

COG OPERATING, LLC

Lea County, NM (NAD83) NMEZ

Branex-COG Federal COM 25H

#25H

**PP: 2,290' FSL, 330' FWL, Sec 9, T-17S, R-32E, Unit L
OH**

HOBBS OCD

JUN 04 2018

RECEIVED

Design: OH

Standard Survey Report

14 December, 2017

Survey Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well #25H
Project:	Lea County, NM (NAD83) NMEZ	TVD Reference:	RKB @ 4086.00usft (Silver Oak3 KB=18')
Site:	Branex-COG Federal COM 25H	MD Reference:	RKB @ 4086.00usft (Silver Oak3 KB=18')
Well:	#25H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.14 Single User Db

Project	Lea County, NM (NAD83) NMEZ		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Branex-COG Federal COM 25H				
Site Position:		Northing:	672,539.20 usft	Latitude:	32° 50' 51.395 N
From:	Map	Easting:	711,365.60 usft	Longitude:	103° 46' 46.863 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.30 °

Well	#25H, SHL: 2,075' FSL, 115' FWL, Sec 9, T-17S, R-32E, Unit L				
Well Position	+N/-S	0.00 usft	Northing:	672,539.20 usft	Latitude: 32° 50' 51.395 N
	+E/-W	0.00 usft	Easting:	711,365.60 usft	Longitude: 103° 46' 46.863 W
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft	Ground Level:	4,068.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	11/18/17	7.05	60.59	48,237.15082853

Design	OH				
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	87.11	

Survey Program	Date 12/14/17				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	2,148.00	Survey #1 - Gyros (OH)	GYD_DP_MS	Gyrodata gyro-compassing and drop	
2,281.00	10,804.00	Survey #2 - VON MWD (OH)	MWD	MWD v3: standard declination	
10,862.00	10,862.00	Survey #3 - PTB (OH)	Projection	Projection	

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	
SHL(BCFC#25H)										
100.00	0.26	271.84	100.00	0.01	-0.23	-0.23	0.26	0.26	0.00	
200.00	0.25	259.77	200.00	-0.02	-0.67	-0.67	0.05	-0.01	-12.07	
263.53	0.40	263.97	263.53	-0.07	-1.03	-1.03	0.24	0.24	6.61	
O-Branex #15H										
300.00	0.49	265.20	300.00	-0.10	-1.31	-1.31	0.24	0.24	3.37	
400.00	0.38	248.80	399.99	-0.25	-2.04	-2.05	0.17	-0.11	-16.40	

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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.14 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)
500.00	0.65	239.19	499.99	-0.66	-2.84	-2.87	0.28	0.27	-9.61
600.00	0.66	245.34	599.98	-1.20	-3.85	-3.91	0.07	0.01	6.15
700.00	0.35	340.33	699.98	-1.15	-4.48	-4.53	0.77	-0.31	94.99
800.00	0.54	238.17	799.98	-1.11	-4.98	-5.03	0.70	0.19	-102.16
900.00	0.59	250.74	899.97	-1.53	-5.87	-5.94	0.13	0.05	12.57
1,000.00	0.79	253.69	999.97	-1.89	-7.01	-7.10	0.20	0.20	2.95
1,100.00	0.69	275.81	1,099.96	-2.02	-8.28	-8.37	0.30	-0.10	22.12
1,200.00	0.57	262.66	1,199.95	-2.03	-9.37	-9.46	0.19	-0.12	-13.15
1,300.00	0.79	274.92	1,299.95	-2.03	-10.55	-10.64	0.26	0.22	12.26
1,400.00	0.83	290.32	1,399.94	-1.72	-11.91	-11.99	0.22	0.04	15.40
1,500.00	0.78	327.98	1,499.93	-0.89	-12.95	-12.98	0.52	-0.05	37.66
1,600.00	0.75	336.12	1,599.92	0.28	-13.58	-13.55	0.11	-0.03	8.14
1,700.00	0.95	341.52	1,699.91	1.67	-14.11	-14.01	0.22	0.20	5.40
1,800.00	1.19	355.46	1,799.89	3.49	-14.45	-14.26	0.35	0.24	13.94
1,900.00	1.54	17.89	1,899.86	5.80	-14.12	-13.81	0.63	0.35	22.43
2,000.00	1.85	23.39	1,999.82	8.56	-13.07	-12.62	0.35	0.31	5.50
2,100.00	1.93	30.07	2,099.76	11.50	-11.58	-10.99	0.23	0.08	6.68
2,148.00	1.86	32.57	2,147.74	12.86	-10.76	-10.10	0.23	-0.15	5.21
2,281.00	2.04	36.46	2,280.66	16.58	-8.19	-7.34	0.17	0.14	2.92
2,344.00	2.22	33.56	2,343.62	18.50	-6.85	-5.91	0.33	0.29	-4.60
2,375.00	2.31	22.19	2,374.59	19.58	-6.28	-5.29	1.48	0.29	-36.68
2,405.00	2.82	19.69	2,404.56	20.83	-5.81	-4.75	1.74	1.70	-8.33
2,437.00	2.95	2.25	2,436.52	22.40	-5.51	-4.37	2.76	0.41	-54.50
2,468.00	3.22	358.25	2,467.48	24.07	-5.50	-4.28	1.11	0.87	-12.90
2,500.00	3.40	355.22	2,499.42	25.91	-5.61	-4.30	0.78	0.56	-9.47
2,531.00	3.56	352.72	2,530.37	27.78	-5.81	-4.40	0.71	0.52	-8.06
2,625.00	4.24	331.01	2,624.15	33.71	-7.86	-6.15	1.72	0.72	-23.10
2,720.00	4.35	330.12	2,718.89	39.91	-11.36	-9.33	0.14	0.12	-0.94
2,815.00	4.44	329.38	2,813.61	46.20	-15.03	-12.68	0.11	0.09	-0.78
2,909.00	4.60	327.59	2,907.31	52.51	-18.90	-16.23	0.23	0.17	-1.90
3,004.00	3.58	335.55	3,002.07	58.43	-22.17	-19.20	1.23	-1.07	8.38
3,099.00	3.37	334.34	3,096.90	63.65	-24.61	-21.37	0.23	-0.22	-1.27
3,197.00	3.53	335.44	3,194.72	68.99	-27.11	-23.60	0.18	0.16	1.12
3,291.00	3.34	334.24	3,288.55	74.08	-29.50	-25.73	0.22	-0.20	-1.28
3,386.00	4.14	333.15	3,383.35	79.64	-32.25	-28.20	0.85	0.84	-1.15
3,481.00	4.23	331.45	3,478.09	85.77	-35.48	-31.11	0.16	0.09	-1.79
3,576.00	4.28	332.78	3,572.83	92.00	-38.77	-34.08	0.12	0.05	1.40
3,672.00	4.29	330.37	3,668.56	98.31	-42.19	-37.18	0.19	0.01	-2.51
3,766.00	4.16	339.03	3,762.31	104.55	-45.14	-39.82	0.69	-0.14	9.21
3,861.00	4.12	341.29	3,857.06	111.00	-47.47	-41.81	0.18	-0.04	2.38
3,956.00	4.32	341.90	3,951.80	117.63	-49.68	-43.68	0.22	0.21	0.64
4,051.00	3.26	330.59	4,046.60	123.39	-52.12	-45.83	1.36	-1.12	-11.91
4,145.00	3.18	329.33	4,140.45	127.96	-54.76	-48.24	0.11	-0.09	-1.34
4,239.00	3.34	339.72	4,234.30	132.77	-57.04	-50.27	0.65	0.17	11.05

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Well:	#25H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.14 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
4,333.00	3.55	344.86	4,328.13	138.15	-58.75	-51.71	0.40	0.22	5.47
4,428.00	3.85	345.34	4,422.93	144.07	-60.32	-52.98	0.32	0.32	0.51
4,524.00	3.61	345.58	4,518.73	150.12	-61.89	-54.24	0.25	-0.25	0.25
4,619.00	2.59	335.75	4,613.59	154.97	-63.52	-55.62	1.21	-1.07	-10.35
4,714.00	2.72	339.65	4,708.48	159.04	-65.18	-57.08	0.23	0.14	4.11
4,808.00	2.93	336.19	4,802.37	163.33	-66.93	-58.61	0.29	0.22	-3.68
4,903.00	2.86	339.17	4,897.25	167.77	-68.75	-60.20	0.17	-0.07	3.14
4,998.00	3.16	342.38	4,992.12	172.48	-70.39	-61.60	0.36	0.32	3.38
5,091.00	3.20	343.28	5,084.97	177.41	-71.91	-62.87	0.07	0.04	0.97
5,186.00	3.39	343.51	5,179.82	182.64	-73.47	-64.17	0.20	0.20	0.24
5,279.00	2.38	341.62	5,272.70	187.11	-74.86	-65.33	1.09	-1.09	-2.03
5,374.00	1.22	358.00	5,367.65	189.99	-75.52	-65.84	1.32	-1.22	17.24
5,467.00	1.07	352.87	5,460.63	191.84	-75.66	-65.89	0.20	-0.16	-5.52
5,562.00	1.13	14.14	5,555.62	193.63	-75.54	-65.68	0.43	0.06	22.39
5,594.00	1.62	48.96	5,587.61	194.23	-75.12	-65.23	2.96	1.53	108.81
KOP: 5594.00' MD, 5587.61' TVD									
5,601.69	1.98	58.04	5,595.29	194.37	-74.93	-65.03	5.95	4.67	118.09
KOP(BCFC#25H)									
5,626.00	3.28	72.31	5,619.58	194.81	-73.91	-63.99	5.95	5.35	58.70
5,657.00	5.59	80.35	5,650.48	195.33	-71.57	-61.63	7.70	7.45	25.94
5,689.00	7.67	80.84	5,682.27	195.93	-67.93	-57.96	6.50	6.50	1.53
5,721.00	10.25	80.78	5,713.87	196.73	-63.01	-53.01	8.06	8.06	-0.19
5,752.00	13.20	79.78	5,744.22	197.80	-56.80	-46.76	9.54	9.52	-3.23
5,783.00	16.36	79.67	5,774.19	199.21	-49.02	-38.92	10.19	10.19	-0.35
5,815.00	19.53	81.18	5,804.63	200.84	-39.30	-29.12	10.01	9.91	4.72
5,847.00	23.00	84.67	5,834.45	202.24	-27.79	-17.55	11.54	10.84	10.91
5,878.00	25.98	87.83	5,862.66	203.06	-14.97	-4.71	10.50	9.61	10.19
5,910.00	29.53	89.56	5,890.97	203.39	-0.07	10.18	11.37	11.09	5.41
5,941.00	32.71	90.49	5,917.51	203.37	15.95	26.18	10.37	10.26	3.00
5,973.00	36.16	89.86	5,943.90	203.32	34.04	44.25	10.84	10.78	-1.97
6,004.00	40.21	88.86	5,968.26	203.54	53.20	63.39	13.22	13.06	-3.23
6,036.00	44.06	88.64	5,991.99	204.01	74.66	84.85	12.04	12.03	-0.69
6,067.00	46.23	88.84	6,013.85	204.50	96.63	106.81	7.01	7.00	0.65
6,099.00	46.88	88.63	6,035.85	205.01	119.85	130.04	2.09	2.03	-0.66
6,130.00	47.12	88.12	6,057.00	205.65	142.52	152.70	1.43	0.77	-1.65
6,162.00	47.63	88.19	6,078.67	206.41	166.05	176.24	1.60	1.59	0.22
6,193.00	47.78	87.93	6,099.53	207.19	188.97	199.17	0.79	0.48	-0.84
6,225.00	49.76	88.26	6,120.62	207.99	213.02	223.23	6.24	6.19	1.03
6,230.80	50.36	88.35	6,124.34	208.12	217.46	227.68	10.38	10.32	1.47
PP(BCFC#25H)									
6,256.00	52.96	88.70	6,139.97	208.63	237.22	247.44	10.38	10.32	1.41
6,288.00	54.83	89.40	6,158.83	209.05	263.07	273.27	6.11	5.84	2.19
6,318.00	57.21	88.40	6,175.59	209.53	287.94	298.14	8.40	7.93	-3.33

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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000:14 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)
6,349.00	60.12	89.62	6,191.71	209.99	314.41	324.60	9.97	9.39	3.94
6,380.00	64.34	89.71	6,206.15	210.15	341.83	351.99	13.62	13.61	0.29
6,412.00	68.60	89.97	6,218.93	210.23	371.16	381.29	13.33	13.31	0.81
6,443.00	73.50	90.22	6,228.99	210.18	400.48	410.56	15.82	15.81	0.81
6,475.00	78.09	90.92	6,236.84	209.87	431.49	441.52	14.50	14.34	2.19
6,506.00	83.10	90.95	6,241.91	209.37	462.06	472.03	16.16	16.16	0.10
6,538.00	87.43	90.16	6,244.55	209.06	493.94	503.85	13.75	13.53	-2.47
EOC: 6538.00' MD, 6244.55' TVD, 87.43° INC, 90.16° AZ, 503.85' VS									
6,570.00	89.12	88.93	6,245.51	209.31	525.92	535.81	6.53	5.28	-3.84
6,601.00	89.47	88.27	6,245.89	210.07	556.91	566.79	2.41	1.13	-2.13
6,636.00	89.53	87.55	6,246.20	211.35	591.88	601.79	2.06	0.17	-2.06
6,730.00	90.31	88.85	6,246.33	214.30	685.83	695.77	1.61	0.83	1.38
6,823.00	89.56	88.59	6,246.43	216.38	778.81	788.73	0.85	-0.81	-0.28
6,917.00	89.66	89.59	6,247.07	217.87	872.80	882.67	1.07	0.11	1.06
7,011.00	90.92	90.74	6,246.60	217.60	966.79	976.53	1.81	1.34	1.22
7,106.00	91.05	90.77	6,244.96	216.35	1,061.77	1,071.33	0.14	0.14	0.03
7,200.00	90.74	91.18	6,243.50	214.75	1,155.74	1,165.10	0.55	-0.33	0.44
7,295.00	91.23	90.05	6,241.86	213.73	1,250.72	1,259.91	1.30	-0.52	-1.19
7,390.00	90.88	90.39	6,240.11	213.36	1,345.70	1,354.75	0.51	-0.37	0.36
7,485.00	90.62	90.69	6,238.87	212.47	1,440.69	1,449.57	0.42	-0.27	0.32
7,579.00	90.02	88.72	6,238.35	212.95	1,534.68	1,543.47	2.19	-0.64	-2.10
7,674.00	90.86	88.86	6,237.62	214.96	1,629.66	1,638.42	0.90	0.88	0.15
7,769.00	90.70	89.12	6,236.32	216.63	1,724.64	1,733.36	0.32	-0.17	0.27
7,863.00	92.62	88.74	6,233.60	218.39	1,818.58	1,827.27	2.08	2.04	-0.40
7,958.00	92.23	88.44	6,229.58	220.72	1,913.46	1,922.16	0.52	-0.41	-0.32
8,052.00	91.70	88.58	6,226.36	223.17	2,007.37	2,016.07	0.58	-0.56	0.15
8,147.00	91.21	88.74	6,223.94	225.39	2,102.32	2,111.01	0.54	-0.52	0.17
8,242.00	90.97	88.82	6,222.14	227.41	2,197.28	2,205.95	0.27	-0.25	0.08
8,336.00	90.34	89.73	6,221.06	228.60	2,291.26	2,299.87	1.18	-0.67	0.97
8,431.00	90.15	89.90	6,220.66	228.91	2,386.26	2,394.77	0.27	-0.20	0.18
8,525.00	90.80	90.46	6,219.88	228.61	2,480.26	2,488.63	0.91	0.69	0.60
8,620.00	90.20	90.66	6,219.05	227.68	2,575.25	2,583.45	0.67	-0.63	0.21
8,715.00	90.84	90.11	6,218.19	227.04	2,670.24	2,678.29	0.89	0.67	-0.58
8,809.00	90.57	90.61	6,217.03	226.45	2,764.23	2,772.13	0.60	-0.29	0.53
8,904.00	90.00	91.01	6,216.56	225.11	2,859.22	2,866.93	0.73	-0.60	0.42
8,998.00	90.96	90.87	6,215.77	223.57	2,953.20	2,960.72	1.03	1.02	-0.15
9,093.00	90.25	90.84	6,214.77	222.15	3,048.19	3,055.51	0.75	-0.75	-0.03
9,187.00	90.99	89.55	6,213.75	221.83	3,142.18	3,149.37	1.58	0.79	-1.37
9,282.00	90.40	89.57	6,212.60	222.56	3,237.17	3,244.27	0.62	-0.62	0.02
9,376.00	91.93	89.18	6,210.69	223.58	3,331.14	3,338.18	1.68	1.63	-0.41
9,472.00	91.58	89.45	6,207.75	224.73	3,427.09	3,434.06	0.46	-0.36	0.28
9,567.00	90.55	89.80	6,205.98	225.35	3,522.07	3,528.95	1.15	-1.08	0.37
9,662.00	92.15	89.84	6,203.74	225.65	3,617.04	3,623.82	1.68	1.68	0.04
9,757.00	91.61	89.88	6,200.63	225.88	3,711.99	3,718.65	0.57	-0.57	0.04

Survey Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well #25H
Project:	Lea County, NM (NAD83) NMEZ	TVD Reference:	RKB @ 4086.00usft (Silver Oak3 KB=18')
Site:	Branex-COG Federal COM 25H	MD Reference:	RKB @ 4086.00usft (Silver Oak3 KB=18')
Well:	#25H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.14 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)
9,852.00	90.21	89.01	6,199.12	226.80	3,806.97	3,813.56	1.73	-1.47	-0.92
9,947.00	91.56	89.35	6,197.65	228.16	3,901.94	3,908.48	1.47	1.42	0.36
10,041.00	90.27	88.81	6,196.15	229.67	3,995.92	4,002.41	1.49	-1.37	-0.57
10,136.00	91.41	89.72	6,194.76	230.89	4,090.90	4,097.33	1.54	1.20	0.96
10,231.00	90.99	90.39	6,192.77	230.80	4,185.87	4,192.19	0.83	-0.44	0.71
10,326.00	90.05	90.79	6,191.90	229.82	4,280.86	4,287.01	1.08	-0.99	0.42
10,420.00	89.31	91.05	6,192.43	228.31	4,374.85	4,380.80	0.83	-0.79	0.28
10,515.00	91.40	90.55	6,191.84	226.99	4,469.83	4,475.59	2.26	2.20	-0.53
10,610.00	93.42	89.85	6,187.85	226.65	4,564.74	4,570.37	2.25	2.13	-0.74
10,703.00	93.01	90.16	6,182.63	226.65	4,657.60	4,663.10	0.55	-0.44	0.33
10,798.00	92.54	90.80	6,178.03	225.85	4,752.48	4,757.82	0.84	-0.49	0.67
10,804.00	92.42	90.84	6,177.77	225.77	4,758.48	4,763.81	2.11	-2.00	0.67
Final MWD Survey: 10804.00' MD, 6177.77' TVD									
10,862.00	92.42	90.84	6,175.32	224.92	4,816.42	4,821.63	0.00	0.00	0.00
BHL: 10862.00' MD, 6175.32' TVD, 92.42° INC, 90.84° AZ, 224.92' +N/-S, 4816.42' +E/-W, 4821.63' VS - BHL_20'_350(BCFC#25H) - Plat_BHL									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,594.00	5,587.61	194.23	-75.12	KOP: 5594.00' MD, 5587.61' TVD
6,538.00	6,244.55	209.06	493.94	EOC: 6538.00' MD, 6244.55' TVD, 87.43° INC, 90.16° AZ, 503.85' VS
10,804.00	6,177.77	225.77	4,758.48	Final MWD Survey: 10804.00' MD, 6177.77' TVD
10,862.00	6,175.32	224.92	4,816.42	BHL: 10862.00' MD, 6175.32' TVD, 92.42° INC, 90.84° AZ, 224.92' +N/-S, 4816

Checked By: _____	Approved By: _____	Date: _____
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PO Box 1370
Artesia, NM 88211-1370
(575) 748-1288

December 15, 2017

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

RE: Branex-COG Fed Com 25H
2075' FSL & 115' FWL
Sec. 9, T17S, R32E
Lea County, New Mexico

Dear Sir,

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

Very truly yours,

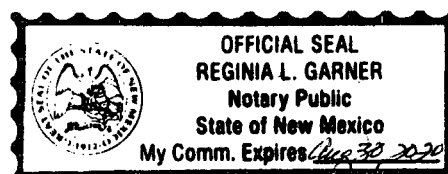
A handwritten signature in cursive script, appearing to read "Chris Graham".

Chris Graham
Asst. Operations Manager

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 15th day of December, 2017.

A handwritten signature in cursive script, appearing to read "Regina L. Garner".

Notary Public

Barnex-COG Fed Com 25H

Date	Depth	Deviation	Direction	TVD
11/27/2017	142	0.40		
11/27/2017	291	0.50		
11/27/2017	452	0.50		
11/28/2017	897	0.20		
11/30/2017	1445	0.60		
11/30/2017	1698	0.90		
11/30/2017	1951	1.50		
11/30/2017	2062	1.50		
12/2/2017	2281	2.00	36.46	2280.66
12/2/2017	2344	2.20	33.56	2343.62
12/2/2017	2375	2.30	22.19	2374.59
12/2/2017	2405	2.82	19.69	2404.56
12/2/2017	2437	2.95	2.25	2436.52
12/2/2017	2468	3.22	358.25	2467.48
12/2/2017	2625	4.24	31.01	
12/2/2017	2720	4.35	330.12	
12/2/2017	2815	4.44	329.38	
12/2/2017	2909	4.60	327.59	
12/2/2017	3004	3.58	335.55	
12/2/2017	3099	3.30	334.34	
12/3/2017	3197	3.50	335.40	3194.72
12/3/2017	3291	3.34	334.34	3288.55
12/3/2017	3386	4.14	333.15	3383.35
12/3/2017	3481	4.23	331.45	3478.09
12/3/2017	3576	4.28	338.78	3522.88
12/3/2017	3672	4.72	330.37	3668.56
12/3/2017	3766	4.16	339.03	3762.31
12/3/2017	3861	4.12	341.29	
12/3/2017	3956	4.32	341.90	
12/3/2017	4051	3.26	330.59	
12/3/2017	4145	3.18	329.33	
12/3/2017	4239	3.34	339.72	
12/4/2017	4333	3.55	344.86	4328.13
12/4/2017	4428	3.85	345.34	
12/4/2017	4524	3.61	345.58	
12/4/2017	4619	2.59	335.75	
12/4/2017	4714	2.72	336.65	
12/4/2017	4808	2.93	336.19	
12/5/2017	5467	1.07	352.87	
12/5/2017	5562	1.13	14.14	
12/5/2017	5594	1.62	48.96	
12/5/2017	5626	3.28	72.31	
12/5/2017	5657	5.59	80.35	

Date	Depth	Deviation	Direction	TVD
12/5/2017	5689	7.67	80.84	
12/5/2017	5721	10.25	80.78	
12/6/2017	5783	16.36	79.67	
12/6/2017	5815	19.53	81.18	
12/6/2017	5847	23.00	84.67	
12/6/2017	5941	32.70	90.49	
12/6/2017	5973	36.16	89.26	
12/6/2017	6036	44.06	88.64	
12/6/2017	6067	46.23	88.84	
12/6/2017	6099	46.88	86.63	
12/6/2017	6139	47.78	87.93	
12/6/2017	6225	49.76	88.26	
12/6/2017	6256	52.96	88.70	
12/6/2017	6288	84.83	89.40	
12/6/2017	6318	57.21	88.40	
12/7/2017	6380	64.34	89.70	6206.00
12/7/2017	6412	68.60	89.90	6218.00
12/7/2017	6443	73.50	90.20	6228.00
12/7/2017	6475	78.00	90.90	6236.00
12/7/2017	6538	87.40	90.10	6244.00
12/7/2017	6570	89.10	88.30	6245.00
12/8/2017	6636	89.50	87.50	6246.00
12/8/2017	6730	90.30	88.80	6246.00
12/8/2017	7011	90.90	90.70	6246.00
12/8/2017	7106	91.00	90.70	6244.00
12/8/2017	7200	90.74	91.18	
12/8/2017	7390	90.88	90.39	
12/8/2017	7485	90.67	90.69	
12/8/2017	7579	90.02	88.72	
12/8/2017	7674	90.86	88.86	
12/9/2017	7958	92.20	88.40	6229.00
12/9/2017	8052	91.70	88.50	6226.00
12/9/2017	8431	90.15	89.90	
12/9/2017	8525	90.80	90.46	
12/9/2017	8620	90.20	90.66	
12/9/2017	8715	90.84	90.11	
12/10/2017	8809	90.50	90.60	6217.00
12/10/2017	8904	90.00	91.00	6216.00
12/10/2017	8998	90.90	90.80	6215.00
12/10/2017	9187	90.90	89.50	6213.00
12/10/2017	9376	91.93	89.18	
12/10/2017	9472	91.93	89.18	
12/10/2017	9567	90.55	89.80	
12/10/2017	9662	92.15	89.84	
12/10/2017	9757	91.61	89.88	

Date	Depth	Deviation	Direction	TVD
12/11/2017	10136	91.40	89.70	6194.00
12/11/2017	10231	90.90	90.30	6192.00
12/11/2017	10326	90.00	90.70	6191.00
12/11/2017	10420	89.30	91.00	6192.00
12/11/2017	10515	91.40	90.50	6191.00
12/11/2017	10703	93.01	90.16	
12/11/2017	10798	92.54	90.80	
12/11/2017	10804	92.42	90.84	

December 4, 2017

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

Attn: Kanicia Castillo

RE: **Branex-COG Federal Com 25H**

Please find enclosed a copy of the survey from 0' to 2148' ran on the above referenced well.

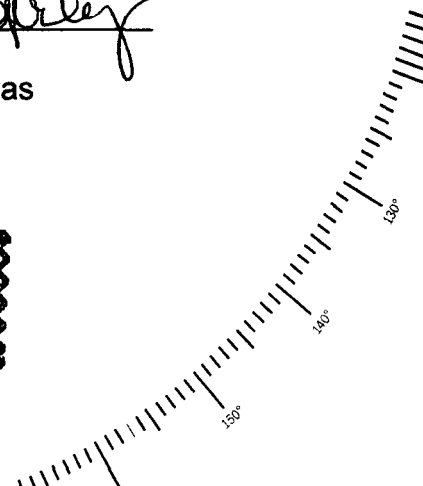
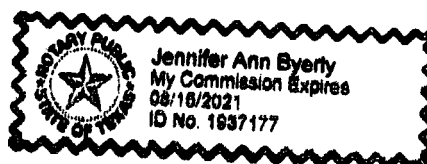
Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 4th day of December, A.D., 2017, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas





Company: COG OPERATING
Lease/Well: BRANEX-COG FEDERAL COM/25H

Rig Name: SILVER OAK 3
State/County: NEW MEXICO/LEA
VS-Azi: 0.00 Degrees
Latitude: 32.84749, Longitude: -103.77918
Grid North = True North -0.30 degs (NAD 27)
Grid Correction Applied = -0.30 degs



Depth Reference : RKB = 18 FEET

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: e-line gyro-de_01.ut
Minimum Curvature Method
Report Date/Time: 12/4/2017 / 13:34

VES SURVEY INTERNATIONAL
GARDENDALE, TEXAS
432-563-5444

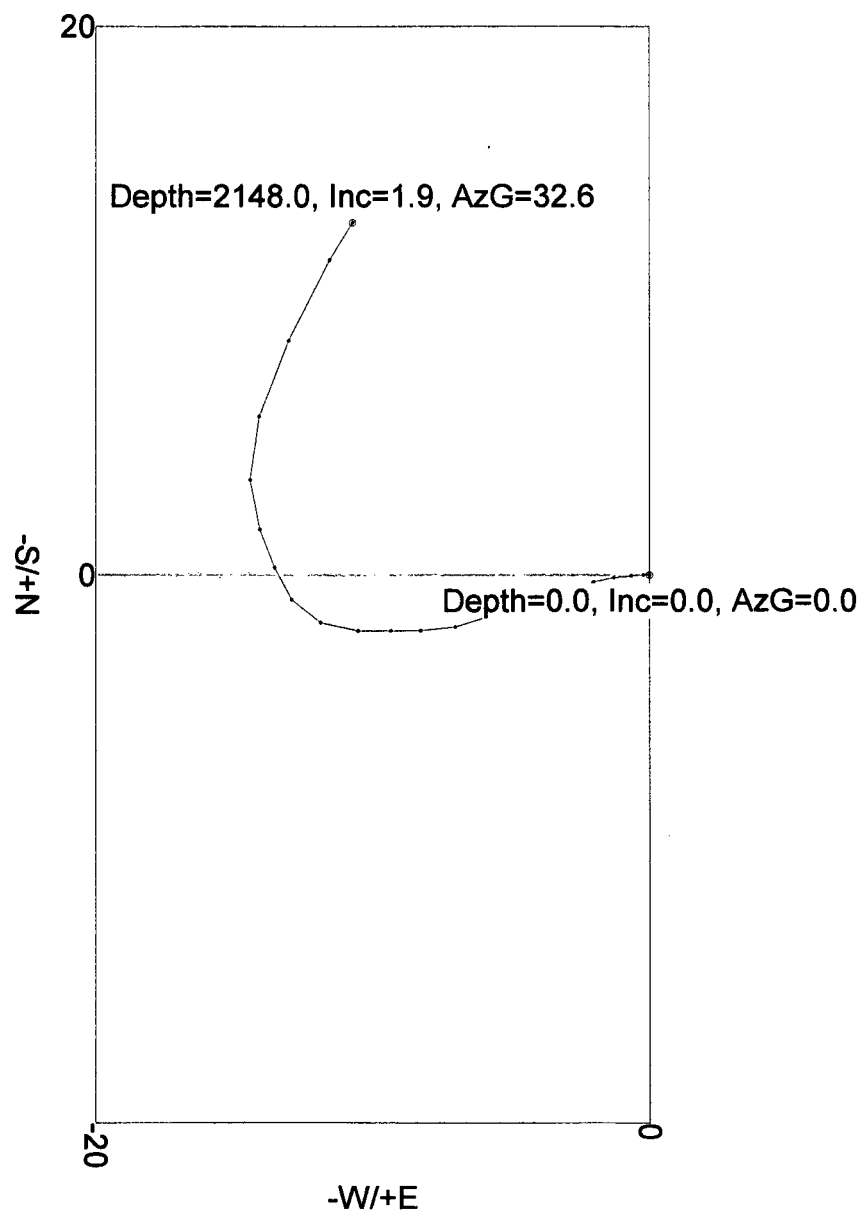
Surveyor: HAYDON LANE
Branex-COG Federal Com 25H / API 30-025-44004

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	0.26	271.84	100.00	0.01	-0.23	0.01	0.23	271.84	0.26
200.00	0.25	259.77	200.00	-0.02	-0.66	-0.02	0.66	267.97	0.05
300.00	0.49	265.20	300.00	-0.10	-1.30	-0.10	1.30	265.72	0.24
400.00	0.38	248.80	399.99	-0.25	-2.03	-0.25	2.05	262.89	0.16
500.00	0.65	239.19	499.99	-0.67	-2.83	-0.67	2.91	256.77	0.28
600.00	0.66	245.34	599.98	-1.20	-3.85	-1.20	4.03	252.69	0.07
700.00	0.35	340.33	699.98	-1.15	-4.47	-1.15	4.62	255.56	0.77
800.00	0.54	238.17	799.98	-1.11	-4.98	-1.11	5.10	257.40	0.70
900.00	0.59	250.74	899.97	-1.53	-5.87	-1.53	6.06	255.36	0.13
1000.00	0.79	253.69	999.97	-1.90	-7.02	-1.90	7.27	254.87	0.20
1100.00	0.69	275.81	1099.96	-2.03	-8.28	-2.03	8.52	256.22	0.30
1200.00	0.57	262.66	1199.95	-2.03	-9.36	-2.03	9.58	257.76	0.19
1300.00	0.79	274.92	1299.95	-2.04	-10.54	-2.04	10.73	259.06	0.26
1400.00	0.83	290.32	1399.94	-1.73	-11.90	-1.73	12.02	261.74	0.22
1500.00	0.78	327.98	1499.93	-0.90	-12.94	-0.90	12.97	266.03	0.52
1600.00	0.75	336.12	1599.92	0.28	-13.56	0.28	13.56	271.17	0.11

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	0.95	341.52	1699.91	1.66	-14.09	1.66	14.19	276.72	0.22
1800.00	1.19	355.46	1799.89	3.48	-14.43	3.48	14.85	283.56	0.35
1900.00	1.54	17.89	1899.86	5.79	-14.10	5.79	15.25	292.33	0.63
2000.00	1.85	23.39	1999.82	8.56	-13.05	8.56	15.60	303.25	0.35
2100.00	1.93	30.07	2099.76	11.50	-11.56	11.50	16.31	314.84	0.24
2148.00	1.86	32.57	2147.74	12.86	-10.74	12.86	16.75	320.14	0.22



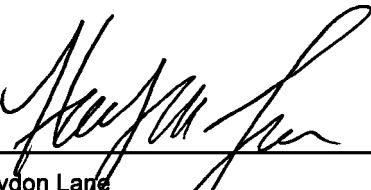
VES SURVEY INTERNATIONAL
GARDENDALE, TEXAS
432-563-5444
Surveyor: HAYDON LANE
Branex-COG Federal Com 25H / API 30-025-44004



VES SURVEY DATE: 11/30/2017



I Haydon Lane certify that I am employed by VES Survey International. That I did on the day(s) of 11/30/17 through 11/30/17 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 2,148.00 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 Branex-COG Federal Com Well # 25H API # 30-025-44004 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.



Haydon Lane
Service Technician
VES Survey International