



CONCHO

COG Operating LLC

Lea County, NM (NAD-27 2015)

Nelson Federal Com #13H

API #: 30-025-43705

SHL: 2358' FSL, 1895' FWL, Sec 15, T17S, R32E, Unit K

PP: 2972' FSL, 1665' FWL, Sec 15, T17S, R32E, Unit F

BHL: 221' FNL, 1677' FWL, Sec 10, T17S, R32E, Unit C

Design: BHL: 220' FNL, 1670' FWL, Sec 10, T17S, R32E, Unit C

Standard Survey Report

22 May, 2017





TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 2358' FSL, 1895' FWL, Sec 15, T17S, R32E, Unit K
Project:	Lea County, NM (NAD-27 2015)	TVD Reference:	KB @ 4064.00usft (Patriot 6)
Site:	Nelson Federal Com #13H	MD Reference:	KB @ 4064.00usft (Patriot 6)
Well:	SHL: 2358' FSL, 1895' FWL, Sec 15, T17S, R32E, Unit K	North Reference:	Grid
Wellbore:	BHL: 220' FNL, 1670' FWL, Sec 10, T17S, R32E, Unit C	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 220' FNL, 1670' FWL, Sec 10, T17S, R32E, Unit C	Database:	EDM 5000.1 Single User Db

Project	Lea County, NM (NAD-27 2015)		
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	Nelson Federal Com #13H		
Site Position:		Northing:	667,500.20 usft
From:	Map	Easting:	677,278.30 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in
		Latitude:	32° 50' 1.368 N
		Longitude:	103° 45' 22.244 W
		Grid Convergence:	0.31 °

Well	SHL: 2358' FSL, 1895' FWL, Sec 15, T17S, R32E, Unit K		
Well Position	+N-S	0.00 usft	Northing:
	+E-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft
		Latitude:	32° 50' 1.368 N
		Longitude:	103° 45' 22.244 W
		Ground Level:	4,046.00 usft

Wellbore	BHL: 220' FNL, 1670' FWL, Sec 10, T17S, R32E, Unit C		
Magnetics	Model Name	Sample Date	Declination
	IGRF2015	4/26/2017	(°)
			7.10
			Dip Angle
			(°)
			60.59
			Field Strength
			(nT)
			48,290

Design	BHL: 220' FNL, 1670' FWL, Sec 10, T17S, R32E, Unit C		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
Vertical Section:	Depth From (TVD)	+N-S	Tie On Depth:
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			358.07

Survey Program	Date 5/22/2017		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.00	2,248.00	VES Gyro #1 (BHL: 220' FNL, 1670' FWL,	VES-ISCWSA-GYRO-3
2,248.00	13,589.00	TDS MWD #2 (BHL: 220' FNL, 1670' FWL	MWD
			Description
			Biaxial Semi-Cont. Gyro
			MWD - Standard

Survey									
Measured	Inclination	Azimuth	Vertical	+N-S	+E-W	Vertical	Dogleg	Build	Turn
Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Rate
(usft)			(usft)			(usft)	(°/100usft)	(°/100usft)	(°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.71	229.35	100.00	-0.40	-0.47	-0.39	0.71	0.71	0.00
200.00	0.75	208.60	199.99	-1.38	-1.25	-1.34	0.27	0.04	-20.75
300.00	0.73	258.36	299.98	-2.09	-2.19	-2.01	0.62	-0.02	49.76
400.00	0.70	274.97	399.97	-2.16	-3.42	-2.04	0.21	-0.03	16.81
500.00	0.69	288.14	499.97	-1.92	-4.60	-1.76	0.16	-0.01	13.17
600.00	0.53	274.32	599.96	-1.70	-5.64	-1.51	0.22	-0.16	-13.82



TDS Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD-27 2015)
Site: Nelson Federal Com #13H
Well: SHL: 2358' FSL, 1895' FWL, Sec 15, T17S, R32E, Unit K
Wellbore: BHL: 220' FNL, 1670' FWL, Sec 10, T17S, R32E, Unit C
Design: BHL: 220' FNL, 1670' FWL, Sec 10, T17S, R32E, Unit C

Local Co-ordinate Reference: Well SHL: 2358' FSL, 1895' FWL, Sec 15, T17S, R32E, Unit K
TVD Reference: KB @ 4064.00usft (Patriot 6)
MD Reference: KB @ 4064.00usft (Patriot 6)
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)
700.00	0.81	259.59	699.95	-1.79	-6.79	-1.56	0.33	0.28	-14.73
800.00	0.17	192.15	799.95	-2.06	-7.52	-1.81	0.76	-0.64	-67.44
900.00	0.99	203.15	899.94	-3.00	-7.89	-2.74	0.82	0.82	11.00
1,000.00	1.96	194.97	999.91	-5.45	-8.67	-5.15	0.99	0.97	-8.18
1,100.00	2.13	193.84	1,099.85	-8.91	-9.58	-8.58	0.17	0.17	-1.13
1,200.00	2.57	201.76	1,199.76	-12.79	-10.83	-12.42	0.55	0.44	7.92
1,300.00	2.86	199.74	1,299.65	-17.22	-12.51	-16.79	0.31	0.29	-2.02
1,400.00	3.54	204.72	1,399.49	-22.38	-14.64	-21.87	0.73	0.68	4.98
1,500.00	3.77	202.89	1,499.29	-28.21	-17.20	-27.62	0.26	0.23	-2.03
1,600.00	3.75	211.99	1,599.08	-34.02	-20.20	-33.32	0.61	-0.02	9.30
1,700.00	2.85	201.23	1,698.91	-39.11	-22.83	-38.32	1.09	-0.90	-10.76
1,800.00	1.71	205.14	1,798.83	-42.78	-24.37	-41.93	1.15	-1.14	3.91
1,900.00	1.13	200.37	1,898.80	-45.05	-25.35	-44.17	0.59	-0.58	-4.77
2,000.00	1.13	205.09	1,998.78	-46.87	-26.11	-45.97	0.09	0.00	4.72
2,100.00	0.89	150.82	2,098.77	-48.44	-26.15	-47.53	0.95	-0.24	-54.27
2,200.00	0.72	201.29	2,198.76	-49.71	-26.00	-48.80	0.70	-0.17	50.47
2,248.00	0.78	215.84	2,248.75	-50.25	-26.30	-49.34	0.41	0.13	29.90
Tie-In to VES Gyro									
2,360.00	0.60	101.40	2,358.75	-50.99	-26.17	-50.08	1.04	-0.16	-102.00
First TDS MWD Survey									
2,391.00	0.40	121.40	2,389.75	-51.08	-25.91	-50.17	0.85	-0.85	64.52
2,423.00	0.40	245.00	2,421.75	-51.18	-25.92	-50.28	2.20	0.00	388.25
2,454.00	1.00	281.20	2,452.74	-51.18	-26.28	-50.26	2.31	1.94	116.77
2,486.00	2.00	280.50	2,484.73	-51.02	-27.11	-50.06	3.13	3.13	-2.19
2,517.00	3.30	278.70	2,515.70	-50.79	-28.52	-49.80	4.20	4.19	-5.81
2,548.00	5.10	279.90	2,546.62	-50.41	-30.76	-49.35	5.81	5.81	3.87
2,643.00	6.50	279.90	2,641.13	-49.76	-40.22	-47.38	1.47	1.47	0.00
2,737.00	5.90	273.80	2,734.58	-47.53	-50.28	-45.81	0.95	-0.64	-8.49
2,831.00	4.50	248.30	2,828.20	-48.69	-58.48	-46.69	3.00	-1.49	-29.26
2,926.00	4.20	237.60	2,922.93	-52.05	-64.83	-49.84	0.76	-0.32	-9.16
3,020.00	3.80	234.80	3,016.70	-55.69	-70.28	-53.29	0.47	-0.43	-2.98
3,115.00	3.30	251.00	3,111.52	-58.40	-75.44	-55.82	1.17	-0.53	17.05
3,209.00	3.80	275.20	3,205.34	-59.00	-81.10	-56.23	1.67	0.53	25.74
3,304.00	5.00	278.70	3,300.06	-58.08	-88.33	-55.08	1.29	1.26	3.68
3,398.00	4.50	274.40	3,393.74	-57.18	-96.05	-53.91	0.65	-0.53	-4.57
3,491.00	3.70	271.90	3,486.50	-56.80	-102.69	-53.31	0.88	-0.86	-2.69
3,586.00	5.00	275.50	3,581.23	-56.30	-109.87	-52.57	1.40	1.37	3.79
3,681.00	6.00	275.90	3,675.79	-55.40	-118.93	-51.36	1.05	1.05	0.42
3,774.00	6.20	277.10	3,768.26	-54.28	-128.75	-49.91	0.26	0.22	1.29
3,868.00	5.40	273.00	3,861.78	-53.42	-138.21	-48.73	0.96	-0.85	-4.36
3,963.00	5.40	270.10	3,956.36	-53.18	-147.14	-48.19	0.29	0.00	-3.05



TDS Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD-27 2015)
Site: Nelson Federal Com #13H
Well: SHL: 2358' FSL, 1895' FWL, Sec 15, T17S, R32E, Unit K
Wellbore: BHL: 220' FNL, 1670' FWL, Sec 10, T17S, R32E, Unit C
Design: BHL: 220' FNL, 1670' FWL, Sec 10, T17S, R32E, Unit C

Local Co-ordinate Reference: Well SHL: 2358' FSL, 1895' FWL, Sec 15, T17S, R32E, Unit K
TVD Reference: KB @ 4084.00usft (Patriot 8)
MD Reference: KB @ 4084.00usft (Patriot 8)
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)
4,057.00	5.50	268.20	4,049.93	-53.31	-156.06	-48.02	0.22	0.11	-2.02
4,152.00	4.50	273.40	4,144.57	-53.23	-164.34	-47.67	1.15	-1.05	5.47
4,246.00	4.70	275.60	4,238.27	-52.64	-171.85	-46.82	0.28	0.21	2.34
4,340.00	3.40	282.90	4,332.03	-51.64	-178.40	-45.60	1.49	-1.38	7.77
4,434.00	3.20	286.90	4,425.88	-50.25	-183.63	-44.04	0.32	-0.21	4.26
4,529.00	4.60	287.30	4,520.65	-48.35	-189.80	-41.93	1.47	1.47	0.42
4,624.00	5.50	273.40	4,615.29	-46.95	-197.98	-40.25	1.59	0.95	-14.63
4,719.00	5.90	274.20	4,709.82	-46.32	-207.40	-39.31	0.43	0.42	0.84
4,813.00	5.20	269.10	4,803.38	-46.03	-216.48	-38.72	0.91	-0.74	-5.43
4,907.00	3.20	283.50	4,897.12	-46.40	-223.34	-38.85	2.17	-2.13	-5.96
5,001.00	0.70	269.80	4,991.06	-46.70	-226.52	-39.04	2.67	-2.66	6.70
5,096.00	0.40	22.00	5,086.06	-46.39	-226.98	-38.72	0.98	-0.32	118.11
5,191.00	0.90	21.40	5,181.05	-45.39	-226.58	-37.73	0.53	0.53	-0.63
5,222.00	2.40	359.10	5,212.04	-44.51	-226.50	-36.86	5.17	4.84	-71.94
5,253.00	5.40	356.40	5,242.96	-42.41	-226.61	-34.75	9.69	9.68	-8.71
5,285.00	8.80	355.60	5,274.71	-38.46	-226.89	-30.80	10.63	10.63	-2.50
5,318.00	12.50	359.10	5,305.17	-32.74	-227.18	-25.07	12.03	11.94	8.06
5,347.00	15.80	359.80	5,335.23	-25.17	-227.31	-17.50	10.73	10.65	5.48
5,379.00	18.80	2.80	5,365.78	-15.66	-227.07	-8.00	9.78	9.38	9.38
5,411.00	21.90	5.50	5,395.78	-4.57	-226.25	3.06	10.12	9.69	8.44
5,442.00	25.10	6.40	5,424.20	7.73	-224.96	15.30	10.39	10.32	2.90
5,474.00	28.30	5.10	5,452.79	22.03	-223.53	29.55	10.16	10.00	-4.06
5,505.00	32.10	3.50	5,479.57	37.58	-222.37	45.04	12.53	12.26	-5.16
5,537.00	35.80	1.70	5,506.11	55.43	-221.58	62.66	11.98	11.56	-5.63
5,569.00	39.10	358.90	5,531.52	74.88	-221.49	82.29	11.60	10.31	-8.75
5,600.00	41.80	358.70	5,555.14	94.93	-222.27	102.36	9.28	8.06	-7.10
5,632.00	43.80	358.60	5,578.66	116.59	-223.54	124.05	6.88	6.88	-0.31
5,664.00	44.80	356.40	5,601.56	138.90	-224.90	146.39	3.16	3.13	-0.63
5,695.00	45.30	356.30	5,623.46	160.79	-226.30	168.32	1.63	1.61	-0.32
5,726.00	45.90	356.20	5,645.15	182.89	-227.75	190.46	1.95	1.94	-0.32
5,758.00	46.50	356.40	5,667.30	205.94	-229.24	213.55	1.93	1.88	0.63
5,789.00	47.10	356.20	5,688.52	228.49	-230.70	236.13	1.99	1.94	-0.65
5,820.00	48.40	356.30	5,709.36	251.39	-232.20	259.07	4.20	4.19	0.32
5,851.00	51.60	357.00	5,729.29	275.09	-233.58	282.80	10.47	10.32	2.26
5,882.00	55.10	357.60	5,747.79	299.93	-234.75	307.87	11.40	11.29	1.94
5,914.00	58.10	358.10	5,765.40	326.63	-235.75	334.38	9.47	9.38	1.56
5,945.00	60.60	358.30	5,781.20	353.28	-236.59	361.05	8.08	8.06	0.65
5,977.00	63.10	358.60	5,796.30	381.48	-237.35	389.26	7.86	7.81	0.94
6,008.00	65.00	359.70	5,809.87	409.35	-237.76	417.13	6.91	6.13	3.55
6,040.00	66.90	0.90	5,822.91	438.57	-237.61	446.33	6.85	5.94	3.75
6,072.00	69.00	1.30	5,834.92	468.22	-237.04	475.94	6.66	6.56	1.25



TDS
Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD-27 2015)
Site: Nelson Federal Com #13H
Well: SHL: 2358' FSL, 1895' FWL, Sec 15, T17S,
R32E, Unit K
Wellbore: BHL: 220' FNL, 1870' FWL, Sec 10, T17S,
R32E, Unit C
Design: BHL: 220' FNL, 1870' FWL, Sec 10, T17S,
R32E, Unit C

Local Co-ordinate Reference: Well SHL: 2358' FSL, 1895' FWL, Sec 15, T17S,
R32E, Unit K
TVD Reference: KB @ 4064.00usft (Patriot 6)
MD Reference: KB @ 4064.00usft (Patriot 6)
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)
6,103.00	71.80	1.50	5,845.32	497.42	-236.32	505.09	9.05	9.03	0.65
6,135.00	74.80	1.20	5,854.48	528.08	-235.80	535.70	9.73	9.69	-0.94
6,168.00	77.20	0.90	5,861.96	558.14	-235.05	565.74	7.48	7.42	-0.97
6,198.00	80.10	1.10	5,868.25	589.51	-234.50	597.07	9.08	9.08	0.63
6,221.31	82.94	1.61	5,871.69	612.55	-233.96	620.08	12.38	12.19	2.19
As-Drilled PP									
6,230.00	84.00	1.80	5,872.68	621.18	-233.70	628.70	12.38	12.19	2.17
6,261.00	87.90	2.30	5,874.87	652.08	-232.59	659.54	12.68	12.58	1.61
6,292.00	89.60	2.70	5,875.54	683.04	-231.24	690.44	5.63	5.48	1.29
6,324.00	90.50	2.60	5,875.52	715.01	-229.76	722.34	2.83	2.81	-0.31
6,418.00	91.60	0.10	5,873.79	808.96	-227.55	816.16	2.91	1.17	-2.66
6,511.00	90.20	358.80	5,872.33	901.94	-228.44	909.12	2.05	-1.51	-1.40
6,608.00	91.80	358.20	5,870.68	998.89	-230.93	1,004.10	1.80	1.68	-0.63
6,701.00	90.00	359.30	5,869.18	1,091.85	-233.00	1,099.07	2.22	-1.89	1.16
6,798.00	88.40	0.10	5,870.51	1,186.83	-233.50	1,194.02	1.88	-1.68	0.84
6,891.00	90.00	0.30	5,871.84	1,281.82	-233.17	1,288.94	1.70	1.68	0.21
6,988.00	88.50	0.00	5,873.08	1,376.81	-232.92	1,383.87	1.81	-1.58	-0.32
7,078.00	90.30	0.60	5,874.04	1,468.80	-232.43	1,475.79	2.06	1.98	0.65
7,172.00	92.60	1.20	5,871.66	1,562.75	-230.96	1,569.64	2.53	2.45	0.64
7,268.00	90.70	0.00	5,868.96	1,656.70	-229.98	1,663.50	2.39	-2.02	-1.28
7,288.00	90.30	359.70	5,868.78	1,676.70	-230.03	1,683.49	2.50	-2.00	-1.50
7,381.00	88.70	358.70	5,869.61	1,771.69	-230.53	1,778.45	1.68	-1.68	0.00
7,478.00	88.60	358.70	5,871.85	1,866.65	-231.85	1,873.40	1.06	-0.11	-1.05
7,571.00	89.30	358.40	5,873.59	1,961.61	-234.25	1,968.38	0.80	0.74	-0.32
7,663.00	89.80	358.60	5,874.31	2,053.57	-236.66	2,060.38	0.59	0.54	0.22
7,757.00	90.70	358.90	5,873.90	2,147.55	-236.71	2,154.37	1.01	0.96	0.32
7,851.00	90.20	358.80	5,873.17	2,241.52	-240.60	2,248.36	0.54	-0.53	-0.11
7,948.00	90.30	359.50	5,872.75	2,336.51	-242.01	2,343.34	0.74	0.11	0.74
8,039.00	90.50	359.60	5,872.10	2,429.51	-242.74	2,436.30	0.24	0.22	0.11
8,133.00	90.30	359.80	5,871.45	2,523.50	-243.23	2,530.28	0.30	-0.21	0.21
8,228.00	90.10	0.10	5,871.11	2,618.50	-243.31	2,625.21	0.38	-0.21	0.32
8,323.00	89.60	0.10	5,871.36	2,713.50	-243.15	2,720.15	0.53	-0.53	0.00
8,415.00	90.20	0.20	5,871.52	2,805.50	-242.91	2,812.09	0.66	0.65	0.11
8,509.00	90.50	0.50	5,870.95	2,899.50	-242.33	2,906.01	0.45	0.32	0.32
8,602.00	90.30	0.90	5,870.30	2,992.49	-241.20	2,998.91	0.48	-0.22	0.43
8,697.00	90.00	0.80	5,870.05	3,087.48	-239.79	3,093.80	0.33	-0.32	-0.11
8,792.00	89.30	0.70	5,870.63	3,182.47	-238.55	3,188.69	0.74	-0.74	-0.11
8,886.00	89.10	1.00	5,871.94	3,276.45	-237.15	3,282.57	0.38	-0.21	0.32
8,981.00	88.50	359.80	5,873.93	3,371.42	-236.49	3,377.47	1.41	-0.63	-1.26
9,075.00	89.50	359.80	5,875.57	3,465.41	-236.82	3,471.41	1.06	1.06	0.00
9,170.00	89.80	359.50	5,876.15	3,560.40	-237.40	3,566.38	0.45	0.32	-0.32



TDS
Survey Report



Company: COG Operating LLC

Project: Lea County, NM (NAD-27 2015)

Site: Nelson Federal Com #13H

Well: SHL: 2358' FSL, 1895' FWL, Sec 15, T17S,
R32E, Unit K

Wellbore: BHL: 220' FNL, 1870' FWL, Sec 10, T17S,
R32E, Unit C

Design: BHL: 220' FNL, 1870' FWL, Sec 10, T17S,
R32E, Unit C

Local Co-ordinate Reference:

TVD Reference:

MD Reference:

North Reference:

Survey Calculation Method:

Database:

Well SHL: 2358' FSL, 1895' FWL, Sec 15, T17S,
R32E, Unit K

KB @ 4064.00usft (Patriot 6)

KB @ 4064.00usft (Patriot 6)

Grid

Minimum Curvature

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)
9,265.00	89.40	359.10	5,876.82	3,855.39	-238.58	3,861.35	0.60	-0.42	-0.42
9,359.00	89.80	358.40	5,877.47	3,749.37	-240.61	3,755.34	0.86	0.43	-0.74
9,454.00	90.10	358.40	5,877.56	3,844.33	-243.28	3,850.34	0.32	0.32	0.00
9,548.00	89.80	358.40	5,877.64	3,836.29	-245.83	3,842.34	0.33	-0.33	0.00
9,641.00	90.90	359.00	5,877.06	4,031.26	-247.98	4,037.33	1.32	1.16	0.63
9,738.00	91.60	359.60	5,874.98	4,126.23	-249.14	4,132.28	0.97	0.74	0.63
9,830.00	91.70	0.50	5,872.28	4,220.19	-249.06	4,226.19	0.96	0.11	0.96
9,925.00	89.90	0.20	5,870.95	4,315.18	-248.48	4,321.10	1.92	-1.89	-0.32
10,019.00	89.30	0.20	5,871.61	4,409.18	-248.15	4,415.03	0.84	-0.84	0.00
10,113.00	89.10	0.10	5,872.92	4,503.17	-247.91	4,508.96	0.24	-0.21	-0.11
10,208.00	89.40	0.00	5,874.16	4,598.16	-247.82	4,603.90	0.33	0.32	-0.11
10,303.00	89.50	0.00	5,875.07	4,693.15	-247.82	4,698.84	0.11	0.11	0.00
10,398.00	89.90	0.00	5,876.40	4,788.14	-247.82	4,793.77	0.63	-0.63	0.00
10,493.00	89.60	359.00	5,877.64	4,883.13	-248.65	4,888.73	1.28	0.74	-1.05
10,588.00	90.80	0.40	5,877.31	4,978.12	-249.15	4,983.69	1.94	1.26	1.47
10,684.00	90.30	359.20	5,876.39	5,074.12	-249.49	5,079.64	1.35	-0.52	-1.25
10,778.00	89.80	359.10	5,876.31	5,168.11	-250.88	5,173.82	0.54	-0.53	-0.11
10,873.00	90.80	359.30	5,875.81	5,263.09	-252.21	5,268.60	1.07	1.05	0.21
10,969.00	90.70	0.10	5,874.56	5,359.08	-252.71	5,364.56	0.84	-0.10	0.83
11,064.00	90.30	359.70	5,873.73	5,454.08	-252.88	5,459.50	0.60	-0.42	-0.42
11,157.00	90.00	358.90	5,873.48	5,547.07	-254.01	5,552.48	0.92	-0.32	-0.86
11,252.00	89.60	359.10	5,873.81	5,642.06	-255.67	5,647.47	0.47	-0.42	0.21
11,348.00	89.50	359.30	5,874.55	5,736.04	-256.98	5,741.45	0.24	-0.11	0.21
11,442.00	89.90	359.40	5,875.06	5,832.04	-258.07	5,837.42	0.43	0.42	0.10
11,537.00	89.80	359.70	5,875.30	5,927.03	-258.82	5,932.39	0.33	-0.11	0.32
11,631.00	89.50	359.90	5,875.88	6,021.03	-259.15	6,026.34	0.38	-0.32	0.21
11,726.00	90.50	359.60	5,875.88	6,116.03	-259.56	6,121.30	1.10	1.05	-0.32
11,821.00	90.50	359.80	5,875.05	6,211.02	-260.06	6,216.26	0.21	0.00	0.21
11,917.00	89.90	359.10	5,874.71	6,307.02	-260.98	6,312.23	0.96	-0.63	-0.73
12,011.00	90.00	359.70	5,874.80	6,401.01	-261.96	6,406.20	0.65	0.11	0.64
12,106.00	89.80	0.10	5,874.96	6,496.01	-262.13	6,501.16	0.47	-0.21	0.42
12,201.00	89.80	359.00	5,875.46	6,591.01	-262.88	6,596.12	1.18	-0.21	-1.16
12,297.00	89.50	359.50	5,876.21	6,686.99	-264.13	6,692.10	0.53	-0.10	0.52
12,391.00	89.00	359.50	5,877.44	6,780.98	-264.95	6,786.06	0.53	-0.53	0.00
12,486.00	89.10	0.40	5,879.02	6,875.97	-265.03	6,880.99	0.95	0.11	0.95
12,581.00	90.20	359.80	5,879.60	6,970.96	-264.87	6,975.93	1.32	1.16	-0.63
12,676.00	91.00	358.60	5,878.60	7,065.95	-266.20	7,070.90	1.52	0.84	-1.26
12,772.00	91.00	359.10	5,876.93	7,161.91	-268.12	7,166.88	0.52	0.00	0.52
12,867.00	90.70	359.20	5,875.52	7,256.89	-269.53	7,261.85	0.33	-0.32	0.11
12,962.00	90.60	359.70	5,874.44	7,351.88	-270.44	7,356.82	0.54	-0.11	0.53
13,058.00	90.50	0.20	5,873.52	7,447.88	-270.53	7,452.76	0.53	-0.10	0.52



TDS
Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD-27 2015)
Site: Nelson Federal Com #13H
Well: SHL: 2358' FSL, 1895' FWL, Sec 15, T17S, R32E, Unit K
Wellbore: BHL: 220' FNL, 1670' FWL, Sec 10, T17S, R32E, Unit C
Design: BHL: 220' FNL, 1670' FWL, Sec 10, T17S, R32E, Unit C

Local Co-ordinate Reference: Well SHL: 2358' FSL, 1895' FWL, Sec 15, T17S, R32E, Unit K
TVD Reference: KB @ 4064.00usft (Patriot 6)
MD Reference: KB @ 4064.00usft (Patriot 6)
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)
13,153.00	90.50	1.40	5,872.69	7,542.86	-269.20	7,547.65	1.26	0.00	1.26
13,248.00	90.30	0.50	5,872.03	7,637.85	-267.63	7,642.53	0.97	-0.21	-0.95
13,343.00	89.60	0.20	5,872.11	7,732.84	-267.04	7,737.45	0.80	-0.74	-0.32
13,438.00	90.10	1.20	5,872.36	7,827.83	-265.88	7,832.35	1.18	0.53	1.05
13,533.00	89.80	1.30	5,872.44	7,922.81	-263.81	7,927.20	0.33	-0.32	0.11
Last TDS MWD Survey									
13,589.00	89.80	1.30	5,872.64	7,978.80	-262.54	7,983.11	0.00	0.00	0.00
Projection to Bit/UD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,248.00	2,248.75	-50.25	-26.30	Tie-In to VES Gyro
2,380.00	2,358.75	-50.99	-26.17	First TDS MWD Survey
6,221.31	5,871.89	612.55	-233.96	As-Drilled PP
13,533.00	5,872.44	7,922.81	-263.81	Last TDS MWD Survey
13,589.00	5,872.64	7,978.80	-262.54	Projection to Bit/UD

Checked By: _____ Approved By: _____ Date: _____



May 11, 2017

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

Attn: Kanicia Castillo

RE: Nelson Federal Com No. 013H

Please find enclosed a copy of the survey from 0' to 2248' ran on the above referenced well.

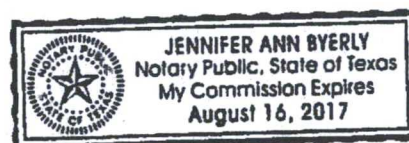
Sincerely,


Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 11th day of May, A.D., 2017, by Keith Havelka:


Jennifer Ann Byerly
Notary Public, State of Texas



Company: COG OPERATING
Lease/Well: NELSON FEDERAL COM No./013H



Rig Name: PATRIOT 6
State/County: NEW MEXICO/LEA
VS-Azi: 0.00 Degrees
Latitude: 32.83383, Longitude: -103.75668
Grid North = True North -0.31 degs (NAD 83)
Grid Correction Applied = -0.31 degs



Depth Reference : RKB=18 FEET

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: e-line gyro-de_01.ut

Minimum Curvature Method

Report Date/Time: 5/11/2017 / 08:33

VES Survey International

Midland, Texas

432-563-5444

Surveyor: Michael Cook

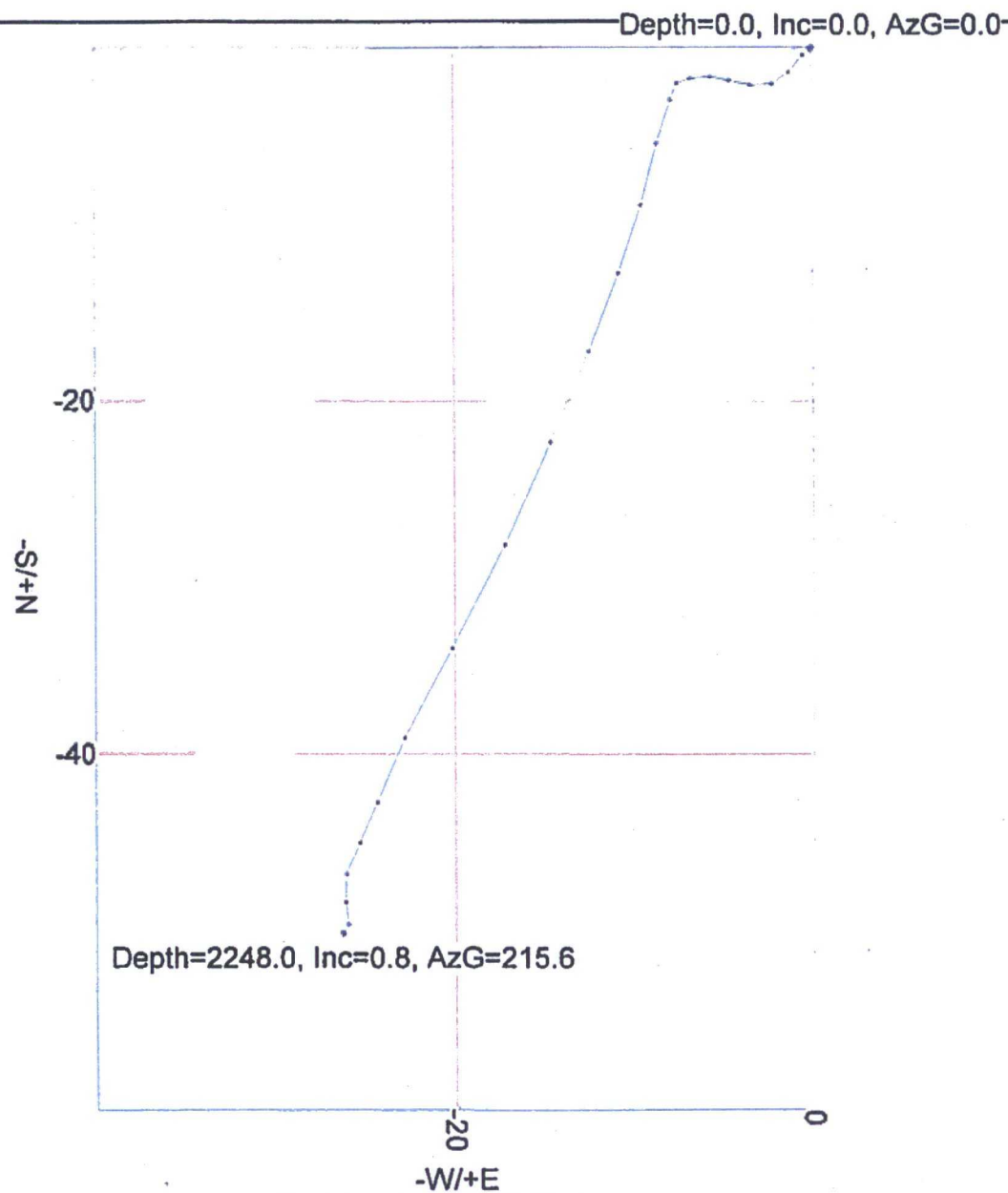
Nelson Federal Com No. 013H / API 30-025-43705

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	0.71	229.35	100.00	-0.40	-0.47	-0.40	0.62	229.35	0.71
200.00	0.75	208.60	199.99	-1.38	-1.25	-1.38	1.86	222.24	0.26
300.00	0.73	258.36	299.98	-2.08	-2.19	-2.08	3.02	226.45	0.62
400.00	0.70	274.97	399.97	-2.15	-3.42	-2.15	4.04	237.79	0.21
500.00	0.69	288.14	499.97	-1.91	-4.60	-1.91	4.98	247.42	0.16
600.00	0.63	274.32	599.96	-1.69	-5.63	-1.69	5.88	253.28	0.22
700.00	0.81	269.69	699.95	-1.78	-6.78	-1.78	7.01	255.26	0.33
800.00	0.17	192.15	799.95	-2.05	-7.50	-2.05	7.78	254.70	0.76
900.00	0.99	203.15	899.95	-2.99	-7.87	-2.99	8.42	249.21	0.83
1000.00	1.96	194.97	999.91	-5.43	-8.65	-5.43	10.21	237.89	0.99
1100.00	2.13	193.84	1099.85	-8.88	-9.54	-8.88	13.03	227.03	0.18
1200.00	2.57	201.76	1199.76	-12.77	-10.81	-12.77	16.73	220.25	0.54
1300.00	2.86	199.74	1299.65	-17.20	-12.48	-17.20	21.25	215.98	0.31
1400.00	3.54	204.72	1399.50	-22.35	-14.62	-22.35	26.70	213.19	0.73
1500.00	3.77	202.69	1499.29	-28.18	-17.18	-28.18	33.00	211.36	0.27
1600.00	3.75	211.99	1599.08	-33.99	-20.18	-33.99	39.52	210.70	0.61

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	2.85	201.23	1698.91	-39.07	-22.81	-39.07	45.24	210.27	1.08
1800.00	1.71	205.14	1798.83	-42.75	-24.34	-42.75	49.19	209.66	1.15
1900.00	1.13	200.37	1898.80	-45.02	-25.32	-45.02	51.65	209.35	0.60
2000.00	1.13	205.09	1998.78	-46.84	-26.08	-46.84	53.61	209.11	0.09
2100.00	0.89	150.82	2098.77	-48.41	-26.12	-48.41	55.01	208.35	0.95
2200.00	0.72	201.29	2198.76	-49.68	-25.97	-49.68	56.06	207.60	0.71
2248.00	0.78	215.64	2246.75	-50.23	-26.27	-50.23	56.68	207.61	0.41



VES Survey International
Midland, Texas
432-563-5444
Surveyor: Michael Cook
Nelson Federal Com No. 013H / API 30-025-43705



V.E.S. Survey Date: 5/5/2017



I Michael Cook certify that I am employed by VES Survey International. That I did on the day(s) of 05/06/17 through 05/06/17 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 2,248.00 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 Nelson Federal Com Well # 013H API # 30-025-43705 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 blue ink, appearing to read "M. Cook", is written over a horizontal line.

Michael Cook
Service Technician
VES Survey International