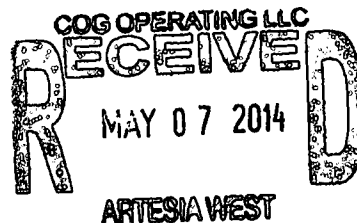


**McVAY DRILLING COMPANY**

P.O. Box 2450
Hobbs, New Mexico 88241
(575) 397-3311
FAX: 39-DRILL



Well Name and Num: Buena Vista 2 State #4H
Location: Sec 2, T20S, R30E
Operator: COG
Drilling Contractor: McVay Drilling Company

15-41829

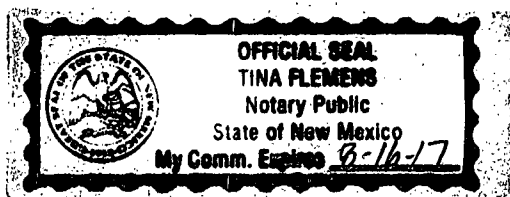
The undersigned certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that he has conducted deviation tests and obtained the following results:

<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>
0.60	384	8.90	7332	89.40	12855
0.80	562	9.30	7754	90.20	13046
2.00	817	10.90	7970	90.50	13158
2.80	1199	41.70	8416		
1.30	1581	59.80	8799		
1.90	1962	91.20	9216		
2.30	2152	91.00	9598		
0.80	2551	89.80	9693		
1.20	2913	90.10	9880		
1.00	3103	88.80	9944		
0.90	3484	89.50	10133		
1.10	3756	89.60	10243		
12.30	4233	92.60	10703		
11.80	5183	87.80	11083		
11.50	5658	90.50	11652		
9.50	6609	90.20	11927		
8.90	7085	90.80	12601		

By: Hunter Crum

Subscribed and sworn to before me this 5th day of May, 2014

Tina Flemens
Notary Public, Lea County, New Mexico





A GYRO TECHNOLOGIES INC. COMPANY

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

NM OIL CONSERVATION
ARTESIA DISTRICT

JUL 01 2014

RECEIVED

May 1, 2014

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

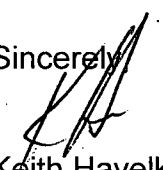
Attn: Kanicia Castillo

Re: **Buena Vista 2 State No 004H**

Please find enclosed a copy of the survey from 0' to 3,665' 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.

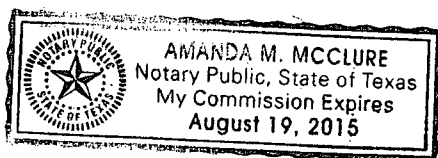
Sincerely,


Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 1 day of May,
A.D., 2014, by Keith Havelka.


Amanda McClure
Notary Public, State of Texas





Company: COG OPERATING
Lease/Well: BUENA VISTA 2 STATE/No 004H

Rig Name: MCVAY #6
State/County: NEW MEXICO/EDDY
Latitude: 32.60, Longitude: -103.94
GRID North is 0.21 Degrees East of True North
VS-Azi: 341.28 Degrees



Depth Reference : RKB 19 FEET

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: gyro survey-de_01.ut

Minimum Curvature Method

Report Date/Time: 5/1/2014 / 15:52

VES Survey International

Woodward, OK

580-254-5000

Surveyor: Vincent Marasco

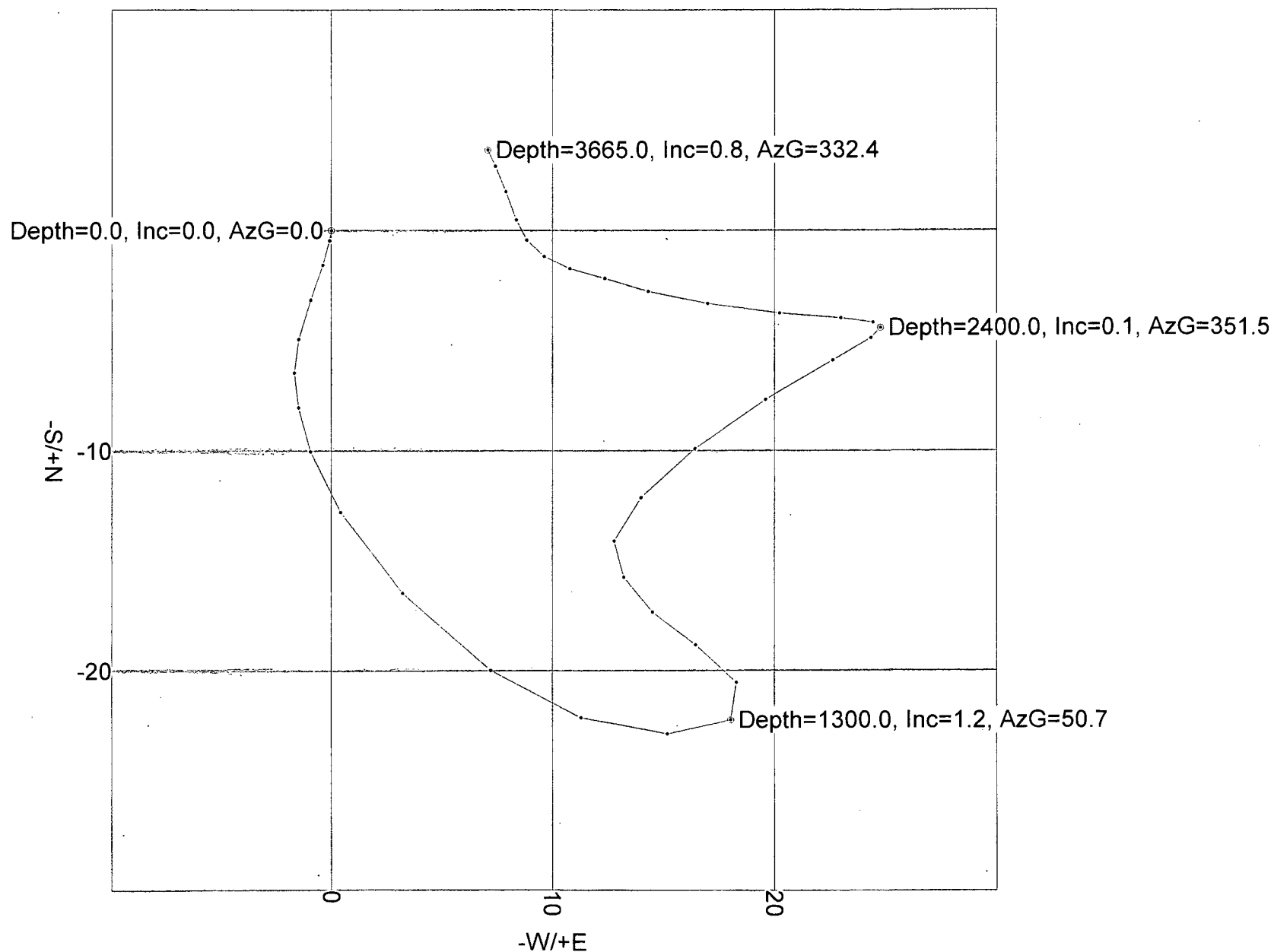
Buena Vista 2 State No 004H / API 30-015-41829

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.54	190.56	100.00	-0.47	-0.09	-0.41	0.47	190.56	0.54
200.00	0.77	198.29	199.99	-1.57	-0.38	-1.36	1.62	193.77	0.24
300.00	1.15	199.47	299.98	-3.16	-0.93	-2.69	3.29	196.43	0.38
400.00	0.96	192.97	399.96	-4.93	-1.46	-4.20	5.14	196.46	0.22
500.00	0.81	181.58	499.95	-6.45	-1.66	-5.58	6.67	194.46	0.23
600.00	1.03	166.26	599.94	-8.03	-1.47	-7.14	8.17	190.37	0.33
700.00	1.35	164.10	699.91	-10.04	-0.93	-9.21	10.08	185.32	0.32
800.00	2.20	147.64	799.87	-12.79	0.41	-12.25	12.80	178.14	0.98
900.00	3.11	139.09	899.76	-16.46	3.22	-16.62	16.77	168.93	0.99
1000.00	3.04	123.68	999.62	-19.98	7.20	-21.24	21.24	160.18	0.83
1100.00	2.29	110.46	1099.51	-22.15	11.28	-24.60	24.86	153.02	0.97
1200.00	2.31	91.48	1199.43	-22.90	15.16	-26.55	27.46	146.50	0.76
1300.00	1.24	50.75	1299.38	-22.26	18.01	-26.87	28.64	141.03	1.59
1400.00	1.35	330.44	1399.36	-20.55	18.27	-25.33	27.50	138.36	1.68
1500.00	1.65	299.04	1499.33	-18.83	16.43	-23.10	24.99	138.89	0.86
1600.00	1.19	319.61	1599.30	-17.34	14.50	-21.07	22.60	140.10	0.68
1700.00	1.18	321.71	1699.28	-15.74	13.19	-19.14	20.53	140.04	0.04
1800.00	0.98	13.85	1799.26	-14.10	12.75	-17.44	19.01	137.86	0.97

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	1.74	41.84	1899.24	-12.13	13.97	-15.97	18.50	130.98	0.98
2000.00	2.07	52.47	1999.18	-9.91	16.41	-14.65	19.17	121.12	0.48
2100.00	2.39	57.36	2099.11	-7.68	19.60	-13.56	21.05	111.40	0.38
2200.00	1.63	62.34	2199.04	-5.89	22.62	-12.84	23.37	104.61	0.78
2300.00	0.65	52.33	2299.02	-4.89	24.33	-12.43	24.81	101.36	0.99
2400.00	0.13	351.53	2399.02	-4.43	24.76	-12.14	25.15	100.14	0.60
2500.00	0.41	293.18	2499.02	-4.18	24.42	-11.79	24.77	99.71	0.36
2600.00	1.28	272.74	2599.01	-3.99	22.97	-11.15	23.31	99.84	0.91
2700.00	1.88	276.00	2698.97	-3.76	20.22	-10.05	20.57	100.54	0.60
2800.00	1.89	279.51	2798.91	-3.32	16.97	-8.59	17.29	101.06	0.12
2900.00	1.24	284.60	2898.88	-2.77	14.30	-7.22	14.57	100.98	0.66
3000.00	1.11	289.05	2998.86	-2.19	12.34	-6.03	12.53	100.04	0.16
3100.00	0.76	282.09	3098.84	-1.73	10.78	-5.10	10.92	99.13	0.36
3200.00	0.75	309.45	3198.83	-1.18	9.63	-4.21	9.70	96.98	0.36
3300.00	0.50	317.97	3298.83	-0.44	8.83	-3.25	8.85	92.86	0.27
3400.00	0.71	344.06	3398.82	0.48	8.37	-2.23	8.39	86.72	0.35
3500.00	0.85	335.23	3498.81	1.75	7.89	-0.87	8.08	77.47	0.18
3600.00	0.58	340.42	3598.81	2.91	7.41	0.38	7.96	68.56	0.27
3665.00	0.84	332.41	3663.80	3.65	7.08	1.18	7.96	62.73	0.43



VES Survey International
Woodward, OK
580-254-5000
Surveyor: Vincent Marasco
Buena Vista 2 State No 004H / API 30-015-41829



VES Survey Date: 04/17/2014

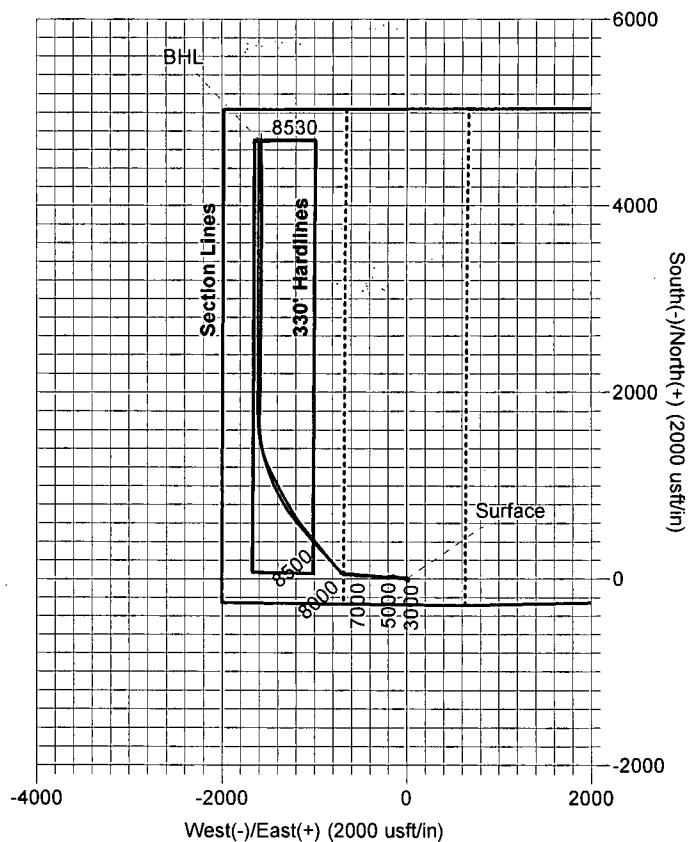
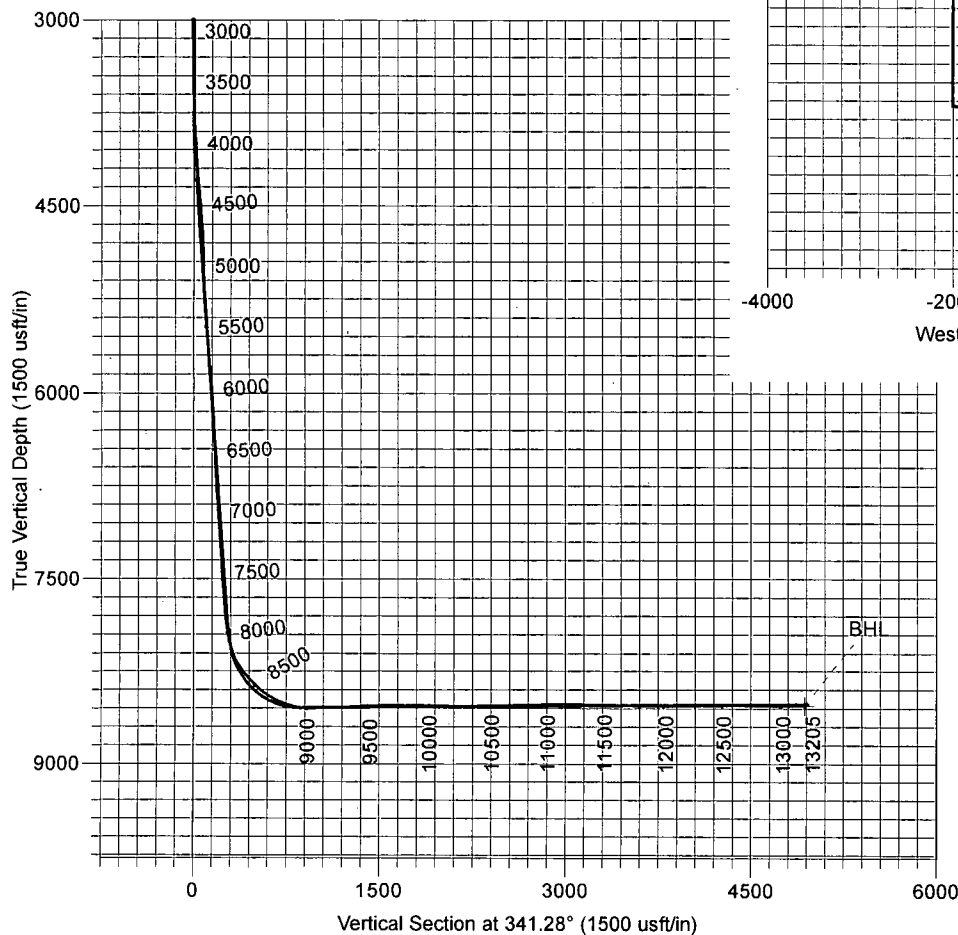
COG OPERATING, LLC

Field: Eddy County, NM
 Site: Buena Vista 2 State Com 4H
 Well: 4H
 Wellbore: Lateral
 Plan: Surveys



Azimuths to Grid North
 True North: -0.21°
 Magnetic North: 7.23°

Magnetic Field
 Strength: 48518.1snT
 Dip Angle: 60.40°
 Date: 04/12/2014
 Model: IGRF2010



LEGEND

- 4H, Lateral, Plan #1 V0
- Surveys

TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Buena Vista 4H Surface	0.00	0.00	0.00	580616.80	619785.60	32° 35' 44.23 N	103° 56' 39.80 W	Point
Buena Vista 4H BHL	8529.60	4680.26	-1574.79	585297.06	618210.81	32° 36' 30.60 N	103° 56' 58.01 W	Point



ARCHER DIRECTIONAL DRILLING SERVICES
 12101 Cutten Rd. Houston, Texas 77066
 Phone: 281-301-2600 Fax: 281-301-2795

Design: Surveys (4H/Lateral)
 Created By: Alexa Ramirez
 Date: 14:59, April 29 2014

Archer

Survey Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well 4H
Project:	Eddy County, NM	TVD Reference:	3222'GL+20'KB @ 3242.00usft (Planning)
Site:	Buena Vista 2 State Com 4H	MD Reference:	3222'GL+20'KB @ 3242.00usft (Planning)
Well:	4H	North Reference:	Grid
Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM R5000 MULTI

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	Buena Vista 2 State Com 4H		
Site Position:		Northing:	580,616.80 usft
From:	Map	Easting:	619,785.60 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13.200 in
		Latitude:	32° 35' 44.23 N
		Longitude:	103° 56' 39.80 W
		Grid Convergence:	0.21 °

Well	4H		
Well Position	+N/-S	0.00 usft	Northing: 580,616.80 usft
	+E/-W	0.00 usft	Easting: 619,785.60 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 35' 44.23 N
		Longitude:	103° 56' 39.80 W
		Ground Level:	3,222.00 usft

Wellbore	Lateral		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010	04/12/14	7.44
			Dip Angle (°)
			60.40
			Field Strength (nT)
			48,518

Design	Surveys		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction (°)
			341.28

Survey Program	Date	04/29/14		
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
100.00	3,665.00	Survey #2 (Lateral)	Gyroscope	Gyroscope
3,756.00	13,158.00	Survey #3 (Lateral)	MWD	Std MWD
13,205.00	13,205.00	Survey #4 (Lateral)	Project	Projection

Survey									
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn
Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Rate
(usft)			(usft)			(usft)	(°/100usft)	(°/100usft)	(°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.54	190.56	100.00	-0.46	-0.09	-0.41	0.54	0.54	0.00
200.00	0.77	198.29	199.99	-1.56	-0.38	-1.36	0.25	0.23	7.73
300.00	1.15	199.47	299.98	-3.15	-0.93	-2.68	0.38	0.38	1.18
400.00	0.96	192.97	399.96	-4.91	-1.45	-4.19	0.22	-0.19	-6.50
500.00	0.81	181.58	499.95	-6.43	-1.66	-5.56	0.23	-0.15	-11.39
600.00	1.03	166.26	599.94	-8.01	-1.46	-7.12	0.33	0.22	-15.32
700.00	1.35	164.10	699.91	-10.02	-0.93	-9.19	0.32	0.32	-2.16
800.00	2.20	147.64	799.87	-12.77	0.42	-12.23	0.98	0.85	-16.46

Archer Survey Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well 4H
Project:	Eddy County, NM	TVD Reference:	3222'GL+20'KB @ 3242.00usft (Planning)
Site:	Buena Vista 2 State Corn 4H	MD Reference:	3222'GL+20'KB @ 3242.00usft (Planning)
Well:	4H	North Reference:	Grid
Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM R5000 MULTI

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
900.00	3.11	139.09	899.76	-16.45	3.23	-16.61	0.99	0.91	-8.55
1,000.00	3.04	123.68	999.62	-19.97	7.21	-21.22	0.83	-0.07	-15.41
1,100.00	2.29	110.46	1,099.51	-22.13	11.29	-24.59	0.96	-0.75	-13.22
1,200.00	2.31	91.48	1,199.43	-22.89	15.17	-26.54	0.76	0.02	-18.98
1,300.00	1.24	50.75	1,299.38	-22.25	18.03	-26.86	1.59	-1.07	-40.73
1,400.00	1.35	330.44	1,399.36	-20.54	18.28	-25.32	1.67	0.11	-80.31
1,500.00	1.65	299.04	1,499.33	-18.82	16.44	-23.10	0.86	0.30	-31.40
1,600.00	1.19	319.61	1,599.30	-17.33	14.51	-21.07	0.68	-0.46	20.57
1,700.00	1.18	321.71	1,699.28	-15.73	13.20	-19.14	0.04	-0.01	2.10
1,800.00	0.98	13.85	1,799.26	-14.09	12.77	-17.44	0.97	-0.20	52.14
1,900.00	1.74	41.84	1,899.24	-12.13	13.98	-15.98	0.99	0.76	27.99
2,000.00	2.07	52.47	1,999.18	-9.90	16.43	-14.65	0.48	0.33	10.63
2,100.00	2.39	57.36	2,099.11	-7.67	19.62	-13.57	0.37	0.32	4.89
2,200.00	1.63	62.34	2,199.04	-5.89	22.63	-12.84	0.78	-0.76	4.98
2,300.00	0.65	52.33	2,299.02	-4.88	24.34	-12.44	1.00	-0.98	-10.01
2,400.00	0.13	351.53	2,399.02	-4.42	24.77	-12.14	0.60	-0.52	-60.80
2,500.00	0.41	293.18	2,499.02	-4.17	24.43	-11.79	0.36	0.28	-58.35
2,600.00	1.28	272.74	2,599.01	-3.98	22.98	-11.14	0.91	0.87	-20.44
2,700.00	1.88	276.00	2,698.97	-3.75	20.24	-10.05	0.61	0.60	3.26
2,800.00	1.89	279.51	2,798.91	-3.31	16.98	-8.58	0.12	0.01	3.51
2,900.00	1.24	284.60	2,898.88	-2.76	14.31	-7.21	0.66	-0.65	5.09
3,000.00	1.11	289.05	2,998.86	-2.17	12.34	-6.02	0.16	-0.13	4.45
3,100.00	0.76	282.09	3,098.84	-1.72	10.78	-5.09	0.37	-0.35	-6.96
3,200.00	0.75	309.45	3,198.83	-1.16	9.63	-4.19	0.36	-0.01	27.36
3,300.00	0.50	317.97	3,298.83	-0.42	8.83	-3.24	0.27	-0.25	8.52
3,400.00	0.71	344.06	3,398.82	0.50	8.37	-2.22	0.34	0.21	26.09
3,500.00	0.85	335.23	3,498.81	1.76	7.88	-0.86	0.18	0.14	-8.83
3,600.00	0.58	340.42	3,598.81	2.92	7.40	0.38	0.28	-0.27	5.19
3,665.00	0.84	332.41	3,663.80	3.65	7.07	1.18	0.43	0.40	-12.32
3,756.00	1.10	340.40	3,754.79	5.06	6.47	2.72	0.32	0.29	8.78
3,851.00	4.70	305.60	3,849.65	8.19	3.00	6.79	4.05	3.79	-36.63
3,947.00	5.50	298.80	3,945.27	12.69	-4.23	13.38	1.04	0.83	-7.08
4,042.00	8.00	266.90	4,039.64	14.53	-14.83	18.52	4.65	2.63	-33.58
4,137.00	11.10	265.80	4,133.31	13.50	-30.55	22.59	3.27	3.26	-1.16
4,233.00	12.30	273.20	4,227.32	13.40	-49.98	28.73	2.00	1.25	7.71
4,327.00	12.90	274.20	4,319.06	14.72	-70.44	36.55	0.68	0.64	1.06
4,423.00	13.20	275.30	4,412.58	16.52	-92.04	45.19	0.41	0.31	1.15
4,518.00	8.40	288.60	4,505.88	19.74	-109.43	53.82	5.66	-5.05	14.00
4,612.00	7.60	292.30	4,598.97	24.29	-121.69	62.06	1.01	-0.85	3.94
4,708.00	7.60	293.20	4,694.12	29.20	-133.40	70.47	0.12	0.00	0.94
4,803.00	8.70	261.10	4,788.21	30.56	-146.28	75.89	4.86	1.16	-33.79
4,898.00	10.90	256.60	4,881.82	27.37	-162.12	77.95	2.45	2.32	-4.74
4,993.00	11.30	256.70	4,975.04	23.14	-179.91	79.66	0.42	0.42	0.11

Archer Survey Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well 4H
Project:	Eddy County, NM	TVD Reference:	3222'GL+20'KB @ 3242.00usft (Planning)
Site:	Buena Vista 2 State Com 4H	MD Reference:	3222'GL+20'KB @ 3242.00usft (Planning)
Well:	4H	North Reference:	Grid
Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM R5000 MULTI

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,088.00	10.90	257.40	5,068.27	19.04	-197.74	81.50	0.44	-0.42	0.74
5,183.00	11.80	267.00	5,161.42	16.58	-216.20	85.09	2.20	0.95	10.11
5,278.00	11.60	269.20	5,254.44	15.93	-235.45	90.66	0.51	-0.21	2.32
5,373.00	11.70	269.80	5,347.48	15.77	-254.64	96.66	0.17	0.11	0.63
5,468.00	11.60	269.40	5,440.53	15.63	-273.82	102.69	0.14	-0.11	-0.42
5,564.00	11.70	275.10	5,534.55	16.40	-293.17	109.62	1.20	0.10	5.94
5,658.00	11.50	275.90	5,626.63	18.21	-311.98	117.37	0.27	-0.21	0.85
5,753.00	9.90	277.60	5,719.98	20.26	-329.50	124.94	1.72	-1.68	1.79
5,848.00	9.90	279.50	5,813.56	22.69	-345.65	132.42	0.34	0.00	2.00
5,943.00	9.60	280.50	5,907.19	25.48	-361.49	140.15	0.36	-0.32	1.05
6,038.00	9.50	281.30	6,000.88	28.46	-376.97	147.94	0.17	-0.11	0.84
6,133.00	8.60	283.10	6,094.69	31.61	-391.57	155.61	0.99	-0.95	1.89
6,228.00	8.40	272.70	6,188.65	33.54	-405.42	161.89	1.63	-0.21	-10.95
6,323.00	10.00	264.80	6,282.43	33.12	-420.57	166.35	2.14	1.68	-8.32
6,418.00	9.90	264.00	6,376.00	31.52	-436.91	170.08	0.18	-0.11	-0.84
6,513.00	10.20	269.80	6,469.55	30.64	-453.44	174.55	1.11	0.32	6.11
6,609.00	9.50	267.60	6,564.13	30.28	-469.86	179.47	0.83	-0.73	-2.29
6,704.00	9.10	271.80	6,657.89	30.19	-485.20	184.31	0.83	-0.42	4.42
6,799.00	8.70	278.80	6,751.74	31.52	-499.81	190.26	1.21	-0.42	7.37
6,894.00	7.60	278.90	6,845.78	33.59	-513.11	196.50	1.16	-1.16	0.11
6,990.00	7.80	278.50	6,940.92	35.54	-525.83	202.42	0.22	0.21	-0.42
7,085.00	8.90	274.90	7,034.91	37.12	-539.53	208.31	1.28	1.16	-3.79
7,181.00	10.90	275.70	7,129.48	38.65	-555.96	215.04	2.09	2.08	0.83
7,276.00	10.20	274.00	7,222.87	40.13	-573.29	222.00	0.81	-0.74	-1.79
7,372.00	8.90	274.70	7,317.54	41.33	-589.17	228.24	1.36	-1.35	0.73
7,468.00	10.50	270.50	7,412.16	42.02	-605.32	234.07	1.82	1.67	-4.38
7,563.00	9.90	273.40	7,505.66	42.58	-622.13	239.99	0.83	-0.63	3.05
7,659.00	9.90	272.20	7,600.23	43.39	-638.61	246.05	0.21	0.00	-1.25
7,754.00	9.30	273.40	7,693.90	44.15	-654.44	251.85	0.67	-0.63	1.26
7,850.00	9.70	284.50	7,788.59	46.64	-670.01	259.21	1.95	0.42	11.56
7,938.00	10.90	297.40	7,875.18	52.33	-684.58	269.27	2.95	1.36	14.66
7,970.00	10.90	298.80	7,906.61	55.18	-689.91	273.68	0.83	0.00	4.38
8,002.00	11.00	301.00	7,938.02	58.20	-695.18	278.24	1.34	0.31	6.88
8,034.00	12.40	310.50	7,969.36	62.01	-700.41	283.52	7.43	4.38	29.69
8,066.00	13.80	317.40	8,000.53	67.05	-705.61	289.96	6.55	4.38	21.56
8,098.00	16.70	317.40	8,031.40	73.25	-711.31	297.66	9.06	9.06	0.00
8,130.00	19.70	314.90	8,061.80	80.44	-718.24	306.70	9.69	9.38	-7.81
8,162.00	22.40	311.60	8,091.66	88.30	-726.62	316.83	9.21	8.44	-10.31
8,193.00	25.50	311.80	8,119.99	96.67	-736.02	327.77	10.00	10.00	0.65
8,225.00	28.40	314.90	8,148.51	106.63	-746.54	340.59	10.07	9.06	9.69
8,257.00	30.50	320.40	8,176.38	118.26	-757.11	355.00	10.69	6.56	17.19
8,289.00	32.60	320.30	8,203.65	131.16	-767.80	370.64	6.56	6.56	-0.31
8,321.00	34.90	319.30	8,230.25	144.73	-779.27	387.18	7.39	7.19	-3.13

Archer

Survey Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well 4H
Project:	Eddy County, NM	TVD Reference:	3222'GL+20'KB @ 3242.00usft (Planning)
Site:	Buena Vista 2 State Com 4H	MD Reference:	3222'GL+20'KB @ 3242.00usft (Planning)
Well:	4H	North Reference:	Grid
Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM R5000 MULTI

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,353.00	37.00	318.90	8,256.16	158.93	-791.58	404.57	6.60	6.56	-1.25
8,384.00	39.50	320.20	8,280.50	173.53	-804.02	422.40	8.47	8.06	4.19
8,416.00	41.70	320.40	8,304.79	189.56	-817.32	441.84	6.89	6.88	0.63
8,448.00	44.20	319.80	8,328.22	206.28	-831.31	462.17	7.92	7.81	-1.88
8,480.00	46.60	320.30	8,350.68	223.75	-845.94	483.41	7.58	7.50	1.56
8,512.00	49.00	320.60	8,372.18	242.03	-861.03	505.56	7.53	7.50	0.94
8,544.00	51.40	321.10	8,392.66	261.09	-876.55	528.60	7.60	7.50	1.56
8,576.00	53.70	321.10	8,412.11	280.86	-892.50	552.44	7.19	7.19	0.00
8,607.00	56.40	320.60	8,429.87	300.56	-908.54	576.25	8.81	8.71	-1.61
8,639.00	58.70	320.00	8,447.04	321.34	-925.79	601.46	7.36	7.19	-1.88
8,671.00	61.10	319.80	8,463.09	342.51	-943.62	627.24	7.52	7.50	-0.63
8,703.00	63.30	319.20	8,478.01	364.03	-962.01	653.52	7.07	6.88	-1.88
8,735.00	66.00	318.60	8,491.71	385.82	-981.02	680.26	8.61	8.44	-1.88
8,767.00	67.10	319.70	8,504.45	408.03	-1,000.22	707.46	4.66	3.44	3.44
8,799.00	69.80	319.50	8,516.20	430.69	-1,019.50	735.11	8.46	8.44	-0.63
8,831.00	73.20	319.60	8,526.35	453.78	-1,039.19	763.30	10.63	10.63	0.31
8,864.00	76.80	320.30	8,534.89	478.18	-1,059.70	792.98	11.10	10.91	2.12
8,896.00	80.20	320.10	8,541.27	502.27	-1,079.77	822.24	10.64	10.63	-0.63
8,928.00	83.60	320.60	8,545.78	526.66	-1,099.98	851.82	10.74	10.63	1.56
9,024.00	91.00	325.40	8,550.30	603.17	-1,157.62	942.79	9.18	7.71	5.00
9,119.00	90.30	328.20	8,549.22	682.65	-1,209.63	1,034.76	3.04	-0.74	2.95
9,215.00	91.00	329.40	8,548.13	764.76	-1,259.36	1,128.48	1.45	0.73	1.25
9,311.00	92.10	330.10	8,545.54	847.65	-1,307.70	1,222.51	1.36	1.15	0.73
9,406.00	93.60	330.40	8,540.81	930.03	-1,354.78	1,315.64	1.61	1.58	0.32
9,502.00	93.30	332.10	8,535.03	1,014.04	-1,400.87	1,409.99	1.80	-0.31	1.77
9,598.00	91.00	333.20	8,531.43	1,099.24	-1,444.94	1,504.83	2.66	-2.40	1.15
9,693.00	89.80	335.50	8,530.77	1,184.87	-1,486.06	1,599.13	2.73	-1.26	2.42
9,756.00	89.80	338.10	8,530.99	1,242.77	-1,510.87	1,661.93	4.13	0.00	4.13
9,817.00	89.70	341.00	8,531.26	1,299.92	-1,532.18	1,722.89	4.76	-0.16	4.75
9,880.00	90.20	344.50	8,531.31	1,360.07	-1,550.86	1,785.86	5.61	0.79	5.56
9,944.00	88.60	347.60	8,531.98	1,422.17	-1,566.29	1,849.63	5.45	-2.50	4.84
10,038.00	88.20	352.00	8,534.61	1,514.63	-1,582.92	1,942.53	4.70	-0.43	4.68
10,133.00	89.50	357.10	8,536.52	1,609.15	-1,591.94	2,034.94	5.54	1.37	5.37
10,243.00	89.60	1.30	8,537.38	1,719.11	-1,593.48	2,139.58	3.82	0.09	3.82
10,324.00	90.90	1.80	8,537.03	1,800.08	-1,591.29	2,215.56	1.72	1.60	0.62
10,419.00	89.80	1.70	8,536.45	1,895.03	-1,588.39	2,304.56	1.16	-1.16	-0.11
10,514.00	91.90	2.00	8,535.04	1,989.96	-1,585.32	2,393.49	2.23	2.21	0.32
10,608.00	90.20	1.30	8,533.31	2,083.90	-1,582.61	2,481.59	1.96	-1.81	-0.74
10,703.00	92.60	1.60	8,530.99	2,178.84	-1,580.21	2,570.73	2.55	2.53	0.32
10,798.00	92.10	0.40	8,527.10	2,273.74	-1,578.55	2,660.08	1.37	-0.53	-1.26
10,893.00	90.20	0.20	8,525.19	2,368.72	-1,578.06	2,749.88	2.01	-2.00	-0.21
10,988.00	89.60	0.60	8,525.36	2,463.71	-1,577.39	2,839.63	0.76	-0.63	0.42
11,083.00	91.80	0.60	8,524.20	2,558.70	-1,576.40	2,929.27	2.32	2.32	0.00
11,178.00	90.30	0.10	8,522.46	2,653.68	-1,575.82	3,019.04	1.66	-1.58	-0.53

Archer

Survey Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well 4H
Project:	Eddy County, NM	TVD Reference:	3222'GL+20'KB @ 3242.00usft (Planning)
Site:	Buena Vista 2 State Com 4H	MD Reference:	3222'GL+20'KB @ 3242.00usft (Planning)
Well:	4H	North Reference:	Grid
Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM R5000 MULTI

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
11,272.00	87.80	359.80	8,524.01	2,747.66	-1,575.90	3,108.07	2.68	-2.66	-0.32	
11,368.00	88.40	0.60	8,527.20	2,843.60	-1,575.57	3,198.84	1.04	0.63	0.83	
11,462.00	90.70	0.30	8,527.94	2,937.59	-1,574.83	3,287.62	2.47	2.45	-0.32	
11,557.00	88.40	0.70	8,528.68	3,032.58	-1,574.00	3,377.31	2.46	-2.42	0.42	
11,652.00	90.50	0.80	8,529.59	3,127.56	-1,572.75	3,466.87	2.21	2.21	0.11	
11,747.00	90.10	0.70	8,529.10	3,222.55	-1,571.51	3,556.44	0.43	-0.42	-0.11	
11,842.00	88.40	0.80	8,530.34	3,317.53	-1,570.27	3,645.99	1.79	-1.79	0.11	
11,937.00	90.20	0.50	8,531.50	3,412.51	-1,569.19	3,735.61	1.92	1.89	-0.32	
12,031.00	90.60	0.30	8,530.84	3,506.51	-1,568.53	3,824.42	0.48	0.43	-0.21	
12,126.00	91.50	0.60	8,529.10	3,601.49	-1,567.79	3,914.13	1.00	0.95	0.32	
12,221.00	88.10	0.60	8,529.43	3,696.47	-1,566.79	4,003.77	3.58	-3.58	0.00	
12,316.00	90.50	0.70	8,530.59	3,791.45	-1,565.72	4,093.38	2.53	2.53	0.11	
12,411.00	89.80	0.00	8,530.35	3,886.44	-1,565.14	4,183.16	1.04	-0.74	-0.74	
12,506.00	92.10	359.60	8,528.77	3,981.42	-1,565.47	4,273.23	2.46	2.42	-0.42	
12,601.00	90.90	358.70	8,526.28	4,076.38	-1,566.88	4,363.61	1.58	-1.26	-0.95	
12,696.00	88.30	359.20	8,526.95	4,171.35	-1,568.62	4,454.12	2.79	-2.74	0.53	
12,792.00	88.70	359.30	8,529.46	4,267.31	-1,569.87	4,545.40	0.43	0.42	0.10	
12,855.00	89.50	359.30	8,530.45	4,330.30	-1,570.64	4,605.30	1.27	1.27	0.00	
12,950.00	90.00	359.70	8,530.86	4,425.29	-1,571.47	4,695.54	0.67	0.53	0.42	
13,046.00	90.20	359.20	8,530.70	4,521.29	-1,572.39	4,786.75	0.56	0.21	-0.52	
13,158.00	90.50	359.10	8,530.01	4,633.27	-1,574.05	4,893.35	0.28	0.27	-0.09	
13,205.00	90.50	359.10	8,529.60	4,680.26	-1,574.79	4,938.09	0.00	0.00	0.00	

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Buena Vista 4H Surface	0.00	0.00	0.00	0.00	0.00	580,616.80	619,785.60	32° 35' 44.23 N	103° 56' 39.80 W
- actual wellpath hits target center									
- Point									
Buena Vista 4H BHL	0.00	0.00	8,529.60	4,680.26	-1,574.79	585,297.07	618,210.81	32° 36' 30.60 N	103° 56' 58.01 W
- actual wellpath hits target center									
- Point									