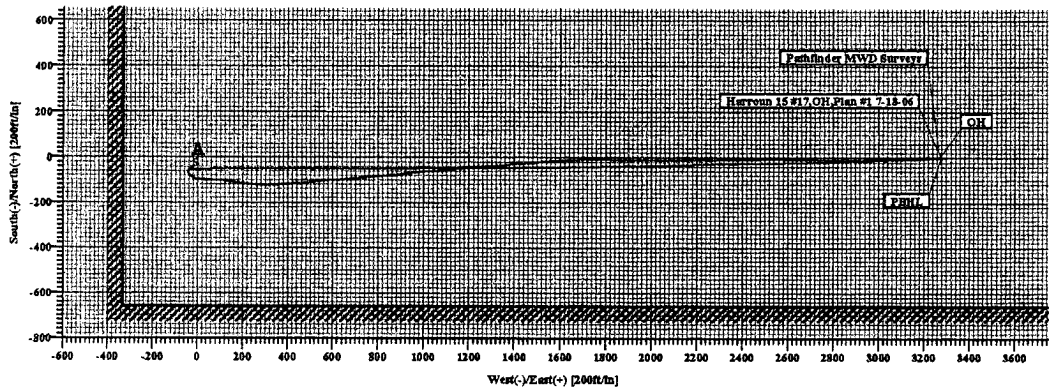
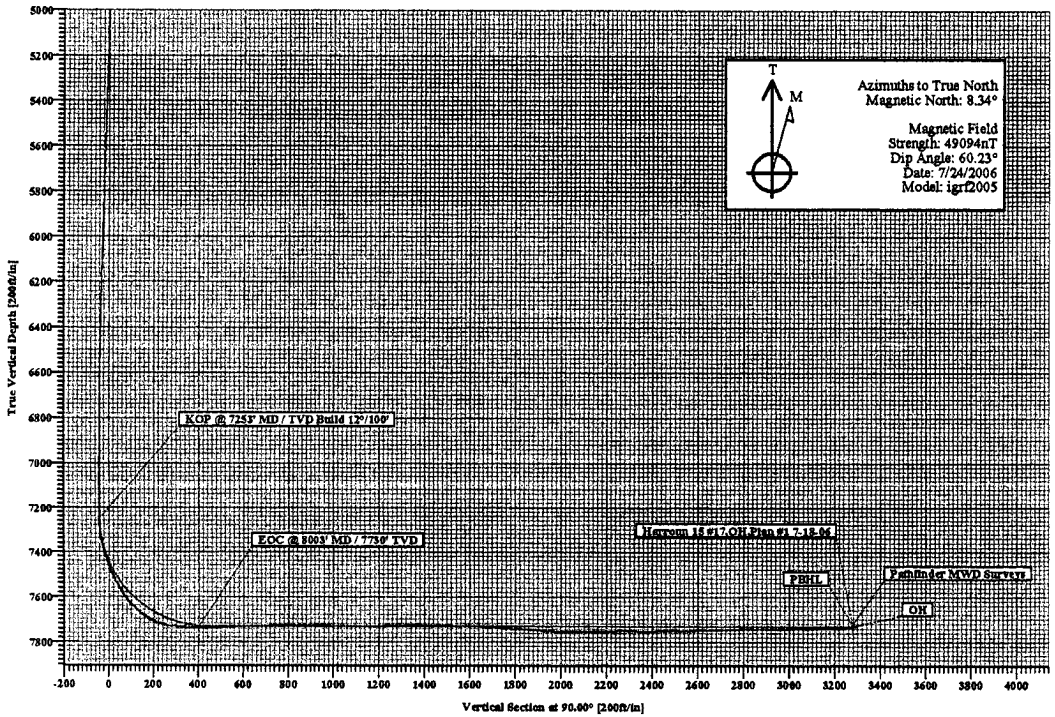
Field: Eddy County, NM NAD-27
Site: Pierce Crossing Bone Spring East
Well: Harroun 15 #17
Wellpath: OH
Survey: Pathfinder MWD Surveys





CONFIDENTIAL

SITE DETAILS

Pierce Crossing Bone Spring East

Site Centre Latitude: 32°12'43.092N
Longitude: 103°58'45.552W

Ground Level: 2927.00
Positional Uncertainty: 0.00
Convergence: 0.19

TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
PBHL	7730.45	0.00	3277.46	Point

FIELD DETAILS

Eddy County, NM NAD-27

Geodetic System: US State Plane Coordinate System 1927
Ellipsoid: NAD27 (Clarke 1866)
Zone: New Mexico, Eastern Zone
Magnetic Model: igrf2005

System Datum: Mean Sea Level
Local North: True North

WELLPATH DETAILS

OH

Rig:
Ref. Datum: Ground Level 2927.00ft

V.Section Angle	Origin +N/-S	Origin +E/-W	Starting From TVD
90.00°	0.00	0.00	0.00

ANNOTATIONS

No.	TVD	MD	Annotation
1	7251.14	7253.00	KOP @ 7253' MD / TVD Build 12°/100'
2	7737.29	8002.98	EOC @ 8003' MD / 7730' TVD

Survey: Pathfinder MWD Surveys (Harroun 15 #17/OH)

No	MD	Inc	Az	TVD	+N/-S	+E/-W	DLeg	TFace	VSec
111	10447.00	91.01	90.08	7742.26	-8.76	2838.05	0.28	0.00	2838.05
112	10479.00	91.19	90.43	7741.65	-8.90	2870.05	1.23	62.78	2870.05
113	10511.00	90.57	89.11	7741.16	-8.78	2902.04	4.56	-115.15	2902.04
114	10607.00	91.01	88.06	7739.83	-6.41	2998.00	1.19	-67.26	2998.00
115	10703.00	91.19	88.50	7737.99	-3.52	3093.94	0.50	67.74	3093.94
116	10830.00	91.08	88.35	7735.48	-0.03	3220.87	0.15	-126.26	3220.87
117	10880.00	91.08	88.35	7734.53	1.40	3270.84	0.00	0.00	3270.84

Survey Pathfinder MWD Surveys (Harroun 15 #17/OH)
Created By: M.McMillan Date: 8/11/2006

Pathfinder Energy
Survey Report

Company:	POGO Producing Company	**Date:** 8/11/2006 **Time:** 15:41:41	**Page:** 1
Field:	Eddy County, NM NAD-27	**Co-ordinate(NE) Reference:**	Well: Harroun 15 #17, True North
Site:	Pierce Crossing Bone Spring East	**Vertical (TVD) Reference:**	Ground Level 2927.0
Well:	Harroun 15 #17	**Section (VS) Reference:**	Well (0.00N,0.00E,90.00Azi)
Wellpath:	OH	**Survey Calculation Method:**	Minimum Curvature **Db:** Sybase

Field: Eddy County, NM NAD-27

Map System:	US State Plane Coordinate System 1927	**Map Zone:**	New Mexico, Eastern Zone
Geo Datum:	NAD27 (Clarke 1866)	**Coordinate System:**	Well Centre
Sys Datum:	Mean Sea Level	**Geomagnetic Model:**	igrf2005

Site: Pierce Crossing Bone Spring East

Site Position:		**Northing:**	441014.39 ft	**Latitude:**	32 12 43.092 N
From:	Geographic	**Easting:**	609489.34 ft	**Longitude:**	103 58 45.552 W
Position Uncertainty:	0.00 ft			**North Reference:**	True
Ground Level:	2927.00 ft			**Grid Convergence:**	0.19 deg

Well: Harroun 15 #17 **Slot Name:**

Well Position:	+N/-S	0.00 ft	**Northing:**	441014.39 ft	**Latitude:**	32 12 43.092 N
	+E/-W	0.00 ft	**Easting :**	609489.34 ft	**Longitude:**	103 58 45.552 W
Position Uncertainty:		0.00 ft				

Wellpath: OH

				Drilled From:	Surface
				Tie-on Depth:	0.00 ft
Current Datum:	Ground Level	**Height**	2927.00 ft	**Above System Datum:**	Mean Sea Level
Magnetic Data:	7/24/2006			**Declination:**	8.34 deg
Field Strength:	49094 nT			**Mag Dip Angle:**	60.23 deg

Vertical Section: Depth From (TVD) ft	+N/-S ft	+E/-W ft	**Direction** deg
0.00	0.00	0.00	90.00

Survey: Pathfinder MWD Surveys **Start Date:** 8/1/2006

Company:	Pathfinder Energy	**Engineer:**	Midwellplan
Tool:		**Tied-to:**	From: Definitive Path

Survey: Pathfinder MWD Surveys

MD ft	Incl deg	Azim deg	TVD ft	+N/-S ft	+E/-W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	Tool/Comment
6600.00	1.39	234.40	6598.71	-54.73	-40.62	-40.62	0.00	0.00	0.00	
6647.00	0.18	291.70	6645.70	-55.03	-41.15	-41.15	2.77	-2.57	121.91	
6743.00	0.44	11.77	6741.70	-54.62	-41.21	-41.21	0.46	0.27	83.41	
6839.00	0.53	357.00	6837.70	-53.81	-41.16	-41.16	0.16	0.09	-15.39	
6935.00	0.62	301.45	6933.69	-53.10	-41.63	-41.63	0.56	0.09	-57.86	
7029.00	1.67	202.93	7027.68	-54.10	-42.59	-42.59	1.98	1.12	-104.81	
7125.00	3.96	184.82	7123.56	-58.69	-43.42	-43.42	2.53	2.39	-18.86	
7157.00	4.22	185.44	7155.48	-60.96	-43.62	-43.62	0.82	0.81	1.94	
7189.00	4.75	188.96	7187.38	-63.44	-43.94	-43.94	1.87	1.66	11.00	
7221.00	4.92	193.53	7219.27	-66.09	-44.47	-44.47	1.32	0.53	14.28	
7253.00	5.54	166.72	7251.14	-68.92	-44.43	-44.43	7.80	1.94	-83.78	
7285.00	8.79	141.67	7282.89	-72.35	-42.56	-42.56	13.86	10.16	-78.28	
7318.00	11.26	133.94	7315.39	-76.56	-38.68	-38.68	8.51	7.48	-23.42	
7350.00	14.16	131.04	7346.60	-81.30	-33.47	-33.47	9.28	9.06	-9.06	
7382.00	16.27	123.92	7377.48	-86.37	-26.80	-26.80	8.80	6.59	-22.25	
7414.00	17.59	112.05	7408.10	-90.69	-18.60	-18.60	11.54	4.12	-37.09	
7446.00	19.17	104.23	7438.47	-93.80	-9.02	-9.02	9.14	4.94	-24.44	
7478.00	20.84	98.96	7468.54	-95.98	1.70	1.70	7.67	5.22	-16.47	
7509.00	23.92	95.09	7497.21	-97.39	13.41	13.41	11.01	9.94	-12.48	
7541.00	26.56	90.25	7526.15	-98.00	27.03	27.03	10.47	8.25	-15.12	
7573.00	29.55	91.92	7554.39	-98.30	42.07	42.07	9.66	9.34	5.22	
7606.00	32.10	93.07	7582.72	-99.04	58.96	58.96	7.93	7.73	3.48	
7637.00	37.20	93.24	7608.22	-100.01	76.55	76.55	16.45	16.45	0.55	
7669.00	42.91	94.74	7632.70	-101.46	97.09	97.09	18.10	17.84	4.69	

CONFIDENTIAL

Pathfinder Energy
Survey Report

Company:	POGO Producing Company	**Date:** 8/11/2006 **Time:** 15:41:41	**Page:** 2
Field:	Eddy County, NM NAD-27	**Co-ordinate(NE) Reference:**	Well: Harroun 15 #17, True North
Site:	Pierce Crossing Bone Spring East	**Vertical (TVD) Reference:**	Ground Level 2927.0
Well:	Harroun 15 #17	**Section (VS) Reference:**	Well (0.00N,0.00E,90.00Azi)
Wellpath:	OH	**Survey Calculation Method:**	Minimum Curvature **Db:** Sybase

Survey: Pathfinder MWD Surveys

MD ft	Incl deg	Azim deg	TVD ft	+N/-S ft	+E/-W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	Tool/Comment
7701.00	47.78	98.60	7655.19	-104.13	119.68	119.68	17.47	15.22	12.06	
7732.00	52.41	97.37	7675.07	-107.43	143.22	143.22	15.24	14.94	-3.97	
7765.00	57.86	97.20	7693.93	-110.86	170.07	170.07	16.52	16.52	-0.52	
7796.00	64.46	98.08	7708.87	-114.47	196.97	196.97	21.43	21.29	2.84	
7828.00	72.28	96.23	7720.66	-118.16	226.46	226.46	25.02	24.44	-5.78	
7860.00	81.34	94.91	7727.96	-121.17	257.43	257.43	28.60	28.31	-4.12	
7892.00	86.79	90.78	7731.27	-122.75	289.21	289.21	21.32	17.03	-12.91	
7924.00	86.44	88.32	7733.15	-122.50	321.15	321.15	7.75	-1.09	-7.69	
7956.00	85.82	85.95	7735.31	-120.90	353.03	353.03	7.64	-1.94	-7.41	
7988.00	88.20	85.24	7736.98	-118.45	384.89	384.89	7.76	7.44	-2.22	
8020.00	90.84	84.80	7737.25	-115.67	416.77	416.77	8.36	8.25	-1.37	
8051.00	91.98	84.98	7736.49	-112.91	447.63	447.63	3.72	3.68	0.58	
8083.00	92.07	85.07	7735.36	-110.14	479.49	479.49	0.40	0.28	0.28	
8115.00	92.15	85.07	7734.18	-107.39	511.35	511.35	0.25	0.25	0.00	
8147.00	92.07	85.24	7733.00	-104.69	543.22	543.22	0.59	-0.25	0.53	
8179.00	92.07	85.33	7731.85	-102.06	575.09	575.09	0.28	0.00	0.28	
8211.00	91.63	84.98	7730.81	-99.36	606.96	606.96	1.76	-1.37	-1.09	
8243.00	91.36	85.16	7729.98	-96.61	638.83	638.83	1.01	-0.84	0.56	
8275.00	91.28	85.33	7729.24	-93.96	670.71	670.71	0.59	-0.25	0.53	
8307.00	90.48	84.98	7728.75	-91.25	702.59	702.59	2.73	-2.50	-1.09	
8339.00	90.22	84.63	7728.55	-88.36	734.46	734.46	1.36	-0.81	-1.09	
8371.00	90.13	84.80	7728.46	-85.41	766.32	766.32	0.60	-0.28	0.53	
8403.00	90.31	84.80	7728.33	-82.51	798.19	798.19	0.56	0.56	0.00	
8435.00	90.31	84.89	7728.16	-79.63	830.06	830.06	0.28	0.00	0.28	
8466.00	90.22	83.66	7728.02	-76.54	860.90	860.90	3.98	-0.29	-3.97	
8498.00	90.04	83.66	7727.94	-73.01	892.71	892.71	0.56	-0.56	0.00	
8530.00	89.69	83.66	7728.02	-69.47	924.51	924.51	1.09	-1.09	0.00	
8562.00	89.52	84.37	7728.24	-66.14	956.34	956.34	2.28	-0.53	2.22	
8594.00	89.25	84.72	7728.58	-63.09	988.19	988.19	1.38	-0.84	1.09	
8626.00	89.16	85.16	7729.03	-60.27	1020.06	1020.06	1.40	-0.28	1.37	
8658.00	89.16	85.24	7729.50	-57.60	1051.95	1051.95	0.25	0.00	0.25	
8690.00	88.99	84.89	7730.01	-54.84	1083.82	1083.82	1.22	-0.53	-1.09	
8722.00	89.87	84.54	7730.33	-51.90	1115.69	1115.69	2.96	2.75	-1.09	
8754.00	90.92	84.98	7730.11	-48.97	1147.55	1147.55	3.56	3.28	1.37	
8786.00	91.28	85.51	7729.50	-46.32	1179.43	1179.43	2.00	1.12	1.66	
8818.00	91.01	85.51	7728.86	-43.82	1211.33	1211.33	0.84	-0.84	0.00	
8850.00	91.01	85.60	7728.29	-41.34	1243.23	1243.23	0.28	0.00	0.28	
8882.00	90.84	85.51	7727.78	-38.86	1275.13	1275.13	0.60	-0.53	-0.28	
8914.00	90.75	85.68	7727.33	-36.40	1307.03	1307.03	0.60	-0.28	0.53	
8946.00	89.96	85.60	7727.13	-33.97	1338.94	1338.94	2.48	-2.47	-0.25	
8978.00	89.69	85.51	7727.23	-31.49	1370.84	1370.84	0.89	-0.84	-0.28	
9010.00	89.60	85.42	7727.43	-28.96	1402.74	1402.74	0.40	-0.28	-0.28	
9042.00	89.52	85.51	7727.68	-26.43	1434.64	1434.64	0.38	-0.25	0.28	
9074.00	89.43	85.33	7727.97	-23.87	1466.53	1466.53	0.63	-0.28	-0.56	
9106.00	89.25	85.42	7728.34	-21.29	1498.43	1498.43	0.63	-0.56	0.28	
9138.00	89.16	85.24	7728.78	-18.69	1530.32	1530.32	0.63	-0.28	-0.56	
9170.00	88.81	85.24	7729.35	-16.03	1562.20	1562.20	1.09	-1.09	0.00	
9202.00	88.55	85.77	7730.09	-13.52	1594.10	1594.10	1.84	-0.81	1.66	
9234.00	88.20	86.47	7730.99	-11.36	1626.01	1626.01	2.44	-1.09	2.19	
9266.00	87.93	87.35	7732.07	-9.64	1657.95	1657.95	2.88	-0.84	2.75	
9298.00	86.97	87.71	7733.50	-8.26	1689.88	1689.88	3.20	-3.00	1.12	
9330.00	86.09	88.94	7735.43	-7.32	1721.81	1721.81	4.72	-2.75	3.84	
9362.00	85.82	90.61	7737.69	-7.20	1753.73	1753.73	5.27	-0.84	5.22	

CONFIDENTIA

Pathfinder Energy
Survey Report

Company: POGO Producing Company
Field: Eddy County, NM NAD-27
Site: Pierce Crossing Bone Spring East
Well: Harroun 15 #17
Wellpath: OH

Date: 8/11/2006 **Time:** 15:41:41 **Page:** 3
Co-ordinate(NE) Reference: Well: Harroun 15 #17, True North
Vertical (TVD) Reference: Ground Level 2927.0
Section (VS) Reference: Well (0.00N,0.00E,90.00Azi)
Survey Calculation Method: Minimum Curvature **Db:** Sybase

Survey: Pathfinder MWD Surveys

MD ft	Incl deg	Azim deg	TVD ft	+N/-S ft	+E/-W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	Tool/Comment
9394.00	85.38	90.87	7740.15	-7.61	1785.63	1785.63	1.60	-1.37	0.81	
9425.00	84.94	90.43	7742.76	-7.96	1816.52	1816.52	2.00	-1.42	-1.42	
9457.00	85.82	89.81	7745.34	-8.03	1848.41	1848.41	3.36	2.75	-1.94	
9489.00	87.23	90.43	7747.28	-8.09	1880.35	1880.35	4.81	4.41	1.94	
9520.00	87.58	90.78	7748.68	-8.42	1911.32	1911.32	1.60	1.13	1.13	
9552.00	87.14	90.43	7750.16	-8.76	1943.29	1943.29	1.76	-1.37	-1.09	
9583.00	87.85	89.99	7751.51	-8.87	1974.26	1974.26	2.69	2.29	-1.42	
9615.00	89.25	89.90	7752.32	-8.84	2006.24	2006.24	4.38	4.37	-0.28	
9647.00	89.60	90.17	7752.64	-8.86	2038.24	2038.24	1.38	1.09	0.84	
9679.00	89.69	90.17	7752.84	-8.96	2070.24	2070.24	0.28	0.28	0.00	
9711.00	90.48	90.08	7752.79	-9.03	2102.24	2102.24	2.48	2.47	-0.28	
9743.00	90.48	89.90	7752.53	-9.02	2134.24	2134.24	0.56	0.00	-0.56	
9775.00	90.75	89.81	7752.18	-8.94	2166.24	2166.24	0.89	0.84	-0.28	
9807.00	90.84	89.81	7751.74	-8.83	2198.24	2198.24	0.28	0.28	0.00	
9839.00	90.40	89.73	7751.39	-8.70	2230.23	2230.23	1.40	-1.37	-0.25	
9871.00	90.22	89.29	7751.22	-8.43	2262.23	2262.23	1.49	-0.56	-1.37	
9903.00	89.87	89.11	7751.19	-7.98	2294.23	2294.23	1.23	-1.09	-0.56	
9935.00	89.69	88.94	7751.32	-7.44	2326.22	2326.22	0.77	-0.56	-0.53	
9967.00	89.78	89.20	7751.46	-6.92	2358.22	2358.22	0.86	0.28	0.81	
9999.00	90.48	89.38	7751.39	-6.52	2390.22	2390.22	2.26	2.19	0.56	
10031.00	90.48	89.38	7751.12	-6.18	2422.21	2422.21	0.00	0.00	0.00	
10063.00	90.22	89.11	7750.93	-5.76	2454.21	2454.21	1.17	-0.81	-0.84	
10095.00	90.31	88.76	7750.78	-5.16	2486.20	2486.20	1.13	0.28	-1.09	
10127.00	91.19	89.29	7750.36	-4.62	2518.20	2518.20	3.21	2.75	1.66	
10159.00	91.45	91.05	7749.62	-4.71	2550.19	2550.19	5.56	0.81	5.50	
10191.00	91.54	91.48	7748.79	-5.42	2582.17	2582.17	1.37	0.28	1.34	
10223.00	91.45	91.22	7747.95	-6.17	2614.15	2614.15	0.86	-0.28	-0.81	
10255.00	91.19	90.78	7747.22	-6.73	2646.13	2646.13	1.60	-0.81	-1.37	
10287.00	91.80	90.87	7746.38	-7.19	2678.12	2678.12	1.93	1.91	0.28	
10319.00	91.80	90.87	7745.38	-7.68	2710.10	2710.10	0.00	0.00	0.00	
10351.00	91.54	90.52	7744.45	-8.06	2742.08	2742.08	1.36	-0.81	-1.09	
10383.00	91.71	90.87	7743.54	-8.45	2774.07	2774.07	1.22	0.53	1.09	
10415.00	90.92	90.08	7742.80	-8.72	2806.06	2806.06	3.49	-2.47	-2.47	
10447.00	91.01	90.08	7742.26	-8.76	2838.05	2838.05	0.28	0.28	0.00	
10479.00	91.19	90.43	7741.65	-8.90	2870.05	2870.05	1.23	0.56	1.09	
10511.00	90.57	89.11	7741.16	-8.78	2902.04	2902.04	4.56	-1.94	-4.12	
10607.00	91.01	88.06	7739.83	-6.41	2998.00	2998.00	1.19	0.46	-1.09	
10703.00	91.19	88.50	7737.99	-3.52	3093.94	3093.94	0.50	0.19	0.46	
10830.00	91.08	88.35	7735.48	-0.03	3220.87	3220.87	0.15	-0.09	-0.12	
10880.00	91.08	88.35	7734.53	1.40	3270.84	3270.84	0.00	0.00	0.00	

CONFIDENTIAL