

30-015-38107

PathFinder Energy Services, Inc.

BHL Report

Page 01/01
Tie-in Date: 10/16/2010
Date Completed: 10/23/2010

MARBOB ENERGY CORPORATION
LIZARD POT STATE COM #1H
EDDY COUNTY, NM
Rig:MCVAY 7
PathFinder Office Supervisor: FRANCISCO SINISTERRA
PathFinder Field Engineers: JAMES CLOUD
LOREN FLEMING

Survey Horiz. Reference: WELLHEAD
Ref Coordinates: LAT: 32.36.41.0272 N LON: 103.49.43.1084 W
GRID Reference: NAD27 new mexico east Transverse Mercator
Ref GRID Coord: X: 655405.7000 Y: 586506.4000
North Aligned To: GRID NORTH
Total Magnetic Correction: 7.54° EAST TO GRID
Vertical Section Plane: 182.86
Survey Vert. Reference: 19.00' Kelly Bushing To Ground
Altitude: 3481.00' Ground To MSL

Measured Depth	14552.00	(feet)
Inclination	92.24	(deg)
Azimuth	179.61	(deg)
True Vertical Depth	9277.91	(feet)
Vertical Section	5593.24	(feet)
Survey X cord	655218.07	(feet)
Survey Y cord	580915.56	(feet)
Survey Lat	32.59603121 N	(deg)
Survey Lon	103.82933660 W	(deg)
Rectangular Corr. N/S	5590.84 S	(feet)
Rectangular Corr. E/W	187.63 W	(feet)
Closure Distance	5593.99	(feet)
Direction of Closure	181.92	(deg)
Dogleg Severity	0.00	(deg/100ft)

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Survey Report

MARBOB ENERGY CORPORATION

LIZARD POT STATE COM #1H

EDDY COUNTY, NM

Rig:MCVAY 7

PathFinder Office Supervisor: FRANCISCO SINISTERRA

PathFinder Field Engineers: JAMES CLOUD

LOREN FLEMING

Survey Horiz. Reference:WELLHEAD

Ref Coordinates: LAT:32.36.41.0272 N LON:103.49.43.1084 W

GRID Reference:NAD27 new mexico east Transverse Mercator

Ref GRID Coord: X: 655405.7000 Y: 586506.4000

North Aligned To:GRID NORTH

Total Magnetic Correction: 7.54° EAST TO GRID

Vertical Section Plane: 182.86

Survey Vert. Reference: 19.00' Kelly Bushing To Ground

Altitude:3481.00' Ground To MSL

Survey Calculations by PathCalc v2.00 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 DDC MWD SURVEYS										
8719.00	6.30	165.20	8716.47	0.00	40.25	42.27 S	39.48 E	57.83@	136.96	25.21
8751.00	13.20	160.10	8747.99	32.00	45.29	47.41 S	41.17 E	62.79@	139.03	21.71
8783.00	18.40	160.70	8778.77	32.00	53.35	55.61 S	44.08 E	70.97@	141.60	16.26
8815.00	20.70	162.50	8808.92	32.00	63.33	65.78 S	47.45 E	81.11@	144.19	7.43
8847.00	23.20	165.90	8838.60	32.00	74.66	77.29 S	50.69 E	92.43@	146.74	8.76
8878.00	26.10	167.40	8866.77	31.00	87.08	89.87 S	53.67 E	104.67@	149.15	9.57
8910.00	28.10	168.40	8895.26	32.00	101.16	104.12 S	56.72 E	118.57@	151.42	6.41
8942.00	30.60	173.70	8923.15	32.00	116.50	119.60 S	59.13 E	133.42@	153.69	11.26
8974.00	33.50	174.30	8950.27	32.00	133.28	136.49 S	60.90 E	149.46@	155.95	9.12
9005.00	36.00	177.30	8975.75	31.00	150.81	154.11 S	62.18 E	166.18@	158.03	9.77
9037.00	38.40	178.00	9001.23	32.00	170.08	173.43 S	62.97 E	184.51@	160.05	7.62
9068.00	40.40	180.20	9025.19	31.00	189.71	193.11 S	63.27 E	203.21@	161.86	7.87
9100.00	41.80	179.60	9049.30	32.00	210.72	214.14 S	63.31 E	223.30@	163.53	4.55
9132.00	44.00	181.10	9072.74	32.00	232.48	235.92 S	63.17 E	244.23@	165.01	7.58
9164.00	46.20	183.20	9095.33	32.00	255.14	258.57 S	62.31 E	265.97@	166.45	8.30
TIE IN TO DDC MWD SURVERYS @ 9196' MD.										
9196.00	48.90	184.10	9116.93	32.00	278.74	282.13 S	60.80 E	288.61@	167.84	8.69
THE FOLLOWING ARE PATHFINDER MWD SURVEYS										
9233.00	52.58	185.36	9140.34	37.00	307.37	310.67 S	58.43 E	316.12@	169.35	10.29
9265.00	54.43	187.88	9159.37	32.00	333.03	336.22 S	55.46 E	340.76@	170.63	8.57
9297.00	57.86	190.81	9177.20	32.00	359.43	362.43 S	51.13 E	366.02@	171.97	13.14
9329.00	61.73	193.14	9193.30	32.00	386.73	389.48 S	45.39 E	392.11@	173.35	13.63
9361.00	65.60	193.41	9207.49	32.00	414.93	417.38 S	38.80 E	419.18@	174.69	12.12
9392.00	70.08	193.20	9219.18	31.00	443.15	445.31 S	32.20 E	446.48@	175.86	14.46
9424.00	74.83	192.62	9228.82	32.00	473.19	475.05 S	25.38 E	475.72@	176.94	14.94

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LIZARD POT STATE COM #1H
EDDY COUNTY, NM
RIG:MCVAY 7

Page 02/04

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)
9455.00	79.05	191.52	9235.83	31.00	502.99	504.57 S	19.07 E	504.93@	177.84	14.04
9487.00	82.31	190.89	9241.01	32.00	534.23	535.54 S	12.94 E	535.70@	178.62	10.37
9518.00	85.21	190.27	9244.38	31.00	564.76	565.83 S	7.28 E	565.88@	179.26	9.56
9550.00	87.67	189.32	9246.36	32.00	596.47	597.30 S	1.85 E	597.30@	179.82	8.24
9576.00	88.90	188.95	9247.14	26.00	622.30	622.96 S	2.28 W	622.96@	180.21	4.94
9608.00	88.64	188.33	9247.83	32.00	654.13	654.59 S	7.08 W	654.63@	180.62	2.10
9640.00	88.11	187.63	9248.74	32.00	685.99	686.27 S	11.52 W	686.36@	180.96	2.74
9672.00	87.58	187.28	9249.94	32.00	717.86	717.97 S	15.67 W	718.14@	181.25	1.98
9704.00	87.05	186.57	9251.44	32.00	749.74	749.70 S	19.53 W	749.96@	181.49	2.77
9736.00	87.85	185.96	9252.86	32.00	781.66	781.48 S	23.01 W	781.82@	181.69	3.14
9767.00	88.72	184.90	9253.79	31.00	812.61	812.33 S	25.95 W	812.74@	181.83	4.42
9799.00	88.90	184.20	9254.45	32.00	844.59	844.22 S	28.48 W	844.70@	181.93	2.26
9831.00	89.60	183.76	9254.87	32.00	876.58	876.14 S	30.71 W	876.68@	182.01	2.58
9863.00	89.60	183.50	9255.10	32.00	908.58	908.07 S	32.73 W	908.66@	182.06	0.81
9895.00	89.69	183.67	9255.30	32.00	940.57	940.01 S	34.73 W	940.65@	182.12	0.60
9990.00	89.69	182.71	9255.81	95.00	1035.57	1034.86 S	40.02 W	1035.63@	182.21	1.01
10083.00	89.69	182.27	9256.31	93.00	1128.57	1127.77 S	44.06 W	1128.63@	182.24	0.47
10177.00	87.67	181.30	9258.48	94.00	1222.52	1221.69 S	46.99 W	1222.60@	182.20	2.38
10273.00	88.55	180.69	9261.64	96.00	1318.41	1317.63 S	48.65 W	1318.53@	182.11	1.12
10368.00	88.72	180.69	9263.91	95.00	1413.32	1412.59 S	49.80 W	1413.47@	182.02	0.18
10464.00	89.87	181.39	9265.09	96.00	1509.26	1508.57 S	51.54 W	1509.45@	181.96	1.40
10561.00	89.78	182.18	9265.38	97.00	1606.24	1605.52 S	54.56 W	1606.45@	181.95	0.82
10657.00	90.13	183.76	9265.46	96.00	1702.24	1701.39 S	59.53 W	1702.43@	182.00	1.69
10754.00	89.78	184.20	9265.54	97.00	1799.22	1798.15 S	66.27 W	1799.37@	182.11	0.58
10851.00	89.60	183.76	9266.06	97.00	1896.20	1894.92 S	73.00 W	1896.32@	182.21	0.49
10947.00	89.78	182.53	9266.58	96.00	1992.19	1990.77 S	78.26 W	1992.31@	182.25	1.29
11044.00	89.08	183.41	9267.55	97.00	2089.19	2087.63 S	83.29 W	2089.29@	182.28	1.16
11137.00	87.32	185.08	9270.47	93.00	2182.11	2180.33 S	90.17 W	2182.19@	182.37	2.61

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EDDY COUNTY, NM
RIG:MCVAY 7

Page 03/04

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets		Closure Dist Dir		DLS (dg/100ft)
(ft)	(deg)	(deg)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(deg)	(dg/100ft)
11230.00	87.14	184.90	9274.96	93.00	2274.94	2272.86 S	98.25 W	2274.99@	182.48	0.27
11323.00	85.91	184.02	9280.60	93.00	2367.73	2365.41 S	105.47 W	2367.76@	182.55	1.63
11415.00	87.49	185.17	9285.89	92.00	2459.53	2456.96 S	112.83 W	2459.55@	182.63	2.12
11508.00	90.04	185.69	9287.90	93.00	2552.40	2549.51 S	121.63 W	2552.41@	182.73	2.80
11601.00	89.87	184.99	9287.97	93.00	2645.32	2642.11 S	130.28 W	2645.32@	182.82	0.77
11693.00	89.25	184.11	9288.68	92.00	2737.27	2733.81 S	137.58 W	2737.27@	182.88	1.17
11787.00	87.76	182.79	9291.13	94.00	2831.23	2827.60 S	143.23 W	2831.23@	182.90	2.12
11879.00	87.76	183.85	9294.73	92.00	2923.16	2919.38 S	148.56 W	2923.16@	182.91	1.15
11972.00	89.78	183.59	9296.72	93.00	3016.12	3012.16 S	154.59 W	3016.12@	182.94	2.19
12064.00	91.71	183.08	9295.53	92.00	3108.10	3103.99 S	159.94 W	3108.11@	182.95	2.17
12157.00	91.54	182.02	9292.89	93.00	3201.06	3196.86 S	164.08 W	3201.07@	182.94	1.15
12250.00	91.80	181.58	9290.18	93.00	3294.01	3289.77 S	167.00 W	3294.01@	182.91	0.55
12342.00	91.19	181.28	9287.78	92.00	3385.95	3381.71 S	169.29 W	3385.95@	182.87	0.74
12434.00	91.01	180.91	9286.01	92.00	3477.89	3473.68 S	171.05 W	3477.89@	182.82	0.45
12527.00	90.92	181.38	9284.45	93.00	3570.83	3566.65 S	172.91 W	3570.83@	182.78	0.51
12619.00	88.11	181.38	9285.22	92.00	3662.79	3658.61 S	175.12 W	3662.80@	182.74	3.05
12712.00	89.16	182.35	9287.44	93.00	3755.75	3751.53 S	178.15 W	3755.76@	182.72	1.54
12804.00	90.22	183.27	9287.94	92.00	3847.74	3843.41 S	182.66 W	3847.75@	182.72	1.53
12897.00	90.40	182.74	9287.43	93.00	3940.74	3936.28 S	187.53 W	3940.75@	182.73	0.60
12990.00	90.84	181.48	9286.43	93.00	4033.72	4029.21 S	190.96 W	4033.74@	182.71	1.43
13083.00	91.10	180.21	9284.85	93.00	4126.65	4122.19 S	192.33 W	4126.67@	182.67	1.39
13176.00	90.48	178.91	9283.57	93.00	4219.48	4215.17 S	191.61 W	4219.53@	182.60	1.55
13270.00	89.69	178.35	9283.43	94.00	4313.23	4309.15 S	189.37 W	4313.31@	182.52	1.03
13363.00	89.60	179.51	9284.01	93.00	4406.01	4402.13 S	187.63 W	4406.12@	182.44	1.25
13455.00	90.04	180.32	9284.30	92.00	4497.88	4494.13 S	187.49 W	4498.03@	182.39	1.00
13547.00	89.78	179.90	9284.44	92.00	4589.78	4586.12 S	187.67 W	4589.96@	182.34	0.54
13640.00	88.99	178.96	9285.44	93.00	4682.60	4679.11 S	186.75 W	4682.84@	182.29	1.32
13733.00	88.37	178.99	9287.58	93.00	4775.36	4772.07 S	185.08 W	4775.66@	182.22	0.67

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MARBOB ENERGY CORPORATION
LIZARD POT STATE COM #1H
EDDY COUNTY, NM
RIG:MCVAY 7

Page 04/04

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)
13828.00	89.08	179.53	9289.70	95.00	4870.15	4867.04 S	183.86 W	4870.51@	182.16	0.94
13923.00	89.78	180.94	9290.64	95.00	4965.05	4962.03 S	184.25 W	4965.45@	182.13	1.66
14018.00	91.01	180.95	9289.99	95.00	5059.99	5057.02 S	185.81 W	5060.43@	182.10	1.29
14113.00	90.31	179.79	9288.89	95.00	5154.89	5152.01 S	186.43 W	5155.38@	182.07	1.43
14208.00	91.10	180.20	9287.72	95.00	5249.76	5247.00 S	186.42 W	5250.31@	182.03	0.94
14303.00	91.63	180.43	9285.46	95.00	5344.64	5341.97 S	186.94 W	5345.24@	182.00	0.61
14398.00	91.28	180.62	9283.05	95.00	5439.53	5436.93 S	187.81 W	5440.18@	181.98	0.42
14493.00	92.15	179.64	9280.21	95.00	5534.38	5531.89 S	188.03 W	5535.08@	181.95	1.38
14504.00	92.24	179.61	9279.78	11.00	5545.35	5542.88 S	187.95 W	5546.07@	181.94	0.86
STRAIGHT LINE PROJECTION TO BIT @ 14552' MD.										
14552.00	92.24	179.61	9277.91	48.00	5593.24	5590.84 S	187.63 W	5593.99@	181.92	0.00



ENERGY SERVICES

TIE-IN SURVEY INFORMATION SHEET

CLIENT INFORMATION

CLIENT:	MARBOB ENERGY		
LEASE / WELL No.:	LIZARD POT STATE COM	#1H	
WELL LOCATION:	EDDY COUNTY, NEW MEXICO, USA		
COUNTY / STATE / COUNTRY:	EDDY	NEW MEXICO	USA
RIG:	McVAY 7		
API WELL No:	30-015-38107		
JOB No:	700000580-WT-WT		
P.O. / AFE No.			
DIRECTIONAL COMPANY:	PES		

WELL SITE INFORMATION

TOTAL MAGNETIC CORRECTION (TMC):			
On Wall Plat:	7.53	LWD Calculated:	7.54
		Agreed Upon:	7.54
X =	655405.700000	Feet	Y = 586506.400000
			Feet
SITE LATITUDE:	32.611396 N	SITE LONGITUDE:	103.828641 W
GRID SYSTEM:	TRUE ☐ UTM ☒	LAMBERT ☐	ZONE: NEW MEXICO EAST
PROPOSED DRIFT DIRECTION:	182.86		
KELLY BUSHING ELEVATION:	19'		
ALTITUDE:	3481'	Feet	WATER DEPTH: N/A
			Feet

TIE-IN SURVEY

MEASURED DEPTH:	9196'		
DRIFT ANGLE:	48.9		
DRIFT DIRECTION:	184.1		
TRUE VERTICAL DEPTH:	9116.93'		
VERTICAL SECTION:	278.74'		
RECTANGULAR COORDINATE (N / S) :	282.13 S		
RECTANGULAR COORDINATE (E / W) :	60.80 E		
CLOSURE DISTANCE / DIRECTION:	288.61'	167.84	
SURVEY CALCULATION METHOD:	AA ☐	MC ☒	RC ☐ BT ☐
SOURCE OF TIE-IN DATA (COMPANY):	SCIENTIFIC DRILLING		
COPY OF TIE-IN SURVEY REPORT	☒ YES ☐ NO		

WELL PLAN

KICKOFF DEPTH:	9260'	TOTAL DEPTH:	14554.02'
KICKOFF ANGLE:	54.3	MAX ANGLE:	90

PES Engineers:

JAMES CLOUD

LOREN FLEMING

**Signature of both field engineers required if applicable

Directional Driller: PATRICK QUAIN

DATE: 16-Oct-2010



A Schlumberger Company

PathFinder Energy Services, Inc. Magnetic & Grid Calculations

MARBOB ENERGY
LIZARD POT STATE #1H
EDDY COUNTY, NEW MEXICO
Rig: McVAY 7

Thu Oct 14 23:42:56 2010

Coordinates

Latitude: 32.611396 N (32 deg. 36 min. 41.0272 sec.)
Longitude: 103.828641 W (-103 deg. 49 min. 43.1084 sec.)
Elevation: 3499.00 feet.
Calculation Date: Oct/14/2010

Magnetic Calculations

Model: IGRF2010
Dip Angle: 60.5181 degrees
Total Magnetic Field: 0.48888 gauss
Magnetic Declination: 7.815540 degrees
Horizontal Intensity: 0.240602 gauss

To Convert a Magnetic Dir. to a TRUE North Dir. Add 7.815540 Degr.

Transverse Mercator Grid Calculations NAD27

Grid System: Transverse Mercator: new mexico east
Ellipsoid: Clarke 1866
X: 655405.7000 feet
Y: 586506.4000 feet
True to Grid: (convergence) -0.272003 degrees
Magnetic to Grid: 7.543537 degrees

To Convert a Magnetic Dir. to a GRID dir. Add 7.543537 Degr.