

Results of Directional Survey

API number:	30-025-41126		
OGRID:		Operator:	COG PRODUCTION, LLC
		Property:	MACHO NACHO STATE # 4H

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

BH Loc	ULSTR:	M	07	T	24S	R	33E
15511	MD	10826.5	TVD	903	FSL	381	FWL
						4899	FEL

Top Perf/OH	ULSTR:	P	07	T	24S	R	33E
11098	MD	10885.7	TVD	507	FSL	602	FEL

Bot Perf/OH	ULSTR:	M	07	T	24S	R	33E
15425	MD	10825.1	TVD	908	FSL	467	FWL
						4813	FEL

	MD	N/S	E/W	VD
	11067	159.20	-388.40	10877.6
TOP PERFS/OH	11098	177.00	-412.40	10885.70
	11098	177.00	-412.40	10885.70
	15379	581.00	-4576.90	10824.30
BOT PERFS/OH	15425	578.46	-4622.83	10825.12
	15446	577.30	-4643.80	10825.50

NEXT TO LAST	15446	577.30	-4643.80	10825.50
LAST READING	15500	574.10	-4697.70	10826.30
TD	15511	573.45	-4708.68	10826.46

Surface Location	330	FS	190	FE
Projected BHL	903	FS	4899	FE
Location of				
Top Perfs/OH	507	FS	602	FE
Bottom Perfs/OH	908	FS	4813	FE

SUMMARY of Subsurface Locations

Surface Location	P-07-24S-33E	330	FS	190	FE	Vert. Depth
Top Perfs/OH	P-07-24S-33E	507	FS	602	FE	10885.70
Bottom Perfs/OH	M-07-24S-33E	908	FS	4813	FE	10825.12
Projected TD	M-07-24S-33E	903	FS	4899	FE	10826.46

JAN 15 2014

OPERATOR COG OPERATING LLC
WELL/LEASE ACHO NACHO STATE #4-H
COUNTY LEA, NM

STATE OF NEW MEXICO
DEVIATION REPORT

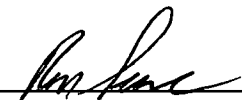
345	1.60
630	1.70
912	0.50
1150	1.00
2674	0.40
2957	0.30
3241	0.30
3524	0.70
3815	0.30
4104	1.00
4377	1.40
4661	2.30
5184	1.90
5378	1.50
5656	0.90
5940	0.90
6223	0.40
6509	0.70
6790	0.50
7107	1.00
7670	1.10
7955	1.40
8303	1.20
8900	2.30
9590	1.30
9910	4.80
10000	3.90
10096	3.80
10191	3.40
10469	14.60
10500	16.90

HOBBS OCD

JAN 06 2014

RECEIVED

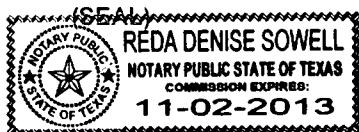
SIGNED BY:



RON SCADOLARI, VP-CONTRACT DRILLING

STATE OF TEXAS
COUNTY OF MIDLAND

ON THIS 1 DAY OF November, 2013, 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

OPERATOR COG OPERATING LLC
WELL/LEASE ACHO NACHO STATE #4-H
COUNTY LEA, NM

STATE OF NEW MEXICO
DEVIATION REPORT

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HOBBS OCD

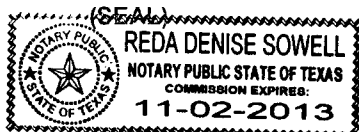
JAN 06 2014

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COUNTY OF MIDLAND

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OPERATOR COG OPERATING LLC
WELL/LEASE MACHO NACHO STATE #4-H
COUNTY LEA, NM

STATE OF NEW MEXICO
DEVIATION REPORT

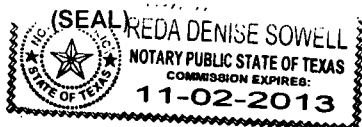
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HOBBS OCD
JAN 06 2014
RECEIVED

SIGNED BY: 
RON SCNADOLARI, VP-CONTRACT DRILLING

STATE OF TEXAS
COUNTY OF MIDLAND

ON THIS 1 DAY OF November, 2013, 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



A GYRO TECHNOLOGIES INC. COMPANY

P.O. Box 261021
Corpus Christi, Texas 78426
(361) 767-0602 • (800) 606-GYRO • Fax (361) 767-0612

October 10, 2013

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

Attn: Kanicia Castillo

HOBBS OCD

JAN 06 2014

RECEIVED

RE: **Macho Nacho State No. 004H**

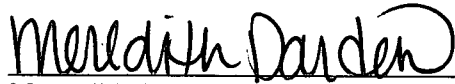
Please find enclosed a copy of the survey from 0.00' to 10363.00' ran on the above referenced well.

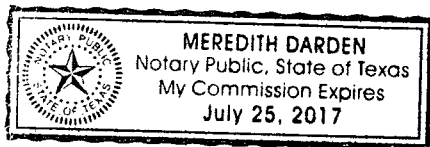
Sincerely,


Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 10 day of October, A.D., 2013, by Keith Havelka.


Meredith Darden
Notary Public, State of Texas



Company: COG Operating LLC (Concho)
Lease/Well: Macho Nacho State/No. 004H



Rig Name: Basic #49
State/County: New Mexico/Lea
Latitude: 32.23, Longitude: -103.60
GRID North is 0.39 Degrees East of True North
VS-Azi: 270.20 Degrees



HOBBS OCD

RKB : 22 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

JAN 06 2014

Filename: gyro survey.ut
Minimum Curvature Method
Report Date/Time: 10/10/2013 / 07:06

RECEIVED

Vaughn Energy Services
Fort Worth, TX
817- 741-3610
Surveyor: Jason Wilson
Macho Nacho State No. 004H / API 30-025-41126

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	0.30	298.97	100.00	0.13	-0.23	0.23	0.26	298.97	0.30
200.00	0.33	349.29	200.00	0.53	-0.51	0.51	0.74	316.30	0.27
300.00	0.31	348.04	300.00	1.07	-0.62	0.62	1.24	330.11	0.02
400.00	0.24	352.99	400.00	1.54	-0.70	0.70	1.69	335.66	0.07
500.00	0.26	116.93	500.00	1.65	-0.52	0.53	1.73	342.38	0.44
600.00	0.80	137.99	599.99	1.03	0.14	-0.14	1.04	7.84	0.57
700.00	0.67	130.49	699.98	0.14	1.05	-1.05	1.06	82.64	0.16
800.00	0.68	143.15	799.98	-0.72	1.85	-1.85	1.98	111.19	0.15
900.00	0.64	172.43	899.97	-1.75	2.28	-2.29	2.87	127.48	0.34
1000.00	1.03	190.41	999.96	-3.19	2.19	-2.20	3.87	145.48	0.46
1100.00	1.09	192.09	1099.94	-5.00	1.83	-1.85	5.32	159.88	0.07
1200.00	0.49	196.79	1199.93	-6.33	1.51	-1.53	6.51	166.58	0.60
1300.00	0.48	188.13	1299.93	-7.15	1.33	-1.35	7.27	169.48	0.07
1400.00	0.19	175.88	1399.93	-7.73	1.28	-1.31	7.83	170.59	0.30
1500.00	0.10	173.57	1499.93	-7.98	1.30	-1.33	8.09	170.73	0.08
1600.00	0.23	168.00	1599.93	-8.27	1.35	-1.38	8.38	170.70	0.13
1700.00	0.24	131.75	1699.92	-8.60	1.55	-1.58	8.74	169.77	0.15
1800.00	0.19	138.88	1799.92	-8.87	1.82	-1.85	9.05	168.42	0.06

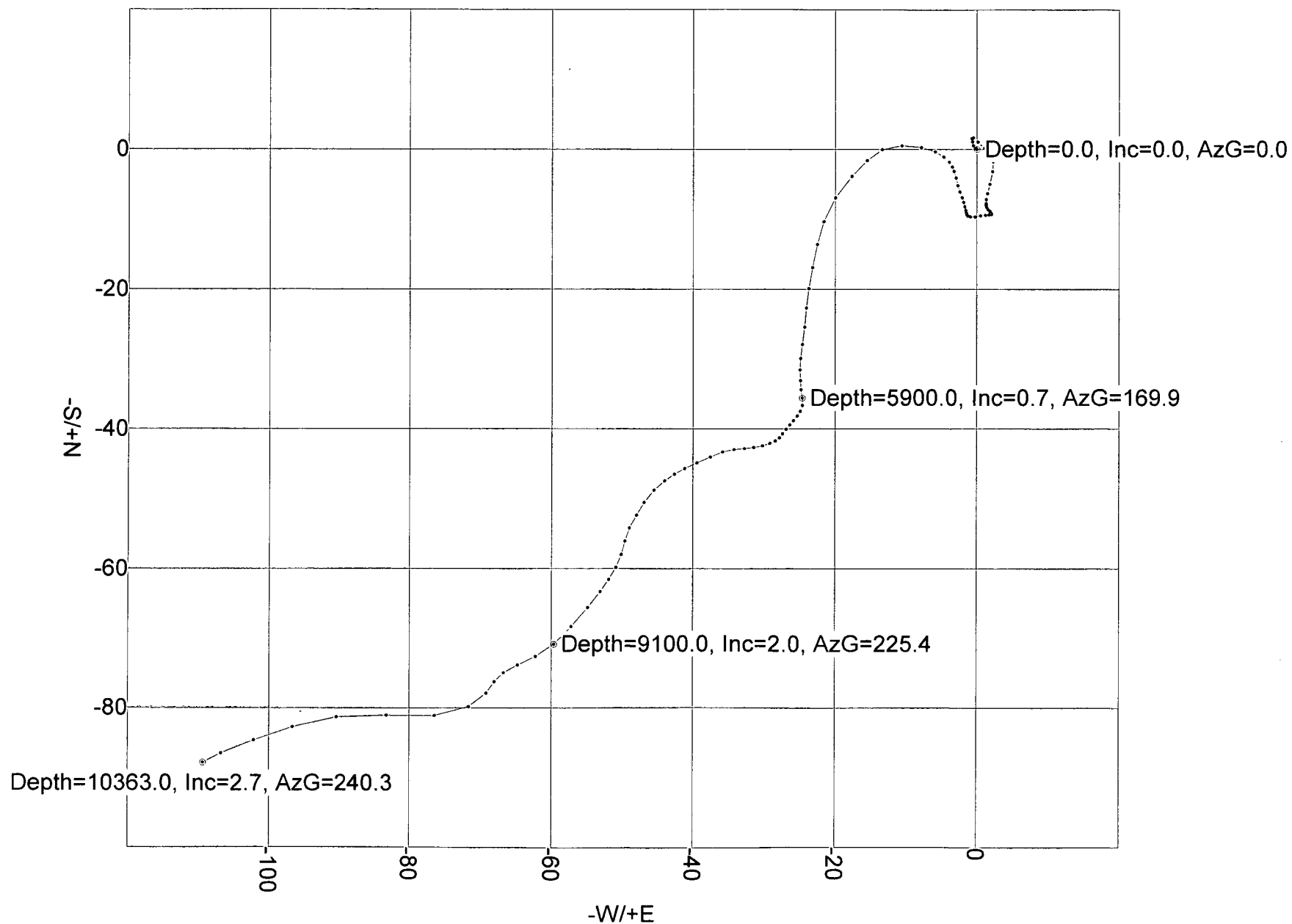
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	0.11	172.56	1899.92	-9.08	1.94	-1.97	9.29	167.97	0.11
2000.00	0.14	117.28	1999.92	-9.23	2.05	-2.09	9.45	167.45	0.12
2100.00	0.15	261.29	2099.92	-9.30	2.03	-2.07	9.52	167.67	0.27
2200.00	0.24	259.09	2199.92	-9.36	1.70	-1.73	9.52	169.72	0.10
2300.00	0.34	267.05	2299.92	-9.42	1.19	-1.23	9.49	172.78	0.10
2400.00	0.45	259.29	2399.92	-9.51	0.51	-0.55	9.52	176.91	0.12
2500.00	0.46	260.68	2499.92	-9.64	-0.26	0.23	9.65	181.57	0.01
2600.00	0.31	284.91	2599.91	-9.64	-0.92	0.89	9.68	185.46	0.22
2700.00	0.10	304.09	2699.91	-9.52	-1.25	1.22	9.60	187.50	0.22
2800.00	0.13	323.42	2799.91	-9.38	-1.39	1.36	9.49	188.43	0.05
2900.00	0.22	354.33	2899.91	-9.10	-1.48	1.44	9.22	189.22	0.13
3000.00	0.23	341.19	2999.91	-8.71	-1.56	1.53	8.85	190.15	0.05
3100.00	0.40	349.55	3099.91	-8.18	-1.69	1.66	8.35	191.66	0.17
3200.00	0.31	339.02	3199.91	-7.58	-1.85	1.82	7.81	193.71	0.11
3300.00	0.48	343.46	3299.91	-6.93	-2.07	2.04	7.23	196.60	0.16
3400.00	0.55	335.17	3399.90	-6.10	-2.39	2.36	6.55	201.37	0.10
3500.00	0.56	349.35	3499.90	-5.18	-2.68	2.66	5.83	207.33	0.14
3600.00	0.71	346.42	3599.89	-4.10	-2.91	2.90	5.03	215.40	0.15
3700.00	0.42	337.17	3699.89	-3.16	-3.20	3.19	4.50	225.37	0.30
3800.00	0.35	340.53	3799.88	-2.53	-3.45	3.44	4.27	233.74	0.07
3900.00	0.58	315.71	3899.88	-1.88	-3.90	3.89	4.33	244.31	0.30
4000.00	0.67	313.00	3999.87	-1.12	-4.68	4.68	4.81	256.56	0.10
4100.00	0.98	294.29	4099.86	-0.37	-5.89	5.89	5.90	266.43	0.41
4200.00	1.38	282.97	4199.84	0.26	-7.84	7.85	7.85	271.86	0.47
4300.00	1.84	269.09	4299.80	0.50	-10.63	10.63	10.64	272.70	0.59
4400.00	1.48	245.36	4399.76	-0.06	-13.41	13.41	13.41	269.72	0.77
4500.00	1.60	223.41	4499.73	-1.62	-15.54	15.53	15.62	264.06	0.60
4600.00	1.96	223.22	4599.68	-3.88	-17.67	17.66	18.09	257.63	0.37
4700.00	2.44	211.94	4699.61	-6.93	-19.97	19.95	21.14	250.86	0.64
4800.00	1.91	197.07	4799.53	-10.34	-21.59	21.55	23.93	244.42	0.77
4900.00	1.97	194.48	4899.48	-13.60	-22.51	22.46	26.30	238.86	0.11
5000.00	1.90	188.95	4999.42	-16.91	-23.20	23.14	28.70	233.92	0.20
5100.00	1.57	190.05	5099.37	-19.90	-23.70	23.63	30.94	229.98	0.33
5200.00	1.66	184.31	5199.33	-22.69	-24.04	23.96	33.06	226.66	0.18
5300.00	1.48	186.19	5299.30	-25.42	-24.29	24.20	35.16	223.70	0.18
5400.00	1.37	187.75	5399.26	-27.89	-24.59	24.49	37.18	221.40	0.12
5500.00	0.98	186.68	5499.24	-29.92	-24.85	24.75	38.89	219.72	0.39
5600.00	0.92	178.19	5599.23	-31.57	-24.93	24.82	40.22	218.29	0.15
5700.00	0.81	177.53	5699.22	-33.08	-24.87	24.75	41.38	216.94	0.12

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	0.69	174.81	5799.21	-34.38	-24.79	24.67	42.38	215.79	0.13
5900.00	0.70	169.88	5899.20	-35.57	-24.62	24.50	43.27	214.69	0.06
6000.00	0.53	190.34	5999.20	-36.63	-24.60	24.47	44.12	213.89	0.27
6100.00	0.49	208.08	6099.19	-37.46	-24.89	24.76	44.98	213.60	0.16
6200.00	0.47	217.14	6199.19	-38.17	-25.33	25.20	45.81	213.58	0.08
6300.00	0.49	217.84	6299.19	-38.83	-25.84	25.71	46.64	213.65	0.02
6400.00	0.44	226.36	6399.18	-39.43	-26.38	26.24	47.44	213.78	0.09
6500.00	0.51	213.41	6499.18	-40.06	-26.90	26.76	48.25	213.88	0.13
6600.00	0.43	220.52	6599.18	-40.71	-27.38	27.24	49.07	213.93	0.10
6700.00	0.43	214.55	6699.17	-41.30	-27.84	27.69	49.81	213.98	0.04
6800.00	0.46	251.41	6799.17	-41.74	-28.43	28.28	50.50	214.26	0.28
6900.00	0.53	240.65	6899.17	-42.09	-29.21	29.06	51.23	214.76	0.12
7000.00	0.74	259.31	6999.16	-42.44	-30.25	30.10	52.12	215.48	0.29
7100.00	0.70	258.78	7099.15	-42.68	-31.49	31.34	53.04	216.42	0.04
7200.00	0.79	267.31	7199.14	-42.83	-32.77	32.62	53.93	217.42	0.14
7300.00	0.90	262.30	7299.13	-42.97	-34.24	34.09	54.94	218.55	0.14
7400.00	0.96	252.90	7399.12	-43.32	-35.82	35.67	56.21	219.59	0.16
7500.00	1.19	244.23	7499.10	-44.02	-37.56	37.41	57.87	220.47	0.28
7600.00	1.17	245.74	7599.08	-44.89	-39.43	39.27	59.75	221.29	0.04
7700.00	1.00	245.95	7699.06	-45.66	-41.15	40.99	61.47	222.03	0.16
7800.00	0.96	235.05	7799.05	-46.50	-42.64	42.48	63.09	222.52	0.19
7900.00	0.97	235.44	7899.03	-47.46	-44.02	43.85	64.73	222.85	0.01
8000.00	1.34	224.08	7999.01	-48.78	-45.53	45.36	66.72	223.03	0.43
8100.00	1.26	212.44	8098.99	-50.55	-46.93	46.76	68.98	222.88	0.27
8200.00	1.16	208.77	8198.97	-52.36	-48.01	47.83	71.04	222.52	0.13
8300.00	1.22	208.05	8298.94	-54.19	-49.00	48.81	73.05	222.12	0.07
8400.00	1.11	191.17	8398.92	-56.07	-49.68	49.49	74.92	221.54	0.36
8500.00	1.16	197.01	8498.90	-57.99	-50.17	49.96	76.68	220.86	0.13
8600.00	1.13	208.01	8598.88	-59.83	-50.93	50.72	78.57	220.40	0.22
8700.00	1.17	212.69	8698.86	-61.56	-51.94	51.72	80.54	220.16	0.10
8800.00	1.24	215.62	8798.84	-63.30	-53.12	52.90	82.63	220.01	0.10
8900.00	2.07	218.80	8898.80	-65.58	-54.88	54.65	85.52	219.92	0.83
9000.00	2.06	222.21	8998.74	-68.32	-57.23	56.99	89.12	219.95	0.12
9100.00	1.97	225.40	9098.67	-70.86	-59.66	59.41	92.63	220.09	0.15
9200.00	1.69	248.68	9198.62	-72.61	-62.26	62.00	95.65	220.61	0.79
9300.00	1.49	238.64	9298.58	-73.82	-64.75	64.49	98.20	221.25	0.34
9400.00	1.10	243.08	9398.56	-74.94	-66.72	66.46	100.34	221.68	0.40
9500.00	1.06	205.49	9498.54	-76.21	-67.98	67.71	102.12	221.73	0.70
9600.00	1.27	221.21	9598.52	-77.88	-69.11	68.84	104.12	221.58	0.38

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	2.40	237.63	9698.47	-79.84	-71.60	71.33	107.24	221.89	1.23
9800.00	3.50	267.05	9798.34	-81.11	-76.42	76.14	111.44	223.29	1.84
9900.00	4.30	273.28	9898.11	-81.06	-83.22	82.93	116.17	225.75	0.91
10000.00	3.93	262.44	9997.85	-81.29	-90.36	90.08	121.55	228.02	0.86
10100.00	3.53	251.05	10097.64	-82.74	-96.67	96.38	127.24	229.44	0.84
10200.00	3.12	250.57	10197.47	-84.65	-102.14	101.85	132.66	230.35	0.41
10300.00	2.65	244.64	10297.35	-86.54	-106.80	106.50	137.46	230.98	0.55
10363.00	2.67	240.33	10360.28	-87.89	-109.39	109.08	140.33	231.22	0.32



Vaughn Energy Services
Fort Worth, TX
817-741-3610
Surveyor: Jason Wilson
Macho Nacho State No. 004H / API 30-025-41126



VES Survey Date: 09/30/2013



COG Production LLC

Lea County, NM

Macho Nacho State

#4H

ST01

Survey: MWD ST01_REV2

Standard Survey Report

24 October, 2013

HOBBS OCD

JAN 06 2014

RECEIVED



Wellplanning Survey Report

Company:	COG Production LLC	Local Co-ordinate Reference:	Well #4H
Project:	Lea County, NM	TVD Reference:	WELL @ 3599.8usft (Original Well Elev)
Site:	Macho Nacho State	MD Reference:	WELL @ 3599.8usft (Original Well Elev)
Well:	#4H	North Reference:	Grid
Wellbore:	ST01	Survey Calculation Method:	Minimum Curvature
Design:	Mach NachoST01	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		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	#4H					
Well Position	+N/-S	0.0 usft	Northing:	446,603.70 usft	Latitude:	32° 13' 32.594 N
	+E/-W	0.0 usft	Easting:	725,838.70 usft	Longitude:	103° 36' 10.882 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,577.8 usft

Wellbore	ST01				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/7/2013	7.32	60.13	48,381

Design	Mach NachoST01				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	10,363.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	277.26	

Survey Program	Date 10/24/2013			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	10,363.0	GYRO (OH)	MWD	MWD - Standard
10,406.0	11,697.0	MWD ST01 (ST01)	MWD	MWD - Standard

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
10,363.0	2.67	240.33	10,360.3	-87.9	-109.4	97.4	0.00	0.00	0.00	
KOP - 10363.0 °MD, 2.67° INC, 240.33° AZI										
10,475.0	3.00	356.40	10,472.2	-86.3	-111.8	100.0	4.30	0.29	103.63	
10,507.0	7.80	356.00	10,504.1	-83.3	-112.0	100.6	15.00	15.00	-1.25	
10,538.0	12.80	348.30	10,534.5	-77.8	-112.9	102.1	16.69	16.13	-24.84	
10,569.0	17.50	339.90	10,564.5	-70.1	-115.2	105.4	16.70	15.16	-27.10	
10,601.0	21.30	330.90	10,594.7	-60.5	-119.6	111.0	15.08	11.88	-28.13	
10,632.0	24.80	321.60	10,623.2	-50.4	-126.4	119.0	16.26	11.29	-30.00	
10,664.0	28.80	312.80	10,651.7	-39.9	-136.3	130.1	17.58	12.50	-27.50	
10,695.0	33.60	308.20	10,678.3	-29.6	-148.5	143.6	17.28	15.48	-14.84	



Wellplanning Survey Report

Company: COG Production LLC
Project: Lea County, NM
Site: Macho Nacho State
Well: #4H
Wellbore: ST01
Design: Mach NachoST01

Local Co-ordinate Reference: Well #4H
TVD Reference: WELL @ 3599.8usft (Original Well Elev)
MD Reference: WELL @ 3599.8usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,727.0	38.50	307.70	10,704.1	-18.0	-163.3	159.8	15.34	15.31	-1.56
10,759.0	43.30	308.80	10,728.3	-5.0	-179.8	177.7	15.17	15.00	3.44
10,790.0	47.50	309.50	10,750.1	8.9	-196.9	196.4	13.64	13.55	2.26
10,822.0	51.40	307.90	10,770.9	24.1	-215.9	217.2	12.77	12.19	-5.00
10,846.0	55.20	307.90	10,785.2	35.9	-231.0	233.7	15.83	15.83	0.00
10,877.0	60.10	308.20	10,801.8	52.1	-251.7	256.2	15.83	15.81	0.97
10,909.0	61.70	308.90	10,817.4	69.5	-273.5	280.1	5.35	5.00	2.19
10,941.0	63.80	308.60	10,832.0	87.3	-295.7	304.4	6.62	6.56	-0.94
10,972.0	66.10	308.10	10,845.1	104.7	-317.7	328.4	7.56	7.42	-1.61
11,003.0	68.80	308.10	10,857.0	122.4	-340.3	353.0	8.71	8.71	0.00
11,035.0	71.20	307.40	10,868.0	140.8	-364.0	378.9	7.78	7.50	-2.19
11,067.0	73.70	306.60	10,877.6	159.2	-388.4	405.4	8.17	7.81	-2.50
11,098.0	75.90	306.50	10,885.7	177.0	-412.4	431.5	7.10	7.10	-0.32
11,130.0	78.90	306.50	10,892.7	195.5	-437.5	458.7	9.38	9.38	0.00
11,161.0	81.30	307.20	10,898.0	213.9	-462.0	485.3	8.06	7.74	2.26
11,193.0	83.70	307.50	10,902.2	233.1	-487.2	512.7	7.56	7.50	0.94
11,224.0	85.40	307.70	10,905.2	251.9	-511.6	539.4	5.52	5.48	0.65
11,256.0	87.40	307.90	10,907.2	271.5	-536.9	566.9	6.28	6.25	0.63
11,287.0	90.00	307.90	10,907.9	290.5	-561.3	593.5	8.39	8.39	0.00
EOC- 11287.0 'MD, 90.00° INC, 307.90° AZI									
11,319.0	91.10	306.50	10,907.6	309.9	-586.8	621.3	5.56	3.44	-4.38
11,413.0	90.70	303.70	10,906.1	363.9	-663.7	704.4	3.01	-0.43	-2.98
11,508.0	89.70	301.40	10,905.8	415.0	-743.8	790.3	2.64	-1.05	-2.42
11,602.0	89.60	296.10	10,906.3	460.2	-826.2	877.7	5.64	-0.11	-5.64
11,697.0	90.80	293.10	10,906.0	499.8	-912.5	968.4	3.40	1.26	-3.16
11,791.0	91.50	290.50	10,904.1	534.7	-999.8	1,059.3	2.86	0.74	-2.77
11,886.0	91.10	284.10	10,902.0	562.9	-1,090.4	1,152.8	6.75	-0.42	-6.74
11,980.0	91.80	281.00	10,899.6	583.3	-1,182.1	1,246.4	3.38	0.74	-3.30
12,075.0	91.50	278.00	10,896.8	599.0	-1,275.8	1,341.2	3.17	-0.32	-3.16
12,169.0	89.90	273.40	10,895.7	608.3	-1,369.3	1,435.2	5.18	-1.70	-4.89
12,264.0	91.00	269.90	10,895.0	611.1	-1,464.2	1,529.7	3.86	1.16	-3.68
12,358.0	92.40	269.00	10,892.2	610.2	-1,558.2	1,622.8	1.77	1.49	-0.96
12,453.0	92.30	268.30	10,888.3	607.9	-1,653.0	1,716.6	0.74	-0.11	-0.74
12,547.0	92.20	268.30	10,884.6	605.1	-1,746.9	1,809.4	0.11	-0.11	0.00
12,641.0	92.80	268.20	10,880.5	602.3	-1,840.8	1,902.2	0.65	0.64	-0.11
12,736.0	91.70	269.60	10,876.7	600.4	-1,935.7	1,996.1	1.87	-1.16	1.47
12,830.0	91.50	269.00	10,874.1	599.3	-2,029.7	2,089.1	0.67	-0.21	-0.64
12,925.0	92.20	268.50	10,871.1	597.2	-2,124.6	2,183.0	0.91	0.74	-0.53
13,019.0	90.90	269.60	10,868.5	595.7	-2,218.5	2,276.0	1.81	-1.38	1.17
13,113.0	91.90	270.10	10,866.2	595.4	-2,312.5	2,369.2	1.19	1.06	0.53
13,208.0	92.00	271.80	10,863.0	597.0	-2,407.4	2,463.6	1.79	0.11	1.79
13,302.0	90.60	272.50	10,860.9	600.5	-2,501.3	2,557.2	1.67	-1.49	0.74
13,397.0	89.50	272.00	10,860.8	604.3	-2,596.3	2,651.8	1.27	-1.16	-0.53



Wellplanning Survey Report

Company: COG Production LLC
Project: Lea County, NM
Site: Macho Nacho State
Well: #4H
Wellbore: ST01
Design: Mach NachoST01

Local Co-ordinate Reference: Well #4H
TVD Reference: WELL @ 3599.8usft (Original Well Elev)
MD Reference: WELL @ 3599.8usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,491.0	90.00	271.50	10,861.2	607.1	-2,690.2	2,745.4	0.75	0.53	-0.53
13,586.0	91.20	271.00	10,860.2	609.2	-2,785.2	2,839.9	1.37	1.26	-0.53
13,680.0	91.20	270.40	10,858.2	610.3	-2,879.2	2,933.2	0.64	0.00	-0.64
13,774.0	93.50	270.10	10,854.4	610.8	-2,973.1	3,026.4	2.47	2.45	-0.32
13,869.0	92.20	269.90	10,849.6	610.8	-3,068.0	3,120.5	1.38	-1.37	-0.21
13,963.0	92.30	269.40	10,845.9	610.2	-3,161.9	3,213.6	0.54	0.11	-0.53
14,058.0	91.10	269.40	10,843.1	609.2	-3,256.8	3,307.7	1.26	-1.26	0.00
14,125.0	90.80	269.60	10,842.0	608.6	-3,323.8	3,374.1	0.54	-0.45	0.30
14,246.0	90.00	269.70	10,841.2	607.9	-3,444.8	3,494.0	0.67	-0.66	0.08
14,341.0	89.30	268.90	10,841.8	606.7	-3,539.8	3,588.1	1.12	-0.74	-0.84
14,435.0	89.90	269.20	10,842.4	605.1	-3,633.8	3,681.1	0.71	0.64	0.32
14,530.0	90.80	269.70	10,841.8	604.2	-3,728.8	3,775.2	1.08	0.95	0.53
14,624.0	91.70	269.60	10,839.8	603.7	-3,822.8	3,868.4	0.96	0.96	-0.11
14,718.0	92.40	269.00	10,836.4	602.5	-3,916.7	3,961.4	0.98	0.74	-0.64
14,813.0	93.80	268.70	10,831.3	600.6	-4,011.5	4,055.3	1.51	1.47	-0.32
14,907.0	91.90	268.50	10,826.6	598.3	-4,105.4	4,148.1	2.03	-2.02	-0.21
15,001.0	92.20	268.20	10,823.2	595.6	-4,199.3	4,240.9	0.45	0.32	-0.32
15,096.0	90.60	268.30	10,820.9	592.7	-4,294.2	4,334.7	1.69	-1.68	0.11
15,190.0	90.40	267.80	10,820.1	589.5	-4,388.2	4,427.5	0.57	-0.21	-0.53
15,284.0	87.80	267.40	10,821.6	585.6	-4,482.0	4,520.1	2.80	-2.77	-0.43
15,379.0	88.90	267.10	10,824.3	581.0	-4,576.9	4,613.6	1.20	1.16	-0.32
15,446.0	89.10	266.60	10,825.5	577.3	-4,643.8	4,679.5	0.80	0.30	-0.75
15,500.0	89.10	266.60	10,826.3	574.1	-4,697.7	4,732.6	0.00	0.00	0.00

BHL- 15500.0 'MD, 89.10° INC, 266.60° AZI - PBHL(MN#4)

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
10,363.0	10,360.3	-87.9	-109.4	KOP - 10363.0 'MD, 2.67° INC, 240.33° AZI
11,287.0	10,907.9	290.5	-561.3	EOC- 11287.0 'MD, 90.00° INC, 307.90° AZI
15,500.0	10,826.3	574.1	-4,697.7	BHL- 15500.0 'MD, 89.10° INC, 266.60° AZI

Checked By: _____ Approved By: _____ Date: _____