



NM OIL CONSERVATION
ARTESIA DISTRICT

NOV 14 2016

RECEIVED

COG Operating LLC

Eddy County, NM (NAD-83 2015)

Puckett 13 Federal Com #27H

API #: 30-015-43872

SHL: 387' FSL, 1097' FEL, Sec 12, T17S, R31E, Unit P

PP: 330' FNL, 894' FEL, Sec 13, T17S, R31E, Unit A

BHL: 373' FSL, 978' FEL, Sec 13, T17S, R31E, Unit P

Design: BHL: 350' FSL, 970' FEL, Sec 13, T17S, R31E, Unit P

Standard Survey Report

09 September, 2016





TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Puckett 13 Federal Com #27H
Project:	Eddy County, NM (NAD-83 2015)	TVD Reference:	KB @ 3983.00usft (Silver Oak 3)
Site:	Puckett 13 Federal Com #27H	MD Reference:	KB @ 3983.00usft (Silver Oak 3)
Well:	SHL: 387' FSL, 1097' FEL, Sec 12, T17S, R31E, Unit P	North Reference:	Grid
Wellbore:	BHL: 350' FSL, 970' FEL, Sec 13, T17S, R31E, Unit P	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FSL, 970' FEL, Sec 13, T17S, R31E, Unit P	Database:	EDM 5000.1 Single User Db

Project	Eddy County, NM (NAD-83 2015)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Puckett 13 Federal Com #27H			
Site Position:		Northing:	670,803.50 usft	Latitude: 32° 50' 34.811 N
From:	Map	Easting:	699,583.10 usft	Longitude: 103° 49' 5.077 W
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence: 0.28 °

Well	SHL: 387' FSL, 1097' FEL, Sec 12, T17S, R31E, Unit P			
Well Position	+N/-S	0.00 usft	Northing:	670,803.50 usft
	+E/-W	0.00 usft	Easting:	699,583.10 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level: 3,965.00 usft

Wellbore	BHL: 350' FSL, 970' FEL, Sec 13, T17S, R31E, Unit P				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	8/23/2016	7.20	60.60	48,360

Design	BHL: 350' FSL, 970' FEL, Sec 13, T17S, R31E, Unit P			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	178.30

Survey Program	Date 9/9/2016	
From (usft)	To (usft)	Survey (Wellbore)
100.00	2,012.00	VES Gyro #1 (BHL: 350' FSL, 970' FEL, S
2,012.00	11,035.00	TDS MWD #2 (BHL: 350' FSL, 970' FEL, S
		Tool Name
		VES-ISCWSA-GYRO-3
		MWD
		Description
		Biaxial Semi-Cont. Gyro
		MWD - Standard

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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.43	279.53	100.00	0.06	-0.37	-0.07	0.43	0.43	0.00
200.00	0.55	206.50	200.00	-0.31	-0.95	0.28	0.59	0.12	-73.03
300.00	0.32	224.00	299.99	-0.94	-1.36	0.89	0.26	-0.23	17.50
400.00	0.42	218.22	399.99	-1.42	-1.78	1.37	0.11	0.10	-5.78
500.00	0.50	238.54	499.99	-1.94	-2.38	1.87	0.18	0.08	20.32
600.00	0.34	202.17	599.99	-2.44	-2.87	2.36	0.30	-0.16	-36.37



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Project:	Eddy County, NM (NAD-83 2015)	TVD Reference:	KB @ 3983.00usft (Silver Oak 3)
Site:	Puckett 13 Federal Com #27H	MD Reference:	KB @ 3983.00usft (Silver Oak 3)
Well:	SHL: 387' FSL, 1097' FEL, Sec 12, T17S, R31E, Unit P	North Reference:	Grid
Wellbore:	BHL: 350' FSL, 970' FEL, Sec 13, T17S, R31E, Unit P	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FSL, 970' FEL, Sec 13, T17S, R31E, Unit P	Database:	EDM 5000.1 Single User Db

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)
700.00	0.28	207.31	699.98	-2.93	-3.09	2.84	0.07	-0.06	5.14
800.00	0.37	214.06	799.98	-3.42	-3.38	3.32	0.10	0.09	6.75
900.00	0.26	331.76	899.98	-3.49	-3.67	3.38	0.54	-0.11	117.70
1,000.00	0.33	13.68	999.98	-3.01	-3.71	2.90	0.22	0.07	41.92
1,100.00	0.34	23.84	1,099.98	-2.46	-3.52	2.35	0.06	0.01	10.16
1,200.00	0.17	339.21	1,199.98	-2.05	-3.46	1.94	0.25	-0.17	-44.63
1,300.00	0.11	86.01	1,299.98	-1.90	-3.41	1.80	0.23	-0.06	106.80
1,400.00	0.32	62.63	1,399.98	-1.77	-3.07	1.67	0.22	0.21	-23.38
1,500.00	0.79	46.99	1,499.97	-1.17	-2.32	1.10	0.49	0.47	-15.64
1,600.00	0.76	40.48	1,599.96	-0.19	-1.38	0.15	0.09	-0.03	-6.51
1,700.00	0.83	89.35	1,699.95	0.32	-0.23	-0.33	0.66	0.07	48.87
1,800.00	0.94	78.37	1,799.94	0.49	1.30	-0.46	0.20	0.11	-10.98
1,900.00	1.38	70.66	1,899.92	1.06	3.24	-0.96	0.47	0.44	-7.71
2,000.00	1.23	75.40	1,999.90	1.73	5.42	-1.57	0.18	-0.15	4.74
2,012.00	1.21	73.58	2,011.89	1.80	5.66	-1.63	0.36	-0.17	-15.17
TIE-IN to VES Gyro									
2,140.00	0.50	81.50	2,139.88	2.26	7.51	-2.04	0.56	-0.55	6.19
First TDS MWD Survey									
2,233.00	1.50	94.10	2,232.86	2.23	9.13	-1.96	1.09	1.08	13.55
2,326.00	1.50	95.30	2,325.83	2.03	11.55	-1.69	0.03	0.00	1.29
2,420.00	1.50	105.70	2,419.80	1.59	13.96	-1.17	0.29	0.00	11.06
2,513.00	1.50	66.20	2,512.77	1.75	16.25	-1.27	1.09	0.00	-42.47
2,606.00	1.60	69.20	2,605.74	2.70	18.57	-2.15	0.14	0.11	3.23
2,700.00	1.20	70.30	2,699.71	3.50	20.73	-2.88	0.43	-0.43	1.17
2,793.00	1.60	88.30	2,792.68	3.87	22.94	-3.18	0.63	0.43	19.35
2,886.00	1.60	102.70	2,885.64	3.62	25.51	-2.86	0.43	0.00	15.48
2,980.00	2.20	90.90	2,979.59	3.30	28.59	-2.45	0.76	0.64	-12.55
3,073.00	2.00	99.80	3,072.53	3.00	31.97	-2.05	0.41	-0.22	9.57
3,166.00	1.80	110.90	3,165.48	2.20	34.94	-1.16	0.45	-0.22	11.94
3,259.00	1.80	117.00	3,258.43	1.02	37.60	0.10	0.21	0.00	6.56
3,353.00	2.00	92.00	3,352.38	0.29	40.56	0.91	0.90	0.21	-26.60
3,446.00	1.80	98.90	3,445.33	0.01	43.62	1.29	0.33	-0.22	7.42
3,539.00	1.80	99.20	3,538.29	-0.45	46.51	1.83	0.01	0.00	0.32
3,632.00	1.70	104.80	3,631.24	-1.04	49.28	2.50	0.21	-0.11	6.02
3,726.00	2.40	81.40	3,725.18	-1.10	52.58	2.66	1.15	0.74	-24.89
3,819.00	2.70	79.70	3,818.09	-0.42	56.66	2.10	0.33	0.32	-1.83
3,912.00	2.40	74.70	3,911.00	0.49	60.69	1.31	0.40	-0.32	-5.38
4,006.00	2.30	80.30	4,004.92	1.32	64.45	0.59	0.27	-0.11	5.96
4,099.00	2.30	81.50	4,097.85	1.92	68.14	0.11	0.05	0.00	1.29
4,192.00	2.50	86.30	4,190.76	2.32	72.00	-0.18	0.30	0.22	5.16
4,286.00	2.60	89.60	4,284.67	2.47	76.18	-0.21	0.19	0.11	3.51
4,379.00	2.70	87.80	4,377.57	2.57	80.48	-0.18	0.14	0.11	-1.94



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Survey Report



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Well:	SHL: 387' FSL, 1097' FEL, Sec 12, T17S, R31E, Unit P	North Reference:	Grid
Wellbore:	BHL: 350' FSL, 970' FEL, Sec 13, T17S, R31E, Unit P	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FSL, 970' FEL, Sec 13, T17S, R31E, Unit P	Database:	EDM 5000.1 Single User Db

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)
4,473.00	1.70	94.30	4,471.50	2.55	84.08	-0.05	1.09	-1.06	6.91
4,568.00	1.50	88.40	4,566.46	2.48	86.73	0.10	0.27	-0.21	-6.21
4,662.00	1.50	94.50	4,660.43	2.42	89.19	0.23	0.17	0.00	6.49
4,755.00	1.50	98.00	4,753.40	2.15	91.61	0.57	0.10	0.00	3.76
4,848.00	1.50	92.80	4,846.37	1.92	94.03	0.87	0.15	0.00	-5.59
4,942.00	1.50	96.60	4,940.34	1.72	96.48	1.14	0.11	0.00	4.04
5,035.00	1.40	105.90	5,033.31	1.27	98.78	1.66	0.27	-0.11	10.00
5,128.00	1.40	105.60	5,126.28	0.65	100.97	2.34	0.01	0.00	-0.32
5,221.00	1.60	106.00	5,219.25	-0.01	103.31	3.08	0.22	0.22	0.43
5,315.00	1.50	109.10	5,313.21	-0.78	105.73	3.91	0.14	-0.11	3.30
5,346.00	1.40	112.80	5,344.20	-1.06	106.47	4.21	0.44	-0.32	11.94
5,377.00	1.90	154.70	5,375.19	-1.67	107.04	4.84	4.09	1.61	135.16
5,409.00	3.90	175.80	5,407.15	-3.23	107.34	6.41	6.98	6.25	65.94
5,440.00	6.90	175.10	5,438.01	-6.14	107.58	9.33	9.68	9.68	-2.26
5,471.00	9.90	170.60	5,468.67	-10.62	108.17	13.83	9.90	9.68	-14.52
5,503.00	13.20	170.50	5,500.02	-16.94	109.23	20.18	10.31	10.31	-0.31
5,534.00	17.00	170.30	5,529.94	-24.90	110.57	28.17	12.26	12.26	-0.65
5,565.00	20.20	171.20	5,559.32	-34.66	112.16	37.98	10.36	10.32	2.90
5,597.00	23.80	170.70	5,588.99	-46.50	114.05	49.86	11.27	11.25	-1.56
5,627.00	27.50	171.40	5,616.02	-59.33	116.06	62.74	12.37	12.33	2.33
5,659.00	31.60	170.40	5,643.86	-74.90	118.56	78.39	12.90	12.81	-3.13
5,690.00	35.60	170.20	5,669.67	-91.81	121.46	95.37	12.91	12.90	-0.65
5,721.00	38.90	170.50	5,694.34	-110.31	124.60	113.95	10.66	10.65	0.97
5,752.00	41.50	170.70	5,718.02	-130.04	127.87	133.78	8.40	8.39	0.65
5,783.00	43.60	170.90	5,740.86	-150.74	131.22	154.56	6.79	6.77	0.65
5,815.00	44.60	170.50	5,763.84	-172.71	134.82	176.64	3.24	3.13	-1.25
5,846.00	44.90	170.30	5,785.85	-194.23	138.46	198.25	1.07	0.97	-0.65
5,877.00	45.20	170.00	5,807.75	-215.85	142.21	219.97	1.19	0.97	-0.97
5,908.00	45.40	170.40	5,829.56	-237.56	145.96	241.79	1.12	0.65	1.29
5,939.00	45.80	170.10	5,851.25	-259.39	149.71	263.72	1.46	1.29	-0.97
5,970.00	46.20	170.00	5,872.78	-281.35	153.56	285.79	1.31	1.29	-0.32
6,001.00	47.50	169.80	5,893.98	-303.62	157.53	308.16	4.22	4.19	-0.65
6,032.00	50.70	169.80	5,914.28	-326.68	161.68	331.33	10.32	10.32	0.00
6,064.00	54.50	170.40	5,933.71	-351.72	166.05	356.49	11.97	11.88	1.88
6,095.00	58.10	171.70	5,950.91	-377.19	170.05	382.07	12.13	11.61	4.19
6,126.00	61.10	173.00	5,966.59	-403.69	173.60	408.66	10.33	9.68	4.19
6,157.00	63.50	173.70	5,981.00	-430.95	176.78	436.00	8.00	7.74	2.26
6,188.00	66.00	173.70	5,994.23	-458.81	179.86	463.95	8.06	8.06	0.00
6,219.00	69.40	173.90	6,005.99	-487.32	182.95	492.53	10.98	10.97	0.65
6,251.00	72.60	173.10	6,016.40	-517.38	186.38	522.68	10.28	10.00	-2.50
6,282.00	74.10	173.00	6,025.29	-546.86	189.97	552.26	4.85	4.84	-0.32
6,313.00	76.30	174.20	6,033.20	-576.64	193.31	582.12	8.02	7.10	3.87



TDS
Survey Report



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Survey									
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6,345.00	79.60	175.00	6,039.88	-607.79	196.26	613.35	10.60	10.31	2.50
6,375.00	83.10	176.00	6,044.40	-637.36	198.58	642.97	12.12	11.67	3.33
6,407.00	86.80	174.90	6,047.21	-669.13	201.11	674.80	12.06	11.56	-3.44
6,438.00	89.10	172.30	6,048.32	-699.91	204.56	705.67	11.19	7.42	-8.39
6,453.44	89.35	172.13	6,048.53	-715.20	206.66	721.02	1.94	1.61	-1.08
As-Drilled PP									
6,531.00	90.60	171.30	6,048.56	-791.95	217.83	798.07	1.94	1.61	-1.08
6,624.00	90.30	173.10	6,047.83	-884.09	230.45	890.53	1.96	-0.32	1.94
6,690.00	90.90	176.60	6,047.14	-949.81	236.37	956.40	5.38	0.91	5.30
6,783.00	91.90	180.70	6,044.87	-1,042.73	238.56	1,049.35	4.54	1.08	4.41
6,876.00	91.50	182.70	6,042.11	-1,135.64	235.81	1,142.14	2.19	-0.43	2.15
6,970.00	88.90	183.50	6,041.78	-1,229.50	230.72	1,235.80	2.89	-2.77	0.85
7,063.00	88.80	181.80	6,043.65	-1,322.38	226.42	1,328.51	1.83	-0.11	-1.83
7,156.00	88.50	182.30	6,045.84	-1,415.29	223.10	1,421.29	0.63	-0.32	0.54
7,250.00	88.80	180.60	6,048.05	-1,509.23	220.72	1,515.11	1.84	0.32	-1.81
7,343.00	88.30	181.20	6,050.41	-1,602.19	219.26	1,607.99	0.84	-0.54	0.65
7,437.00	90.20	181.60	6,051.64	-1,696.15	216.96	1,701.84	2.07	2.02	0.43
7,530.00	89.90	182.00	6,051.56	-1,789.10	214.04	1,794.66	0.54	-0.32	0.43
7,623.00	89.60	182.30	6,051.96	-1,882.04	210.55	1,887.45	0.46	-0.32	0.32
7,717.00	89.00	180.00	6,053.11	-1,976.00	208.67	1,981.32	2.53	-0.64	-2.45
7,810.00	88.70	180.10	6,054.98	-2,068.98	208.59	2,074.26	0.34	-0.32	0.11
7,904.00	90.70	179.90	6,055.47	-2,162.98	208.59	2,168.21	2.14	2.13	-0.21
7,998.00	90.50	180.10	6,054.49	-2,256.97	208.59	2,262.17	0.30	-0.21	0.21
8,091.00	90.00	180.10	6,054.08	-2,349.97	208.42	2,355.12	0.54	-0.54	0.00
8,185.00	89.50	180.20	6,054.49	-2,443.97	208.18	2,449.07	0.54	-0.53	0.11
8,278.00	90.90	180.40	6,054.17	-2,536.97	207.69	2,542.01	1.52	1.51	0.22
8,371.00	91.00	180.70	6,052.62	-2,629.95	206.80	2,634.93	0.34	0.11	0.32
8,465.00	90.90	180.90	6,051.07	-2,723.93	205.49	2,728.82	0.24	-0.11	0.21
8,558.00	90.50	181.10	6,049.93	-2,816.90	203.86	2,821.71	0.48	-0.43	0.22
8,651.00	90.30	181.50	6,049.28	-2,909.88	201.75	2,914.58	0.48	-0.22	0.43
8,745.00	90.20	182.10	6,048.87	-3,003.83	198.80	3,008.41	0.65	-0.11	0.64
8,839.00	89.90	182.50	6,048.79	-3,097.75	195.03	3,102.18	0.53	-0.32	0.43
8,932.00	89.80	183.10	6,049.03	-3,190.64	190.48	3,194.89	0.65	-0.11	0.65
9,026.00	89.50	180.90	6,049.61	-3,284.58	187.20	3,288.69	2.36	-0.32	-2.34
9,119.00	89.50	181.50	6,050.42	-3,377.55	185.26	3,381.56	0.65	0.00	0.65
9,213.00	89.20	181.90	6,051.48	-3,471.51	182.47	3,475.39	0.53	-0.32	0.43
9,306.00	90.10	179.40	6,052.05	-3,564.49	181.41	3,568.30	2.86	0.97	-2.69
9,400.00	89.80	179.90	6,052.13	-3,658.49	181.99	3,662.28	0.62	-0.32	0.53
9,494.00	89.40	180.20	6,052.79	-3,752.48	181.91	3,756.23	0.53	-0.43	0.32
9,587.00	90.60	180.20	6,052.79	-3,845.48	181.58	3,849.18	1.29	1.29	0.00
9,681.00	90.50	180.20	6,051.89	-3,939.48	181.25	3,943.12	0.11	-0.11	0.00
9,774.00	90.20	180.60	6,051.32	-4,032.47	180.60	4,036.06	0.54	-0.32	0.43



TDS
Survey Report



Company: COG Operating LLC
Project: Eddy County, NM (NAD-83 2015)
Site: Puckett 13 Federal Com #27H
Well: SHL: 387' FSL, 1097' FEL, Sec 12, T17S, R31E, Unit P
Wellbore: BHL: 350' FSL, 970' FEL, Sec 13, T17S, R31E, Unit P
Design: BHL: 350' FSL, 970' FEL, Sec 13, T17S, R31E, Unit P
Local Co-ordinate Reference: Site Puckett 13 Federal Com #27H
TVD Reference: KB @ 3983.00usft (Silver Oak 3)
MD Reference: KB @ 3983.00usft (Silver Oak 3)
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)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,867.00	89.80	181.20	6,051.32	-4,125.46	179.14	4,128.96	0.78	-0.43	0.65
9,960.00	89.60	181.80	6,051.81	-4,218.43	176.71	4,221.81	0.68	-0.22	0.65
10,053.00	89.40	182.50	6,052.62	-4,311.36	173.22	4,314.60	0.78	-0.22	0.75
10,146.00	91.00	181.80	6,052.29	-4,404.29	169.73	4,407.39	1.88	1.72	-0.75
10,240.00	90.90	182.10	6,050.73	-4,498.22	166.53	4,501.18	0.34	-0.11	0.32
10,333.00	90.80	179.60	6,049.35	-4,591.19	165.15	4,594.07	2.69	-0.11	-2.69
10,428.00	90.70	180.00	6,048.11	-4,686.18	165.49	4,689.03	0.43	-0.11	0.42
10,521.00	90.70	180.40	6,046.98	-4,779.18	165.16	4,781.97	0.43	0.00	0.43
10,616.00	90.70	181.60	6,045.81	-4,874.15	163.50	4,876.86	1.26	0.00	1.26
10,709.00	90.80	182.30	6,044.60	-4,967.09	160.34	4,969.66	0.76	0.11	0.75
10,803.00	89.10	181.60	6,044.68	-5,061.03	157.14	5,063.47	1.96	-1.81	-0.74
10,896.00	89.00	181.70	6,046.22	-5,153.98	154.46	5,156.29	0.15	-0.11	0.11
10,981.00	88.80	182.20	6,047.85	-5,238.92	151.57	5,241.11	0.63	-0.24	0.59
Last TDS MWD Survey									
11,035.00	88.80	182.20	6,048.98	-5,292.86	149.50	5,294.97	0.00	0.00	0.00
Projection to Bit/TD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,012.00	2,011.89	1.80	5.66	TIE-IN to VES Gyro
2,140.00	2,139.88	2.26	7.51	First TDS MWD Survey
6,453.44	6,048.53	-715.20	206.66	As-Drilled PP
10,981.00	6,047.85	-5,238.92	151.57	Last TDS MWD Survey
11,035.00	6,048.98	-5,292.86	149.50	Projection to Bit/TD

Checked By:

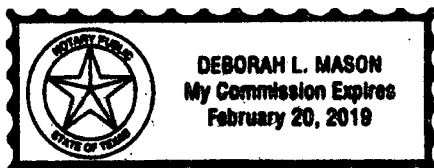
Deborah Mason

Approved By:

Paul Lth

Date:

11/2/2016





11/2/16

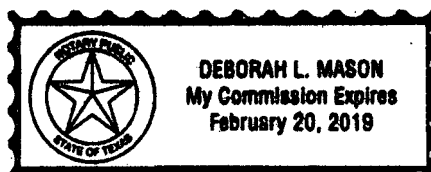
State of New Mexico
County of Eddy

I, Donald D. Mason, certify that: I am employed by Terra Directional Services LLC; that I did on the day(s) of 09/01/2016 through 09/08/2016 conduct or supervise the taking of a MWD survey from a depth of 2012 feet to a depth of 11035 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Terra Directional Services LLC; that I am authorized and qualified to make this report; that this survey was conducted at the request of COG Operating LLC for the Puckett 13 Fed Com #27H Well API 30-015-43872 in Eddy County, New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by Terra Directional Services LLC.

Donald D. Mason
President

State of Texas
County of Burnet

Before me, a notary public, on this day personally appeared Donald D. Mason, known to me to be the person whose name is subscribed to the foregoing document and, being by me first duly sworn, declared that the statements therein contained are true and correct.


Notary Public's Signature



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

NM OIL CONSERVATION
ARTESIA DISTRICT

NOV 14 2016

RECEIVED

September 12, 2016

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

RE: Puckett 13 Fed Com 27H
387' FSL & 1097' FEL
Sec. 12, T17S, R31E
Eddy County, New Mexico

Dear Sir,

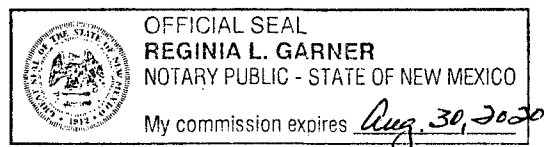
The attached is the Deviation Survey for the above captioned well.

Very truly yours,

Chris Graham
Drilling Superintendent

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 12th day of September, 2016.

Notary Public

Puckett 13 Fed Com 27H

Date	Depth	Deviation	Direction
8/28/2016	87	0.30	
8/29/2016	354	0.60	
8/29/2016	619	0.20	
8/30/2016	990	3.10	
8/30/2016	1083	3.00	
8/30/2016	1240	3.00	
8/31/2016	1458	0.50	
8/31/2016	1706	0.80	
8/31/2016	1990	0.40	
9/1/2016	2140	5.00	81.50
9/1/2016	2233	1.50	94.10
9/1/2016	2326	1.50	95.30
9/1/2016	2513	1.50	66.20
9/2/2016	2606	1.60	69.20
9/2/2016	2700	1.20	70.30
9/2/2016	2793	1.60	88.30
9/2/2016	2886	1.60	102.70
9/2/2016	2980	2.20	90.90
9/2/2016	3073	2.00	99.80
9/2/2016	3259	1.80	117.00
9/2/2016	3353	2.00	92.00
9/2/2016	3446	1.80	98.90
9/2/2016	3539	1.80	99.20
9/2/2016	3632	1.70	64.80
9/2/2016	3819	2.70	79.70
9/2/2016	3912	2.40	74.70
9/2/2016	4006	2.30	80.30
9/2/2016	4099	2.30	81.50
9/2/2016	4192	2.50	86.30
9/3/2016	4379	2.70	87.80
9/3/2016	4473	1.70	94.30
9/3/2016	4568	1.50	88.40
9/3/2016	4662	1.50	94.50
9/3/2016	4755	1.50	98.00
9/3/2016	4848	1.50	92.80
9/3/2016	5085	1.40	105.90
9/3/2016	5125	1.40	105.60
9/3/2016	5221	1.60	106.00
9/3/2016	5315	1.50	109.10
9/3/2016	5346	0.40	112.80
9/3/2016	5377	1.70	154.70
9/3/2016	5409	3.90	175.80

Date	Depth	Deviation	Direction
9/3/2016	5471	9.90	170.60
9/3/2016	5503	13.20	170.50
9/3/2016	5534	17.00	170.30
9/3/2016	5659	31.60	170.40
9/3/2016	5690	35.60	170.20
9/3/2016	5721	38.90	170.50
9/4/2016	5783	43.60	170.90
9/4/2016	5815	44.60	170.50
9/4/2016	5908	45.40	170.40
9/4/2016	5939	45.80	170.10
9/4/2016	6032	50.70	169.80
9/4/2016	6050	47.50	169.80
9/4/2016	6064	54.50	170.40
9/4/2016	6095	58.10	171.70
9/4/2016	6126	61.10	179.00
9/4/2016	6157	63.50	173.70
9/4/2016	6188	66.00	173.70
9/4/2016	6375	83.10	176.00
9/4/2016	6407	86.80	174.90
9/4/2016	6438	89.10	171.50
9/5/2016	6531	90.60	171.30
9/5/2016	6690	90.90	176.60
9/5/2016	6783	91.90	180.70
9/5/2016	6876	91.50	182.70
9/5/2016	6970	88.90	183.50
9/5/2016	7063	88.80	181.80
9/6/2016	7156	88.50	182.30
9/6/2016	7250	88.80	180.60
9/6/2016	7343	88.30	181.20
9/6/2016	7437	90.20	181.60
9/6/2016	7530	89.90	182.00
9/6/2016	7623	89.60	82.30
9/6/2016	7717	89.00	180.00
9/6/2016	7810	88.70	180.10
9/6/2016	7904	90.70	179.90
9/6/2016	7998	90.50	180.10
9/6/2016	8091	90.00	180.10
9/6/2016	8185	89.50	180.20
9/6/2016	8278	90.90	180.40
9/7/2016	8371	91.00	180.70
9/7/2016	8465	90.90	180.90
9/7/2016	8558	90.50	181.00
9/7/2016	8651	90.30	181.50
9/7/2016	8839	89.90	182.50
9/7/2016	8932	89.80	183.10

Date	Depth	Deviation	Direction
9/7/2016	9026	89.50	180.90
9/7/2016	9113	89.50	181.50
9/7/2016	9306	90.10	179.40
9/7/2016	9400	89.80	179.90
9/7/2016	9494	89.40	180.20
9/7/2016	9587	90.60	180.20
9/8/2016	9681	90.50	180.20
9/8/2016	9774	90.20	180.60
9/8/2016	9867	89.80	181.20
9/8/2016	9960	89.60	181.80
9/8/2016	10148	91.00	181.80
9/8/2016	10240	90.90	182.10
9/8/2016	10333	90.80	179.60
9/8/2016	10428	90.70	180.00
9/8/2016	10521	90.70	180.40
9/8/2016	10616	90.70	181.60
9/8/2016	10709	90.80	182.30
9/8/2016	10803	89.10	181.60
9/9/2016	10981	88.80	182.20

September 7, 2016

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

Attn: Kanicia Castillo

RE: **Puckett 13 Federal Com No. 027H**

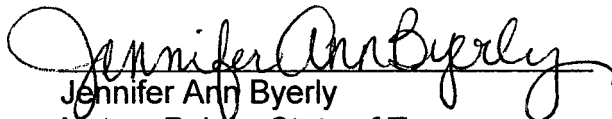
Please find enclosed a copy of the survey from 0' to 2012' ran on the above referenced well.

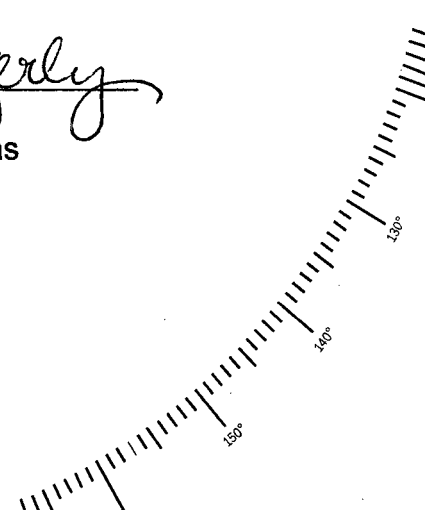
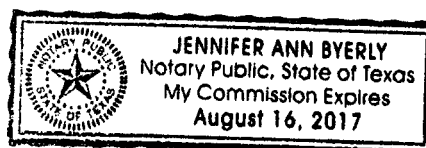
Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

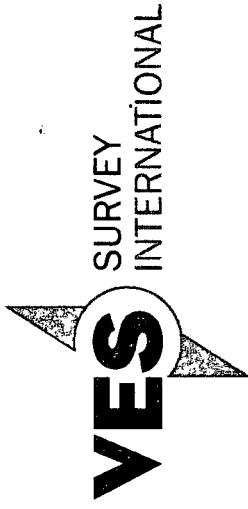
This instrument was acknowledged before me on the 7th day of
September, A.D., 2016, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas





Company: COG OPERATING
Lease/Well: PUCKETT 13 FEDERAL COM No./027H



Rig Name: SILVER OAK 3
State/County: NEW MEXICO/EDDY
VS-Azi: 178.30 Degrees
Latitude: 32.84300, Longitude: -103.81808
Grid North = True North -0.28 degs (NAD 27)
Grid Correction Applied = -0.28 degs

Depth Reference : RKB=18 FEET

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: e-line gyro -de_01.ut
Minimum Curvature Method
Report Date/Time: 9/7/2016 / 15:13

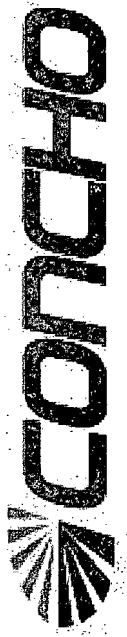
VES Survey International
Midland, Texas
432-563-5444

Surveyor: Michael Cook

Puckett 13 Federal Com No. 027H / API 30-015-43872

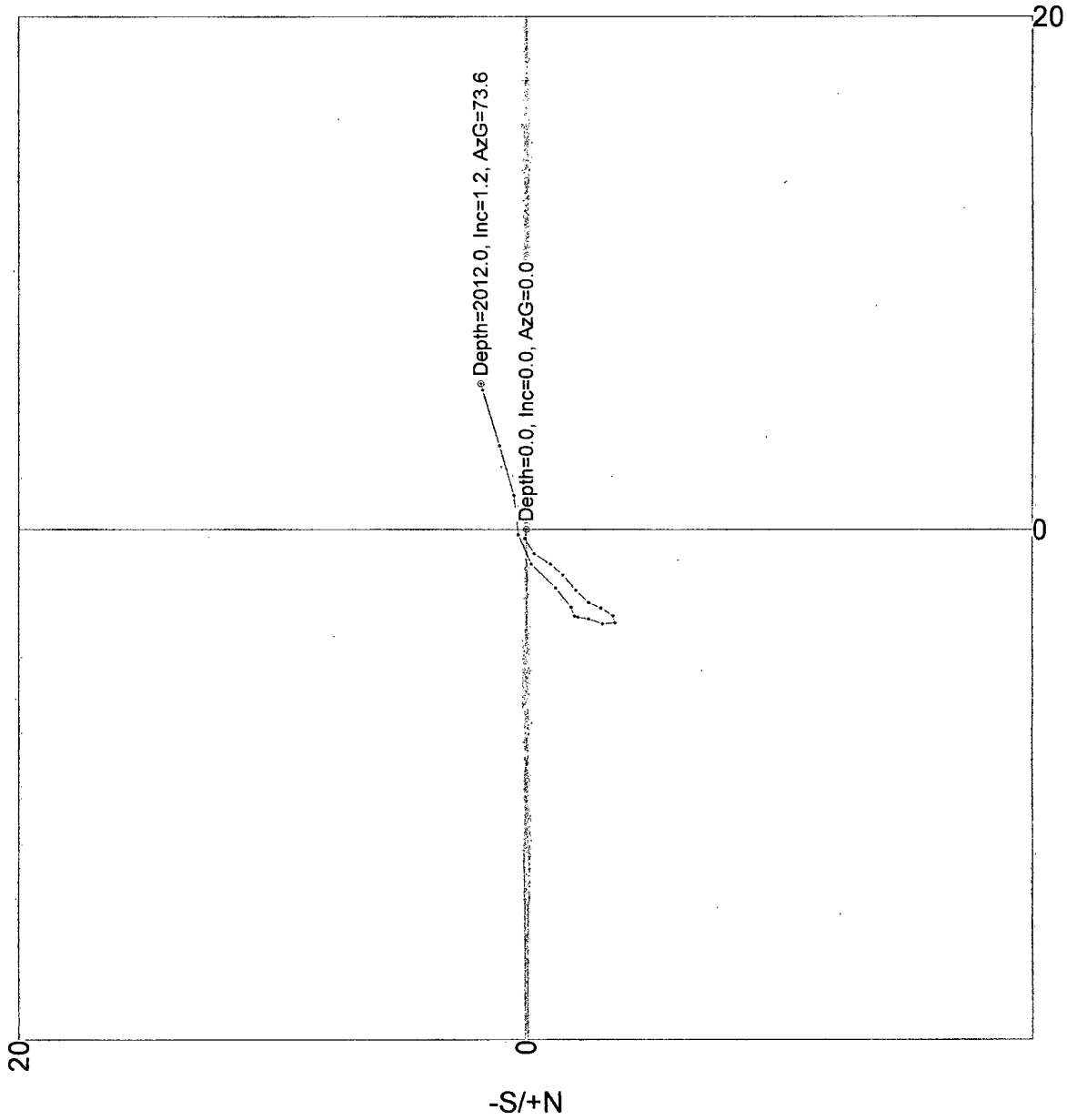
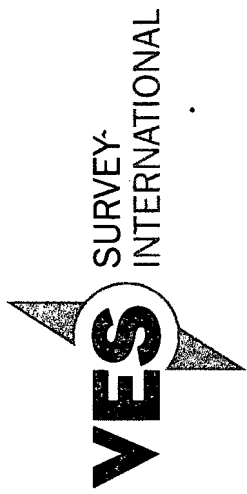
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.43	279.53	100.00	0.06	-0.37	-0.07	0.37	279.53	0.43
200.00	0.55	206.50	200.00	-0.31	-0.95	0.28	1.00	251.95	0.59
300.00	0.32	224.00	299.99	-0.94	-1.36	0.90	1.66	235.23	0.26
400.00	0.42	218.22	399.99	-1.43	-1.78	1.38	2.29	231.17	0.10
500.00	0.50	238.54	499.99	-1.95	-2.38	1.88	3.07	230.68	0.18
600.00	0.34	202.17	599.99	-2.45	-2.86	2.36	3.76	229.43	0.30
700.00	0.28	207.31	699.98	-2.94	-3.08	2.84	4.26	226.37	0.07
800.00	0.37	214.06	799.98	-3.42	-3.37	3.31	4.80	224.62	0.10
900.00	0.26	331.76	899.98	-3.48	-3.66	3.37	5.05	226.38	0.54
1000.00	0.33	13.68	999.98	-3.00	-3.69	2.89	4.76	230.87	0.22
1100.00	0.34	23.84	1099.98	-2.45	-3.50	2.34	4.27	235.05	0.06
1200.00	0.17	339.21	1199.98	-2.04	-3.43	1.93	3.99	239.34	0.25
1300.00	0.11	86.01	1299.98	-1.89	-3.39	1.79	3.88	240.84	0.23
1400.00	0.32	62.63	1399.98	-1.76	-3.05	1.67	3.52	240.02	0.22
1500.00	0.79	46.99	1499.97	-1.16	-2.30	1.09	2.57	243.21	0.49
1600.00	0.76	40.48	1599.96	-0.19	-1.36	0.15	1.38	262.20	0.09

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	0.83	89.35	1699.95	0.32	-0.21	-0.33	0.38	327.05	0.66
1800.00	0.94	78.37	1799.94	0.50	1.32	-0.46	1.41	69.37	0.20
1900.00	1.38	70.66	1899.92	1.06	3.26	-0.96	3.43	71.97	0.47
2000.00	1.23	75.40	1999.90	1.73	5.43	-1.57	5.70	72.33	0.19
2012.00	1.21	73.58	2011.89	1.80	5.68	-1.63	5.96	72.43	0.36



VES Survey International
Midland, Texas
432-563-5444

Surveyor: Michael Cook
Puckett 13 Federal Com No. 027H / API 30-015-43872



-W/+E
V.E.S. Survey Date: 8/31/2016



I Michael Cook certify that I am employed by VES Survey International. That I did on the day(s) of 08/31/16 through 08/31/16 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 2,012.00 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 Puckett 13 Federal Com Well # 27H API # 30-015-43872 in Eddy 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 cursive script, appearing to read "M Cook", is written over a horizontal line.

Michael Cook
Service Technician
VES Survey International