

PathFinder Energy Services, Inc.

MARBOB ENERGY CORPORATION
LIBERATOR FED COM #1H
Eddy COUNTY, NM
Rig:Patriot #6
PathFinder Office Supervisor: Francisco Sinisterra
PathFinder Field Engineers: David Baker

Survey Report

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Tie-in Date: 09/10/2009
Date Completed: 09/24/2009

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:32.40.0.3064 N LON:103.48.53.9899 W
Reference:NAD27 new mexico east Transverse Mercator
Ref GRID Coord: X: 659508.7789 Y: 606664.8806
North Aligned To:GRID NORTH
Total Magnetic Correction: 7.65°EAST TO GRID
Vertical Section Plane: 179.60
Survey Vert. Reference: 14.00' Kelly Bushing To Ground
Altitude:3600.00' Ground To MSL

Survey Calculations by RX5 V5.11i 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 INTO SCIENTIFIC DRILLING GYRO SURVEY @ 8605'MD										
8605.00	0.31	135.57	8602.78	0.00	-18.37	18.81 N	63.64 E	66.36@	73.53	0.00
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.										
8654.00	0.18	89.50	8651.78	49.00	-18.27	18.72 N	63.81 E	66.50@	73.65	0.46
8687.00	0.44	109.75	8684.78	33.00	-18.23	18.67 N	63.98 E	66.65@	73.73	0.84
8719.00	1.06	169.79	8716.78	32.00	-17.89	18.34 N	64.15 E	66.72@	74.04	2.88
8751.00	2.73	165.04	8748.76	32.00	-16.86	17.31 N	64.40 E	66.68@	74.95	5.24
8783.00	6.33	170.96	8780.65	32.00	-14.38	14.83 N	64.87 E	66.55@	77.12	11.33
8814.00	10.29	173.67	8811.32	31.00	-9.94	10.39 N	65.45 E	66.27@	80.98	12.83
8846.00	14.60	173.27	8842.56	32.00	-3.08	3.54 N	66.23 E	66.33@	86.94	13.47
8878.00	19.52	171.68	8873.15	32.00	6.23	5.76 S	67.48 E	67.73@	94.88	15.44
8910.00	23.39	171.73	8902.92	32.00	17.82	17.34 S	69.17 E	71.31@	104.07	12.09
8942.00	26.20	171.97	8931.97	32.00	31.12	30.62 S	71.07 E	77.39@	113.31	8.79
8973.00	28.40	174.01	8959.52	31.00	45.24	44.73 S	72.80 E	85.44@	121.57	7.71
9005.00	30.86	175.04	8987.33	32.00	61.00	60.48 S	74.30 E	95.80@	129.14	7.85
9037.00	33.68	176.55	9014.38	32.00	78.04	77.52 S	75.54 E	108.24@	135.74	9.16
9069.00	36.49	176.36	9040.57	32.00	96.40	95.87 S	76.68 E	122.77@	141.35	8.79
9101.00	39.57	175.21	9065.77	32.00	116.07	115.53 S	78.14 E	139.47@	145.93	9.88
9133.00	42.56	174.41	9089.89	32.00	137.02	136.46 S	80.04 E	158.20@	149.61	9.49
9164.00	45.81	174.55	9112.12	31.00	158.53	157.96 S	82.12 E	178.04@	152.53	10.49
9204.00	47.40	182.43	9139.62	40.00	187.55	186.97 S	82.86 E	204.51@	156.10	14.85
9236.00	51.35	185.32	9160.46	32.00	211.76	211.20 S	81.20 E	226.27@	158.97	14.12
9268.00	55.75	187.41	9179.47	32.00	237.31	236.77 S	78.33 E	249.39@	161.69	14.72
9300.00	60.76	188.90	9196.30	32.00	264.21	263.69 S	74.47 E	274.01@	164.23	16.15
9332.00	66.48	189.46	9210.51	32.00	292.46	291.98 S	69.89 E	300.23@	166.54	17.94
9363.00	71.23	190.78	9221.69	31.00	320.88	320.43 S	64.81 E	326.92@	168.57	15.83
9395.00	74.66	191.25	9231.07	32.00	350.86	350.46 S	58.96 E	355.38@	170.45	10.81

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
9427.00	78.08	192.01	9238.61	32.00	381.27	380.91 S	52.69 E	384.54@	172.12	10.93
9459.00	80.37	192.03	9244.60	32.00	411.97	411.66 S	46.15 E	414.24@	173.60	7.16
9491.00	81.69	192.85	9249.59	32.00	442.79	442.52 S	39.34 E	444.27@	174.92	4.84
9523.00	82.39	192.50	9254.02	32.00	473.66	473.44 S	32.38 E	474.55@	176.09	2.44
9555.00	84.06	193.19	9257.79	32.00	504.59	504.42 S	25.32 E	505.06@	177.13	5.64
9586.00	87.49	195.01	9260.08	31.00	534.51	534.40 S	17.79 E	534.70@	178.09	12.52
9618.00	89.66	196.06	9260.87	32.00	565.27	565.22 S	9.22 E	565.30@	179.07	7.53
9649.00	90.06	196.04	9260.95	31.00	595.00	595.01 S	0.65 E	595.01@	179.94	1.29
9681.00	90.75	196.26	9260.72	32.00	625.68	625.75 S	8.25 W	625.80@	180.76	2.26
9713.00	91.19	196.11	9260.18	32.00	656.34	656.48 S	17.17 W	656.70@	181.50	1.45
9745.00	91.19	194.42	9259.52	32.00	687.14	687.34 S	25.59 W	687.82@	182.13	5.28
9777.00	90.31	193.04	9259.10	32.00	718.17	718.42 S	33.19 W	719.19@	182.64	5.12
9808.00	90.13	192.47	9258.98	31.00	748.36	748.66 S	40.03 W	749.72@	183.06	1.93
9840.00	90.04	191.36	9258.93	32.00	779.62	779.97 S	46.64 W	781.36@	183.42	3.48
9872.00	90.22	190.76	9258.86	32.00	810.98	811.37 S	52.78 W	813.09@	183.72	1.96
9904.00	90.84	190.43	9258.56	32.00	842.39	842.82 S	58.66 W	844.86@	183.98	2.20
9936.00	90.22	188.87	9258.27	32.00	873.90	874.37 S	64.02 W	876.71@	184.19	5.25
9968.00	90.22	188.88	9258.14	32.00	905.48	905.99 S	68.96 W	908.61@	184.35	0.03
10000.00	89.87	187.52	9258.12	32.00	937.12	937.66 S	73.52 W	940.54@	184.48	4.39
10031.00	88.72	185.58	9258.50	31.00	967.89	968.45 S	77.06 W	971.51@	184.55	7.28
10095.00	87.67	184.70	9260.51	64.00	1031.56	1032.16 S	82.79 W	1035.48@	184.59	2.14
10158.00	88.55	183.35	9262.59	63.00	1094.33	1094.97 S	87.21 W	1098.44@	184.55	2.56
10222.00	89.52	181.92	9263.67	64.00	1158.23	1158.89 S	90.15 W	1162.39@	184.45	2.70
10286.00	89.69	179.66	9264.11	64.00	1222.21	1222.88 S	91.03 W	1226.26@	184.26	3.54
10349.00	90.13	178.86	9264.21	63.00	1285.21	1285.87 S	90.22 W	1289.03@	184.01	1.45
10413.00	90.48	176.85	9263.87	64.00	1349.18	1349.82 S	87.83 W	1352.68@	183.72	3.19
10508.00	91.36	175.99	9262.34	95.00	1444.02	1444.62 S	81.89 W	1446.94@	183.24	1.30
10604.00	90.31	174.82	9260.95	96.00	1539.75	1540.30 S	74.20 W	1542.09@	182.76	1.64
10699.00	89.78	176.42	9260.87	95.00	1634.51	1635.02 S	66.95 W	1636.39@	182.34	1.77

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10794.00	90.40	175.96	9260.72	95.00	1729.34	1729.81 S	60.64 W	1730.87@	182.01	0.81
10890.00	89.87	176.69	9260.50	96.00	1825.19	1825.61 S	54.48 W	1826.42@	181.71	0.94
10985.00	89.34	176.91	9261.15	95.00	1920.07	1920.46 S	49.18 W	1921.09@	181.47	0.60
11079.00	89.43	177.63	9262.16	94.00	2013.99	2014.35 S	44.70 W	2014.84@	181.27	0.77
11175.00	89.69	178.43	9262.90	96.00	2109.95	2110.29 S	41.40 W	2110.69@	181.12	0.88
11270.00	90.75	179.03	9262.53	95.00	2204.93	2205.26 S	39.30 W	2205.61@	181.02	1.28
11365.00	90.84	179.59	9261.21	95.00	2299.92	2300.25 S	38.15 W	2300.56@	180.95	0.60
11461.00	91.54	178.88	9259.22	96.00	2395.90	2396.21 S	36.87 W	2396.50@	180.88	1.04
11556.00	90.57	178.81	9257.47	95.00	2490.87	2491.18 S	34.96 W	2491.42@	180.80	1.02
11651.00	91.01	178.45	9256.16	95.00	2585.85	2586.14 S	32.69 W	2586.35@	180.72	0.60
11747.00	89.08	178.36	9256.09	96.00	2681.82	2682.10 S	30.02 W	2682.27@	180.64	2.01
11842.00	89.69	177.45	9257.11	95.00	2776.78	2777.03 S	26.54 W	2777.16@	180.55	1.15
11937.00	89.69	177.98	9257.62	95.00	2871.72	2871.95 S	22.76 W	2872.04@	180.45	0.56
12032.00	90.22	178.23	9257.69	95.00	2966.69	2966.90 S	19.61 W	2966.96@	180.38	0.62
12128.00	90.40	179.08	9257.17	96.00	3062.67	3062.87 S	17.36 W	3062.92@	180.32	0.90
12223.00	90.13	180.20	9256.74	95.00	3157.67	3157.87 S	16.76 W	3157.91@	180.30	1.21
12318.00	90.48	179.08	9256.23	95.00	3252.67	3252.86 S	16.17 W	3252.90@	180.28	1.23
12413.00	89.52	178.37	9256.23	95.00	3347.66	3347.84 S	14.05 W	3347.87@	180.24	1.26
12508.00	89.52	177.60	9257.03	95.00	3442.62	3442.77 S	10.71 W	3442.79@	180.18	0.81
12603.00	89.34	176.21	9257.97	95.00	3537.50	3537.63 S	5.58 W	3537.63@	180.09	1.48
12699.00	89.60	177.21	9258.86	96.00	3633.38	3633.46 S	0.08 W	3633.46@	180.00	1.08
12794.00	90.04	178.20	9259.16	95.00	3728.32	3728.39 S	3.73 E	3728.39@	179.94	1.14
12888.00	90.75	176.90	9258.51	94.00	3822.26	3822.30 S	7.75 E	3822.30@	179.88	1.58
12985.00	90.57	178.36	9257.39	97.00	3919.19	3919.20 S	11.76 E	3919.22@	179.83	1.52
13080.00	90.04	178.92	9256.89	95.00	4014.17	4014.17 S	14.01 E	4014.20@	179.80	0.81
13175.00	90.57	178.54	9256.38	95.00	4109.16	4109.15 S	16.12 E	4109.18@	179.78	0.69
13271.00	90.22	179.51	9255.72	96.00	4205.15	4205.13 S	17.75 E	4205.17@	179.76	1.07
13366.00	90.13	180.14	9255.43	95.00	4300.15	4300.13 S	18.04 E	4300.17@	179.76	0.67
13461.00	90.92	179.82	9254.56	95.00	4395.14	4395.12 S	18.07 E	4395.16@	179.76	0.90

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular (ft)	Offsets (ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
13556.00	91.89	179.63	9252.23	95.00	4490.11	4490.09 S	18.53 E	4490.13@	179.76	1.04
13633.00	92.51	179.52	9249.27	77.00	4567.06	4567.04 S	19.10 E	4567.08@	179.76	0.82
STRAIGHT-LINE PROJECTION TO BIT @ 13680'MD.										
13680.00	92.51	179.52	9247.21	47.00	4614.01	4613.99 S	19.49 E	4614.03@	179.76	0.00

Wellhead

330 FNL 380 FEL

Bottom hole

4944 FNL 360.5 FEL