

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC.
BIRDSEYE 32 STATE 1H OWB
EDDY COUNTY, NM
Rig:
PathFinder Office Supervisor:
PathFinder Field Engineers:

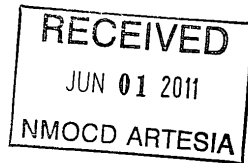
30-015-38295

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Tie-in Date: 03/15/2011
Date Completed: 03/23/2011

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:28.30.0.0000 N LON:96.0.0.0000 W
GRID Reference:NAD27 Texas south central Lambert
Ref GRID Coord: X: 2963503.9128 Y: 254759.8006
North Aligned To:TRUE NORTH
Total Magnetic Correction: 7.55° EAST TO TRUE
Vertical Section Plane: 359.59
Survey Vert. Reference: 17.00' Rotary Table To Ground
Altitude:3462.60' Ground To MSL

Survey Calculations by RX5 V6.03D 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)
TIE IN TO SCIENTIFIC DRILLING GYRO SURVEY AT 8171.75' MD.										
8171.75	0.45	106.87	8170.32	0.00	17.96	17.86 N	14.20 W	22.82@	321.51	0.00
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.										
8358.00	0.35	29.26	8356.57	186.25	18.24	18.14 N	13.22 W	22.45@	323.92	0.27
8460.00	0.53	281.51	8458.57	102.00	18.61	18.51 N	13.53 W	22.93@	323.83	0.70
8512.00	0.97	348.39	8510.56	52.00	19.09	18.99 N	13.86 W	23.51@	323.88	1.74
8543.00	6.60	358.52	8541.48	31.00	21.13	21.03 N	13.96 W	25.24@	326.43	18.22
8574.00	12.93	358.50	8572.02	31.00	26.38	26.28 N	14.09 W	29.82@	331.80	20.42
8605.00	17.67	359.39	8601.91	31.00	34.56	34.46 N	14.23 W	37.28@	337.56	15.31
8636.00	20.84	358.36	8631.17	31.00	44.78	44.68 N	14.44 W	46.95@	342.09	10.28
8667.00	23.74	358.41	8659.85	31.00	56.53	56.43 N	14.77 W	58.33@	345.33	9.36
8697.00	26.91	359.30	8686.97	30.00	69.36	69.26 N	15.02 W	70.87@	347.76	10.64
8728.00	28.84	359.23	8714.37	31.00	83.86	83.75 N	15.21 W	85.12@	349.71	6.23
8759.00	31.66	358.24	8741.14	31.00	99.47	99.36 N	15.56 W	100.57@	351.10	9.24
8790.00	34.47	358.60	8767.12	31.00	116.38	116.27 N	16.02 W	117.36@	352.15	9.09
8821.00	37.99	358.96	8792.12	31.00	134.70	134.58 N	16.41 W	135.58@	353.05	11.38
8852.00	40.80	0.74	8816.08	31.00	154.37	154.25 N	16.45 W	155.13@	353.91	9.77
8883.00	44.23	1.46	8838.92	31.00	175.30	175.19 N	16.05 W	175.93@	354.77	11.18
8914.00	48.54	0.79	8860.30	31.00	197.73	197.63 N	15.61 W	198.24@	355.48	13.99
8945.00	52.50	359.72	8880.01	31.00	221.65	221.55 N	15.51 W	222.09@	356.00	13.05
8976.00	55.75	359.70	8898.17	31.00	246.77	246.66 N	15.64 W	247.16@	356.37	10.48
9007.00	59.71	359.38	8914.72	31.00	272.98	272.87 N	15.85 W	273.33@	356.68	12.80
9037.00	62.96	359.89	8929.11	30.00	299.30	299.19 N	16.02 W	299.62@	356.94	10.94
9068.00	67.53	359.63	8942.09	31.00	327.44	327.33 N	16.14 W	327.73@	357.18	14.76
9099.00	72.02	359.22	8952.80	31.00	356.52	356.41 N	16.43 W	356.79@	357.36	14.54
9131.00	75.45	359.00	8961.76	32.00	387.23	387.12 N	16.91 W	387.49@	357.50	10.74



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9162.00	79.05	359.16	8968.60	31.00	417.46	417.35 N	17.39 W	417.71@	357.61	11.62
9194.00	82.83	359.68	8973.64	32.00	449.06	448.94 N	17.71 W	449.29@	357.74	11.92
9251.00	88.90	359.83	8977.75	57.00	505.88	505.77 N	17.95 W	506.09@	357.97	10.65
9314.00	90.40	359.09	8978.14	63.00	568.88	568.76 N	18.55 W	569.06@	358.13	2.65
9377.00	92.42	359.19	8976.59	63.00	631.86	631.73 N	19.49 W	632.03@	358.23	3.21
9470.00	93.03	0.50	8972.16	93.00	724.75	724.62 N	19.74 W	724.89@	358.44	1.55
9532.00	91.28	1.11	8969.83	62.00	786.69	786.57 N	18.87 W	786.80@	358.63	2.99
9594.00	90.92	2.17	8968.64	62.00	848.63	848.53 N	17.10 W	848.71@	358.85	1.81
9686.00	89.78	3.67	8968.08	92.00	940.47	940.41 N	12.41 W	940.49@	359.24	2.05
9748.00	88.90	3.96	8968.80	62.00	1002.30	1002.27 N	8.29 W	1002.30@	359.53	1.49
9809.00	89.08	4.82	8969.87	61.00	1063.08	1063.08 N	3.62 W	1063.08@	359.80	1.44
9902.00	87.76	2.45	8972.43	93.00	1155.80	1155.85 N	2.27 E	1155.85@	0.11	2.92
9994.00	88.72	0.19	8975.26	92.00	1247.71	1247.77 N	4.39 E	1247.78@	0.20	2.67
10087.00	89.43	0.05	8976.76	93.00	1340.69	1340.76 N	4.59 E	1340.77@	0.20	0.78
10180.00	90.84	0.50	8976.54	93.00	1433.68	1433.75 N	5.03 E	1433.76@	0.20	1.59
10273.00	89.87	0.84	8975.97	93.00	1526.66	1526.75 N	6.12 E	1526.76@	0.23	1.11
10365.00	90.66	1.87	8975.54	92.00	1618.62	1618.72 N	8.30 E	1618.74@	0.29	1.41
10459.00	90.75	0.43	8974.38	94.00	1712.57	1712.69 N	10.18 E	1712.72@	0.34	1.54
10552.00	91.71	359.63	8972.39	93.00	1805.55	1805.66 N	10.23 E	1805.69@	0.32	1.34
10645.00	90.31	358.59	8970.75	93.00	1898.52	1898.64 N	8.79 E	1898.66@	0.27	1.88
10739.00	91.01	358.28	8969.67	94.00	1992.50	1992.59 N	6.22 E	1992.60@	0.18	0.81
10832.00	90.31	359.16	8968.59	93.00	2085.48	2085.56 N	4.14 E	2085.57@	0.11	1.21
10926.00	91.63	359.11	8967.00	94.00	2179.46	2179.54 N	2.72 E	2179.54@	0.07	1.41
11020.00	89.52	358.83	8966.06	94.00	2273.45	2273.51 N	1.03 E	2273.51@	0.03	2.27
11082.00	90.84	359.42	8965.87	62.00	2335.44	2335.50 N	0.09 E	2335.50@	0.00	2.33
11175.00	89.34	359.40	8965.72	93.00	2428.44	2428.49 N	0.87 W	2428.49@	359.98	1.61
11268.00	90.04	358.98	8966.22	93.00	2521.43	2521.48 N	2.18 W	2521.48@	359.95	0.88
11360.00	91.28	358.91	8965.16	92.00	2613.42	2613.46 N	3.88 W	2613.46@	359.91	1.35

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11453.00	91.45	359.34	8962.95	93.00	2706.39	2706.42 N 5.30 W	2706.43@ 359.89	0.50
11545.00	90.84	0.01	8961.11	92.00	2798.37	2798.40 N 5.82 W	2798.41@ 359.88	0.98
11607.00	90.40	359.85	8960.44	62.00	2860.37	2860.40 N 5.90 W	2860.40@ 359.88	0.75
11699.00	88.99	359.58	8960.93	92.00	2952.36	2952.39 N 6.35 W	2952.40@ 359.88	1.56
11792.00	88.72	359.69	8962.79	93.00	3045.34	3045.37 N 6.95 W	3045.38@ 359.87	0.31
11886.00	88.90	359.57	8964.74	94.00	3139.32	3139.35 N 7.55 W	3139.36@ 359.86	0.23
11983.00	91.45	359.53	8964.44	97.00	3236.31	3236.34 N 8.31 W	3236.35@ 359.85	2.63
12079.00	91.19	358.75	8962.23	96.00	3332.29	3332.30 N 9.75 W	3332.32@ 359.83	0.86
12174.00	90.13	358.81	8961.14	95.00	3427.27	3427.27 N 11.78 W	3427.29@ 359.80	1.12
12270.00	90.13	359.44	8960.92	96.00	3523.26	3523.26 N 13.24 W	3523.28@ 359.78	0.66
12366.00	88.64	358.95	8961.95	96.00	3619.25	3619.24 N 14.59 W	3619.27@ 359.77	1.63
12462.00	89.87	357.81	8963.20	96.00	3715.22	3715.19 N 17.31 W	3715.23@ 359.73	1.75
12559.00	89.87	358.04	8963.42	97.00	3812.18	3812.13 N 20.82 W	3812.18@ 359.69	0.24
12623.00	90.31	358.10	8963.32	64.00	3876.16	3876.09 N 22.97 W	3876.16@ 359.66	0.69
12719.00	91.71	357.48	8961.62	96.00	3972.09	3972.00 N 26.67 W	3972.09@ 359.62	1.59
12783.00	90.66	357.24	8960.30	64.00	4036.03	4035.92 N 29.62 W	4036.03@ 359.58	1.68
12845.00	89.16	356.28	8960.40	62.00	4097.95	4097.82 N 33.13 W	4097.95@ 359.54	2.87
12941.00	88.64	357.27	8962.24	96.00	4193.81	4193.65 N 38.53 W	4193.82@ 359.47	1.16
13035.00	89.87	357.24	8963.46	94.00	4287.73	4287.53 N 43.03 W	4287.74@ 359.43	1.31
13130.00	91.54	356.60	8962.30	95.00	4382.61	4382.38 N 48.13 W	4382.64@ 359.37	1.88
13225.00	91.19	357.81	8960.03	95.00	4477.50	4477.24 N 52.76 W	4477.55@ 359.32	1.33
13289.00	90.48	358.65	8959.10	64.00	4541.48	4541.20 N 54.74 W	4541.53@ 359.31	1.72
STRAIGHT LINE PROJECTION TO BIT @ 13350' MD.								
13350.00	90.48	358.65	8958.59	61.00	4602.47	4602.18 N 56.18 W	4602.52@ 359.30	0.00