

Results of Directional Survey

API number:	30-025-41958		
OGRID:		Operator:	COG PRODUCTION, LLC
		Property:	MACHO NACHO STATE COM # 5H

surface	ULSTR:	P	07	T 24S	R 33E
				190 FSL	430 FEL

BH Loc	ULSTR:	A	07	T 24S	R 33E
14000	MD	9512.2	TVD	343 FNL	712 FEL
4937 FSL					

Top Perf/OH	ULSTR:	P	07	T 24S	R 33E
9717	MD	9477.1	TVD	665 FSL	476 FEL

Bot Perf/OH	ULSTR:	A	07	T 24S	R 33E
13850	MD	9513.4	TVD	492 FSL	701 FEL
4788 FSL					

	MD	N/S	E/W	VD
	9686.00	444.80	-46.20	9469.00
TOP PERFS/OH	9717.00	474.70	-46.10	9477.10
	9717.00	474.70	-46.10	9477.10
	13948.00	4695.30	-278.20	9512.60
BOT PERFS/OH	13850.00	4597.68	-271.42	9513.35
	14000.00	4747.10	-281.80	9512.20

NEXT TO LAST	13948.00	4695.30	-278.20	9512.60
LAST READING	14000.00	4747.10	-281.80	9512.20
TD	14000.00	4747.10	-281.80	9512.20

Surface Location	190	FS	430	FE
Projected BHL	4937	FS	712	FE
Location of				
Top Perfs/OH	665	FS	476	FE
Bottom Perfs/OH	4788	FS	701	FE

SUMMARY of Subsurface Locations

Surface Location	P-07-24S-33E	190	FS	430	FE	Vert. Depth
Top Perfs/OH	P-07-24S-33E	665	FS	476	FE	9477.10
Bottom Perfs/OH	A-07-24S-33E	4788	FS	701	FE	9513.35
Projected TD	A-07-24S-33E	4937	FS	712	FE	9512.20

FEB 10 2015

OPERATOR COG Operating
WELL/LEASE Macho Nacho St. Com #5-H
COUNTY Lea Co., NM

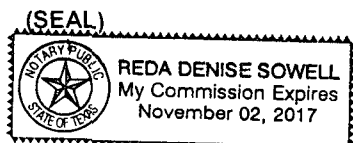
STATE OF NEW MEXICO
DEVIATION REPORT

318	0.50
550	1.50
850	0.35
1236	0.33
1267	0.30
1541	0.30
1825	0.40
2108	0.70
2675	0.70
2958	0.80
3242	0.90
3525	1.10
4091	0.60
4657	1.80
5251	1.10
5822	0.80
6105	2.20
6421	0.51
6765	0.60
7080	1.60
7334	1.00
7617	1.20
8179	1.30
8462	0.50
8835	0.70
8866	0.70
8898	3.60

HOBBSOCD
JAN 30 2015
RECEIVED

SIGNED BY: Ron Scandolari
RON SCANDOLARI, VP-CONTRACT DRILLING
STATE OF TEXAS
COUNTY OF MIDLAND

ON THIS 20 DAY OF November, 2014, BEFORE ME, R SOWELL, A NOTARY PUBLIC, PERSONALLY APPEARED RON SCANDOLARI, WHO ACKNOWLEDGED AND EXECUTED THIS DOCUMENT. WITNESS MY HAND AND OFFICIAL SEAL.



Reda Denise Sowell
NOTARY PUBLIC

hm



November 11, 2014

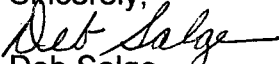
Concho Resources, Inc.
One Concho Center
600 W. Illinois Avenue
Midland, Texas 79701

HOESOC
JAN 30 2015
RECEIVED

Attn: Kanicia Castillo

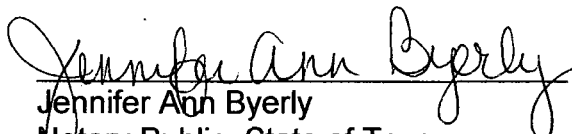
RE: **Macho Nacho State Com 5H**

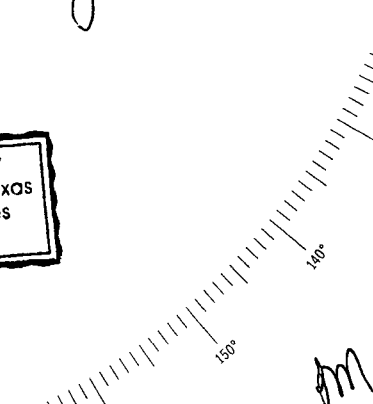
Please find enclosed a copy of the survey from 0.00' to 8772.00' ran on the above referenced well.

Sincerely,

Deb Salge
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 11 day of November A.D., 2014, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas



Company: COG OPERATING, LLC (CONCHO)
Lease/Well: MACHO NACHO STATE COM/5H



Rig Name: BASIC #46
State/County: NEW MEXICO /LEA
Latitude: 32.23, Longitude: -103.60
GRID North is 0.39 Degrees East of True North
VS-Azi: 0.00 Degrees



Depth Reference : RKB: 22 FEET

HOBBSD

JAN 30 2015

RECEIVED

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: gyro survey.ut

Minimum Curvature Method

Report Date/Time: 11/11/2014 / 14:41

VES Survey International

West Texas

(432) 563-5444

Surveyor: Jordan Shelleby

Macho Nacho State Com 5H / API 30-025-41958

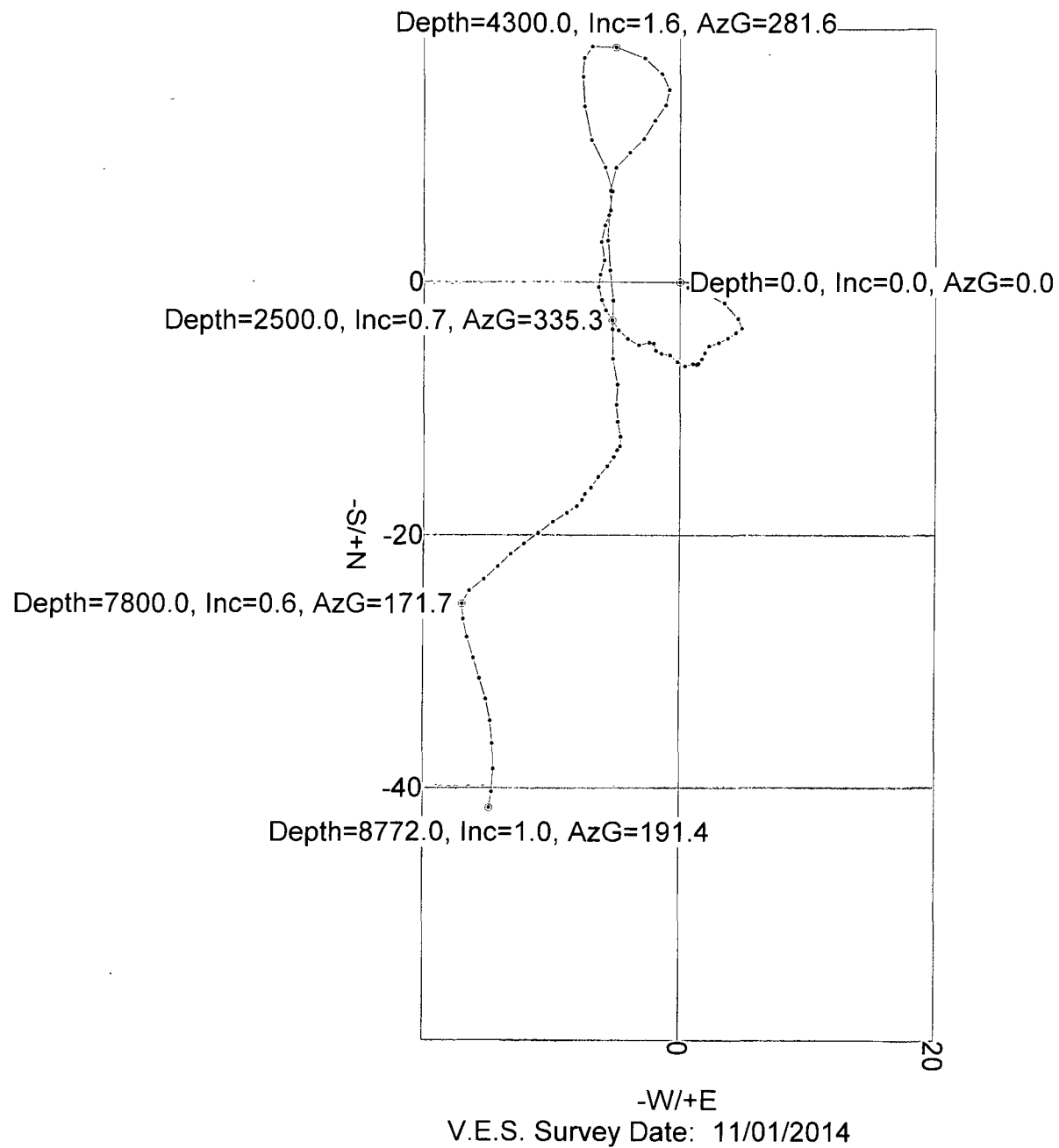
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.85	124.51	100.00	-0.42	0.61	-0.42	0.74	124.51	0.85
200.00	0.94	96.48	199.98	-0.93	2.03	-0.93	2.23	114.57	0.44
300.00	0.98	135.40	299.97	-1.63	3.45	-1.63	3.81	115.30	0.64
400.00	0.94	142.60	399.96	-2.89	4.54	-2.89	5.38	122.43	0.13
500.00	0.27	235.78	499.95	-3.67	4.84	-3.67	6.07	127.15	0.99
600.00	0.37	237.83	599.95	-3.97	4.37	-3.97	5.91	132.28	0.10
700.00	0.50	232.98	699.95	-4.41	3.75	-4.41	5.79	139.66	0.14
800.00	0.47	253.98	799.94	-4.79	3.00	-4.79	5.65	147.92	0.18
900.00	0.41	245.94	899.94	-5.05	2.28	-5.05	5.54	155.69	0.08
1000.00	0.45	181.10	999.94	-5.58	1.95	-5.58	5.91	160.79	0.46
1100.00	0.26	250.27	1099.94	-6.05	1.73	-6.05	6.29	164.06	0.43
1200.00	0.37	192.34	1199.94	-6.44	1.45	-6.44	6.60	167.32	0.32
1300.00	0.27	340.95	1299.94	-6.53	1.30	-6.53	6.66	168.71	0.61
1400.00	0.31	235.89	1399.94	-6.45	1.01	-6.45	6.53	171.14	0.46
1500.00	0.45	267.22	1499.93	-6.62	0.39	-6.62	6.63	176.60	0.25
1600.00	0.46	330.80	1599.93	-6.29	-0.19	-6.29	6.30	181.75	0.48
1700.00	0.48	295.22	1699.93	-5.77	-0.76	-5.77	5.82	187.54	0.29
1800.00	0.33	259.54	1799.93	-5.65	-1.43	-5.65	5.82	194.19	0.28

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	0.37	332.78	1899.92	-5.41	-1.86	-5.41	5.72	198.99	0.42
2000.00	0.33	355.00	1999.92	-4.84	-2.03	-4.84	5.25	202.81	0.14
2100.00	0.47	234.47	2099.92	-4.79	-2.39	-4.79	5.35	206.55	0.70
2200.00	0.53	275.42	2199.92	-4.98	-3.18	-4.98	5.91	212.59	0.35
2300.00	0.71	315.69	2299.91	-4.49	-4.08	-4.49	6.07	222.25	0.46
2400.00	0.42	314.09	2399.91	-3.79	-4.78	-3.79	6.10	231.60	0.29
2500.00	0.67	335.28	2499.90	-3.00	-5.29	-3.00	6.08	240.47	0.32
2600.00	0.39	312.43	2599.90	-2.23	-5.79	-2.23	6.21	248.92	0.35
2700.00	0.69	354.65	2699.89	-1.40	-6.10	-1.40	6.26	257.09	0.48
2800.00	0.54	334.95	2799.89	-0.37	-6.36	-0.37	6.37	266.65	0.26
2900.00	0.73	31.64	2899.88	0.59	-6.22	0.59	6.25	275.44	0.62
3000.00	0.68	358.02	2999.88	1.72	-5.91	1.72	6.16	286.25	0.41
3100.00	1.00	348.14	3099.87	3.16	-6.11	3.16	6.88	297.38	0.35
3200.00	0.75	45.03	3199.86	4.48	-5.83	4.48	7.35	307.54	0.86
3300.00	0.82	355.58	3299.85	5.65	-5.42	5.65	7.83	316.22	0.66
3400.00	0.98	2.72	3399.83	7.23	-5.43	7.23	9.04	323.06	0.20
3500.00	1.19	22.88	3499.82	9.04	-4.99	9.04	10.32	331.09	0.43
3600.00	0.83	70.35	3599.80	10.23	-3.90	10.23	10.95	339.13	0.88
3700.00	1.07	25.76	3699.79	11.32	-2.81	11.32	11.66	346.04	0.75
3800.00	0.86	35.55	3799.78	12.77	-1.97	12.77	12.92	351.22	0.26
3900.00	0.84	33.93	3899.77	13.98	-1.13	13.98	14.03	355.39	0.04
4000.00	0.72	348.06	3999.76	15.20	-0.85	15.20	15.23	356.80	0.62
4100.00	0.91	326.89	4099.75	16.48	-1.41	16.48	16.54	355.10	0.35
4200.00	1.21	303.27	4199.73	17.72	-2.73	17.72	17.93	351.26	0.52
4300.00	1.62	281.65	4299.70	18.58	-4.99	18.58	19.24	344.97	0.67
4400.00	0.59	243.26	4399.68	18.64	-6.83	18.64	19.85	339.86	1.21
4500.00	0.80	194.10	4499.67	17.73	-7.47	17.73	19.23	337.16	0.61
4600.00	0.93	177.18	4599.66	16.24	-7.60	16.24	17.93	334.93	0.28
4700.00	1.75	176.74	4699.64	13.91	-7.47	13.91	15.79	331.76	0.82
4800.00	1.44	157.93	4799.60	11.22	-6.91	11.22	13.18	328.38	0.60
4900.00	1.35	148.49	4899.57	9.06	-5.82	9.06	10.77	327.26	0.25
5000.00	1.03	183.34	4999.55	7.16	-5.26	7.16	8.88	323.67	0.77
5100.00	1.14	192.10	5099.53	5.29	-5.52	5.29	7.65	313.73	0.20
5200.00	1.20	173.36	5199.51	3.28	-5.61	3.28	6.50	300.27	0.38
5300.00	1.50	178.71	5299.48	0.93	-5.46	0.93	5.54	279.66	0.33
5400.00	1.26	168.80	5399.45	-1.46	-5.22	-1.46	5.42	254.41	0.34
5500.00	1.40	192.30	5499.43	-3.72	-5.26	-3.72	6.45	234.73	0.56
5600.00	1.34	165.61	5599.40	-6.05	-5.23	-6.05	8.00	220.87	0.63
5700.00	1.05	174.12	5699.38	-8.09	-4.85	-8.09	9.43	210.92	0.34

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	0.81	193.98	5799.36	-9.69	-4.93	-9.69	10.87	206.94	0.40
5900.00	0.78	160.38	5899.36	-11.02	-4.87	-11.02	12.05	203.83	0.46
6000.00	0.63	180.74	5999.35	-12.21	-4.65	-12.21	13.06	200.83	0.29
6100.00	0.25	185.62	6099.34	-12.97	-4.67	-12.97	13.79	199.82	0.38
6200.00	0.27	245.00	6199.34	-13.28	-4.91	-13.28	14.16	200.27	0.26
6300.00	0.51	185.72	6299.34	-13.83	-5.16	-13.83	14.76	200.47	0.44
6400.00	0.62	238.38	6399.34	-14.56	-5.67	-14.56	15.62	201.27	0.51
6500.00	0.70	203.16	6499.33	-15.40	-6.36	-15.40	16.66	202.46	0.40
6600.00	0.50	227.26	6599.33	-16.25	-6.92	-16.25	17.67	203.07	0.32
6700.00	0.29	214.25	6699.32	-16.76	-7.38	-16.76	18.31	203.78	0.23
6800.00	0.31	201.26	6799.32	-17.22	-7.63	-17.22	18.83	203.89	0.07
6900.00	0.43	232.53	6899.32	-17.70	-8.02	-17.70	19.44	204.39	0.23
7000.00	0.63	237.61	6999.32	-18.23	-8.79	-18.23	20.24	205.75	0.20
7100.00	0.85	235.02	7099.31	-18.95	-9.86	-18.95	21.36	207.50	0.22
7200.00	0.79	229.73	7199.30	-19.82	-11.00	-19.82	22.67	209.03	0.09
7300.00	0.81	233.93	7299.29	-20.69	-12.10	-20.69	23.97	210.33	0.06
7400.00	0.68	231.16	7399.28	-21.48	-13.14	-21.48	25.18	211.46	0.14
7500.00	0.96	221.97	7499.27	-22.47	-14.16	-22.47	26.56	212.22	0.30
7600.00	0.75	235.09	7599.26	-23.47	-15.26	-23.47	27.99	213.03	0.28
7700.00	0.96	229.30	7699.25	-24.39	-16.43	-24.39	29.40	213.97	0.23
7800.00	0.56	171.73	7799.24	-25.42	-16.99	-25.42	30.58	213.76	0.81
7900.00	0.83	177.57	7899.23	-26.63	-16.89	-26.63	31.53	212.39	0.28
8000.00	0.86	159.90	7999.22	-28.05	-16.60	-28.05	32.60	210.62	0.26
8100.00	1.11	163.57	8099.21	-29.69	-16.07	-29.69	33.76	208.43	0.26
8200.00	0.84	162.99	8199.19	-31.31	-15.58	-31.31	34.98	206.46	0.28
8300.00	1.13	162.57	8299.18	-32.95	-15.08	-32.95	36.23	204.59	0.29
8400.00	0.90	174.88	8399.16	-34.67	-14.71	-34.67	37.66	203.00	0.31
8500.00	1.19	174.04	8499.14	-36.48	-14.53	-36.48	39.27	201.72	0.29
8600.00	1.12	183.96	8599.12	-38.49	-14.49	-38.49	41.13	200.64	0.21
8700.00	0.98	185.06	8699.11	-40.32	-14.64	-40.32	42.90	199.95	0.14
8772.00	1.03	191.37	8771.10	-41.57	-14.82	-41.57	44.13	199.62	0.17



VES Survey International
West Texas
(432) 563-5444
Surveyor: Jordan Shelleby
Macho Nacho State Com 5H / API 30-025-41958





COG Production LLC

Lea County, NM
Macho Nacho State
#5H

OH

Design: OH

Survey Report - Geographic

08 November, 2014

HOBBSD

JAN 30 2015

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PM



TDS
Survey Report - Geographic



Company: COG Production LLC
Project: Lea County, NM
Site: Macho Nacho State
Well: #5H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #5H
TVD Reference: KB @ 3597.1usft
MD Reference: KB @ 3597.1usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Project Lea County, NM

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 Macho Nacho State

Site Position: Northing: 446,603.70 usft Latitude: 32° 13' 32.594 N
From: Map Easting: 725,838.70 usft Longitude: 103° 36' 10.882 W
Position Uncertainty: 3.0 usft Slot Radius: 12-1/4 " Grid Convergence: 0.39 °

Well #5H

Well Position +N/-S 0.0 usft Northing: 446,462.40 usft Latitude: 32° 13' 31.212 N
+E/-W 0.0 usft Easting: 725,599.70 usft Longitude: 103° 36' 13.675 W
Position Uncertainty 0.0 usft Wellhead Elevation: 0.0 usft Ground Level: 3,575.1 usft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/18/2014	7.20	60.10	48,286

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	356.82

Survey Program Date 11/8/2014

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	8,772.0	GYRO #1 (OH)	MWD	MWD - Standard
8,835.0	14,000.0	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
0.0	0.00	0.00	0.0	0.0	0.0	446,462.40	725,599.70	32° 13' 31.212 N	103° 36' 13.675 W
100.0	0.85	124.51	100.0	-0.4	0.6	446,461.98	725,600.31	32° 13' 31.208 N	103° 36' 13.668 W
200.0	0.94	96.48	200.0	-0.9	2.0	446,461.47	725,601.73	32° 13' 31.203 N	103° 36' 13.652 W
300.0	0.98	135.40	300.0	-1.6	3.5	446,460.77	725,603.15	32° 13' 31.196 N	103° 36' 13.635 W
400.0	0.94	142.60	400.0	-2.9	4.6	446,459.50	725,604.25	32° 13' 31.183 N	103° 36' 13.622 W
500.0	0.27	235.78	500.0	-3.7	4.9	446,458.72	725,604.55	32° 13' 31.176 N	103° 36' 13.619 W
600.0	0.37	237.83	600.0	-4.0	4.4	446,458.42	725,604.08	32° 13' 31.173 N	103° 36' 13.624 W
700.0	0.50	232.98	699.9	-4.4	3.8	446,457.98	725,603.46	32° 13' 31.168 N	103° 36' 13.632 W
800.0	0.47	253.98	799.9	-4.8	3.0	446,457.61	725,602.72	32° 13' 31.165 N	103° 36' 13.640 W
900.0	0.41	245.94	899.9	-5.1	2.3	446,457.35	725,602.00	32° 13' 31.162 N	103° 36' 13.649 W
1,000.0	0.45	181.10	999.9	-5.6	2.0	446,456.81	725,601.66	32° 13' 31.157 N	103° 36' 13.653 W



TDS
Survey Report - Geographic



Company: COG Production LLC
Project: Lea County, NM
Site: Macho Nacho State
Well: #5H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #5H
TVD Reference: KB @ 3597.1usft
MD Reference: KB @ 3597.1usft
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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,100.0	0.26	250.27	1,099.9	-6.1	1.7	446,456.34	725,601.44	32° 13' 31.152 N	103° 36' 13.655 W
1,200.0	0.37	192.34	1,199.9	-6.5	1.5	446,455.95	725,601.16	32° 13' 31.148 N	103° 36' 13.659 W
1,300.0	0.27	340.95	1,299.9	-6.5	1.3	446,455.85	725,601.01	32° 13' 31.147 N	103° 36' 13.660 W
1,400.0	0.31	235.89	1,399.9	-6.5	1.0	446,455.93	725,600.71	32° 13' 31.148 N	103° 36' 13.664 W
1,500.0	0.45	267.22	1,499.9	-6.6	0.4	446,455.75	725,600.10	32° 13' 31.146 N	103° 36' 13.671 W
1,600.0	0.46	330.80	1,599.9	-6.3	-0.2	446,456.09	725,599.51	32° 13' 31.150 N	103° 36' 13.678 W
1,700.0	0.48	295.22	1,699.9	-5.8	-0.8	446,456.61	725,598.93	32° 13' 31.155 N	103° 36' 13.685 W
1,800.0	0.33	259.54	1,799.9	-5.7	-1.4	446,456.74	725,598.27	32° 13' 31.156 N	103° 36' 13.692 W
1,900.0	0.37	332.78	1,899.9	-5.4	-1.9	446,456.98	725,597.84	32° 13' 31.159 N	103° 36' 13.697 W
2,000.0	0.33	355.00	1,999.9	-4.9	-2.0	446,457.55	725,597.67	32° 13' 31.164 N	103° 36' 13.699 W
2,100.0	0.47	234.47	2,099.9	-4.8	-2.4	446,457.60	725,597.31	32° 13' 31.165 N	103° 36' 13.703 W
2,200.0	0.53	275.42	2,199.9	-5.0	-3.2	446,457.40	725,596.52	32° 13' 31.163 N	103° 36' 13.713 W
2,300.0	0.71	315.69	2,299.9	-4.5	-4.1	446,457.89	725,595.62	32° 13' 31.168 N	103° 36' 13.723 W
2,400.0	0.42	314.09	2,399.9	-3.8	-4.8	446,458.59	725,594.93	32° 13' 31.175 N	103° 36' 13.731 W
2,500.0	0.67	335.28	2,499.9	-3.0	-5.3	446,459.38	725,594.42	32° 13' 31.183 N	103° 36' 13.737 W
2,600.0	0.39	312.43	2,599.9	-2.3	-5.8	446,460.14	725,593.92	32° 13' 31.190 N	103° 36' 13.743 W
2,700.0	0.69	354.65	2,699.9	-1.4	-6.1	446,460.97	725,593.62	32° 13' 31.198 N	103° 36' 13.746 W
2,800.0	0.54	334.95	2,799.9	-0.4	-6.3	446,461.99	725,593.36	32° 13' 31.209 N	103° 36' 13.749 W
2,900.0	0.73	31.64	2,899.9	0.6	-6.2	446,462.96	725,593.49	32° 13' 31.218 N	103° 36' 13.747 W
3,000.0	0.68	358.02	2,999.9	1.7	-5.9	446,464.10	725,593.81	32° 13' 31.229 N	103° 36' 13.744 W
3,100.0	1.00	348.14	3,099.9	3.1	-6.1	446,465.54	725,593.61	32° 13' 31.244 N	103° 36' 13.746 W
3,200.0	0.75	45.03	3,199.9	4.5	-5.8	446,466.86	725,593.89	32° 13' 31.257 N	103° 36' 13.742 W
3,300.0	0.82	355.58	3,299.8	5.6	-5.4	446,468.04	725,594.30	32° 13' 31.268 N	103° 36' 13.738 W
3,400.0	0.98	2.72	3,399.8	7.2	-5.4	446,469.60	725,594.28	32° 13' 31.284 N	103° 36' 13.738 W
3,500.0	1.19	22.88	3,499.8	9.0	-5.0	446,471.41	725,594.73	32° 13' 31.302 N	103° 36' 13.732 W
3,600.0	0.83	70.35	3,599.8	10.2	-3.9	446,472.61	725,595.82	32° 13' 31.314 N	103° 36' 13.720 W
3,700.0	1.07	25.76	3,699.8	11.3	-2.8	446,473.70	725,596.90	32° 13' 31.324 N	103° 36' 13.707 W
3,800.0	0.86	35.55	3,799.8	12.8	-2.0	446,475.15	725,597.75	32° 13' 31.339 N	103° 36' 13.697 W
3,900.0	0.84	33.93	3,899.8	14.0	-1.1	446,476.37	725,598.59	32° 13' 31.351 N	103° 36' 13.687 W
4,000.0	0.72	348.06	3,999.8	15.2	-0.8	446,477.59	725,598.87	32° 13' 31.363 N	103° 36' 13.684 W
4,100.0	0.91	326.89	4,099.7	16.5	-1.4	446,478.87	725,598.31	32° 13' 31.375 N	103° 36' 13.690 W
4,200.0	1.21	303.27	4,199.7	17.7	-2.7	446,480.12	725,596.99	32° 13' 31.388 N	103° 36' 13.705 W
4,300.0	1.62	281.65	4,299.7	18.6	-5.0	446,480.98	725,594.72	32° 13' 31.396 N	103° 36' 13.732 W
4,400.0	0.59	243.26	4,399.7	18.6	-6.8	446,481.03	725,592.88	32° 13' 31.397 N	103° 36' 13.753 W
4,500.0	0.80	194.10	4,499.7	17.7	-7.4	446,480.13	725,592.25	32° 13' 31.388 N	103° 36' 13.761 W
4,600.0	0.93	177.18	4,599.7	16.2	-7.6	446,478.64	725,592.12	32° 13' 31.373 N	103° 36' 13.762 W
4,700.0	1.75	176.74	4,699.6	13.9	-7.5	446,476.30	725,592.24	32° 13' 31.350 N	103° 36' 13.761 W
4,800.0	1.44	157.93	4,799.6	11.2	-6.9	446,473.61	725,592.80	32° 13' 31.324 N	103° 36' 13.755 W
4,900.0	1.35	148.49	4,899.6	9.0	-5.8	446,471.45	725,593.89	32° 13' 31.302 N	103° 36' 13.742 W
5,000.0	1.03	183.34	4,999.5	7.1	-5.2	446,469.54	725,594.45	32° 13' 31.283 N	103° 36' 13.736 W
5,100.0	1.14	192.10	5,099.5	5.3	-5.5	446,467.67	725,594.19	32° 13' 31.265 N	103° 36' 13.739 W
5,200.0	1.20	173.36	5,199.5	3.3	-5.6	446,465.66	725,594.11	32° 13' 31.245 N	103° 36' 13.740 W
5,300.0	1.50	178.71	5,299.5	0.9	-5.4	446,463.31	725,594.26	32° 13' 31.222 N	103° 36' 13.738 W
5,400.0	1.26	168.80	5,399.5	-1.5	-5.2	446,460.93	725,594.50	32° 13' 31.198 N	103° 36' 13.736 W
5,500.0	1.40	192.30	5,499.4	-3.7	-5.2	446,458.65	725,594.45	32° 13' 31.176 N	103° 36' 13.737 W
5,600.0	1.34	165.61	5,599.4	-6.1	-5.2	446,456.33	725,594.48	32° 13' 31.153 N	103° 36' 13.736 W
5,700.0	1.05	174.12	5,699.4	-8.1	-4.8	446,454.28	725,594.87	32° 13' 31.132 N	103° 36' 13.732 W
5,800.0	0.81	193.98	5,799.4	-9.7	-4.9	446,452.69	725,594.79	32° 13' 31.116 N	103° 36' 13.733 W
5,900.0	0.78	160.38	5,899.4	-11.0	-4.8	446,451.36	725,594.85	32° 13' 31.103 N	103° 36' 13.733 W
6,000.0	0.63	180.74	5,999.3	-12.2	-4.6	446,450.17	725,595.07	32° 13' 31.092 N	103° 36' 13.730 W
6,100.0	0.25	185.62	6,099.3	-13.0	-4.7	446,449.40	725,595.04	32° 13' 31.084 N	103° 36' 13.730 W
6,200.0	0.27	245.00	6,199.3	-13.3	-4.9	446,449.08	725,594.81	32° 13' 31.081 N	103° 36' 13.733 W
6,300.0	0.51	185.72	6,299.3	-13.9	-5.1	446,448.54	725,594.55	32° 13' 31.075 N	103° 36' 13.736 W
6,400.0	0.62	238.38	6,399.3	-14.6	-5.7	446,447.82	725,594.04	32° 13' 31.068 N	103° 36' 13.742 W
6,500.0	0.70	203.16	6,499.3	-15.4	-6.4	446,446.97	725,593.34	32° 13' 31.060 N	103° 36' 13.750 W



TDS
Survey Report - Geographic



Company: COG Production LLC
Project: Lea County, NM
Site: Macho Nacho State
Well: #5H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #5H
TVD Reference: KB @ 3597.1usft
MD Reference: KB @ 3597.1usft
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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,600.0	0.50	227.26	6,599.3	-16.3	-6.9	446,446.11	725,592.78	32° 13' 31.052 N	103° 36' 13.757 W
6,700.0	0.29	214.25	6,699.3	-16.8	-7.4	446,445.61	725,592.32	32° 13' 31.047 N	103° 36' 13.762 W
6,800.0	0.31	201.26	6,799.3	-17.3	-7.6	446,445.15	725,592.08	32° 13' 31.042 N	103° 36' 13.765 W
6,900.0	0.43	232.53	6,899.3	-17.7	-8.0	446,444.67	725,591.68	32° 13' 31.037 N	103° 36' 13.770 W
7,000.0	0.63	237.61	6,999.3	-18.3	-8.8	446,444.14	725,590.92	32° 13' 31.032 N	103° 36' 13.779 W
7,100.0	0.85	235.02	7,099.3	-19.0	-9.8	446,443.42	725,589.85	32° 13' 31.025 N	103° 36' 13.791 W
7,200.0	0.79	229.73	7,199.3	-19.8	-11.0	446,442.55	725,588.72	32° 13' 31.017 N	103° 36' 13.805 W
7,300.0	0.81	233.93	7,299.3	-20.7	-12.1	446,441.69	725,587.62	32° 13' 31.008 N	103° 36' 13.817 W
7,400.0	0.68	231.16	7,399.3	-21.5	-13.1	446,440.90	725,586.58	32° 13' 31.000 N	103° 36' 13.830 W
7,500.0	0.96	221.97	7,499.3	-22.5	-14.1	446,439.91	725,585.56	32° 13' 30.991 N	103° 36' 13.842 W
7,600.0	0.75	235.09	7,599.3	-23.5	-15.2	446,438.91	725,584.47	32° 13' 30.981 N	103° 36' 13.854 W
7,700.0	0.96	229.30	7,699.2	-24.4	-16.4	446,437.99	725,583.29	32° 13' 30.972 N	103° 36' 13.868 W
7,800.0	0.56	171.73	7,799.2	-25.4	-17.0	446,436.96	725,582.73	32° 13' 30.962 N	103° 36' 13.875 W
7,900.0	0.83	177.57	7,899.2	-26.6	-16.9	446,435.75	725,582.83	32° 13' 30.950 N	103° 36' 13.874 W
8,000.0	0.86	159.90	7,999.2	-28.1	-16.6	446,434.32	725,583.12	32° 13' 30.936 N	103° 36' 13.870 W
8,100.0	1.11	163.57	8,099.2	-29.7	-16.0	446,432.69	725,583.65	32° 13' 30.919 N	103° 36' 13.864 W
8,200.0	0.84	162.99	8,199.2	-31.3	-15.6	446,431.06	725,584.14	32° 13' 30.903 N	103° 36' 13.859 W
8,300.0	1.13	162.57	8,299.2	-33.0	-15.0	446,429.42	725,584.65	32° 13' 30.887 N	103° 36' 13.853 W
8,400.0	0.90	174.88	8,399.2	-34.7	-14.7	446,427.70	725,585.01	32° 13' 30.870 N	103° 36' 13.849 W
8,500.0	1.19	174.04	8,499.1	-36.5	-14.5	446,425.88	725,585.19	32° 13' 30.852 N	103° 36' 13.847 W
8,600.0	1.12	183.96	8,599.1	-38.5	-14.5	446,423.87	725,585.23	32° 13' 30.832 N	103° 36' 13.847 W
8,700.0	0.98	185.06	8,699.1	-40.4	-14.6	446,422.05	725,585.09	32° 13' 30.814 N	103° 36' 13.848 W
8,772.0	1.03	191.37	8,771.1	-41.6	-14.8	446,420.80	725,584.91	32° 13' 30.802 N	103° 36' 13.851 W
8,835.0	0.70	210.90	8,834.1	-42.5	-15.1	446,419.91	725,584.60	32° 13' 30.793 N	103° 36' 13.854 W
8,866.0	0.70	309.50	8,865.1	-42.5	-15.3	446,419.87	725,584.35	32° 13' 30.792 N	103° 36' 13.857 W
8,898.0	3.60	354.50	8,897.1	-41.4	-15.6	446,421.00	725,584.11	32° 13' 30.804 N	103° 36' 13.860 W
8,929.0	9.30	351.40	8,927.9	-38.0	-16.1	446,424.44	725,583.64	32° 13' 30.838 N	103° 36' 13.865 W
8,960.0	14.10	354.40	8,958.2	-31.7	-16.8	446,430.68	725,582.90	32° 13' 30.900 N	103° 36' 13.873 W
8,992.0	18.10	355.80	8,988.9	-22.9	-17.5	446,439.52	725,582.15	32° 13' 30.987 N	103° 36' 13.881 W
9,023.0	21.80	356.90	9,018.1	-12.3	-18.2	446,450.08	725,581.49	32° 13' 31.092 N	103° 36' 13.888 W
9,056.0	25.10	358.30	9,048.3	0.8	-18.7	446,463.19	725,580.95	32° 13' 31.221 N	103° 36' 13.893 W
9,087.0	27.90	0.20	9,076.1	14.6	-18.9	446,477.02	725,580.78	32° 13' 31.358 N	103° 36' 13.894 W
9,119.0	30.30	358.70	9,104.0	30.2	-19.1	446,492.58	725,580.62	32° 13' 31.512 N	103° 36' 13.895 W
9,150.0	32.00	356.50	9,130.6	46.2	-19.8	446,508.60	725,579.94	32° 13' 31.671 N	103° 36' 13.902 W
9,182.0	33.50	354.80	9,157.5	63.5	-21.1	446,525.86	725,578.62	32° 13' 31.842 N	103° 36' 13.916 W
9,213.0	34.80	355.70	9,183.1	80.8	-22.5	446,543.20	725,577.18	32° 13' 32.013 N	103° 36' 13.931 W
9,244.0	37.00	355.80	9,208.3	98.9	-23.9	446,561.33	725,575.84	32° 13' 32.193 N	103° 36' 13.945 W
9,276.0	38.70	355.00	9,233.5	118.5	-25.4	446,580.90	725,574.26	32° 13' 32.387 N	103° 36' 13.962 W
9,308.0	39.70	355.80	9,258.3	138.7	-27.1	446,601.06	725,572.64	32° 13' 32.586 N	103° 36' 13.979 W
9,339.0	41.20	355.80	9,281.9	158.7	-28.5	446,621.12	725,571.17	32° 13' 32.785 N	103° 36' 13.995 W
9,371.0	43.50	356.30	9,305.6	180.2	-30.0	446,642.62	725,569.68	32° 13' 32.998 N	103° 36' 14.010 W
9,402.0	46.20	356.50	9,327.5	202.0	-31.4	446,664.44	725,568.31	32° 13' 33.214 N	103° 36' 14.025 W
9,434.0	49.10	355.70	9,349.1	225.6	-33.0	446,688.03	725,566.70	32° 13' 33.447 N	103° 36' 14.041 W
9,465.0	52.70	355.60	9,368.6	249.6	-34.8	446,712.01	725,564.88	32° 13' 33.685 N	103° 36' 14.061 W
9,497.0	56.10	355.70	9,387.3	275.6	-36.8	446,737.95	725,562.90	32° 13' 33.941 N	103° 36' 14.082 W
9,528.0	59.40	355.80	9,403.8	301.7	-38.7	446,764.10	725,560.96	32° 13' 34.200 N	103° 36' 14.102 W
9,560.0	60.40	354.90	9,419.8	329.3	-41.0	446,791.69	725,558.72	32° 13' 34.474 N	103° 36' 14.126 W
9,591.0	63.30	355.60	9,434.5	356.5	-43.2	446,818.92	725,556.45	32° 13' 34.743 N	103° 36' 14.150 W
9,623.0	67.20	356.90	9,447.9	385.5	-45.1	446,847.92	725,554.56	32° 13' 35.030 N	103° 36' 14.170 W
9,654.0	70.40	359.10	9,459.1	414.4	-46.1	446,876.80	725,553.56	32° 13' 35.316 N	103° 36' 14.180 W
9,686.0	73.10	0.50	9,469.1	444.8	-46.2	446,907.18	725,553.45	32° 13' 35.617 N	103° 36' 14.178 W
9,717.0	76.90	359.90	9,477.1	474.7	-46.1	446,937.12	725,553.56	32° 13' 35.913 N	103° 36' 14.175 W
9,749.0	81.30	0.30	9,483.2	506.1	-46.1	446,968.53	725,553.61	32° 13' 36.224 N	103° 36' 14.172 W
9,755.0	82.10	0.00	9,484.0	512.1	-46.1	446,974.47	725,553.63	32° 13' 36.283 N	103° 36' 14.171 W
9,787.0	85.30	358.50	9,487.5	543.9	-46.5	447,006.27	725,553.21	32° 13' 36.597 N	103° 36' 14.173 W



TDS
Survey Report - Geographic



Company: COG Production LLC
Project: Lea County, NM
Site: Macho Nacho State
Well: #5H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #5H
TVD Reference: KB @ 3597.1usft
MD Reference: KB @ 3597.1usft
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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,818.0	88.50	357.50	9,489.2	574.8	-47.6	447,037.20	725,552.13	32° 13' 36.903 N	103° 36' 14.183 W
9,912.0	90.60	357.80	9,490.0	668.7	-51.4	447,131.12	725,548.28	32° 13' 37.833 N	103° 36' 14.221 W
10,007.0	90.90	0.50	9,488.7	763.7	-52.8	447,226.09	725,546.87	32° 13' 38.773 N	103° 36' 14.230 W
10,101.0	88.90	0.70	9,488.9	857.7	-51.8	447,320.08	725,547.85	32° 13' 39.703 N	103° 36' 14.211 W
10,195.0	89.70	0.80	9,490.0	951.7	-50.6	447,414.06	725,549.08	32° 13' 40.633 N	103° 36' 14.189 W
10,290.0	87.10	359.10	9,492.7	1,046.6	-50.7	447,509.01	725,549.00	32° 13' 41.572 N	103° 36' 14.183 W
10,384.0	87.70	359.40	9,496.9	1,140.5	-51.9	447,602.91	725,547.77	32° 13' 42.502 N	103° 36' 14.190 W
10,479.0	88.90	0.10	9,499.8	1,235.5	-52.3	447,697.86	725,547.36	32° 13' 43.441 N	103° 36' 14.187 W
10,573.0	88.60	0.70	9,501.8	1,329.4	-51.7	447,791.84	725,548.01	32° 13' 44.371 N	103° 36' 14.172 W
10,667.0	89.30	359.10	9,503.5	1,423.4	-51.8	447,885.82	725,547.85	32° 13' 45.301 N	103° 36' 14.166 W
10,762.0	88.40	358.20	9,505.4	1,518.4	-54.1	447,980.77	725,545.61	32° 13' 46.241 N	103° 36' 14.185 W
10,856.0	88.80	358.00	9,507.7	1,612.3	-57.2	448,074.69	725,542.50	32° 13' 47.171 N	103° 36' 14.214 W
10,950.0	88.40	356.60	9,510.0	1,706.2	-61.6	448,168.56	725,538.07	32° 13' 48.100 N	103° 36' 14.258 W
11,045.0	91.60	355.40	9,510.0	1,800.9	-68.3	448,263.31	725,531.44	32° 13' 49.038 N	103° 36' 14.327 W
11,139.0	92.30	355.40	9,506.8	1,894.6	-75.8	448,356.95	725,523.91	32° 13' 49.965 N	103° 36' 14.408 W
11,233.0	91.50	355.60	9,503.7	1,988.2	-83.2	448,450.61	725,516.54	32° 13' 50.892 N	103° 36' 14.486 W
11,328.0	92.50	355.60	9,500.4	2,082.9	-90.4	448,545.27	725,509.25	32° 13' 51.830 N	103° 36' 14.563 W
11,422.0	90.20	354.70	9,498.2	2,176.5	-98.4	448,638.90	725,501.31	32° 13' 52.757 N	103° 36' 14.649 W
11,516.0	88.50	355.60	9,499.3	2,270.2	-106.3	448,732.55	725,493.36	32° 13' 53.684 N	103° 36' 14.734 W
11,611.0	90.00	354.50	9,500.5	2,364.8	-114.5	448,827.19	725,485.17	32° 13' 54.621 N	103° 36' 14.822 W
11,705.0	92.20	353.80	9,498.7	2,458.3	-124.1	448,920.67	725,475.59	32° 13' 55.547 N	103° 36' 14.926 W
11,800.0	89.90	355.40	9,497.0	2,552.8	-133.0	449,015.23	725,466.65	32° 13' 56.483 N	103° 36' 15.022 W
11,894.0	90.10	355.40	9,497.0	2,646.5	-140.6	449,108.93	725,459.11	32° 13' 57.411 N	103° 36' 15.103 W
11,988.0	90.90	355.60	9,496.1	2,740.2	-148.0	449,202.63	725,451.74	32° 13' 58.338 N	103° 36' 15.181 W
12,083.0	90.80	355.20	9,494.7	2,834.9	-155.6	449,297.31	725,444.12	32° 13' 59.276 N	103° 36' 15.262 W
12,177.0	90.70	355.70	9,493.5	2,928.6	-163.0	449,391.01	725,436.66	32° 14' 0.203 N	103° 36' 15.342 W
12,272.0	90.70	356.30	9,492.3	3,023.4	-169.7	449,485.77	725,430.04	32° 14' 1.142 N	103° 36' 15.411 W
12,366.0	89.40	357.50	9,492.3	3,117.2	-174.7	449,579.63	725,424.95	32° 14' 2.071 N	103° 36' 15.463 W
12,461.0	90.20	357.80	9,492.6	3,212.1	-178.6	449,674.55	725,421.06	32° 14' 3.010 N	103° 36' 15.501 W
12,555.0	88.90	357.30	9,493.3	3,306.1	-182.7	449,768.46	725,417.04	32° 14' 3.940 N	103° 36' 15.540 W
12,649.0	90.70	358.50	9,493.6	3,400.0	-186.1	449,862.39	725,413.60	32° 14' 4.870 N	103° 36' 15.573 W
12,744.0	89.10	356.40	9,493.8	3,494.9	-190.3	449,957.29	725,409.37	32° 14' 5.809 N	103° 36' 15.615 W
12,838.0	88.40	356.40	9,495.9	3,588.7	-196.2	450,051.08	725,403.47	32° 14' 6.737 N	103° 36' 15.676 W
12,933.0	88.40	356.10	9,498.5	3,683.4	-202.4	450,145.84	725,397.26	32° 14' 7.676 N	103° 36' 15.741 W
13,027.0	88.10	355.60	9,501.4	3,777.1	-209.2	450,239.55	725,390.46	32° 14' 8.603 N	103° 36' 15.813 W
13,122.0	88.30	355.40	9,504.4	3,871.8	-216.7	450,334.21	725,383.01	32° 14' 9.541 N	103° 36' 15.892 W
13,216.0	88.10	355.00	9,507.3	3,965.4	-224.6	450,427.83	725,375.15	32° 14' 10.468 N	103° 36' 15.976 W
13,310.0	88.20	354.70	9,510.4	4,059.0	-233.0	450,521.40	725,366.71	32° 14' 11.394 N	103° 36' 16.067 W
13,405.0	89.40	355.00	9,512.3	4,153.6	-241.5	450,616.00	725,358.19	32° 14' 12.331 N	103° 36' 16.159 W
13,499.0	90.00	354.90	9,512.8	4,247.2	-249.8	450,709.63	725,349.91	32° 14' 13.258 N	103° 36' 16.247 W
13,594.0	89.40	355.70	9,513.3	4,341.9	-257.6	450,804.31	725,342.13	32° 14' 14.195 N	103° 36' 16.331 W
13,688.0	89.30	357.00	9,514.4	4,435.7	-263.6	450,898.11	725,336.15	32° 14' 15.124 N	103° 36' 16.393 W
13,782.0	90.00	356.60	9,515.0	4,529.6	-268.8	450,991.96	725,330.90	32° 14' 16.053 N	103° 36' 16.447 W
13,877.0	91.40	357.10	9,513.8	4,624.4	-274.0	451,086.81	725,325.68	32° 14' 16.992 N	103° 36' 16.500 W
13,948.0	90.50	356.10	9,512.6	4,695.3	-278.2	451,157.67	725,321.47	32° 14' 17.693 N	103° 36' 16.543 W
Last MWD Survey									
14,000.0	90.50	356.10	9,512.2	4,747.1	-281.8	451,209.55	725,317.93	32° 14' 18.207 N	103° 36' 16.580 W
Projection to Bit									



TDS
Survey Report - Geographic



Company:	COG Production LLC	Local Co-ordinate Reference:	Well #5H
Project:	Lea County, NM	TVD Reference:	KB @ 3597.1usft
Site:	Macho Nacho State	MD Reference:	KB @ 3597.1usft
Well:	#5H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
13,948.0	9,512.6	4,695.3	-278.2	Last MWD Survey
14,000.0	9,512.2	4,747.1	-281.8	Projection to Bit

Checked By: _____ Approved By: _____ Date: _____