



HOBBS OCD
MAR 15 2017
RECEIVED

COG Operating LLC

Lea County, NM (NAD-27 2015)

Sneed 9 Federal Com #11H

API #: 30-025-43284

SHL: 470' FNL, 150' FWL, Sec 9, T17S, R32E, Unit D

PP: 353' FNL, 330' FWL, Sec 9, T17S, R32E, Unit D

BHL: 352' FNL, 965' FWL, Sec 10, T17S, R32E, Unit D

Design: BHL: 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D

Standard Survey Report

07 November, 2016





TDS
Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD-27 2015)
Site: Sneed 9 Federal Com #11H
Well: SHL 470' FNL, 150' FWL, Sec 9, T17S, R32E, Unit D
Wellbore: BHL 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D
Design: BHL 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D

Local Co-ordinate Reference: Site Sneed 9 Federal Com #11H
TVD Reference: KB @ 4107.00usft (Patriot 6)
MD Reference: KB @ 4107.00usft (Patriot 6)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Project Lea County, NM (NAD-27 2015)

Map System: US State Plane 1927 (Exact solution)
Geo Datum: NAD 1927 (NADCON CONUS)
Map Zone: New Mexico East 3001

System Datum: Mean Sea Level

Site Sneed 9 Federal Com #11H

Site Position: Northing: 675,208.10 usft Latitude: 32° 51' 18.011 N
From: Map Easting: 670,216.00 usft Longitude: 103° 46' 44.539 W
Position Uncertainty: 0.00 usft Slot Radius: 13.20 in Grid Convergence: 0.30 °

Well SHL 470' FNL, 150' FWL, Sec 9, T17S, R32E, Unit D

Well Position: +N/-S 0.00 usft Northing: 675,208.10 usft Latitude: 32° 51' 18.011 N
+E/-W 0.00 usft Easting: 670,216.00 usft Longitude: 103° 46' 44.539 W
Position Uncertainty: 0.00 usft Wellhead Elevation: 0.00 usft Ground Level: 4,089.00 usft

Wellbore BHL 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	10/4/2016	7.17	60.62	48,358

Design BHL 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D

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	88.67

Survey Program Date 11/7/2016

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	2,200.00	VES Gyro #1 (BHL 350' FNL, 968' FWL, S	VES-ISCWSA-GYRO-3	Biaxial Semi-Cont. Gyro
2,310.00	11,662.00	TDS MWD #2 (BHL 350' FNL, 968' FWL,	MWD	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	0.25	54.84	100.00	0.13	0.18	0.18	0.25	0.25	0.00
200.00	0.34	12.36	200.00	0.54	0.42	0.43	0.23	0.09	-42.48
300.00	0.49	319.25	300.00	1.15	0.20	0.23	0.39	0.15	-53.11
400.00	0.31	286.74	399.99	1.56	-0.33	-0.30	0.28	-0.18	-32.51
500.00	0.50	331.05	499.99	2.02	-0.80	-0.76	0.35	0.19	44.31
600.00	0.82	287.64	599.99	2.62	-1.70	-1.64	0.57	0.32	-43.41



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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	0.87	280.18	699.97	2.97	-3.13	-3.08	0.12	0.05	-7.46
800.00	0.95	290.50	799.96	3.39	-4.65	-4.57	0.18	0.08	10.32
900.00	0.80	298.18	899.95	4.01	-6.04	-5.95	0.19	-0.15	7.68
1,000.00	0.99	303.38	999.94	4.82	-7.38	-7.26	0.21	0.19	5.20
1,100.00	1.27	297.05	1,099.92	5.79	-9.09	-8.95	0.31	0.28	-6.33
1,200.00	0.78	294.26	1,199.90	6.58	-10.69	-10.54	0.49	-0.49	-2.79
1,300.00	1.49	295.22	1,299.88	7.41	-12.49	-12.32	0.71	0.71	0.96
1,400.00	1.12	310.25	1,399.86	8.60	-14.41	-14.21	0.50	-0.37	15.03
1,500.00	1.17	303.19	1,499.84	9.79	-16.01	-15.78	0.15	0.05	-7.06
1,600.00	1.29	322.17	1,599.81	11.24	-17.56	-17.29	0.42	0.12	18.98
1,700.00	1.33	305.14	1,699.79	12.79	-19.20	-18.90	0.39	0.04	-17.03
1,800.00	1.31	317.66	1,799.76	14.31	-20.92	-20.58	0.29	-0.02	12.52
1,900.00	1.30	301.82	1,899.74	15.75	-22.65	-22.28	0.36	-0.01	-15.84
2,000.00	1.10	330.98	1,999.71	17.19	-24.08	-23.67	0.63	-0.20	29.16
2,100.00	1.23	325.13	2,099.69	18.91	-25.16	-24.71	0.18	0.13	-5.85
2,200.00	0.93	329.96	2,199.68	20.49	-26.18	-25.70	0.31	-0.30	4.83
Tie-In to VES Gyro - Tie-In to VES Gyro Survey									
2,310.00	0.90	351.40	2,309.66	22.12	-26.76	-26.23	0.31	-0.03	19.49
First TDS MWD Survey									
2,374.00	1.40	336.80	2,373.65	23.33	-27.14	-26.59	0.90	0.78	-23.13
2,468.00	3.00	324.80	2,467.58	26.39	-29.02	-28.40	1.76	1.70	-12.77
2,562.00	2.80	323.00	2,561.46	30.23	-31.83	-31.12	0.23	-0.21	-1.70
2,656.00	3.60	308.30	2,655.31	33.89	-35.53	-34.73	1.21	0.85	-15.84
2,751.00	3.30	307.10	2,750.14	37.39	-40.05	-39.17	0.32	-0.32	-1.26
2,845.00	2.90	302.30	2,844.00	40.29	-44.22	-43.27	0.51	-0.43	-5.11
2,939.00	3.30	312.40	2,937.86	43.39	-46.22	-47.20	0.72	0.43	10.74
3,033.00	3.10	313.60	3,031.72	46.96	-52.06	-50.96	0.22	-0.21	1.28
3,128.00	3.10	315.10	3,126.58	50.56	-55.74	-54.55	0.09	0.00	1.58
3,221.00	3.90	313.60	3,219.40	54.52	-59.80	-58.52	0.87	0.86	-1.61
3,315.00	3.50	309.80	3,313.21	58.56	-64.32	-62.94	0.50	-0.43	-4.04
3,410.00	3.40	307.20	3,408.04	62.12	-68.79	-67.33	0.20	-0.11	-2.74
3,503.00	4.00	311.10	3,500.84	65.92	-73.43	-71.88	0.70	0.65	4.19
3,598.00	3.60	310.00	3,595.63	70.01	-78.21	-76.57	0.43	-0.42	-1.16
3,693.00	3.90	306.80	3,690.43	73.87	-83.09	-81.35	0.38	0.32	-3.37
3,787.00	4.00	308.50	3,784.21	77.82	-88.21	-86.38	0.16	0.11	1.81
3,881.00	3.80	305.70	3,877.89	81.68	-93.31	-91.39	0.28	-0.21	-2.98
3,976.00	3.70	305.30	3,972.79	85.29	-98.37	-96.36	0.11	-0.11	-0.42
4,071.00	3.60	306.90	4,067.59	88.85	-103.25	-101.16	0.15	-0.11	1.68
4,165.00	3.30	304.30	4,161.42	92.15	-107.85	-105.68	0.36	-0.32	-2.77
4,259.00	3.20	306.00	4,255.27	95.21	-112.21	-109.96	0.15	-0.11	1.81
4,355.00	3.10	309.30	4,351.13	98.43	-116.38	-114.07	0.22	-0.10	3.44
4,449.00	3.10	308.30	4,444.99	101.62	-120.34	-117.95	0.06	0.00	-1.08



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Local Co-ordinate Reference: Site Sneed 9 Federal Com #11H
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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)
4,544.00	3.20	310.30	4,539.85	104.93	-124.38	-121.91	0.18	0.11	2.11
4,639.00	3.00	309.70	4,634.71	108.23	-128.32	-125.77	0.21	-0.21	-0.83
4,734.00	2.60	308.20	4,729.59	111.15	-131.92	-129.31	0.43	-0.42	-1.58
4,829.00	0.70	279.60	4,824.55	112.58	-134.19	-131.54	2.12	-2.00	-30.11
4,924.00	0.10	125.50	4,919.55	112.63	-134.69	-132.04	0.83	-0.63	-162.21
5,019.00	0.20	132.40	5,014.55	112.47	-134.50	-131.86	0.11	0.11	7.26
5,050.00	1.40	91.10	5,045.54	112.42	-134.08	-131.44	4.05	3.87	-133.23
5,082.00	3.80	89.50	5,077.51	112.42	-132.63	-129.99	7.50	7.50	-5.00
5,114.00	6.50	92.40	5,109.38	112.36	-129.76	-127.12	8.47	8.44	9.06
5,145.00	9.30	93.80	5,140.08	112.12	-125.51	-122.87	9.05	9.03	4.52
5,177.00	12.40	93.80	5,171.50	111.72	-119.50	-118.87	9.89	9.89	0.00
5,208.00	15.60	90.80	5,201.58	111.45	-112.01	-109.39	10.82	10.32	-10.32
5,240.00	18.50	89.80	5,232.17	111.43	-102.83	-100.01	9.09	9.06	-2.50
5,272.00	21.80	89.90	5,262.21	111.46	-91.60	-88.99	10.31	10.31	0.31
5,303.00	25.10	90.20	5,290.64	111.44	-79.27	-76.66	10.65	10.65	0.97
5,335.00	28.20	90.70	5,319.24	111.33	-64.92	-62.32	9.71	9.69	1.56
5,365.00	30.90	91.30	5,345.34	111.07	-50.13	-47.54	9.05	9.00	2.00
5,397.00	33.60	90.70	5,372.40	110.77	-33.06	-30.48	8.50	8.44	-1.88
5,428.00	36.80	89.80	5,397.72	110.70	-15.19	-12.62	10.46	10.32	-2.90
5,459.00	40.00	88.80	5,422.02	110.94	4.06	6.64	10.51	10.32	-3.23
5,491.00	42.90	88.10	5,446.00	111.52	25.23	27.82	9.18	9.08	-2.19
5,522.00	43.40	87.40	5,468.62	112.35	46.42	49.01	2.23	1.61	-2.26
5,554.00	42.60	87.20	5,492.02	113.38	68.22	70.83	2.54	-2.50	-0.83
5,585.00	42.10	87.20	5,514.93	114.40	89.08	91.71	1.61	-1.61	0.00
5,617.00	41.80	87.60	5,538.73	115.37	110.45	113.09	1.26	-0.94	1.25
5,648.00	41.30	87.50	5,561.93	116.25	130.99	133.65	1.63	-1.61	-0.32
5,680.00	41.50	88.20	5,585.93	117.04	152.13	154.81	1.58	0.83	2.19
5,712.00	44.40	90.30	5,609.35	117.31	173.93	176.61	10.10	9.06	6.56
5,720.52	45.53	90.65	5,615.38	117.26	179.95	182.63	13.52	13.21	4.07
As-Drilled PP									
5,743.00	48.50	91.50	5,630.71	118.95	198.39	199.05	13.52	13.23	3.80
5,774.00	52.50	91.40	5,650.42	116.35	220.30	222.94	12.91	12.90	-0.32
5,805.00	56.50	90.70	5,668.42	115.89	245.53	248.15	13.03	12.90	-2.26
5,837.00	60.60	90.10	5,685.11	115.70	272.82	275.43	12.91	12.81	-1.88
5,869.00	64.80	89.80	5,699.79	115.73	301.25	303.85	13.15	13.13	-0.94
5,900.00	68.80	89.90	5,712.00	115.80	329.74	332.34	12.91	12.90	0.32
5,932.00	72.80	90.10	5,722.52	115.80	359.95	362.54	12.51	12.50	0.63
5,964.00	76.50	89.70	5,730.99	115.86	390.80	393.39	11.83	11.56	-1.25
5,995.00	79.60	89.40	5,737.40	118.10	421.13	423.71	10.04	10.00	-0.97
6,027.00	82.50	89.10	5,742.38	116.51	452.73	455.31	9.11	9.06	-0.94
6,058.00	84.90	88.80	5,745.78	117.13	483.54	486.12	7.91	7.74	-1.61
6,089.00	88.40	88.30	5,747.60	117.97	514.47	517.07	11.33	11.29	-0.97



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Survey Report



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6,121.00	89.50	87.70	5,748.18	119.08	546.44	549.06	3.92	3.44	-1.88
6,182.00	89.80	87.80	5,748.55	121.48	607.39	610.05	0.52	0.49	0.16
6,277.00	89.60	88.60	5,749.05	124.46	702.34	705.04	0.87	-0.21	0.84
6,372.00	89.50	88.60	5,749.80	126.78	797.31	800.04	0.11	-0.11	0.00
6,467.00	90.20	89.60	5,750.05	128.27	892.30	895.04	1.28	0.74	1.05
6,561.00	89.60	88.70	5,750.21	129.67	986.29	989.03	1.15	-0.64	-0.96
6,654.00	89.50	90.50	5,750.94	130.32	1,079.28	1,082.01	1.94	-0.11	1.94
6,749.00	89.70	91.90	5,751.60	128.33	1,174.25	1,176.91	1.49	0.21	1.47
6,844.00	89.20	91.40	5,752.52	125.59	1,269.21	1,271.76	0.74	-0.53	-0.53
6,938.00	89.50	91.20	5,753.58	123.46	1,363.18	1,365.66	0.38	0.32	-0.21
7,032.00	90.50	90.60	5,753.58	121.98	1,457.16	1,459.60	1.24	1.06	-0.64
7,127.00	90.10	90.70	5,753.09	120.91	1,552.16	1,554.54	0.43	-0.42	0.11
7,221.00	91.00	90.30	5,752.18	120.09	1,646.15	1,648.49	1.05	0.96	-0.43
7,315.00	90.70	90.70	5,750.79	119.27	1,740.13	1,742.43	0.53	-0.32	0.43
7,410.00	90.50	89.10	5,749.79	119.43	1,835.12	1,837.40	1.70	-0.21	-1.68
7,504.00	90.30	89.00	5,749.14	120.99	1,929.11	1,931.40	0.24	-0.21	-0.11
7,599.00	90.10	89.00	5,748.81	122.65	2,024.09	2,026.40	0.21	-0.21	0.00
7,693.00	89.80	89.40	5,748.89	123.96	2,118.08	2,120.39	0.53	-0.32	0.43
7,788.00	89.50	89.10	5,749.47	125.20	2,213.07	2,215.38	0.45	-0.32	-0.32
7,883.00	88.90	89.10	5,750.79	126.70	2,308.05	2,310.37	0.63	-0.63	0.00
7,977.00	89.90	89.50	5,751.78	127.84	2,402.04	2,404.36	1.15	1.08	0.43
8,072.00	91.00	89.50	5,751.03	128.67	2,497.03	2,499.35	1.16	1.16	0.00
8,166.00	90.60	89.30	5,749.72	129.66	2,591.02	2,593.33	0.48	-0.43	-0.21
8,261.00	90.10	88.50	5,749.14	131.48	2,686.00	2,688.32	0.99	-0.53	-0.84
8,356.00	90.00	89.90	5,749.06	132.81	2,780.98	2,783.32	1.48	-0.11	1.47
8,451.00	90.60	90.30	5,748.56	132.64	2,875.98	2,878.29	0.76	0.63	0.42
8,545.00	90.30	90.30	5,747.82	132.15	2,969.98	2,972.25	0.32	-0.32	0.00
8,639.00	89.80	90.10	5,747.74	131.82	3,063.98	3,066.21	0.57	-0.53	-0.21
8,734.00	89.50	90.80	5,748.32	131.08	3,158.97	3,161.16	0.80	-0.32	0.74
8,827.00	89.50	90.80	5,749.13	129.78	3,251.96	3,254.10	0.00	0.00	0.00
8,922.00	90.80	91.00	5,748.88	128.29	3,346.95	3,349.02	1.38	1.37	0.21
9,016.00	90.60	90.00	5,747.73	127.47	3,440.93	3,442.97	1.08	-0.21	-1.06
9,110.00	90.50	89.40	5,746.83	127.96	3,534.93	3,536.95	0.65	-0.11	-0.64
9,205.00	90.10	89.40	5,746.33	128.95	3,629.92	3,631.94	0.42	-0.42	0.00
9,300.00	89.50	89.40	5,746.67	129.95	3,724.91	3,726.93	0.63	-0.63	0.00
9,394.00	89.10	89.40	5,747.81	130.93	3,818.90	3,820.91	0.43	-0.43	0.00
9,489.00	90.30	89.70	5,748.31	131.68	3,913.90	3,915.90	1.30	1.26	0.32
9,582.00	90.10	89.90	5,747.99	132.00	4,008.89	4,008.88	0.30	-0.22	0.22
9,676.00	89.60	89.50	5,748.23	132.49	4,100.89	4,102.86	0.68	-0.53	-0.43
9,771.00	89.70	90.50	5,748.81	132.49	4,195.89	4,197.83	1.06	0.11	1.05
9,866.00	89.30	90.80	5,749.64	131.42	4,290.88	4,292.77	0.53	-0.42	0.32
9,960.00	90.10	90.00	5,750.13	130.76	4,384.87	4,386.73	1.20	0.85	-0.85



TDS
Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD-27 2015)
Site: Sneed 9 Federal Com #11H
Well: SHL: 470' FNL, 150' FWL, Sec 9, T17S, R32E, Unit D
Wellbore: BHL: 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D
Design: BHL: 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D

Local Co-ordinate Reference: Site Sneed 9 Federal Com #11H
TVD Reference: KB @ 4107.00usft (Patriot 6)
MD Reference: KB @ 4107.00usft (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)
10,054.00	89.80	89.80	5,750.22	130.92	4,478.87	4,480.71	0.38	-0.32	-0.21
10,148.00	89.60	89.50	5,750.71	131.50	4,572.87	4,574.69	0.38	-0.21	-0.32
10,243.00	90.00	89.50	5,751.04	132.33	4,667.87	4,669.68	0.42	0.42	0.00
10,337.00	89.60	89.20	5,751.37	133.39	4,761.86	4,763.67	0.53	-0.43	-0.32
10,431.00	90.20	89.00	5,751.53	134.87	4,855.85	4,857.67	0.67	0.64	-0.21
10,525.00	90.10	90.50	5,751.29	135.28	4,949.84	4,951.65	1.60	-0.11	1.60
10,620.00	89.60	90.50	5,751.54	134.45	5,044.84	5,046.60	0.53	-0.53	0.00
10,715.00	90.20	89.80	5,751.70	134.20	5,139.84	5,141.57	0.97	0.63	-0.74
10,810.00	89.80	89.70	5,751.70	134.62	5,234.84	5,236.55	0.43	-0.42	-0.11
10,904.00	90.90	90.10	5,751.13	134.78	5,328.83	5,330.53	1.25	1.17	0.43
10,999.00	91.00	90.20	5,749.55	134.53	5,423.82	5,425.48	0.15	0.11	0.11
11,093.00	90.30	90.40	5,748.49	134.04	5,517.81	5,519.44	0.77	-0.74	0.21
11,187.00	90.90	89.40	5,747.50	134.20	5,611.81	5,613.41	1.24	0.64	-1.06
11,281.00	90.80	89.70	5,748.11	134.94	5,705.79	5,707.39	0.34	-0.11	0.32
11,376.00	91.00	89.80	5,744.61	135.36	5,800.78	5,802.36	0.24	0.21	0.11
11,470.00	89.30	89.30	5,744.37	136.10	5,894.77	5,896.34	1.89	-1.81	-0.53
11,565.00	88.70	89.00	5,746.03	137.50	5,989.75	5,991.32	0.71	-0.63	-0.32
Last TDS MWD Survey									
11,662.00	88.70	89.00	5,748.23	139.20	6,086.71	6,088.30	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)	
2,200.00	2,199.68	20.49	-26.18	Tie-In to VES Gyro
2,200.00	2,199.68	20.49	-26.18	Tie-In to VES Gyro Survey
2,310.00	2,309.66	22.12	-26.76	First TDS MWD Survey
5,720.52	5,615.38	117.26	179.95	As-Drilled PP
11,565.00	5,748.03	137.50	5,989.75	Last TDS MWD Survey
11,662.00	5,748.23	139.20	6,086.71	Projection to Bit/TD

Checked By: _____ Approved By: _____ Date: _____



October 27, 2016

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

Attn: Kanicia Castillo

RE: **Sneed 9 Federal Com No. 011H**

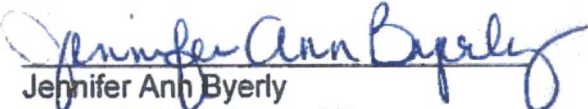
Please find enclosed a copy of the survey from 0' to 2200' ran on the above referenced well.

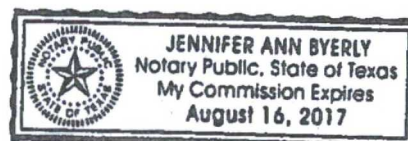
Sincerely,


Keith Havelka
Operations

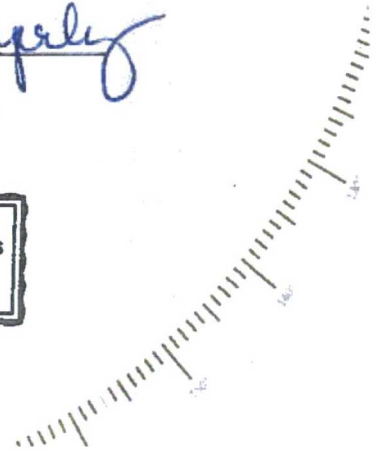
STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 27th day of October,
A.D., 2016, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas



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





Company: COG OPERATING
Lease/Well: SNEED 9 FEDERAL COM NO./011H

Rig Name: PATRIOT 6
State/County: NEW MEXICO/LEA
VS-Azi: 0.00 Degrees
Latitude: 32.85500, Longitude: -103.77904
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: 10/27/2016 / 13:57

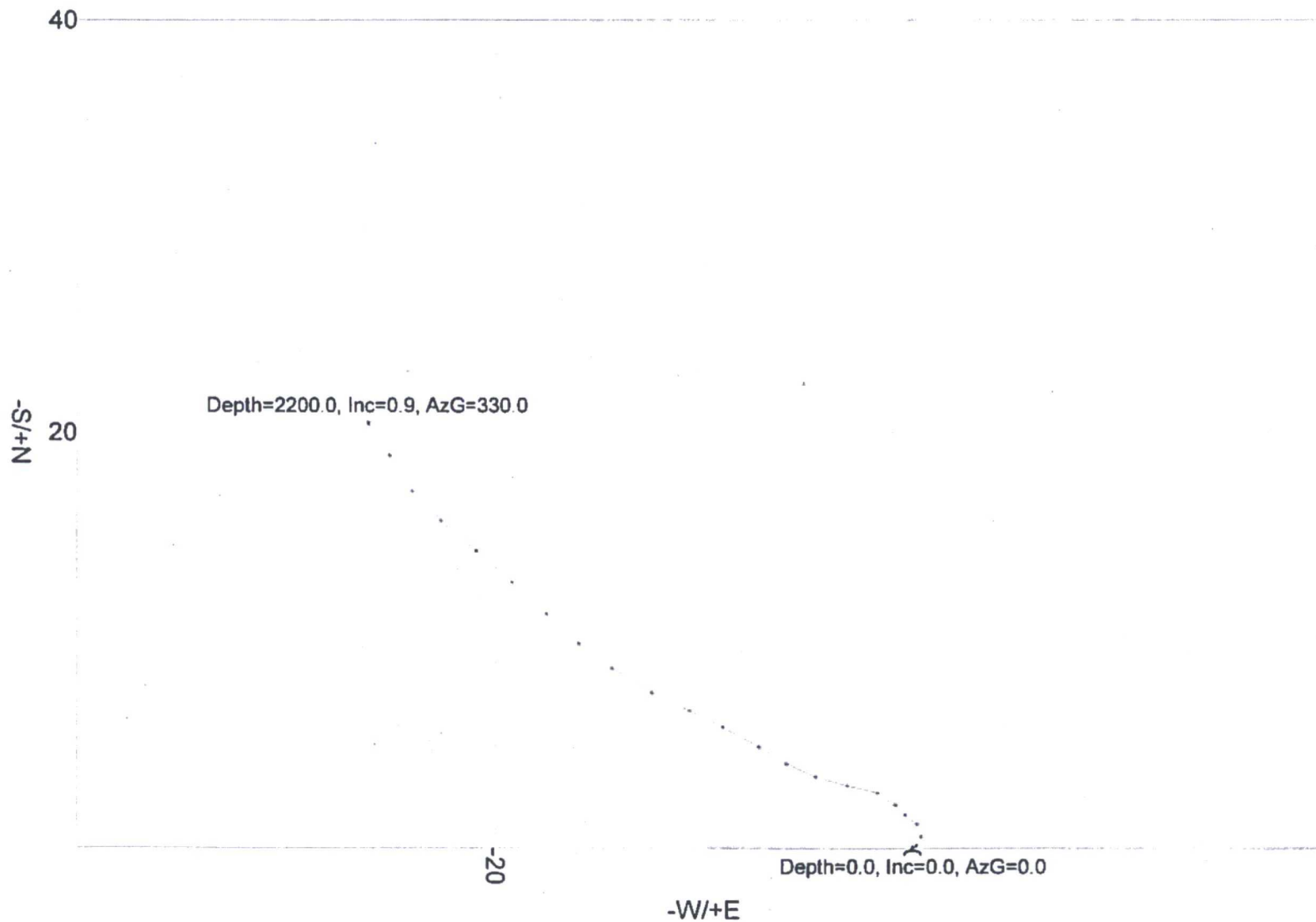
VES Survey International
Midland, Texas
432-563-5444
Surveyor: Michael Cook
Sneed 9 Federal Com No. 011H / API 30-025-43284

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	0.25	54.84	100.00	0.13	0.18	0.13	0.22	54.84	0.25
200.00	0.34	12.36	200.00	0.55	0.43	0.55	0.69	37.99	0.23
300.00	0.49	319.25	300.00	1.16	0.21	1.16	1.18	10.24	0.40
400.00	0.31	286.74	399.99	1.56	-0.33	1.56	1.60	347.98	0.28
500.00	0.50	331.05	499.99	2.02	-0.81	2.02	2.18	338.29	0.35
600.00	0.82	287.64	599.99	2.62	-1.70	2.62	3.12	327.03	0.57
700.00	0.87	280.18	699.97	2.97	-3.13	2.97	4.31	313.49	0.12
800.00	0.95	290.50	799.96	3.39	-4.65	3.39	5.76	306.11	0.18
900.00	0.80	298.18	899.95	4.01	-6.04	4.01	7.25	303.59	0.19
1000.00	0.99	303.38	999.94	4.82	-7.38	4.82	8.81	303.14	0.21
1100.00	1.27	297.05	1099.92	5.80	-9.09	5.80	10.79	302.53	0.31
1200.00	0.78	294.26	1199.90	6.58	-10.70	6.58	12.57	301.60	0.50
1300.00	1.49	295.22	1299.88	7.42	-12.50	7.42	14.53	300.69	0.71
1400.00	1.12	310.25	1399.86	8.60	-14.42	8.60	16.79	300.82	0.50
1500.00	1.17	303.19	1499.84	9.79	-16.02	9.79	18.77	301.44	0.15
1600.00	1.29	322.17	1599.81	11.23	-17.56	11.23	20.84	302.62	0.42

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	1.33	305.14	1699.79	12.79	-19.19	12.79	23.07	303.68	0.39
1800.00	1.31	317.66	1799.76	14.30	-20.91	14.30	25.34	304.37	0.29
1900.00	1.30	301.82	1899.74	15.75	-22.65	15.75	27.59	304.81	0.36
2000.00	1.10	330.98	1999.71	17.18	-24.08	17.18	29.58	305.51	0.64
2100.00	1.23	325.13	2099.69	18.90	-25.15	18.90	31.46	306.92	0.18
2200.00	0.93	329.96	2199.68	20.48	-26.17	20.48	33.23	308.04	0.31



VES Survey International
Midland, Texas
432-563-5444
Surveyor: Michael Cook
Sneed 9 Federal Com No. 011H / API 30-025-43284



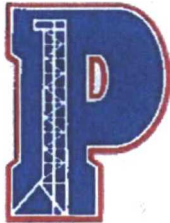
V.E.S. Survey Date: 10/21/2016



I Michael Cook certify that I am employed by VES Survey International. That I did on the day(s) of 10/21/16 through 10/21/16 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 2,200.00 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 Sneed 9 Federal Com Well # 11H API # 30-025-43284 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.

Michael Cook

Michael Cook
Service Technician
VES Survey International



PATRIOT DRILLING, LLC

OPERATOR: COG Operating, LLC
WELL/LEASE: Sneed 9 Fed Com #11H
COUNTY: Lea Co., New Mexico
Sec. 9, T 17S, R 32E

**STATE OF NEW MEXICO
DEVIATION REPORT**

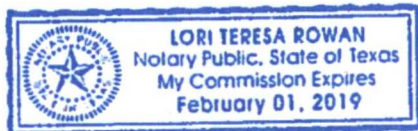
<u>Depth</u>	<u>Deviation</u>	<u>Depth</u>	<u>Deviation</u>
506	1/4	1,570	1
900	1	1,889	1
1,221	3/4		

Patriot Drilling, LLC

M. Leroy Peterson, Executive Vice-President

The foregoing instrument was acknowledged before me on this 7th day of November 2016 by M. Leroy Peterson, Executive Vice-President of Patriot Drilling, LLC.

My Commission Expires: 02/01/2019



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