

PathFinder Energy Services, Inc.

Survey Report

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HUBBSOCD

MARBOB ENERGY
S L DEEP FEDERAL #3

LEA COUNTY, NM

Rig: PATRIOT #2

PathFinder Office Supervisor: FRANCISCO SINISTERRA

PathFinder Field Engineers: MIKE EVANS
MATT SHIPP

Survey Horiz. Reference: WELLHEAD

Ref Coordinates: LAT: 32.38.9.2461 N LON: 103.48.29.9859 W

Reference: NAD27 new mexico east Transverse Mercator

Ref GRID Coord: X: 661616.1788 Y: 595451.6809

North Aligned To: GRID NORTH

Total Magnetic Correction: 7.67° EAST TO GRID

Vertical Section Plane: 0.00

Survey Vert. Reference: 18.00' Kelly Bushing To Ground

Altitude: 3537.00' 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)
ASSUME VERTICAL @ 4732' MD										
4732.00	0.00	0.00	4732.00	0.00	0.00	0.00	0.00	0.00@	0.00	0.00
THE FOLLOWING ARE PATHFINDER MWD SURVEYS										
4832.00	2.11	184.73	4831.98	100.00	-1.83	1.83 S	0.15 W	1.84@	184.73	2.11
4886.00	1.41	177.53	4885.95	54.00	-3.49	3.49 S	0.21 W	3.50@	183.36	1.36
4952.00	1.32	173.98	4951.93	66.00	-5.06	5.06 S	0.09 W	5.06@	181.02	0.19
5011.00	1.23	163.01	5010.92	59.00	-6.34	6.34 S	0.17 E	6.34@	178.50	0.44
5105.00	1.14	161.49	5104.90	94.00	-8.19	8.19 S	0.76 E	8.22@	174.72	0.10
5199.00	1.14	157.38	5198.88	94.00	-9.94	9.94 S	1.41 E	10.04@	171.90	0.09
5293.00	0.79	160.56	5292.87	94.00	-11.41	11.41 S	1.99 E	11.59@	170.11	0.38
5388.00	0.79	154.08	5387.86	95.00	-12.62	12.62 S	2.49 E	12.86@	168.82	0.09
5482.00	0.88	144.59	5481.85	94.00	-13.79	13.79 S	3.20 E	14.16@	166.96	0.17
5575.00	0.53	156.40	5574.84	93.00	-14.77	14.77 S	3.78 E	15.24@	165.64	0.41
5731.00	0.44	129.22	5730.83	156.00	-15.81	15.81 S	4.53 E	16.44@	164.00	0.16
5888.00	0.26	135.78	5887.83	157.00	-16.44	16.44 S	5.25 E	17.26@	162.30	0.12
6046.00	0.35	123.99	6045.83	158.00	-16.97	16.97 S	5.90 E	17.97@	160.83	0.07
6202.00	0.35	93.41	6201.83	156.00	-17.27	17.27 S	6.77 E	18.55@	158.59	0.12
6358.00	0.35	84.32	6357.82	156.00	-17.25	17.25 S	7.72 E	18.90@	155.89	0.03
6514.00	0.34	66.93	6513.82	156.00	-17.02	17.02 S	8.62 E	19.08@	153.14	0.07
6671.00	0.51	24.15	6670.82	157.00	-16.20	16.20 S	9.33 E	18.70@	150.05	0.22
6827.00	0.70	29.30	6826.81	156.00	-14.73	14.73 S	10.08 E	17.85@	145.61	0.13
6985.00	0.79	42.13	6984.80	158.00	-13.08	13.08 S	11.29 E	17.28@	139.21	0.12
7142.00	0.88	83.13	7141.78	157.00	-12.14	12.14 S	13.21 E	17.94@	132.57	0.38
7300.00	1.41	299.75	7299.77	158.00	-11.03	11.03 S	12.73 E	16.84@	130.91	1.38

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S L DEEP FEDERAL #3
LEA COUNTY, NM
RIG:PATRIOT #2

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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)
7458.00	0.26	49.54	7457.75	158.00	-9.83	9.83 S	11.31 E	14.99@	130.99	0.96
7614.00	0.70	82.59	7613.74	156.00	-9.48	9.48 S	12.53 E	15.71@	127.11	0.32
7769.00	0.88	93.03	7768.73	155.00	-9.42	9.42 S	14.65 E	17.42@	122.73	0.15
7926.00	1.23	92.74	7925.70	157.00	-9.56	9.56 S	17.54 E	19.98@	118.60	0.22
8082.00	1.85	84.59	8081.65	156.00	-9.41	9.41 S	21.72 E	23.67@	113.41	0.42
8239.00	2.11	92.84	8238.55	157.00	-9.31	9.31 S	27.13 E	28.68@	108.94	0.24
8396.00	2.02	97.93	8395.45	157.00	-9.83	9.83 S	32.76 E	34.20@	106.71	0.13
8552.00	2.29	98.34	8551.34	156.00	-10.67	10.67 S	38.56 E	40.01@	105.46	0.17
8647.00	2.55	93.80	8646.25	95.00	-11.08	11.08 S	42.55 E	43.97@	104.60	0.34
8740.00	2.99	83.39	8739.15	93.00	-10.94	10.94 S	47.02 E	48.28@	103.10	0.72
8835.00	2.20	72.85	8834.05	95.00	-10.12	10.12 S	51.23 E	52.22@	101.17	0.97
8928.00	1.93	77.01	8926.99	93.00	-9.24	9.24 S	54.46 E	55.24@	99.63	0.33
9022.00	1.85	73.88	9020.94	94.00	-8.46	8.46 S	57.46 E	58.08@	98.38	0.14
9116.00	1.58	78.68	9114.90	94.00	-7.78	7.78 S	60.19 E	60.69@	97.37	0.32
9209.00	1.49	84.69	9207.86	93.00	-7.42	7.42 S	62.65 E	63.09@	96.76	0.20
9304.00	1.93	94.06	9302.82	95.00	-7.42	7.42 S	65.48 E	65.89@	96.47	0.55
9398.00	2.02	102.89	9396.76	94.00	-7.90	7.90 S	68.67 E	69.12@	96.56	0.34
9493.00	2.20	100.90	9491.70	95.00	-8.62	8.62 S	72.09 E	72.61@	96.82	0.20
9531.00	2.46	96.31	9529.67	38.00	-8.85	8.85 S	73.62 E	74.15@	96.85	0.84
STRAIGHT-LINE PROJECTION TO BIT @ 9580'MD.										
9580.00	2.46	96.31	9578.62	49.00	-9.08	9.08 S	75.71 E	76.25@	96.84	0.00

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Magnetic & Grid Calculations

MARBOB ENERGY
S L DEEP FEDERAL #3
LEA COUNTY, NEW MEXICO
Rig:PATRIOT 2

Fri Jun 26 19:12:01 2009

Coordinates

Latitude: 32.635902 N (32 deg. 38 min. 9.2463 sec.)
Longitude: 103.808329 W (-103 deg. 48 min. 29.9857 sec.)
Elevation: 3537.00 feet.
Calculation Date: Jun/26/2009

Magnetic Calculations

Model: IGRF2005
Dip Angle: 60.5932 degrees
Total Magnetic Field: 0.49064 gauss
Magnetic Declination: 7.950504 degrees
Horizontal Intensity: 0.240906 gauss
To Convert a Magnetic Dir. to a TRUE North Dir. Add 7.950504 Degr.

Transverse Mercator Grid Calculations NAD27

Grid System: Transverse Mercator: new mexico east
Ellipsoid: Clarke 1866
X: 661616.2000 feet
Y: 595451.7000 feet
True to Grid: (convergence) -0.283140 degrees
Magnetic to Grid: 7.667364 degrees
To Convert a Magnetic Dir. to a GRID dir. Add 7.667364 Degr.