



30-015-38257

990' FNL 330' FEL
SEC 9 T26S R28E

Cog Operating, LLC

Eddy County (NAD83)

SRO ~~X~~ State

#1H 17H

OH



Survey: MWD #1

Pathfinder X & Y Survey Report

20 December, 2010

PATHFINDER

A Schlumberger Company



Pathfinder
Pathfinder X & Y Survey Report



Company: Cog Operating, LLC
Project: Eddy County (NAD83)
Site: SRO 9 State
Well: #1H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #1H
TVD Reference: WELL @ 3056.20usft (17' KB Correction)
MD Reference: WELL @ 3056.20usft (17' KB Correction)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Project	Eddy County (NAD83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	SRO 9 State		
Site Position:		Northing:	386,252.900 usft
From: Map		Easting:	613,648.210 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 3' 42.027 N
		Longitude:	104° 5' 59.668 W
		Grid Convergence:	0.12 "

Well	#1H					
Well Position	+N/-S	0.00 usft	Northing:	386,252.900 usft	Latitude:	32° 3' 42.027 N
	+E/-W	0.00 usft	Easting:	613,648.210 usft	Longitude:	104° 5' 59.668 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,039.20 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/30/10	7.88	59.96	48,515

Design:	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	135.80	



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Survey Program	Date 12/20/10				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	6,200.00	GYRO (OH)	MWD	MWD - Standard	
6,234.00	10,400.00	MWD #1 (OH)	MWD	MWD - Standard	

MD (usft)	Inc (")	Azi (")	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg ("/100usft)	Northing (usft)	Easting (usft)
6,200.00	1.25	171.98	6,198.74	-3,142.54	-49.04	19.58	48.81	0.00	386,203.86	613,667.79
6,234.00	0.97	208.93	6,232.73	-3,176.53	-49.66	19.50	49.19	2.21	386,203.24	613,667.71
6,265.00	4.13	169.73	6,263.70	-3,207.50	-50.99	19.57	50.20	11.08	386,201.91	613,667.78
6,297.00	11.61	169.29	6,295.38	-3,239.18	-55.30	20.37	53.84	23.38	386,197.60	613,668.58
6,328.00	16.53	170.17	6,325.44	-3,269.24	-62.71	21.71	60.09	15.89	386,190.19	613,669.92
6,360.00	20.40	172.55	6,355.79	-3,299.59	-72.73	23.21	68.32	12.32	386,180.17	613,671.42
6,392.00	22.51	174.74	6,385.57	-3,329.37	-84.36	24.49	77.55	7.05	386,168.54	613,672.70
6,423.00	24.71	176.50	6,413.97	-3,357.77	-96.74	25.43	87.08	7.45	386,156.16	613,673.64
6,455.00	27.35	177.56	6,442.72	-3,386.52	-110.76	26.15	97.63	8.38	386,142.14	613,674.36
6,487.00	30.51	177.47	6,470.73	-3,414.53	-126.23	26.83	109.19	9.88	386,126.67	613,675.04
6,518.00	33.59	176.24	6,497.00	-3,440.80	-142.65	27.74	121.60	10.16	386,110.25	613,675.95
6,550.00	36.32	175.27	6,523.22	-3,467.02	-160.93	29.10	135.65	8.71	386,091.97	613,677.31
6,581.00	39.04	175.27	6,547.75	-3,491.55	-179.81	30.66	150.27	8.77	386,073.09	613,678.87
6,613.00	41.68	175.80	6,572.14	-3,515.94	-200.47	32.27	166.21	8.32	386,052.43	613,680.48
6,644.00	44.41	176.85	6,594.79	-3,538.59	-221.58	33.62	182.28	9.10	386,031.32	613,681.83
6,675.00	47.40	176.68	6,616.36	-3,560.16	-243.81	34.88	199.09	9.65	386,009.09	613,683.09
6,707.00	50.74	176.24	6,637.32	-3,581.12	-267.94	36.37	217.43	10.49	385,984.96	613,684.58
6,739.00	54.08	175.88	6,656.84	-3,600.64	-293.23	38.12	236.78	10.48	385,959.67	613,686.33
6,770.00	57.07	175.71	6,674.36	-3,618.16	-318.73	39.99	256.36	9.66	385,934.17	613,688.20
6,802.00	60.32	175.88	6,690.99	-3,634.79	-345.99	42.00	277.31	10.17	385,906.91	613,690.21
6,834.00	63.84	175.80	6,705.97	-3,649.77	-374.19	44.05	298.95	11.00	385,878.71	613,692.26



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EDM 5000.1 Single User Db

Survey										
MD (usft)	Inc (°)	Azi (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
6,865.00	67.97	176.24	6,718.62	-3,662.42	-402.41	46.01	320.55	13.39	385,850.49	613,694.22
6,897.00	71.93	177.20	6,729.59	-3,673.39	-432.42	47.73	343.26	12.69	385,820.48	613,695.94
6,929.00	75.62	178.08	6,738.53	-3,682.33	-463.11	48.99	366.14	11.83	385,789.79	613,697.20
6,960.00	78.52	178.79	6,745.46	-3,689.26	-493.31	49.81	388.36	9.62	385,759.59	613,698.02
6,991.00	80.55	179.14	6,751.10	-3,694.90	-523.79	50.36	410.59	6.64	385,729.11	613,698.57
7,023.00	83.71	179.23	6,755.48	-3,699.28	-555.48	50.81	433.63	9.88	385,697.42	613,699.02
7,055.00	87.67	179.75	6,757.88	-3,701.68	-587.38	51.10	456.69	12.48	385,665.52	613,699.31
7,085.00	90.40	179.18	6,758.39	-3,702.19	-617.37	51.38	478.39	9.30	385,635.53	613,699.59
7,180.00	91.71	179.11	6,756.64	-3,700.44	-712.34	52.79	547.46	1.38	385,540.56	613,701.00
7,275.00	92.42	179.47	6,753.21	-3,697.01	-807.27	53.97	616.33	0.84	385,445.63	613,702.18
7,369.00	91.19	179.08	6,750.25	-3,694.05	-901.22	55.16	684.50	1.37	385,351.68	613,703.37
7,464.00	87.93	178.53	6,750.98	-3,694.78	-996.18	57.14	753.96	3.48	385,256.72	613,705.35
7,559.00	87.49	178.88	6,754.78	-3,698.58	-1,091.08	59.29	823.48	0.59	385,161.82	613,707.50
7,653.00	86.88	178.42	6,759.39	-3,703.19	-1,184.94	61.50	892.31	0.81	385,067.96	613,709.71
7,747.00	87.14	178.22	6,764.30	-3,708.10	-1,278.77	64.25	961.49	0.35	384,974.13	613,712.46
7,842.00	89.34	179.30	6,767.22	-3,711.02	-1,373.70	66.30	1,030.97	2.58	384,879.20	613,714.51
7,935.00	91.63	180.41	6,766.43	-3,710.23	-1,466.69	66.54	1,097.79	2.74	384,786.21	613,714.75
8,029.00	91.45	180.35	6,763.90	-3,707.70	-1,560.65	65.92	1,164.72	0.20	384,692.25	613,714.13
8,124.00	90.92	179.62	6,761.94	-3,705.74	-1,655.63	65.94	1,232.82	0.95	384,597.27	613,714.15
8,218.00	90.66	178.63	6,760.64	-3,704.44	-1,749.61	67.38	1,301.19	1.09	384,503.29	613,715.59
8,312.00	89.69	180.01	6,760.35	-3,704.15	-1,843.60	68.49	1,369.34	1.79	384,409.30	613,716.70
8,407.00	89.16	180.01	6,761.31	-3,705.11	-1,938.59	68.48	1,437.43	0.56	384,314.31	613,716.69
8,501.00	89.96	179.36	6,762.03	-3,705.83	-2,032.59	68.99	1,505.17	1.10	384,220.31	613,717.20
8,595.00	90.66	179.65	6,761.52	-3,705.32	-2,126.58	69.80	1,573.11	0.81	384,126.32	613,718.01
8,690.00	90.04	179.43	6,760.94	-3,704.74	-2,221.58	70.57	1,641.74	0.69	384,031.32	613,718.78
8,785.00	89.60	179.64	6,761.24	-3,705.04	-2,316.57	71.34	1,710.38	0.51	383,936.33	613,719.55
8,879.00	90.04	179.91	6,761.53	-3,705.33	-2,410.57	71.71	1,778.02	0.55	383,842.33	613,719.92



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WELL @ 3056.20usft (17' KB Correction)
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Minimum Curvature
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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)	
8,973.00	89.69	179.87	6,761.76	-3,705.56	-2,504.57	71.89	1,845.53	0.37	383,748.33	613,720.10	
9,068.00	90.66	179.65	6,761.47	-3,705.27	-2,599.57	72.29	1,913.91	1.05	383,653.33	613,720.50	
9,163.00	91.10	179.47	6,760.01	-3,703.81	-2,694.55	73.02	1,982.51	0.50	383,558.35	613,721.23	
9,257.00	89.60	178.69	6,759.43	-3,703.23	-2,788.54	74.52	2,050.93	1.80	383,464.36	613,722.73	
9,351.00	88.02	177.37	6,761.38	-3,705.18	-2,882.46	77.75	2,120.51	2.19	383,370.44	613,725.96	
9,447.00	89.69	178.46	6,763.30	-3,707.10	-2,978.37	81.25	2,191.70	2.08	383,274.53	613,729.46	
9,541.00	90.75	179.62	6,762.94	-3,706.74	-3,072.35	82.82	2,260.17	1.67	383,180.55	613,731.03	
9,635.00	90.48	180.07	6,761.93	-3,705.73	-3,166.35	83.08	2,327.72	0.56	383,086.55	613,731.29	
9,729.00	90.57	179.65	6,761.07	-3,704.87	-3,260.34	83.31	2,395.27	0.46	382,992.56	613,731.52	
9,823.00	90.48	178.58	6,760.21	-3,704.01	-3,354.32	84.76	2,463.65	1.14	382,898.58	613,732.97	
9,917.00	89.69	178.57	6,760.07	-3,703.87	-3,448.29	87.09	2,532.64	0.84	382,804.61	613,735.30	
10,011.00	89.87	178.90	6,760.43	-3,704.23	-3,542.27	89.17	2,601.46	0.40	382,710.63	613,737.38	
10,106.00	89.78	178.85	6,760.72	-3,704.52	-3,637.25	91.04	2,670.84	0.11	382,615.65	613,739.25	
10,200.00	91.10	178.94	6,760.00	-3,703.80	-3,731.23	92.85	2,739.48	1.41	382,521.67	613,741.06	
10,295.00	90.75	178.24	6,758.47	-3,702.27	-3,826.19	95.19	2,809.18	0.82	382,426.71	613,743.40	
10,345.00	91.45	178.09	6,757.51	-3,701.31	-3,876.15	96.79	2,846.11	1.43	382,376.75	613,745.00	
10,400.00	91.45	178.09	6,756.11	-3,699.91	-3,931.10	98.62	2,886.78	0.00	382,321.80	613,746.83	
BHL-10400.00°MD,91.45°INC,178.09°AZI, 6756.11°TVD, 2886.78°VS, -3931.10°N, 98.62°E											

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
10,400.00	6,756.11	-3,931.10	98.62	BHL-10400.00°MD,91.45°INC,178.09°AZI, 6756.11°TVD, 2886.78°VS, -3931.10°

Checked By: _____ Approved By: _____ Date: _____