

30-015-38523

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC.
DAISY 24 FEE COM #4H
EDDY COUNTY, NM
Rig:MCVAY 7
PathFinder Office Supervisor: FRANCISCO SINISTERRA
PathFinder Field Engineers: ERIC PAYNE
FRED KNAAK

Page 01/06
Tie-in Date: 04/09/2011
Date Completed: 04/16/2011

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:32.632.5670 N LON:104.8.11.1230 W
GRID Reference:NAD83 new mexico east Transverse Mercator
Ref GRID Coord: X: 602305.0400 Y: 403463.1500
North Aligned To:GRID NORTH
Total Magnetic Correction: 7.75°EAST TO GRID
Vertical Section Plane: 359.16
Survey Vert. Reference: 19.00' Kelly Bushing To Ground
Altitude:3004.00' Ground To MSL

Survey Calculations by RX5 V6.03E using Minimum Curvature

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
THE FOLLOWING ARE SCIENTIFIC DRILLING GYRO SURVEYS.										
100.00	0.22	325.44	100.00	0.00	0.16	0.16 N	0.11 W	0.20@	324.93	0.00
200.00	0.42	341.91	200.00	100.00	0.67	0.67 N	0.34 W	0.75@	333.30	0.22
300.00	0.23	289.43	300.00	100.00	1.09	1.08 N	0.64 W	1.26@	329.46	0.33
400.00	0.30	284.74	400.00	100.00	1.23	1.22 N	1.08 W	1.63@	318.36	0.07
500.00	0.41	139.72	500.00	100.00	1.03	1.01 N	1.10 W	1.50@	312.46	0.68
600.00	0.53	163.92	600.00	100.00	0.30	0.29 N	0.74 W	0.80@	291.45	0.23
700.00	0.14	205.34	699.99	100.00	-0.25	0.26 S	0.67 W	0.72@	248.53	0.43
800.00	0.58	194.70	799.99	100.00	-0.85	0.86 S	0.85 W	1.21@	224.52	0.44
900.00	0.73	220.03	899.99	100.00	-1.82	1.84 S	1.39 W	2.30@	217.00	0.32
1000.00	0.54	234.72	999.98	100.00	-2.57	2.60 S	2.18 W	3.39@	219.99	0.25
1100.00	0.77	250.79	1099.97	100.00	-3.05	3.09 S	3.20 W	4.45@	225.97	0.29
1200.00	0.95	255.50	1199.96	100.00	-3.45	3.52 S	4.64 W	5.82@	232.78	0.19
1300.00	1.32	263.97	1299.94	100.00	-3.75	3.85 S	6.59 W	7.63@	239.69	0.41
1400.00	1.49	271.46	1399.91	100.00	-3.81	3.94 S	9.03 W	9.85@	246.44	0.25
1500.00	0.35	325.93	1499.90	100.00	-3.50	3.65 S	10.50 W	11.12@	250.82	1.32
1600.00	1.62	82.35	1599.89	100.00	-3.07	3.21 S	9.27 W	9.81@	250.90	1.80
1700.00	1.80	88.55	1699.84	100.00	-2.89	2.98 S	6.30 W	6.97@	244.66	0.26
1800.00	3.47	94.41	1799.73	100.00	-3.15	3.18 S	1.71 W	3.61@	208.34	1.69
1900.00	3.83	93.60	1899.53	100.00	-3.69	3.62 S	4.64 E	5.88@	127.96	0.36
2000.00	3.54	94.96	1999.32	100.00	-4.26	4.10 S	11.05 E	11.78@	110.34	0.30
2100.00	2.64	97.06	2099.18	100.00	-4.89	4.65 S	16.41 E	17.05@	105.81	0.91
2200.00	2.08	104.80	2199.09	100.00	-5.69	5.39 S	20.45 E	21.15@	104.77	0.64
2300.00	1.61	112.57	2299.04	100.00	-6.74	6.39 S	23.50 E	24.35@	105.22	0.53
2400.00	1.67	111.53	2399.00	100.00	-7.85	7.47 S	26.15 E	27.20@	105.94	0.07
2500.00	1.91	103.73	2498.95	100.00	-8.82	8.40 S	29.13 E	30.31@	106.08	0.34

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DAISY 24 FEE COM #4H
EDDY COUNTY, NM
RIG:MCVAY 7

Page 02/06

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
2600.00	2.00	105.97	2598.89	100.00	-9.75	9.27 S	32.42 E	33.72@	105.96	0.12
2700.00	1.92	101.36	2698.83	100.00	-10.61	10.08 S	35.74 E	37.14@	105.76	0.18
2800.00	2.11	98.42	2798.77	100.00	-11.26	10.68 S	39.21 E	40.64@	105.24	0.22
2900.00	1.84	98.48	2898.71	100.00	-11.81	11.19 S	42.62 E	44.06@	104.71	0.27
3000.00	1.72	93.39	2998.66	100.00	-12.18	11.52 S	45.70 E	47.13@	104.14	0.20
3100.00	1.39	89.87	3098.63	100.00	-12.31	11.60 S	48.41 E	49.78@	103.48	0.34
3200.00	1.30	84.57	3198.60	100.00	-12.23	11.49 S	50.76 E	52.04@	102.76	0.15
3300.00	1.23	71.13	3298.57	100.00	-11.81	11.04 S	52.90 E	54.04@	101.79	0.30
3400.00	1.28	59.00	3398.55	100.00	-10.92	10.11 S	54.87 E	55.80@	100.44	0.27
3500.00	1.44	35.90	3498.52	100.00	-9.35	8.52 S	56.57 E	57.21@	98.57	0.57
3600.00	1.50	19.18	3598.49	100.00	-7.11	6.27 S	57.73 E	58.07@	96.20	0.43
3700.00	1.48	6.67	3698.46	100.00	-4.60	3.75 S	58.31 E	58.43@	93.68	0.32
3800.00	1.32	359.45	3798.43	100.00	-2.17	1.31 S	58.45 E	58.47@	91.29	0.24
3900.00	1.09	359.61	3898.41	100.00	-0.07	0.79 N	58.44 E	58.44@	89.23	0.23
4000.00	0.95	351.32	3998.39	100.00	1.70	2.56 N	58.30 E	58.36@	87.49	0.20
4100.00	1.09	350.08	4098.37	100.00	3.46	4.32 N	58.01 E	58.18@	85.75	0.14
4200.00	0.88	343.00	4198.36	100.00	5.14	5.99 N	57.63 E	57.94@	84.07	0.24
4300.00	0.70	326.84	4298.35	100.00	6.40	7.23 N	57.07 E	57.52@	82.78	0.28
4400.00	0.56	304.67	4398.34	100.00	7.20	8.02 N	56.33 E	56.90@	81.90	0.28
4500.00	0.41	313.27	4498.34	100.00	7.73	8.55 N	55.67 E	56.32@	81.27	0.17
4600.00	0.32	293.38	4598.34	100.00	8.09	8.90 N	55.15 E	55.87@	80.83	0.15
4700.00	0.39	311.06	4698.34	100.00	8.43	9.24 N	54.64 E	55.41@	80.41	0.13
4800.00	0.35	294.59	4798.33	100.00	8.79	9.59 N	54.11 E	54.95@	79.95	0.11
4900.00	0.07	16.05	4898.33	100.00	8.98	9.77 N	53.84 E	54.72@	79.71	0.35
5000.00	0.12	160.64	4998.33	100.00	8.94	9.73 N	53.90 E	54.77@	79.76	0.18
5100.00	0.19	220.13	5098.33	100.00	8.72	9.51 N	53.82 E	54.66@	79.98	0.17
5200.00	0.17	224.69	5198.33	100.00	8.49	9.27 N	53.61 E	54.41@	80.19	0.02
5300.00	0.32	190.31	5298.33	100.00	8.11	8.89 N	53.46 E	54.19@	80.55	0.20

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Page 03/06

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
5400.00	0.54	174.64	5398.33	100.00	7.37	8.15 N	53.45 E	54.07@	81.33	0.25
5500.00	0.63	180.70	5498.32	100.00	6.35	7.13 N	53.49 E	53.96@	82.41	0.11
5600.00	0.96	184.18	5598.31	100.00	4.96	5.75 N	53.42 E	53.73@	83.86	0.33
5700.00	1.02	190.37	5698.30	100.00	3.25	4.03 N	53.20 E	53.35@	85.66	0.12
5800.00	1.11	196.80	5798.28	100.00	1.46	2.23 N	52.76 E	52.81@	87.58	0.15
5900.00	1.51	196.90	5898.26	100.00	-0.72	0.04 N	52.10 E	52.10@	89.95	0.40
TIED-IN TO SCIENTIFIC DRILLING GYRO SURVEY @ 6000'MD.										
6000.00	1.54	180.62	5998.22	0.00	-3.32	2.56 S	51.70 E	51.76@	92.83	0.00
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.										
6008.00	1.32	58.46	6006.22	8.00	-3.38	2.62 S	51.78 E	51.84@	92.90	31.32
6039.00	7.03	22.16	6037.13	31.00	-1.45	0.67 S	52.80 E	52.80@	90.73	19.41
6071.00	10.82	19.79	6068.73	32.00	3.17	3.97 N	54.55 E	54.70@	85.84	11.90
6102.00	14.25	19.09	6098.99	31.00	9.48	10.31 N	56.79 E	57.72@	79.71	11.08
6134.00	17.67	17.59	6129.75	32.00	17.79	18.67 N	59.54 E	62.40@	72.59	10.76
6165.00	21.02	16.80	6159.00	31.00	27.56	28.48 N	62.57 E	68.75@	65.53	10.84
6196.00	24.27	15.40	6187.60	31.00	38.97	39.94 N	65.87 E	77.04@	58.77	10.63
6227.00	27.17	13.73	6215.53	31.00	51.94	52.97 N	69.25 E	87.18@	52.59	9.64
6259.00	29.37	12.23	6243.71	32.00	66.66	67.73 N	72.64 E	99.32@	47.00	7.22
6291.00	31.57	10.56	6271.29	32.00	82.52	83.64 N	75.84 E	112.91@	42.20	7.37
6322.00	33.77	9.86	6297.39	31.00	98.94	100.11 N	78.80 E	127.40@	38.21	7.20
6354.00	36.40	8.10	6323.57	32.00	117.06	118.27 N	81.67 E	143.73@	34.62	8.81
6384.00	40.19	5.55	6347.11	30.00	135.49	136.73 N	83.86 E	160.40@	31.52	13.68
6416.00	44.23	4.41	6370.81	32.00	156.87	158.14 N	85.71 E	179.88@	28.46	12.85
6447.00	48.80	4.06	6392.14	31.00	179.27	180.57 N	87.37 E	200.60@	25.82	14.77
6478.00	53.46	3.18	6411.59	31.00	203.32	204.65 N	88.89 E	223.12@	23.48	15.19
6509.00	57.77	1.25	6429.09	31.00	228.86	230.21 N	89.87 E	247.12@	21.32	14.82
6536.00	60.76	359.93	6442.89	27.00	252.06	253.41 N	90.10 E	268.95@	19.57	11.84
6567.00	65.07	358.17	6457.00	31.00	279.65	281.00 N	89.64 E	294.95@	17.69	14.79

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Page 04/06

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
6598.00	68.94	357.55	6469.11	31.00	308.18	309.51 N	88.57 E	321.93@	15.97	12.62
6629.00	72.28	356.50	6479.40	31.00	337.39	338.70 N	87.05 E	349.71@	14.41	11.24
6661.00	74.83	355.36	6488.46	32.00	368.03	369.32 N	84.87 E	378.94@	12.94	8.67
6692.00	76.59	355.18	6496.11	31.00	398.00	399.25 N	82.39 E	407.67@	11.66	5.71
6723.00	78.08	355.09	6502.91	31.00	428.17	429.39 N	79.83 E	436.75@	10.53	4.81
6755.00	80.02	355.71	6508.98	32.00	459.52	460.70 N	77.31 E	467.14@	9.53	6.35
6786.00	82.39	355.62	6513.72	31.00	490.10	491.25 N	74.99 E	496.94@	8.68	7.65
6817.00	83.71	354.92	6517.47	31.00	520.80	521.92 N	72.45 E	526.92@	7.90	4.81
6849.00	85.38	355.01	6520.52	32.00	552.57	553.65 N	69.66 E	558.01@	7.17	5.23
6880.00	86.35	355.62	6522.75	31.00	583.41	584.46 N	67.13 E	588.30@	6.55	3.69
6912.00	88.02	356.76	6524.32	32.00	615.33	616.35 N	65.01 E	619.77@	6.02	6.32
6943.00	88.55	357.91	6525.25	31.00	646.30	647.30 N	63.57 E	650.42@	5.61	4.08
6974.00	88.72	358.17	6525.99	31.00	677.29	678.28 N	62.51 E	681.15@	5.27	1.00
7006.00	89.43	357.91	6526.51	32.00	709.28	710.25 N	61.41 E	712.90@	4.94	2.36
7037.00	89.69	358.17	6526.74	31.00	740.27	741.23 N	60.35 E	743.69@	4.66	1.19
7068.00	89.52	358.08	6526.96	31.00	771.26	772.22 N	59.34 E	774.49@	4.39	0.62
7099.00	89.43	357.82	6527.24	31.00	802.26	803.19 N	58.23 E	805.30@	4.15	0.89
7131.00	90.22	358.35	6527.34	32.00	834.25	835.18 N	57.16 E	837.13@	3.92	2.97
7162.00	90.48	358.26	6527.15	31.00	865.24	866.16 N	56.25 E	867.99@	3.72	0.89
7194.00	90.04	357.47	6527.01	32.00	897.24	898.14 N	55.05 E	899.83@	3.51	2.83
7257.00	89.16	357.82	6527.45	63.00	960.21	961.08 N	52.46 E	962.52@	3.12	1.50
7319.00	89.60	357.47	6528.12	62.00	1022.19	1023.03 N	49.92 E	1024.25@	2.79	0.91
7413.00	88.37	358.43	6529.78	94.00	1116.15	1116.95 N	46.55 E	1117.92@	2.39	1.66
7507.00	88.99	357.73	6531.95	94.00	1210.10	1210.87 N	43.41 E	1211.65@	2.05	1.00
7602.00	89.87	356.32	6532.89	95.00	1305.03	1305.74 N	38.48 E	1306.30@	1.69	1.75
7696.00	89.69	356.24	6533.25	94.00	1398.91	1399.54 N	32.38 E	1399.91@	1.33	0.21
7790.00	90.48	356.94	6533.11	94.00	1492.82	1493.37 N	26.79 E	1493.61@	1.03	1.12
7886.00	89.96	357.11	6532.74	96.00	1588.75	1589.24 N	21.80 E	1589.39@	0.79	0.57

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Page 05/06

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7981.00	90.48	359.05	6532.38	95.00	1683.73	1684.18 N	18.62 E	1684.28@	0.63	2.11
8077.00	90.75	358.35	6531.35	96.00	1779.72	1780.15 N	16.44 E	1780.22@	0.53	0.78
8171.00	90.57	357.20	6530.27	94.00	1873.68	1874.07 N	12.79 E	1874.11@	0.39	1.24
8266.00	90.57	358.87	6529.32	95.00	1968.65	1969.01 N	9.54 E	1969.03@	0.28	1.76
8361.00	89.87	356.85	6528.96	95.00	2063.62	2063.93 N	5.99 E	2063.94@	0.17	2.25
8456.00	91.45	357.55	6527.86	95.00	2158.56	2158.81 N	1.35 E	2158.81@	0.04	1.82
8552.00	92.42	358.35	6524.62	96.00	2254.48	2254.69 N	2.08 W	2254.69@	359.95	1.31
8615.00	91.89	358.43	6522.25	63.00	2317.43	2317.62 N	3.85 W	2317.63@	359.90	0.85
8677.00	90.75	359.31	6520.82	62.00	2379.41	2379.59 N	5.07 W	2379.60@	359.88	2.32
8741.00	89.69	359.58	6520.58	64.00	2443.41	2443.59 N	5.69 W	2443.59@	359.87	1.71
8836.00	87.58	358.08	6522.84	95.00	2538.37	2538.53 N	7.63 W	2538.54@	359.83	2.72
8899.00	88.02	358.87	6525.26	63.00	2601.32	2601.46 N	9.31 W	2601.48@	359.80	1.43
8962.00	88.55	359.49	6527.15	63.00	2664.29	2664.43 N	10.21 W	2664.45@	359.78	1.29
9025.00	89.08	0.19	6528.45	63.00	2727.27	2727.41 N	10.38 W	2727.43@	359.78	1.39
9089.00	88.81	357.91	6529.63	64.00	2791.26	2791.39 N	11.45 W	2791.41@	359.77	3.59
9153.00	89.69	356.76	6530.46	64.00	2855.22	2855.31 N	14.42 W	2855.35@	359.71	2.26
9216.00	90.57	356.24	6530.32	63.00	2918.15	2918.20 N	18.27 W	2918.25@	359.64	1.62
9310.00	89.52	357.29	6530.25	94.00	3012.06	3012.04 N	23.57 W	3012.14@	359.55	1.58
9407.00	87.32	357.82	6532.92	97.00	3108.98	3108.91 N	27.71 W	3109.03@	359.49	2.33
9502.00	88.11	358.52	6536.71	95.00	3203.89	3203.79 N	30.74 W	3203.93@	359.45	1.11
9598.00	88.81	358.96	6539.29	96.00	3299.85	3299.73 N	32.85 W	3299.89@	359.43	0.86
9693.00	91.89	0.89	6538.71	95.00	3394.83	3394.71 N	32.97 W	3394.87@	359.44	3.83
9787.00	92.51	2.30	6535.10	94.00	3488.67	3488.60 N	30.36 W	3488.73@	359.50	1.64
9882.00	89.87	2.83	6533.13	95.00	3583.47	3583.48 N	26.11 W	3583.57@	359.58	2.83
9975.00	89.69	3.36	6533.48	93.00	3676.25	3676.34 N	21.09 W	3676.40@	359.67	0.60
10067.00	89.43	0.02	6534.19	92.00	3768.15	3768.28 N	18.38 W	3768.33@	359.72	3.64
10160.00	88.55	358.26	6535.83	93.00	3861.13	3861.25 N	19.77 W	3861.31@	359.71	2.11
10252.00	89.87	358.61	6537.10	92.00	3953.11	3953.21 N	22.28 W	3953.27@	359.68	1.48

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Page 06/06

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10314.00	90.31	357.47	6537.00	62.00	4015.10	4015.17 N	24.40 W	4015.25@	359.65	1.97
10375.00	90.75	356.59	6536.44	61.00	4076.05	4076.09 N	27.56 W	4076.18@	359.61	1.61
10437.00	90.22	355.45	6535.91	62.00	4137.96	4137.93 N	31.87 W	4138.06@	359.56	2.03
10530.00	89.34	355.62	6536.27	93.00	4230.77	4230.65 N	39.11 W	4230.83@	359.47	0.96
10622.00	88.81	355.09	6537.76	92.00	4322.55	4322.34 N	46.56 W	4322.59@	359.38	0.81
10714.00	87.85	354.92	6540.44	92.00	4414.27	4413.95 N	54.56 W	4414.28@	359.29	1.06
10807.00	88.81	354.83	6543.15	93.00	4506.97	4506.53 N	62.87 W	4506.97@	359.20	1.04
10897.00	86.88	354.48	6546.53	90.00	4596.62	4596.07 N	71.24 W	4596.63@	359.11	2.18
STRAIGHT LINE PROJECTION TO BIT @ 10,950.43' MD.										
10950.43	86.88	354.48	6549.44	53.43	4649.80	4649.18 N	76.38 W	4649.80@	359.06	0.00