

DIRECTIONAL SURVEY REPORT

DEVON ENERGY

COTTON DRAW UNIT #121H

EDDY COUNTY, NEW MEXICO



PREPARED BY: FRANCISCO SINISTERRA



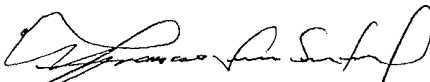
DIRECTIONAL SURVEY COMPANY REPORT:

1. NAME OF SURVEYING COMPANY: PATHFINDER ENERGY SERVICES
2. NAME OF PERSON(S) PERFORMING SURVEY:
A) WAYNE GRAHAM
3. POSITION OF SAID PERSON(S): (A-F) SURVEYORS (FIELD ENGINEERS)
4. DATE(S) ON WHICH SURVEY WAS PERFORMED: 10-11-10 TO 10-22-10
5. STATE IN WHICH SURVEY WAS PERFORMED: NEW MEXICO
6. LOCATION OF WELL: EDDY COUNTY, NM
7. TYPE OF SURVEY(S) PERFORMED: MWD
8. COMPLETE IDENTIFICATION OF WELL:

COG OPERATING
COTTON DRAW UNIT #121H
EDDY COUNTY, NM
RIG: MCVAY #8

9. SURVEY CERTIFIED FROM: 7662 TO 12508 FEET MEASURED DEPTH.

THIS IS TO VERIFY THAT ATTACHED DOCUMENTS SHOWING THE WELL TO BE
DISPLACED AT 4617.01 FEET ON A BEARING OF 180.12 DEGREES FROM THE
CENTER OF THE ROTARY TABLE AT A PROJECTED BIT DEPTH OF 12555 FEET,
ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.



FRANCISCO SINISTERRA
M/LWD SERVICE COORDINATOR

PathFinder Energy Services, Inc.

BHL Report

Page 01/01
Tie-in Date: 10/11/2010
Date Completed: 10/21/2010

DEVON ENERGY
COTTON DRAW UNIT #121H
EDDY COUNTY, NM
Rig:McVAY 8
PathFinder Office Supervisor: FRANCISCO SINSTERRA
PathFinder Field Engineers:W.GRAHAM
C.HARDY

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:32.11.40.8759 N LON:103.45.17.9914 W
GRID Reference:NAD83 new mexico east Transverse Mercator
Ref GRID Coord: X: 720236.1410 Y: 435042.8770
North Aligned To:GRID NORTH
Total Magnetic Correction: 7.44° EAST TO GRID
Vertical Section Plane: 179.65
Survey Vert. Reference: 19.00' Kelly Bushing To Ground
Altitude:3534.00' Ground To MSL

Measured Depth	12555.00	(feet)
Inclination	91.01	(deg)
Azimuth	183.01	(deg)
True Vertical Depth	8277.13	(feet)
Vertical Section	4616.85	(feet)
Survey X cord	720226.37	(feet)
Survey Y cord	430425.86	(feet)
Survey Lat	32.18199672 N	(deg)
Survey Lon	103.75510943 W	(deg)
Rectangular Corr. N/S	4617.00 S	(feet)
Rectangular Corr. E/W	9.74 W	(feet)
Closure Distance	4617.01	(feet)
Direction of Closure	180.12	(deg)
Dogleg Severity	0.00	(deg/100ft)

PathFinder Energy Services, Inc.

Survey Report

DEVON ENERGY
COTTON DRAW UNIT #121H
EDDY COUNTY, NM
Rig:McVAY 8
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PathFinder Field Engineers: W.GRAHAM
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Page 01/04
Tie-in Date: 10/11/2010
Date Completed: 10/21/2010

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GRID Reference:NAD83 new mexico east Transverse Mercator
Ref GRID Coord: X: 720236.1410 Y: 435042.8770
North Aligned To:GRID NORTH
Total Magnetic Correction: 7.44° EAST TO GRID
Vertical Section Plane: 179.65
Survey Vert. Reference: 19.00' Kelly Bushing To Ground
Altitude:3534.00' Ground To MSL

Survey Calculations by RX5 V6.03B 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 GYRODATA SURVEY @ 7648.98' MD.										
7648.98	1.53	167.88	7646.99	0.00	75.28	74.86 S	68.90 E	101.74@	137.37	0.00
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.										
7662.00	1.49	176.32	7660.01	13.02	75.62	75.20 S	68.95 E	102.02@	137.48	1.73
7694.00	1.76	169.83	7691.99	32.00	76.52	76.10 S	69.06 E	102.76@	137.78	1.02
7726.00	4.40	174.84	7723.94	32.00	78.23	77.80 S	69.26 E	104.16@	138.33	8.28
7758.00	7.56	176.85	7755.77	32.00	81.55	81.13 S	69.48 E	106.82@	139.42	9.89
7790.00	10.46	178.64	7787.37	32.00	86.56	86.14 S	69.67 E	110.78@	141.03	9.10
7822.00	13.63	181.28	7818.66	32.00	93.24	92.81 S	69.65 E	116.04@	143.11	10.05
7854.00	17.24	180.11	7849.50	32.00	101.75	101.33 S	69.56 E	122.90@	145.53	11.32
7885.00	20.49	178.79	7878.83	31.00	111.77	111.35 S	69.67 E	131.34@	147.97	10.57
7917.00	23.39	177.62	7908.51	32.00	123.72	123.30 S	70.05 E	141.80@	150.40	9.16
7949.00	26.73	177.41	7937.49	32.00	137.26	136.83 S	70.64 E	153.99@	152.70	10.44
7981.00	30.25	177.97	7965.61	32.00	152.52	152.08 S	71.25 E	167.95@	154.90	11.03
8013.00	33.59	179.71	7992.77	32.00	169.43	169.00 S	71.58 E	183.53@	157.04	10.83
8045.00	37.02	181.01	8018.88	32.00	187.92	187.49 S	71.45 E	200.64@	159.14	10.97
8077.00	40.27	181.20	8043.87	32.00	207.89	207.46 S	71.07 E	219.30@	161.09	10.16
8109.00	43.26	181.16	8067.74	32.00	229.20	228.77 S	70.63 E	239.43@	162.84	9.34
8141.00	46.08	180.98	8090.49	32.00	251.69	251.26 S	70.21 E	260.89@	164.39	8.82
8172.00	48.98	180.73	8111.42	31.00	274.54	274.12 S	69.87 E	282.89@	165.70	9.37
8204.00	52.23	180.23	8131.73	32.00	299.27	298.85 S	69.66 E	306.86@	166.88	10.23
8236.00	55.13	180.27	8150.68	32.00	325.05	324.63 S	69.55 E	332.00@	167.91	9.06
8269.00	57.95	180.24	8168.87	33.00	352.57	352.16 S	69.43 E	358.93@	168.85	8.55
8301.00	60.76	180.34	8185.18	32.00	380.10	379.68 S	69.29 E	385.95@	169.66	8.79
8331.00	63.31	180.57	8199.25	30.00	406.59	406.18 S	69.08 E	412.01@	170.35	8.53
8364.00	66.65	180.33	8213.20	33.00	436.49	436.08 S	68.84 E	441.48@	171.03	10.14

PathFinder Energy Services, Inc.

Survey Report

DEVON ENERGY
COTTON DRAW UNIT #121H
EDDY COUNTY, NM
RIG:McVAY 8

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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)
8394.00	69.20	180.77	8224.48	30.00	464.28	463.87 S	68.58 E	468.91@	171.59	8.61
8426.00	72.28	181.27	8235.03	32.00	494.48	494.07 S	68.04 E	498.74@	172.16	9.74
8458.00	75.53	181.79	8243.90	32.00	525.20	524.80 S	67.22 E	529.09@	172.70	10.28
8490.00	77.73	181.70	8251.30	32.00	556.31	555.92 S	66.27 E	559.86@	173.20	6.88
8522.00	80.64	180.58	8257.31	32.00	587.73	587.34 S	65.64 E	591.00@	173.62	9.72
8554.00	82.39	179.22	8262.03	32.00	619.38	618.99 S	65.70 E	622.47@	173.94	6.90
8586.00	83.54	179.48	8265.95	32.00	651.14	650.75 S	66.06 E	654.09@	174.20	3.68
8617.00	86.09	178.79	8268.75	31.00	682.01	681.61 S	66.53 E	684.85@	174.43	8.52
8650.00	88.55	178.90	8270.29	33.00	714.96	714.57 S	67.19 E	717.72@	174.63	7.46
8713.00	89.25	178.88	8271.50	63.00	777.95	777.54 S	68.41 E	780.55@	174.97	1.11
8777.00	89.96	179.00	8271.94	64.00	841.94	841.53 S	69.60 E	844.40@	175.27	1.12
8841.00	91.01	178.88	8271.40	64.00	905.93	905.52 S	70.78 E	908.28@	175.53	1.65
8904.00	89.96	179.44	8270.87	63.00	968.93	968.51 S	71.70 E	971.16@	175.77	1.89
8968.00	89.96	179.01	8270.91	64.00	1032.92	1032.50 S	72.57 E	1035.05@	175.98	0.67
9031.00	90.31	178.40	8270.76	63.00	1095.91	1095.48 S	73.99 E	1097.98@	176.14	1.12
9096.00	89.08	178.86	8271.11	65.00	1160.90	1160.46 S	75.55 E	1162.92@	176.28	2.02
9160.00	88.55	180.18	8272.43	64.00	1224.89	1224.45 S	76.08 E	1226.81@	176.44	2.22
9224.00	88.90	181.75	8273.86	64.00	1288.85	1288.42 S	75.01 E	1290.60@	176.67	2.51
9288.00	89.08	181.73	8274.98	64.00	1352.80	1352.38 S	73.06 E	1354.35@	176.91	0.28
9351.00	89.34	180.83	8275.85	63.00	1415.77	1415.36 S	71.65 E	1417.17@	177.10	1.49
9415.00	90.13	180.66	8276.15	64.00	1479.75	1479.35 S	70.82 E	1481.04@	177.26	1.26
9479.00	91.10	180.71	8275.46	64.00	1543.74	1543.34 S	70.06 E	1544.93@	177.40	1.52
9543.00	91.54	180.20	8273.99	64.00	1607.72	1607.32 S	69.55 E	1608.83@	177.52	1.05
9607.00	89.78	180.25	8273.25	64.00	1671.71	1671.31 S	69.30 E	1672.75@	177.63	2.75
9670.00	89.69	180.13	8273.54	63.00	1734.70	1734.31 S	69.09 E	1735.69@	177.72	0.24
9732.00	89.96	180.70	8273.73	62.00	1796.70	1796.31 S	68.64 E	1797.62@	177.81	1.02
9795.00	90.40	180.78	8273.53	63.00	1859.68	1859.30 S	67.83 E	1860.54@	177.91	0.71
9859.00	91.23	180.48	8272.60	64.00	1923.67	1923.29 S	67.12 E	1924.46@	178.00	1.45

PathFinder Energy Services, Inc.

Survey Report

DEVON ENERGY
COTTON DRAW UNIT #121H
EDDY COUNTY, NM
RIG:McVAY 8

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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)
9923.00	90.92	181.62	8271.37	64.00	1987.64	1987.27 S	65.95 E	1988.36@	178.10	1.87
9988.00	91.36	181.62	8270.07	65.00	2052.58	2052.23 S	64.11 E	2053.23@	178.21	0.68
10052.00	91.98	181.37	8268.21	64.00	2116.52	2116.18 S	62.44 E	2117.10@	178.31	1.04
10115.00	90.84	180.98	8266.66	63.00	2179.48	2179.15 S	61.15 E	2180.01@	178.39	1.91
10177.00	89.08	180.55	8266.70	62.00	2241.47	2241.14 S	60.33 E	2241.95@	178.46	2.92
10240.00	89.25	180.07	8267.62	63.00	2304.46	2304.13 S	59.98 E	2304.91@	178.51	0.81
10304.00	88.29	180.12	8268.99	64.00	2368.44	2368.12 S	59.88 E	2368.87@	178.55	1.50
10367.00	88.81	180.30	8270.59	63.00	2431.41	2431.10 S	59.65 E	2431.83@	178.59	0.87
10431.00	88.81	179.16	8271.92	64.00	2495.40	2495.08 S	59.95 E	2495.80@	178.62	1.78
10495.00	89.43	179.32	8272.90	64.00	2559.39	2559.07 S	60.80 E	2559.79@	178.64	1.00
10558.00	89.43	179.99	8273.53	63.00	2622.39	2622.06 S	61.18 E	2622.78@	178.66	1.06
10622.00	88.46	180.30	8274.70	64.00	2686.37	2686.05 S	61.02 E	2686.74@	178.70	1.59
10682.00	88.90	180.58	8276.09	60.00	2746.35	2746.03 S	60.55 E	2746.70@	178.74	0.87
10744.00	89.25	181.34	8277.09	62.00	2808.33	2808.02 S	59.52 E	2808.65@	178.79	1.35
10808.00	90.48	182.06	8277.24	64.00	2872.28	2871.98 S	57.62 E	2872.56@	178.85	2.23
10871.00	91.10	181.41	8276.37	63.00	2935.23	2934.95 S	55.71 E	2935.48@	178.91	1.43
10935.00	90.40	181.60	8275.53	64.00	2999.20	2998.92 S	54.03 E	2999.41@	178.97	1.13
10997.00	90.57	181.13	8275.01	62.00	3061.16	3060.90 S	52.55 E	3061.35@	179.02	0.81
11059.00	90.75	180.25	8274.29	62.00	3123.15	3122.89 S	51.81 E	3123.32@	179.05	1.45
11121.00	91.01	179.46	8273.34	62.00	3185.14	3184.88 S	51.96 E	3185.31@	179.07	1.34
11182.00	90.13	179.89	8272.73	61.00	3246.14	3245.88 S	52.31 E	3246.30@	179.08	1.60
11244.00	89.96	180.51	8272.69	62.00	3308.13	3307.88 S	52.09 E	3308.29@	179.10	1.04
11306.00	91.10	181.36	8272.11	62.00	3370.12	3369.87 S	51.08 E	3370.25@	179.13	2.29
11368.00	90.13	181.54	8271.45	62.00	3432.08	3431.84 S	49.51 E	3432.20@	179.17	1.59
11429.00	88.64	181.36	8272.10	61.00	3493.04	3492.82 S	47.97 E	3493.15@	179.21	2.46
11491.00	88.99	180.99	8273.38	62.00	3555.01	3554.79 S	46.70 E	3555.10@	179.25	0.82
11552.00	89.69	181.16	8274.09	61.00	3615.99	3615.78 S	45.55 E	3616.06@	179.28	1.18
11614.00	89.60	180.93	8274.47	62.00	3677.97	3677.76 S	44.42 E	3678.03@	179.31	0.40

PathFinder Energy Services, Inc.

Survey Report

DEVON ENERGY
COTTON DRAW UNIT #121H
EDDY COUNTY, NM
RIG:McVAY 8

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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)
11676.00	89.96	182.25	8274.71	62.00	3739.93	3739.74 S	42.70 E	3739.98@	179.35	2.21
11768.00	89.96	182.74	8274.77	92.00	3831.82	3831.65 S	38.70 E	3831.85@	179.42	0.53
11861.00	89.34	183.62	8275.34	93.00	3924.64	3924.50 S	33.54 E	3924.65@	179.51	1.16
11953.00	91.28	185.52	8274.84	92.00	4016.29	4016.20 S	26.21 E	4016.29@	179.63	2.95
12045.00	89.52	183.54	8274.20	92.00	4107.94	4107.90 S	18.94 E	4107.95@	179.74	2.88
12138.00	88.02	183.23	8276.20	93.00	4200.72	4200.72 S	13.45 E	4200.74@	179.82	1.65
12232.00	88.81	183.08	8278.80	94.00	4294.51	4294.54 S	8.28 E	4294.55@	179.89	0.86
12324.00	89.60	183.07	8280.07	92.00	4386.34	4386.40 S	3.35 E	4386.40@	179.96	0.86
12416.00	91.01	183.58	8279.58	92.00	4478.14	4478.24 S	1.99 W	4478.24@	180.03	1.63
12508.00	91.01	183.01	8277.96	92.00	4569.94	4570.07 S	7.28 W	4570.08@	180.09	0.62
STRAIGHT LINE PROJECTION TO BIT @ 12555'MD (8277'TVD)										
12555.00	91.01	183.01	8277.13	47.00	4616.85	4617.00 S	9.74 W	4617.01@	180.12	0.00



A Schlumberger Company

TIE-IN SURVEY INFORMATION SHEET**CLIENT INFORMATION**

CLIENT:	DEVON ENERGY		
LEASE / WELL No.:	COTTON DRAW UNIT	#121H	
WELL LOCATION:	EDDY COUNTY		
COUNTY / STATE / COUNTRY:	EDDY	NM	USA
RIG:	MCVAY 8		
API WELL No:	30-015-37409		
JOB No:	700000553-WT-WT		
P.O. / AFE No.	150455		
DIRECTIONAL COMPANY:	PES		

WELL SITE INFORMATION

TOTAL MAGNETIC CORRECTION (TMC):			
On Wall Plat:	7.44	LWD Calculated:	7.44
		Agreed Upon:	7.44
X =	720236.141000	Feet	Y = 435042.877000
			Feet
SITE LATITUDE:	32.194688 N	SITE LONGITUDE:	103.754998
GRID SYSTEM:	TRUE ☒ UTM ☐ LAMBERT ☐	ZONE:	NEW MEXICO EAST
PROPOSED DRIFT DIRECTION:	179.65		
KELLY BUSHING ELEVATION:	3553		
ALTITUDE:	3534	Feet	WATER DEPTH:
			Feet

TIE-IN SURVEY

MEASURED DEPTH:	7648		
DRIFT ANGLE:	1.53		
DRIFT DIRECTION:	167.88		
TRUE VERTICAL DEPTH:	7646.99		
VERTICAL SECTION:	75.28		
RECTANGULAR COORDINATE (N / S) :	74.86 S		
RECTANGULAR COORDINATE (E / W) :	68.9 E		
CLOSURE DISTANCE / DIRECTION:	101.7	137.4	
SURVEY CALCULATION METHOD:	AA ☐	MC ☒	RC ☐ BT ☐
SOURCE OF TIE-IN DATA (COMPANY):	Gyrodata		
COPY OF TIE-IN SURVEY REPORT	☒ YES ☐ NO		

WELL PLAN

KICKOFF DEPTH:	7737	TOTAL DEPTH:	12555
KICKOFF ANGLE:	1.53	MAX ANGLE:	91

PES Engineers: W.GRAHAM
C.HARDY

**Signature of both field engineers required if applicable

Directional Driller: S.BRANDTDATE: 10-Oct-2010

PathFinder Energy Services, Inc.

Magnetic & Grid Calculations

DEVON ENERGY
COTTON DRAW UNIT #121H
EDDY COUNTY, NEW MEXICO
Rig:McVAY 8

Sun Oct 10 08:27:33 2010

Coordinates

Latitude: 32.194688 N (32 deg. 11 min. 40.8759 sec.)
Longitude: 103.754998 W (-103 deg. 45 min. 17.9914 sec.)
Elevation: 3553.00 feet.
Calculation Date: Oct/10/2010

Magnetic Calculations

Model: IGRF2010
Dip Angle: 60.1446 degrees
Total Magnetic Field: 0.48645 gauss
Magnetic Declination: 7.750721 degrees
Horizontal Intensity: 0.242163 gauss
To Convert a Magnetic Dir. to a TRUE North Dir. Add 7.750721 Degr

Transverse Mercator Grid Calculations NAD83

Grid System: Transverse Mercator: new mexico east
Ellipsoid: GRS80
X: 720236.1410 feet
Y: 435042.8770 feet
True to Grid: (convergence) -0.308144 degrees
Magnetic to Grid: 7.442577 degrees
To Convert a Magnetic Dir. to a GRID dir. Add 7.442577 Degr.

FNL 330
FWL 660



November 5, 2010

Devon Energy
20 N. Broadway
Oklahoma City, OK 73102

RE: Devon Energy
Cotton Draw Unit #121H
Eddy County, NM
Rig: McVay #8
Field: Bone Springs
PED File No.: 700000533-WT-WT

To whom it may concern:

We hereby certify that the enclosed Original Field Survey Data contained in this report represents to the best of our knowledge, a true and accurate survey of the well at the time the survey was run.

DIRECTIONAL SURVEY DATA
1 – Original survey report
2 – Survey report copies

We appreciate the opportunity to work with you and we look forward to your business support. If you have any questions, I can be reached at (432) 687-1647

Sincerely,

FRANCISCO SINISTERRA
M/LWD Service Coordinator
PathFinder Energy Services

ML:sh

