



HOBBS OCD

SEP 06 2018

RECEIVED

I Dustin Byers certify that I am employed by VES Survey International. That I did on the day(s) of 07/19/17 through 07/19/17 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 11,575.00 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Vaughn Energy Services, that I am authorized and qualified to make this report; that this survey was conducted at the request of COG Operating for the Columbus Fed Com Well # 21H API # 30-025-43689 in Lea County / Parish New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by VES Survey International.

A handwritten signature in black ink, appearing to read "Dustin Byers", is written over a horizontal line.

Dustin Byers
Service Technician
VES Survey International

HOBBS OCD

SEP 06 2018

RECEIVED



July 24, 2017

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

Attn: Kanicia Castillo

RE: Columbus Federal Com No. 21H

Please find enclosed a copy of the survey from 0' to 11,575' ran on the above referenced well.

Sincerely,

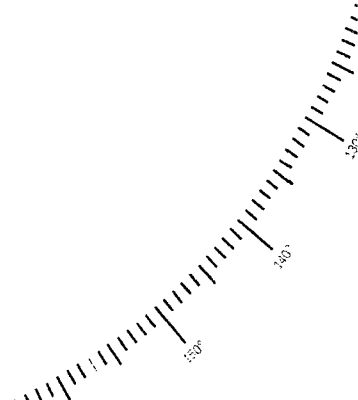
Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 24th day of July,
A.D., 2017, by Keith Havelka.

A handwritten signature in cursive script, reading "Jennifer Ann Byerly".

Jennifer Ann Byerly
Notary Public, State of Texas



Company: COG OPERATING
Lease/Well: COLUMBUS FEDERAL COM No/21H



Rig Name: SCAN FREEDOM
State/County: NEW MEXICO/LEA
VS-Azi: 0.00 Degrees



Latitude: 32.09369, Longitude: -103.55585
Grid North = True North -0.41 degs (NAD 27)
Grid Correction Applied = -0.41 degs

Depth Reference : RKB 26'

HOBBS OCD

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: eline-de_01.ut
Minimum Curvature Method
Report Date/Time: 7/24/2017 / 15:58

SEP 06 2018

RECEIVED

VES Survey International
West Texas
432-563-5444
Surveyor: Dustin Byers
Columbus Federal Com No 21H / API 30-025-43689

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	0.29	89.23	100.00	0.00	0.26	0.00	0.26	89.23	0.29
200.00	0.32	86.12	200.00	0.03	0.79	0.03	0.79	88.14	0.03
300.00	0.38	105.86	300.00	-0.05	1.38	-0.05	1.38	91.93	0.14
400.00	0.53	80.93	399.99	-0.06	2.16	-0.06	2.16	91.69	0.25
500.00	0.43	89.34	499.99	0.01	2.99	0.01	2.99	89.74	0.13
600.00	0.47	91.23	599.99	0.01	3.78	0.01	3.78	89.86	0.05
700.00	0.20	128.14	699.98	-0.11	4.33	-0.11	4.33	91.45	0.33
800.00	0.22	99.72	799.98	-0.25	4.66	-0.25	4.67	93.09	0.10
900.00	0.40	134.66	899.98	-0.53	5.09	-0.53	5.12	95.90	0.25
1000.00	0.14	102.57	999.98	-0.80	5.46	-0.80	5.52	98.30	0.28
1100.00	0.21	125.54	1099.98	-0.93	5.74	-0.93	5.81	99.23	0.10
1200.00	0.08	323.54	1199.98	-0.98	5.84	-0.98	5.93	99.54	0.29
1300.00	0.05	176.34	1299.98	-0.97	5.80	-0.97	5.88	99.47	0.13
1400.00	0.45	229.83	1399.98	-1.26	5.51	-1.26	5.65	102.93	0.42
1500.00	0.09	291.10	1499.98	-1.49	5.13	-1.49	5.34	106.16	0.41
1600.00	0.07	135.62	1599.98	-1.50	5.10	-1.50	5.32	106.41	0.16

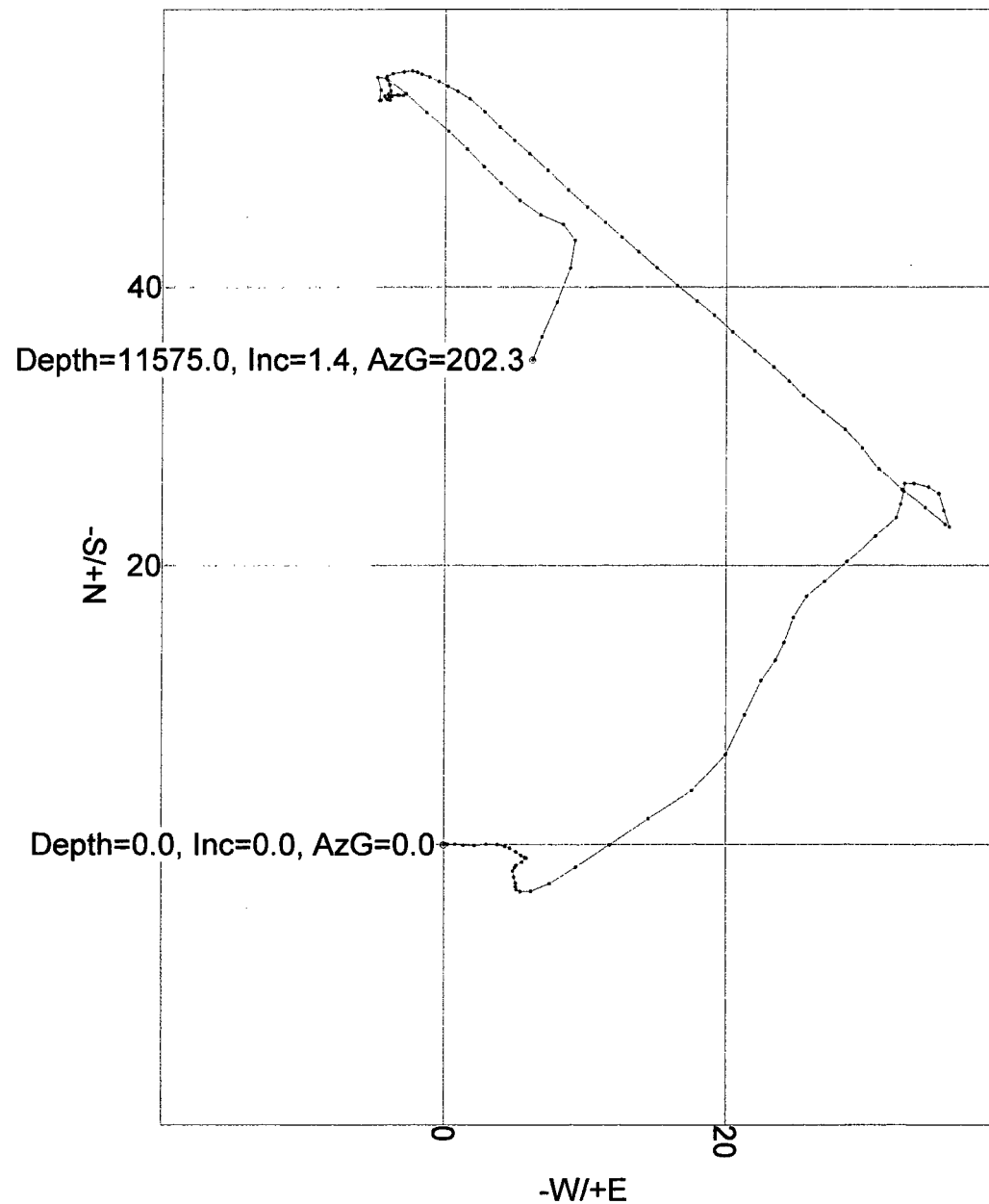
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1700.00	0.21	225.79	1699.98	-1.67	5.01	-1.67	5.28	108.42	0.22
1800.00	0.13	180.88	1799.98	-1.91	4.88	-1.91	5.24	111.32	0.15
1900.00	0.36	165.16	1899.98	-2.32	4.96	-2.32	5.48	115.06	0.24
2000.00	0.18	169.24	1999.98	-2.78	5.07	-2.78	5.78	118.71	0.18
2100.00	0.13	193.11	2099.98	-3.04	5.08	-3.04	5.92	120.92	0.08
2200.00	0.14	138.99	2199.98	-3.24	5.13	-3.24	6.07	122.28	0.12
2300.00	0.22	102.43	2299.97	-3.38	5.40	-3.38	6.37	122.00	0.14
2400.00	0.67	84.52	2399.97	-3.36	6.17	-3.36	7.03	118.57	0.46
2500.00	1.03	57.04	2499.96	-2.82	7.51	-2.82	8.02	110.59	0.53
2600.00	1.50	57.26	2599.94	-1.62	9.36	-1.62	9.50	99.84	0.48
2700.00	1.79	55.03	2699.89	-0.02	11.74	-0.02	11.74	90.09	0.29
2800.00	2.03	56.92	2799.84	1.84	14.51	1.84	14.63	82.75	0.25
2900.00	2.22	56.01	2899.77	3.89	17.60	3.89	18.02	77.53	0.19
3000.00	1.95	28.39	2999.71	6.47	20.01	6.47	21.03	72.08	1.03
3100.00	1.67	20.40	3099.66	9.34	21.33	9.34	23.28	66.36	0.38
3200.00	1.45	31.17	3199.62	11.78	22.49	11.78	25.39	62.35	0.37
3300.00	0.59	44.31	3299.60	13.23	23.50	13.23	26.97	60.62	0.88
3400.00	1.05	15.77	3399.59	14.48	24.11	14.48	28.13	59.01	0.61
3500.00	1.15	24.41	3499.57	16.28	24.78	16.28	29.65	56.69	0.19
3600.00	0.91	41.82	3599.56	17.79	25.72	17.79	31.27	55.34	0.39
3700.00	1.01	57.65	3699.54	18.85	27.00	18.85	32.93	55.08	0.29
3800.00	1.46	41.34	3799.52	20.28	28.59	20.28	35.05	54.65	0.56
3900.00	1.78	55.54	3899.48	22.12	30.71	22.12	37.84	54.24	0.51
4000.00	0.57	22.69	3999.46	23.45	32.18	23.45	39.82	53.92	1.34
4100.00	0.61	16.22	4099.45	24.41	32.52	24.41	40.66	53.10	0.08
4200.00	0.48	9.54	4199.45	25.34	32.73	25.34	41.39	52.26	0.14
4300.00	0.17	358.39	4299.45	25.90	32.80	25.90	41.79	51.70	0.31
4400.00	0.74	102.95	4399.45	25.91	33.42	25.91	42.29	52.22	0.80
4500.00	0.55	102.15	4499.44	25.66	34.52	25.66	43.01	53.38	0.18
4600.00	0.51	151.29	4599.44	25.17	35.21	25.17	43.28	54.44	0.44
4700.00	0.96	170.04	4699.43	23.96	35.56	23.96	42.88	56.04	0.51
4800.00	0.54	145.14	4799.42	22.74	35.98	22.74	42.56	57.70	0.53
4900.00	0.94	315.62	4899.42	22.94	35.67	22.94	42.41	57.25	1.47
5000.00	1.17	307.46	4999.40	24.15	34.29	24.15	41.94	54.85	0.27
5100.00	1.25	308.35	5099.38	25.44	32.63	25.44	41.38	52.05	0.09
5200.00	1.33	314.84	5199.35	26.94	30.95	26.94	41.03	48.96	0.17
5300.00	0.98	325.00	5299.33	28.46	29.64	28.46	41.09	46.16	0.40
5400.00	1.08	311.71	5399.31	29.78	28.44	29.78	41.18	43.68	0.26
5500.00	1.26	305.93	5499.29	31.05	26.86	31.05	41.05	40.86	0.21

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
5600.00	0.82	315.89	5599.28	32.21	25.47	32.21	41.06	38.33	0.47
5700.00	0.82	313.29	5699.27	33.22	24.45	33.22	41.24	36.35	0.04
5800.00	0.84	314.04	5799.26	34.22	23.40	34.22	41.45	34.36	0.03
5900.00	1.24	307.89	5899.24	35.39	22.01	35.39	41.68	31.88	0.41
6000.00	1.14	314.56	5999.22	36.76	20.45	36.76	42.06	29.09	0.17
6100.00	0.90	310.31	6099.20	37.97	19.14	37.97	42.52	26.76	0.25
6200.00	0.92	308.29	6199.19	38.97	17.91	38.97	42.89	24.68	0.04
6300.00	1.14	310.01	6299.17	40.12	16.51	40.12	43.38	22.37	0.22
6400.00	1.06	312.23	6399.15	41.38	15.06	41.38	44.04	20.00	0.09
6500.00	0.95	311.69	6499.14	42.55	13.76	42.55	44.72	17.92	0.11
6600.00	0.87	310.52	6599.13	43.59	12.57	43.59	45.37	16.08	0.08
6700.00	0.95	312.54	6699.11	44.65	11.38	44.65	46.07	14.30	0.09
6800.00	1.00	309.03	6799.10	45.76	10.09	45.76	46.85	12.44	0.08
6900.00	1.13	314.97	6899.08	47.00	8.72	47.00	47.80	10.51	0.17
7000.00	1.16	313.38	6999.06	48.40	7.28	48.40	48.94	8.55	0.05
7100.00	0.84	310.77	7099.05	49.57	5.99	49.57	49.93	6.88	0.33
7200.00	0.83	312.17	7199.04	50.54	4.89	50.54	50.78	5.53	0.02
7300.00	0.79	314.15	7299.03	51.51	3.86	51.51	51.65	4.29	0.05
7400.00	0.97	315.70	7399.01	52.59	2.77	52.59	52.67	3.02	0.17
7500.00	0.67	305.94	7499.00	53.54	1.71	53.54	53.57	1.83	0.33
7600.00	0.50	296.38	7599.00	54.07	0.86	54.07	54.08	0.91	0.19
7700.00	0.40	297.79	7699.00	54.43	0.15	54.43	54.43	0.16	0.09
7800.00	0.42	300.77	7798.99	54.78	-0.47	54.78	54.78	359.51	0.02
7900.00	0.44	290.02	7898.99	55.10	-1.14	55.10	55.11	358.82	0.08
8000.00	0.23	292.07	7998.99	55.30	-1.68	55.30	55.33	358.26	0.20
8100.00	0.17	298.12	8098.99	55.45	-2.00	55.45	55.49	357.93	0.06
8200.00	0.26	276.49	8198.99	55.55	-2.37	55.55	55.60	357.56	0.12
8300.00	0.42	256.73	8298.99	55.49	-2.95	55.49	55.57	356.96	0.19
8400.00	0.49	261.65	8398.98	55.34	-3.73	55.34	55.47	356.15	0.08
8500.00	0.15	184.91	8498.98	55.15	-4.16	55.15	55.30	355.69	0.48
8600.00	0.18	150.17	8598.98	54.88	-4.09	54.88	55.03	355.74	0.10
8700.00	0.26	165.48	8698.98	54.52	-3.96	54.52	54.67	355.85	0.10
8800.00	0.24	173.16	8798.98	54.10	-3.88	54.10	54.24	355.90	0.04
8900.00	0.24	173.97	8898.98	53.68	-3.83	53.68	53.82	355.92	0.01
9000.00	0.15	247.40	8998.98	53.43	-3.93	53.43	53.57	355.79	0.24
9100.00	0.18	316.93	9098.98	53.49	-4.16	53.49	53.65	355.56	0.19
9200.00	0.14	326.72	9198.98	53.71	-4.33	53.71	53.89	355.39	0.04
9300.00	0.41	83.62	9298.98	53.86	-4.05	53.86	54.01	355.70	0.49
9400.00	0.37	109.78	9398.97	53.79	-3.39	53.79	53.89	356.39	0.18

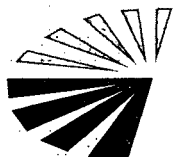
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
9500.00	0.11	43.29	9498.97	53.75	-3.02	53.75	53.83	356.78	0.34
9600.00	0.41	262.17	9598.97	53.77	-3.31	53.77	53.87	356.47	0.51
9700.00	0.36	267.62	9698.97	53.71	-3.99	53.71	53.86	355.76	0.07
9800.00	0.47	228.99	9798.97	53.42	-4.61	53.42	53.62	355.07	0.29
9900.00	0.39	40.49	9898.97	53.41	-4.70	53.41	53.62	354.97	0.86
10000.00	0.57	345.91	9998.96	54.15	-4.60	54.15	54.35	355.15	0.47
10100.00	0.53	348.10	10098.96	55.09	-4.82	55.09	55.30	355.00	0.04
10200.00	1.02	125.73	10198.95	55.03	-4.19	55.03	55.19	355.64	1.46
10300.00	1.03	133.62	10298.94	53.89	-2.82	53.89	53.96	357.00	0.14
10400.00	1.26	131.45	10398.92	52.55	-1.35	52.55	52.56	358.53	0.23
10500.00	1.10	130.41	10498.90	51.20	0.20	51.20	51.20	0.23	0.16
10600.00	1.03	138.56	10598.88	49.90	1.53	49.90	49.92	1.76	0.17
10700.00	0.96	133.65	10698.87	48.65	2.73	48.65	48.72	3.21	0.11
10800.00	0.98	135.01	10798.85	47.47	3.94	47.47	47.63	4.74	0.03
10900.00	1.11	129.78	10898.83	46.24	5.29	46.24	46.54	6.53	0.16
11000.00	0.97	120.35	10998.82	45.19	6.77	45.19	45.70	8.52	0.22
11100.00	1.03	105.19	11098.80	44.53	8.37	44.53	45.31	10.64	0.27
11200.00	1.06	180.98	11198.79	43.37	9.22	43.37	44.34	12.00	1.28
11300.00	1.28	195.89	11298.77	41.38	8.90	41.38	42.32	12.14	0.38
11400.00	1.76	205.18	11398.73	38.91	7.94	38.91	39.71	11.53	0.54
11500.00	1.33	200.09	11498.70	36.43	6.89	36.43	37.08	10.70	0.45
11575.00	1.43	202.34	11573.68	34.75	6.23	34.75	35.30	10.17	0.14



VES Survey International
West Texas
432-563-5444
Surveyor: Dustin Byers
Columbus Federal Com No 21H / API 30-025-43689



VES Survey Date: 7/19/2017



C O N C H O

HOBBS OCD

SEP 06 2018

RECEIVED

COG Operating L L C

Lea County, NM (NAD27 NME)

Sec. 34, T 25 S. , R 33 E

Columbus Fed Com 21H

Wellbore #1

Design: Wellbore #1

Standard Survey Report

15 September, 2017



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Columbus Fed Com 21H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3350.00ft
Site:	Sec. 34, T-25 S., R 33 E	MD Reference:	KB=26' @ 3350.00ft
Well:	Columbus Fed Com 21H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi 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	Sec. 34, T-25 S., R 33 E		
Site Position:		Northing:	398,623.8000 usft
From:	Map	Easting:	739,904.9000 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "
		Latitude:	32.093564
		Longitude:	-103.558656
		Grid Convergence:	0.41 °

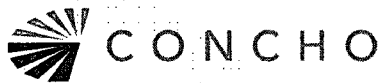
Well	Columbus Fed Com 21H, ACTIVE		
Well Position	+N/-S	0.00 ft	Northing: 398,637.1000 usft
	+E/-W	0.00 ft	Easting: 741,887.4000 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	0.00 ft
		Latitude:	32.093561
		Longitude:	-103.552255
		Ground Level:	3,324.00 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	HDGM	6/29/2017	6.83	59.78	47,965

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(ft)	(ft)	(ft)	(°)	
	0.00	0.00	0.00	179.58	

Survey Program	Date 9/15/2017				
From	To	Survey (Wellbore)	Tool Name	Description	
(ft)	(ft)				
100.00	11,600.00	VES Gyros (Wellbore #1)	VESSI_GYROFLEX	VESSI Gyroflex Gyro	
11,710.00	22,321.00	IDS MWD Surveys (Wellbore #1)	MWD	MWD - Standard	

Survey										
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn	
Depth	(°)	(°)	Depth	(ft)	(ft)	Section	Rate	Rate	Rate	
(ft)			(ft)			(ft)	(°/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	0.29	89.23	100.00	0.00	0.25	0.00	0.29	0.29	0.00	
200.00	0.32	86.12	200.00	0.03	0.78	-0.02	0.03	0.03	-3.11	
300.00	0.38	105.86	300.00	-0.05	1.38	0.06	0.13	0.06	19.74	
400.00	0.53	80.93	399.99	-0.06	2.16	0.08	0.25	0.15	-24.93	
500.00	0.43	89.34	499.99	0.01	2.99	0.01	0.12	-0.10	8.41	
600.00	0.47	91.23	599.99	0.01	3.78	0.02	0.04	0.04	1.89	
700.00	0.20	128.14	699.98	-0.11	4.32	0.14	0.33	-0.27	36.91	
800.00	0.22	99.72	799.98	-0.25	4.65	0.28	0.10	0.02	-28.42	
900.00	0.40	134.66	899.98	-0.53	5.09	0.56	0.25	0.18	34.94	



Integrity Directional Services, LLC
Survey Report



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Columbus Fed Com 21H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3350.00ft
Site:	Sec. 34 T.25 S. R 33 E	MD Reference:	KB=26' @ 3350.00ft
Well:	Columbus Fed Com 21H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,000.00	0.14	102.57	999.98	-0.80	5.45	0.84	0.29	-0.26	-32.09
1,100.00	0.21	125.54	1,099.98	-0.93	5.72	0.97	0.10	0.07	22.97
1,200.00	0.08	323.54	1,199.98	-0.98	5.83	1.02	0.29	-0.13	-162.00
1,300.00	0.05	176.34	1,299.98	-0.97	5.79	1.01	0.12	-0.03	-147.20
1,400.00	0.45	229.83	1,399.98	-1.27	5.49	1.31	0.42	0.40	53.49
1,500.00	0.09	291.10	1,499.98	-1.49	5.12	1.53	0.41	-0.36	61.27
1,600.00	0.07	135.62	1,599.98	-1.51	5.09	1.54	0.16	-0.02	-155.48
1,700.00	0.21	225.79	1,699.98	-1.68	5.00	1.71	0.22	0.14	90.17
1,800.00	0.13	180.88	1,799.98	-1.92	4.87	1.95	0.15	-0.08	-44.91
1,900.00	0.36	165.16	1,899.98	-2.34	4.95	2.37	0.24	0.23	-15.72
2,000.00	0.18	169.24	1,999.98	-2.79	5.06	2.83	0.18	-0.18	4.08
2,100.00	0.13	193.11	2,099.98	-3.06	5.06	3.10	0.08	-0.05	23.87
2,200.00	0.14	138.99	2,199.98	-3.26	5.12	3.30	0.12	0.01	-54.12
2,300.00	0.22	102.43	2,299.97	-3.39	5.38	3.43	0.14	0.08	-36.56
2,400.00	0.67	84.52	2,399.97	-3.38	6.15	3.42	0.47	0.45	-17.91
2,500.00	1.03	57.04	2,499.96	-2.84	7.49	2.89	0.53	0.36	-27.48
2,600.00	1.50	57.26	2,599.94	-1.64	9.34	1.71	0.47	0.47	0.22
2,700.00	1.79	55.03	2,699.89	-0.04	11.72	0.12	0.30	0.29	-2.23
2,800.00	2.03	56.92	2,799.84	1.83	14.49	-1.72	0.25	0.24	1.89
2,900.00	2.22	56.01	2,899.77	3.88	17.58	-3.75	0.19	0.19	-0.91
3,000.00	1.95	28.39	2,999.71	6.46	19.99	-6.31	1.03	-0.27	-27.62
3,100.00	1.67	20.40	3,099.66	9.32	21.31	-9.16	0.38	-0.28	-7.99
3,200.00	1.45	31.17	3,199.62	11.77	22.47	-11.60	0.37	-0.22	10.77
3,300.00	0.59	44.31	3,299.60	13.22	23.49	-13.05	0.89	-0.86	13.14
3,400.00	1.05	15.77	3,399.59	14.47	24.10	-14.29	0.60	0.46	-28.54
3,500.00	1.15	24.41	3,499.57	16.26	24.76	-16.08	0.19	0.10	8.64
3,600.00	0.91	41.82	3,599.56	17.77	25.70	-17.58	0.39	-0.24	17.41
3,700.00	1.01	57.65	3,699.54	18.83	26.98	-18.63	0.28	0.10	15.83
3,800.00	1.46	41.34	3,799.52	20.26	28.56	-20.05	0.57	0.45	-16.31
3,900.00	1.78	55.54	3,899.48	22.10	30.69	-21.87	0.51	0.32	14.20
4,000.00	0.57	22.69	3,999.46	23.43	32.16	-23.20	1.34	-1.21	-32.85
4,100.00	0.61	16.22	4,099.45	24.40	32.50	-24.17	0.08	0.04	-6.47
4,200.00	0.48	9.54	4,199.45	25.33	32.72	-25.09	0.14	-0.13	-6.68
4,300.00	0.17	358.39	4,299.45	25.89	32.78	-25.65	0.31	-0.31	-11.15
4,400.00	0.74	102.95	4,399.45	25.89	33.41	-25.65	0.80	0.57	104.56
4,500.00	0.55	102.15	4,499.44	25.65	34.51	-25.39	0.19	-0.19	-0.80
4,600.00	0.51	151.29	4,599.44	25.16	35.19	-24.90	0.44	-0.04	49.14
4,700.00	0.96	170.04	4,699.43	23.94	35.55	-23.68	0.50	0.45	18.75
4,800.00	0.54	145.14	4,799.42	22.73	35.96	-22.47	0.52	-0.42	-24.90
4,900.00	0.94	315.62	4,899.42	22.93	35.66	-22.67	1.48	0.40	170.48
5,000.00	1.17	307.46	4,999.40	24.14	34.27	-23.88	0.27	0.23	-8.16
5,100.00	1.25	308.35	5,099.38	25.43	32.61	-25.19	0.08	0.08	0.89
5,200.00	1.33	314.84	5,199.35	26.93	30.93	-26.70	0.17	0.08	6.49

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Columbus Fed Com 21H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3350.00ft
Site:	Sec. 34, T 25 S, R 33 E	MD Reference:	KB=26' @ 3350.00ft
Well:	Columbus Fed Com 21H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,300.00	0.98	325.00	5,299.33	28.45	29.62	-28.23	0.40	-0.35	10.16
5,400.00	1.08	311.71	5,399.31	29.77	28.42	-29.57	0.26	0.10	-13.29
5,500.00	1.26	305.93	5,499.29	31.05	26.83	-30.85	0.22	0.18	-5.78
5,600.00	0.82	315.89	5,599.28	32.21	25.44	-32.02	0.47	-0.44	9.96
5,700.00	0.82	313.29	5,699.27	33.21	24.42	-33.03	0.04	0.00	-2.60
5,800.00	0.84	314.04	5,799.26	34.21	23.37	-34.04	0.02	0.02	0.75
5,900.00	1.24	307.89	5,899.24	35.38	21.99	-35.22	0.41	0.40	-6.15
6,000.00	1.14	314.56	5,999.22	36.75	20.43	-36.60	0.17	-0.10	6.67
6,100.00	0.90	310.31	6,099.20	37.95	19.12	-37.81	0.25	-0.24	-4.25
6,200.00	0.92	308.29	6,199.19	38.96	17.89	-38.83	0.04	0.02	-2.02
6,300.00	1.14	310.01	6,299.17	40.10	16.50	-39.97	0.22	0.22	1.72
6,400.00	1.06	312.23	6,399.15	41.36	15.05	-41.25	0.09	-0.08	2.22
6,500.00	0.95	311.69	6,499.14	42.53	13.75	-42.43	0.11	-0.11	-0.54
6,600.00	0.87	310.52	6,599.13	43.57	12.55	-43.48	0.08	-0.08	-1.17
6,700.00	0.95	312.54	6,699.11	44.63	11.37	-44.54	0.09	0.08	2.02
6,800.00	1.00	309.03	6,799.10	45.74	10.08	-45.66	0.08	0.05	-3.51
6,900.00	1.13	314.97	6,899.08	46.98	8.70	-46.92	0.17	0.13	5.94
7,000.00	1.16	313.38	6,999.06	48.38	7.27	-48.32	0.04	0.03	-1.59
7,100.00	0.84	310.77	7,099.05	49.55	5.98	-49.51	0.32	-0.32	-2.61
7,200.00	0.83	312.17	7,199.04	50.52	4.89	-50.48	0.02	-0.01	1.40
7,300.00	0.79	314.15	7,299.03	51.48	3.85	-51.45	0.05	-0.04	1.98
7,400.00	0.97	315.70	7,399.01	52.57	2.77	-52.55	0.18	0.18	1.55
7,500.00	0.67	305.94	7,499.00	53.52	1.70	-53.50	0.33	-0.30	-9.76
7,600.00	0.50	296.38	7,599.00	54.05	0.84	-54.05	0.20	-0.17	-9.56
7,700.00	0.40	297.79	7,699.00	54.41	0.14	-54.41	0.10	-0.10	1.41
7,800.00	0.42	300.77	7,798.99	54.76	-0.48	-54.76	0.03	0.02	2.98
7,900.00	0.44	290.02	7,898.99	55.08	-1.16	-55.09	0.08	0.02	-10.75
8,000.00	0.23	292.07	7,998.99	55.29	-1.71	-55.30	0.21	-0.21	2.05
8,100.00	0.17	298.12	8,098.99	55.43	-2.02	-55.45	0.06	-0.06	6.05
8,200.00	0.26	276.49	8,198.99	55.53	-2.38	-55.54	0.12	0.09	-21.63
8,300.00	0.42	256.73	8,298.99	55.47	-2.96	-55.49	0.20	0.16	-19.76
8,400.00	0.49	261.65	8,398.98	55.32	-3.74	-55.35	0.08	0.07	4.92
8,500.00	0.15	184.91	8,498.98	55.13	-4.18	-55.16	0.48	-0.34	-76.74
8,600.00	0.18	150.17	8,598.98	54.86	-4.11	-54.89	0.10	0.03	-34.74
8,700.00	0.26	165.48	8,698.98	54.51	-3.97	-54.54	0.10	0.08	15.31
8,800.00	0.24	173.16	8,798.98	54.08	-3.89	-54.11	0.04	-0.02	7.68
8,900.00	0.24	173.97	8,898.98	53.66	-3.85	-53.69	0.00	0.00	0.81
9,000.00	0.15	247.40	8,998.98	53.41	-3.94	-53.43	0.24	-0.09	73.43
9,100.00	0.18	316.93	9,098.98	53.47	-4.17	-53.50	0.19	0.03	69.53
9,200.00	0.14	326.72	9,198.98	53.69	-4.35	-53.72	0.05	-0.04	9.79
9,300.00	0.41	83.62	9,298.98	53.83	-4.06	-53.86	0.49	0.27	116.90
9,400.00	0.37	109.78	9,398.97	53.76	-3.40	-53.78	0.18	-0.04	26.16
9,500.00	0.11	43.29	9,498.97	53.72	-3.03	-53.74	0.34	-0.26	-66.49

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Columbus Fed Com 21H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3350.00ft
Site:	Sec. 34, T 25 S., R 33 E	MD Reference:	KB=26' @ 3350.00ft
Well:	Columbus Fed Com 21H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,600.00	0.41	262.17	9,598.97	53.74	-3.32	-53.76	0.50	0.30	-141.12
9,700.00	0.36	267.62	9,698.97	53.68	-3.99	-53.71	0.06	-0.05	5.45
9,800.00	0.47	228.99	9,798.97	53.40	-4.61	-53.43	0.29	0.11	-38.63
9,900.00	0.39	40.49	9,898.97	53.39	-4.70	-53.42	0.86	-0.08	171.50
10,000.00	0.57	345.91	9,998.96	54.13	-4.60	-54.16	0.47	0.18	-54.58
10,100.00	0.53	348.10	10,098.96	55.06	-4.81	-55.10	0.05	-0.04	2.19
10,200.00	1.02	125.73	10,198.95	55.00	-4.19	-55.02	1.46	0.49	137.63
10,300.00	1.03	133.62	10,298.94	53.86	-2.81	-53.87	0.14	0.01	7.89
10,400.00	1.26	131.45	10,398.92	52.51	-1.34	-52.52	0.23	0.23	-2.17
10,500.00	1.10	130.41	10,498.90	51.16	0.22	-51.15	0.16	-0.16	-1.04
10,600.00	1.03	138.56	10,598.88	49.86	1.54	-49.85	0.17	-0.07	8.15
10,700.00	0.96	133.65	10,698.87	48.61	2.74	-48.59	0.11	-0.07	-4.91
10,800.00	0.98	135.01	10,798.85	47.43	3.95	-47.40	0.03	0.02	1.36
10,900.00	1.11	129.78	10,898.83	46.20	5.30	-46.16	0.16	0.13	-5.23
11,000.00	0.97	120.35	10,998.82	45.15	6.78	-45.10	0.22	-0.14	-9.43
11,100.00	1.03	105.19	11,098.80	44.49	8.38	-44.43	0.27	0.06	-15.16
11,200.00	1.06	180.98	11,198.79	43.33	9.23	-43.26	1.28	0.03	75.79
11,300.00	1.28	195.89	11,298.77	41.33	8.91	-41.27	0.37	0.22	14.91
11,400.00	1.76	205.18	11,398.73	38.87	7.95	-38.81	0.54	0.48	9.29
11,500.00	1.33	200.09	11,498.70	36.39	6.89	-36.34	0.45	-0.43	-5.09
11,575.00	1.43	202.34	11,573.68	34.71	6.24	-34.66	0.15	0.13	3.00
11,710.00	2.17	197.05	11,708.61	30.70	4.85	-30.67	0.56	0.55	-3.92
First MWD Survey @ 11710' MD									
11,788.00	6.67	192.50	11,786.36	24.87	3.44	-24.84	5.78	5.77	-5.83
11,835.00	14.91	193.16	11,832.49	16.30	1.46	-16.29	17.53	17.53	1.40
11,882.00	20.49	194.19	11,877.24	2.43	-1.93	-2.44	11.89	11.87	2.19
11,929.00	24.77	195.74	11,920.62	-15.04	-6.62	14.99	9.19	9.11	3.30
11,976.00	27.55	194.31	11,962.80	-35.05	-11.98	34.96	6.06	5.91	-3.04
12,023.00	29.40	184.96	12,004.13	-57.09	-15.67	56.97	10.26	3.94	-19.89
12,070.00	30.92	175.69	12,044.79	-80.63	-15.76	80.52	10.41	3.23	-19.72
12,117.00	32.03	174.45	12,084.87	-105.08	-13.64	104.98	2.73	2.36	-2.64
12,146.47	33.00	176.76	12,109.73	-120.87	-12.43	120.78	5.33	3.28	7.82
North 330' Crossing @ 12146.47' MD / 120.78' VS									
12,164.00	33.59	178.07	12,124.38	-130.48	-12.00	130.39	5.33	3.39	7.50
12,211.00	37.10	181.76	12,162.71	-157.66	-12.00	157.57	8.74	7.47	7.85
12,258.00	40.73	183.06	12,199.28	-187.15	-13.25	187.05	7.92	7.72	2.77
12,305.00	42.14	183.21	12,234.51	-218.21	-14.95	218.09	3.01	3.00	0.32
12,352.00	43.34	183.20	12,269.03	-250.05	-16.74	249.92	2.55	2.55	-0.02
12,399.00	45.96	181.34	12,302.47	-283.05	-18.03	282.91	6.23	5.57	-3.96
12,447.00	49.73	182.62	12,334.68	-318.61	-19.27	318.46	8.10	7.85	2.67
12,494.00	53.38	182.21	12,363.89	-355.38	-20.82	355.22	7.80	7.77	-0.87
12,541.00	58.42	179.49	12,390.24	-394.27	-21.37	394.11	11.74	10.72	-5.79
12,588.00	65.19	179.98	12,412.43	-435.67	-21.18	435.51	14.43	14.40	1.04
12,635.00	70.43	180.11	12,430.18	-479.18	-21.22	479.01	11.15	11.15	0.28

Company:	COG Operating L.L.C	Local Co-ordinate Reference:	Well Columbus Fed Com 21H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3350.00ft
Site:	Sec. 34, T.25 S., R.33 E	MD Reference:	KB=26' @ 3350.00ft
Well:	Columbus Fed Com 21H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,682.00	76.48	179.58	12,443.56	-524.21	-21.09	524.04	12.92	12.87	-1.13
12,729.00	81.84	179.06	12,452.39	-570.35	-20.54	570.19	11.46	11.40	-1.11
12,776.00	88.17	179.66	12,456.48	-617.15	-20.02	616.98	13.53	13.47	1.28
12,823.00	92.06	183.69	12,456.39	-664.11	-21.40	663.93	11.92	8.28	8.57
12,917.00	95.17	180.04	12,450.46	-757.84	-24.45	757.64	5.10	3.31	-3.88
13,012.00	90.88	176.65	12,445.45	-852.63	-21.71	852.45	5.75	-4.52	-3.57
13,106.00	88.98	177.57	12,445.56	-946.51	-16.97	946.36	2.25	-2.02	0.98
13,200.00	88.17	177.14	12,447.90	-1,040.38	-12.63	1,040.26	0.98	-0.86	-0.46
13,294.00	88.59	179.76	12,450.56	-1,134.30	-10.09	1,134.19	2.82	0.45	2.79
13,388.00	88.61	180.40	12,452.85	-1,228.27	-10.22	1,228.16	0.68	0.02	0.68
13,482.00	90.49	181.32	12,453.59	-1,322.25	-11.63	1,322.13	2.23	2.00	0.98
13,575.00	90.57	180.62	12,452.73	-1,415.23	-13.21	1,415.10	0.76	0.09	-0.75
13,669.00	88.87	179.99	12,453.19	-1,509.23	-13.71	1,509.09	1.93	-1.81	-0.67
13,764.00	88.02	179.77	12,455.77	-1,604.19	-13.51	1,604.05	0.92	-0.89	-0.23
13,858.00	87.30	179.75	12,459.61	-1,698.11	-13.12	1,697.97	0.77	-0.77	-0.02
13,953.00	88.28	179.38	12,463.27	-1,793.04	-12.40	1,792.90	1.10	1.03	-0.39
14,047.00	90.04	182.17	12,464.65	-1,887.00	-13.67	1,886.85	3.51	1.87	2.97
14,141.00	88.81	187.55	12,465.59	-1,980.63	-21.63	1,980.42	5.87	-1.31	5.72
14,169.00	90.32	189.36	12,465.80	-2,008.32	-25.74	2,008.08	8.42	5.39	6.46
14,264.00	89.57	181.11	12,465.89	-2,102.84	-34.40	2,102.53	8.72	-0.79	-8.68
14,358.00	91.81	179.14	12,464.76	-2,196.82	-34.61	2,196.51	3.17	2.38	-2.10
14,452.00	88.02	176.90	12,464.90	-2,290.74	-31.36	2,290.45	4.68	-4.03	-2.38
14,546.00	89.31	179.60	12,467.09	-2,384.66	-28.49	2,384.39	3.18	1.37	2.87
14,641.00	89.20	179.12	12,468.33	-2,479.65	-27.43	2,479.38	0.52	-0.12	-0.51
14,735.00	86.48	176.60	12,471.87	-2,573.50	-23.93	2,573.26	3.94	-2.89	-2.68
14,829.00	91.33	177.46	12,473.67	-2,667.33	-19.06	2,667.12	5.24	5.16	0.91
14,924.00	89.99	175.32	12,472.57	-2,762.13	-13.08	2,761.96	2.66	-1.41	-2.25
15,018.00	90.32	176.04	12,472.32	-2,855.86	-6.00	2,855.74	0.84	0.35	0.77
15,112.00	88.75	171.01	12,473.08	-2,949.22	4.60	2,949.18	5.61	-1.67	-5.35
15,207.00	91.69	178.54	12,472.72	-3,043.75	13.24	3,043.76	8.51	3.09	7.93
15,301.00	90.71	184.63	12,470.75	-3,137.65	10.64	3,137.64	6.56	-1.04	6.48
15,395.00	89.34	186.88	12,470.70	-3,231.16	1.22	3,231.09	2.80	-1.46	2.39
15,489.00	88.25	179.29	12,472.68	-3,324.94	-3.84	3,324.82	8.16	-1.16	-8.07
15,583.00	91.56	181.56	12,472.84	-3,418.91	-4.53	3,418.79	4.27	3.52	2.41
15,677.00	91.16	175.40	12,470.61	-3,512.81	-2.04	3,512.70	6.57	-0.43	-6.55
15,771.00	90.10	169.88	12,469.57	-3,605.99	9.99	3,605.97	5.98	-1.13	-5.87
15,865.00	88.39	169.56	12,470.81	-3,698.47	26.77	3,698.57	1.85	-1.82	-0.34
15,959.00	89.65	177.30	12,472.42	-3,791.77	37.51	3,791.94	8.34	1.34	8.23
16,053.00	88.59	178.04	12,473.87	-3,885.68	41.33	3,885.88	1.38	-1.13	0.79
16,147.00	92.28	181.50	12,473.15	-3,979.64	41.71	3,979.84	5.38	3.93	3.68
16,242.00	89.26	181.53	12,471.87	-4,074.59	39.20	4,074.77	3.18	-3.18	0.03
16,336.00	88.67	181.61	12,473.57	-4,168.54	36.62	4,168.70	0.63	-0.63	0.09
16,430.00	89.31	181.61	12,475.23	-4,262.49	33.98	4,262.62	0.68	0.68	0.00

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Columbus Fed Com 21H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3350.00ft
Site:	Sec. 34, T 25 S., R 33 E	MD Reference:	KB=26' @ 3350.00ft
Well:	Columbus Fed Com 21H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,524.00	87.91	181.57	12,477.51	-4,356.42	31.38	4,356.53	1.49	-1.49	-0.04
16,618.00	87.97	181.17	12,480.89	-4,450.33	29.13	4,450.43	0.43	0.06	-0.43
16,712.00	88.70	180.27	12,483.62	-4,544.28	27.95	4,544.37	1.23	0.78	-0.96
16,806.00	89.93	179.06	12,484.74	-4,638.27	28.50	4,638.36	1.84	1.31	-1.29
16,900.00	88.55	178.31	12,485.99	-4,732.24	30.66	4,732.33	1.67	-1.47	-0.80
16,994.00	87.77	174.05	12,489.01	-4,825.96	36.91	4,826.10	4.60	-0.83	-4.53
17,088.00	90.27	170.49	12,490.62	-4,919.07	49.55	4,919.30	4.63	2.66	-3.79
17,186.00	92.43	179.84	12,488.30	-5,016.58	57.80	5,016.86	9.79	2.20	9.54
17,280.00	91.30	185.00	12,485.24	-5,110.41	53.84	5,110.67	5.62	-1.20	5.49
17,375.00	90.85	181.39	12,483.46	-5,205.23	48.54	5,205.44	3.83	-0.47	-3.80
17,469.00	91.78	181.06	12,481.30	-5,299.18	46.54	5,299.38	1.05	0.99	-0.35
17,563.00	89.40	179.09	12,480.34	-5,393.17	46.41	5,393.36	3.29	-2.53	-2.10
17,657.00	89.76	179.73	12,481.02	-5,487.16	47.38	5,487.36	0.78	0.38	0.68
17,751.00	90.07	180.33	12,481.16	-5,581.16	47.33	5,581.35	0.72	0.33	0.64
17,845.00	90.43	181.16	12,480.75	-5,675.15	46.11	5,675.33	0.96	0.38	0.88
17,939.00	91.55	181.78	12,479.13	-5,769.10	43.70	5,769.27	1.36	1.19	0.66
18,033.00	92.56	183.43	12,475.76	-5,862.94	39.43	5,863.07	2.06	1.07	1.76
18,128.00	92.68	181.62	12,471.42	-5,957.74	35.25	5,957.84	1.91	0.13	-1.91
18,222.00	91.86	178.74	12,467.69	-6,051.66	34.95	6,051.75	3.18	-0.87	-3.06
18,316.00	90.15	178.88	12,466.04	-6,145.62	36.91	6,145.72	1.83	-1.82	0.15
18,410.00	88.19	178.78	12,467.40	-6,239.59	38.83	6,239.70	2.09	-2.09	-0.11
18,504.00	88.25	179.41	12,470.32	-6,333.53	40.31	6,333.65	0.67	0.06	0.67
18,599.00	88.61	179.15	12,472.93	-6,428.48	41.50	6,428.62	0.47	0.38	-0.27
18,693.00	87.72	181.11	12,475.94	-6,522.43	41.29	6,522.56	2.29	-0.95	2.09
18,787.00	92.11	179.77	12,476.08	-6,616.40	40.57	6,616.52	4.88	4.67	-1.43
18,881.00	91.64	179.67	12,473.00	-6,710.35	41.03	6,710.47	0.51	-0.50	-0.11
18,975.00	90.85	179.85	12,470.96	-6,804.33	41.42	6,804.45	0.86	-0.84	0.19
19,070.00	93.32	181.91	12,467.50	-6,899.24	39.96	6,899.35	3.38	2.60	2.17
19,164.00	91.19	179.05	12,463.80	-6,993.15	39.18	6,993.25	3.79	-2.27	-3.04
19,257.00	92.79	179.21	12,460.57	-7,086.08	40.59	7,086.19	1.73	1.72	0.17
19,352.00	90.55	179.79	12,457.81	-7,181.03	41.42	7,181.14	2.44	-2.36	0.61
19,445.00	89.37	179.60	12,457.87	-7,274.03	41.91	7,274.14	1.29	-1.27	-0.20
19,539.00	90.55	180.91	12,457.94	-7,368.02	41.50	7,368.13	1.88	1.26	1.39
19,633.00	89.09	181.25	12,458.23	-7,462.00	39.72	7,462.09	1.59	-1.55	0.36
19,727.00	91.97	181.87	12,457.36	-7,555.95	37.17	7,556.02	3.13	3.06	0.66
19,821.00	91.41	181.00	12,454.59	-7,649.88	34.81	7,649.93	1.10	-0.60	-0.93
19,915.00	89.79	180.05	12,453.61	-7,743.87	33.95	7,743.91	2.00	-1.72	-1.01
20,009.00	89.68	178.63	12,454.04	-7,837.86	35.03	7,837.90	1.52	-0.12	-1.51
20,103.00	88.42	178.92	12,455.60	-7,931.82	37.04	7,931.88	1.38	-1.34	0.31
20,198.00	88.14	178.52	12,458.45	-8,026.75	39.16	8,026.83	0.51	-0.29	-0.42
20,292.00	88.33	180.40	12,461.35	-8,120.70	40.05	8,120.78	2.01	0.20	2.00
20,386.00	85.67	177.20	12,466.27	-8,214.53	42.01	8,214.62	4.42	-2.83	-3.40
20,480.00	86.01	178.43	12,473.09	-8,308.21	45.59	8,308.32	1.35	0.36	1.31
20,574.00	88.81	179.21	12,477.33	-8,402.09	47.52	8,402.21	3.09	2.98	0.83

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Columbus Fed Com 21H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3350.00ft
Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3350.00ft
Well:	Columbus Fed Com 21H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Buid Rate (°/100usft)	Turn Rate (°/100usft)
20,668.00	88.45	176.99	12,479.58	-8,496.00	50.63	8,496.15	2.39	-0.38	-2.36
20,762.00	92.48	175.90	12,478.82	-8,589.80	56.46	8,589.98	4.44	4.29	-1.16
20,856.00	92.59	176.68	12,474.66	-8,683.51	62.54	8,683.73	0.84	0.12	0.83
20,952.00	91.89	176.74	12,470.91	-8,779.28	68.04	8,779.54	0.73	-0.73	0.06
21,046.00	92.76	178.49	12,467.09	-8,873.11	71.95	8,873.40	2.08	0.93	1.86
21,140.00	93.10	179.85	12,462.29	-8,966.98	73.31	8,967.27	1.49	0.36	1.45
21,234.00	90.10	180.66	12,459.66	-9,060.93	72.89	9,061.22	3.31	-3.19	0.86
21,328.00	90.85	181.36	12,458.89	-9,154.91	71.24	9,155.19	1.09	0.80	0.74
21,422.00	89.45	180.84	12,458.64	-9,248.89	69.43	9,249.15	1.59	-1.49	-0.55
21,516.00	90.52	181.40	12,458.66	-9,342.87	67.59	9,343.11	1.28	1.14	0.60
21,610.00	88.50	180.06	12,459.47	-9,436.85	66.40	9,437.09	2.58	-2.15	-1.43
21,704.00	90.52	181.88	12,460.27	-9,530.83	64.81	9,531.05	2.89	2.15	1.94
21,798.00	89.06	181.24	12,460.62	-9,624.79	62.25	9,624.99	1.70	-1.55	-0.68
21,892.00	90.57	182.09	12,460.92	-9,718.74	59.52	9,718.92	1.84	1.61	0.90
21,986.00	91.27	183.13	12,459.41	-9,812.63	55.24	9,812.77	1.33	0.74	1.11
22,080.00	89.87	181.03	12,458.48	-9,906.56	51.82	9,906.67	2.68	-1.49	-2.23
22,175.00	91.05	181.26	12,457.71	-10,001.53	49.93	10,001.63	1.27	1.24	0.24
22,190.86	91.23	181.33	12,457.40	-10,017.39	49.57	10,017.48	1.22	1.13	0.44
South 330' Crossing @ 22190.86'MD / 10017.47'VS									
22,264.00	92.06	181.65	12,455.30	-10,090.47	47.67	10,090.55	1.22	1.13	0.44
Final MWD Survey @ 22264'MD									
22,321.00	92.06	181.65	12,453.25	-10,147.41	46.03	10,147.48	0.00	0.00	0.00
Projection to TD @ 22321'MD									

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
11,710.00	11,708.61	30.70	4.85	First MWD Survey @ 11710'MD
12,146.47	12,109.73	-120.87	-12.43	North 330' Crossing @ 12146.47'MD / 120.78' VS
22,190.86	12,457.40	-10,017.39	49.57	South 330' Crossing @ 22190.86'MD / 10017.47'VS
22,264.00	12,455.30	-10,090.47	47.67	Final MWD Survey @ 22264'MD
22,321.00	12,453.25	-10,147.41	46.03	Projection to TD @ 22321'MD

Checked By: _____	Approved By: _____	Date: _____
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