



3001542484

February 5, 2015

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

NM OIL CONSERVATION
ARTESIA DISTRICT

APR 06 2015

RECEIVED

Attn: Kanicia Castillo

RE: Horned Owl Federal 1H

Please find enclosed a copy of the survey from 0' to 6670' ran on the above referenced well.

Sincerely,

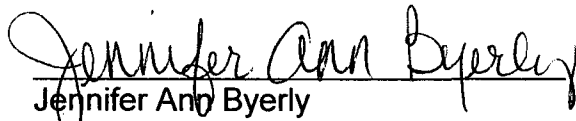

Keith Havelka
Operations

STATE OF TEXAS §

§

COUNTY OF NUECES §

This instrument was acknowledged before me on the 5 day of Feb,
A.D., 2015, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas





Company: Concho
Lease/Well: Horned Owl Federal/1H

Location:

Rig Name: Silver Oak 1

State/County: New Mexico /Eddy

Latitude: 32.02, Longitude: -104.25

GRID North is 0.04 Degrees East of True North

VS-Azi: 178.48 Degrees



NM OIL CONSERVATION
ARTESIA DISTRICT
APR 06 2015
RECEIVED

Depth Reference : R.K.B = 17.5

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: horned owl 1h survey.ut

Minimum Curvature Method

Report Date/Time: 2/5/2015 / 10:40

VES Survey International

(432) 563-5444

West Texas

Surveyor: Javier Estrada

Horned Owl Federal 1H / API 30-015-42484

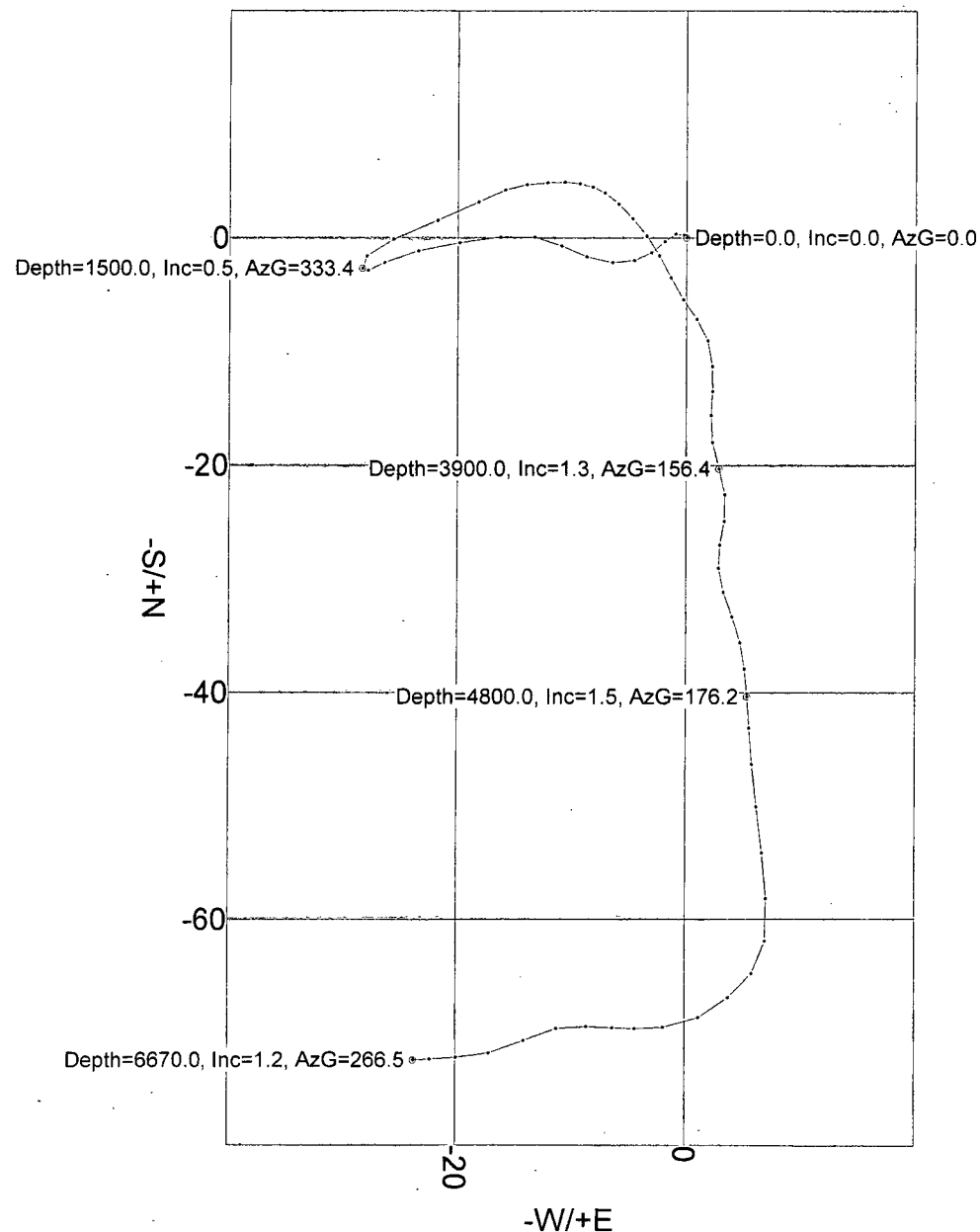
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.41	316.65	100.00	0.26	-0.24	-0.26	0.35	316.65	0.41
200.00	0.59	251.24	200.00	0.35	-0.98	-0.37	1.04	289.62	0.56
300.00	0.81	223.61	299.99	-0.33	-1.95	0.28	1.98	260.41	0.40
400.00	0.94	236.17	399.98	-1.30	-3.12	1.21	3.38	247.43	0.23
500.00	0.94	254.09	499.96	-1.98	-4.59	1.85	5.00	246.70	0.29
600.00	1.28	270.98	599.95	-2.18	-6.50	2.01	6.86	251.43	0.47
700.00	1.40	293.86	699.92	-1.67	-8.73	1.44	8.89	259.17	0.54
800.00	1.36	293.13	799.89	-0.71	-10.94	0.42	10.97	266.29	0.04
900.00	1.49	282.78	899.86	0.05	-13.31	-0.40	13.31	270.20	0.29
1000.00	1.99	261.68	999.81	0.08	-16.30	-0.52	16.30	270.29	0.80
1100.00	2.08	262.02	1099.75	-0.42	-19.82	-0.10	19.83	268.78	0.09
1200.00	2.15	255.01	1199.68	-1.16	-23.43	0.54	23.46	267.17	0.27
1300.00	1.46	244.74	1299.63	-2.19	-26.39	1.49	26.48	265.26	0.76
1400.00	0.40	243.15	1399.62	-2.89	-27.86	2.15	28.01	264.08	1.06
1500.00	0.47	333.42	1499.62	-2.68	-28.35	1.92	28.48	264.61	0.62
1600.00	1.03	39.23	1599.61	-1.62	-27.97	0.87	28.01	266.69	0.94
1700.00	2.21	66.16	1699.57	-0.14	-25.64	-0.54	25.64	269.68	1.37
1800.00	2.62	66.57	1799.48	1.54	-21.78	-2.12	21.83	274.06	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
1900.00	1.87	64.63	1899.40	3.15	-18.21	-3.63	18.48	279.82	0.76
2000.00	1.07	66.72	1999.37	4.22	-15.88	-4.64	16.43	284.88	0.80
2100.00	1.16	83.65	2099.35	4.70	-14.02	-5.07	14.78	288.53	0.34
2200.00	0.95	87.06	2199.33	4.85	-12.18	-5.17	13.11	291.72	0.23
2300.00	0.77	90.91	2299.32	4.88	-10.68	-5.17	11.75	294.57	0.18
2400.00	0.76	100.90	2399.31	4.75	-9.36	-5.00	10.50	296.90	0.13
2500.00	0.58	107.03	2499.30	4.48	-8.23	-4.69	9.37	298.54	0.19
2600.00	0.80	122.38	2599.30	3.95	-7.16	-4.14	8.18	298.91	0.29
2700.00	0.94	135.04	2699.29	3.00	-5.98	-3.15	6.69	296.59	0.24
2800.00	1.11	137.54	2799.27	1.70	-4.75	-1.82	5.04	289.67	0.18
2900.00	1.14	143.62	2899.25	0.18	-3.50	-0.27	3.50	272.90	0.12
3000.00	1.23	151.60	2999.23	-1.57	-2.40	1.50	2.87	236.85	0.19
3100.00	1.30	153.14	3099.20	-3.52	-1.38	3.49	3.78	201.32	0.08
3200.00	1.23	147.75	3199.18	-5.44	-0.29	5.43	5.45	183.06	0.14
3300.00	1.17	141.87	3299.16	-7.15	0.91	7.17	7.21	172.74	0.13
3400.00	1.29	162.99	3399.14	-9.03	1.87	9.08	9.23	168.29	0.47
3500.00	1.35	175.30	3499.11	-11.29	2.30	11.35	11.52	168.49	0.29
3600.00	1.19	184.70	3599.09	-13.50	2.31	13.56	13.70	170.29	0.27
3700.00	1.22	182.32	3699.06	-15.60	2.18	15.65	15.75	172.03	0.06
3800.00	1.52	172.71	3799.03	-17.98	2.31	18.03	18.12	172.68	0.38
3900.00	1.26	156.41	3899.01	-20.30	2.91	20.37	20.51	171.83	0.47
4000.00	1.45	176.93	3998.98	-22.57	3.42	22.65	22.83	171.38	0.52
4100.00	1.24	186.16	4098.95	-24.91	3.37	24.99	25.14	172.29	0.30
4200.00	1.21	195.45	4198.93	-27.00	2.98	27.07	27.17	173.71	0.20
4300.00	1.18	170.98	4298.91	-29.04	2.86	29.10	29.18	174.38	0.51
4400.00	1.27	165.03	4398.88	-31.13	3.31	31.20	31.30	173.94	0.16
4500.00	1.40	156.77	4498.86	-33.32	4.07	33.42	33.57	173.03	0.23
4600.00	1.35	169.04	4598.83	-35.60	4.78	35.71	35.92	172.36	0.30
4700.00	1.33	172.40	4698.80	-37.90	5.16	38.03	38.25	172.25	0.08
4800.00	1.48	176.20	4798.77	-40.34	5.39	40.47	40.70	172.38	0.18
4900.00	1.69	176.03	4898.73	-43.09	5.58	43.23	43.45	172.62	0.21
5000.00	1.99	174.90	4998.68	-46.29	5.84	46.43	46.66	172.81	0.30
5100.00	2.34	172.93	5098.61	-50.04	6.24	50.19	50.43	172.89	0.36
5200.00	2.35	173.16	5198.53	-54.10	6.74	54.26	54.52	172.90	0.02
5300.00	2.31	176.40	5298.44	-58.15	7.11	58.31	58.58	173.03	0.14
5400.00	2.04	187.10	5398.37	-61.93	7.02	62.09	62.33	173.54	0.49
5500.00	1.64	220.18	5498.32	-64.79	5.87	64.93	65.06	174.82	1.12
5600.00	1.75	227.64	5598.28	-66.92	3.82	67.00	67.03	176.74	0.25
5700.00	1.91	243.77	5698.23	-68.69	1.19	68.69	68.70	179.01	0.54

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
5800.00	1.84	265.19	5798.18	-69.56	-1.91	69.48	69.58	181.57	0.70
5900.00	0.99	270.18	5898.14	-69.69	-4.38	69.55	69.83	183.59	0.86
6000.00	1.22	274.22	5998.13	-69.61	-6.30	69.42	69.89	185.17	0.23
6100.00	1.40	270.90	6098.10	-69.51	-8.58	69.26	70.04	187.04	0.20
6200.00	1.62	262.64	6198.06	-69.67	-11.20	69.35	70.57	189.14	0.30
6300.00	1.97	239.41	6298.02	-70.73	-14.08	70.33	72.12	191.26	0.80
6400.00	1.80	261.33	6397.96	-71.84	-17.12	71.36	73.85	193.40	0.74
6500.00	1.46	264.37	6497.92	-72.20	-19.94	71.65	74.91	195.44	0.34
6600.00	1.17	267.65	6597.90	-72.37	-22.23	71.76	75.71	197.08	0.30
6670.00	1.16	266.48	6667.88	-72.44	-23.65	71.79	76.21	198.08	0.04



VES Survey International
(432) 563-5444
West Texas
Surveyor: Javier Estrada
Horned Owl Federal 1H / API 30-015-42484



VES Survey Date: 1/31/2015



COG Operating LLC

Eddy County, NM

Horned Owl Federal #1H

Surface: 20' FNL, 330' FWL, Sec 25, T26S, R26E, Unit D

PP: 7353.0' MD, 7267.8' TVD, 310.0' S, 10.3' E, 310.1' VS

EOC: 7652.6' MD, 7350.0' TVD, 588.9' S, 62.8' E, 590.3' VS

BHL: 350' FSL, 380' FWL, Sec 25, T26E, R26E, Unit M

Design: BHL: 350' FSL, 380' FWL, Sec 25, T26E, R26E, Unit M

Survey Report - Geographic

07 February, 2015





TDS
Survey Report - Geographic



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Horned Owl Federal #1H
Project:	Eddy County, NM	TVD Reference:	KB @ 3432.1usft
Site:	Horned Owl Federal #1H	MD Reference:	KB @ 3432.1usft
Well:	Surface: 20' FNL, 330' FWL, Sec 25, T26S, R26E, Unit D	North Reference:	Grid
Wellbore:	BHL: 350' FSL, 380' FWL, Sec 25, T26E, R26E, Unit M	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FSL, 380' FWL, Sec 25, T26E, R26E, Unit M	Database:	EDM 5000.1 Single User Db

Project	Eddy 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		Horned Owl Federal #1H			
Site Position:		Northing:	371,130.00 usft	Latitude:	32° 1' 13.171 N
From:	Map	Easting:	524,796.70 usft	Longitude:	104° 15' 11.970 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.04 °

Well	Surface: 20' FNL, 330' FWL, Sec 25, T26S, R26E, Unit D					
Well Position	+N/-S	0.0 usft	Northing:	371,130.00 usft	Latitude:	32° 1' 13.171 N
	+E/-W	0.0 usft	Easting:	524,796.70 usft	Longitude:	104° 15' 11.970 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	3,415.1 usft

Wellbore	BHL: 350' FSL, 380' FWL, Sec 25, T26E, R26E, Unit M				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/6/2014	7.48	59.80	48,089

Design	BHL: 350' FSL, 380' FWL, Sec 25, T26E, R26E, Unit M				
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	178.48	

Survey Program	Date	2/7/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	6,670.0	GYRO #1 (BHL: 350' FSL, 380' FWL, Sec	Good_gyro	Good Gyro	
6,710.0	11,930.0	MWD #1 (BHL: 350' FSL, 380' FWL, Sec 2	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	371,130.00	524,796.70	32° 1' 13.171 N	104° 15' 11.970 W
100.0	0.41	316.65	100.0	0.3	-0.2	371,130.26	524,796.46	32° 1' 13.173 N	104° 15' 11.973 W
200.0	0.59	251.24	200.0	0.4	-1.0	371,130.35	524,795.72	32° 1' 13.174 N	104° 15' 11.981 W
300.0	0.81	223.61	300.0	-0.3	-2.0	371,129.68	524,794.75	32° 1' 13.168 N	104° 15' 11.993 W
400.0	0.94	236.17	400.0	-1.3	-3.1	371,128.71	524,793.58	32° 1' 13.158 N	104° 15' 12.006 W
500.0	0.94	254.09	500.0	-2.0	-4.6	371,128.03	524,792.11	32° 1' 13.151 N	104° 15' 12.023 W
600.0	1.28	270.98	599.9	-2.2	-6.5	371,127.82	524,790.20	32° 1' 13.149 N	104° 15' 12.045 W
700.0	1.40	293.86	699.9	-1.7	-8.7	371,128.33	524,787.97	32° 1' 13.154 N	104° 15' 12.071 W
800.0	1.36	293.13	799.9	-0.7	-10.9	371,129.29	524,785.76	32° 1' 13.164 N	104° 15' 12.097 W



TDS
Survey Report - Geographic



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Horned Owl Federal #1H
Project:	Eddy County, NM	TVD Reference:	KB @ 3432.1usft
Site:	Horned Owl Federal #1H	MD Reference:	KB @ 3432.1usft
Well:	Surface: 20' FNL, 330' FWL, Sec 25, T26S, R26E, Unit D	North Reference:	Grid
Wellbore:	BHL: 350' FSL, 380' FWL, Sec 25, T26E, R26E, Unit M	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FSL, 380' FWL, Sec 25, T26E, R26E, Unit M	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	
900.0	1.49	282.78	899.9	0.0	-13.3	371,130.05	524,783.40	32° 1' 13.171 N	104° 15' 12.124 W	
1,000.0	1.99	261.68	999.8	0.1	-16.3	371,130.08	524,780.42	32° 1' 13.172 N	104° 15' 12.159 W	
1,100.0	2.08	262.02	1,099.8	-0.4	-19.8	371,129.58	524,776.90	32° 1' 13.167 N	104° 15' 12.200 W	
1,200.0	2.15	255.01	1,199.7	-1.2	-23.4	371,128.84	524,773.29	32° 1' 13.160 N	104° 15' 12.242 W	
1,300.0	1.46	244.74	1,299.6	-2.2	-26.4	371,127.81	524,770.33	32° 1' 13.149 N	104° 15' 12.276 W	
1,400.0	0.40	243.15	1,399.6	-2.9	-27.8	371,127.11	524,768.86	32° 1' 13.143 N	104° 15' 12.293 W	
1,500.0	0.47	333.42	1,499.6	-2.7	-28.3	371,127.32	524,768.37	32° 1' 13.145 N	104° 15' 12.299 W	
1,600.0	1.03	39.23	1,599.6	-1.6	-27.9	371,128.39	524,768.75	32° 1' 13.155 N	104° 15' 12.295 W	
1,700.0	2.21	66.16	1,699.6	-0.1	-25.6	371,129.86	524,771.09	32° 1' 13.170 N	104° 15' 12.267 W	
1,800.0	2.62	66.57	1,799.5	1.6	-21.8	371,131.55	524,774.95	32° 1' 13.186 N	104° 15' 12.223 W	
1,900.0	1.87	64.63	1,899.4	3.2	-18.2	371,133.16	524,778.52	32° 1' 13.202 N	104° 15' 12.181 W	
2,000.0	1.07	66.72	1,999.4	4.2	-15.9	371,134.23	524,780.85	32° 1' 13.213 N	104° 15' 12.154 W	
2,100.0	1.16	83.65	2,099.3	4.7	-14.0	371,134.71	524,782.71	32° 1' 13.218 N	104° 15' 12.132 W	
2,200.0	0.95	87.06	2,199.3	4.9	-12.2	371,134.86	524,784.55	32° 1' 13.219 N	104° 15' 12.111 W	
2,300.0	0.77	90.91	2,299.3	4.9	-10.7	371,134.89	524,786.05	32° 1' 13.219 N	104° 15' 12.094 W	
2,400.0	0.76	100.90	2,399.3	4.8	-9.3	371,134.76	524,787.37	32° 1' 13.218 N	104° 15' 12.078 W	
2,500.0	0.58	107.03	2,499.3	4.5	-8.2	371,134.48	524,788.51	32° 1' 13.215 N	104° 15' 12.065 W	
2,600.0	0.80	122.38	2,599.3	4.0	-7.1	371,133.96	524,789.58	32° 1' 13.210 N	104° 15' 12.053 W	
2,700.0	0.94	135.04	2,699.3	3.0	-6.0	371,133.01	524,790.75	32° 1' 13.201 N	104° 15' 12.039 W	
2,800.0	1.11	137.54	2,799.3	1.7	-4.7	371,131.71	524,791.98	32° 1' 13.188 N	104° 15' 12.025 W	
2,900.0	1.14	143.62	2,899.3	0.2	-3.5	371,130.20	524,793.23	32° 1' 13.173 N	104° 15' 12.010 W	
3,000.0	1.23	151.60	2,999.2	-1.5	-2.4	371,128.45	524,794.33	32° 1' 13.156 N	104° 15' 11.997 W	
3,100.0	1.30	153.14	3,099.2	-3.5	-1.4	371,126.49	524,795.35	32° 1' 13.136 N	104° 15' 11.986 W	
3,200.0	1.23	147.75	3,199.2	-5.4	-0.3	371,124.58	524,796.43	32° 1' 13.117 N	104° 15' 11.973 W	
3,300.0	1.17	141.87	3,299.2	-7.1	0.9	371,122.86	524,797.64	32° 1' 13.100 N	104° 15' 11.959 W	
3,400.0	1.29	162.99	3,399.1	-9.0	1.9	371,120.98	524,798.60	32° 1' 13.082 N	104° 15' 11.948 W	
3,500.0	1.35	175.30	3,499.1	-11.3	2.3	371,118.73	524,799.02	32° 1' 13.059 N	104° 15' 11.943 W	
3,600.0	1.19	184.70	3,599.1	-13.5	2.3	371,116.53	524,799.03	32° 1' 13.038 N	104° 15' 11.943 W	
3,700.0	1.22	182.32	3,699.1	-15.6	2.2	371,114.43	524,798.91	32° 1' 13.017 N	104° 15' 11.944 W	
3,800.0	1.52	172.71	3,799.0	-18.0	2.3	371,112.05	524,799.03	32° 1' 12.993 N	104° 15' 11.943 W	
3,900.0	1.26	156.41	3,899.0	-20.3	2.9	371,109.72	524,799.64	32° 1' 12.970 N	104° 15' 11.936 W	
4,000.0	1.45	176.93	3,999.0	-22.5	3.4	371,107.45	524,800.15	32° 1' 12.948 N	104° 15' 11.930 W	
4,100.0	1.24	186.16	4,099.0	-24.9	3.4	371,105.11	524,800.10	32° 1' 12.925 N	104° 15' 11.931 W	
4,200.0	1.21	195.45	4,198.9	-27.0	3.0	371,103.02	524,799.70	32° 1' 12.904 N	104° 15' 11.935 W	
4,300.0	1.18	170.98	4,298.9	-29.0	2.9	371,100.99	524,799.58	32° 1' 12.884 N	104° 15' 11.937 W	
4,400.0	1.27	165.03	4,398.9	-31.1	3.3	371,098.90	524,800.03	32° 1' 12.863 N	104° 15' 11.931 W	
4,500.0	1.40	156.77	4,498.9	-33.3	4.1	371,096.71	524,800.80	32° 1' 12.841 N	104° 15' 11.923 W	
4,600.0	1.35	169.04	4,598.8	-35.6	4.8	371,094.43	524,801.50	32° 1' 12.819 N	104° 15' 11.914 W	
4,700.0	1.33	172.40	4,698.8	-37.9	5.2	371,092.12	524,801.88	32° 1' 12.796 N	104° 15' 11.910 W	
4,800.0	1.48	176.20	4,798.8	-40.3	5.4	371,089.68	524,802.12	32° 1' 12.772 N	104° 15' 11.907 W	
4,900.0	1.69	176.03	4,898.7	-43.1	5.6	371,086.92	524,802.31	32° 1' 12.745 N	104° 15' 11.905 W	
5,000.0	1.99	174.90	4,998.7	-46.3	5.9	371,083.72	524,802.56	32° 1' 12.713 N	104° 15' 11.902 W	
5,100.0	2.34	172.93	5,098.6	-50.0	6.3	371,079.97	524,802.97	32° 1' 12.676 N	104° 15' 11.897 W	
5,200.0	2.35	173.16	5,198.5	-54.1	6.8	371,075.90	524,803.47	32° 1' 12.635 N	104° 15' 11.892 W	
5,300.0	2.31	176.40	5,298.4	-58.1	7.1	371,071.86	524,803.84	32° 1' 12.595 N	104° 15' 11.888 W	
5,400.0	2.04	187.10	5,398.4	-61.9	7.0	371,068.08	524,803.74	32° 1' 12.558 N	104° 15' 11.889 W	
5,500.0	1.64	220.18	5,498.3	-64.8	5.9	371,065.22	524,802.60	32° 1' 12.530 N	104° 15' 11.902 W	
5,600.0	1.75	227.64	5,598.3	-66.9	3.8	371,063.10	524,800.55	32° 1' 12.509 N	104° 15' 11.926 W	
5,700.0	1.91	243.77	5,698.2	-68.7	1.2	371,061.33	524,797.92	32° 1' 12.491 N	104° 15' 11.956 W	
5,800.0	1.84	265.19	5,798.2	-69.5	-1.9	371,060.46	524,794.83	32° 1' 12.483 N	104° 15' 11.992 W	
5,900.0	0.99	270.18	5,898.1	-69.7	-4.3	371,060.33	524,792.37	32° 1' 12.481 N	104° 15' 12.021 W	
6,000.0	1.22	274.22	5,998.1	-69.6	-6.3	371,060.41	524,790.44	32° 1' 12.482 N	104° 15' 12.043 W	



TDS
Survey Report - Geographic



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Horned Owl Federal #1H
Project:	Eddy County, NM	TVD Reference:	KB @ 3432.1usft
Site:	Horned Owl Federal #1H	MD Reference:	KB @ 3432.1usft
Well:	Surface: 20' FNL, 330' FWL, Sec 25, T26S, R26E, Unit D	North Reference:	Grid
Wellbore:	BHL: 350' FSL, 380' FWL, Sec 25, T26E, R26E, Unit M	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FSL, 380' FWL, Sec 25, T26E, R26E, Unit M	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	
6,100.0	1.40	270.90	6,098.1	-69.5	-8.5	371,060.51	524,788.16	32° 1' 12.483 N	104° 15' 12.070 W	
6,200.0	1.62	262.64	6,198.1	-69.7	-11.2	371,060.35	524,785.53	32° 1' 12.482 N	104° 15' 12.100 W	
6,300.0	1.97	239.41	6,298.0	-70.7	-14.0	371,059.29	524,782.65	32° 1' 12.471 N	104° 15' 12.134 W	
6,400.0	1.80	261.33	6,398.0	-71.8	-17.1	371,058.18	524,779.62	32° 1' 12.460 N	104° 15' 12.169 W	
6,500.0	1.46	264.37	6,497.9	-72.2	-19.9	371,057.82	524,776.80	32° 1' 12.457 N	104° 15' 12.202 W	
6,600.0	1.17	267.65	6,597.9	-72.3	-22.2	371,057.65	524,774.51	32° 1' 12.455 N	104° 15' 12.228 W	
6,670.0	1.16	266.48	6,667.9	-72.4	-23.6	371,057.58	524,773.09	32° 1' 12.454 N	104° 15' 12.245 W	
6,710.0	1.10	280.40	6,707.9	-72.4	-24.4	371,057.62	524,772.31	32° 1' 12.455 N	104° 15' 12.254 W	
6,742.0	1.70	173.60	6,739.9	-72.8	-24.6	371,057.21	524,772.06	32° 1' 12.451 N	104° 15' 12.257 W	
6,773.0	5.70	164.90	6,770.8	-74.7	-24.2	371,055.26	524,772.51	32° 1' 12.431 N	104° 15' 12.251 W	
6,805.0	9.30	174.30	6,802.5	-78.8	-23.5	371,051.15	524,773.18	32° 1' 12.391 N	104° 15' 12.244 W	
6,837.0	13.30	177.80	6,833.9	-85.1	-23.1	371,044.90	524,773.58	32° 1' 12.329 N	104° 15' 12.239 W	
6,868.0	16.80	178.10	6,863.8	-93.1	-22.8	371,036.86	524,773.87	32° 1' 12.249 N	104° 15' 12.236 W	
6,900.0	20.40	177.40	6,894.2	-103.3	-22.4	371,026.66	524,774.27	32° 1' 12.148 N	104° 15' 12.231 W	
6,932.0	24.00	174.40	6,923.8	-115.4	-21.5	371,014.61	524,775.16	32° 1' 12.029 N	104° 15' 12.221 W	
6,964.0	28.00	170.90	6,952.5	-129.3	-19.7	371,000.71	524,776.99	32° 1' 11.891 N	104° 15' 12.200 W	
6,995.0	32.60	169.90	6,979.3	-144.7	-17.1	370,985.29	524,779.60	32° 1' 11.739 N	104° 15' 12.170 W	
7,027.0	36.70	169.80	7,005.6	-162.6	-13.9	370,967.39	524,782.81	32° 1' 11.562 N	104° 15' 12.133 W	
7,058.0	40.00	169.80	7,029.9	-181.5	-10.5	370,948.46	524,786.21	32° 1' 11.374 N	104° 15' 12.093 W	
7,090.0	42.20	170.50	7,054.0	-202.3	-6.9	370,927.73	524,789.81	32° 1' 11.169 N	104° 15' 12.052 W	
7,120.0	44.00	170.50	7,075.9	-222.5	-3.5	370,907.52	524,793.19	32° 1' 10.969 N	104° 15' 12.013 W	
7,152.0	46.00	170.30	7,098.6	-244.8	0.3	370,885.21	524,796.97	32° 1' 10.748 N	104° 15' 11.969 W	
7,183.0	49.50	170.10	7,119.4	-267.4	4.2	370,862.60	524,800.87	32° 1' 10.524 N	104° 15' 11.924 W	
7,215.0	53.80	169.90	7,139.2	-292.1	8.5	370,837.89	524,805.23	32° 1' 10.280 N	104° 15' 11.873 W	
7,247.0	56.00	170.00	7,157.6	-317.9	13.1	370,812.11	524,809.80	32° 1' 10.025 N	104° 15' 11.820 W	
7,279.0	57.50	170.30	7,175.2	-344.3	17.7	370,785.75	524,814.38	32° 1' 9.764 N	104° 15' 11.768 W	
7,311.0	59.10	169.80	7,192.0	-371.1	22.4	370,758.93	524,819.08	32° 1' 9.498 N	104° 15' 11.713 W	
7,342.0	61.20	168.20	7,207.4	-397.5	27.5	370,732.54	524,824.22	32° 1' 9.237 N	104° 15' 11.654 W	
7,374.0	63.40	166.80	7,222.3	-425.1	33.6	370,704.89	524,830.35	32° 1' 8.963 N	104° 15' 11.583 W	
7,405.0	65.00	166.40	7,235.8	-452.3	40.1	370,677.74	524,836.82	32° 1' 8.695 N	104° 15' 11.508 W	
7,437.0	66.80	166.60	7,248.9	-480.7	46.9	370,649.33	524,843.64	32° 1' 8.414 N	104° 15' 11.429 W	
7,469.0	69.10	166.60	7,260.9	-509.5	53.8	370,620.48	524,850.51	32° 1' 8.128 N	104° 15' 11.349 W	
7,501.0	70.80	166.80	7,271.9	-538.8	60.7	370,591.23	524,857.43	32° 1' 7.838 N	104° 15' 11.269 W	
7,532.0	71.80	167.10	7,281.8	-567.4	67.4	370,562.63	524,864.06	32° 1' 7.555 N	104° 15' 11.192 W	
7,564.0	72.40	167.00	7,291.6	-597.0	74.2	370,532.95	524,870.88	32° 1' 7.262 N	104° 15' 11.113 W	
7,595.0	74.20	167.40	7,300.5	-626.0	80.8	370,504.00	524,877.46	32° 1' 6.975 N	104° 15' 11.037 W	
7,626.0	77.10	170.90	7,308.2	-655.5	86.4	370,474.51	524,883.10	32° 1' 6.683 N	104° 15' 10.972 W	
7,658.0	79.30	173.60	7,314.8	-686.5	90.6	370,443.47	524,887.32	32° 1' 6.376 N	104° 15' 10.923 W	
7,690.0	81.80	175.50	7,320.0	-717.9	93.6	370,412.05	524,890.32	32° 1' 6.065 N	104° 15' 10.889 W	
7,719.0	83.40	176.50	7,323.8	-746.6	95.6	370,383.37	524,892.32	32° 1' 5.781 N	104° 15' 10.866 W	
7,751.0	84.60	176.80	7,327.1	-778.4	97.5	370,351.60	524,894.18	32° 1' 5.467 N	104° 15' 10.844 W	
7,783.0	86.40	177.80	7,329.6	-810.3	99.0	370,319.73	524,895.69	32° 1' 5.151 N	104° 15' 10.827 W	
7,814.0	87.30	178.50	7,331.3	-841.2	100.0	370,288.80	524,896.69	32° 1' 4.845 N	104° 15' 10.816 W	
7,846.0	88.10	179.30	7,332.6	-873.2	100.6	370,256.83	524,897.30	32° 1' 4.529 N	104° 15' 10.809 W	
7,878.0	88.10	179.20	7,333.7	-905.1	101.0	370,224.85	524,897.72	32° 1' 4.212 N	104° 15' 10.804 W	
7,973.0	88.90	179.00	7,336.1	-1,000.1	102.5	370,129.89	524,899.21	32° 1' 3.272 N	104° 15' 10.788 W	
8,068.0	89.80	178.70	7,337.2	-1,095.1	104.4	370,034.92	524,901.12	32° 1' 2.332 N	104° 15' 10.766 W	
8,163.0	87.60	179.10	7,339.4	-1,190.0	106.2	369,939.97	524,902.94	32° 1' 1.393 N	104° 15' 10.746 W	
8,258.0	87.60	179.10	7,343.4	-1,284.9	107.7	369,845.06	524,904.43	32° 1' 0.453 N	104° 15' 10.730 W	
8,353.0	89.30	179.40	7,345.9	-1,379.9	109.0	369,750.11	524,905.67	32° 0' 59.514 N	104° 15' 10.716 W	
8,448.0	90.50	179.30	7,346.1	-1,474.9	110.0	369,655.12	524,906.75	32° 0' 58.574 N	104° 15' 10.704 W	
8,543.0	91.30	178.90	7,344.6	-1,569.9	111.5	369,560.14	524,908.24	32° 0' 57.634 N	104° 15' 10.688 W	



TDS
Survey Report - Geographic



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Horned Owl Federal #1H
Project:	Eddy County, NM	TVD Reference:	KB @ 3432.1usft
Site:	Horned Owl Federal #1H	MD Reference:	KB @ 3432.1usft
Well:	Surface: 20' FNL, 330' FWL, Sec 25, T26S, R26E, Unit D	North Reference:	Grid
Wellbore:	BHL: 350' FSL, 380' FWL, Sec 25, T26E, R26E, Unit M	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FSL, 380' FWL, Sec 25, T26E, R26E, Unit M	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	
8,639.0	90.60	178.60	7,343.0	-1,665.8	113.6	369,464.18	524,910.34	32° 0' 56.684 N	104° 15' 10.664 W	
8,734.0	91.20	178.70	7,341.5	-1,760.8	115.9	369,369.22	524,912.58	32° 0' 55.744 N	104° 15' 10.639 W	
8,829.0	89.80	179.20	7,340.7	-1,855.8	117.6	369,274.24	524,914.32	32° 0' 54.804 N	104° 15' 10.620 W	
8,924.0	90.40	179.70	7,340.5	-1,950.8	118.5	369,179.25	524,915.23	32° 0' 53.864 N	104° 15' 10.610 W	
9,019.0	90.10	179.70	7,340.1	-2,045.8	119.0	369,084.25	524,915.73	32° 0' 52.924 N	104° 15' 10.605 W	
9,112.0	90.30	178.70	7,339.8	-2,138.7	120.3	368,991.26	524,917.02	32° 0' 52.004 N	104° 15' 10.591 W	
9,206.0	91.20	177.80	7,338.6	-2,232.7	123.2	368,897.31	524,919.89	32° 0' 51.074 N	104° 15' 10.558 W	
9,299.0	89.40	178.70	7,338.1	-2,325.6	126.0	368,804.36	524,922.73	32° 0' 50.154 N	104° 15' 10.526 W	
9,393.0	89.20	178.60	7,339.2	-2,419.6	128.2	368,710.40	524,924.95	32° 0' 49.224 N	104° 15' 10.501 W	
9,487.0	90.20	178.30	7,339.7	-2,513.6	130.8	368,616.43	524,927.49	32° 0' 48.294 N	104° 15' 10.472 W	
9,582.0	91.20	178.10	7,338.5	-2,608.5	133.8	368,521.49	524,930.47	32° 0' 47.354 N	104° 15' 10.439 W	
9,675.0	88.90	179.10	7,338.5	-2,701.5	136.0	368,428.52	524,932.75	32° 0' 46.434 N	104° 15' 10.413 W	
9,770.0	89.20	178.60	7,340.0	-2,796.4	138.0	368,333.56	524,934.65	32° 0' 45.494 N	104° 15' 10.392 W	
9,864.0	90.20	178.30	7,340.5	-2,890.4	140.5	368,239.59	524,937.20	32° 0' 44.564 N	104° 15' 10.363 W	
9,958.0	91.30	177.90	7,339.3	-2,984.3	143.6	368,145.65	524,940.31	32° 0' 43.635 N	104° 15' 10.328 W	
10,052.0	90.00	178.60	7,338.2	-3,078.3	146.5	368,051.71	524,943.18	32° 0' 42.705 N	104° 15' 10.295 W	
10,145.0	90.30	178.70	7,338.0	-3,171.3	148.7	367,958.73	524,945.37	32° 0' 41.785 N	104° 15' 10.270 W	
10,239.0	91.60	178.40	7,336.4	-3,265.2	151.0	367,864.78	524,947.75	32° 0' 40.855 N	104° 15' 10.244 W	
10,332.0	89.30	178.40	7,335.7	-3,358.2	153.6	367,771.82	524,950.35	32° 0' 39.935 N	104° 15' 10.214 W	
10,427.0	89.80	178.40	7,336.4	-3,453.1	156.3	367,676.86	524,953.00	32° 0' 38.995 N	104° 15' 10.184 W	
10,520.0	90.90	177.80	7,335.9	-3,546.1	159.4	367,583.92	524,956.08	32° 0' 38.075 N	104° 15' 10.149 W	
10,615.0	90.50	178.20	7,334.7	-3,641.0	162.7	367,488.98	524,959.40	32° 0' 37.136 N	104° 15' 10.112 W	
10,709.0	89.30	179.50	7,334.9	-3,735.0	164.6	367,395.01	524,961.28	32° 0' 36.206 N	104° 15' 10.090 W	
10,802.0	90.20	179.30	7,335.3	-3,828.0	165.6	367,302.01	524,962.26	32° 0' 35.285 N	104° 15' 10.080 W	
10,895.0	89.80	180.20	7,335.3	-3,921.0	166.0	367,209.02	524,962.66	32° 0' 34.365 N	104° 15' 10.076 W	
10,990.0	90.80	180.60	7,334.8	-4,016.0	165.3	367,114.02	524,962.00	32° 0' 33.425 N	104° 15' 10.085 W	
11,083.0	90.50	180.20	7,333.7	-4,109.0	164.7	367,021.03	524,961.35	32° 0' 32.504 N	104° 15' 10.093 W	
11,177.0	89.90	180.00	7,333.4	-4,203.0	164.5	366,927.03	524,961.19	32° 0' 31.574 N	104° 15' 10.096 W	
11,270.0	90.00	178.30	7,333.5	-4,296.0	165.9	366,834.04	524,962.57	32° 0' 30.654 N	104° 15' 10.080 W	
11,364.0	91.30	176.80	7,332.4	-4,389.9	169.9	366,740.14	524,966.59	32° 0' 29.725 N	104° 15' 10.035 W	
11,458.0	90.70	175.70	7,330.8	-4,483.6	176.0	366,646.36	524,972.73	32° 0' 28.796 N	104° 15' 9.964 W	
11,552.0	90.80	175.00	7,329.6	-4,577.3	183.7	366,552.68	524,980.35	32° 0' 27.869 N	104° 15' 9.876 W	
11,645.0	91.00	173.90	7,328.1	-4,669.9	192.6	366,460.12	524,989.35	32° 0' 26.953 N	104° 15' 9.773 W	
11,740.0	91.70	173.10	7,325.9	-4,764.2	203.4	366,365.76	525,000.10	32° 0' 26.019 N	104° 15' 9.649 W	
11,834.0	92.80	171.50	7,322.2	-4,857.3	216.0	366,272.69	525,012.68	32° 0' 25.098 N	104° 15' 9.503 W	
Final MWD Survey										
11,930.0	92.80	171.50	7,317.5	-4,952.1	230.2	366,177.85	525,026.85	32° 0' 24.159 N	104° 15' 9.339 W	
Projection to Bit/TD										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
11,834.0	7,322.2	-4,857.3	216.0	Final MWD Survey	
11,930.0	7,317.5	-4,952.1	230.2	Projection to Bit/TD	

Checked By: _____ Approved By: _____ Date: _____



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

NM OIL CONSERVATION
ARTESIA DISTRICT

APR 06 2015

RECEIVED

February 9, 2015

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

RE: Horned Owl Federal 1H
20' FNL & 330' FWL
Sec. 25, T26S, R26E
Eddy County, New Mexico

Dear Sir,

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

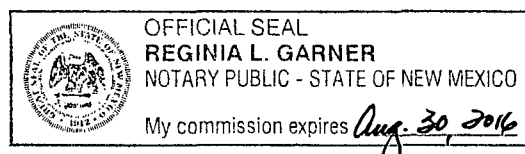
Very truly yours,

A handwritten signature in black ink, appearing to read "Chris Graham", written over a horizontal line.

Chris Graham
Drilling Superintendent

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 9th day of February, 2015.

A handwritten signature in black ink, appearing to read "Regina L. Garner", written over a horizontal line.
Notary Public

Horned Owl Fed 1H

Date	Depth	Deviation	Direction	TVD	Horiz Disp
1/23/2015	113	0.20			
1/25/2015	447	0.70			
1/25/2015	866	1.50			
1/25/2015	1050	2.10			
1/25/2015	1118	1.80			
1/25/2015	1203	1.80			
1/25/2015	1295	1.00			
1/25/2015	1385	0.50			
1/25/2015	1476	0.50			
1/25/2015	1568	0.90			
1/25/2015	1659	1.80			
1/26/2015	1751	2.40			
1/26/2015	1843	1.80			
1/26/2015	1935	1.40			
1/27/2015	2060	1.10			
1/27/2015	2310	0.60			
1/27/2015	2564	0.70			
1/28/2015	3070	1.10			
1/28/2015	3320	1.00			
1/28/2015	3577	1.20			
1/30/2015	4084	1.20			
1/30/2015	4337	1.00			
1/30/2015	4592	1.40			
1/30/2015	4814	1.50			
1/30/2015	5098	2.20			
1/30/2015	5352	2.20			
1/30/2015	5605	1.70			
1/31/2015	5857	1.00			
1/31/2015	6110	1.50			
1/31/2015	6360	1.80			
1/31/2015	6613	1.10			
1/31/2015	6689	1.00			
2/1/2015	6675	1.10	272.10		
2/1/2015	6773	5.70	164.90	6770.80	74.09
2/1/2015	6737	13.30	177.80	6833.89	84.47
2/1/2015	6900	20.40	177.40	6894.15	102.73
2/2/2015	6964	28.00	170.90	6452.53	
2/2/2015	6995	32.61	169.90	6979.29	
2/2/2015	7027	36.70	169.80	7005.67	162.20
2/2/2015	7215	53.80	169.90	7139.00	
2/2/2015	7311	59.10	169.80	7192.00	
2/2/2015	7437	66.80	166.60	7248.87	481.76
2/2/2015	7469	69.10	166.60	7260.88	510.78

Date	Depth	Deviation	Direction	TVD	Horiz Disp
2/2/2015	7564	72.40	167.00	7291.62	698.82
2/3/2015	7262	77.10	170.90	7308.00	
2/3/2015	7656	79.30	173.60	7314.00	
2/3/2015	7690	81.80	175.50	7320.00	
2/3/2015	7719	83.40	176.50	7323.00	
2/3/2015	7751	84.60	176.80	7327.10	780.73
2/3/2015	7878	88.10	179.20	7333.65	907.53
2/3/2015	8068	89.80	178.70	7337.22	1097.48
2/4/2015	8258	87.60	179.10	7343.30	
2/4/2015	8353	89.30	179.40	7345.92	
2/4/2015	8639	90.60	178.60	7343.30	
2/4/2015	8734	91.20	178.70	7341.00	
2/4/2015	9112	90.30	178.70	7339.00	
2/4/2015	9298	89.40	178.70	7338.00	
2/5/2015	9864	90.20	178.30	7340.53	
2/5/2015	10052	90.00	178.80	7338.00	
2/5/2015	10145	90.30	178.70	7337.00	
2/5/2015	10427	89.80	178.40	7336.00	
2/5/2015	10615	90.50	178.20	7334.00	
2/5/2015	10709	89.30	179.50	7334.00	
2/5/2015	10895	89.80	180.20	7335.00	
2/5/2015	11083	90.50	180.20	7333.00	
2/6/2015	11177	89.90	180.00	7333.00	
2/6/2015	11270	90.20	178.00	7333.00	
2/6/2015	11458	90.70	175.70	7330.00	
2/6/2015	11645	91.00	173.90	7328.00	
2/6/2015	11834	92.80	171.50	7322.00	