



NM OIL CONSERVATION
ARTESIA DISTRICT

JAN 08 2016

RECEIVED

April 24, 2015

30 015 42643

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

Attn: Kanicia Castillo

RE: **Pilum 15 Fee 1H**

Please find enclosed a copy of the survey from 0' to 2058' ran on the above referenced well.

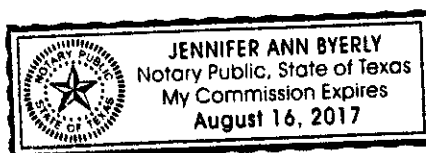
Sincerely,

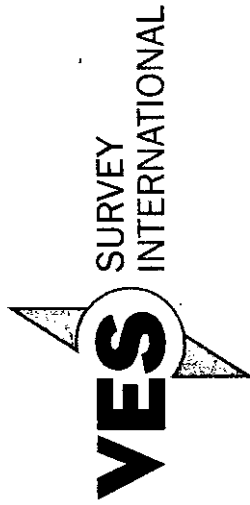
Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 24 day of April,
A.D., 2015, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas





Company: Cog Operating

Lease/Well: Pilum 15 FEE /1H

Location:

Rig Name: Silver Oak 3

State/County: New Mexico /Eddy

VS-Azi: 0.00 Degrees

Latitude: 32.74741, Longitude: -104.37919

Grid Convergence Applied = +0.02 degs (NAD 27)

Grid North = True North +0.02 degs

Depth Reference : R.K.B= 18FT

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: pilum 15 fee 1h-de_01.ut

Minimum Curvature Method

Report Date/Time: 4/24/2015 / 13:57

VES Survey International

(432) 563-5444

West Texas

Surveyor: Javier Estrada

Pilum 15 Fee 1H / API 30-015-42643

NM OIL CONSERVATION

ARTESIA DISTRICT

JAN 08 2016

RECEIVED

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	0.31	244.58	100.00	-0.12	-0.25	-0.12	0.27	244.58	0.31
200.00	0.20	240.45	200.00	-0.32	-0.64	-0.32	0.72	243.58	0.11
300.00	0.05	358.25	300.00	-0.36	-0.79	-0.36	0.87	245.58	0.23
400.00	0.12	120.72	400.00	-0.37	-0.71	-0.37	0.80	242.48	0.15
500.00	0.15	122.26	500.00	-0.49	-0.51	-0.49	0.71	226.36	0.03
600.00	0.25	152.07	600.00	-0.75	-0.30	-0.75	0.81	202.07	0.14
700.00	0.11	112.20	700.00	-0.97	-0.12	-0.97	0.98	186.82	0.18
800.00	0.02	48.77	800.00	-1.00	-0.02	-1.00	1.00	181.03	0.10
900.00	0.08	81.29	900.00	-0.98	0.05	-0.98	0.98	177.02	0.05
1000.00	0.17	117.53	1000.00	-1.04	0.24	-1.04	1.06	167.03	0.13
1100.00	0.30	93.13	1100.00	-1.12	0.63	-1.12	1.29	150.61	0.16
1200.00	0.40	75.14	1199.99	-1.05	1.23	-1.05	1.61	130.40	0.15
1300.00	0.21	13.35	1299.99	-0.78	1.61	-0.78	1.79	115.93	0.35
1400.00	0.30	68.78	1399.99	-0.51	1.89	-0.51	1.96	105.21	0.25
1500.00	0.44	348.83	1499.99	-0.04	2.05	-0.04	2.05	91.13	0.49
1600.00	0.46	5.85	1599.99	0.74	2.02	0.74	2.15	69.98	0.13

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1700.00	0.39	27.63	1699.98	1.43	2.22	1.43	2.64	57.15	0.17
1800.00	0.12	79.65	1799.98	1.75	2.48	1.75	3.03	54.76	0.33
1900.00	0.20	74.45	1899.98	1.82	2.75	1.82	3.30	56.57	0.08
2000.00	0.15	66.10	1999.98	1.92	3.05	1.92	3.60	57.79	0.06
2058.00	0.11	97.63	2057.98	1.94	3.17	1.94	3.72	58.51	0.14



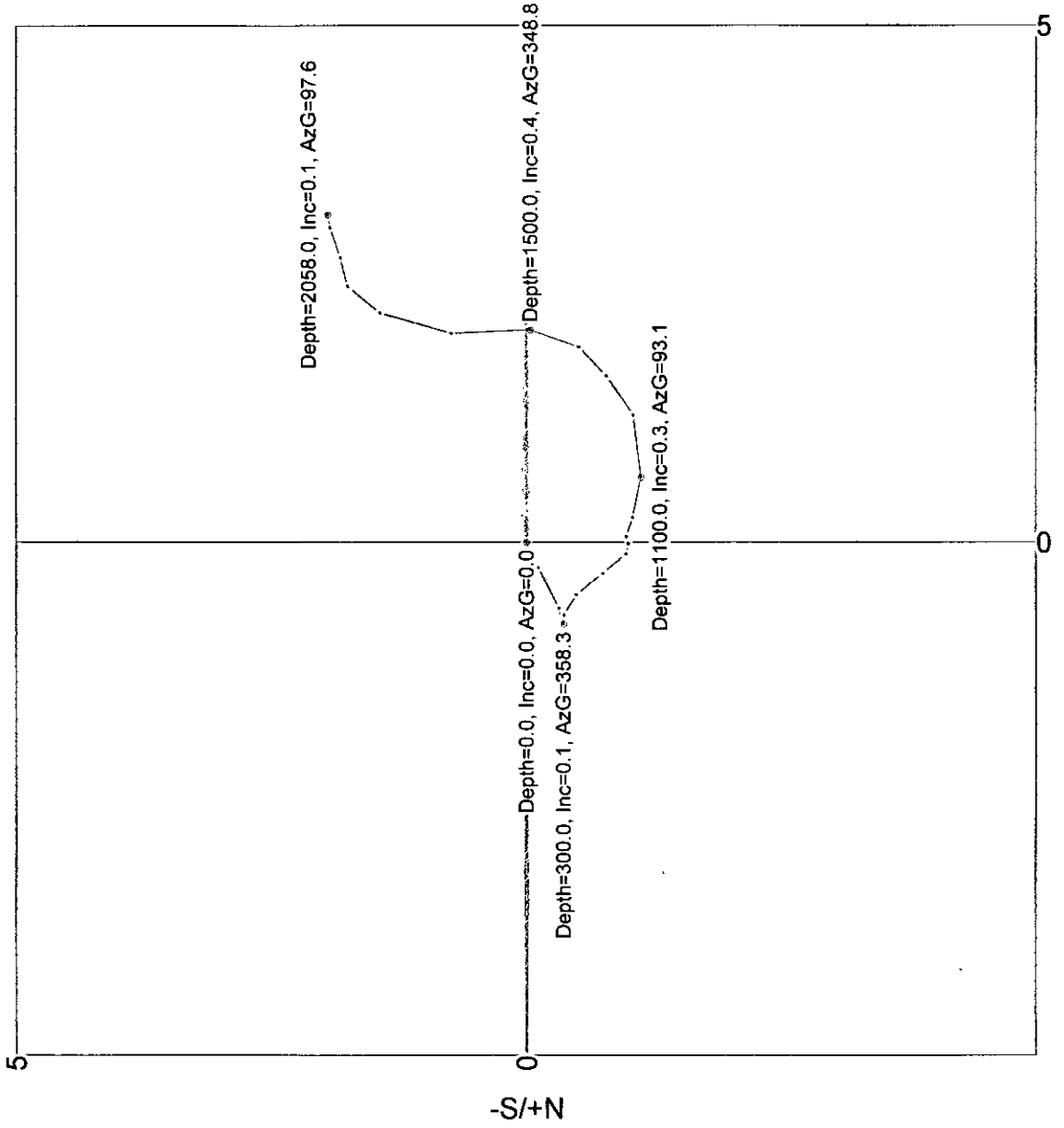
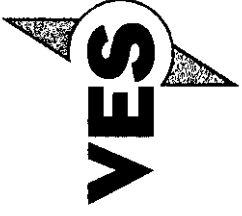
VES Survey International

(432) 563-5444

West Texas

Surveyor: Javier Estrada

Pilum 15 Fee 1H / API 30-015-42643



-W/+E

VES Survey Date: 4/21/2015



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

NM OIL CONSERVATION
ARTESIA DISTRICT

JAN 08 2016

RECEIVED

April 29, 2015

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

RE: Pilum 15 Fee #1H
2485' FSL & 425' FEL
Sec. 16, T18S, R26E
Eddy County, New Mexico

Dear Sir,

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

Very truly yours,

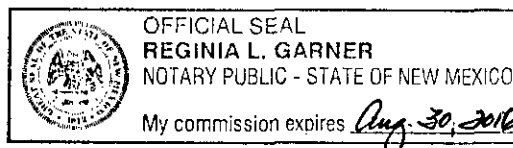
A handwritten signature in cursive script, appearing to read "Chris Graham".

Chris Graham
Drilling Superintendent

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 29th day of April, 2015.

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

Notary Public

PILUM 15 FEE #1H

Date	Depth	Deviation	Direction	TVD
4/19/2015	257	0.20	0.00	0.00
4/19/2015	502	0.90	0.00	0.00
4/19/2015	745	0.70	0.00	0.00
4/19/2015	998	0.90	0.00	0.00
4/19/2015	1205	0.60	0.00	0.00
4/21/2015	1531	0.40	0.00	0.00
4/21/2015	2005	0.60	0.00	0.00
4/22/2015	2088	0.20	57.30	2087.00
4/22/2015	2120	0.30	119.50	2119.00
4/22/2015	2152	3.00	104.70	2151.00
4/22/2015	2183	6.80	103.20	2182.00
4/22/2015	2214	10.20	102.40	2213.00
4/22/2015	2246	13.00	101.80	2244.00
4/22/2015	2277	15.60	102.80	2274.00
4/22/2015	2308	18.50	109.40	2304.00
4/22/2015	2340	21.30	106.20	0.00
4/22/2015	2371	23.20	106.80	0.00
4/22/2015	2402	24.80	105.30	0.00
4/22/2015	2434	26.40	103.20	0.00
4/22/2015	2465	28.30	101.50	0.00
4/22/2015	2496	30.90	101.10	0.00
4/22/2015	2528	33.70	101.90	0.00
4/22/2015	2560	36.70	102.20	0.00
4/22/2015	2655	46.20	105.10	0.00
4/22/2015	2655	46.20	105.10	0.00
4/22/2015	2687	50.40	104.10	0.00
4/22/2015	2687	50.40	104.10	0.00
4/22/2015	2718	53.80	103.60	0.00
4/22/2015	2749	56.60	103.70	0.00
4/22/2015	2874	70.10	102.90	0.00
4/22/2015	2906	73.40	101.80	0.00
4/22/2015	2938	76.30	101.80	0.00
4/23/2015	2970	74.40	102.20	2737.00
4/23/2015	3001	82.10	103.20	2742.00
4/23/2015	3033	84.00	103.60	2746.00
4/23/2015	3053	85.40	103.50	0.00
4/23/2015	3116	89.30	103.60	0.00
4/23/2015	3147	89.70	103.50	0.00
4/23/2015	3241	89.90	100.30	0.00
4/23/2015	3429	89.70	93.30	0.00
4/23/2015	3524	90.20	90.80	0.00
4/23/2015	3619	89.80	90.40	0.00

Date	Depth	Deviation	Direction	TVD
4/23/2015	3714	90.60	90.30	0.00
4/24/2015	3809	90.20	89.80	2752.00
4/24/2015	3904	91.20	90.60	2751.00
4/24/2015	3999	90.70	90.30	2749.00
4/24/2015	4094	90.60	90.20	2748.00
4/24/2015	4189	90.20	89.80	2747.00
4/24/2015	4284	89.70	89.40	0.00
4/24/2015	4379	91.30	90.50	0.00
4/24/2015	4474	91.20	90.20	0.00
4/24/2015	4568	90.80	90.00	0.00
4/24/2015	4663	89.90	89.60	0.00
4/24/2015	4757	91.20	91.20	0.00
4/24/2015	4852	91.10	91.10	0.00
4/24/2015	4947	90.90	91.00	0.00
4/25/2015	5042	90.60	90.50	2737.00
4/25/2015	5136	90.20	90.60	2736.00
4/25/2015	5231	89.70	90.20	2736.00
4/25/2015	5326	90.10	88.70	0.00
4/25/2015	5419	90.90	90.10	0.00
4/25/2015	5513	90.80	89.70	0.00
4/25/2015	5609	90.50	89.70	0.00
4/25/2015	5703	90.20	89.90	0.00
4/25/2015	5798	89.70	89.60	0.00
4/25/2015	5893	91.40	90.80	0.00
4/26/2015	5957	91.30	90.70	2729.00
4/26/2015	6074	91.20	90.20	2727.00
4/26/2015	6169	91.10	89.80	2725.00
4/26/2015	6263	91.10	89.60	2724.00
4/26/2015	6358	90.20	90.40	0.00
4/26/2015	6452	90.50	90.10	0.00
4/26/2015	6547	90.80	90.10	0.00
4/26/2015	6641	90.90	89.70	0.00
4/26/2015	6736	89.10	90.30	0.00
4/26/2015	6831	89.40	90.00	0.00
4/26/2015	6925	89.20	89.30	0.00
4/27/2015	7050	90.30	90.10	2722.00
4/27/2015	7145	90.00	89.50	2722.00
4/27/2015	7240	91.30	90.30	2721.00
4/27/2015	7334	91.10	89.80	2719.00
4/27/2015	7429	91.00	89.30	0.00
4/27/2015	7524	90.60	88.70	0.00
4/27/2015	7619	91.60	89.70	0.00
4/27/2015	7714	90.10	90.10	0.00
4/27/2015	7771	0.00	0.00	0.00

EOF



NM OIL CONSERVATION
ARTESIA DISTRICT

JAN 08 2016

RECEIVED

COG Operating LLC

Eddy County, NM (NAD27 NME)

Pilum 15 Fee

#1H

WB1 / Job #1513353

Design: Surveys (Silver Oak 3)

Standard Survey Report

28 April, 2015





Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3370.00usft (Silver Oak 3)
Site:	Pilum 15 Fee	MD Reference:	KB @ 3370.00usft (Silver Oak 3)
Well:	#1H	North Reference:	Grid
Wellbore:	WB1 / Job #1513353	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	Compass 5000 GCR

Project	Eddy County, NM (NAD27 NME)		
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	Pilum 15 Fee		
Site Position:		Northing:	632,879.50 usft
From:	Map	Easting:	487,958.90 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 44' 23.54811 N
		Longitude:	104° 22' 20.97828 W
		Grid Convergence:	-0.02 °

Well	#1H		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 44' 50.65970 N
		Longitude:	104° 22' 45.07921 W
		Ground Level:	3,352.00 usft

Wellbore	WB1 / Job #1513353				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	4/10/2015	7.60	60.62	48,417

Design	Surveys (Silver Oak 3)			
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	92.10

Survey Program	Date 4/28/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	2,058.00	VES Gyro Survey (WB1 / Job #1513353)	NS-GYRO-MS	North sensing gyrocompassing m/s
2,088.00	7,845.00	Phoenix MWD Survey (WB1 / Job #15133)	PHX+MWD+HDGM	PHX+MWD+HDGM

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	0.31	244.58	100.00	-0.12	-0.24	-0.24	0.31	0.31	0.00	
200.00	0.20	240.45	200.00	-0.32	-0.64	-0.63	0.11	-0.11	-4.13	
300.00	0.05	358.25	300.00	-0.36	-0.79	-0.78	0.23	-0.15	117.80	
400.00	0.12	120.72	400.00	-0.37	-0.70	-0.69	0.15	0.07	122.47	
500.00	0.15	122.26	500.00	-0.49	-0.50	-0.49	0.03	0.03	1.54	
600.00	0.25	152.07	600.00	-0.76	-0.29	-0.26	0.14	0.10	29.81	
700.00	0.11	112.20	700.00	-0.99	-0.10	-0.06	0.18	-0.14	-39.87	
800.00	0.02	48.77	800.00	-1.01	0.00	0.04	0.10	-0.09	-63.43	
900.00	0.06	81.29	900.00	-0.99	0.07	0.10	0.04	0.04	32.52	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3370.00usft (Silver Oak 3)
Site:	Pilum 15 Fee	MD Reference:	KB @ 3370.00usft (Silver Oak 3)
Well:	#1H	North Reference:	Grid
Wellbore:	WB1 / Job #1513353	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	Compass 5000 GCR

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)
1,000.00	0.17	117.53	1,000.00	-1.05	0.25	0.29	0.13	0.11	36.24
1,100.00	0.30	93.13	1,100.00	-1.13	0.64	0.68	0.16	0.13	-24.40
1,200.00	0.40	75.14	1,199.99	-1.06	1.24	1.28	0.15	0.10	-17.99
1,300.00	0.21	13.35	1,299.99	-0.79	1.62	1.65	0.35	-0.19	-61.79
1,400.00	0.30	68.78	1,399.99	-0.52	1.91	1.93	0.25	0.09	55.43
1,500.00	0.44	348.83	1,499.99	-0.05	2.08	2.08	0.49	0.14	-79.95
1,600.00	0.46	5.85	1,599.99	0.73	2.04	2.02	0.13	0.02	17.02
1,700.00	0.39	27.63	1,699.98	1.43	2.24	2.19	0.17	-0.07	21.78
1,800.00	0.12	79.65	1,799.98	1.75	2.50	2.44	0.33	-0.27	52.02
1,900.00	0.20	74.45	1,899.98	1.82	2.77	2.71	0.08	0.08	-5.20
2,000.00	0.15	66.10	1,999.98	1.92	3.06	2.99	0.06	-0.05	-8.35
2,058.00	0.11	97.63	2,057.98	1.94	3.19	3.11	0.14	-0.07	54.36
Tie-on to VES Gyro Survey									
2,088.00	0.20	57.30	2,087.98	1.96	3.26	3.19	0.45	0.30	-134.43
First Phoenix MWD Survey									
2,120.00	0.30	119.50	2,119.98	1.95	3.38	3.31	0.85	0.31	194.38
2,152.00	3.00	104.70	2,151.97	1.70	4.26	4.20	8.47	8.44	-46.25
2,183.00	6.80	103.20	2,182.85	1.07	6.84	6.79	12.26	12.26	-4.84
2,214.00	10.20	102.40	2,213.50	0.06	11.30	11.29	10.97	10.97	-2.58
2,246.00	13.00	101.80	2,244.85	-1.28	17.60	17.63	8.76	8.75	-1.88
2,277.00	15.60	102.80	2,274.88	-2.92	25.07	25.16	8.42	8.39	3.23
2,308.00	18.50	104.90	2,304.52	-5.11	33.89	34.06	9.56	9.35	6.77
2,340.00	21.30	106.20	2,334.60	-8.03	44.38	44.65	8.86	8.75	4.06
2,371.00	23.20	106.80	2,363.29	-11.37	55.64	56.02	6.17	6.13	1.94
2,402.00	24.80	105.30	2,391.61	-14.85	67.75	68.25	5.52	5.16	-4.84
2,434.00	26.40	103.20	2,420.47	-18.25	81.16	81.77	5.75	5.00	-6.56
2,465.00	28.30	101.50	2,448.01	-21.28	95.07	95.78	6.63	6.13	-5.48
2,496.00	30.90	101.10	2,474.96	-24.28	110.08	110.90	8.41	8.39	-1.29
2,528.00	33.70	101.90	2,502.00	-27.70	126.83	127.76	8.85	8.75	2.50
2,560.00	36.70	102.20	2,528.15	-31.55	144.87	145.93	9.39	9.38	0.94
2,591.00	39.90	103.80	2,552.47	-35.88	163.59	164.79	10.81	10.32	5.16
2,623.00	43.00	105.60	2,576.46	-41.26	184.07	185.46	10.38	9.69	5.63
2,655.00	46.20	105.10	2,599.24	-47.21	205.73	207.33	10.06	10.00	-1.56
2,687.00	50.40	104.10	2,620.52	-53.22	228.85	230.65	13.33	13.13	-3.13
2,718.00	53.80	103.60	2,639.56	-59.07	252.60	254.59	11.04	10.97	-1.61
2,749.00	56.60	103.70	2,657.25	-65.08	277.33	279.53	9.04	9.03	0.32
2,781.00	60.60	103.90	2,673.92	-71.60	303.85	306.27	12.51	12.50	0.63
2,812.00	63.90	103.80	2,688.35	-78.16	330.49	333.13	10.65	10.65	-0.32
2,843.00	66.90	103.80	2,701.26	-84.88	357.86	360.73	9.68	9.68	0.00
2,874.00	70.10	102.90	2,712.62	-91.54	385.92	389.01	10.67	10.32	-2.90
2,906.00	73.40	101.80	2,722.64	-98.04	415.60	418.91	10.82	10.31	-3.44
2,938.00	76.30	101.80	2,731.00	-104.35	445.83	449.35	9.06	9.06	0.00
2,970.00	79.40	102.20	2,737.73	-110.86	476.43	480.17	9.76	9.69	1.25



Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3370.00usft (Silver Oak 3)
Site:	Pilum 15 Fee	MD Reference:	KB @ 3370.00usft (Silver Oak 3)
Well:	#1H	North Reference:	Grid
Wellbore:	WB1 / Job #1513353	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	Compass 5000 GCR

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)
3,001.00	82.10	103.20	2,742.72	-117.58	506.27	510.24	9.27	8.71	3.23
3,033.00	84.00	103.60	2,746.59	-124.94	537.17	541.39	6.07	5.94	1.25
3,053.00	85.40	103.50	2,748.44	-129.61	556.53	560.90	7.02	7.00	-0.50
3,084.00	87.10	103.20	2,750.46	-136.75	586.63	591.24	5.57	5.48	-0.97
3,116.00	89.30	103.60	2,751.47	-144.16	617.74	622.61	6.99	6.88	1.25
3,147.00	89.70	103.50	2,751.74	-151.43	647.87	652.99	1.33	1.29	-0.32
3,241.00	89.80	100.30	2,752.15	-170.81	739.84	745.60	3.41	0.11	-3.40
3,335.00	89.60	96.60	2,752.64	-184.62	832.80	839.01	3.94	-0.21	-3.94
3,429.00	89.70	93.30	2,753.22	-192.73	926.44	932.88	3.51	0.11	-3.51
3,524.00	90.20	90.80	2,753.30	-196.13	1,021.37	1,027.87	2.68	0.53	-2.63
3,619.00	89.80	90.40	2,753.30	-197.12	1,116.36	1,122.84	0.60	-0.42	-0.42
3,714.00	90.60	90.30	2,752.97	-197.70	1,211.36	1,217.79	0.85	0.84	-0.11
3,809.00	90.20	89.80	2,752.30	-197.78	1,306.36	1,312.73	0.67	-0.42	-0.53
3,904.00	91.20	90.60	2,751.14	-198.12	1,401.35	1,407.67	1.35	1.05	0.84
3,999.00	90.70	90.30	2,749.57	-198.86	1,496.33	1,502.61	0.61	-0.53	-0.32
4,094.00	90.60	90.20	2,748.49	-199.28	1,591.32	1,597.56	0.15	-0.11	-0.11
4,189.00	90.20	89.80	2,747.83	-199.28	1,686.32	1,692.49	0.60	-0.42	-0.42
4,284.00	89.70	89.40	2,747.91	-198.61	1,781.32	1,787.40	0.67	-0.53	-0.42
4,379.00	91.30	90.50	2,747.08	-198.53	1,876.31	1,882.32	2.04	1.68	1.16
4,474.00	91.20	90.20	2,745.01	-199.11	1,971.29	1,977.26	0.33	-0.11	-0.32
4,568.00	90.80	90.00	2,743.37	-199.27	2,065.27	2,071.19	0.48	-0.43	-0.21
4,663.00	89.90	89.60	2,742.79	-198.94	2,160.27	2,166.11	1.04	-0.95	-0.42
4,757.00	91.20	91.20	2,741.89	-199.60	2,254.26	2,260.06	2.19	1.38	1.70
4,852.00	91.10	91.10	2,739.98	-201.50	2,349.22	2,355.02	0.15	-0.11	-0.11
4,947.00	90.90	91.00	2,738.32	-203.24	2,444.19	2,449.99	0.24	-0.21	-0.11
5,042.00	90.60	90.50	2,737.08	-204.49	2,539.17	2,544.96	0.61	-0.32	-0.53
5,136.00	90.20	90.60	2,736.42	-205.39	2,633.16	2,638.92	0.44	-0.43	0.11
5,231.00	89.70	90.20	2,736.50	-206.05	2,728.16	2,733.88	0.67	-0.53	-0.42
5,326.00	90.10	88.70	2,736.67	-205.14	2,823.15	2,828.77	1.63	0.42	-1.58
5,419.00	90.90	90.10	2,735.86	-204.17	2,916.14	2,921.66	1.73	0.86	1.51
5,513.00	90.80	89.70	2,734.46	-204.00	3,010.13	3,015.58	0.44	-0.11	-0.43
5,609.00	90.50	89.70	2,733.37	-203.50	3,106.12	3,111.49	0.31	-0.31	0.00
5,703.00	90.20	89.80	2,732.80	-203.09	3,200.12	3,205.41	0.34	-0.32	0.11
5,798.00	89.70	89.60	2,732.88	-202.59	3,295.12	3,300.33	0.57	-0.53	-0.21
5,893.00	91.40	90.80	2,731.97	-202.93	3,390.11	3,395.27	2.19	1.79	1.26
5,979.00	91.30	90.70	2,729.95	-204.05	3,476.08	3,481.22	0.16	-0.12	-0.12
6,074.00	91.20	90.20	2,727.87	-204.80	3,571.05	3,576.16	0.54	-0.11	-0.53
6,169.00	91.10	89.80	2,725.97	-204.80	3,666.03	3,671.07	0.43	-0.11	-0.42
6,263.00	91.10	89.60	2,724.16	-204.30	3,760.01	3,764.97	0.21	0.00	-0.21
6,358.00	90.20	90.40	2,723.08	-204.30	3,855.01	3,859.90	1.27	-0.95	0.84
6,452.00	90.50	90.10	2,722.51	-204.71	3,949.00	3,953.85	0.45	0.32	-0.32
6,547.00	90.80	90.10	2,721.43	-204.88	4,044.00	4,048.79	0.32	0.32	0.00
6,641.00	90.90	89.70	2,720.04	-204.72	4,137.99	4,142.71	0.44	0.11	-0.43
6,736.00	89.10	90.30	2,720.04	-204.72	4,232.98	4,237.64	2.00	-1.89	0.63



Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3370.00usft (Silver Oak 3)
Site:	Pilum 15 Fee	MD Reference:	KB @ 3370.00usft (Silver Oak 3)
Well:	#1H	North Reference:	Grid
Wellbore:	WB1 / Job #1513353	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	Compass 5000 GCR

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)
6,831.00	89.40	90.00	2,721.28	-204.97	4,327.97	4,332.58	0.45	0.32	-0.32
6,925.00	89.20	89.30	2,722.43	-204.39	4,421.96	4,426.48	0.77	-0.21	-0.74
7,050.00	90.30	90.10	2,722.97	-203.74	4,546.96	4,551.37	1.09	0.88	0.64
7,145.00	90.00	89.50	2,722.73	-203.40	4,641.96	4,646.29	0.71	-0.32	-0.63
7,240.00	91.30	90.30	2,721.65	-203.24	4,736.95	4,741.21	1.61	1.37	0.84
7,334.00	91.10	89.80	2,719.68	-203.32	4,830.93	4,835.13	0.57	-0.21	-0.53
7,429.00	91.00	89.30	2,717.94	-202.58	4,925.91	4,930.02	0.54	-0.11	-0.53
7,524.00	90.60	88.70	2,716.61	-200.92	5,020.88	5,024.87	0.76	-0.42	-0.63
7,619.00	91.60	89.70	2,714.79	-199.59	5,115.85	5,119.73	1.49	1.05	1.05
7,714.00	90.10	90.10	2,713.38	-199.43	5,210.84	5,214.65	1.63	-1.58	0.42
7,771.00	90.20	90.00	2,713.23	-199.47	5,267.84	5,271.61	0.25	0.18	-0.18
Last Phoenix MWD Survey									
7,845.00	90.20	90.00	2,712.97	-199.47	5,341.84	5,345.56	0.00	0.00	0.00
Projection to TD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,058.00	2,057.98	1.94	3.19	Tie-on to VES Gyro Survey
2,088.00	2,087.98	1.96	3.26	First Phoenix MWD Survey
7,771.00	2,713.23	-199.47	5,267.84	Last Phoenix MWD Survey
7,845.00	2,712.97	-199.47	5,341.84	Projection to TD

Checked By: _____

Approved By: _____

Date: _____