	0.30
4400.00	1.24	299.87	4398.34	35.18	-31.66	47.33	318.01	0.49
4500.00	1.12	305.32	4498.32	36.28	-33.40	49.31	317.37	0.17
4600.00	1.20	285.39	4598.30	37.13	-35.21	51.17	316.52	0.41
4700.00	1.29	303.06	4698.27	38.02	-37.16	53.17	315.65	0.39
4800.00	1.22	305.27	4798.25	39.25	-38.98	55.32	315.20	0.09
4900.00	1.08	300.57	4898.23	40.34	-40.66	57.28	314.78	0.17
5000.00	0.79	313.43	4998.22	41.30	-41.96	58.88	314.54	0.35
5100.00	0.58	342.53	5098.21	42.25	-42.62	60.01	314.75	0.40
5200.00	0.65	354.45	5198.20	43.30	-42.82	60.90	315.32	0.15
5300.00	0.58	354.10	5298.20	44.37	-42.93	61.74	315.94	0.07
5400.00	0.42	36.56	5398.19	45.16	-42.76	62.20	316.56	0.39
5500.00	0.18	25.31	5498.19	45.60	-42.48	62.32	317.03	0.24
5600.00	0.22	20.53	5598.19	45.92	-42.34	62.46	317.32	0.04
5700.00	0.43	253.06	5698.19	45.99	-42.64	62.72	317.16	0.59

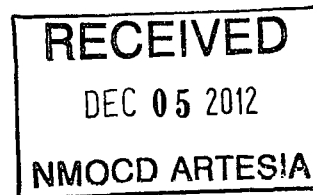
Measured Depth FT	Incl Angle Deg	Drit Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5800.00	0.68	254.96	5798.19	45.72	-43.58	63.16	316.38	0.25
5900.00	0.92	256.99	5898.18	45.39	-44.93	63.87	315.29	0.24
6000.00	0.90	268.05	5998.16	45.18	-46.50	64.84	314.18	0.18
6100.00	0.58	254.00	6098.16	45.02	-47.78	65.64	313.30	0.37
6200.00	0.68	288.17	6198.15	45.06	-48.82	66.44	312.71	0.38
6300.00	0.41	235.00	6298.15	45.04	-49.68	67.05	312.20	0.54
6400.00	0.14	206.63	6398.14	44.73	-50.02	67.10	311.80	0.29
6500.00	0.27	201.53	6498.14	44.40	-50.16	66.99	311.51	0.13
6600.00	0.38	236.89	6598.14	44.00	-50.53	67.00	311.05	0.22
6700.00	0.30	222.83	6698.14	43.62	-50.98	67.10	310.55	0.12
6800.00	0.62	211.16	6798.14	42.97	-51.44	67.03	309.88	0.33
6900.00	0.95	203.30	6898.13	41.75	-52.05	66.72	308.73	0.35
7000.00	0.94	183.88	6998.11	40.17	-52.43	66.05	307.46	0.32
7100.00	1.17	188.84	7098.10	38.34	-52.64	65.13	306.07	0.25
7200.00	1.50	193.72	7198.07	36.06	-53.11	64.20	304.18	0.34
7300.00	1.75	223.16	7298.03	33.68	-54.46	64.04	301.73	0.86
7400.00	1.97	243.80	7397.98	31.81	-57.05	65.32	299.14	0.70
7500.00	1.15	261.19	7497.94	30.89	-59.59	67.12	297.40	0.94
7600.00	0.84	277.59	7597.93	30.84	-61.30	68.62	296.70	0.42
7700.00	0.64	273.98	7697.92	30.97	-62.58	69.83	296.33	0.21
7800.00	0.49	245.54	7797.91	30.84	-63.52	70.61	295.89	0.31
7900.00	0.42	153.86	7897.91	30.33	-63.75	70.60	295.45	0.65
8000.00	0.48	159.47	7997.91	29.61	-63.44	70.01	295.02	0.08
8100.00	0.46	211.35	8097.91	28.88	-63.50	69.76	294.45	0.41
8200.00	0.39	267.33	8197.90	28.52	-64.05	70.12	294.00	0.40
8300.00	0.29	328.38	8297.90	28.71	-64.53	70.63	293.99	0.36
8400.00	0.20	40.78	8397.90	29.06	-64.55	70.79	294.24	0.29
8500.00	0.31	65.85	8497.90	29.30	-64.19	70.56	294.54	0.16
8600.00	0.20	65.73	8597.90	29.48	-63.78	70.26	294.81	0.11
8700.00	0.22	152.33	8697.90	29.38	-63.53	69.99	294.82	0.29
8751.00	0.44	225.51	8748.90	29.16	-63.62	69.98	294.62	0.84



Vaughn Energy Services
Gardendale, TX
(432) 563-5444
Surveyor: Dustin Wedel
Lizard Pot Federal Com 4 / API 30-015-38236



VES Survey Date: 08/26/2012



COG Operating LLC

Eddy County, NM

Lizard Pot Fed

#4H

OH

Design: OH

Survey Report - Geographic

24 September, 2012





Survey Report - Geographic



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #4H
Project:	Eddy County, NM	TVD Reference:	RKB @ 3522.0usft
Site:	Lizard Pot Fed	MD Reference:	RKB @ 3522.0usft
Well:	#4H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Houston R5000 Database

Project	Eddy 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		Lizard Pot Fed			
Site Position:		Northing:	587,516.13 usft	Latitude:	32° 36' 50.835 N
From:	Map	Easting:	659,268.19 usft	Longitude:	103° 48' 57.895 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.28 °

Well	#4H					
Well Position	+N/-S	0.0 usft	Northing:	587,516.13 usft	Latitude:	32° 36' 50.835 N
	+E/-W	0.0 usft	Easting:	659,268.19 usft	Longitude:	103° 48' 57.895 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,500.0 usft	

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	IGRF2010	8/4/2012	(°)	(°)	(nT)
			7.59	60.48	48,710

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	178.93	

Survey Program		Date	9/4/2012	
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	8,751.0	Gyro Surveys (OH)	MWD	MWD - Standard
8,811.0	15,474.0	MWD Surveys 1 (OH)	MWD	MWD - Standard
15,618.0	15,618.0	PTB (OH)	MWD	MWD - Standard

Survey									
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	587,516.13	659,268.19	32° 36' 50.835 N	103° 48' 57.895 W
100.0	0.16	28.42	100.0	0.1	0.1	587,516.25	659,268.25	32° 36' 50.836 N	103° 48' 57.894 W
200.0	0.20	164.97	200.0	0.1	0.2	587,516.21	659,268.36	32° 36' 50.836 N	103° 48' 57.893 W
300.0	0.49	184.76	300.0	-0.5	0.2	587,515.61	659,268.37	32° 36' 50.830 N	103° 48' 57.893 W
400.0	0.66	201.52	400.0	-1.5	-0.1	587,514.65	659,268.13	32° 36' 50.820 N	103° 48' 57.896 W
500.0	1.05	215.34	500.0	-2.8	-0.8	587,513.37	659,267.39	32° 36' 50.808 N	103° 48' 57.905 W
600.0	1.49	221.45	600.0	-4.5	-2.2	587,511.64	659,266.00	32° 36' 50.791 N	103° 48' 57.921 W
700.0	1.42	228.39	699.9	-6.3	-4.0	587,509.85	659,264.21	32° 36' 50.773 N	103° 48' 57.942 W
800.0	0.91	218.29	799.9	-7.7	-5.4	587,508.40	659,262.79	32° 36' 50.759 N	103° 48' 57.959 W
900.0	1.08	222.31	899.9	-9.0	-6.5	587,507.08	659,261.66	32° 36' 50.746 N	103° 48' 57.972 W

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #4H
Project:	Eddy County, NM	TVD Reference:	RKB @ 3522.0usft
Site:	Lizard Pot Fed	MD Reference:	RKB @ 3522.0usft
Well:	#4H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Houston R5000 Database

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,000.0	1.08	233.55	999.9	-10.3	-7.9	587,505.82	659,260.27	32° 36' 50.733 N	103° 48' 57.988 W
1,100.0	1.29	241.36	1,099.8	-11.4	-9.7	587,504.72	659,258.53	32° 36' 50.723 N	103° 48' 58.009 W
1,200.0	1.35	234.41	1,199.8	-12.6	-11.6	587,503.50	659,256.58	32° 36' 50.711 N	103° 48' 58.032 W
1,300.0	1.36	244.59	1,299.8	-13.8	-13.6	587,502.30	659,254.55	32° 36' 50.699 N	103° 48' 58.055 W
1,400.0	1.63	256.97	1,399.8	-14.7	-16.1	587,501.47	659,252.09	32° 36' 50.691 N	103° 48' 58.084 W
1,500.0	1.68	259.91	1,499.7	-15.2	-18.9	587,500.90	659,249.26	32° 36' 50.685 N	103° 48' 58.117 W
1,600.0	1.75	268.74	1,599.7	-15.5	-21.9	587,500.61	659,246.29	32° 36' 50.682 N	103° 48' 58.152 W
1,700.0	1.97	275.72	1,699.6	-15.4	-25.1	587,500.74	659,243.06	32° 36' 50.684 N	103° 48' 58.190 W
1,800.0	1.63	288.42	1,799.6	-14.8	-28.2	587,501.36	659,240.00	32° 36' 50.690 N	103° 48' 58.226 W
1,900.0	1.30	318.10	1,899.5	-13.5	-30.3	587,502.66	659,237.89	32° 36' 50.703 N	103° 48' 58.250 W
2,000.0	1.59	355.33	1,999.5	-11.2	-31.2	587,504.89	659,237.02	32° 36' 50.725 N	103° 48' 58.260 W
2,100.0	2.43	8.20	2,099.4	-7.8	-31.0	587,508.37	659,237.21	32° 36' 50.760 N	103° 48' 58.258 W
2,200.0	2.87	25.88	2,199.3	-3.4	-29.6	587,512.72	659,238.60	32° 36' 50.803 N	103° 48' 58.241 W
2,300.0	3.08	43.13	2,299.2	0.8	-26.7	587,516.93	659,241.53	32° 36' 50.844 N	103° 48' 58.207 W
2,400.0	2.95	61.49	2,399.1	4.0	-22.6	587,520.12	659,245.63	32° 36' 50.876 N	103° 48' 58.159 W
2,500.0	2.12	66.96	2,499.0	5.9	-18.6	587,522.07	659,249.59	32° 36' 50.895 N	103° 48' 58.112 W
2,600.0	1.40	59.83	2,598.9	7.3	-15.8	587,523.41	659,252.35	32° 36' 50.908 N	103° 48' 58.080 W
2,700.0	0.94	59.16	2,698.9	8.3	-14.1	587,524.44	659,254.11	32° 36' 50.918 N	103° 48' 58.059 W
2,800.0	1.17	50.19	2,798.9	9.4	-12.6	587,525.52	659,255.60	32° 36' 50.929 N	103° 48' 58.042 W
2,900.0	1.03	61.67	2,898.9	10.5	-11.0	587,526.60	659,257.18	32° 36' 50.939 N	103° 48' 58.023 W
3,000.0	0.81	64.68	2,998.9	11.2	-9.6	587,527.33	659,258.61	32° 36' 50.946 N	103° 48' 58.007 W
3,100.0	0.72	69.67	3,098.8	11.7	-8.4	587,527.85	659,259.84	32° 36' 50.951 N	103° 48' 57.992 W
3,200.0	0.58	41.78	3,198.8	12.3	-7.4	587,528.44	659,260.76	32° 36' 50.957 N	103° 48' 57.981 W
3,300.0	1.13	343.45	3,298.8	13.6	-7.4	587,529.77	659,260.82	32° 36' 50.970 N	103° 48' 57.981 W
3,400.0	1.99	327.04	3,398.8	16.0	-8.6	587,532.17	659,259.59	32° 36' 50.994 N	103° 48' 57.995 W
3,500.0	2.27	308.05	3,498.7	18.7	-11.1	587,534.85	659,257.09	32° 36' 51.021 N	103° 48' 58.024 W
3,600.0	1.70	311.94	3,598.7	20.9	-13.8	587,537.06	659,254.43	32° 36' 51.043 N	103° 48' 58.055 W
3,700.0	1.64	306.48	3,698.6	22.8	-16.0	587,538.90	659,252.17	32° 36' 51.061 N	103° 48' 58.081 W
3,800.0	1.86	309.50	3,798.6	24.7	-18.4	587,540.78	659,249.77	32° 36' 51.080 N	103° 48' 58.109 W
3,900.0	1.85	310.35	3,898.5	26.7	-20.9	587,542.86	659,247.29	32° 36' 51.101 N	103° 48' 58.138 W
4,000.0	1.78	311.26	3,998.5	28.8	-23.3	587,544.93	659,244.89	32° 36' 51.121 N	103° 48' 58.166 W
4,100.0	1.44	306.23	4,098.4	30.6	-25.5	587,546.70	659,242.71	32° 36' 51.139 N	103° 48' 58.191 W
4,200.0	1.45	303.22	4,198.4	32.0	-27.6	587,548.13	659,240.64	32° 36' 51.153 N	103° 48' 58.215 W
4,300.0	1.63	312.08	4,298.4	33.7	-29.7	587,549.78	659,238.52	32° 36' 51.169 N	103° 48' 58.240 W
4,400.0	1.24	299.87	4,398.3	35.1	-31.7	587,551.27	659,236.53	32° 36' 51.184 N	103° 48' 58.263 W
4,500.0	1.12	305.32	4,498.3	36.2	-33.4	587,552.37	659,234.79	32° 36' 51.195 N	103° 48' 58.284 W
4,600.0	1.20	285.39	4,598.3	37.1	-35.2	587,553.22	659,232.98	32° 36' 51.204 N	103° 48' 58.305 W
4,700.0	1.29	303.06	4,698.3	38.0	-37.2	587,554.11	659,231.03	32° 36' 51.213 N	103° 48' 58.327 W
4,800.0	1.22	305.27	4,798.2	39.2	-39.0	587,555.34	659,229.22	32° 36' 51.225 N	103° 48' 58.349 W
4,900.0	1.08	300.57	4,898.2	40.3	-40.6	587,556.43	659,227.54	32° 36' 51.236 N	103° 48' 58.368 W
5,000.0	0.79	313.43	4,998.2	41.3	-42.0	587,557.38	659,226.23	32° 36' 51.245 N	103° 48' 58.383 W
5,100.0	0.58	342.53	5,098.2	42.2	-42.6	587,558.34	659,225.57	32° 36' 51.255 N	103° 48' 58.391 W
5,200.0	0.65	354.45	5,198.2	43.3	-42.8	587,559.39	659,225.37	32° 36' 51.265 N	103° 48' 58.393 W
5,300.0	0.58	354.10	5,298.2	44.3	-42.9	587,560.46	659,225.26	32° 36' 51.276 N	103° 48' 58.395 W
5,400.0	0.42	36.56	5,398.2	45.1	-42.8	587,561.25	659,225.43	32° 36' 51.284 N	103° 48' 58.393 W
5,500.0	0.18	25.31	5,498.2	45.6	-42.5	587,561.69	659,225.71	32° 36' 51.288 N	103° 48' 58.389 W
5,600.0	0.22	20.53	5,598.2	45.9	-42.3	587,562.01	659,225.85	32° 36' 51.291 N	103° 48' 58.388 W
5,700.0	0.43	253.06	5,698.2	46.0	-42.6	587,562.08	659,225.56	32° 36' 51.292 N	103° 48' 58.391 W
5,800.0	0.68	254.96	5,798.2	45.7	-43.6	587,561.82	659,224.62	32° 36' 51.289 N	103° 48' 58.402 W
5,900.0	0.92	256.99	5,898.2	45.4	-44.9	587,561.49	659,223.27	32° 36' 51.286 N	103° 48' 58.418 W
6,000.0	0.90	268.05	5,998.2	45.2	-46.5	587,561.28	659,221.70	32° 36' 51.284 N	103° 48' 58.436 W
6,100.0	0.58	254.00	6,098.1	45.0	-47.8	587,561.11	659,220.43	32° 36' 51.282 N	103° 48' 58.451 W
6,200.0	0.68	288.17	6,198.1	45.0	-48.8	587,561.16	659,219.38	32° 36' 51.283 N	103° 48' 58.463 W
6,300.0	0.41	235.00	6,298.1	45.0	-49.7	587,561.14	659,218.52	32° 36' 51.283 N	103° 48' 58.473 W
6,400.0	0.14	206.63	6,398.1	44.7	-50.0	587,560.82	659,218.17	32° 36' 51.280 N	103° 48' 58.477 W

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #4H
Project:	Eddy County, NM	TVD Reference:	RKB @ 3522.0usft
Site:	Lizard Pot Fed	MD Reference:	RKB @ 3522.0usft
Well:	#4H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Houston R5000 Database

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,500.0	0.27	201.53	6,498.1	44.4	-50.2	587,560.49	659,218.03	32° 36' 51.276 N	103° 48' 58.479 W
6,600.0	0.38	236.89	6,598.1	44.0	-50.5	587,560.09	659,217.67	32° 36' 51.273 N	103° 48' 58.483 W
6,700.0	0.30	222.83	6,698.1	43.6	-51.0	587,559.72	659,217.21	32° 36' 51.269 N	103° 48' 58.489 W
6,800.0	0.62	211.16	6,798.1	42.9	-51.4	587,559.07	659,216.75	32° 36' 51.262 N	103° 48' 58.494 W
6,900.0	0.95	203.30	6,898.1	41.7	-52.0	587,557.84	659,216.15	32° 36' 51.250 N	103° 48' 58.501 W
7,000.0	0.94	183.88	6,998.1	40.1	-52.4	587,556.26	659,215.76	32° 36' 51.235 N	103° 48' 58.506 W
7,100.0	1.17	188.84	7,098.1	38.3	-52.6	587,554.43	659,215.55	32° 36' 51.217 N	103° 48' 58.508 W
7,200.0	1.50	193.72	7,198.1	36.0	-53.1	587,552.15	659,215.08	32° 36' 51.194 N	103° 48' 58.514 W
7,300.0	1.75	223.16	7,298.0	33.6	-54.5	587,549.77	659,213.73	32° 36' 51.171 N	103° 48' 58.530 W
7,400.0	1.97	243.80	7,398.0	31.8	-57.0	587,547.90	659,211.14	32° 36' 51.152 N	103° 48' 58.560 W
7,500.0	1.15	261.19	7,497.9	30.9	-59.6	587,546.98	659,208.61	32° 36' 51.143 N	103° 48' 58.590 W
7,600.0	0.84	277.59	7,597.9	30.8	-61.3	587,546.93	659,208.89	32° 36' 51.143 N	103° 48' 58.610 W
7,700.0	0.64	273.98	7,697.9	30.9	-62.6	587,547.06	659,205.61	32° 36' 51.144 N	103° 48' 58.625 W
7,800.0	0.49	245.54	7,797.9	30.8	-63.5	587,546.92	659,204.66	32° 36' 51.143 N	103° 48' 58.636 W
7,900.0	0.42	153.86	7,897.9	30.3	-63.8	587,546.42	659,204.43	32° 36' 51.138 N	103° 48' 58.639 W
8,000.0	0.48	159.47	7,997.9	29.6	-63.4	587,545.70	659,204.74	32° 36' 51.131 N	103° 48' 58.635 W
8,100.0	0.46	211.35	8,097.9	28.8	-63.5	587,544.96	659,204.68	32° 36' 51.123 N	103° 48' 58.636 W
8,200.0	0.39	267.33	8,197.9	28.5	-64.1	587,544.60	659,204.13	32° 36' 51.120 N	103° 48' 58.642 W
8,300.0	0.29	328.38	8,297.9	28.7	-64.5	587,544.80	659,203.66	32° 36' 51.122 N	103° 48' 58.648 W
8,400.0	0.20	40.78	8,397.9	29.0	-64.5	587,545.15	659,203.64	32° 36' 51.125 N	103° 48' 58.648 W
8,500.0	0.31	65.85	8,497.9	29.3	-64.2	587,545.39	659,204.00	32° 36' 51.128 N	103° 48' 58.644 W
8,600.0	0.20	65.73	8,597.9	29.4	-63.8	587,545.58	659,204.41	32° 36' 51.130 N	103° 48' 58.639 W
8,700.0	0.22	152.33	8,697.9	29.3	-63.5	587,545.48	659,204.65	32° 36' 51.129 N	103° 48' 58.636 W
8,751.0	0.44	225.51	8,748.9	29.1	-63.6	587,545.25	659,204.56	32° 36' 51.126 N	103° 48' 58.637 W
KOP - 8751.00' MD, 8748.90' TVD, 0.44° INC, 225.51° AZI, -30.31' VS									
8,811.0	2.80	178.00	8,808.9	27.5	-63.7	587,543.63	659,204.45	32° 36' 51.110 N	103° 48' 58.639 W
8,843.0	7.30	176.40	8,840.7	24.7	-63.6	587,540.82	659,204.60	32° 36' 51.082 N	103° 48' 58.637 W
8,873.0	11.70	177.80	8,870.3	19.7	-63.3	587,535.87	659,204.84	32° 36' 51.033 N	103° 48' 58.635 W
8,905.0	15.60	177.40	8,901.4	12.2	-63.0	587,528.33	659,205.16	32° 36' 50.959 N	103° 48' 58.631 W
8,936.0	18.70	176.20	8,931.0	3.1	-62.5	587,519.20	659,205.68	32° 36' 50.868 N	103° 48' 58.626 W
8,967.0	21.30	174.80	8,960.1	-7.5	-61.7	587,508.64	659,206.52	32° 36' 50.764 N	103° 48' 58.617 W
8,998.0	24.50	174.00	8,988.7	-19.5	-60.5	587,496.63	659,207.70	32° 36' 50.645 N	103° 48' 58.604 W
9,030.0	27.30	175.30	9,017.5	-33.4	-59.2	587,482.72	659,208.99	32° 36' 50.507 N	103° 48' 58.589 W
9,060.0	30.80	179.60	9,043.7	-48.0	-58.6	587,468.17	659,209.61	32° 36' 50.363 N	103° 48' 58.583 W
9,090.0	33.20	179.80	9,069.1	-63.9	-58.5	587,452.28	659,209.69	32° 36' 50.206 N	103° 48' 58.583 W
9,121.0	35.10	178.50	9,094.8	-81.2	-58.2	587,434.88	659,209.96	32° 36' 50.034 N	103° 48' 58.581 W
9,153.0	36.10	176.70	9,120.8	-99.9	-57.4	587,416.27	659,210.74	32° 36' 49.850 N	103° 48' 58.573 W
9,184.0	39.40	179.00	9,145.3	-118.8	-56.7	587,397.31	659,211.44	32° 36' 49.662 N	103° 48' 58.565 W
9,215.0	43.90	178.30	9,168.5	-139.4	-56.3	587,376.72	659,211.93	32° 36' 49.458 N	103° 48' 58.561 W
9,246.0	45.40	181.30	9,190.5	-161.2	-56.2	587,354.94	659,212.00	32° 36' 49.243 N	103° 48' 58.561 W
9,277.0	49.30	182.20	9,211.5	-184.0	-56.9	587,332.15	659,211.30	32° 36' 49.017 N	103° 48' 58.571 W
9,307.0	52.60	180.60	9,230.4	-207.3	-57.5	587,308.87	659,210.73	32° 36' 48.787 N	103° 48' 58.579 W
9,339.0	56.00	179.00	9,249.1	-233.2	-57.4	587,282.89	659,210.83	32° 36' 48.530 N	103° 48' 58.579 W
9,369.0	58.90	178.80	9,265.2	-258.5	-56.9	587,257.61	659,211.32	32° 36' 48.280 N	103° 48' 58.575 W
9,401.0	62.50	179.50	9,280.9	-286.4	-56.5	587,229.71	659,211.73	32° 36' 48.004 N	103° 48' 58.572 W
9,431.0	67.50	179.70	9,293.6	-313.6	-56.3	587,202.53	659,211.92	32° 36' 47.735 N	103° 48' 58.571 W
9,463.0	68.40	179.20	9,305.6	-343.3	-56.0	587,172.87	659,212.20	32° 36' 47.441 N	103° 48' 58.569 W
9,494.0	70.40	179.20	9,316.5	-372.3	-55.6	587,143.86	659,212.61	32° 36' 47.154 N	103° 48' 58.566 W
9,525.0	74.00	178.70	9,326.0	-401.8	-55.0	587,114.35	659,213.15	32° 36' 46.862 N	103° 48' 58.562 W
9,556.0	78.90	179.80	9,333.2	-431.9	-54.6	587,084.23	659,213.54	32° 36' 46.564 N	103° 48' 58.559 W
9,588.0	80.40	179.70	9,339.0	-463.4	-54.5	587,052.75	659,213.68	32° 36' 46.252 N	103° 48' 58.559 W
9,618.0	82.80	179.60	9,343.4	-493.1	-54.3	587,023.07	659,213.86	32° 36' 45.959 N	103° 48' 58.558 W
9,650.0	86.60	178.90	9,346.3	-524.9	-53.9	586,991.22	659,214.28	32° 36' 45.643 N	103° 48' 58.555 W
9,672.0	89.26	178.99	9,347.1	-546.9	-53.5	586,969.24	659,214.68	32° 36' 45.426 N	103° 48' 58.552 W
EOC - 9672.00' MD, 9347.13' TVD, 89.26° INC, 178.99° AZI, 545.80' VS									

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #4H
Project:	Eddy County, NM	TVD Reference:	RKB @ 3522.0usft
Site:	Lizard Pot Fed	MD Reference:	RKB @ 3522.0usft
Well:	#4H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Houston R5000 Database

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
9,674.0	89.50	179.00	9,347.1	-548.9	-53.5	586,967.24	659,214.72	32° 36' 45.406 N	103° 48' 58.552 W	
9,766.0	90.10	177.90	9,347.5	-640.9	-51.0	586,875.27	659,217.21	32° 36' 44.496 N	103° 48' 58.528 W	
9,860.0	89.10	177.10	9,348.1	-734.8	-46.9	586,781.37	659,221.31	32° 36' 43.567 N	103° 48' 58.485 W	
9,953.0	89.20	176.00	9,349.5	-827.6	-41.3	586,688.55	659,226.90	32° 36' 42.648 N	103° 48' 58.425 W	
10,047.0	87.70	176.30	9,352.0	-921.3	-35.0	586,594.80	659,233.21	32° 36' 41.720 N	103° 48' 58.357 W	
10,141.0	87.80	174.70	9,355.7	-1,015.0	-27.6	586,501.16	659,240.58	32° 36' 40.793 N	103° 48' 58.276 W	
10,234.0	88.50	176.50	9,358.7	-1,107.6	-20.5	586,408.49	659,247.71	32° 36' 39.876 N	103° 48' 58.198 W	
10,326.0	88.50	175.80	9,361.1	-1,199.4	-14.3	586,316.73	659,253.89	32° 36' 38.967 N	103° 48' 58.131 W	
10,418.0	89.30	178.00	9,362.9	-1,291.2	-9.3	586,224.89	659,258.86	32° 36' 38.058 N	103° 48' 58.078 W	
10,512.0	88.50	180.80	9,364.7	-1,385.2	-8.3	586,130.92	659,259.84	32° 36' 37.128 N	103° 48' 58.072 W	
10,606.0	88.90	179.80	9,366.8	-1,479.2	-8.8	586,036.95	659,259.35	32° 36' 36.198 N	103° 48' 58.083 W	
10,699.0	88.90	180.80	9,368.6	-1,572.2	-9.3	585,943.97	659,258.87	32° 36' 35.278 N	103° 48' 58.094 W	
10,792.0	88.70	179.80	9,370.6	-1,665.1	-9.8	585,850.99	659,258.38	32° 36' 34.358 N	103° 48' 58.105 W	
10,885.0	89.10	180.60	9,372.4	-1,758.1	-10.1	585,758.01	659,258.05	32° 36' 33.438 N	103° 48' 58.114 W	
10,980.0	88.90	179.00	9,374.0	-1,853.1	-9.8	585,663.03	659,258.39	32° 36' 32.498 N	103° 48' 58.115 W	
11,073.0	89.00	180.50	9,375.7	-1,946.1	-9.4	585,570.05	659,258.79	32° 36' 31.578 N	103° 48' 58.116 W	
11,167.0	89.00	179.10	9,377.4	-2,040.1	-9.1	585,476.07	659,259.12	32° 36' 30.648 N	103° 48' 58.117 W	
11,262.0	89.00	179.70	9,379.0	-2,135.0	-8.1	585,381.09	659,260.11	32° 36' 29.708 N	103° 48' 58.111 W	
11,356.0	90.30	178.90	9,379.6	-2,229.0	-6.9	585,287.10	659,261.26	32° 36' 28.778 N	103° 48' 58.103 W	
11,450.0	90.30	179.90	9,379.1	-2,323.0	-5.9	585,193.11	659,262.25	32° 36' 27.848 N	103° 48' 58.097 W	
11,543.0	90.50	180.00	9,378.5	-2,416.0	-5.9	585,100.11	659,262.33	32° 36' 26.928 N	103° 48' 58.101 W	
11,637.0	89.20	181.30	9,378.7	-2,510.0	-6.9	585,006.12	659,261.26	32° 36' 25.998 N	103° 48' 58.119 W	
11,730.0	89.50	180.90	9,379.8	-2,603.0	-8.7	584,913.14	659,259.48	32° 36' 25.078 N	103° 48' 58.145 W	
11,825.0	89.20	180.30	9,380.8	-2,698.0	-9.7	584,818.15	659,258.48	32° 36' 24.138 N	103° 48' 58.162 W	
11,917.0	89.10	179.20	9,382.2	-2,790.0	-9.3	584,726.17	659,258.88	32° 36' 23.228 N	103° 48' 58.163 W	
12,012.0	88.70	178.20	9,384.0	-2,884.9	-7.1	584,631.21	659,261.04	32° 36' 22.288 N	103° 48' 58.143 W	
12,106.0	89.60	179.00	9,385.4	-2,978.9	-4.9	584,537.25	659,263.33	32° 36' 21.358 N	103° 48' 58.121 W	
12,201.0	88.60	177.60	9,386.9	-3,073.8	-2.0	584,442.31	659,266.15	32° 36' 20.419 N	103° 48' 58.094 W	
12,293.0	88.20	177.70	9,389.5	-3,165.7	1.7	584,350.42	659,269.92	32° 36' 19.509 N	103° 48' 58.055 W	
12,386.0	88.80	179.10	9,391.9	-3,258.6	4.3	584,257.49	659,272.52	32° 36' 18.589 N	103° 48' 58.030 W	
12,478.0	89.50	179.90	9,393.3	-3,350.6	5.1	584,165.51	659,273.32	32° 36' 17.679 N	103° 48' 58.026 W	
12,571.0	88.90	179.40	9,394.6	-3,443.6	5.7	584,072.52	659,273.89	32° 36' 16.759 N	103° 48' 58.024 W	
12,667.0	88.60	179.70	9,396.7	-3,539.6	6.5	583,976.55	659,274.64	32° 36' 15.809 N	103° 48' 58.021 W	
12,760.0	90.00	180.30	9,397.8	-3,632.6	6.5	583,883.56	659,274.64	32° 36' 14.889 N	103° 48' 58.026 W	
12,853.0	90.00	179.30	9,397.8	-3,725.6	6.8	583,790.56	659,274.97	32° 36' 13.969 N	103° 48' 58.028 W	
12,946.0	89.40	178.60	9,398.3	-3,818.6	8.5	583,697.58	659,276.67	32° 36' 13.049 N	103° 48' 58.013 W	
13,040.0	90.40	178.30	9,398.5	-3,912.5	11.0	583,603.61	659,279.21	32° 36' 12.119 N	103° 48' 57.989 W	
13,135.0	89.70	177.60	9,398.4	-4,007.5	14.4	583,508.67	659,282.61	32° 36' 11.179 N	103° 48' 57.955 W	
13,230.0	89.80	177.40	9,398.8	-4,102.4	18.6	583,413.77	659,286.76	32° 36' 10.240 N	103° 48' 57.911 W	
13,323.0	90.50	177.00	9,398.5	-4,195.3	23.1	583,320.88	659,291.30	32° 36' 9.320 N	103° 48' 57.864 W	
13,414.0	89.90	176.00	9,398.2	-4,286.1	28.7	583,230.05	659,296.85	32° 36' 8.421 N	103° 48' 57.804 W	
13,508.0	90.00	176.80	9,398.3	-4,379.9	34.6	583,136.24	659,302.76	32° 36' 7.493 N	103° 48' 57.740 W	
13,602.0	90.10	177.60	9,398.2	-4,473.8	39.2	583,042.35	659,307.35	32° 36' 6.563 N	103° 48' 57.692 W	
13,694.0	90.00	176.60	9,398.1	-4,565.7	43.8	582,950.47	659,312.00	32° 36' 5.654 N	103° 48' 57.643 W	
13,788.0	90.70	176.60	9,397.6	-4,659.5	49.4	582,856.64	659,317.58	32° 36' 4.725 N	103° 48' 57.583 W	
13,883.0	88.50	177.40	9,398.2	-4,754.4	54.4	582,761.78	659,322.55	32° 36' 3.786 N	103° 48' 57.530 W	
13,977.0	88.30	176.40	9,400.9	-4,848.2	59.4	582,667.95	659,327.63	32° 36' 2.858 N	103° 48' 57.476 W	
14,073.0	87.30	177.70	9,404.5	-4,944.0	64.4	582,572.15	659,332.57	32° 36' 1.909 N	103° 48' 57.424 W	
14,166.0	88.40	177.50	9,408.0	-5,036.8	68.3	582,479.30	659,336.46	32° 36' 0.990 N	103° 48' 57.384 W	
14,258.0	88.50	176.10	9,410.5	-5,128.6	73.4	582,387.48	659,341.59	32° 36' 0.082 N	103° 48' 57.329 W	
14,352.0	87.90	175.30	9,413.5	-5,222.3	80.5	582,293.79	659,348.64	32° 35' 59.154 N	103° 48' 57.252 W	
14,447.0	89.20	174.60	9,415.9	-5,316.9	88.8	582,199.19	659,357.00	32° 35' 58.218 N	103° 48' 57.159 W	
14,538.0	89.90	175.30	9,416.6	-5,407.6	96.8	582,108.55	659,365.01	32° 35' 57.320 N	103° 48' 57.071 W	
14,630.0	90.30	176.70	9,416.4	-5,499.3	103.2	582,016.78	659,371.42	32° 35' 56.412 N	103° 48' 57.001 W	
14,722.0	88.70	177.30	9,417.2	-5,591.2	108.1	581,924.91	659,376.24	32° 35' 55.503 N	103° 48' 56.950 W	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #4H
Project:	Eddy County, NM	TVD Reference:	RKB @ 3522.0usft
Site:	Lizard Pot Fed	MD Reference:	RKB @ 3522.0usft
Well:	#4H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Houston R5000 Database

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,815.0	87.70	176.20	9,420.2	-5,684.0	113.3	581,832.11	659,381.51	32° 35' 54.584 N	103° 48' 56.894 W
14,910.0	87.60	178.20	9,424.1	-5,778.8	118.0	581,737.31	659,386.14	32° 35' 53.646 N	103° 48' 56.845 W
15,006.0	88.50	179.00	9,427.3	-5,874.7	120.3	581,641.39	659,388.49	32° 35' 52.697 N	103° 48' 56.823 W
15,099.0	89.50	179.50	9,428.9	-5,967.7	121.5	581,548.42	659,389.70	32° 35' 51.776 N	103° 48' 56.814 W
15,193.0	90.60	179.70	9,428.9	-6,061.7	122.2	581,454.42	659,390.36	32° 35' 50.846 N	103° 48' 56.812 W
15,287.0	90.40	179.40	9,428.0	-6,155.7	122.9	581,360.43	659,391.10	32° 35' 49.916 N	103° 48' 56.809 W
15,380.0	89.80	178.30	9,427.9	-6,248.7	124.8	581,267.45	659,392.97	32° 35' 48.996 N	103° 48' 56.792 W
15,474.0	89.90	177.40	9,428.1	-6,342.6	128.3	581,173.52	659,396.49	32° 35' 48.066 N	103° 48' 56.756 W
15,618.0	89.90	177.40	9,428.4	-6,486.5	134.8	581,029.67	659,403.02	32° 35' 46.643 N	103° 48' 56.688 W
BHL - 15618.00' MD, 9428.39' TVD, 89.90° INC, 177.40° AZI, -6486.47' N, 134.84' E, 6487.86' VS									

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
8,751.0	8,748.9	29.1	-63.6	KOP - 8751.00' MD, 8748.90' TVD, 0.44° INC, 225.51° AZI, -30.31' VS
9,672.0	9,347.1	-546.9	-53.5	EOC - 9672.00' MD, 9347.13' TVD, 89.26° INC, 178.99° AZI, 545.80' VS
15,618.0	9,428.4	-6,486.5	134.8	BHL - 15618.00' MD, 9428.39' TVD, 89.90° INC, 177.40° AZI, -6486.47' N, 134.84' E, 6487.86' VS

Checked By: _____ Approved By: _____ Date: _____



COG Operating LLC
Eddy County, NM
Lizard Pot Fed #4
Plan #2



Azimuths to Grid North
True North: -0.28°
Magnetic North: 7.31°
Magnetic Field
Strength: 48710.1nT
Dip Angle: 60.48°
Date: 8/4/2012
Model: IGRF2010

Surface Location					
	Ground Elev:	3500.00	RKB @ 3522.00ft		
+N-S	+E-W	Northing	Easting	Latitude	Longitude
0.00	0.00	587517.30	659269.50	32.614121	-103.816082

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)					
Name	TVD	+N-S	+E-W	Northing	Easting
Lizard Pot Fed #4N PBHL	9430.00	-6597.70	122.90	580919.80	659392.40

SECTION DETAILS										
MD	Inc	Ad	TVD	+N-S	+E-W	Dleg	IFace	VSect	Annotation	
8751.00	0.44	225.51	8748.90	28.13	-63.63	0.00	0.00	-30.31	Tie-On to Gyro Surveys - 8751.00' MD, 8748.90' TVD	
8877.18	0.44	225.51	8875.08	28.45	-64.32	0.00	0.00	-29.64	Straight line Projection to KOP @ 8877.18' MD, 8875.08' TVD.	
9618.48	89.26	178.36	9350.00	-442.69	-53.46	12.00	-47.16	441.62	Landing Point - Hold @ 89.26° INC, 178.36° AZ	
15776.54	89.26	178.36	9430.00	-6597.70	122.90	0.00	0.00	6598.84	TD @ 15776.54' MD, 9430.00' TVD	

