



Cog Operating LLC- Eastern NM

Lea County

Ranger Lake 1 State Com

#1H

OH

RECEIVED

MAY 01 2011

HOBSOCD

Plan: Plan #1

Pathfinder X & Y Planning Report

08 February, 2011

PATHFINDER
A Schlumberger Company

30-025-40076



Pathfinder
Pathfinder X & Y Planning Report

PATHFINDER
A Schlumberger Company

Company:	Cog Operating LLC- Eastern NM	Local Co-ordinate Reference:	Well #1H
Project:	Lea County	TVD Reference:	WELL @ 4138.00usft (Original Well Elev)
Site:	Ranger Lake 1 State Com	MD Reference:	WELL @ 4138.00usft (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

Project	Lea County, New Mexico
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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	Ranger Lake 1 State Com
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Site Position:		Northing:	809,504.500 usft	Latitude:	33° 13' 20.177 N
From:	Map	Easting:	768,198.100 usft	Longitude:	103° 27' 22.841 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.48 °

Well	#1H
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Well Position	+N/-S	0.00 usft	Northing:	809,504.500 usft	Latitude:	33° 13' 20.177 N
	+E/-W	0.00 usft	Easting:	768,198.100 usft	Longitude:	103° 27' 22.841 W
Position Uncertainty	0.00 usft		Wellhead Elevation:	usft	Ground Level:	4,120.00 usft

Wellbore	OH
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	02/08/11	7.63	61.16	49,292

Design	Plan #1
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Audit Notes:				
Version:	Phase: PLAN	Tie On Depth:	0.00	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	269.98

Survey Tool Program	Date	02/08/11		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	13,658.46	Plan #1 (OH)	MWD	MWD - Standard



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MD (usft)	Inc (°)	Azi (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	4,138.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
100.00	0.00	0.00	100.00	4,038.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
200.00	0.00	0.00	200.00	3,938.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
300.00	0.00	0.00	300.00	3,838.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
400.00	0.00	0.00	400.00	3,738.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
500.00	0.00	0.00	500.00	3,638.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
600.00	0.00	0.00	600.00	3,538.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
700.00	0.00	0.00	700.00	3,438.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
800.00	0.00	0.00	800.00	3,338.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
900.00	0.00	0.00	900.00	3,238.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
1,000.00	0.00	0.00	1,000.00	3,138.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
1,100.00	0.00	0.00	1,100.00	3,038.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
1,200.00	0.00	0.00	1,200.00	2,938.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
1,300.00	0.00	0.00	1,300.00	2,838.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
1,400.00	0.00	0.00	1,400.00	2,738.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
1,500.00	0.00	0.00	1,500.00	2,638.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
1,600.00	0.00	0.00	1,600.00	2,538.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
1,700.00	0.00	0.00	1,700.00	2,438.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
1,800.00	0.00	0.00	1,800.00	2,338.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
1,900.00	0.00	0.00	1,900.00	2,238.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
2,000.00	0.00	0.00	2,000.00	2,138.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
2,100.00	0.00	0.00	2,100.00	2,038.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
2,200.00	0.00	0.00	2,200.00	1,938.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
2,300.00	0.00	0.00	2,300.00	1,838.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
2,400.00	0.00	0.00	2,400.00	1,738.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
2,500.00	0.00	0.00	2,500.00	1,638.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
2,600.00	0.00	0.00	2,600.00	1,538.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10



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2,700.00	0.00	0.00	2,700.00	1,438.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
2,800.00	0.00	0.00	2,800.00	1,338.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
2,900.00	0.00	0.00	2,900.00	1,238.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
3,000.00	0.00	0.00	3,000.00	1,138.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
3,100.00	0.00	0.00	3,100.00	1,038.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
3,200.00	0.00	0.00	3,200.00	938.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
3,300.00	0.00	0.00	3,300.00	838.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
3,400.00	0.00	0.00	3,400.00	738.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
3,500.00	0.00	0.00	3,500.00	638.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
3,600.00	0.00	0.00	3,600.00	538.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
3,700.00	0.00	0.00	3,700.00	438.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
3,800.00	0.00	0.00	3,800.00	338.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
3,900.00	0.00	0.00	3,900.00	238.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
4,000.00	0.00	0.00	4,000.00	138.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
4,100.00	0.00	0.00	4,100.00	38.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
4,200.00	0.00	0.00	4,200.00	-62.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
4,300.00	0.00	0.00	4,300.00	-162.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
4,400.00	0.00	0.00	4,400.00	-262.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
4,500.00	0.00	0.00	4,500.00	-362.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
4,600.00	0.00	0.00	4,600.00	-462.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
4,700.00	0.00	0.00	4,700.00	-562.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
4,800.00	0.00	0.00	4,800.00	-662.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
4,900.00	0.00	0.00	4,900.00	-762.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
5,000.00	0.00	0.00	5,000.00	-862.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
5,100.00	0.00	0.00	5,100.00	-962.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
5,200.00	0.00	0.00	5,200.00	-1,062.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
5,300.00	0.00	0.00	5,300.00	-1,162.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10



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5,400.00	0.00	0.00	5,400.00	-1,262.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
5,500.00	0.00	0.00	5,500.00	-1,362.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
5,600.00	0.00	0.00	5,600.00	-1,462.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
5,700.00	0.00	0.00	5,700.00	-1,562.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
5,800.00	0.00	0.00	5,800.00	-1,662.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
5,900.00	0.00	0.00	5,900.00	-1,762.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
6,000.00	0.00	0.00	6,000.00	-1,862.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
6,100.00	0.00	0.00	6,100.00	-1,962.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
6,200.00	0.00	0.00	6,200.00	-2,062.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
6,300.00	0.00	0.00	6,300.00	-2,162.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
6,400.00	0.00	0.00	6,400.00	-2,262.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
6,500.00	0.00	0.00	6,500.00	-2,362.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
6,600.00	0.00	0.00	6,600.00	-2,462.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
6,700.00	0.00	0.00	6,700.00	-2,562.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
6,800.00	0.00	0.00	6,800.00	-2,662.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
6,900.00	0.00	0.00	6,900.00	-2,762.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
7,000.00	0.00	0.00	7,000.00	-2,862.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
7,100.00	0.00	0.00	7,100.00	-2,962.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
7,200.00	0.00	0.00	7,200.00	-3,062.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
7,300.00	0.00	0.00	7,300.00	-3,162.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
7,400.00	0.00	0.00	7,400.00	-3,262.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
7,500.00	0.00	0.00	7,500.00	-3,362.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
7,600.00	0.00	0.00	7,600.00	-3,462.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
7,700.00	0.00	0.00	7,700.00	-3,562.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
7,800.00	0.00	0.00	7,800.00	-3,662.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
7,900.00	0.00	0.00	7,900.00	-3,762.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
8,000.00	0.00	0.00	8,000.00	-3,862.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10



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8,100.00	0.00	0.00	8,100.00	-3,962.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
8,200.00	0.00	0.00	8,200.00	-4,062.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
8,300.00	0.00	0.00	8,300.00	-4,162.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
8,400.00	0.00	0.00	8,400.00	-4,262.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
8,500.00	0.00	0.00	8,500.00	-4,362.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
8,600.00	0.00	0.00	8,600.00	-4,462.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
8,700.00	0.00	0.00	8,700.00	-4,562.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
8,800.00	0.00	0.00	8,800.00	-4,662.00	0.00	0.00	0.00	0.00	809,504.50	768,198.10
8,862.50	0.00	0.00	8,862.50	-4,724.50	0.00	0.00	0.00	0.00	809,504.50	768,198.10
8,875.00	1.50	269.98	8,875.00	-4,737.00	0.00	-0.16	0.16	12.00	809,504.50	768,197.94
8,900.00	4.50	269.98	8,899.96	-4,761.96	0.00	-1.47	1.47	12.00	809,504.50	768,196.63
8,925.00	7.50	269.98	8,924.82	-4,786.82	0.00	-4.08	4.08	12.00	809,504.50	768,194.02
8,950.00	10.50	269.98	8,949.51	-4,811.51	0.00	-7.99	7.99	12.00	809,504.50	768,190.11
8,975.00	13.50	269.98	8,973.96	-4,835.96	0.00	-13.19	13.19	12.00	809,504.50	768,184.91
9,000.00	16.50	269.98	8,998.11	-4,860.11	-0.01	-19.66	19.66	12.00	809,504.49	768,178.44
9,025.00	19.50	269.98	9,021.88	-4,883.88	-0.01	-27.38	27.38	12.00	809,504.49	768,170.72
9,050.00	22.50	269.98	9,045.22	-4,907.22	-0.01	-36.34	36.34	12.00	809,504.49	768,161.76
9,075.00	25.50	269.98	9,068.05	-4,930.05	-0.02	-46.51	46.51	12.00	809,504.48	768,151.59
9,100.00	28.50	269.98	9,090.33	-4,952.33	-0.02	-57.86	57.86	12.00	809,504.48	768,140.24
9,125.00	31.50	269.98	9,111.98	-4,973.98	-0.02	-70.35	70.35	12.00	809,504.48	768,127.75
9,150.00	34.50	269.98	9,132.94	-4,994.94	-0.03	-83.97	83.97	12.00	809,504.47	768,114.13
9,175.00	37.50	269.98	9,153.17	-5,015.17	-0.03	-98.66	98.66	12.00	809,504.47	768,099.44
9,200.00	40.50	269.98	9,172.59	-5,034.59	-0.04	-114.39	114.39	12.00	809,504.46	768,083.71
9,225.00	43.50	269.98	9,191.17	-5,053.17	-0.05	-131.12	131.12	12.00	809,504.45	768,066.98
9,250.00	46.50	269.98	9,208.85	-5,070.85	-0.05	-148.79	148.79	12.00	809,504.45	768,049.31
9,275.00	49.50	269.98	9,225.57	-5,087.57	-0.06	-167.37	167.37	12.00	809,504.44	768,030.73
9,300.00	52.50	269.98	9,241.31	-5,103.31	-0.07	-186.79	186.79	12.00	809,504.43	768,011.31



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9,325.00	55.50	269.98	9,256.00	-5,118.00	-0.07	-207.01	207.01	12.00	809,504.43	767,991.09
9,350.00	58.50	269.98	9,269.62	-5,131.62	-0.08	-227.98	227.98	12.00	809,504.42	767,970.12
9,375.00	61.50	269.98	9,282.12	-5,144.12	-0.09	-249.62	249.62	12.00	809,504.41	767,948.48
9,400.00	64.50	269.98	9,293.47	-5,155.47	-0.09	-271.90	271.90	12.00	809,504.41	767,926.20
9,425.00	67.50	269.98	9,303.64	-5,165.64	-0.10	-294.73	294.73	12.00	809,504.40	767,903.37
9,450.00	70.49	269.98	9,312.60	-5,174.60	-0.11	-318.07	318.07	12.00	809,504.39	767,880.03
9,475.00	73.49	269.98	9,320.32	-5,182.32	-0.12	-341.84	341.84	12.00	809,504.38	767,856.26
9,500.00	76.49	269.98	9,326.80	-5,188.80	-0.13	-365.98	365.98	12.00	809,504.37	767,832.12
9,525.00	79.49	269.98	9,332.00	-5,194.00	-0.14	-390.43	390.43	12.00	809,504.36	767,807.67
9,550.00	82.49	269.98	9,335.91	-5,197.91	-0.14	-415.12	415.12	12.00	809,504.36	767,782.98
9,575.00	85.49	269.98	9,338.52	-5,200.52	-0.15	-439.98	439.98	12.00	809,504.35	767,758.12
9,600.00	88.49	269.98	9,339.83	-5,201.83	-0.16	-464.95	464.95	12.00	809,504.34	767,733.15
9,612.56	90.00	269.98	9,340.00	-5,202.00	-0.17	-477.50	477.50	12.00	809,504.33	767,720.60
9,700.00	90.00	269.98	9,340.00	-5,202.00	-0.20	-564.94	564.94	0.00	809,504.30	767,633.16
9,800.00	90.00	269.98	9,340.00	-5,202.00	-0.23	-664.94	664.94	0.00	809,504.27	767,533.16
9,900.00	90.00	269.98	9,340.00	-5,202.00	-0.27	-764.94	764.94	0.00	809,504.23	767,433.16
10,000.00	90.00	269.98	9,340.00	-5,202.00	-0.30	-864.94	864.94	0.00	809,504.20	767,333.16
10,100.00	90.00	269.98	9,340.00	-5,202.00	-0.34	-964.94	964.94	0.00	809,504.16	767,233.16
10,200.00	90.00	269.98	9,340.00	-5,202.00	-0.37	-1,064.94	1,064.94	0.00	809,504.13	767,133.16
10,300.00	90.00	269.98	9,340.00	-5,202.00	-0.41	-1,164.94	1,164.94	0.00	809,504.09	767,033.16
10,400.00	90.00	269.98	9,340.00	-5,202.00	-0.44	-1,264.94	1,264.94	0.00	809,504.06	766,933.16
10,500.00	90.00	269.98	9,340.00	-5,202.00	-0.48	-1,364.94	1,364.94	0.00	809,504.02	766,833.16
10,600.00	90.00	269.98	9,340.00	-5,202.00	-0.51	-1,464.94	1,464.94	0.00	809,503.99	766,733.16
10,700.00	90.00	269.98	9,340.00	-5,202.00	-0.55	-1,564.94	1,564.94	0.00	809,503.95	766,633.16
10,800.00	90.00	269.98	9,340.00	-5,202.00	-0.58	-1,664.94	1,664.94	0.00	809,503.92	766,533.16
10,900.00	90.00	269.98	9,340.00	-5,202.00	-0.62	-1,764.94	1,764.94	0.00	809,503.88	766,433.16
11,000.00	90.00	269.98	9,340.00	-5,202.00	-0.65	-1,864.94	1,864.94	0.00	809,503.85	766,333.16



Pathfinder
Pathfinder X & Y Planning Report

PATHFINDER
A Schlumberger Company

Company: Cog Operating LLC- Eastern NM
Project: Lea County
Site: Ranger Lake 1 State Com
Well: #1H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well #1H
TVD Reference: WELL @ 4138.00usft (Original Well Elev)
MD Reference: WELL @ 4138.00usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
11,100.00	90.00	269.98	9,340.00	-5,202.00	-0.69	-1,964.94	1,964.94	0.00	809,503.81	766,233.16
11,200.00	90.00	269.98	9,340.00	-5,202.00	-0.72	-2,064.94	2,064.94	0.00	809,503.78	766,133.16
11,300.00	90.00	269.98	9,340.00	-5,202.00	-0.76	-2,164.94	2,164.94	0.00	809,503.74	766,033.16
11,400.00	90.00	269.98	9,340.00	-5,202.00	-0.79	-2,264.94	2,264.94	0.00	809,503.71	765,933.16
11,500.00	90.00	269.98	9,340.00	-5,202.00	-0.83	-2,364.94	2,364.94	0.00	809,503.67	765,833.16
11,600.00	90.00	269.98	9,340.00	-5,202.00	-0.86	-2,464.94	2,464.94	0.00	809,503.64	765,733.16
11,700.00	90.00	269.98	9,340.00	-5,202.00	-0.90	-2,564.94	2,564.94	0.00	809,503.60	765,633.16
11,800.00	90.00	269.98	9,340.00	-5,202.00	-0.93	-2,664.94	2,664.94	0.00	809,503.57	765,533.16
11,900.00	90.00	269.98	9,340.00	-5,202.00	-0.97	-2,764.94	2,764.94	0.00	809,503.53	765,433.16
12,000.00	90.00	269.98	9,340.00	-5,202.00	-1.00	-2,864.94	2,864.94	0.00	809,503.50	765,333.16
12,100.00	90.00	269.98	9,340.00	-5,202.00	-1.03	-2,964.94	2,964.94	0.00	809,503.47	765,233.16
12,200.00	90.00	269.98	9,340.00	-5,202.00	-1.07	-3,064.94	3,064.94	0.00	809,503.43	765,133.16
12,300.00	90.00	269.98	9,340.00	-5,202.00	-1.10	-3,164.94	3,164.94	0.00	809,503.40	765,033.16
12,400.00	90.00	269.98	9,340.00	-5,202.00	-1.14	-3,264.94	3,264.94	0.00	809,503.36	764,933.16
12,500.00	90.00	269.98	9,340.00	-5,202.00	-1.17	-3,364.94	3,364.94	0.00	809,503.33	764,833.16
12,600.00	90.00	269.98	9,340.00	-5,202.00	-1.21	-3,464.94	3,464.94	0.00	809,503.29	764,733.16
12,700.00	90.00	269.98	9,340.00	-5,202.00	-1.24	-3,564.94	3,564.94	0.00	809,503.26	764,633.16
12,800.00	90.00	269.98	9,340.00	-5,202.00	-1.28	-3,664.94	3,664.94	0.00	809,503.22	764,533.16
12,900.00	90.00	269.98	9,340.00	-5,202.00	-1.31	-3,764.94	3,764.94	0.00	809,503.19	764,433.16
13,000.00	90.00	269.98	9,340.00	-5,202.00	-1.35	-3,864.94	3,864.94	0.00	809,503.15	764,333.16
13,100.00	90.00	269.98	9,340.00	-5,202.00	-1.38	-3,964.94	3,964.94	0.00	809,503.12	764,233.16
13,200.00	90.00	269.98	9,340.00	-5,202.00	-1.42	-4,064.94	4,064.94	0.00	809,503.08	764,133.16
13,300.00	90.00	269.98	9,340.00	-5,202.00	-1.45	-4,164.94	4,164.94	0.00	809,503.05	764,033.16
13,400.00	90.00	269.98	9,340.00	-5,202.00	-1.49	-4,264.94	4,264.94	0.00	809,503.01	763,933.16
13,500.00	90.00	269.98	9,340.00	-5,202.00	-1.52	-4,364.94	4,364.94	0.00	809,502.98	763,833.16
13,600.00	90.00	269.98	9,340.00	-5,202.00	-1.56	-4,464.94	4,464.94	0.00	809,502.94	763,733.16
13,658.46	90.00	269.98	9,340.00	-5,202.00	-1.58	-4,523.40	4,523.40	0.00	809,502.92	763,674.70



Pathfinder
Pathfinder X & Y Planning Report

PATHFINDER
A Schlumberger Company

Company:	Cog Operating LLC- Eastern NM	Local Co-ordinate Reference:	Well #1H
Project:	Lea County	TVD Reference:	WELL @ 4138.00usft (Original Well Elev)
Site:	Ranger Lake 1 State Com	MD Reference:	WELL @ 4138.00usft (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

Checked By:	_____	Approved By:	_____	Date:	_____
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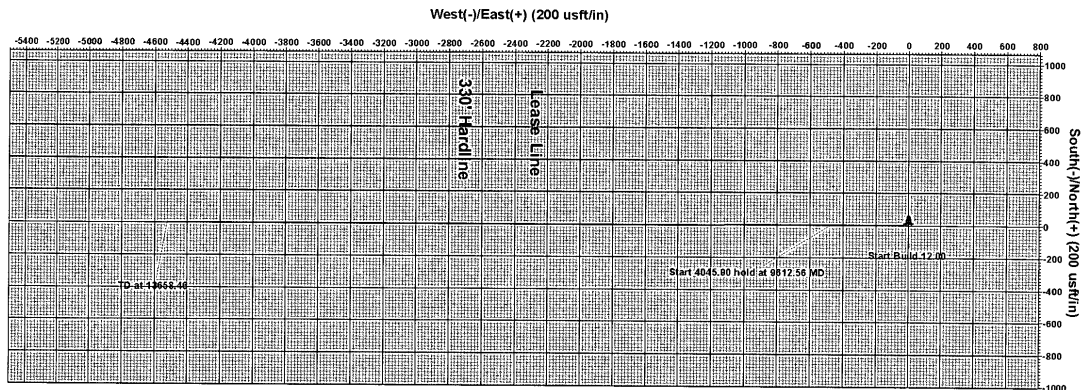
Project: Lea County
Site: Ranger Lake 1 State Con
Well: #1H
Wellbore: OH
Plan: Plan #1 (#1H/OH)



Azimuths to Grid North
True North: -0.48°
Magnetic North: 7.15°

Magnetic Field
Strength: 49292.1snT
Dip Angle: 61.16°
Date: 02/08/2011
Model: IGRF200510

PATHFINDER
A Schlumberger Company



WELL DETAILS: #1H

Ground Elevation: 4120.00
RKB Elevation: WELL @ 4138.00usft (Original Well Elev)
Rig Name: Original Well Elev

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	809504.500	768198.100	33° 13' 20.177 N	103° 27' 22.841 W	

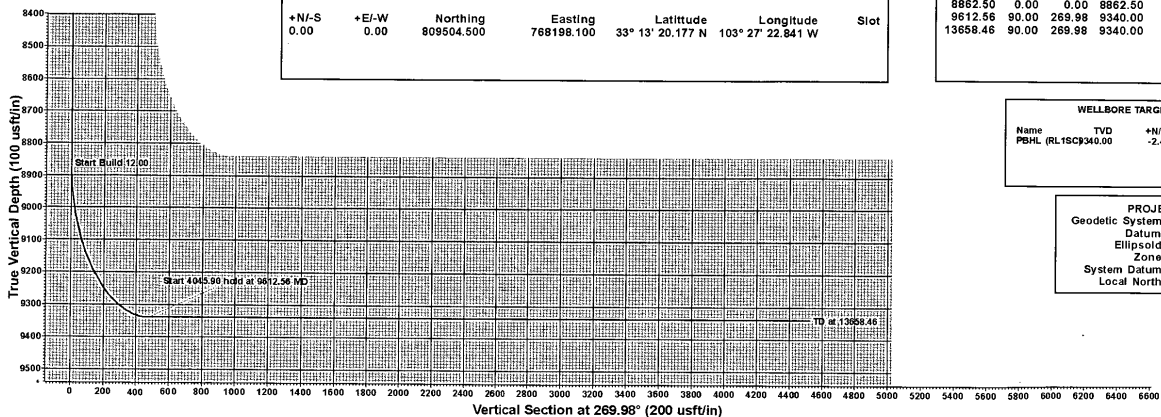
SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSeet	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
8862.50	0.00	0.00	8862.50	0.00	0.00	0.00	0.00	0.00	
9612.56	90.00	269.98	9340.00	-0.17	-477.50	12.00	269.98	477.50	
13658.46	90.00	269.98	9340.00	-1.58	-4523.40	0.00	0.00	4523.40	PBHL (RL1SC)

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
PBHL (RL1SC) 9340.00	-2.40	-4523.40	809502.100	763674.700	Point	

PROJECT DETAILS: Lea County
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: Nate Ringham Date: 16/10 February 08 2011