Company: Cog Operating LLC
Lease/Well: Lusk Deep Unit A No/026Y

Rig Name: Patriot 6
State/County: New Mexico /Lea
VS-Azi: 0.00 Degrees
Latitude: 32.63953, Longitude: -103.80782
Grid North = True North -0.28 degs (NAD 27)
Grid Correction Applied = -0.28 degs

FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : R.K.B = 18FT

DRILLOG HA GYRO SURVEY CALCULATIONS
Filename: lusk deep unit a 26y.ut
Minimum Curvature Method
Report Date/Time: 11/9/2015 / 08:12

VES Survey International
Midland, Texas
432-563-5444
Surveyor: Javier Estrada
Lusk Deep Unit A No 026Y / API 30-025-42858

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	0.40	65.66	100.00	0.14	0.32	0.14	0.35	65.66	0.40
200.00	0.38	7.82	200.00	0.61	0.68	0.61	0.92	48.04	0.38
300.00	0.50	48.95	299.99	1.23	1.06	1.23	1.62	40.75	0.33
400.00	0.43	10.10	399.99	1.88	1.45	1.88	2.38	37.62	0.32
500.00	0.38	43.20	499.99	2.50	1.75	2.50	3.05	34.96	0.24
600.00	0.84	24.15	599.98	3.41	2.27	3.41	4.10	33.70	0.50
700.00	0.86	0.98	699.97	4.83	2.59	4.83	5.48	28.18	0.34
800.00	0.91	355.87	799.96	6.37	2.54	6.37	6.86	21.77	0.09
900.00	0.74	359.04	899.95	7.80	2.48	7.80	8.19	17.60	0.17
1000.00	0.77	349.94	999.94	9.11	2.35	9.11	9.40	14.46	0.12
1100.00	0.34	332.86	1099.94	10.03	2.10	10.03	10.24	11.81	0.46
1200.00	0.14	327.71	1199.94	10.39	1.90	10.39	10.56	10.35	0.20
1300.00	0.40	337.73	1299.93	10.81	1.70	10.81	10.95	8.95	0.26
1400.00	0.21	288.36	1399.93	11.19	1.40	11.19	11.28	7.11	0.30

/.E.S. Survey Date: 11/4/2015

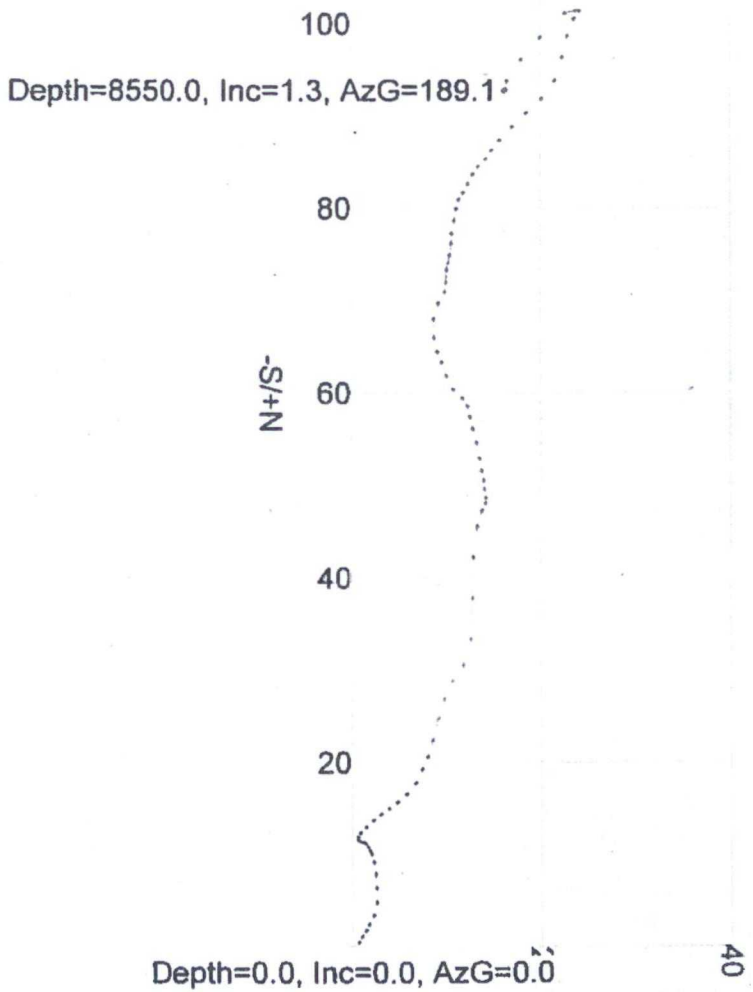
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1500.00	0.21	289.84	1499.93	11.31	1.05	11.31	11.36	5.30	0.01
1600.00	0.19	309.75	1599.93	11.48	0.75	11.48	11.50	3.75	0.07
1700.00	0.33	17.76	1699.93	11.85	0.71	11.85	11.88	3.44	0.31
1800.00	0.29	44.18	1799.93	12.31	0.98	12.31	12.35	4.53	0.15
1900.00	0.65	41.49	1899.93	12.91	1.53	12.91	13.00	6.74	0.36
2000.00	0.59	47.58	1999.92	13.68	2.28	13.68	13.87	9.46	0.09
2100.00	0.59	54.56	2099.92	14.33	3.08	14.33	14.65	12.12	0.07
2200.00	0.60	51.63	2199.91	14.95	3.91	14.95	15.45	14.84	0.03
2300.00	0.65	45.54	2299.90	15.67	4.72	15.67	16.36	16.76	0.08
2400.00	0.94	52.73	2399.89	16.56	5.77	16.56	17.53	19.21	0.31
2500.00	0.94	24.82	2499.88	17.80	6.77	17.80	19.04	20.81	0.45
2600.00	0.92	24.40	2599.87	19.28	7.45	19.28	20.67	21.11	0.02
2700.00	0.77	21.17	2699.86	20.64	8.02	20.64	22.14	21.23	0.17
2800.00	1.42	11.50	2799.84	22.48	8.51	22.48	24.03	20.73	0.68
2900.00	1.29	17.15	2899.81	24.76	9.09	24.76	26.38	20.15	0.19
3000.00	1.22	17.41	2999.79	26.85	9.74	26.85	28.56	19.93	0.07
3100.00	1.19	31.16	3099.76	28.76	10.59	28.76	30.65	20.22	0.29
3200.00	1.22	34.58	3199.74	30.52	11.73	30.52	32.70	21.03	0.08
3300.00	2.20	5.45	3299.70	33.30	12.52	33.30	35.56	20.60	1.28
3400.00	2.88	0.22	3399.60	37.72	12.71	37.72	39.80	18.62	0.72
3500.00	2.41	4.03	3499.49	42.32	12.87	42.32	44.24	16.91	0.50
3600.00	1.36	12.69	3599.44	45.56	13.28	45.58	47.48	16.24	1.08
3700.00	0.76	22.02	3699.42	47.36	13.78	47.36	49.32	16.23	0.63
3800.00	0.23	39.51	3799.42	48.12	14.16	48.12	50.17	16.40	0.54
3900.00	0.51	343.47	3899.42	48.70	14.17	48.70	50.72	16.22	0.42
4000.00	0.56	359.05	3999.41	49.62	14.03	49.62	51.56	15.79	0.15
4100.00	0.53	351.44	4099.41	50.56	13.95	50.56	52.45	15.43	0.08
4200.00	0.67	347.18	4199.40	51.59	13.76	51.59	53.39	14.93	0.14
4300.00	0.93	353.39	4299.39	52.96	13.53	52.96	54.66	14.33	0.28
4400.00	0.99	346.08	4399.38	54.60	13.23	54.60	56.18	13.62	0.13
4500.00	0.78	342.76	4499.37	56.08	12.83	56.08	57.53	12.88	0.22
4600.00	0.77	350.12	4599.36	57.39	12.51	57.39	58.74	12.30	0.10
4700.00	0.60	344.34	4699.35	58.55	12.25	58.55	59.82	11.82	0.18
4800.00	0.62	310.91	4799.34	59.41	11.70	59.41	60.56	11.14	0.35
4900.00	0.93	318.51	4899.33	60.38	10.76	60.38	61.33	10.10	0.33
5000.00	1.05	348.85	4999.32	61.89	10.04	61.89	62.70	9.21	0.53
5100.00	0.75	332.11	5099.31	63.37	9.55	63.37	64.08	8.57	0.39
5200.00	0.69	345.20	5199.30	64.53	9.09	64.53	65.17	8.02	0.18
5300.00	1.18	349.60	5299.29	66.14	8.75	66.14	66.71	7.54	0.49
5400.00	1.15	5.95	5399.27	68.15	8.67	68.15	68.70	7.25	0.33

V.E.S. Survey Date: 11/4/2015

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
5500.00	0.95	25.51	5499.25	69.90	9.13	69.90	70.49	7.44	0.41
5600.00	0.66	36.45	5599.24	71.11	9.83	71.11	71.78	7.87	0.32
5700.00	0.67	340.27	5699.23	72.12	9.97	72.12	72.80	7.87	0.63
5800.00	0.94	17.96	5799.22	73.44	10.03	73.44	74.13	7.78	0.58
5900.00	0.93	6.21	5899.21	75.03	10.37	75.03	75.74	7.87	0.19
6000.00	0.47	4.80	5999.20	76.24	10.49	76.24	76.96	7.83	0.46
6100.00	0.81	3.74	6099.20	77.35	10.57	77.35	78.07	7.78	0.34
6200.00	0.74	15.30	6199.19	78.68	10.79	78.68	79.41	7.81	0.17
6300.00	0.78	7.85	6299.18	79.98	11.05	79.98	80.74	7.87	0.11
6400.00	0.39	32.62	6399.17	80.94	11.33	80.94	81.73	7.97	0.46
6500.00	0.59	28.21	6499.17	81.68	11.75	81.68	82.52	8.19	0.21
6600.00	0.67	29.66	6599.16	82.64	12.29	82.64	83.55	8.46	0.07
6700.00	0.64	24.07	6699.16	83.66	12.80	83.66	84.63	8.70	0.07
6800.00	0.54	47.32	6799.15	84.49	13.38	84.49	85.54	9.00	0.26
6900.00	0.73	44.30	6899.15	85.26	14.17	85.26	86.43	9.43	0.20
7000.00	0.60	20.94	6999.14	86.21	14.80	86.21	87.47	9.74	0.30
7100.00	1.03	44.37	7099.13	87.34	15.62	87.34	88.72	10.14	0.54
7200.00	1.26	40.88	7199.11	88.82	16.97	88.82	90.42	10.81	0.24
7300.00	1.30	47.74	7299.08	90.41	18.52	90.41	92.29	11.58	0.16
7400.00	1.30	47.55	7399.06	91.94	20.20	91.94	94.13	12.39	0.01
7500.00	1.54	21.52	7499.03	93.96	21.53	93.96	96.39	12.91	0.68
7600.00	1.44	15.29	7599.00	96.42	22.36	96.42	98.98	13.05	0.19
7700.00	1.25	10.66	7698.97	98.70	22.89	98.70	101.32	13.06	0.22
7800.00	1.07	31.69	7798.95	100.56	23.58	100.56	103.29	13.20	0.46
7900.00	0.12	65.45	7898.94	101.40	24.17	101.40	104.24	13.41	0.98
8000.00	0.58	270.43	7998.94	101.45	23.76	101.45	104.19	13.18	0.69
8100.00	0.80	248.21	8098.93	101.19	22.60	101.19	103.69	12.59	0.35
8200.00	0.97	216.58	8198.92	100.25	21.45	100.25	102.52	12.07	0.51
8300.00	1.58	221.86	8298.90	98.54	20.02	98.54	100.55	11.48	0.62
8400.00	1.97	220.60	8398.85	96.21	17.98	96.21	97.87	10.58	0.39
8500.00	1.21	198.95	8498.81	93.90	16.51	93.90	95.34	9.97	0.96
8550.00	1.26	189.11	8548.80	92.86	16.26	92.86	94.27	9.93	0.44

V.E.S. Survey Date: 11/4/2015

VES Survey International
Midland, Texas
432-563-5444
Surveyor: Javier Estrada
Lusk Deep Unit A No 026Y / API 30-025-42858



V.E.S. Survey Date: 11/4/2015

COG Operating LLC.

Lea County, NM
Lusk Deep Unit A
#26Y

OH

Survey: Survey #1 - MWD

Survey Report - Geographic

17 November, 2015

CONCHO

Wellplanning

Survey Report - Geographic

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well #26Y
Project:	Lea County, NM	**TVD Reference:**	WELL @ 3560.8usft (Original Well Elev)
Site:	Lusk Deep Unit A	**MD Reference:**	WELL @ 3560.8usft (Original Well Elev)
Well:	#26Y	**North Reference:**	Grid
Wellbore:	OH	**Survey Calculation Method:**	Minimum Curvature
Design:	OH	**Database:**	EDM 5000.1 Single User Db

Project	Lea 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	Lusk Deep Unit A				
Site Position:		**Northing:**	603,696.00 usft	**Latitude:**	32° 39' 30.900 N
From:	Map	**Easting:**	660,099.70 usft	**Longitude:**	103° 48' 47.247 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.28 °

Well	#26Y					
Well Position	**+N/-S**	0.0 usft	**Northing:**	596,771.80 usft	**Latitude:**	32° 38' 22.302 N
	+E/-W	0.0 usft	**Easting:**	661,767.80 usft	**Longitude:**	103° 48' 28.137 W
Position Uncertainty		2.0 usft	**Wellhead Elevation:**	usft	**Ground Level:**	3,542.8 usft

Wellbore	OH			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2010	7/22/2015	7.22	60.43	48,429

Design	OH				
Audit Notes:					
Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0.0
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**
	0.0	0.0	0.0	1.71

Survey Program		**Date** 11/17/2015		
From (usft)	**To (usft)**	**Survey (Wellbore)**	**Tool Name**	**Description**
100.0	13,549.0	Survey #1 - MWD (OH)	MWD	MWD - Standard

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	596,771.80	661,767.80	32° 38' 22.302 N	103° 48' 28.137 W
4.3	0.02	65.66	4.3	0.0	0.0	596,771.80	661,767.81	32° 38' 22.302 N	103° 48' 28.137 W
Lusk DU #10 (100 Rad)									
100.0	0.40	65.66	100.0	0.1	0.3	596,771.95	661,768.12	32° 38' 22.303 N	103° 48' 28.133 W
200.0	0.38	7.82	200.0	0.6	0.7	596,772.42	661,768.49	32° 38' 22.308 N	103° 48' 28.129 W
300.0	0.50	48.95	300.0	1.2	1.1	596,773.03	661,768.86	32° 38' 22.314 N	103° 48' 28.124 W
400.0	0.43	10.10	400.0	1.9	1.5	596,773.69	661,769.26	32° 38' 22.320 N	103° 48' 28.119 W
500.0	0.38	43.20	500.0	2.5	1.7	596,774.30	661,769.55	32° 38' 22.326 N	103° 48' 28.116 W
600.0	0.84	24.15	600.0	3.4	2.3	596,775.21	661,770.07	32° 38' 22.335 N	103° 48' 28.110 W
700.0	0.86	0.98	700.0	4.8	2.6	596,776.63	661,770.39	32° 38' 22.349 N	103° 48' 28.106 W
800.0	0.91	355.87	800.0	6.4	2.5	596,778.17	661,770.34	32° 38' 22.365 N	103° 48' 28.106 W
900.0	0.74	359.04	900.0	7.8	2.5	596,779.61	661,770.28	32° 38' 22.379 N	103° 48' 28.107 W

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well #26Y
Project:	Lea County, NM	**TVD Reference:**	WELL @ 3560.8usft (Original Well Elev)
Site:	Lusk Deep Unit A	**MD Reference:**	WELL @ 3560.8usft (Original Well Elev)
Well:	#26Y	**North Reference:**	Grid
Wellbore:	OH	**Survey Calculation Method:**	Minimum Curvature
Design:	OH	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,000.0	0.77	349.94	999.9	9.1	2.3	596,780.92	661,770.15	32° 38' 22.392 N	103° 48' 28.109 W
1,100.0	0.34	332.86	1,099.9	10.0	2.1	596,781.84	661,769.89	32° 38' 22.401 N	103° 48' 28.112 W
1,200.0	0.14	327.71	1,199.9	10.4	1.9	596,782.21	661,769.69	32° 38' 22.405 N	103° 48' 28.114 W
1,300.0	0.40	337.73	1,299.9	10.8	1.7	596,782.64	661,769.50	32° 38' 22.409 N	103° 48' 28.116 W
1,400.0	0.21	288.36	1,399.9	11.2	1.4	596,783.02	661,769.19	32° 38' 22.413 N	103° 48' 28.120 W
1,500.0	0.21	289.84	1,499.9	11.3	1.0	596,783.14	661,768.84	32° 38' 22.414 N	103° 48' 28.124 W
1,600.0	0.19	309.75	1,599.9	11.5	0.7	596,783.31	661,768.54	32° 38' 22.415 N	103° 48' 28.127 W
1,700.0	0.33	17.76	1,699.9	11.9	0.7	596,783.69	661,768.50	32° 38' 22.419 N	103° 48' 28.128 W
1,800.0	0.29	44.18	1,799.9	12.3	1.0	596,784.14	661,768.77	32° 38' 22.424 N	103° 48' 28.125 W
1,900.0	0.65	41.49	1,899.9	12.9	1.5	596,784.75	661,769.32	32° 38' 22.430 N	103° 48' 28.118 W
2,000.0	0.59	47.58	1,999.9	13.7	2.3	596,785.52	661,770.08	32° 38' 22.437 N	103° 48' 28.109 W
2,100.0	0.59	54.56	2,099.9	14.4	3.1	596,786.17	661,770.88	32° 38' 22.444 N	103° 48' 28.100 W
2,200.0	0.60	51.63	2,199.9	15.0	3.9	596,786.79	661,771.71	32° 38' 22.450 N	103° 48' 28.090 W
2,300.0	0.65	45.54	2,299.9	15.7	4.7	596,787.51	661,772.52	32° 38' 22.457 N	103° 48' 28.080 W
2,400.0	0.94	52.73	2,399.9	16.6	5.8	596,788.41	661,773.58	32° 38' 22.466 N	103° 48' 28.068 W
2,500.0	0.94	24.82	2,499.9	17.8	6.8	596,789.65	661,774.58	32° 38' 22.478 N	103° 48' 28.056 W
2,600.0	0.92	24.40	2,599.9	19.3	7.4	596,791.12	661,775.25	32° 38' 22.492 N	103° 48' 28.048 W
2,700.0	0.77	21.17	2,699.9	20.7	8.0	596,792.48	661,775.83	32° 38' 22.506 N	103° 48' 28.042 W
2,800.0	1.42	11.50	2,799.8	22.5	8.5	596,794.32	661,776.32	32° 38' 22.524 N	103° 48' 28.036 W
2,900.0	1.29	17.15	2,899.8	24.8	9.1	596,796.61	661,776.89	32° 38' 22.547 N	103° 48' 28.029 W
3,000.0	1.22	17.41	2,999.8	26.9	9.7	596,798.70	661,777.55	32° 38' 22.567 N	103° 48' 28.021 W
3,100.0	1.19	31.16	3,099.8	28.8	10.8	596,800.61	661,778.40	32° 38' 22.586 N	103° 48' 28.011 W
3,200.0	1.22	34.58	3,199.7	30.6	11.7	596,802.37	661,779.54	32° 38' 22.604 N	103° 48' 27.997 W
3,300.0	2.20	5.45	3,299.7	33.4	12.5	596,805.16	661,780.33	32° 38' 22.631 N	103° 48' 27.988 W
3,400.0	2.88	0.22	3,399.6	37.8	12.7	596,809.58	661,780.52	32° 38' 22.675 N	103° 48' 27.986 W
3,500.0	2.41	4.03	3,499.5	42.4	12.9	596,814.19	661,780.68	32° 38' 22.720 N	103° 48' 27.984 W
3,600.0	1.36	12.69	3,599.4	45.6	13.3	596,817.45	661,781.09	32° 38' 22.753 N	103° 48' 27.979 W
3,700.0	0.76	22.02	3,699.4	47.4	13.8	596,819.22	661,781.60	32° 38' 22.770 N	103° 48' 27.972 W
3,800.0	0.23	39.51	3,799.4	48.2	14.2	596,819.99	661,781.97	32° 38' 22.778 N	103° 48' 27.968 W
3,900.0	0.51	343.47	3,899.4	48.8	14.2	596,820.57	661,781.97	32° 38' 22.784 N	103° 48' 27.968 W
4,000.0	0.56	359.05	3,999.4	49.7	14.0	596,821.49	661,781.84	32° 38' 22.793 N	103° 48' 27.970 W
4,100.0	0.53	351.44	4,099.4	50.6	14.0	596,822.43	661,781.76	32° 38' 22.802 N	103° 48' 27.970 W
4,200.0	0.67	347.18	4,199.4	51.7	13.8	596,823.46	661,781.56	32° 38' 22.812 N	103° 48' 27.973 W
4,300.0	0.93	353.39	4,299.4	53.0	13.5	596,824.84	661,781.34	32° 38' 22.826 N	103° 48' 27.975 W
4,400.0	0.99	346.08	4,399.4	54.7	13.2	596,826.48	661,781.04	32° 38' 22.842 N	103° 48' 27.979 W
4,500.0	0.78	342.76	4,499.4	56.2	12.8	596,827.97	661,780.63	32° 38' 22.857 N	103° 48' 27.983 W
4,600.0	0.77	350.12	4,599.4	57.5	12.5	596,829.28	661,780.31	32° 38' 22.870 N	103° 48' 27.987 W
4,700.0	0.60	344.34	4,699.3	58.6	12.3	596,830.45	661,780.06	32° 38' 22.881 N	103° 48' 27.990 W
4,800.0	0.62	310.91	4,799.3	59.5	11.7	596,831.31	661,779.51	32° 38' 22.890 N	103° 48' 27.996 W
4,900.0	0.93	318.51	4,899.3	60.5	10.8	596,832.27	661,778.56	32° 38' 22.899 N	103° 48' 28.007 W
5,000.0	1.05	348.85	4,999.3	62.0	10.0	596,833.78	661,777.84	32° 38' 22.914 N	103° 48' 28.016 W
5,100.0	0.75	332.11	5,099.3	63.5	9.6	596,835.25	661,777.36	32° 38' 22.929 N	103° 48' 28.021 W
5,200.0	0.69	345.20	5,199.3	64.8	9.1	596,836.41	661,776.90	32° 38' 22.941 N	103° 48' 28.026 W
5,300.0	1.18	349.60	5,299.3	66.2	8.8	596,838.01	661,776.56	32° 38' 22.956 N	103° 48' 28.030 W
5,400.0	1.15	5.95	5,399.3	68.2	8.7	596,840.02	661,776.48	32° 38' 22.976 N	103° 48' 28.031 W
5,500.0	0.95	25.51	5,499.2	70.0	9.1	596,841.77	661,776.94	32° 38' 22.994 N	103° 48' 28.026 W
5,600.0	0.66	36.45	5,599.2	71.2	9.8	596,842.98	661,777.64	32° 38' 23.005 N	103° 48' 28.017 W
5,700.0	0.67	340.27	5,699.2	72.2	10.0	596,843.99	661,777.78	32° 38' 23.015 N	103° 48' 28.016 W
5,800.0	0.94	17.96	5,799.2	73.5	10.0	596,845.32	661,777.84	32° 38' 23.029 N	103° 48' 28.015 W
5,900.0	0.93	6.21	5,899.2	75.1	10.4	596,846.91	661,778.18	32° 38' 23.044 N	103° 48' 28.011 W
6,000.0	0.47	4.80	5,999.2	76.3	10.5	596,848.12	661,778.30	32° 38' 23.056 N	103° 48' 28.009 W
6,100.0	0.81	3.74	6,099.2	77.4	10.6	596,849.24	661,778.38	32° 38' 23.067 N	103° 48' 28.008 W
6,200.0	0.74	15.30	6,199.2	78.8	10.8	596,850.57	661,778.60	32° 38' 23.081 N	103° 48' 28.006 W
6,300.0	0.78	7.85	6,299.2	80.1	11.1	596,851.86	661,778.86	32° 38' 23.093 N	103° 48' 28.003 W
6,400.0	0.39	32.62	6,399.2	81.0	11.3	596,852.82	661,779.14	32° 38' 23.103 N	103° 48' 27.999 W

Company:	COG Operating LLC.	Local Co-ordinate Reference:	Well #26Y
Project:	Lea County, NM	TVD Reference:	WELL @ 3560.8usft (Original Well Elev)
Site:	Lusk Deep Unit A	MD Reference:	WELL @ 3560.8usft (Original Well Elev)
Well:	#26Y	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,500.0	0.59	28.21	6,499.2	81.8	11.8	596,853.57	661,779.57	32° 38' 23.110 N	103° 48' 27.994 W
6,600.0	0.67	29.66	6,599.2	82.7	12.3	596,854.53	661,780.10	32° 38' 23.120 N	103° 48' 27.988 W
6,700.0	0.64	24.07	6,699.2	83.7	12.8	596,855.54	661,780.62	32° 38' 23.130 N	103° 48' 27.982 W
6,800.0	0.54	47.32	6,799.2	84.6	13.4	596,856.37	661,781.19	32° 38' 23.138 N	103° 48' 27.975 W
6,900.0	0.73	44.30	6,899.1	85.3	14.2	596,857.15	661,781.98	32° 38' 23.145 N	103° 48' 27.966 W
7,000.0	0.60	20.94	6,999.1	86.3	14.8	596,858.09	661,782.61	32° 38' 23.155 N	103° 48' 27.958 W
7,100.0	1.03	44.37	7,099.1	87.4	15.6	596,859.23	661,783.43	32° 38' 23.166 N	103° 48' 27.949 W
7,200.0	1.26	40.88	7,199.1	88.9	17.0	596,860.70	661,784.78	32° 38' 23.180 N	103° 48' 27.933 W
7,300.0	1.30	47.74	7,299.1	90.5	18.5	596,862.29	661,786.34	32° 38' 23.196 N	103° 48' 27.915 W
7,400.0	1.30	47.55	7,399.1	92.0	20.2	596,863.82	661,788.01	32° 38' 23.211 N	103° 48' 27.895 W
7,500.0	1.54	21.52	7,499.0	94.0	21.5	596,865.84	661,789.34	32° 38' 23.231 N	103° 48' 27.879 W
7,600.0	1.44	15.29	7,599.0	96.5	22.4	596,868.30	661,790.17	32° 38' 23.255 N	103° 48' 27.869 W
7,700.0	1.25	10.66	7,699.0	98.8	22.9	596,870.58	661,790.70	32° 38' 23.278 N	103° 48' 27.863 W
7,800.0	1.07	31.69	7,798.9	100.6	23.6	596,872.45	661,791.39	32° 38' 23.296 N	103° 48' 27.855 W
7,900.0	0.12	65.45	7,898.9	101.5	24.2	596,873.29	661,791.96	32° 38' 23.305 N	103° 48' 27.848 W
8,000.0	0.58	270.43	7,998.9	101.5	23.8	596,873.34	661,791.57	32° 38' 23.305 N	103° 48' 27.853 W
8,100.0	0.80	248.21	8,098.9	101.3	22.8	596,873.08	661,790.41	32° 38' 23.303 N	103° 48' 27.866 W
8,200.0	0.97	216.58	8,198.9	100.3	21.5	596,872.14	661,789.26	32° 38' 23.293 N	103° 48' 27.880 W
8,300.0	1.58	221.86	8,298.9	98.6	20.0	596,870.44	661,787.84	32° 38' 23.277 N	103° 48' 27.897 W
8,400.0	1.97	220.60	8,398.8	96.3	18.0	596,868.10	661,785.80	32° 38' 23.254 N	103° 48' 27.921 W
8,500.0	1.21	198.95	8,498.8	94.0	16.5	596,865.80	661,784.34	32° 38' 23.231 N	103° 48' 27.938 W
8,550.0	1.26	189.11	8,548.8	93.0	16.3	596,864.76	661,784.08	32° 38' 23.221 N	103° 48' 27.941 W
8,677.0	2.20	152.30	8,675.7	89.4	17.2	596,861.22	661,784.99	32° 38' 23.186 N	103° 48' 27.930 W
8,708.0	2.30	145.90	8,706.7	88.4	17.8	596,860.18	661,785.62	32° 38' 23.175 N	103° 48' 27.923 W
8,740.0	2.60	114.60	8,738.7	87.5	18.8	596,859.34	661,786.64	32° 38' 23.167 N	103° 48' 27.911 W
8,771.0	3.60	60.40	8,769.6	87.7	20.3	596,859.53	661,788.12	32° 38' 23.169 N	103° 48' 27.894 W
8,803.0	7.00	40.90	8,801.5	89.7	22.5	596,861.50	661,790.27	32° 38' 23.188 N	103° 48' 27.869 W
8,835.0	11.10	33.00	8,833.1	93.8	25.4	596,865.56	661,793.23	32° 38' 23.228 N	103° 48' 27.834 W
8,867.0	14.90	25.20	8,864.3	100.1	28.9	596,871.87	661,796.86	32° 38' 23.290 N	103° 48' 27.793 W
8,898.0	18.70	22.40	8,894.0	108.3	32.4	596,880.08	661,800.25	32° 38' 23.371 N	103° 48' 27.751 W
8,930.0	22.70	21.10	8,923.9	118.8	36.6	596,890.58	661,804.43	32° 38' 23.475 N	103° 48' 27.701 W
8,962.0	26.40	18.50	8,953.0	131.3	41.1	596,903.09	661,808.91	32° 38' 23.599 N	103° 48' 27.648 W
8,993.0	30.20	15.40	8,980.3	145.3	45.4	596,917.15	661,813.17	32° 38' 23.738 N	103° 48' 27.598 W
9,025.0	33.50	12.20	9,007.5	161.7	49.4	596,933.55	661,817.16	32° 38' 23.900 N	103° 48' 27.550 W
9,057.0	36.70	10.10	9,033.6	179.8	52.9	596,951.60	661,820.72	32° 38' 24.078 N	103° 48' 27.507 W
9,088.0	40.00	9.90	9,057.9	198.7	56.3	596,970.54	661,824.06	32° 38' 24.265 N	103° 48' 27.467 W
9,120.0	44.00	10.90	9,081.7	219.8	60.1	596,991.59	661,827.93	32° 38' 24.474 N	103° 48' 27.421 W
9,152.0	48.20	11.60	9,103.9	242.4	64.6	597,014.20	661,832.43	32° 38' 24.697 N	103° 48' 27.367 W
9,183.0	52.00	12.10	9,123.8	265.7	69.5	597,037.47	661,837.32	32° 38' 24.927 N	103° 48' 27.308 W
9,215.0	55.80	12.10	9,142.6	290.9	74.9	597,062.75	661,842.74	32° 38' 25.177 N	103° 48' 27.243 W
9,247.0	60.10	12.40	9,159.6	317.4	80.7	597,089.25	661,848.49	32° 38' 25.439 N	103° 48' 27.175 W
9,278.0	63.30	11.90	9,174.3	344.1	86.4	597,115.93	661,854.23	32° 38' 25.703 N	103° 48' 27.106 W
9,310.0	66.20	11.30	9,188.0	372.5	92.2	597,144.28	661,860.05	32° 38' 25.983 N	103° 48' 27.036 W
9,341.0	69.20	10.30	9,199.7	400.6	97.6	597,172.45	661,865.42	32° 38' 26.261 N	103° 48' 26.972 W
9,378.0	72.80	9.70	9,211.8	435.1	103.7	597,206.89	661,871.49	32° 38' 26.602 N	103° 48' 26.899 W
9,409.0	75.10	8.80	9,220.3	464.5	108.5	597,236.30	661,876.28	32° 38' 26.893 N	103° 48' 26.841 W
9,441.0	77.80	7.60	9,227.8	495.3	112.9	597,267.08	661,880.72	32° 38' 27.197 N	103° 48' 26.787 W
9,473.0	80.50	6.40	9,233.9	526.5	116.7	597,298.28	661,884.54	32° 38' 27.506 N	103° 48' 26.741 W
9,504.0	83.30	6.10	9,238.2	557.0	120.1	597,328.78	661,887.88	32° 38' 27.807 N	103° 48' 26.700 W
9,536.0	85.10	5.70	9,241.5	588.6	123.4	597,360.45	661,891.16	32° 38' 28.120 N	103° 48' 26.660 W
9,568.0	86.90	5.10	9,243.7	620.4	126.4	597,392.23	661,894.16	32° 38' 28.435 N	103° 48' 26.623 W
9,599.0	88.30	4.80	9,245.0	651.3	129.0	597,423.08	661,896.83	32° 38' 28.740 N	103° 48' 26.590 W
9,631.0	90.10	3.70	9,245.4	683.2	131.4	597,454.99	661,899.20	32° 38' 29.056 N	103° 48' 26.560 W
9,662.0	90.20	2.10	9,245.4	714.1	133.0	597,485.95	661,900.77	32° 38' 29.362 N	103° 48' 26.540 W
9,757.0	90.50	0.20	9,244.8	809.1	134.9	597,580.92	661,902.68	32° 38' 30.302 N	103° 48' 26.512 W

Company:	COG Operating LLC.	**Local Co-ordinate Reference:**	Well #26Y
Project:	Lea County, NM	**TVD Reference:**	WELL @ 3560 8usft (Original Well Elev)
Site:	Lusk Deep Unit A	**MD Reference:**	WELL @ 3560 8usft (Original Well Elev)
Well:	#26Y	**North Reference:**	Grid
Wellbore:	OH	**Survey Calculation Method:**	Minimum Curvature
Design:	OH	**Database:**	EDM 5000 1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,852.0	89.20	0.10	9,245.0	904.1	135.1	597,875.92	661,902.93	32° 38' 31.242 N	103° 48' 26.504 W
9,947.0	89.80	0.10	9,245.8	999.1	135.3	597,770.92	661,903.09	32° 38' 32.182 N	103° 48' 26.497 W
10,042.0	89.90	1.00	9,246.1	1,094.1	136.2	597,865.91	661,904.01	32° 38' 33.122 N	103° 48' 26.480 W
10,137.0	88.70	1.80	9,247.3	1,189.1	138.5	597,960.87	661,906.33	32° 38' 34.061 N	103° 48' 26.448 W
10,232.0	90.20	1.30	9,248.2	1,284.0	141.1	598,055.83	661,908.90	32° 38' 35.001 N	103° 48' 26.412 W
10,327.0	89.00	0.40	9,248.8	1,379.0	142.5	598,150.81	661,910.30	32° 38' 35.940 N	103° 48' 26.390 W
10,391.0	90.20	359.40	9,249.3	1,443.0	142.4	598,214.81	661,910.19	32° 38' 36.574 N	103° 48' 26.388 W
10,486.0	88.90	358.60	9,250.0	1,538.0	140.7	598,309.79	661,908.54	32° 38' 37.514 N	103° 48' 26.402 W
10,581.0	89.50	0.10	9,251.4	1,633.0	139.7	598,404.77	661,907.46	32° 38' 38.454 N	103° 48' 26.409 W
10,676.0	90.70	359.40	9,251.2	1,728.0	139.2	598,499.77	661,907.04	32° 38' 39.394 N	103° 48' 26.408 W
10,775.0	89.80	359.30	9,250.8	1,827.0	138.1	598,598.76	661,905.92	32° 38' 40.373 N	103° 48' 26.416 W
10,870.0	88.90	0.30	9,251.8	1,921.9	137.8	598,693.75	661,905.59	32° 38' 41.313 N	103° 48' 26.414 W
10,965.0	89.30	359.90	9,253.3	2,016.9	137.9	598,788.74	661,905.75	32° 38' 42.253 N	103° 48' 26.406 W
11,060.0	90.00	359.40	9,253.9	2,111.9	137.4	598,883.74	661,905.17	32° 38' 43.193 N	103° 48' 26.408 W
11,155.0	90.70	358.60	9,253.3	2,206.9	135.7	598,978.72	661,903.52	32° 38' 44.133 N	103° 48' 26.422 W
11,249.0	91.60	357.90	9,251.4	2,300.8	132.8	599,072.65	661,900.65	32° 38' 45.063 N	103° 48' 26.450 W
11,344.0	90.00	357.20	9,250.1	2,395.8	128.8	599,167.55	661,896.59	32° 38' 46.002 N	103° 48' 26.492 W
11,471.0	89.70	359.60	9,250.4	2,522.7	125.2	599,294.49	661,893.04	32° 38' 47.258 N	103° 48' 26.526 W
11,566.0	90.40	358.90	9,250.4	2,617.7	124.0	599,389.48	661,891.80	32° 38' 48.198 N	103° 48' 26.535 W
11,693.0	88.80	2.70	9,251.2	2,744.6	125.8	599,516.44	661,893.57	32° 38' 49.455 N	103° 48' 26.507 W
11,788.0	89.80	1.80	9,252.4	2,839.6	129.5	599,611.36	661,897.30	32° 38' 50.394 N	103° 48' 26.456 W
11,883.0	90.60	1.20	9,252.1	2,934.5	132.0	599,706.33	661,899.78	32° 38' 51.333 N	103° 48' 26.423 W
11,978.0	91.00	1.30	9,250.8	3,029.5	134.1	599,801.29	661,901.86	32° 38' 52.273 N	103° 48' 26.393 W
12,073.0	89.20	1.20	9,250.6	3,124.5	136.1	599,896.27	661,903.93	32° 38' 53.212 N	103° 48' 26.364 W
12,168.0	89.70	0.20	9,251.5	3,219.4	137.3	599,991.25	661,905.09	32° 38' 54.152 N	103° 48' 26.345 W
12,241.7	90.01	359.97	9,251.7	3,293.2	137.4	600,065.00	661,905.20	32° 38' 54.882 N	103° 48' 26.339 W
Lusk Yates SR #3									
12,263.0	90.10	359.90	9,251.7	3,314.4	137.4	600,086.25	661,905.17	32° 38' 55.092 N	103° 48' 26.338 W
12,358.0	91.00	358.80	9,250.8	3,409.4	136.3	600,181.24	661,904.10	32° 38' 56.032 N	103° 48' 26.345 W
12,453.0	91.00	359.00	9,249.1	3,504.4	134.5	600,276.21	661,902.27	32° 38' 56.972 N	103° 48' 26.361 W
12,579.0	88.30	359.80	9,249.9	3,630.4	133.1	600,402.19	661,900.95	32° 38' 58.219 N	103° 48' 26.369 W
12,674.0	89.60	359.10	9,251.6	3,725.4	132.2	600,497.16	661,900.04	32° 38' 59.159 N	103° 48' 26.374 W
12,769.0	90.60	358.50	9,251.4	3,820.3	130.2	600,592.14	661,898.05	32° 39' 0.099 N	103° 48' 26.392 W
12,864.0	92.00	358.30	9,249.3	3,915.3	127.6	600,687.08	661,895.40	32° 39' 1.038 N	103° 48' 26.418 W
12,991.0	89.90	359.40	9,247.2	4,042.2	125.0	600,814.02	661,892.85	32° 39' 2.295 N	103° 48' 26.440 W
13,086.0	91.20	359.30	9,246.3	4,137.2	124.0	600,909.01	661,891.77	32° 39' 3.234 N	103° 48' 26.447 W
13,181.0	90.00	0.20	9,245.3	4,232.2	123.8	601,004.00	661,891.36	32° 39' 4.174 N	103° 48' 26.447 W
13,276.0	91.70	359.80	9,243.9	4,327.2	123.8	601,098.99	661,891.36	32° 39' 5.114 N	103° 48' 26.441 W
13,402.0	90.00	0.30	9,242.0	4,453.2	123.7	601,224.97	661,891.47	32° 39' 6.361 N	103° 48' 26.432 W
13,498.0	90.40	359.90	9,241.7	4,549.2	123.8	601,320.97	661,891.64	32° 39' 7.311 N	103° 48' 26.425 W
13,549.0	90.40	359.90	9,241.3	4,600.2	123.7	601,371.97	661,891.55	32° 39' 7.816 N	103° 48' 26.423 W
PBHL (L26Y) - PBHL(LDU#26H)									

Checked By: _____ Approved By: _____ Date: _____

VES SURVEY INTERNATIONAL

November 9, 2015

HOBBS OCD
SEP 28 2016
RECEIVED

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

Attn: Kanicia Castillo

RE: **Lusk Deep Unit A No 026Y**

Please find enclosed a copy of the survey from 0' to 8550' ran on the above referenced well.

Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
§
COUNTY OF NUECES §

This instrument was acknowledged before me on the 9 day of November A.D., 2015, by Keith Havelka.

Jennifer Ann Byerly
Notary Public, State of Texas

JENNIFER ANN BYERLY
Notary Public, State of Texas
My Commission Expires
August 16, 2017

VES Survey International
P.O. Box 261021, Corpus Christi, Texas 78426
T (361) 767-0602 F (361) 767-0612
www.vessurvey.com

VES SURVEY INTERNATIONAL

I JAVIER ESTRADA certify that I am employed by Vaughn Energy Services. That I did on the day(s) of 11/04/15 through 11/04/15 conduct or supervise the taking of a Rate gyro survey from a depth of 0 feet to a depth of 8550 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 Lusk Deep Unit A Well # 26Y API # 30-025-42858 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 Vaughn Energy Services

JAVIER ESTRADA
Service Technician
Vaughn Energy Services

PATRIOT DRILLING, LLC

HOBBS OCD
SEP 28 2016
RECEIVED

OPERATOR: COG Operating, LLC
WELL/LEASE: Lusk Deep Unit A 26Y
COUNTY: Lea Co., New Mexico
Sec. 19, T 19S, R 32E

STATE OF NEW MEXICO
DEVIATION REPORT

Depth	Deviation	Depth	Deviation
528	3/4	4,828	1 1/4
1,008	1	5,328	1
1,543	1/2	5,773	1
2,018	1	6,241	1/2
2,302	1 1/4	6,682	1/2
2,696	1 1/2	7,100	1 1/2
3,075	1 1/4	7,538	1 1/2
3,583	1 1/2	7,950	1/2
3,961	1/2	8,335	1 3/4
4,341	1		

Patriot Drilling, LLC

M. Leroy Peterson, Executive Vice-President

The foregoing instrument was acknowledged before me on this 18th day of November 2015 by M. Leroy Peterson, Executive Vice-President of Patriot Drilling, LLC.

My Commission Expires: 02/01/2019

LORI TERESA ROWAN
Notary Public, State of Texas
My Commission Expires
February 01, 2019

Lori T. Rowan
Notary Public for Ector Co., Texas

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