

30-015-38981

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Tie-in Date: 06/18/2011

Date Completed: 06/26/2011

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC.

MYOX 29 STATE COM #1H

HAY HOLLOW; BONE SPRING, NORTH

Rig: PATRIOT 2

PathFinder Office Supervisor: FRANCISCO SINISTERRA

PathFinder Field Engineers: DAVID PHILLIPS

FRED KNAAK

Survey Horiz. Reference: WELLHEAD

Ref Coordinates: LAT: 32.537.9376 N LON: 103.58.59.8298 W

GRID Reference: NAD27 new mexico east Transverse Mercator

Ref GRID Coord: X: 608402.3900 Y: 398049.9300

North Aligned To: GRID NORTH

Total Magnetic Correction: 7.58° EAST TO GRID

Vertical Section Plane: 359.58

Survey Vert. Reference: 17.00' Kelly Bushing To Ground

Altitude: 3006.80' Ground To MSL

Survey Calculations by RX5 V6.03E using Minimum Curvature

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Subsea Depth (ft)	Vertical Section (ft)	Rectangular (ft)	TOTAL Offsets (ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)	TEMP (F)
TIED INTO SCIENTIFIC DRILLING GYRO SURVEYS AT 6000' MD.											
6000.00	1.15	181.40	5999.21	5982.21	-15.46	15.66 S	27.05 W	31.26@	239.93	0.00	0.00
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.											
6085.00	5.19	13.38	6084.11	6067.11	-12.58	12.77 S	26.18 W	29.13@	244.00	7.43	108.25
6117.00	11.52	11.18	6115.76	6098.76	-8.04	8.22 S	25.22 W	26.53@	251.95	19.80	108.25
6148.00	16.44	10.22	6145.83	6128.83	-0.69	0.86 S	23.85 W	23.86@	267.93	15.89	108.25
6180.00	20.22	8.63	6176.20	6159.20	9.23	9.06 N	22.21 W	23.99@	292.20	11.91	111.87
6211.00	22.69	7.76	6205.05	6188.05	20.44	20.29 N	20.60 W	28.91@	314.56	8.03	111.87
6242.00	25.32	7.58	6233.37	6216.37	32.92	32.78 N	18.92 W	37.85@	330.01	8.49	111.87
6274.00	28.40	7.49	6261.91	6244.91	47.24	47.12 N	17.02 W	50.10@	340.13	9.63	111.87
6306.00	31.83	7.49	6289.59	6272.59	63.14	63.03 N	14.93 W	64.78@	346.67	10.72	111.87
6337.00	34.82	8.11	6315.49	6298.49	79.99	79.90 N	12.62 W	80.89@	351.03	9.71	111.87
6369.00	37.02	7.67	6341.40	6324.40	98.57	98.50 N	10.04 W	99.01@	354.18	6.92	111.87
6400.00	39.83	6.70	6365.69	6348.69	117.66	117.61 N	7.64 W	117.86@	356.28	9.27	111.87
6431.00	42.74	5.56	6388.98	6371.98	137.98	137.94 N	5.46 W	138.05@	357.73	9.70	115.48
6463.00	45.90	5.82	6411.87	6394.87	160.21	160.19 N	3.24 W	160.22@	358.84	9.89	111.87
6495.00	48.54	7.23	6433.60	6416.60	183.52	183.52 N	0.57 W	183.52@	359.82	8.86	111.87
6527.00	51.62	8.81	6454.13	6437.13	207.79	207.82 N	2.87 E	207.84@	0.79	10.34	111.87
6559.00	55.22	9.34	6473.20	6456.20	233.13	233.19 N	6.92 E	233.29@	1.70	11.33	115.48
6590.00	59.27	9.78	6489.97	6472.97	258.80	258.89 N	11.25 E	259.13@	2.49	13.12	115.48
6622.00	62.78	9.87	6505.47	6488.47	286.34	286.47 N	16.03 E	286.92@	3.20	10.97	115.48
6654.00	64.98	9.87	6519.56	6502.56	314.61	314.77 N	20.95 E	315.47@	3.81	6.88	115.48
6686.00	66.74	9.43	6532.64	6515.64	343.36	343.56 N	25.85 E	344.53@	4.30	5.64	115.48
6718.00	69.29	8.46	6544.62	6527.62	372.64	372.87 N	30.46 E	374.11@	4.67	8.45	115.48
6749.00	72.63	7.14	6554.74	6537.74	401.64	401.90 N	34.43 E	403.37@	4.90	11.50	115.48
6781.00	75.62	6.70	6563.49	6546.49	432.16	432.45 N	38.14 E	434.13@	5.04	9.44	119.09

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Subsea Depth (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)	TEMP (F)
6813.00	77.21	6.79	6571.00	6554.00	463.02	463.34 N	41.79 E	465.22@	5.15	4.98	115.48
6844.00	80.46	6.79	6577.01	6560.01	493.19	493.54 N	45.39 E	495.62@	5.25	10.48	115.48
6876.00	84.68	6.53	6581.14	6564.14	524.67	525.05 N	49.07 E	527.33@	5.34	13.21	115.48
6912.00	89.87	6.35	6582.85	6565.85	560.36	560.77 N	53.10 E	563.27@	5.41	14.43	119.09
6943.00	90.75	5.82	6582.69	6565.69	591.16	591.59 N	56.38 E	594.27@	5.44	3.31	119.09
6975.00	90.13	4.15	6582.44	6565.44	623.02	623.47 N	59.16 E	626.27@	5.42	5.57	119.09
7039.00	89.60	1.78	6582.59	6565.59	686.90	687.38 N	62.47 E	690.21@	5.19	3.79	119.09
7102.00	89.60	0.64	6583.03	6566.03	749.87	750.36 N	63.80 E	753.07@	4.86	1.81	119.09
7165.00	88.64	0.20	6584.00	6567.00	812.86	813.35 N	64.27 E	815.89@	4.52	1.68	119.09
7229.00	89.52	358.70	6585.03	6568.03	876.85	877.34 N	63.65 E	879.64@	4.15	2.72	122.71
7292.00	90.40	359.41	6585.07	6568.07	939.84	940.33 N	62.61 E	942.41@	3.81	1.80	122.71
7355.00	90.92	358.97	6584.34	6567.34	1002.84	1003.32 N	61.72 E	1005.21@	3.52	1.08	122.71
7418.00	91.45	358.53	6583.04	6566.04	1065.82	1066.29 N	60.35 E	1067.99@	3.24	1.09	122.71
7482.00	91.45	359.32	6581.42	6564.42	1129.79	1130.25 N	59.15 E	1131.80@	3.00	1.23	122.71
7544.00	91.19	359.06	6579.99	6562.99	1191.77	1192.23 N	58.27 E	1193.65@	2.80	0.59	126.32
7607.00	90.22	359.32	6579.22	6562.22	1254.77	1255.22 N	57.38 E	1256.53@	2.62	1.59	126.32
7670.00	90.31	359.49	6578.93	6561.93	1317.76	1318.22 N	56.73 E	1319.44@	2.46	0.31	126.32
7733.00	90.75	359.23	6578.34	6561.34	1380.76	1381.21 N	56.02 E	1382.34@	2.32	0.81	126.32
7796.00	90.13	359.32	6577.86	6560.86	1443.76	1444.20 N	55.23 E	1445.26@	2.19	0.99	126.32
7859.00	89.87	358.62	6577.86	6560.86	1506.75	1507.19 N	54.09 E	1508.16@	2.06	1.19	126.32
7923.00	89.87	357.82	6578.01	6561.01	1570.74	1571.16 N	52.11 E	1572.02@	1.90	1.25	126.32
7986.00	90.22	358.97	6577.96	6560.96	1633.72	1634.13 N	50.34 E	1634.91@	1.76	1.91	126.32
8049.00	90.84	359.32	6577.37	6560.37	1696.72	1697.12 N	49.40 E	1697.84@	1.67	1.13	129.94
8111.00	88.99	358.88	6577.47	6560.47	1758.71	1759.11 N	48.43 E	1759.78@	1.58	3.07	129.94
8175.00	88.55	359.41	6578.84	6561.84	1822.69	1823.09 N	47.47 E	1823.71@	1.49	1.08	126.32
8238.00	88.02	359.58	6580.72	6563.72	1885.67	1886.06 N	46.92 E	1886.64@	1.42	0.88	129.94
8301.00	87.58	358.79	6583.14	6566.14	1948.62	1949.01 N	46.02 E	1949.55@	1.35	1.43	129.94
8364.00	88.11	359.41	6585.51	6568.51	2011.57	2011.95 N	45.03 E	2012.46@	1.28	1.29	126.32

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Subsea Depth (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)	TEMP (F)
8428.00	88.99	359.85	6587.13	6570.13	2075.55	2075.93 N	44.62 E	2076.41@	1.23	1.54	129.94
8491.00	89.08	359.58	6588.19	6571.19	2138.54	2138.92 N	44.31 E	2139.38@	1.19	0.45	129.94
8555.00	89.25	359.23	6589.13	6572.13	2202.53	2202.91 N	43.64 E	2203.34@	1.13	0.61	129.94
8618.00	88.81	358.35	6590.19	6573.19	2265.52	2265.89 N	42.31 E	2266.28@	1.07	1.56	133.55
8681.00	88.99	358.35	6591.40	6574.40	2328.49	2328.85 N	40.50 E	2329.20@	1.00	0.29	129.94
8743.00	90.13	0.37	6591.88	6574.88	2390.48	2390.84 N	39.81 E	2391.17@	0.95	3.74	129.94
8806.00	89.60	0.20	6592.03	6575.03	2453.48	2453.84 N	40.12 E	2454.17@	0.94	0.88	133.55
8869.00	89.69	359.32	6592.42	6575.42	2516.48	2516.84 N	39.86 E	2517.15@	0.91	1.40	133.55
8932.00	90.04	358.70	6592.56	6575.56	2579.47	2579.83 N	38.77 E	2580.12@	0.86	1.13	133.55
8995.00	90.40	357.39	6592.32	6575.32	2642.45	2642.79 N	36.62 E	2643.04@	0.79	2.16	133.55
9058.00	90.31	358.00	6591.93	6574.93	2705.41	2705.73 N	34.08 E	2705.95@	0.72	0.98	129.94
9121.00	89.69	359.14	6591.93	6574.93	2768.40	2768.71 N	32.51 E	2768.90@	0.67	2.06	129.94
9184.00	89.96	0.28	6592.13	6575.13	2831.40	2831.71 N	32.19 E	2831.89@	0.65	1.86	129.94
9247.00	89.16	0.64	6592.61	6575.61	2894.39	2894.71 N	32.70 E	2894.89@	0.65	1.39	129.94
9310.00	88.81	0.55	6593.72	6576.72	2957.37	2957.69 N	33.35 E	2957.88@	0.65	0.57	133.55
9372.00	89.43	1.25	6594.68	6577.68	3019.35	3019.68 N	34.33 E	3019.87@	0.65	1.51	129.94
9435.00	89.78	1.43	6595.11	6578.11	3082.31	3082.66 N	35.80 E	3082.87@	0.67	0.63	133.55
9498.00	89.87	1.34	6595.30	6578.30	3145.28	3145.64 N	37.32 E	3145.86@	0.68	0.20	133.55
9562.00	89.43	0.46	6595.69	6578.69	3209.26	3209.63 N	38.33 E	3209.86@	0.68	1.54	133.55
9625.00	89.60	0.37	6596.23	6579.23	3272.25	3272.63 N	38.78 E	3272.86@	0.68	0.31	133.55
9689.00	89.78	359.93	6596.57	6579.57	3336.25	3336.63 N	38.95 E	3336.85@	0.67	0.74	133.55
9751.00	90.13	359.67	6596.62	6579.62	3398.25	3398.62 N	38.74 E	3398.84@	0.65	0.70	133.55
9814.00	88.72	358.88	6597.26	6580.26	3461.24	3461.61 N	37.94 E	3461.82@	0.63	2.57	133.55
9877.00	88.29	358.88	6598.90	6581.90	3524.22	3524.58 N	36.71 E	3524.77@	0.60	0.68	133.55
9940.00	89.52	358.70	6600.10	6583.10	3587.20	3587.55 N	35.38 E	3587.73@	0.56	1.97	133.55
10003.00	89.96	358.79	6600.39	6583.39	3650.19	3650.54 N	34.00 E	3650.70@	0.53	0.71	133.55
10067.00	90.22	358.35	6600.29	6583.29	3714.18	3714.52 N	32.40 E	3714.66@	0.50	0.80	137.17
10130.00	89.52	358.79	6600.43	6583.43	3777.17	3777.50 N	30.83 E	3777.62@	0.47	1.31	133.55

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MYOX 29 STATE COM #1H
HAY HOLLOW; BONE SPRING, NORTH
RIG: PATRIOT 2

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Subsea Depth (ft)	Vertical Section (ft)	TOTAL		Closure		DLS (dg/100ft)	TEMP (F)
						Rectangular Offsets (ft)	Rectangular Offsets (ft)	Dist (ft)	Dir (deg)		
10193.00	89.25	358.00	6601.11	6584.11	3840.15	3840.47 N	29.06 E	3840.58@	0.43	1.33	137.17
10256.00	89.60	358.09	6601.74	6584.74	3903.13	3903.43 N	26.91 E	3903.52@	0.40	0.57	133.55
10320.00	89.69	359.58	6602.14	6585.14	3967.12	3967.41 N	25.61 E	3967.49@	0.37	2.33	133.55
10383.00	89.96	359.49	6602.33	6585.33	4030.12	4030.41 N	25.10 E	4030.49@	0.36	0.45	137.17
10447.00	89.96	358.79	6602.37	6585.37	4094.12	4094.40 N	24.14 E	4094.47@	0.34	1.09	137.17
10510.00	90.04	357.82	6602.37	6585.37	4157.10	4157.37 N	22.28 E	4157.43@	0.31	1.55	137.17
10573.00	89.25	357.91	6602.76	6585.76	4220.07	4220.33 N	19.93 E	4220.38@	0.27	1.26	137.17
10636.00	89.08	358.70	6603.68	6586.68	4283.05	4283.29 N	18.07 E	4283.33@	0.24	1.28	137.17
10699.00	88.55	359.85	6604.98	6587.98	4346.03	4346.27 N	17.27 E	4346.31@	0.23	2.01	137.17
10762.00	88.55	359.76	6606.58	6589.58	4409.01	4409.25 N	17.06 E	4409.29@	0.22	0.14	137.17
10825.00	89.08	359.58	6607.88	6590.88	4472.00	4472.24 N	16.69 E	4472.27@	0.21	0.89	137.17
10887.00	87.85	359.41	6609.54	6592.54	4533.97	4534.21 N	16.15 E	4534.24@	0.20	2.00	137.17
10964.00	87.67	358.88	6612.55	6595.55	4610.91	4611.14 N	15.00 E	4611.17@	0.19	0.73	137.17
STRAIGHT LINE PROJECTION TO BIT AT 11015'MD.											
11015.00	87.67	358.88	6614.63	6597.63	4661.87	4662.09 N	14.00 E	4662.11@	0.17	0.00	137.17