

PATHFINDER

An Operating Unit of Smith International, Inc.

HOBBS OCD

AUG 29 2011

RECEIVED

HOBBS OCD

AUG 29

RECEIVED

DIRECTIONAL SURVEY REPORT

30-015-38338

DEVON ENERGY

EMERALD PWU 20 #1H

EDDY COUNTY, NEW MEXICO

PREPARED BY: FRANCISCO SINISTERRA

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

Pathfinder

6213 W Interstate 20
Midland, Texas 79706
Tel 432 687 1647
Fax 432 687 1544

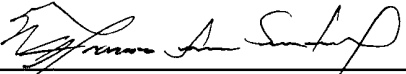


DIRECTIONAL SURVEY COMPANY REPORT:

1. NAME OF SURVEYING COMPANY: PATHFINDER ENERGY SERVICES
2. NAME OF PERSON(S) PERFORMING SURVEY:
A) DAVID PHILLIPS
3. POSITION OF SAID PERSON(S): (A-F) SURVEYORS (FIELD ENGINEERS)
4. DATE(S) ON WHICH SURVEY WAS PERFORMED: 03-07-11 TO 03-15-11
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:

DEVON ENERGY
EMERALD PWU 20 #1H
EDDY COUNTY, NM
RIG: H&P 300
9. SURVEY CERTIFIED FROM: 7189 TO 12134 FEET MEASURED DEPTH.

THIS IS TO VERIFY THAT ATTACHED DOCUMENTS SHOWING THE WELL TO BE DISPLACED AT 4638.79 FEET ON A BEARING OF 89.97 DEGREES FROM THE CENTER OF THE ROTARY TABLE AT A PROJECTED BIT DEPTH OF 12214.22 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: 03/06/2011
Date Completed: 03/14/2011

DEVON ENREGY CORPORATION
EMERALD PWU 20 #1H
EDDY COUNTY, NM
Rig:H&P 300
PathFinder Office Supervisor: FRANSISCO SINISTERRA
PathFinder Field Engineers:DAVID PHILLIPS
RYAN MILLER

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:32.39.9.1286 N LON:104.6.16.3212 W
GRID Reference:NAD83 new mexico east Transverse Mercator
Ref GRID Coord: X: 611755.8400 Y: 601199.3200
North Aligned To:GRID NORTH
Total Magnetic Correction: 7.77° EAST TO GRID
Vertical Section Plane: 90.02
Survey Vert. Reference: 25.00' Rotary Table To Ground
Altitude:3352.70' Ground To MSL

Measured Depth	12214.22	(feet)
Inclination	88.20	(deg)
Azimuth	91.09	(deg)
True Vertical Depth	7883.28	(feet)
Vertical Section	4638.79	(feet)
Survey X cord	616394.63	(feet)
Survey Y cord	601201.45	(feet)
Survey Lat	32.65251321 N	(deg)
Survey Lon	104.08946166 W	(deg)
Rectangular Corr. N/S	2.13 N	(feet)
Rectangular Corr. E/W	4638.79 E	(feet)
Closure Distance	4638.79	(feet)
Direction of Closure	89.97	(deg)
Dogleg Severity	0.00	(deg/100ft)

PathFinder Energy Services, Inc.

Survey Report

DEVON ENREGY CORPORATION

EMERALD PWU 20 #1H

EDDY COUNTY, NM

Rig:H&P 300

PathFinder Office Supervisor: FRANCISCO SINISTERRA

PathFinder Field Engineers: DAVID PHILLIPS

RYAN MILLER

Survey Horiz. Reference:WELLHEAD

Ref Coordinates: LAT:32.39.9.1286 N LON:104.6.16.3212 W

GRID Reference:NAD83 new mexico east Transverse Mercator

Ref GRID Coord: X: 611755.8400 Y: 601199.3200

North Aligned To:GRID NORTH

Total Magnetic Correction: 7.77° EAST TO GRID

Vertical Section Plane: 90.02

Survey Vert. Reference: 25.00' Rotary Table To Ground

Altitude:3352.70' Ground To MSL

Survey Calculations by RX5 V6.03D 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)
TIED INTO SCIENTIC DRILLING SURVEYS AT 7110'MD.										
7110.00	1.27	70.02	7108.71	0.00	-37.21	91.97 N	37.18 W	99.20@	337.99	0.00
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.										
7189.00	2.81	94.17	7187.66	79.00	-34.46	92.13 N	34.43 W	98.35@	339.51	2.19
7218.00	5.54	95.05	7216.58	29.00	-32.35	91.95 N	32.32 W	97.47@	340.63	9.42
7252.00	9.15	93.99	7250.30	34.00	-28.02	91.62 N	27.99 W	95.80@	343.01	10.62
7283.00	12.49	93.55	7280.74	31.00	-22.21	91.24 N	22.18 W	93.90@	346.34	10.78
7313.00	15.83	94.61	7309.82	30.00	-14.90	90.71 N	14.86 W	91.92@	350.69	11.17
7346.00	18.82	96.10	7341.32	33.00	-5.11	89.78 N	5.08 W	89.93@	356.76	9.16
7378.00	20.66	97.86	7371.44	32.00	5.61	88.46 N	5.64 E	88.64@	3.65	6.04
7407.00	23.13	98.65	7398.35	29.00	16.31	86.91 N	16.34 E	88.43@	10.65	8.58
7440.00	25.59	98.65	7428.41	33.00	29.77	84.86 N	29.80 E	89.94@	19.35	7.46
7473.00	28.05	97.86	7457.86	33.00	44.50	82.73 N	44.53 E	93.95@	28.29	7.53
7502.00	31.30	96.89	7483.05	29.00	58.74	80.89 N	58.77 E	99.99@	36.00	11.33
7536.00	34.12	96.45	7511.65	34.00	76.99	78.76 N	77.02 E	110.16@	44.36	8.32
7567.00	36.05	95.84	7537.02	31.00	94.71	76.85 N	94.73 E	121.99@	50.95	6.33
7597.00	38.60	95.05	7560.88	30.00	112.81	75.13 N	112.84 E	135.56@	56.34	8.65
7630.00	41.42	94.52	7586.15	33.00	133.95	73.36 N	133.98 E	152.75@	61.30	8.61
7662.00	43.35	95.13	7609.78	32.00	155.45	71.55 N	155.47 E	171.15@	65.29	6.17
7691.00	45.46	96.36	7630.50	29.00	175.64	69.51 N	175.66 E	188.91@	68.41	7.86
7725.00	47.48	96.89	7653.92	34.00	200.12	66.67 N	200.15 E	210.96@	71.58	6.05
7756.00	49.86	96.98	7674.39	31.00	223.23	63.86 N	223.25 E	232.20@	74.04	7.68
7787.00	51.44	96.98	7694.04	31.00	247.02	60.94 N	247.04 E	254.45@	76.14	5.10
7819.00	53.73	96.72	7713.48	32.00	272.26	57.91 N	272.28 E	278.37@	77.99	7.18
7851.00	56.45	96.98	7731.80	32.00	298.31	54.78 N	298.33 E	303.32@	79.59	8.53
7880.00	59.27	97.07	7747.22	29.00	322.68	51.78 N	322.70 E	326.83@	80.88	9.73

PathFinder Energy Services, Inc.

Survey Report

DEVON ENREGY CORPORATION
EMERALD PWU 20 #1H
EDDY COUNTY, NM
RIG:H&P 300

Page 02/03

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)
7914.00	62.70	97.42	7763.71	34.00	352.17	48.03 N	352.19 E	355.45@	82.23	10.13
7944.00	65.42	96.89	7776.83	30.00	378.94	44.67 N	378.95 E	381.58@	83.28	9.21
7975.00	68.59	96.28	7788.94	31.00	407.28	41.40 N	407.30 E	409.40@	84.20	10.39
8009.00	72.19	95.92	7800.35	34.00	439.13	38.00 N	439.14 E	440.78@	85.05	10.64
8040.00	75.45	95.31	7808.99	31.00	468.75	35.09 N	468.77 E	470.08@	85.72	10.68
8070.00	78.61	95.31	7815.72	30.00	497.86	32.38 N	497.87 E	498.92@	86.28	10.53
8103.00	82.75	96.01	7821.06	33.00	530.26	29.17 N	530.27 E	531.07@	86.85	12.72
8137.00	86.79	97.59	7824.16	34.00	563.87	25.16 N	563.88 E	564.44@	87.45	12.75
8167.00	88.64	97.24	7825.36	30.00	593.60	21.29 N	593.61 E	593.99@	87.95	6.28
8200.00	87.85	95.92	7826.37	33.00	626.37	17.51 N	626.37 E	626.62@	88.40	4.66
8232.00	86.70	94.52	7827.89	32.00	658.20	14.60 N	658.20 E	658.36@	88.73	5.66
8262.00	85.91	93.11	7829.82	30.00	688.07	12.61 N	688.07 E	688.19@	88.95	5.38
8356.00	85.82	89.24	7836.60	94.00	781.79	10.69 N	781.79 E	781.86@	89.22	4.11
8451.00	87.67	88.37	7842.00	95.00	876.61	12.67 N	876.61 E	876.70@	89.17	2.15
8545.00	88.81	88.10	7844.88	94.00	970.51	15.56 N	970.52 E	970.64@	89.08	1.25
8640.00	88.81	88.63	7846.86	95.00	1065.45	18.27 N	1065.46 E	1065.62@	89.02	0.56
8735.00	88.81	88.89	7848.83	95.00	1160.41	20.33 N	1160.42 E	1160.60@	89.00	0.27
8829.00	88.99	89.16	7850.64	94.00	1254.38	21.93 N	1254.39 E	1254.58@	89.00	0.35
8924.00	88.81	88.81	7852.46	95.00	1349.35	23.61 N	1349.35 E	1349.56@	89.00	0.41
9018.00	88.29	88.98	7854.84	94.00	1443.30	25.42 N	1443.31 E	1443.53@	88.99	0.58
9113.00	88.20	88.98	7857.75	95.00	1538.24	27.11 N	1538.25 E	1538.49@	88.99	0.09
9207.00	87.93	89.16	7860.92	94.00	1632.17	28.64 N	1632.18 E	1632.43@	88.99	0.35
9302.00	88.11	90.04	7864.20	95.00	1727.11	29.30 N	1727.12 E	1727.37@	89.03	0.94
9399.00	88.72	90.39	7866.89	97.00	1824.07	28.94 N	1824.08 E	1824.31@	89.09	0.72
9491.00	88.37	90.04	7869.22	92.00	1916.04	28.59 N	1916.05 E	1916.26@	89.15	0.54
9586.00	88.99	89.68	7871.41	95.00	2011.02	28.82 N	2011.03 E	2011.23@	89.18	0.75
9680.00	89.60	90.04	7872.57	94.00	2105.01	29.05 N	2105.02 E	2105.22@	89.21	0.75
9776.00	89.60	90.48	7873.24	96.00	2201.00	28.62 N	2201.01 E	2201.20@	89.26	0.46

PathFinder Energy Services, Inc.

Survey Report

DEVON ENREGY CORPORATION
EMERALD PWU 20 #1H
EDDY COUNTY, NM
RIG:H&P 300

Page 03/03

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)
9869.00	89.08	90.56	7874.31	93.00	2293.99	27.77 N	2294.00 E	2294.17@	89.31	0.57
9963.00	89.43	91.62	7875.53	94.00	2387.97	25.98 N	2387.98 E	2388.12@	89.38	1.19
10058.00	89.34	91.71	7876.55	95.00	2482.92	23.22 N	2482.93 E	2483.04@	89.46	0.13
10152.00	89.08	91.53	7877.85	94.00	2576.88	20.57 N	2576.89 E	2576.97@	89.54	0.34
10247.00	89.34	91.44	7879.16	95.00	2671.84	18.11 N	2671.84 E	2671.91@	89.61	0.29
10341.00	89.60	91.00	7880.03	94.00	2765.81	16.10 N	2765.82 E	2765.87@	89.67	0.54
10436.00	89.87	90.48	7880.47	95.00	2860.80	14.88 N	2860.81 E	2860.85@	89.70	0.62
10531.00	90.22	89.68	7880.39	95.00	2955.80	14.75 N	2955.81 E	2955.85@	89.71	0.92
10625.00	89.43	89.07	7880.68	94.00	3049.80	15.77 N	3049.80 E	3049.84@	89.70	1.06
10720.00	90.48	90.48	7880.75	95.00	3144.79	16.14 N	3144.80 E	3144.84@	89.71	1.85
10814.00	90.48	89.68	7879.97	94.00	3238.79	16.01 N	3238.79 E	3238.83@	89.72	0.85
10909.00	89.60	90.12	7879.90	95.00	3333.79	16.18 N	3333.79 E	3333.83@	89.72	1.04
11004.00	89.69	90.56	7880.49	95.00	3428.78	15.61 N	3428.79 E	3428.82@	89.74	0.47
11098.00	90.48	90.74	7880.35	94.00	3522.78	14.55 N	3522.78 E	3522.81@	89.76	0.86
11193.00	90.31	90.12	7879.69	95.00	3617.77	13.84 N	3617.77 E	3617.80@	89.78	0.68
11288.00	90.48	90.04	7879.04	95.00	3712.77	13.70 N	3712.77 E	3712.80@	89.79	0.20
11382.00	90.92	90.39	7877.89	94.00	3806.76	13.35 N	3806.76 E	3806.79@	89.80	0.60
11476.00	90.57	91.27	7876.67	94.00	3900.74	11.99 N	3900.75 E	3900.76@	89.82	1.01
11571.00	90.04	91.44	7876.16	95.00	3995.71	9.74 N	3995.72 E	3995.73@	89.86	0.59
11666.00	89.96	90.74	7876.16	95.00	4090.70	7.93 N	4090.70 E	4090.71@	89.89	0.74
11760.00	90.31	90.21	7875.94	94.00	4184.69	7.16 N	4184.70 E	4184.70@	89.90	0.68
11855.00	89.69	90.21	7875.94	95.00	4279.69	6.81 N	4279.69 E	4279.70@	89.91	0.65
11949.00	89.34	90.65	7876.74	94.00	4373.69	6.10 N	4373.69 E	4373.69@	89.92	0.60
12044.00	88.72	90.65	7878.34	95.00	4468.67	5.02 N	4468.67 E	4468.67@	89.94	0.65
12134.00	88.20	91.09	7880.76	90.00	4558.62	3.66 N	4558.62 E	4558.63@	89.95	0.76
STRAIGHT LINE PROJECTION TO BIT AT 12214.22'MD.										
12214.22	88.20	91.09	7883.28	80.22	4638.79	2.13 N	4638.79 E	4638.79@	89.97	0.00



A Schlumberger Company

TIE-IN SURVEY INFORMATION SHEET

CLIENT INFORMATION

CLIENT:	Devon Energy		
LEASE / WELL No.:	Emerald PWU 20 #1H		
WELL LOCATION:	EDDY COUNTY		
COUNTY / STATE / COUNTRY:	EDDY	NM	USA
RIG:	H&P 300		
API WELL No:	30-015-38338		
JOB No:	700001794 WT-WT		
P.O. / AFE No.	158214		
DIRECTIONAL COMPANY:	Pathfinder		

WELL SITE INFORMATION

TOTAL MAGNETIC CORRECTION (TMC):			
<i>On Wall Plat:</i>		<i>LWD Calculated:</i>	
X = 611755.840000		Y = 60199.320000	
Feet		Feet	
SITE LATITUDE:		SITE LONGITUDE:	
GRID SYSTEM:	TRUE ☐ UTM ☐ LAMBERT ☒	ZONE:	NAD 83
PROPOSED DRIFT DIRECTION:		90.02	
KELLY BUSHING ELEVATION:		25'	
ALTITUDE:	3252.7	Feet	WATER DEPTH:
		Feet	

TIE-IN SURVEY

MEASURED DEPTH:	7110
DRIFT ANGLE:	1.27
DRIFT DIRECTION:	70.02
TRUE VERTICAL DEPTH:	7108.71
VERTICAL SECTION:	
RECTANGULAR COORDINATE (N / S) :	91.96
RECTANGULAR COORDINATE (E / W) :	-37.98
CLOSURE DISTANCE / DIRECTION:	90.02
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:	12214.64
KICKOFF ANGLE:	MAX ANGLE: 90.06

PES Engineers: David Phillips

**Signature of both field engineers required if applicable

Directional Driller: _____

DATE: 6-Mar-2011

PathFinder Energy Services, Inc.

Magnetic & Grid Calculations

DEVON ENERGY
EMERALD PWU "20" #1H
EDDY COUNTY, NEW MEXICO
Rig:HP 300

Wed Mar 02 19:32:02 2011

Coordinates

Latitude: 32.652536 N (32 deg. 39 min. 9.1286 sec.)
Longitude: 104.104534 W (-104 deg. 6 min. 16.3212 sec.)
Elevation: 3370.70 feet.
Calculation Date: Mar/02/2011

Magnetic Calculations

Model: IGRF2010
Dip Angle: 60.4980 degrees
Total Magnetic Field: 0.48844 gauss
Magnetic Declination: 7.898158 degrees
Horizontal Intensity: 0.240534 gauss
To Convert a Magnetic Dir. to a TRUE North Dir. Add 7.898158 Degs

Transverse Mercator Grid Calculations NAD83

Grid System: Transverse Mercator: new mexico east
Ellipsoid: GRS80
X: 611755.8400 feet
Y: 601199.3200 feet
True to Grid: (convergence) -0.123448 degrees
Magnetic to Grid: 7.774710 degrees

To Convert a Magnetic Dir. to a GRID dir. Add 7.774710 Degs.

PathFinder Energy Services, Inc.

Magnetic & Grid Calculations

Sun Mar 06 18:41:21 2011

Coordinates

Latitude: 32.652536 N (32 deg. 39 min. 9.1286 sec.)
Longitude: 104.104534 W (-104 deg. 6 min. 16.3212 sec.)
Elevation: 3370.70 feet.
Calculation Date: Mar/06/2011

Magnetic Calculations

Model: IGRF2010
Dip Angle: 60.4977 degrees
Total Magnetic Field: 0.48843 gauss
Magnetic Declination: 7.896824 degrees
Horizontal Intensity: 0.240530 gauss
To Convert a Magnetic Dir. to a TRUE North Dir. Add 7.896824 Degr

Transverse Mercator Grid Calculations NAD83

Grid System: Transverse Mercator: new mexico east
Ellipsoid: GRS80
X: 611755.8400 feet
Y: 601199.3200 feet
True to Grid: (convergence) -0.123448 degrees
Magnetic to Grid: 7.773376 degrees
To Convert a Magnetic Dir. to a GRID dir. Add 7.773376 Degr.