

Results of Directional Survey

API number:	30-025-39540		
OGRID:		Operator:	COG OPERATING LLC
		Property:	HIGH PLAINS 22 STATE COM # 1H

surface	ULSTR:	E	22	T 14S	R 34E
				1980 FNL	430 FWL

BH Loc	ULSTR:	H	22	T 14S	R 34E
13840	MD	9675.7	TVD	1625 FNL	4924 FWL

Top Perf/OH	ULSTR:	E	22	T 14S	R 34E
10001	MD	9673.2	TVD	1962 FNL	1102 FWL

Bot Perf/OH	ULSTR:	H	22	T 14S	R 34E
13371	MD	9672.0	TVD	1675 FNL	4457 FWL

	MD	N/S	E/W	VD
	9996	17.18	666.88	9672.86
TOP PERFS/OH	10001	17.84	671.82	9673.21
	10028	21.40	698.52	9675.12
	13339	302.55	3995.46	9671.67
BOT PERFS/OH	13371	305.09	4027.36	9671.96
	13371	305.09	4027.36	9671.96

NEXT TO LAST	13720	339.27	4374.63	9675.74
LAST READING	13752	343.39	4406.36	9675.74
TD	13840	354.72	4493.62	9675.74

Surface Location	1980	FN	430	FW
Projected BHL	1625	FN	4924	FW
Location of				
Top Perfs/OH	1962	FN	1102	FW
Bottom Perfs/OH	1675	FN	4457	FW

SUMMARY of Subsurface Locations

Surface Location	E-22-14S-34E	1980	FN	430	FW	Vert. Depth
Top Perfs/OH	E-22-14S-34E	1962	FN	1102	FW	9673.21
Bottom Perfs/OH	H-22-14S-34E	1675	FN	4457	FW	9671.96
Projected TD	H-22-14S-34E	1625	FN	4924	FW	9675.74



COG Operating LLC

Lea County(NAD83)
High Plains "22" State Com
#1H
OH

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Survey: MWD #1

Pathfinder X & Y Survey Report

09 July, 2010

PATHFINDER

SUR @ E-22-14s-34e, 1980/N & 430/W
BHL @ H-22-14s-34e, 1625/N & 4924/W
API # 30-025-39540



Pathfinder
Pathfinder X & Y Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Lea County(NAD83)	TVD Reference:	WELL @ 4158.00ft (25' KB Correction)
Site:	High Plains "22" State Com	MD Reference:	WELL @ 4158.00ft (25' KB Correction)
Well:	#1H	North Reference:	Gnd
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Midland Database

Project	Lea 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	High Plains "22" State Com		
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Site Position:		Northing:	761,973.600 ft	Latitude:	33° 5' 30.863 N
From:	Map	Easting:	794,733.500 ft	Longitude:	103° 30' 21.427 W
Position Uncertainty:	0.00 ft	Slot Radius:	"	Grid Convergence:	0.45 °

Well		#1H				
Well Position	+N-S	0 00 ft	Northing:	761,973 600 ft	Latitude:	33° 5' 30 863 N
	+E-W	0 00 ft	Easting:	794,733 500 ft	Longitude:	103° 30' 21 427 W
Position Uncertainty		0 00 ft	Wellhead Elevation:	ft	Ground Level:	4,133 00ft

Wellbore	OH				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	06/23/2010	7.73	61.04	49,270

Design	OH				
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Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	85.50	



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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
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Survey Program		Date	07/09/2010			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description		
100 00	9,000 00	GYRO (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s		
9,040.00	13,840 00	MWD #1 (OH)	MWD	MWD - Standard		

Survey											
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)	
9,000.00	1 19	98.82	8,999.42	4,841 42	-30.93	74 95	72.29	0.00	761,942.67	794,808 45	
9,040.00	1.23	108.01	9,039 41	4,881 41	-31.12	75 76	73.09	0.49	761,942.48	794,809.26	
9,072 00	2.46	87.45	9,071.40	4,913.40	-31.20	76 78	74 09	4.31	761,942.40	794,810.28	
9,104.00	6.42	83.58	9,103.29	4,945.29	-30 97	79.24	76 57	12.40	761,942.63	794,812 74	
9,136.00	9.06	84 55	9,135.00	4,977.00	-30 53	83.53	80.88	8.26	761,943.07	794,817 03	
9,168.00	12.05	85.78	9,166 45	5,008.45	-30 04	89.37	86 74	9.37	761,943.56	794,822 87	
9,200.00	14.77	86.74	9,197.58	5,039 58	-29 57	96.77	94.16	8.53	761,944.03	794,830.27	
9,232 00	17.76	87.29	9,228.29	5,070 29	-29 10	105.72	103.11	9 36	761,944.50	794,839.22	
9,264 00	19.87	88.24	9,258.58	5,100.58	-28 70	116.04	113.43	6 66	761,944 90	794,849.54	
9,296.00	22 25	87.18	9,288.44	5,130.44	-28 24	127.52	124 92	7 53	761,945 36	794,861.02	
9,328 00	24 53	85.78	9,317.81	5,159 81	-27.45	140 20	137 62	7 33	761,946 15	794,873 70	
9,360 00	27 52	85.51	9,346.56	5,188 56	-26 38	154 20	151 65	9 35	761,947 22	794,887 70	
9,391.00	30 51	84.11	9,373.67	5,215 67	-25 02	169 17	166.69	9.89	761,948.58	794,902.67	
9,423.00	33 68	84.90	9,400 78	5,242 78	-23 39	186 09	183.68	9 99	761,950.21	794,919 59	
9,455 00	36 67	85.16	9,426.93	5,268 93	-21 80	204 46	202.12	9 36	761,951.80	794,937 96	
9,487.00	40 36	84.99	9,451.96	5,293 96	-20 09	224 31	222.04	11.54	761,953.51	794,957 81	
9,519.00	43.88	85.51	9,475.70	5,317 70	-18 31	245.69	243.50	11.05	761,955.29	794,979 19	
9,550.00	47 04	86 04	9,497 44	5,339 44	-16.69	267.72	265 59	10.27	761,956.91	795,001 22	
9,581 00	49.59	86 66	9,518 05	5,360 05	-15 22	290.83	288 74	8.36	761,958 38	795,024 33	
9,613.00	52.06	86 74	9,538 26	5,380 26	-13.79	315.59	313 54	7.72	761,959 81	795,049.09	
9,645 00	55.22	86.74	9,557 23	5,399 23	-12 32	341 32	339 30	9.87	761,961 28	795,074.82	



Pathfinder
Pathfinder X & Y Survey Report



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Project:	Lea County(NAD83)	TVD Reference:	WELL @ 4158 00ft (25' KB Correction)
Site:	High Plains "22" State Com	MD Reference:	WELL @ 4158 00ft (25' KB Correction)
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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Midland Database

Survey										
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
9,677.00	57.77	86.04	9,574.90	5,416.90	-10.64	367.94	365.97	8.17	761,962.96	795,101.44
9,709.00	59.97	86.13	9,591.44	5,433.44	-8.77	395.27	393.36	6.88	761,964.83	795,128.77
9,741.00	62.52	85.69	9,606.83	5,448.83	-6.77	423.25	421.41	8.06	761,966.83	795,156.75
9,773.00	66.48	84.99	9,620.61	5,462.61	-4.42	452.03	450.29	12.53	761,969.18	795,185.53
9,805.00	70.79	84.46	9,632.26	5,474.26	-1.68	481.70	480.08	13.56	761,971.92	795,215.20
9,837.00	73.25	84.25	9,642.14	5,484.14	1.31	511.98	510.51	7.71	761,974.91	795,245.48
9,869.00	75.71	84.36	9,650.70	5,492.70	4.37	542.66	541.33	7.69	761,977.97	795,276.16
9,900.00	77.03	84.98	9,658.00	5,500.00	7.17	572.66	571.46	4.68	761,980.77	795,306.16
9,932.00	79.93	84.63	9,664.39	5,506.39	10.01	603.88	602.81	9.13	761,983.61	795,337.38
9,964.00	81.95	83.43	9,669.43	5,511.43	13.30	635.31	634.39	7.32	761,986.90	795,368.81
9,996.00	85.74	82.54	9,672.86	5,514.86	17.18	666.88	666.17	12.16	761,990.78	795,400.38
10,028.00	86.17	82.29	9,675.12	5,517.12	21.40	698.52	698.05	1.55	761,995.00	795,432.02
10,060.00	86.35	83.04	9,677.21	5,519.21	25.47	730.19	729.94	2.41	761,999.07	795,463.69
10,092.00	87.58	83.20	9,678.90	5,520.90	29.30	761.92	761.87	3.88	762,002.90	795,495.42
10,124.00	89.43	82.29	9,679.74	5,521.74	33.34	793.65	793.82	6.44	762,006.94	795,527.15
10,161.00	89.96	83.36	9,679.93	5,521.93	37.96	830.36	830.78	3.23	762,011.56	795,563.86
10,193.00	90.22	83.60	9,679.88	5,521.88	41.60	862.15	862.76	1.11	762,015.20	795,595.65
10,225.00	89.78	84.23	9,679.88	5,521.88	44.99	893.97	894.74	2.40	762,018.59	795,627.47
10,257.00	88.64	84.47	9,680.33	5,522.33	48.14	925.81	926.73	3.64	762,021.74	795,659.31
10,289.00	88.20	83.72	9,681.21	5,523.21	51.43	957.63	958.71	2.72	762,025.03	795,691.13
10,321.00	88.11	84.06	9,682.24	5,524.24	54.83	989.43	990.68	1.10	762,028.43	795,722.93
10,352.00	88.20	83.49	9,683.24	5,525.24	58.19	1,020.23	1,021.65	1.86	762,031.79	795,753.73
10,385.00	89.52	83.24	9,683.89	5,525.89	62.01	1,053.00	1,054.62	4.07	762,035.61	795,786.50
10,416.00	89.69	83.80	9,684.11	5,526.11	65.50	1,083.80	1,085.60	1.89	762,039.10	795,817.30
10,448.00	89.43	84.21	9,684.35	5,526.35	68.85	1,115.63	1,117.59	1.52	762,042.45	795,849.13
10,480.00	89.87	84.04	9,684.55	5,526.55	72.12	1,147.46	1,149.58	1.47	762,045.72	795,880.96
10,512.00	91.01	84.41	9,684.30	5,526.30	75.34	1,179.29	1,181.57	3.75	762,048.94	795,912.79



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MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
10,544.00	91.01	85.02	9,683.74	5,525.74	78.29	1,211.15	1,213.56	1.91	762,051.89	795,944.65
10,576.00	91.01	84.70	9,683.17	5,525.17	81.15	1,243.02	1,245.55	1.00	762,054.75	795,976.52
10,607.00	90.75	84.61	9,682.70	5,524.70	84.04	1,273.88	1,276.55	0.89	762,057.64	796,007.38
10,639.00	91.01	84.82	9,682.21	5,524.21	86.99	1,305.74	1,308.54	1.04	762,060.59	796,039.24
10,671.00	90.92	84.29	9,681.67	5,523.67	90.03	1,337.59	1,340.53	1.68	762,063.63	796,071.09
10,703.00	91.01	84.41	9,681.13	5,523.13	93.18	1,369.43	1,372.52	0.47	762,066.78	796,102.93
10,735.00	90.84	84.29	9,680.61	5,522.61	96.33	1,401.27	1,404.51	0.65	762,069.93	796,134.77
10,767.00	90.92	84.12	9,680.12	5,522.12	99.56	1,433.11	1,436.50	0.59	762,073.16	796,166.61
10,799.00	91.28	84.52	9,679.51	5,521.51	102.72	1,464.94	1,468.49	1.68	762,076.32	796,198.44
10,831.00	90.92	84.68	9,678.89	5,520.89	105.73	1,496.79	1,500.48	1.23	762,079.33	796,230.29
10,862.00	91.19	85.07	9,678.32	5,520.32	108.50	1,527.66	1,531.47	1.53	762,082.10	796,261.16
10,894.00	91.28	85.15	9,677.63	5,519.63	111.23	1,559.54	1,563.46	0.38	762,084.83	796,293.04
10,926.00	91.54	86.44	9,676.84	5,518.84	113.58	1,591.44	1,595.45	4.11	762,087.18	796,324.94
10,958.00	91.01	86.93	9,676.13	5,518.13	115.43	1,623.38	1,627.43	2.26	762,089.03	796,356.88
10,989.00	91.01	87.32	9,675.59	5,517.59	116.98	1,654.34	1,658.42	1.26	762,090.58	796,387.84
11,021.00	91.45	87.55	9,674.90	5,516.90	118.41	1,686.30	1,690.39	1.55	762,092.01	796,419.80
11,053.00	92.42	87.59	9,673.82	5,515.82	119.77	1,718.25	1,722.35	3.03	762,093.37	796,451.75
11,085.00	92.24	88.28	9,672.52	5,514.52	120.92	1,750.20	1,754.30	2.23	762,094.52	796,483.70
11,117.00	91.89	88.55	9,671.36	5,513.36	121.80	1,782.17	1,786.23	1.38	762,095.40	796,515.67
11,149.00	91.80	88.38	9,670.33	5,512.33	122.66	1,814.14	1,818.17	0.60	762,096.26	796,547.64
11,181.00	91.98	88.68	9,669.28	5,511.28	123.48	1,846.12	1,850.11	1.09	762,097.08	796,579.62
11,213.00	91.98	88.31	9,668.17	5,510.17	124.32	1,878.09	1,882.05	1.16	762,097.92	796,611.59
11,245.00	92.07	88.29	9,667.04	5,509.04	125.27	1,910.05	1,913.99	0.29	762,098.87	796,643.55
11,277.00	90.92	88.59	9,666.21	5,508.21	126.14	1,942.03	1,945.94	3.71	762,099.74	796,675.53
11,309.00	90.31	87.70	9,665.86	5,507.86	127.18	1,974.01	1,977.90	3.37	762,100.78	796,707.51
11,341.00	90.84	87.79	9,665.54	5,507.54	128.44	2,005.98	2,009.88	1.68	762,102.04	796,739.48
11,371.00	90.40	87.44	9,665.22	5,507.22	129.68	2,035.95	2,039.85	1.87	762,103.28	796,769.45



Pathfinder
Pathfinder X & Y Survey Report



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Site: High Plains "22" State Com
Well: #1H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #1H
TVD Reference: WELL @ 4158 00ft (25' KB Correction)
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Survey Calculation Method: Minimum Curvature
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Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
11,404.00	90.66	87.10	9,664.91	5,506.91	131.26	2,068.92	2,072.84	1.30	762,104.86	796,802.42
11,435.00	90.66	87.30	9,664.56	5,506.56	132.77	2,099.88	2,103.82	0.65	762,106.37	796,833.38
11,467.00	90.31	87.27	9,664.28	5,506.28	134.29	2,131.84	2,135.80	1.10	762,107.89	796,865.34
11,499.00	90.84	86.75	9,663.96	5,505.96	135.95	2,163.79	2,167.79	2.32	762,109.55	796,897.29
11,531.00	90.40	87.13	9,663.62	5,505.62	137.66	2,195.75	2,199.78	1.82	762,111.26	796,929.25
11,563.00	90.57	86.82	9,663.35	5,505.35	139.35	2,227.70	2,231.77	1.10	762,112.95	796,961.20
11,595.00	90.66	86.66	9,663.00	5,505.00	141.17	2,259.65	2,263.76	0.57	762,114.77	796,993.15
11,627.00	90.56	86.30	9,662.66	5,504.66	143.14	2,291.58	2,295.75	1.17	762,116.74	797,025.08
11,658.00	90.92	86.11	9,662.26	5,504.26	145.19	2,322.51	2,326.75	1.31	762,118.79	797,056.01
11,690.00	90.92	87.07	9,661.75	5,503.75	147.09	2,354.45	2,358.74	3.00	762,120.69	797,087.95
11,722.00	90.40	86.75	9,661.38	5,503.38	148.82	2,386.40	2,390.72	1.91	762,122.42	797,119.90
11,753.00	90.92	86.53	9,661.02	5,503.02	150.63	2,417.35	2,421.72	1.82	762,124.23	797,150.85
11,785.00	90.57	86.57	9,660.61	5,502.61	152.56	2,449.29	2,453.71	1.10	762,126.16	797,182.79
11,817.00	90.40	86.35	9,660.34	5,502.34	154.53	2,481.23	2,485.70	0.87	762,128.13	797,214.73
11,849.00	90.57	86.16	9,660.06	5,502.06	156.62	2,513.16	2,517.70	0.80	762,130.22	797,246.66
11,881.00	90.57	86.29	9,659.75	5,501.75	158.73	2,545.09	2,549.69	0.41	762,132.33	797,278.59
11,913.00	90.13	86.10	9,659.55	5,501.55	160.85	2,577.01	2,581.69	1.50	762,134.45	797,310.51
11,945.00	90.48	86.09	9,659.38	5,501.38	163.03	2,608.94	2,613.69	1.09	762,136.63	797,342.44
11,977.00	90.48	86.08	9,659.11	5,501.11	165.22	2,640.86	2,645.69	0.03	762,138.82	797,374.36
12,008.00	90.31	86.10	9,658.90	5,500.90	167.33	2,671.79	2,676.68	0.55	762,140.93	797,405.29
12,040.00	90.57	85.71	9,658.65	5,500.65	169.62	2,703.71	2,708.68	1.46	762,143.22	797,437.21
12,072.00	90.40	85.61	9,658.38	5,500.38	172.04	2,735.61	2,740.68	0.62	762,145.64	797,469.11
12,103.00	90.31	84.99	9,658.19	5,500.19	174.58	2,766.51	2,771.68	2.02	762,148.18	797,500.01
12,135.00	90.48	84.80	9,657.97	5,499.97	177.43	2,798.38	2,803.68	0.80	762,151.03	797,531.88
12,167.00	89.16	84.84	9,658.07	5,500.07	180.31	2,830.25	2,835.67	4.13	762,153.91	797,563.75
12,199.00	89.16	84.46	9,658.54	5,500.54	183.30	2,862.11	2,867.67	1.19	762,156.90	797,595.61
12,231.00	89.60	84.67	9,658.89	5,500.89	186.33	2,893.96	2,899.66	1.52	762,159.93	797,627.46



Pathfinder
Pathfinder X & Y Survey Report



Company: COG Operating LLC
Project: Lea County(NAD83)
Site: High Plains "22" State Com
Well: #1H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #1H
TVD Reference: WELL @ 4158 00ft (25' KB Correction)
MD Reference: WELL @ 4158 00ft (25' KB Correction)
North Reference: Gnd
Survey Calculation Method: Minimum Curvature
Database: Midland Database

Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
12,263.00	89.16	84.00	9,659.23	5,501.23	189.49	2,925.80	2,931.65	2.50	762,163.09	797,659.30
12,295.00	88.99	83.45	9,659.75	5,501.75	192.98	2,957.61	2,963.63	1.80	762,166.58	797,691.11
12,326.00	89.43	83.48	9,660.18	5,502.18	196.51	2,988.40	2,994.61	1.42	762,170.11	797,721.90
12,358.00	89.43	83.20	9,660.49	5,502.49	200.22	3,020.19	3,026.58	0.87	762,173.82	797,753.69
12,390.00	89.69	83.07	9,660.74	5,502.74	204.05	3,051.95	3,058.56	0.91	762,177.65	797,785.45
12,422.00	89.60	83.10	9,660.94	5,502.94	207.90	3,083.72	3,090.53	0.30	762,181.50	797,817.22
12,454.00	89.43	82.88	9,661.21	5,503.21	211.81	3,115.48	3,122.50	0.87	762,185.41	797,848.98
12,486.00	89.43	82.93	9,661.53	5,503.53	215.76	3,147.23	3,154.46	0.16	762,189.36	797,880.73
12,517.00	88.29	82.58	9,662.14	5,504.14	219.67	3,177.98	3,185.42	3.85	762,193.27	797,911.48
12,549.00	88.02	82.61	9,663.17	5,505.17	223.79	3,209.70	3,217.36	0.85	762,197.39	797,943.20
12,581.00	88.11	82.76	9,664.25	5,506.25	227.86	3,241.42	3,249.30	0.55	762,201.46	797,974.92
12,612.00	88.02	82.51	9,665.30	5,507.30	231.83	3,272.15	3,280.25	0.86	762,205.43	798,005.65
12,645.00	88.37	82.79	9,666.34	5,508.34	236.05	3,304.86	3,313.19	1.36	762,209.65	798,038.36
12,676.00	88.02	82.84	9,667.32	5,509.32	239.93	3,335.60	3,344.14	1.14	762,213.53	798,069.10
12,708.00	88.02	82.64	9,668.42	5,510.42	243.97	3,367.32	3,376.08	0.62	762,217.57	798,100.82
12,740.00	88.46	82.44	9,669.41	5,511.41	248.12	3,399.04	3,408.03	1.51	762,221.72	798,132.54
12,772.00	89.25	82.70	9,670.04	5,512.04	252.26	3,430.76	3,439.98	2.60	762,225.86	798,164.26
12,803.00	90.22	83.13	9,670.19	5,512.19	256.08	3,461.52	3,470.95	3.42	762,229.68	798,195.02
12,835.00	90.48	83.67	9,669.99	5,511.99	259.76	3,493.31	3,502.92	1.87	762,233.36	798,226.81
12,867.00	90.57	84.65	9,669.70	5,511.70	263.02	3,525.14	3,534.91	3.08	762,236.62	798,258.64
12,898.00	90.31	85.07	9,669.46	5,511.46	265.79	3,556.02	3,565.91	1.59	762,239.39	798,289.52
12,930.00	89.96	85.17	9,669.39	5,511.39	268.52	3,587.90	3,597.91	1.14	762,242.12	798,321.40
12,962.00	90.04	85.05	9,669.39	5,511.39	271.24	3,619.79	3,629.91	0.45	762,244.84	798,353.29
12,993.00	90.22	84.96	9,669.32	5,511.32	273.94	3,650.67	3,660.91	0.65	762,247.54	798,384.17
13,025.00	90.13	85.29	9,669.22	5,511.22	276.66	3,682.55	3,692.91	1.07	762,250.26	798,416.05
13,057.00	90.48	85.26	9,669.05	5,511.05	279.30	3,714.44	3,724.91	1.10	762,252.90	798,447.94
13,089.00	89.96	85.14	9,668.92	5,510.92	281.98	3,746.33	3,756.91	1.67	762,255.58	798,479.83



Pathfinder
Pathfinder X & Y Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Lea County(NAD83)	TVD Reference:	WELL @ 4158 00ft (25' KB Correction)
Site:	High Plains "22" State Com	MD Reference:	WELL @ 4158 00ft (25' KB Correction)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Midland Database

Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
13,121.00	89.43	84.87	9,669.10	5,511.10	284.76	3,778.21	3,788.90	1.86	762,258.36	798,511.71
13,150.00	89.43	85.08	9,669.38	5,511.38	287.30	3,807.10	3,817.90	0.72	762,260.90	798,540.60
13,181.00	88.90	85.32	9,669.84	5,511.84	289.90	3,837.98	3,848.90	1.88	762,263.50	798,571.48
13,213.00	89.16	85.36	9,670.38	5,512.38	292.49	3,869.87	3,880.89	0.82	762,266.09	798,603.37
13,245.00	89.25	85.44	9,670.82	5,512.82	295.06	3,901.77	3,912.89	0.38	762,268.66	798,635.27
13,277.00	89.43	85.51	9,671.19	5,513.19	297.59	3,933.66	3,944.89	0.60	762,271.19	798,667.16
13,308.00	89.60	85.34	9,671.45	5,513.45	300.06	3,964.56	3,975.89	0.78	762,273.66	798,698.06
13,339.00	89.60	85.43	9,671.67	5,513.67	302.55	3,995.46	4,006.88	0.29	762,276.15	798,728.96
13,371.00	89.34	85.47	9,671.96	5,513.96	305.09	4,027.36	4,038.88	0.82	762,278.69	798,760.86
13,403.00	89.16	85.37	9,672.38	5,514.38	307.65	4,059.26	4,070.88	0.64	762,281.25	798,792.76
13,434.00	89.43	85.14	9,672.76	5,514.76	310.21	4,090.15	4,101.88	1.14	762,283.81	798,823.65
13,466.00	89.60	84.99	9,673.04	5,515.04	312.96	4,122.03	4,133.88	0.71	762,286.56	798,855.53
13,498.00	89.43	84.90	9,673.31	5,515.31	315.78	4,153.90	4,165.87	0.60	762,289.38	798,887.40
13,530.00	89.60	84.96	9,673.58	5,515.58	318.61	4,185.78	4,197.87	0.56	762,292.21	798,919.28
13,562.00	89.60	84.37	9,673.80	5,515.80	321.58	4,217.64	4,229.87	1.84	762,295.18	798,951.14
13,594.00	89.69	84.39	9,674.00	5,516.00	324.72	4,249.48	4,261.86	0.29	762,298.32	798,982.98
13,625.00	89.43	83.81	9,674.24	5,516.24	327.90	4,280.32	4,292.85	2.05	762,301.50	799,013.82
13,657.00	89.43	83.10	9,674.56	5,516.56	331.55	4,312.11	4,324.83	2.22	762,305.15	799,045.61
13,689.00	89.08	83.12	9,674.97	5,516.97	335.39	4,343.87	4,356.80	1.10	762,308.99	799,077.37
13,720.00	89.43	82.51	9,675.37	5,517.37	339.27	4,374.63	4,387.76	2.27	762,312.87	799,108.13
13,752.00	89.25	82.67	9,675.74	5,517.74	343.39	4,406.36	4,419.72	0.75	762,316.99	799,139.86
13,840.00	89.25	82.67	9,676.90	5,518.90	354.62	4,493.63	4,507.60	0.00	762,328.22	799,227.13

BHL-13840.00°MD,89.25°INC,82.67°AZI, 9676.90°TVD, 4507.60°VS, 354.62°N, 4493.63°E



Pathfinder
Pathfinder X & Y Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Lea County(NAD83)	TVD Reference:	WELL @ 4158 00ft (25' KB Correction)
Site:	High Plains "22" State Com	MD Reference:	WELL @ 4158 00ft (25' KB Correction)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Midland Database

Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
- Shape									
PBHL(HP#1H)	0 00	0.00	9,678 16	356 00	4,511.60	762,329.600	799,245.100	33° 5' 34.030 N	103° 29' 28.366 W
- survey misses target center by 18 07ft at 13840.00ft MD (9676.90 TVD, 354 62 N, 4493.63 E)									
- Point									

Survey Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	
13,840 00	9,676 90	354.62	4,493 63	BHL-13840 00'MD,89 25°INC,82 67°AZI, 9676 90'TVD, 4507.60°VS, 35

Checked By: _____ Approved By: _____ Date: _____