



oed Rec'd 3-23-10

An Operating Unit of Smith International, Inc.

DIRECTIONAL SURVEY REPORT

MARBOB ENERGY CORPORATION

FOSTER EDDY FEDERAL #15

EDDY COUNTY, NEW MEXICO

PREPARED BY: FRANCISCO SINISTERRA

Pathfinder Energy Services, Inc.
6213 W. Interstate 20 • Midland, TX • 79706
(432) 681-6000



DIRECTIONAL SURVEY COMPANY REPORT:

1. NAME OF SURVEYING COMPANY: PATHFINDER ENERGY SERVICES
2. NAME OF PERSON(S) PERFORMING SURVEY:
A) JUAN ALCOCER
3. POSITION OF SAID PERSON(S): (A-F) SURVEYORS (FIELD ENGINEERS)
4. DATE(S) ON WHICH SURVEY WAS PERFORMED: 11/05/09 TO 11/06/09
5. STATE IN WHICH SURVEY WAS PERFORMED: NEW MEXICO
6. LOCATION OF WELL: EDDY COUNTY
7. TYPE OF SURVEY(S) PERFORMED: MWD
8. COMPLETE IDENTIFICATION OF WELL:

MARBOB ENERGY CORPORATION
FOSTER EDDY FEDERAL #15
EDDY COUNTY, NM
RIG: TEACO 1

9. SURVEY CERTIFIED FROM: 486 TO 1469 FEET MEASURED DEPTH.

THIS IS TO VERIFY THAT ATTACHED DOCUMENTS SHOWING THE WELL TO BE DISPLACED AT 24.76 FEET ON A BEARING OF 36.57 DEGREES FROM THE CENTER OF THE ROTARY TABLE AT A PROJECTED BIT DEPTH OF 1519 FEET, ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

FRANCISCO SINISTERRA
MWD COORDINATOR



PathFinder Energy Services, Inc.

BHL Report

Page 01/01
Tie-in Date: 11/05/2009
Date Completed: 11/06/2009

MARBOB ENERGY
FOSTER EDDY FEDERAL #15
EDDY COUNTY, NM
Rig:TEACO 1
PathFinder Office Supervisor: FRANCISCO SINISTERRA
PathFinder Field Engineers:JUAN ALCOCER

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:32.50.7.1661 N LON:103.53.23.3034 W
GRID Reference:NAD27 new mexico east Transverse Mercator
Ref GRID Coord: X: 636230.5000 Y: 667887.9000
North Aligned To:GRID NORTH
Total Magnetic Correction: 7.72° EAST TO GRID
Vertical Section Plane: 0.00
Survey Vert. Reference: 12.00' Kelly Bushing To Ground
Altitude: 12.00' Ground To MSL

Measured Depth	1519.00	(feet)
Inclination	0.88	(deg)
Azimuth	116.18	(deg)
True Vertical Depth	1518.44	(feet)
Vertical Section	19.88	(feet)
Survey X cord	636245.23	(feet)
Survey Y cord	667907.76	(feet)
Survey Lat	32.83537833 N	(deg)
Survey Lon	103.88975827 W	(deg)
Rectangular Corr. N/S	19.88 N	(feet)
Rectangular Corr. E/W	14.75 E	(feet)
Closure Distance	24.76	(feet)
Direction of Closure	36.57	(deg)
Dogleg Severity	0.00	(deg/100ft)

PathFinder Energy Services, Inc.

Survey Report

MARBOB ENERGY

FOSTER EDDY FEDERAL #15

EDDY COUNTY, NM

Rig:TEACO 1

PathFinder Office Supervisor: FRANCISCO SINISTERRA

PathFinder Field Engineers: JUAN ALCOCER

Survey Horiz. Reference:WELLHEAD

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Ref GRID Coord: X: 636230.5000 Y: 667887.9000

North Aligned To:GRID NORTH

Total Magnetic Correction: 7.72° EAST TO GRID

Vertical Section Plane: 0.00

Survey Vert. Reference: 12.00' Kelly Bushing To Ground

Altitude: 12.00' Ground To MSL

Survey Calculations by RX4 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 ASSUMED STRAIGHT HOLE @ 300' MD.								
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00@ 0.00	0.00
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.								
486.00	3.96	1.04	485.85	186.00	6.42	6.42 N 0.12 E	6.43@ 1.04	2.13
517.00	3.43	6.93	516.79	31.00	8.41	8.41 N 0.25 E	8.42@ 1.69	2.10
580.00	3.25	14.40	579.68	63.00	12.02	12.02 N 0.92 E	12.05@ 4.38	0.75
644.00	2.55	19.59	643.60	64.00	15.11	15.11 N 1.85 E	15.23@ 6.97	1.17
707.00	1.14	36.55	706.56	63.00	16.94	16.94 N 2.69 E	17.15@ 9.03	2.38
771.00	1.32	42.35	770.55	64.00	17.99	17.99 N 3.57 E	18.34@ 11.21	0.34
833.00	1.41	43.23	832.53	62.00	19.08	19.08 N 4.57 E	19.62@ 13.47	0.15
896.00	0.88	70.56	895.52	63.00	19.80	19.80 N 5.56 E	20.57@ 15.68	1.19
959.00	0.62	91.48	958.51	63.00	19.96	19.96 N 6.35 E	20.94@ 17.66	0.59
1022.00	0.70	86.82	1021.51	63.00	19.97	19.97 N 7.08 E	21.19@ 19.52	0.15
1086.00	0.79	72.23	1085.51	64.00	20.12	20.12 N 7.89 E	21.62@ 21.41	0.33
1182.00	0.88	79.18	1181.49	96.00	20.47	20.47 N 9.24 E	22.46@ 24.31	0.14
1309.00	1.14	65.46	1308.48	127.00	21.17	21.17 N 11.35 E	24.02@ 28.20	0.28
1373.00	1.23	121.19	1372.46	64.00	21.08	21.08 N 12.52 E	24.52@ 30.70	1.74
1469.00	0.88	116.18	1468.45	96.00	20.22	20.22 N 14.06 E	24.63@ 34.81	0.38
STRAIGHT LINE PROJECTION TO BIT @ 1519' MD.								
1519.00	0.88	116.18	1518.44	50.00	19.88	19.88 N 14.75 E	24.76@ 36.57	0.00



ENERGY SERVICES

TIE-IN SURVEY INFORMATION SHEET

CLIENT INFORMATION

CLIENT:	MARBOB ENERGY		
LEASE / WELL No.:	FOSTER EDDY FEDERAL	# 15	
WELL LOCATION:	EDDY COUNTY, NM		
COUNTY / STATE / COUNTRY:	EDDY COUNTY	NM	USA
RIG:	TEACO 1		
API WELL No:	30-015-37134		
JOB No:	101009216 WT-WT		
P.O. / AFE No.	N/A		
DIRECTIONAL COMPANY:	PATHFINDER ENERGY SERVICES		

WELL SITE INFORMATION

TOTAL MAGNETIC CORRECTION (TMC):			
On Wall Plat:	7.72	LWD Calculated:	7.72
X =	636230.500000	Feet	Y = 667887.900000
		Feet	
SITE LATITUDE:	32.835324 N	SITE LONGITUDE:	103.889806 W
GRID SYSTEM:	TRUE ☐ UTM ☒ LAMBERT ☐	ZONE:	
PROPOSED DRIFT DIRECTION:	0		
KELLY BUSHING ELEVATION:	12 Feet		
ALTITUDE:	12	Feet	WATER DEPTH: N/A
		Feet	

TIE-IN SURVEY

MEASURED DEPTH:	300		
DRIFT ANGLE:	0		
DRIFT DIRECTION:	0		
TRUE VERTICAL DEPTH:	300		
VERTICAL SECTION:	0		
RECTANGULAR COORDINATE (N / S):	0		
RECTANGULAR COORDINATE (E / W):	0		
CLOSURE DISTANCE / DIRECTION:	0	0	
SURVEY CALCULATION METHOD:	AA ☐	MC ☒	RC ☐ BT ☐
SOURCE OF TIE-IN DATA (COMPANY):	N/A		
COPY OF TIE-IN SURVEY REPORT	☐ YES		☒ NO

WELL PLAN

KICKOFF DEPTH:	N/A	TOTAL DEPTH:	1518 Feet
KICKOFF ANGLE:	N/A	MAX ANGLE:	1

PES Engineers:

James Alcocer

**Signature of both field engineers required if applicable

Directional Driller:

John Engle

DATE: _____

PathFinder Energy Services, Inc.

Magnetic & Grid Calculations

MARBOB ENERGY
FOSTER EDDY FED. #15
EDDY COUNTY, NEW MEXICO
Rig:TEACO 1

Wed Nov 04 22:05:56 2009

Coordinates

Latitude: 32.835324 N (32 deg. 50 min. 7.1661 sec.)
Longitude: 103.889806 W (-103 deg. 53 min. 23.3034 sec.)
Elevation: 3727.00 feet.
Calculation Date: Nov/04/2009

Magnetic Calculations

Model: IGRF2005
Dip Angle: 60.7551 degrees
Total Magnetic Field: 0.49138 gauss
Magnetic Declination: 7.960650 degrees
Horizontal Intensity: 0.240062 gauss
To Convert a Magnetic Dir. to a TRUE North Dir. Add 7.960650 Degr.

Transverse Mercator Grid Calculations NAD27

Grid System: Transverse Mercator: new mexico east
Ellipsoid: Clarke 1866
X: 636230.5000 feet
Y: 667887.9000 feet
True to Grid: (convergence) -0.240495 degrees
Magnetic to Grid: 7.720154 degrees
To Convert a Magnetic Dir. to a GRID dir. Add 7.720154 Degr.

PathFinder Energy Services, Inc.

Magnetic & Grid Calculations

MARBOB ENERGY
FOSTER EDDY FED. #15
EDDY COUNTY, NEW MEXICO
Rig:TEACO 1

Wed Nov 04 22:06:16 2009

Coordinates

Latitude: 32.835324 N (32 deg. 50 min. 7.1661 sec.)
Longitude: 103.889806 W (-103 deg. 53 min. 23.3034 sec.)
Elevation: 3727.00 feet.
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Transverse Mercator Grid Calculations NAD27

Grid System: Transverse Mercator: new mexico east
Ellipsoid: Clarke 1866
X: 636230.5000 feet
Y: 667887.9000 feet
True to Grid: (convergence) -0.240495 degrees
Magnetic to Grid: 7.720154 degrees
To Convert a Magnetic Dir. to a GRID dir. Add 7.720154 Degr.