

Results of Directional Survey

API number:	30-025-41413		
OGRID:		Operator:	COG PRODUCTION, LLC
		Property:	WINDWARD FEDERAL # 3H

surface	ULSTR:	B	30	T 24S	R 32E
				190 FNL	2100 FEL

BH Loc	ULSTR:	O	31	T 24S	R 32E
20386	MD	10579.0	TVD	343 FSL	1628 FEL
				4937 FNL	

Top Perf/OH	ULSTR:	B	30	T 24S	R 32E
10837	MD	10596.4	TVD	712 FNL	2118 FEL

Bot Perf/OH	ULSTR:	O	31	T 24S	R 32E
20250	MD	10585.5	TVD	458 FSL	1634 FEL
				4822 FNL	

	MD	N/S	E/W	VD
	10805.00	-491.50	-18.60	10587.30
TOP PERFS/OH	10837.00	-522.20	-17.80	10596.40
	10837.00	-522.20	-17.80	10596.40
	20180.00	-9841.80	462.60	10589.00
BOT PERFS/OH	20250.00	-9911.57	466.21	10585.54
	20273.00	-9934.50	467.40	10584.40

NEXT TO LAST	20312.00	9973.40	489.50	10582.20
LAST READING	20386.00	10027.30	472.40	10579.10
TD	20386.00	-10027.30	472.40	10579.10

Surface Location	190	FN	2100	FE
Projected BHL	10217	FN	1628	FE
Location of				
Top Perfs/OH	712	FN	2118	FE
Bottom Perfs/OH	10102	FN	1634	FE

SUMMARY of Subsurface Locations

Surface Location	B-30-24S-32E	190	FN	2100	FE	Vert. Depth
Top Perfs/OH	B-30-24S-32E	712	FN	2118	FE	10596.40
Bottom Perfs/OH	O-31-24S-32E	10102	FN	1634	FE	10585.54
Projected TD	O-31-24S-32E	10217	FN	1628	FE	10579.10

FEB 03 2015



October 9, 2014

COG Operating LLC (Concho)
One Concho Center
600 W. Illinois Avenue
Midland, TX 79701

Attn: Kanicia Castillo

Re: **Windward Federal 3H**

Please find enclosed a copy of the survey from 0' to 9,800' ran on the above referenced well.

If I can be of any further service, please do not hesitate to call me at 800-606-4976.

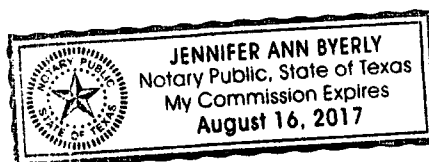
Sincerely,

Keith Havelka
Operations

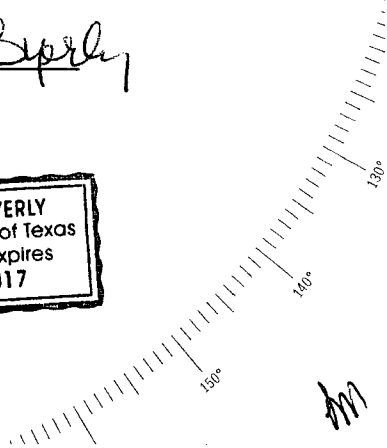
STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 9 day of October A.D., 2014, by Keith Havelka.

Jennifer Byerly
Notary Public, State of Texas



HOBSOCD
JAN 30 2015
RECEIVED





Company: COG Operating
Lease/Well: Windward Federal/3H

Rig Name: Independence 205
State/County: New Mexico/Lea
Latitude: 32.19, Longitude: -103.71
GRID North is 0.33 Degrees East of True North
VS-Azi: 0.00 Degrees



Depth Reference : RKB = 26 Ft

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: ...ard federal 3h_gyro survey.ut

Minimum Curvature Method

Report Date/Time: 10/9/2014 / 12:01

VES Survey International

West Texas

(432) 563-5444

Surveyor: Gene Heiss

Windward Federal 3H / API 30-025-41413

HOBBSD
JAN 30 2015
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	0.44	311.58	100.00	0.26	-0.29	0.26	0.38	311.58	0.44
200.00	0.30	292.32	200.00	0.61	-0.81	0.61	1.02	306.76	0.19
300.00	0.61	277.21	299.99	0.77	-1.58	0.77	1.76	296.09	0.33
400.00	0.55	291.56	399.99	1.02	-2.55	1.02	2.75	291.72	0.15
500.00	0.63	278.10	499.98	1.27	-3.55	1.27	3.77	289.73	0.16
600.00	0.74	258.36	599.98	1.22	-4.72	1.22	4.88	284.47	0.26
700.00	0.63	259.22	699.97	0.99	-5.90	0.99	5.98	279.50	0.11
800.00	0.50	293.68	799.96	1.06	-6.83	1.06	6.91	278.80	0.36
900.00	0.36	264.32	899.96	1.20	-7.54	1.20	7.64	279.05	0.25
1000.00	0.11	248.85	999.96	1.13	-7.94	1.13	8.02	278.13	0.25
1100.00	0.17	237.90	1099.96	1.02	-8.16	1.02	8.23	277.12	0.07
1200.00	0.16	229.41	1199.96	0.85	-8.40	0.85	8.44	275.76	0.03
1300.00	0.15	195.89	1299.96	0.63	-8.54	0.63	8.56	274.21	0.09
1400.00	0.20	116.48	1399.96	0.43	-8.42	0.43	8.43	272.89	0.22
1500.00	0.21	109.74	1499.96	0.29	-8.09	0.29	8.10	272.02	0.03
1600.00	0.27	83.45	1599.96	0.25	-7.69	0.25	7.69	271.86	0.12
1700.00	0.17	51.92	1699.96	0.37	-7.35	0.37	7.35	272.85	0.15
1800.00	0.16	42.99	1799.96	0.56	-7.13	0.56	7.16	274.48	0.03

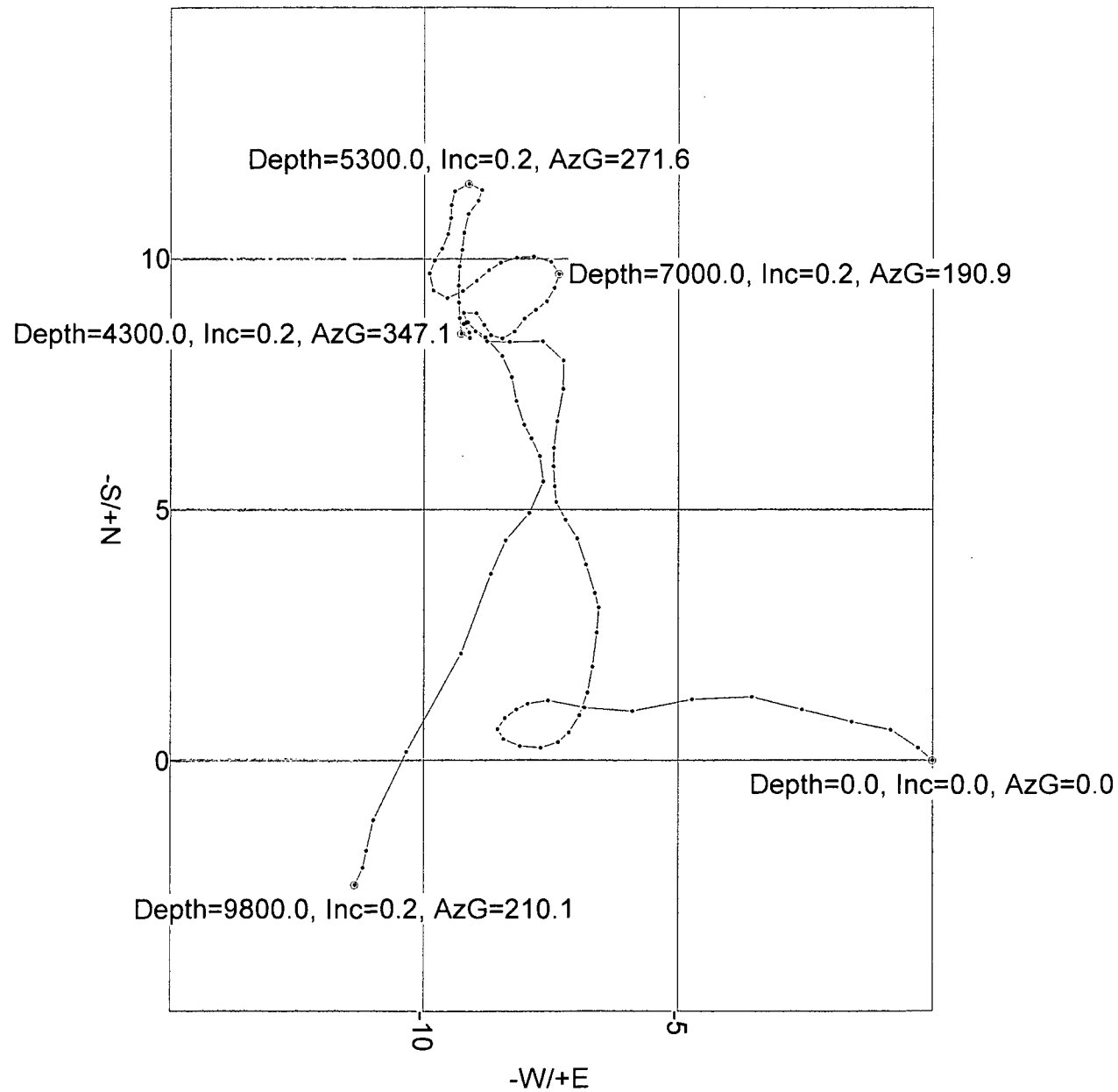
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	0.30	24.23	1899.96	0.90	-6.93	0.90	6.99	277.42	0.15
2000.00	0.26	13.23	1999.96	1.36	-6.77	1.36	6.91	281.36	0.07
2100.00	0.34	8.21	2099.95	1.88	-6.68	1.88	6.93	285.69	0.09
2200.00	0.44	6.34	2199.95	2.56	-6.59	2.56	7.07	291.20	0.10
2300.00	0.13	354.78	2299.95	3.06	-6.56	3.06	7.24	295.01	0.31
2400.00	0.21	339.34	2399.95	3.35	-6.63	3.35	7.43	296.78	0.09
2500.00	0.46	344.92	2499.95	3.91	-6.80	3.91	7.85	299.88	0.25
2600.00	0.17	332.27	2599.95	4.43	-6.98	4.43	8.27	302.42	0.29
2700.00	0.33	325.61	2699.95	4.80	-7.21	4.80	8.66	303.66	0.16
2800.00	0.14	352.81	2799.94	5.16	-7.39	5.16	9.01	304.94	0.21
2900.00	0.21	354.18	2899.94	5.47	-7.42	5.47	9.22	306.40	0.07
3000.00	0.24	359.39	2999.94	5.87	-7.44	5.87	9.48	308.26	0.03
3100.00	0.18	3.77	3099.94	6.24	-7.44	6.24	9.70	309.98	0.07
3200.00	0.44	8.19	3199.94	6.77	-7.37	6.77	10.01	312.56	0.26
3300.00	0.31	13.30	3299.94	7.41	-7.25	7.41	10.37	315.60	0.13
3400.00	0.36	349.60	3399.94	7.98	-7.25	7.98	10.78	317.73	0.14
3500.00	0.42	282.64	3499.94	8.36	-7.66	8.36	11.34	317.51	0.43
3600.00	0.36	252.55	3599.93	8.35	-8.31	8.35	11.78	315.13	0.21
3700.00	0.21	305.08	3699.93	8.36	-8.75	8.36	12.10	313.67	0.28
3800.00	0.15	318.75	3799.93	8.56	-8.99	8.56	12.41	313.60	0.08
3900.00	0.13	322.89	3899.93	8.74	-9.14	8.74	12.64	313.73	0.02
4000.00	0.14	190.97	3999.93	8.71	-9.23	8.71	12.69	313.34	0.24
4100.00	0.17	109.66	4099.93	8.53	-9.11	8.53	12.48	313.14	0.21
4200.00	0.16	246.69	4199.93	8.43	-9.10	8.43	12.40	312.81	0.31
4300.00	0.17	347.09	4299.93	8.52	-9.26	8.52	12.58	312.59	0.26
4400.00	0.18	358.28	4399.93	8.82	-9.30	8.82	12.82	313.48	0.04
4500.00	0.17	357.56	4499.93	9.13	-9.31	9.13	13.04	314.44	0.01
4600.00	0.21	358.60	4599.93	9.47	-9.32	9.47	13.29	315.44	0.04
4700.00	0.23	6.86	4699.93	9.85	-9.30	9.85	13.55	316.63	0.04
4800.00	0.15	11.69	4799.93	10.18	-9.25	10.18	13.75	317.73	0.08
4900.00	0.24	3.75	4899.93	10.52	-9.21	10.52	13.98	318.79	0.09
5000.00	0.20	23.52	4999.93	10.89	-9.13	10.89	14.21	320.04	0.08
5100.00	0.18	51.52	5099.93	11.15	-8.93	11.15	14.29	321.31	0.10
5200.00	0.15	337.08	5199.93	11.37	-8.86	11.37	14.41	322.07	0.20
5300.00	0.24	271.56	5299.92	11.49	-9.12	11.49	14.67	321.57	0.22
5400.00	0.19	205.60	5399.92	11.34	-9.40	11.34	14.73	320.36	0.24
5500.00	0.14	176.93	5499.92	11.07	-9.46	11.07	14.56	319.47	0.10
5600.00	0.16	186.22	5599.92	10.81	-9.47	10.81	14.37	318.77	0.03
5700.00	0.21	192.39	5699.92	10.49	-9.52	10.49	14.17	317.77	0.05

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	0.16	215.72	5799.92	10.20	-9.64	10.20	14.04	316.62	0.09
5900.00	0.16	209.07	5899.92	9.97	-9.79	9.97	13.97	315.51	0.02
6000.00	0.15	193.38	5999.92	9.71	-9.89	9.71	13.86	314.48	0.04
6100.00	0.27	154.10	6099.92	9.37	-9.82	9.37	13.57	313.66	0.18
6200.00	0.22	71.46	6199.92	9.22	-9.54	9.22	13.27	314.03	0.32
6300.00	0.16	56.86	6299.92	9.36	-9.24	9.36	13.15	315.36	0.07
6400.00	0.23	50.52	6399.92	9.56	-8.96	9.56	13.11	316.86	0.07
6500.00	0.13	47.71	6499.92	9.77	-8.72	9.77	13.10	318.25	0.10
6600.00	0.19	63.73	6599.92	9.92	-8.49	9.92	13.06	319.46	0.07
6700.00	0.19	81.06	6699.92	10.02	-8.17	10.02	12.93	320.81	0.06
6800.00	0.19	91.20	6799.92	10.04	-7.84	10.04	12.74	322.03	0.03
6900.00	0.24	118.73	6899.92	9.94	-7.49	9.94	12.45	322.99	0.11
7000.00	0.17	190.86	6999.92	9.70	-7.34	9.70	12.16	322.90	0.25
7100.00	0.17	206.91	7099.92	9.42	-7.43	9.42	12.00	321.75	0.05
7200.00	0.18	210.55	7199.92	9.16	-7.58	9.16	11.89	320.40	0.01
7300.00	0.17	254.53	7299.91	8.99	-7.79	8.99	11.90	319.06	0.13
7400.00	0.18	210.49	7399.91	8.81	-8.02	8.81	11.91	317.71	0.13
7500.00	0.19	224.13	7499.91	8.55	-8.21	8.55	11.86	316.16	0.05
7600.00	0.14	263.81	7599.91	8.42	-8.45	8.42	11.93	314.88	0.12
7700.00	0.15	305.66	7699.91	8.48	-8.68	8.48	12.14	314.33	0.10
7800.00	0.16	347.62	7799.91	8.69	-8.81	8.69	12.38	314.58	0.11
7900.00	0.18	309.37	7899.91	8.92	-8.96	8.92	12.65	314.85	0.11
8000.00	0.19	234.83	7999.91	8.92	-9.22	8.92	12.83	314.07	0.22
8100.00	0.25	117.45	8099.91	8.73	-9.16	8.73	12.66	313.62	0.37
8200.00	0.30	136.01	8199.91	8.44	-8.79	8.44	12.19	313.85	0.10
8300.00	0.28	141.67	8299.91	8.07	-8.46	8.07	11.69	313.64	0.03
8400.00	0.26	169.88	8399.91	7.65	-8.27	7.65	11.26	312.78	0.13
8500.00	0.30	168.52	8499.91	7.17	-8.17	7.17	10.87	311.25	0.04
8600.00	0.27	154.20	8599.91	6.70	-8.02	6.70	10.45	309.87	0.08
8700.00	0.08	150.88	8699.91	6.42	-7.88	6.42	10.17	309.18	0.19
8800.00	0.37	155.12	8799.90	6.07	-7.71	6.07	9.82	308.21	0.29
8900.00	0.26	197.63	8899.90	5.57	-7.64	5.57	9.46	306.06	0.25
9000.00	0.53	206.39	8999.90	4.94	-7.92	4.94	9.33	301.93	0.28
9100.00	0.33	244.33	9099.90	4.39	-8.39	4.39	9.47	297.65	0.34
9200.00	0.63	183.28	9199.89	3.72	-8.68	3.72	9.44	293.22	0.55
9300.00	1.35	208.25	9299.88	2.14	-9.26	2.14	9.51	283.00	0.82
9400.00	1.21	209.09	9399.85	0.18	-10.34	0.18	10.34	270.97	0.14
9500.00	0.53	197.13	9499.84	-1.19	-10.99	-1.19	11.05	263.81	0.70
9600.00	0.19	182.12	9599.84	-1.80	-11.13	-1.80	11.28	260.81	0.35

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
9700.00	0.21	199.07	9699.84	-2.14	-11.20	-2.14	11.40	259.18	0.06
9800.00	0.22	210.10	9799.84	-2.48	-11.36	-2.48	11.62	257.66	0.04



VES Survey International
West Texas
(432) 563-5444
Surveyor: Gene Heiss
Windward Federal 3H / API 30-025-41413



VES Survey Date: 09/30/2014



COG Production LLC

Lea County, NM

Windward Federal

#3H

OH

Survey: MWD #1

Survey Report - Geographic

17 October, 2014

HOBBSD

JAN 30 2015

RECEIVED

jm



Wellplanning

Survey Report - Geographic

Company:	COG Production LLC	Local Co-ordinate Reference:	Well #3H
Project:	Lea County, NM	TVD Reference:	Well1 @ 3577.9usft
Site:	Windward Federal	MD Reference:	Well1 @ 3577.9usft
Well:	#3H	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	Windward Federal				
Site Position:		Northing:	435,194.10 usft	Latitude:	32° 11' 41.866 N
From:	Map	Easting:	690,707.10 usft	Longitude:	103° 43' 0.609 W
Position Uncertainty:	3.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.33 °

Well	#3H				
Well Position	+N/-S	0.0 usft	Northing:	435,207.50 usft	Latitude: 32° 11' 41.906 N
	+E/-W	0.0 usft	Easting:	692,344.70 usft	Longitude: 103° 42' 41.551 W
Position Uncertainty	3.0 usft	Wellhead Elevation:	usft	Ground Level:	3,551.9 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	7/15/2013	7.39	60.11	48,419

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	177.22	

Survey Program	Date 10/17/2014				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	9,800.0	GYRO (OH)	MWD	MWD - Standard	
9,900.0	20,366.0	MWD #1 (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
9,800.0	0.22	210.10	9,799.8	-2.5	-11.4	435,205.01	692,333.31	32° 11' 41.882 N	103° 42' 41.683 W
9,900.0	0.40	214.50	9,899.8	-2.9	-11.7	435,204.56	692,333.01	32° 11' 41.877 N	103° 42' 41.687 W
9,931.0	0.40	231.00	9,930.8	-3.1	-11.8	435,204.40	692,332.87	32° 11' 41.876 N	103° 42' 41.689 W
9,963.0	0.40	195.80	9,962.8	-3.3	-11.9	435,204.22	692,332.75	32° 11' 41.874 N	103° 42' 41.690 W
9,994.0	3.00	189.50	9,993.8	-4.2	-12.1	435,203.32	692,332.59	32° 11' 41.865 N	103° 42' 41.692 W
10,025.0	7.40	191.60	10,024.7	-6.9	-12.6	435,200.56	692,332.05	32° 11' 41.838 N	103° 42' 41.698 W
10,057.0	11.30	191.60	10,056.3	-12.0	-13.7	435,195.47	692,331.01	32° 11' 41.787 N	103° 42' 41.711 W
10,088.0	13.70	190.90	10,086.5	-18.6	-15.0	435,188.89	692,329.70	32° 11' 41.722 N	103° 42' 41.727 W
10,120.0	16.20	192.00	10,117.4	-26.7	-16.6	435,180.80	692,328.06	32° 11' 41.642 N	103° 42' 41.746 W
10,151.0	18.70	193.00	10,147.0	-35.8	-18.7	435,171.73	692,326.04	32° 11' 41.553 N	103° 42' 41.770 W
10,183.0	21.50	192.70	10,177.0	-46.5	-21.1	435,161.01	692,323.60	32° 11' 41.447 N	103° 42' 41.799 W



Wellplanning
Survey Report - Geographic

Company:	COG Production LLC	Local Co-ordinate Reference:	Well #3H
Project:	Lea County, NM	TVD Reference:	Well1 @ 3577.9usft
Site:	Windward Federal	MD Reference:	Well1 @ 3577.9usft
Well:	#3H	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
10,214.0	24.60	190.20	10,205.6	-58.4	-23.5	435,149.11	692,321.20	32° 11' 41.329 N	103° 42' 41.828 W
10,245.0	28.30	187.40	10,233.3	-72.0	-25.6	435,135.47	692,319.11	32° 11' 41.194 N	103° 42' 41.853 W
10,277.0	32.20	183.90	10,261.0	-88.1	-27.1	435,119.43	692,317.56	32° 11' 41.036 N	103° 42' 41.873 W
10,308.0	35.20	181.10	10,286.8	-105.2	-27.9	435,102.25	692,316.82	32° 11' 40.866 N	103° 42' 41.882 W
10,339.0	37.30	179.70	10,311.8	-123.6	-28.0	435,083.93	692,316.70	32° 11' 40.684 N	103° 42' 41.885 W
10,371.0	39.60	179.30	10,336.8	-143.5	-27.8	435,064.03	692,316.88	32° 11' 40.487 N	103° 42' 41.884 W
10,402.0	42.20	179.70	10,360.2	-163.8	-27.6	435,043.74	692,317.05	32° 11' 40.287 N	103° 42' 41.884 W
10,434.0	44.30	179.30	10,383.5	-185.7	-27.5	435,021.81	692,317.24	32° 11' 40.070 N	103° 42' 41.883 W
10,465.0	45.90	178.60	10,405.4	-207.6	-27.0	434,999.86	692,317.65	32° 11' 39.852 N	103° 42' 41.880 W
10,496.0	47.70	177.90	10,426.6	-230.2	-26.4	434,977.27	692,318.34	32° 11' 39.629 N	103° 42' 41.873 W
10,528.0	50.30	176.90	10,447.6	-254.4	-25.3	434,953.15	692,319.44	32° 11' 39.390 N	103° 42' 41.862 W
10,559.0	52.40	176.50	10,467.0	-278.5	-23.9	434,928.98	692,320.84	32° 11' 39.151 N	103° 42' 41.847 W
10,590.0	53.80	177.90	10,485.6	-303.3	-22.7	434,904.22	692,322.04	32° 11' 38.906 N	103° 42' 41.835 W
10,622.0	54.90	178.60	10,504.3	-329.3	-21.9	434,878.23	692,322.84	32° 11' 38.648 N	103° 42' 41.827 W
10,653.0	56.70	179.00	10,521.7	-354.9	-21.3	434,852.60	692,323.37	32° 11' 38.395 N	103° 42' 41.823 W
10,684.0	59.80	178.60	10,538.0	-381.3	-20.8	434,826.25	692,323.93	32° 11' 38.134 N	103° 42' 41.818 W
10,716.0	63.20	178.60	10,553.3	-409.4	-20.1	434,798.14	692,324.61	32° 11' 37.856 N	103° 42' 41.812 W
10,747.0	66.30	179.00	10,566.5	-437.4	-19.5	434,770.11	692,325.20	32° 11' 37.578 N	103° 42' 41.807 W
10,774.0	68.60	179.30	10,576.8	-462.3	-19.1	434,745.18	692,325.57	32° 11' 37.332 N	103° 42' 41.804 W
10,805.0	72.10	178.60	10,587.3	-491.5	-18.6	434,715.99	692,326.11	32° 11' 37.043 N	103° 42' 41.800 W
10,837.0	74.60	178.60	10,596.4	-522.2	-17.8	434,685.35	692,326.85	32° 11' 36.739 N	103° 42' 41.794 W
10,868.0	77.20	179.00	10,604.0	-552.2	-17.2	434,655.29	692,327.48	32° 11' 36.442 N	103° 42' 41.788 W
10,899.0	80.20	179.00	10,610.1	-582.6	-16.7	434,624.90	692,328.01	32° 11' 36.141 N	103° 42' 41.784 W
10,931.0	81.60	179.00	10,615.1	-614.2	-16.1	434,593.31	692,328.57	32° 11' 35.829 N	103° 42' 41.780 W
10,962.0	82.20	178.60	10,619.5	-644.9	-15.5	434,562.62	692,329.21	32° 11' 35.525 N	103° 42' 41.774 W
10,994.0	83.80	178.60	10,623.4	-676.6	-14.7	434,530.87	692,329.98	32° 11' 35.211 N	103° 42' 41.768 W
11,025.0	86.40	177.90	10,626.0	-707.5	-13.8	434,500.00	692,330.93	32° 11' 34.905 N	103° 42' 41.759 W
11,056.0	89.20	178.30	10,627.2	-738.5	-12.7	434,469.04	692,331.95	32° 11' 34.599 N	103° 42' 41.749 W
11,088.0	90.60	178.30	10,627.3	-770.4	-11.8	434,437.06	692,332.90	32° 11' 34.282 N	103° 42' 41.740 W
11,150.0	91.80	178.30	10,626.0	-832.4	-10.0	434,375.10	692,334.74	32° 11' 33.669 N	103° 42' 41.723 W
11,244.0	91.70	176.90	10,623.1	-926.3	-6.0	434,281.23	692,338.68	32° 11' 32.740 N	103° 42' 41.683 W
11,339.0	90.40	176.50	10,621.4	-1,021.1	-0.6	434,186.41	692,344.14	32° 11' 31.801 N	103° 42' 41.626 W
11,433.0	88.00	177.20	10,622.7	-1,114.9	4.6	434,092.56	692,349.31	32° 11' 30.872 N	103° 42' 41.572 W
11,527.0	88.00	177.20	10,626.0	-1,208.8	9.2	433,998.73	692,353.90	32° 11' 29.943 N	103° 42' 41.525 W
11,621.0	88.90	177.20	10,628.5	-1,302.6	13.8	433,904.88	692,358.49	32° 11' 29.014 N	103° 42' 41.478 W
11,715.0	90.10	177.60	10,629.3	-1,396.5	18.1	433,810.98	692,362.75	32° 11' 28.085 N	103° 42' 41.435 W
11,809.0	91.30	177.60	10,628.2	-1,490.4	22.0	433,717.08	692,366.69	32° 11' 27.155 N	103° 42' 41.395 W
11,903.0	90.30	175.80	10,626.9	-1,584.3	27.4	433,623.25	692,372.10	32° 11' 26.227 N	103° 42' 41.339 W
11,998.0	90.30	176.20	10,626.4	-1,679.0	34.0	433,528.48	692,378.73	32° 11' 25.288 N	103° 42' 41.268 W
12,092.0	89.60	176.20	10,626.4	-1,772.8	40.3	433,434.69	692,384.96	32° 11' 24.360 N	103° 42' 41.202 W
12,126.8	89.79	176.46	10,626.6	-1,807.5	42.5	433,399.97	692,387.18	32° 11' 24.016 N	103° 42' 41.178 W
Paduca #1									
12,186.0	90.10	176.90	10,626.7	-1,866.6	45.9	433,340.86	692,390.61	32° 11' 23.431 N	103° 42' 41.142 W
12,280.0	91.50	176.90	10,625.4	-1,960.5	51.0	433,247.01	692,395.69	32° 11' 22.502 N	103° 42' 41.089 W
12,374.0	89.20	175.50	10,624.8	-2,054.3	57.2	433,153.22	692,401.92	32° 11' 21.574 N	103° 42' 41.023 W
12,468.0	89.90	175.50	10,625.5	-2,148.0	64.6	433,059.52	692,409.30	32° 11' 20.646 N	103° 42' 40.944 W
12,562.0	92.60	175.50	10,623.5	-2,241.7	72.0	432,965.84	692,416.67	32° 11' 19.718 N	103° 42' 40.864 W
12,656.0	91.30	175.50	10,620.3	-2,335.3	79.3	432,872.18	692,424.04	32° 11' 18.791 N	103° 42' 40.785 W
12,750.0	84.30	174.40	10,623.9	-2,428.8	87.6	432,778.68	692,432.30	32° 11' 17.865 N	103° 42' 40.695 W
12,844.0	83.60	174.80	10,633.8	-2,521.9	96.4	432,685.62	692,441.10	32° 11' 16.944 N	103° 42' 40.599 W
12,938.0	85.50	177.60	10,642.7	-2,615.2	102.6	432,592.26	692,447.30	32° 11' 16.020 N	103° 42' 40.533 W
13,032.0	86.40	177.90	10,649.4	-2,708.9	106.3	432,498.57	692,450.98	32° 11' 15.092 N	103° 42' 40.496 W
13,126.0	86.40	179.00	10,655.3	-2,802.7	108.8	432,404.79	692,453.52	32° 11' 14.164 N	103° 42' 40.473 W
13,220.0	87.80	180.70	10,660.0	-2,896.6	109.1	432,310.92	692,453.76	32° 11' 13.235 N	103° 42' 40.477 W
13,314.0	89.20	182.10	10,662.5	-2,990.5	106.8	432,216.98	692,451.46	32° 11' 12.306 N	103° 42' 40.510 W



Wellplanning
Survey Report - Geographic

Company:	COG Production LLC	Local Co-ordinate Reference:	Well #3H
Project:	Lea County, NM	TVD Reference:	Well1 @ 3577.9usft
Site:	Windward Federal	MD Reference:	Well1 @ 3577.9usft
Well:	#3H	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
13,408.0	89.40	182.50	10,663.6	-3,084.4	103.0	432,123.06	692,447.69	32° 11' 11.377 N		103° 42' 40.560 W
13,502.0	90.30	183.20	10,663.9	-3,178.3	98.3	432,029.18	692,443.02	32° 11' 10.448 N		103° 42' 40.621 W
13,596.0	92.70	182.50	10,661.4	-3,272.2	93.7	431,935.34	692,438.35	32° 11' 9.519 N		103° 42' 40.681 W
13,691.0	91.10	179.70	10,658.3	-3,367.1	91.8	431,840.42	692,436.52	32° 11' 8.580 N		103° 42' 40.709 W
13,785.0	91.10	178.60	10,656.5	-3,461.1	93.2	431,746.45	692,437.92	32° 11' 7.650 N		103° 42' 40.699 W
13,879.0	89.00	178.30	10,656.4	-3,555.0	95.8	431,652.49	692,440.46	32° 11' 6.720 N		103° 42' 40.676 W
13,974.0	88.30	178.30	10,658.6	-3,649.9	98.6	431,557.56	692,443.28	32° 11' 5.781 N		103° 42' 40.649 W
14,068.0	88.90	176.20	10,660.9	-3,743.8	103.1	431,463.70	692,447.79	32° 11' 4.852 N		103° 42' 40.603 W
14,162.0	94.50	175.80	10,658.1	-3,837.5	109.6	431,370.01	692,454.34	32° 11' 3.924 N		103° 42' 40.533 W
14,256.0	94.80	175.80	10,650.5	-3,930.9	116.5	431,276.57	692,461.20	32° 11' 2.999 N		103° 42' 40.460 W
14,350.0	91.70	174.40	10,645.2	-4,024.4	124.5	431,183.08	692,469.22	32° 11' 2.073 N		103° 42' 40.373 W
14,444.0	92.40	174.10	10,641.8	-4,117.9	133.9	431,089.61	692,478.63	32° 11' 1.148 N		103° 42' 40.269 W
14,538.0	93.30	174.10	10,637.2	-4,211.3	143.6	430,996.22	692,488.28	32° 11' 0.223 N		103° 42' 40.163 W
14,632.0	91.70	175.80	10,633.1	-4,304.8	151.8	430,902.68	692,496.54	32° 10' 59.297 N		103° 42' 40.074 W
14,726.0	92.00	175.80	10,630.0	-4,398.5	158.7	430,808.99	692,503.43	32° 10' 58.369 N		103° 42' 40.000 W
14,820.0	92.40	175.80	10,626.4	-4,492.2	165.6	430,715.31	692,510.30	32° 10' 57.442 N		103° 42' 39.926 W
14,914.0	92.60	175.10	10,622.3	-4,585.8	173.1	430,621.69	692,517.75	32° 10' 56.515 N		103° 42' 39.846 W
15,008.0	92.70	175.10	10,618.0	-4,679.4	181.1	430,528.14	692,525.77	32° 10' 55.589 N		103° 42' 39.759 W
15,102.0	90.60	177.20	10,615.3	-4,773.1	187.4	430,434.40	692,532.08	32° 10' 54.661 N		103° 42' 39.692 W
15,196.0	91.10	177.20	10,613.9	-4,867.0	192.0	430,340.52	692,536.67	32° 10' 53.732 N		103° 42' 39.644 W
15,290.0	89.40	177.60	10,613.5	-4,960.9	196.2	430,246.62	692,540.94	32° 10' 52.802 N		103° 42' 39.601 W
15,384.0	89.40	177.60	10,614.4	-5,054.8	200.2	430,152.71	692,544.87	32° 10' 51.873 N		103° 42' 39.562 W
15,478.0	90.30	177.20	10,614.7	-5,148.7	204.4	430,058.81	692,549.14	32° 10' 50.943 N		103° 42' 39.518 W
15,572.0	90.10	177.20	10,614.4	-5,242.6	209.0	429,964.92	692,553.73	32° 10' 50.014 N		103° 42' 39.471 W
15,666.0	90.60	177.60	10,613.8	-5,336.5	213.3	429,871.02	692,557.99	32° 10' 49.084 N		103° 42' 39.428 W
15,760.0	90.10	176.90	10,613.2	-5,430.4	217.8	429,777.13	692,562.50	32° 10' 48.155 N		103° 42' 39.382 W
15,854.0	90.30	176.90	10,612.9	-5,524.2	222.9	429,683.27	692,567.59	32° 10' 47.226 N		103° 42' 39.329 W
15,949.0	90.60	176.90	10,612.1	-5,619.1	228.0	429,588.41	692,572.72	32° 10' 46.287 N		103° 42' 39.276 W
16,042.0	90.80	176.90	10,611.0	-5,711.9	233.1	429,495.56	692,577.75	32° 10' 45.368 N		103° 42' 39.223 W
16,136.0	90.80	176.90	10,609.7	-5,805.8	238.1	429,401.70	692,582.84	32° 10' 44.439 N		103° 42' 39.171 W
16,230.0	92.20	176.90	10,607.2	-5,899.6	243.2	429,307.87	692,587.92	32° 10' 43.510 N		103° 42' 39.118 W
16,324.0	89.90	175.50	10,605.5	-5,993.4	249.5	429,214.11	692,594.15	32° 10' 42.582 N		103° 42' 39.052 W
16,418.0	90.40	175.50	10,605.3	-6,087.1	256.8	429,120.40	692,601.52	32° 10' 41.654 N		103° 42' 38.972 W
16,512.0	88.90	175.50	10,605.8	-6,180.8	264.2	429,026.69	692,608.90	32° 10' 40.726 N		103° 42' 38.893 W
16,606.0	87.60	175.10	10,608.7	-6,274.4	271.9	428,933.05	692,616.59	32° 10' 39.799 N		103° 42' 38.809 W
16,700.0	87.80	175.10	10,612.5	-6,368.0	279.9	428,839.47	692,624.62	32° 10' 38.872 N		103° 42' 38.722 W
16,794.0	87.10	174.80	10,616.7	-6,461.6	288.2	428,745.93	692,632.88	32° 10' 37.948 N		103° 42' 38.632 W
16,889.0	88.30	174.80	10,620.5	-6,556.1	296.8	428,651.40	692,641.49	32° 10' 37.010 N		103° 42' 38.539 W
16,983.0	90.30	178.80	10,621.6	-6,649.9	302.0	428,557.58	692,646.73	32° 10' 36.082 N		103° 42' 38.484 W
17,076.0	89.70	176.50	10,621.6	-6,742.8	305.8	428,464.66	692,650.54	32° 10' 35.162 N		103° 42' 38.446 W
17,170.0	91.00	177.60	10,621.0	-6,836.7	310.7	428,370.79	692,655.38	32° 10' 34.233 N		103° 42' 38.396 W
17,265.0	91.80	177.90	10,618.7	-6,931.6	314.4	428,275.89	692,659.11	32° 10' 33.293 N		103° 42' 38.359 W
17,359.0	91.30	177.60	10,616.2	-7,025.5	318.1	428,182.00	692,662.80	32° 10' 32.364 N		103° 42' 38.322 W
17,453.0	90.40	177.20	10,614.8	-7,119.4	322.4	428,088.11	692,667.06	32° 10' 31.435 N		103° 42' 38.279 W
17,547.0	91.80	177.90	10,613.0	-7,213.3	326.4	427,994.21	692,671.08	32° 10' 30.505 N		103° 42' 38.239 W
17,641.0	92.40	177.90	10,609.5	-7,307.2	329.8	427,900.34	692,674.52	32° 10' 29.576 N		103° 42' 38.205 W
17,735.0	92.20	177.20	10,605.8	-7,401.0	333.8	427,806.50	692,678.54	32° 10' 28.647 N		103° 42' 38.164 W
17,829.0	91.80	177.20	10,602.5	-7,494.8	338.4	427,712.67	692,683.13	32° 10' 27.718 N		103° 42' 38.117 W
17,923.0	92.20	177.20	10,599.2	-7,588.7	343.0	427,618.84	692,687.72	32° 10' 26.790 N		103° 42' 38.070 W
18,017.0	91.50	177.60	10,596.2	-7,682.5	347.3	427,524.99	692,691.98	32° 10' 25.861 N		103° 42' 38.027 W
18,111.0	91.30	177.90	10,593.9	-7,776.4	351.0	427,431.09	692,695.67	32° 10' 24.931 N		103° 42' 37.990 W
18,205.0	88.70	178.60	10,593.9	-7,870.4	353.8	427,337.14	692,698.54	32° 10' 24.001 N		103° 42' 37.963 W
18,299.0	89.20	178.60	10,595.6	-7,964.3	356.1	427,243.19	692,700.83	32° 10' 23.071 N		103° 42' 37.943 W
18,393.0	88.70	178.30	10,597.3	-8,058.3	358.7	427,149.24	692,703.38	32° 10' 22.142 N		103° 42' 37.920 W
18,487.0	88.90	178.30	10,599.3	-8,152.2	361.5	427,055.30	692,706.16	32° 10' 21.212 N		103° 42' 37.894 W



Wellplanning
Survey Report - Geographic

Company:	COG Production LLC	Local Co-ordinate Reference:	Well #3H
Project:	Lea County, NM	TVD Reference:	Well1 @ 3577.9usft
Site:	Windward Federal	MD Reference:	Well1 @ 3577.9usft
Well:	#3H	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
18,581.0	89.60	177.90	10,600.5	-8,246.1	364.6	426,961.36	692,709.28	32° 10' 20.282 N	103° 42' 37.864 W
18,675.0	90.30	177.90	10,600.6	-8,340.1	368.0	426,867.42	692,712.72	32° 10' 19.352 N	103° 42' 37.830 W
18,769.0	90.60	177.60	10,599.9	-8,434.0	371.7	426,773.50	692,716.41	32° 10' 18.423 N	103° 42' 37.793 W
18,863.0	91.10	177.60	10,598.5	-8,527.9	375.7	426,679.59	692,720.35	32° 10' 17.493 N	103° 42' 37.754 W
18,957.0	89.70	177.20	10,597.8	-8,621.8	379.9	426,585.69	692,724.61	32° 10' 16.564 N	103° 42' 37.711 W
19,051.0	89.40	176.20	10,598.5	-8,715.6	385.3	426,491.85	692,730.03	32° 10' 15.635 N	103° 42' 37.654 W
19,146.0	89.60	175.80	10,599.4	-8,810.4	392.0	426,397.09	692,736.65	32° 10' 14.697 N	103° 42' 37.583 W
19,240.0	90.30	176.20	10,599.5	-8,904.2	398.5	426,303.32	692,743.21	32° 10' 13.768 N	103° 42' 37.513 W
19,334.0	91.30	175.80	10,598.1	-8,997.9	405.1	426,209.56	692,749.77	32° 10' 12.840 N	103° 42' 37.443 W
19,428.0	91.00	175.50	10,596.3	-9,091.7	412.2	426,115.85	692,756.89	32° 10' 11.912 N	103° 42' 37.367 W
19,522.0	91.30	175.10	10,594.4	-9,185.3	419.9	426,022.18	692,764.59	32° 10' 10.985 N	103° 42' 37.283 W
19,616.0	89.70	175.50	10,593.6	-9,279.0	427.6	425,928.51	692,772.30	32° 10' 10.057 N	103° 42' 37.200 W
19,710.0	90.30	175.50	10,593.6	-9,372.7	435.0	425,834.80	692,779.67	32° 10' 9.130 N	103° 42' 37.121 W
19,804.0	88.90	175.80	10,594.2	-9,466.4	442.1	425,741.07	692,786.80	32° 10' 8.202 N	103° 42' 37.044 W
19,898.0	91.30	176.20	10,594.0	-9,560.2	448.7	425,647.31	692,793.36	32° 10' 7.274 N	103° 42' 36.974 W
19,992.0	90.10	177.60	10,592.9	-9,654.0	453.7	425,553.46	692,798.44	32° 10' 6.345 N	103° 42' 36.921 W
20,086.0	91.10	177.20	10,591.9	-9,747.9	458.0	425,459.56	692,802.70	32° 10' 5.415 N	103° 42' 36.878 W
20,180.0	92.40	177.20	10,589.0	-9,841.8	462.6	425,365.72	692,807.29	32° 10' 4.486 N	103° 42' 36.831 W
20,273.0	93.30	176.90	10,584.4	-9,934.5	467.4	425,272.96	692,812.07	32° 10' 3.568 N	103° 42' 36.782 W
20,312.0	93.30	176.90	10,582.2	-9,973.4	469.5	425,234.08	692,814.18	32° 10' 3.183 N	103° 42' 36.760 W
20,366.0	93.30	176.90	10,579.1	-10,027.3	472.4	425,180.25	692,817.09	32° 10' 2.650 N	103° 42' 36.729 W
PBHL(Windward#3H)									

Checked By:	Approved By:	Date:
-------------	--------------	-------