



HOBBS OCD

FEB 22 2012

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COG Operating LLC

Lea County(NAD27)

Macho Nacho State

#1H

OH

Plan: Plan #1

Pathfinder X & Y Report

20 February, 2012

PATHFINDER®
A Schlumberger Company

FEB 23 2012



Pathfinder
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC		Local Co-ordinate Reference:		Well #1H	
Project: Lea County(NAD27)		TVD Reference:		KB = 17' @ 3644.0usft (Original Well Elev)	
Site: Macho Nacho State		MD Reference:		KB = 17' @ 3644.0usft (Original Well Elev)	
Well: #1H		North Reference:		Gnd	
Wellbore: OH		Survey Calculation Method:		Minimum Curvature	
Design: Plan #1		Database:		EDM 5000 1 Single User Db	

Project Lea County(NAD27)					
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: 451,172 700 usft		Latitude: 32° 14' 17 819 N	
From: Map		Easting: 725,665 800 usft		Longitude: 103° 36' 12 533 W	
Position Uncertainty: 0 0 usft		Slot Radius: 13-3/16 "		Grid Convergence: 0.39 °	

Well #1H					
Well Position		Northing: 451,172 700 usft		Latitude: 32° 14' 17 819 N	
+N/-S 0 0 usft		Easting: 725,665 800 usft		Longitude: 103° 36' 12 533 W	
+E/-W 0 0 usft		Wellhead Elevation: usft		Ground Level: 3,627 0 usft	
Position Uncertainty 0 0 usft					

Wellbore OH					
Magnetics					
Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)	
IGRF200510	2/17/2012	7 51	60 20	48,591	

Design Plan #1					
Audit Notes:					
Version:		Phase: PLAN	Tie On Depth: 0 0		
Vertical Section:		Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
		0.0	0 0	0.0	269 66

Survey Tool Program Date: 2/17/2012					
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0 0	15,269 1	Plan #1 (OH)			



Pathfinder
Pathfinder X & Y Report



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Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	EDM 5000 1 Single User Db

Planned Survey

MD (usft)	Inc (")	Azi (azimuth) (")	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg ("/100usft)	Northing (usft)	Easting (usft)
0 0	0 00	0 00	0 0	-3,644 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
100 0	0 00	0 00	100 0	-3,544 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
200 0	0 00	0 00	200 0	-3,444 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
300 0	0 00	0 00	300 0	-3,344 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
400 0	0 00	0 00	400 0	-3,244 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
500 0	0 00	0 00	500 0	-3,144 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
600 0	0 00	0 00	600 0	-3,044 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
700 0	0 00	0 00	700 0	-2,944 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
800 0	0 00	0 00	800 0	-2,844 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
900 0	0 00	0 00	900 0	-2,744 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
1,000 0	0 00	0 00	1,000 0	-2,644 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
1,100 0	0 00	0 00	1,100 0	-2,544 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
1,200 0	0 00	0 00	1,200 0	-2,444 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
1,300 0	0 00	0 00	1,300 0	-2,344 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
1,400 0	0 00	0 00	1,400 0	-2,244 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
1,500 0	0 00	0 00	1,500 0	-2,144 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
1,600 0	0 00	0 00	1,600 0	-2,044 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
1,700 0	0 00	0 00	1,700 0	-1,944 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
1,800 0	0 00	0 00	1,800 0	-1,844 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
1,900 0	0 00	0 00	1,900 0	-1,744 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
2,000 0	0 00	0 00	2,000 0	-1,644 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
2,100 0	0 00	0 00	2,100 0	-1,544 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
2,200 0	0 00	0 00	2,200 0	-1,444 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
2,300 0	0 00	0 00	2,300 0	-1,344 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
2,400 0	0 00	0 00	2,400 0	-1,244 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
2,500 0	0 00	0 00	2,500 0	-1,144 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80
2,600 0	0 00	0 00	2,600 0	-1,044 0	0 0	0 0	0 0	0 00	451,172.70	725,665.80



Pathfinder
Pathfinder X & Y Report



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Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	EDM 5000 1 Single User Db

Planned Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
2,700.0	0.00	0.00	2,700.0	-944.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
2,800.0	0.00	0.00	2,800.0	-844.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
2,900.0	0.00	0.00	2,900.0	-744.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
3,000.0	0.00	0.00	3,000.0	-644.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
3,100.0	0.00	0.00	3,100.0	-544.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
3,200.0	0.00	0.00	3,200.0	-444.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
3,300.0	0.00	0.00	3,300.0	-344.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
3,400.0	0.00	0.00	3,400.0	-244.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
3,500.0	0.00	0.00	3,500.0	-144.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
3,600.0	0.00	0.00	3,600.0	-44.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
3,700.0	0.00	0.00	3,700.0	56.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
3,800.0	0.00	0.00	3,800.0	156.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
3,900.0	0.00	0.00	3,900.0	256.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
4,000.0	0.00	0.00	4,000.0	356.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
4,100.0	0.00	0.00	4,100.0	456.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
4,200.0	0.00	0.00	4,200.0	556.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
4,300.0	0.00	0.00	4,300.0	656.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
4,400.0	0.00	0.00	4,400.0	756.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
4,500.0	0.00	0.00	4,500.0	856.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
4,600.0	0.00	0.00	4,600.0	956.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
4,700.0	0.00	0.00	4,700.0	1,056.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
4,800.0	0.00	0.00	4,800.0	1,156.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
4,900.0	0.00	0.00	4,900.0	1,256.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
5,000.0	0.00	0.00	5,000.0	1,356.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
5,100.0	0.00	0.00	5,100.0	1,456.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
5,200.0	0.00	0.00	5,200.0	1,556.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
5,300.0	0.00	0.00	5,300.0	1,656.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	



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Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	EDM 5000.1 Single User Db

Planned Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
5,400.0	0.00	0.00	5,400.0	1,756.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
5,500.0	0.00	0.00	5,500.0	1,856.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
5,600.0	0.00	0.00	5,600.0	1,956.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
5,700.0	0.00	0.00	5,700.0	2,056.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
5,800.0	0.00	0.00	5,800.0	2,156.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
5,900.0	0.00	0.00	5,900.0	2,256.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
6,000.0	0.00	0.00	6,000.0	2,356.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
6,100.0	0.00	0.00	6,100.0	2,456.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
6,200.0	0.00	0.00	6,200.0	2,556.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
6,300.0	0.00	0.00	6,300.0	2,656.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
6,400.0	0.00	0.00	6,400.0	2,756.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
6,500.0	0.00	0.00	6,500.0	2,856.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
6,600.0	0.00	0.00	6,600.0	2,956.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
6,700.0	0.00	0.00	6,700.0	3,056.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
6,800.0	0.00	0.00	6,800.0	3,156.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
6,900.0	0.00	0.00	6,900.0	3,256.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
7,000.0	0.00	0.00	7,000.0	3,356.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
7,100.0	0.00	0.00	7,100.0	3,456.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
7,200.0	0.00	0.00	7,200.0	3,556.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
7,300.0	0.00	0.00	7,300.0	3,656.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
7,400.0	0.00	0.00	7,400.0	3,756.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
7,500.0	0.00	0.00	7,500.0	3,856.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
7,600.0	0.00	0.00	7,600.0	3,956.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
7,700.0	0.00	0.00	7,700.0	4,056.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
7,800.0	0.00	0.00	7,800.0	4,156.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
7,900.0	0.00	0.00	7,900.0	4,256.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
8,000.0	0.00	0.00	8,000.0	4,356.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	



Pathfinder
Pathfinder X & Y Report

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Site:	Macho Nacho State	MD Reference:	KB = 17' @ 3644.0usft (Original Well Elev)
Well:	#1H	North Reference:	Gnd
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	EDM 5000 1 Single User Db

Planned Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
8,100.0	0.00	0.00	8,100.0	4,456.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
8,200.0	0.00	0.00	8,200.0	4,556.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
8,300.0	0.00	0.00	8,300.0	4,656.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
8,400.0	0.00	0.00	8,400.0	4,756.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
8,500.0	0.00	0.00	8,500.0	4,856.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
8,600.0	0.00	0.00	8,600.0	4,956.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
8,700.0	0.00	0.00	8,700.0	5,056.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
8,800.0	0.00	0.00	8,800.0	5,156.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
8,900.0	0.00	0.00	8,900.0	5,256.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
9,000.0	0.00	0.00	9,000.0	5,356.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
9,100.0	0.00	0.00	9,100.0	5,456.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
9,200.0	0.00	0.00	9,200.0	5,556.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
9,300.0	0.00	0.00	9,300.0	5,656.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
9,400.0	0.00	0.00	9,400.0	5,756.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
9,500.0	0.00	0.00	9,500.0	5,856.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
9,600.0	0.00	0.00	9,600.0	5,956.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
9,700.0	0.00	0.00	9,700.0	6,056.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
9,800.0	0.00	0.00	9,800.0	6,156.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
9,900.0	0.00	0.00	9,900.0	6,256.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
10,000.0	0.00	0.00	10,000.0	6,356.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
10,100.0	0.00	0.00	10,100.0	6,456.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
10,200.0	0.00	0.00	10,200.0	6,556.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
10,300.0	0.00	0.00	10,300.0	6,656.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
10,400.0	0.00	0.00	10,400.0	6,756.0	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
10,432.6	0.00	0.00	10,432.6	6,788.6	0.0	0.0	0.0	0.00	451,172.70	725,665.80	
10,450.0	2.09	269.66	10,450.0	6,806.0	0.0	-0.3	0.3	12.00	451,172.70	725,665.48	
10,475.0	5.09	269.66	10,474.9	6,830.9	0.0	-1.9	1.9	12.00	451,172.69	725,663.92	



Pathfinder
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10,500.0	8.09	269.66	10,499.8	6,855.8	0.0	-4.7	4.7	12.00	451,172.67	725,661.05	
10,525.0	11.09	269.66	10,524.4	6,880.4	-0.1	-8.9	8.9	12.00	451,172.65	725,656.89	
10,550.0	14.09	269.66	10,548.8	6,904.8	-0.1	-14.4	14.4	12.00	451,172.62	725,651.44	
10,575.0	17.09	269.66	10,572.9	6,928.9	-0.1	-21.1	21.1	12.00	451,172.58	725,644.72	
10,600.0	20.09	269.66	10,596.6	6,952.6	-0.2	-29.0	29.0	12.00	451,172.53	725,636.75	
10,625.0	23.09	269.66	10,619.8	6,975.8	-0.2	-38.2	38.2	12.00	451,172.48	725,627.56	
10,650.0	26.09	269.66	10,642.6	6,998.6	-0.3	-48.6	48.6	12.00	451,172.41	725,617.16	
10,675.0	29.09	269.66	10,664.7	7,020.7	-0.4	-60.2	60.2	12.00	451,172.35	725,605.58	
10,700.0	32.09	269.66	10,686.2	7,042.2	-0.4	-72.9	72.9	12.00	451,172.27	725,592.86	
10,725.0	35.09	269.66	10,707.1	7,063.1	-0.5	-86.8	86.8	12.00	451,172.19	725,579.03	
10,750.0	38.09	269.66	10,727.1	7,083.1	-0.6	-101.7	101.7	12.00	451,172.10	725,564.13	
10,775.0	41.09	269.66	10,746.4	7,102.4	-0.7	-117.6	117.6	12.00	451,172.01	725,548.20	
10,800.0	44.09	269.66	10,764.8	7,120.8	-0.8	-134.5	134.5	12.00	451,171.91	725,531.29	
10,825.0	47.09	269.66	10,782.3	7,138.3	-0.9	-152.4	152.4	12.00	451,171.81	725,513.43	
10,850.0	50.09	269.66	10,798.8	7,154.8	-1.0	-171.1	171.1	12.00	451,171.70	725,494.68	
10,875.0	53.09	269.66	10,814.4	7,170.4	-1.1	-190.7	190.7	12.00	451,171.58	725,475.10	
10,900.0	56.09	269.66	10,828.8	7,184.8	-1.2	-211.1	211.1	12.00	451,171.46	725,454.73	
10,925.0	59.09	269.66	10,842.2	7,198.2	-1.4	-232.2	232.2	12.00	451,171.34	725,433.62	
10,950.0	62.09	269.66	10,854.5	7,210.5	-1.5	-254.0	254.0	12.00	451,171.21	725,411.85	
10,975.0	65.09	269.66	10,865.6	7,221.6	-1.6	-276.3	276.3	12.00	451,171.08	725,389.46	
11,000.0	68.09	269.66	10,875.6	7,231.6	-1.8	-299.3	299.3	12.00	451,170.94	725,366.52	
11,025.0	71.09	269.66	10,884.3	7,240.3	-1.9	-322.7	322.7	12.00	451,170.80	725,343.09	
11,050.0	74.09	269.66	10,891.8	7,247.8	-2.0	-346.6	346.6	12.00	451,170.66	725,319.24	
11,075.0	77.09	269.66	10,898.0	7,254.0	-2.2	-370.8	370.8	12.00	451,170.52	725,295.03	
11,100.0	80.09	269.66	10,902.9	7,258.9	-2.3	-395.3	395.3	12.00	451,170.38	725,270.53	
11,125.0	83.09	269.66	10,906.6	7,262.6	-2.5	-420.0	420.0	12.00	451,170.23	725,245.80	
11,150.0	86.09	269.66	10,909.0	7,265.0	-2.6	-444.9	444.9	12.00	451,170.09	725,220.92	



Pathfinder
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Lea County(NAD27)	TVD Reference:	KB = 17' @ 3644.0usft (Original Well Elev)
Site:	Macho Nacho State	MD Reference:	KB = 17' @ 3644.0usft (Original Well Elev)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
11,175.0	89.09	269.66	10,910.0	7,266.0	-2.8	-469.9	469.9	12.00	451,169.94	725,195.94
11,190.8	90.98	269.66	10,910.0	7,266.0	-2.9	-485.7	485.7	12.00	451,169.85	725,180.15
11,200.0	90.98	269.66	10,909.8	7,265.8	-2.9	-494.9	494.9	0.00	451,169.79	725,170.95
11,300.0	90.98	269.66	10,908.1	7,264.1	-3.5	-594.8	594.8	0.00	451,169.21	725,070.96
11,400.0	90.98	269.66	10,906.4	7,262.4	-4.1	-694.8	694.8	0.00	451,168.62	724,970.98
11,500.0	90.98	269.66	10,904.7	7,260.7	-4.7	-794.8	794.8	0.00	451,168.03	724,870.99
11,600.0	90.98	269.66	10,903.0	7,259.0	-5.3	-894.8	894.8	0.00	451,167.45	724,771.01
11,700.0	90.98	269.66	10,901.3	7,257.3	-5.8	-994.8	994.8	0.00	451,166.86	724,671.03
11,800.0	90.98	269.66	10,899.5	7,255.5	-6.4	-1,094.8	1,094.8	0.00	451,166.27	724,571.04
11,900.0	90.98	269.66	10,897.8	7,253.8	-7.0	-1,194.7	1,194.8	0.00	451,165.68	724,471.06
12,000.0	90.98	269.66	10,896.1	7,252.1	-7.6	-1,294.7	1,294.7	0.00	451,165.10	724,371.08
12,100.0	90.98	269.66	10,894.4	7,250.4	-8.2	-1,394.7	1,394.7	0.00	451,164.51	724,271.09
12,200.0	90.98	269.66	10,892.7	7,248.7	-8.8	-1,494.7	1,494.7	0.00	451,163.92	724,171.11
12,300.0	90.98	269.66	10,891.0	7,247.0	-9.4	-1,594.7	1,594.7	0.00	451,163.33	724,071.13
12,400.0	90.98	269.66	10,889.2	7,245.2	-10.0	-1,694.7	1,694.7	0.00	451,162.75	723,971.14
12,500.0	90.98	269.66	10,887.5	7,243.5	-10.5	-1,794.6	1,794.7	0.00	451,162.16	723,871.16
12,600.0	90.98	269.66	10,885.8	7,241.8	-11.1	-1,894.6	1,894.7	0.00	451,161.57	723,771.18
12,700.0	90.98	269.66	10,884.1	7,240.1	-11.7	-1,994.6	1,994.6	0.00	451,160.99	723,671.19
12,800.0	90.98	269.66	10,882.4	7,238.4	-12.3	-2,094.6	2,094.6	0.00	451,160.40	723,571.21
12,900.0	90.98	269.66	10,880.7	7,236.7	-12.9	-2,194.6	2,194.6	0.00	451,159.81	723,471.23
13,000.0	90.98	269.66	10,878.9	7,234.9	-13.5	-2,294.6	2,294.6	0.00	451,159.22	723,371.24
13,100.0	90.98	269.66	10,877.2	7,233.2	-14.1	-2,394.5	2,394.6	0.00	451,158.64	723,271.26
13,200.0	90.98	269.66	10,875.5	7,231.5	-14.6	-2,494.5	2,494.6	0.00	451,158.05	723,171.27
13,300.0	90.98	269.66	10,873.8	7,229.8	-15.2	-2,594.5	2,594.6	0.00	451,157.46	723,071.29
13,400.0	90.98	269.66	10,872.1	7,228.1	-15.8	-2,694.5	2,694.5	0.00	451,156.88	722,971.31
13,500.0	90.98	269.66	10,870.4	7,226.4	-16.4	-2,794.5	2,794.5	0.00	451,156.29	722,871.32
13,600.0	90.98	269.66	10,868.6	7,224.6	-17.0	-2,894.5	2,894.5	0.00	451,155.70	722,771.34



Pathfinder
Pathfinder X & Y Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Lea County(NAD27)	TVD Reference:	KB = 17' @ 3644.0usft (Original Well Elev)
Site:	Macho Nacho State	MD Reference:	KB = 17' @ 3644.0usft (Original Well Elev)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	EDM 5000 1 Single User Db

Planned Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
13,700.0	90.98	269.66	10,866.9	7,222.9	-17.6	-2,994.4	2,994.5	0.00	451,155.11	722,671.36	
13,800.0	90.98	269.66	10,865.2	7,221.2	-18.2	-3,094.4	3,094.5	0.00	451,154.53	722,571.37	
13,900.0	90.98	269.66	10,863.5	7,219.5	-18.8	-3,194.4	3,194.5	0.00	451,153.94	722,471.39	
14,000.0	90.98	269.66	10,861.8	7,217.8	-19.3	-3,294.4	3,294.5	0.00	451,153.35	722,371.41	
14,100.0	90.98	269.66	10,860.1	7,216.1	-19.9	-3,394.4	3,394.4	0.00	451,152.77	722,271.42	
14,200.0	90.98	269.66	10,858.4	7,214.4	-20.5	-3,494.4	3,494.4	0.00	451,152.18	722,171.44	
14,300.0	90.98	269.66	10,856.6	7,212.6	-21.1	-3,594.3	3,594.4	0.00	451,151.59	722,071.46	
14,400.0	90.98	269.66	10,854.9	7,210.9	-21.7	-3,694.3	3,694.4	0.00	451,151.00	721,971.47	
14,500.0	90.98	269.66	10,853.2	7,209.2	-22.3	-3,794.3	3,794.4	0.00	451,150.42	721,871.49	
14,600.0	90.98	269.66	10,851.5	7,207.5	-22.9	-3,894.3	3,894.4	0.00	451,149.83	721,771.50	
14,700.0	90.98	269.66	10,849.8	7,205.8	-23.5	-3,994.3	3,994.3	0.00	451,149.24	721,671.52	
14,800.0	90.98	269.66	10,848.1	7,204.1	-24.0	-4,094.3	4,094.3	0.00	451,148.66	721,571.54	
14,900.0	90.98	269.66	10,846.3	7,202.3	-24.6	-4,194.2	4,194.3	0.00	451,148.07	721,471.55	
15,000.0	90.98	269.66	10,844.6	7,200.6	-25.2	-4,294.2	4,294.3	0.00	451,147.48	721,371.57	
15,100.0	90.98	269.66	10,842.9	7,198.9	-25.8	-4,394.2	4,394.3	0.00	451,146.89	721,271.59	
15,200.0	90.98	269.66	10,841.2	7,197.2	-26.4	-4,494.2	4,494.3	0.00	451,146.31	721,171.60	
15,269.3	90.98	269.66	10,840.0	7,196.0	-26.8	-4,563.5	4,563.6	0.00	451,145.90	721,102.30	

Checked By: _____ Approved By: _____ Date: _____



Project: Lea County(NAD27)
Site: Macho Nacho State
Well: #1H
Wellbore: OH
Plan: Plan #1 (#1H/OH)



Azimuths to Grid North
True North: -0.39°
Magnetic North: 7.12°

Magnetic Field
Strength: 48591.4snT
Dip Angle: 60.20°
Date: 2/17/2012
Model: IGRF200510

PATHFINDER

A Schlumberger Company

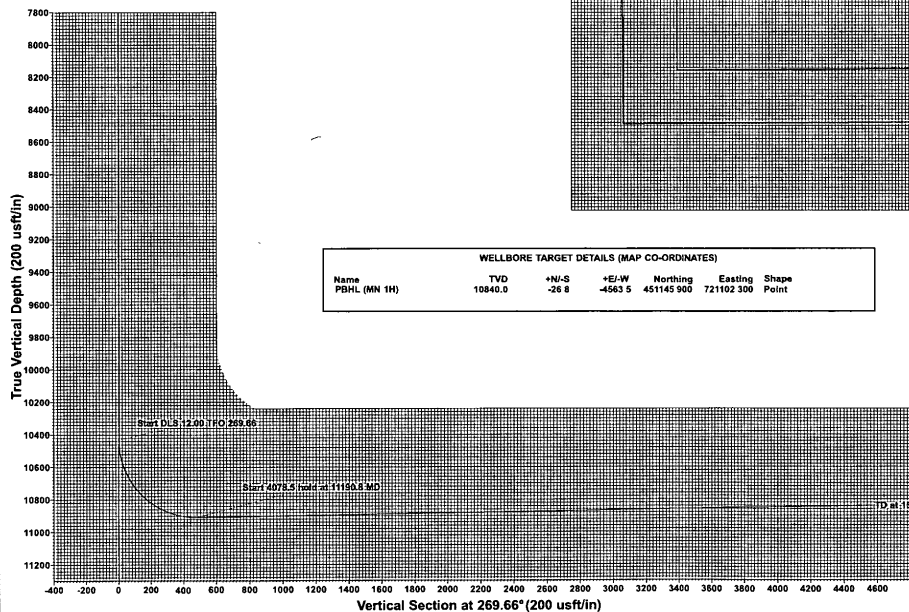
WELL DETAILS: #1H

Ground Elevation: 3627.0
RKB Elevation: KB = 17' @ 3644.0usft (Original Well Elev)
Rig Name: Original Well Elev

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	451172.700	725665.800	32°14' 17.819 N	103°38' 12.533 W	

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	10432.6	0.00	0.00	10432.6	0.0	0.0	0.00	0.00	0.0	
3	11190.8	90.98	269.66	10910.0	-2.9	-485.7	12.00	269.66	485.7	
4	15269.3	90.98	269.66	10840.0	-26.8	-4563.5	0.00	0.00	4563.6	PBHL (MN 1H)



WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
PBHL (MN 1H)	10840.0	-26.8	-4563.5	451145.900	721102.300	Point

PROJECT DETAILS: Lea County(NAD27)
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level
Local North: Grid

Plan: Plan #1 (#1H/OH)

Created By: Michael Trout Date: 9:45, February 20 2012
Checked: _____ Date: _____

