



SA
10-31-07

Energen Resources

San Juan 32-5 Unit #116

Eul Point

San Juan 32-5 Unit #116

Upper Lateral - Revised

30-039-29987

Survey: EOW Survey UL

Surface 700/S 1430/E

End of Well Survey

Horizontal origin: 900/S 2650/W N137068 TVL 2810
BHL 1444/S 1670/W N14490 TVL 2799

29 September, 2007

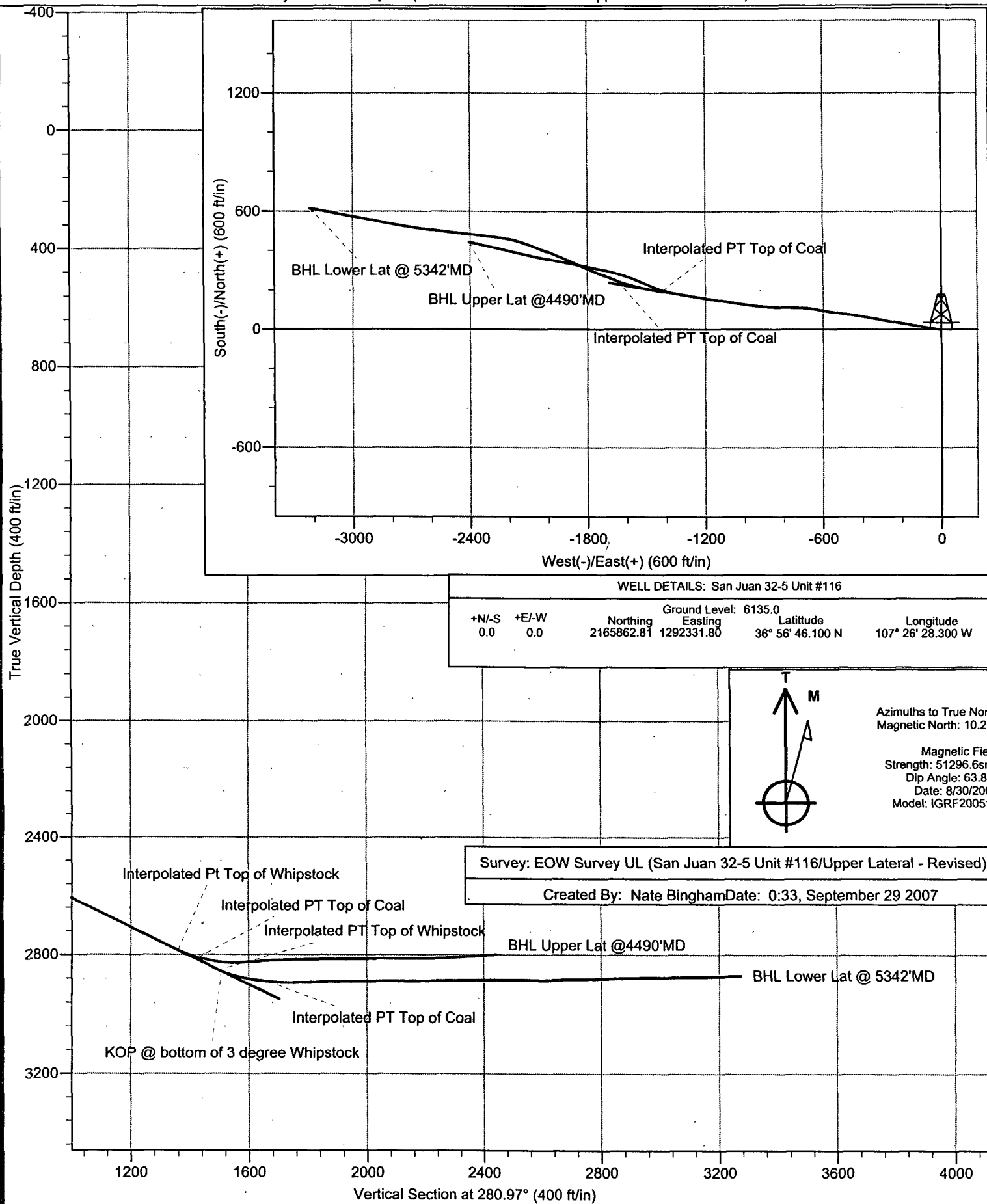
RCVD OCT 16 '07

OIL CONS. DIV.

DIST. 3

PATHFINDER
ENERGY SERVICES

Survey: EOW Survey UL (San Juan 32-5 Unit #116/Upper Lateral - Revised)





Pathfinder Energy Services
End of Well Survey



Company:	Energen Resources	Local Co-ordinate Reference:	Well San Juan 32-5 Unit #116
Project:	San Juan 32-5 Unit #116	TVD Reference:	KB @ 6147.0ft (AWS 289)
Site:	Eul Point	MD Reference:	KB @ 6147.0ft (AWS 289)
Well:	San Juan 32-5 Unit #116	North Reference:	True
Wellbore:	Upper Lateral - Revised	Survey Calculation Method:	Minimum Curvature
Design:	Upper Lateral - Revised	Database:	EDM 2003.16 Single User Db

Project:	San Juan 32-5 Unit #116, S27, T32N, R5W, Dual Lateral FC		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Central Zone		

Site:	Eul Point		
Site Position:		Northing:	2,165,862.81 ft
From:	Lat/Long	Easting:	1,292,331.80 ft
Position Uncertainty:	0.0 ft	Slot Radius:	"
		Latitude:	36° 56' 46.100 N
		Longitude:	107° 26' 28.300 W
		Grid Convergence:	-0.72

Well:	San Juan 32-5 Unit #116					
Well Position	+N/-S	0.0 ft	Northing:	2,165,862.81 ft	Latitude:	36° 56' 46.100 N
	+E/-W	0.0 ft	Easting:	1,292,331.80 ft	Longitude:	107° 26' 28.300 W
Position Uncertainty	0.0 ft	Wellhead Elevation:	6,135.0 ft	Ground Level:	6,135.0 ft	

Wellbore: Upper Lateral - Revised

Magnetics:	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	8/30/2007	10.23	63.80	51,297

Design: Upper Lateral - Revised

Audit Notes:

Version:	1.0	Phase:	ACTUAL	Tie On Depth:	3,389.0
----------	-----	--------	--------	---------------	---------

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	280.97

Survey Program		Date			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
453.0	3,389.0	Survey #1 (Motherbore - final)	Pathfinder	Pathfinder MWD	
3,394.0	4,490.0	EOW Survey UL (Upper Lateral - Revised)	Pathfinder	Pathfinder MWD	

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)
3,389.0	64.81	278.69	2,782.9	182.8	-1,344.5	0.00	1,354.7
3,394.0	64.79	278.92	2,785.1	183.5	-1,349.0	4.18	1,359.3
Interpolated Pt Top of Whipstock							
3,422.0	69.37	282.53	2,796.0	188.3	-1,374.3	20.21	1,385.0
3,453.0	72.55	286.33	2,806.1	195.6	-1,402.7	15.47	1,414.3
3,468.0	74.27	288.11	2,810.4	199.9	-1,416.4	16.15	1,428.6
Interpolated PT Top of Coal							
3,484.0	76.15	289.97	2,814.4	204.9	-1,431.0	16.26	1,443.9
3,515.0	79.67	292.70	2,820.9	215.9	-1,459.3	14.25	1,473.7
3,544.0	83.22	292.43	2,825.3	226.9	-1,485.7	12.28	1,501.8
3,576.0	87.48	292.43	2,827.8	239.1	-1,515.2	13.31	1,533.0



Company: Energen Resources
Project: San Juan 32-5 Unit #116
Site: Eul Point
Well: San Juan 32-5 Unit #116
Wellbore: Upper Lateral - Revised
Design: Upper Lateral - Revised

Local Co-ordinate Reference: Well San Juan 32-5 Unit #116
TVD Reference: KB @ 6147.0ft (AWS 289)
MD Reference: KB @ 6147.0ft (AWS 289)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)
3,607.0	92.68	292.58	2,827.8	251.0	-1,543.8	16.78	1,563.4
3,639.0	93.97	290.56	2,825.9	262.7	-1,573.5	7.48	1,594.8
3,670.0	93.52	287.80	2,823.9	272.9	-1,602.8	9.00	1,625.4
3,701.0	93.24	285.62	2,822.1	281.8	-1,632.4	7.08	1,656.2
3,732.0	93.52	284.71	2,820.3	289.9	-1,662.3	3.07	1,687.1
3,763.0	92.29	283.35	2,818.7	297.4	-1,692.3	5.91	1,718.0
3,794.0	91.06	282.22	2,817.8	304.2	-1,722.5	5.39	1,748.9
3,825.0	91.56	281.38	2,817.1	310.6	-1,752.9	3.15	1,779.9
3,857.0	91.06	280.95	2,816.3	316.8	-1,784.2	2.06	1,811.9
3,888.0	90.06	280.77	2,816.0	322.6	-1,814.7	3.28	1,842.9
3,919.0	90.78	280.89	2,815.8	328.4	-1,845.1	2.35	1,873.9
3,951.0	91.00	281.09	2,815.3	334.5	-1,876.5	0.93	1,905.9
3,982.0	90.34	280.08	2,815.0	340.2	-1,907.0	3.89	1,936.9
4,013.0	90.56	280.29	2,814.7	345.7	-1,937.5	0.98	1,967.9
4,045.0	90.95	279.96	2,814.3	351.3	-1,969.0	1.60	1,999.9
4,076.0	91.40	280.25	2,813.7	356.8	-1,999.5	1.73	2,030.9
4,107.0	90.39	281.59	2,813.2	362.6	-2,030.0	5.41	2,061.9
4,138.0	90.11	281.87	2,813.0	368.9	-2,060.3	1.28	2,092.9
4,169.0	90.28	282.38	2,812.9	375.4	-2,090.6	1.73	2,123.9
4,200.0	90.20	282.38	2,812.8	382.1	-2,120.9	0.26	2,154.9
4,232.0	90.11	282.79	2,812.7	389.1	-2,152.1	1.31	2,186.9
4,263.0	90.61	282.69	2,812.5	395.9	-2,182.4	1.64	2,217.8
4,294.0	91.51	282.64	2,811.9	402.7	-2,212.6	2.91	2,248.8
4,325.0	93.91	283.01	2,810.5	409.6	-2,242.8	7.83	2,279.8
4,356.0	93.57	282.33	2,808.5	416.4	-2,273.0	2.45	2,310.7
4,388.0	93.46	281.59	2,806.5	423.0	-2,304.2	2.33	2,342.6
4,418.0	94.08	281.85	2,804.5	429.1	-2,333.5	2.24	2,372.6
4,490.0	94.08	281.85	2,799.4	443.8	-2,403.8	0.00	2,444.4

BHL Upper Lat @4490'MD



Pathfinder Energy Services
End of Well Survey



Company: Energen Resources
Project: San Juan 32-5 Unit #116
Site: Eul Point
Well: San Juan 32-5 Unit #116
Wellbore: Upper Lateral - Revised
Design: Upper Lateral - Revised

Local Co-ordinate Reference: Well San Juan 32-5 Unit #116
TVD Reference: KB @ 6147.0ft (AWS 289)
MD Reference: KB @ 6147.0ft (AWS 289)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Targets

Target Name hit/miss target Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
KOP Upper Lateral - survey hits target - Point	0.00	0.00	2,785.1	183.5	-1,349.0	2,166,063.15	1,290,985.19	36° 56' 47.914 N	107° 26' 44.917 W
Land Curve - Upper - survey misses by 5.2ft at 3610.3ft MD (2827.6 TVD, 252.2 N, -1546.9 E) - Point	0.00	0.00	2,830.0	256.6	-1,545.3	2,166,138.72	1,290,789.85	36° 56' 48.637 N	107° 26' 47.335 W
TD Upper Lateral - survey misses by 890.5ft at 4490.0ft MD (2799.4 TVD, 443.8 N, -2403.8 E) - Point	0.00	0.00	2,830.0	634.4	-3,273.2	2,166,538.07	1,289,066.78	36° 56' 52.370 N	107° 27' 8.621 W
Legal Window 2 - survey misses by 3096.1ft at 3389.0ft MD (2782.9 TVD, 182.8 N, -1344.5 E) - Rectangle (sides W1,327.0 H1,992.1 D0.0)	0.00	0.00	0.0	0.0	0.0	2,165,862.81	1,292,331.80	36° 56' 46.100 N	107° 26' 28.300 W

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
3,394.0	2,785.1	183.5	-1,349.0	Interpolated Pt Top of Whipstock
3,468.0	2,810.4	199.9	-1,416.4	Interpolated PT Top of Coal
4,490.0	2,799.4	443.8	-2,403.8	BHL Upper Lat @4490'MD

Checked By: _____ Approved By: _____ Date: _____



5th
10-31-07

Energen Resources

San Juan 32-5 Unit #116

Eul Point

San Juan 32-5 Unit #116

Lower Lateral - Revised

Survey: EOW Survey Lower Lateral

End of Well Survey

29 September, 2007

Surface 700/S 1430/E
Lateral origin 953/S 2421 /W md 3791 Tvd 2892
BHL 1316/S 859/W md 5342 Tvd 2871

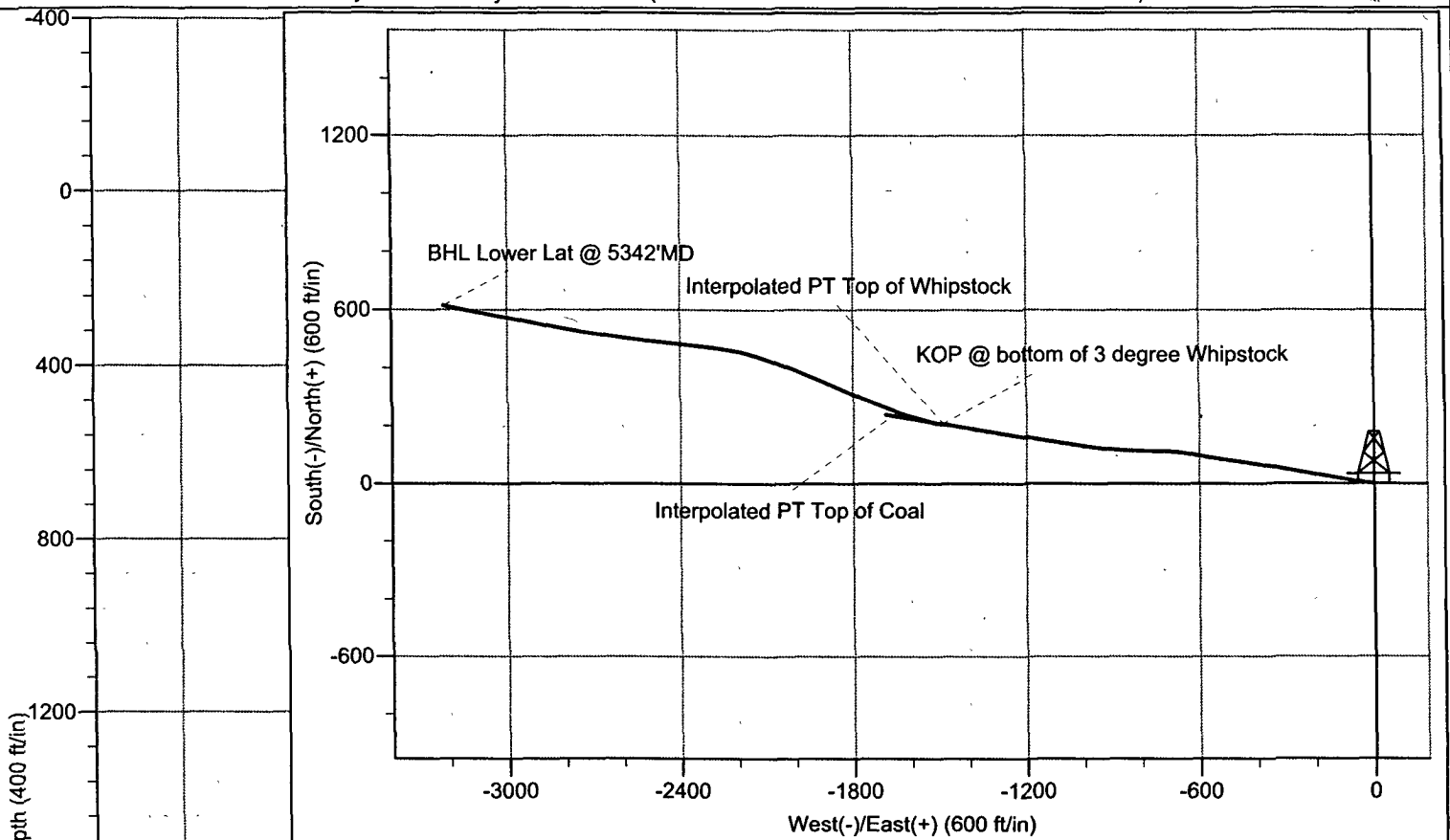
RCVD OCT 16 '07

OIL CONS. DIV.

DIST. 3

PATHFINDER
ENERGY SERVICES

Survey: EOW Survey Lower Lateral (San Juan 32-5 Unit #116/Lower Lateral - Revised)



WELL DETAILS: San Juan 32-5 Unit #116

+N/-S	+E/-W	Northing	Ground Level: 6135.0	Easting	Latitude	Longitude
0.0	0.0	2165862.81	1292333.80	56° 46' 10.00" N	28.300 W	

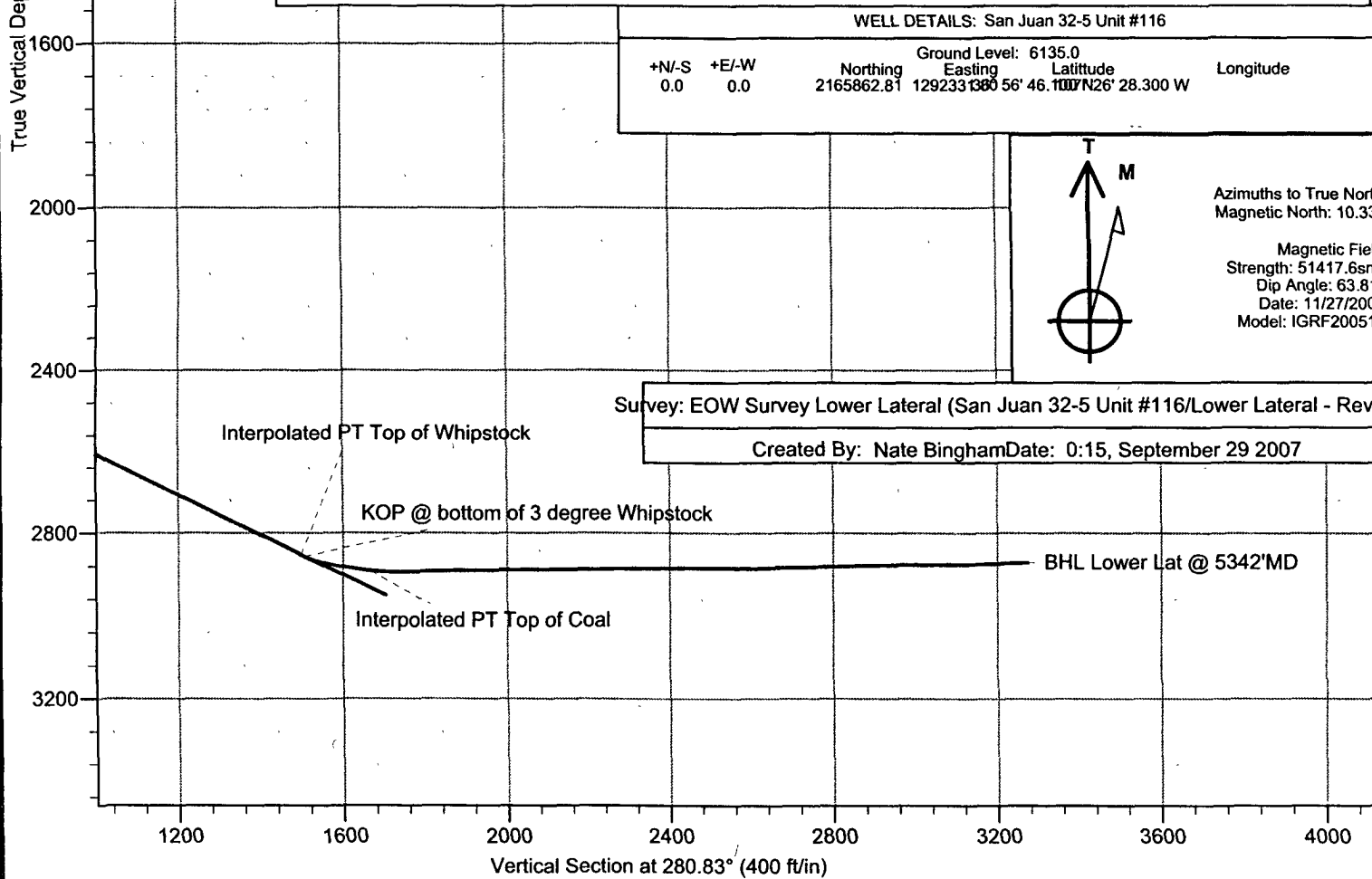


Azimuths to True North
Magnetic North: 10.33°

Magnetic Field
Strength: 51417.6snT
Dip Angle: 63.81°
Date: 11/27/2006
Model: IGRF200510

Survey: EOW Survey Lower Lateral (San Juan 32-5 Unit #116/Lower Lateral - Revised)

Created By: Nate Bingham Date: 0:15, September 29 2007





Pathfinder Energy Services
End of Well Survey



Company: Energen Resources
Project: San Juan 32-5 Unit #116
Site: Eul Point
Well: San Juan 32-5 Unit #116
Wellbore: Lower Lateral - Revised
Design: Lower Lateral - Revised

Local Co-ordinate Reference: Well San Juan 32-5 Unit #116
TVD Reference: KB @ 6147.0ft (AWS 289)
MD Reference: KB @ 6147.0ft (AWS 289)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Project: San Juan 32-5 Unit #116, S27, T32N, R5W, Dual Lateral FC

Map System: US State Plane 1983
Geo Datum: North American Datum 1983
Map Zone: New Mexico Central Zone

System Datum: Mean Sea Level

Site: Eul Point

Site Position: Northing: 2,165,862.81 ft Latitude: 36° 56' 46.100 N
From: Lat/Long Easting: 1,292,331.80 ft Longitude: 107° 26' 28.300 W
Position Uncertainty: 0.0 ft Slot Radius: " Grid Convergence: -0.72 "

Well: San Juan 32-5 Unit #116

Well Position: +N-S 0.0 ft Northing: 2,165,862.81 ft Latitude: 36° 56' 46.100 N
+E-W 0.0 ft Easting: 1,292,331.80 ft Longitude: 107° 26' 28.300 W
Position Uncertainty: 0.0 ft Wellhead Elevation: 6,135.0 ft Ground Level: 6,135.0 ft

Wellbore: Lower Lateral - Revised

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	11/27/2006	10.33	63.82	51,418

Design: Lower Lateral - Revised

Audit Notes:

Version: 1.0 Phase: ACTUAL Tie On Depth: 3,546.0

Vertical Section:	Depth From (TVD) (ft)	+N-S (ft)	+E-W (ft)	Direction (°)
	0.0	0.0	0.0	280.83

Survey Program: Date: 9/29/2007

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
453.0	3,546.0	Survey #1 (Motherbore - final)	Pathfinder	Pathfinder MWD
3,548.0	5,342.0	EOW Survey Lower Lateral (Lower Lateral	Pathfinder	Pathfinder MWD

Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLog (°/100ft)	V. Sec (ft)
3,546.0	63.75	278.61	2,851.3	205.7	-1,484.0	0.00	1,496.2
3,548.0	65.51	278.64	2,852.2	205.9	-1,485.8	88.01	1,498.0
Interpolated PT Top of Whipstock							
3,558.0	66.65	279.86	2,856.2	207.4	-1,494.8	15.95	1,507.1
KOP @ bottom of 3 degree Whipstock							
3,578.0	69.91	281.89	2,863.6	210.9	-1,513.0	18.83	1,525.7
3,609.0	75.71	284.88	2,872.8	217.8	-1,541.8	20.85	1,555.3
3,640.0	80.37	287.73	2,879.2	226.3	-1,570.9	17.52	1,585.4
3,671.0	80.28	281.96	2,884.4	234.1	-1,600.4	18.35	1,615.9
3,703.0	82.66	290.59	2,889.2	243.0	-1,630.8	27.69	1,647.4



Pathfinder Energy Services
End of Well Survey



Company: Energen Resources
Project: San Juan 32-5 Unit #116
Site: Eul Point
Well: San Juan 32-5 Unit #116
Wellbore: Lower Lateral - Revised
Design: Lower Lateral - Revised

Local Co-ordinate Reference: Well San Juan 32-5 Unit #116
TVD Reference: KB @ 6147.0ft (AWS 289)
MD Reference: KB @ 6147.0ft (AWS 289)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)
3,721.0	83.96	290.97	2,891.3	249.3	-1,647.5	7.52	1,665.0
Interpolated PT Top of Coal							
3,731.0	84.68	291.18	2,892.3	252.9	-1,656.8	7.50	1,674.8
3,763.0	88.20	290.74	2,894.3	264.3	-1,686.6	11.09	1,706.2
3,794.0	90.31	292.07	2,894.7	275.7	-1,715.5	8.05	1,736.7
3,825.0	92.51	291.21	2,893.9	287.1	-1,744.3	7.62	1,767.1
3,856.0	90.04	292.31	2,893.2	298.6	-1,773.0	8.72	1,797.6
3,887.0	91.89	292.83	2,892.7	310.5	-1,801.7	6.20	1,827.9
3,918.0	92.07	292.90	2,891.6	322.5	-1,830.2	0.62	1,858.2
3,950.0	90.48	292.63	2,890.9	334.9	-1,859.7	5.04	1,889.5
3,981.0	90.13	292.32	2,890.7	346.7	-1,888.3	1.51	1,919.9
4,012.0	90.92	292.54	2,890.5	358.6	-1,917.0	2.65	1,950.2
4,044.0	90.84	292.64	2,890.0	370.8	-1,946.5	0.40	1,981.6
4,075.0	90.89	292.82	2,889.5	382.8	-1,975.1	0.60	2,011.9
4,106.0	91.40	292.10	2,888.9	394.7	-2,003.8	2.85	2,042.2
4,138.0	90.11	291.11	2,888.5	406.4	-2,033.5	5.08	2,073.7
4,168.0	89.44	290.56	2,888.6	417.1	-2,061.6	2.89	2,103.2
4,199.0	89.27	288.58	2,888.9	427.5	-2,090.8	6.41	2,133.9
4,230.0	90.33	288.16	2,889.0	437.3	-2,120.2	3.68	2,164.6
4,262.0	91.01	286.07	2,888.7	446.7	-2,150.8	6.87	2,196.4
4,292.0	91.23	283.19	2,888.1	454.3	-2,179.8	9.63	2,226.3
4,324.0	90.67	279.55	2,887.5	460.6	-2,211.1	11.51	2,258.3
4,355.0	90.73	277.24	2,887.2	465.1	-2,241.8	7.45	2,289.3
4,386.0	90.95	276.82	2,886.7	468.9	-2,272.6	1.53	2,320.2
4,418.0	90.89	277.08	2,886.2	472.8	-2,304.3	0.83	2,352.1
4,449.0	90.56	276.52	2,885.8	476.4	-2,335.1	2.10	2,383.0
4,480.0	90.39	276.30	2,885.5	479.9	-2,365.9	0.90	2,414.0
4,512.0	90.56	276.63	2,885.3	483.5	-2,397.7	1.16	2,445.9
4,543.0	90.50	275.87	2,885.0	486.9	-2,428.5	2.46	2,476.8
4,575.0	90.39	275.51	2,884.7	490.0	-2,460.4	1.18	2,508.6
4,606.0	89.22	276.13	2,884.8	493.2	-2,491.2	4.27	2,539.5
4,637.0	88.49	275.23	2,885.5	496.3	-2,522.1	3.74	2,570.4
4,669.0	89.16	277.13	2,886.1	499.7	-2,553.9	6.29	2,602.3
4,700.0	93.52	277.83	2,885.4	503.7	-2,584.6	14.24	2,633.2
4,732.0	92.07	276.87	2,883.8	507.8	-2,616.3	5.43	2,665.1
4,762.0	90.28	278.10	2,883.2	511.7	-2,646.0	7.24	2,695.0
4,794.0	91.40	278.66	2,882.8	516.4	-2,677.7	3.91	2,727.0
4,825.0	91.40	278.65	2,882.0	521.1	-2,708.3	0.03	2,758.0
4,856.0	91.73	279.08	2,881.1	525.8	-2,738.9	1.75	2,788.9
4,888.0	91.95	279.05	2,880.1	530.9	-2,770.5	0.69	2,820.9
4,919.0	91.12	279.60	2,879.3	535.9	-2,801.1	3.21	2,851.9
4,951.0	91.90	281.45	2,878.4	541.7	-2,832.5	6.27	2,883.9
4,982.0	91.84	281.09	2,877.4	547.8	-2,862.9	1.18	2,914.9
5,013.0	90.78	281.80	2,876.7	553.9	-2,893.3	4.12	2,945.8

Company: Energen Resources
 Project: San Juan 32-5 Unit #116
 Site: Eul Point
 Well: San Juan 32-5 Unit #116
 Wellbore: Lower Lateral - Revised
 Design: Lower Lateral - Revised

Local Co-ordinate Reference: Well San Juan 32-5 Unit #116
 TVD Reference: KB @ 6147.0ft (AWS 289)
 MD Reference: KB @ 6147.0ft (AWS 289)
 North Reference: True
 Survey Calculation Method: Minimum Curvature
 Database: EDM 2003.16 Single User Db

Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)
5,045.0	90.61	280.95	2,876.3	560.2	-2,924.7	2.71	2,977.8
5,076.0	90.22	280.65	2,876.1	566.1	-2,955.1	1.59	3,008.8
5,106.0	90.17	280.41	2,876.0	571.5	-2,984.6	0.82	3,038.8
5,137.0	90.61	280.32	2,875.8	577.1	-3,015.1	1.45	3,069.8
5,168.0	91.06	280.24	2,875.4	582.6	-3,045.6	1.47	3,100.8
5,200.0	91.12	280.60	2,874.7	588.4	-3,077.1	1.14	3,132.8
5,231.0	91.12	281.11	2,874.1	594.3	-3,107.5	1.64	3,163.8
5,262.0	91.95	281.06	2,873.3	600.2	-3,137.9	2.68	3,194.8
5,342.0	91.95	281.06	2,870.6	615.6	-3,216.4	0.00	3,274.8

BHL Lower Lat @ 5342'MD

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Land Curve - survey misses by 50.9ft at 3742.7ft MD (2893.2 TVD, 257.1 N, -1667.6 E) - Point	0.00	0.23	2,895.0	304.6	-1,649.3	2,166,188.00	1,290,686.43	36° 56' 49.111 N	107° 26' 48.617 W
KOP @3560' MD, - survey misses by 64.8ft at 3560.5ft MD (2857.2 TVD, 207.8 N, -1497.1 E) - Point	0.00	0.23	2,854.0	271.6	-1,486.1	2,166,152.96	1,290,849.21	36° 56' 48.785 N	107° 26' 46.606 W
End Lateral - survey misses by 64.5ft at 5342.0ft MD (2870.6 TVD, 615.6 N, -3216.4 E) - Point	0.00	0.23	2,895.0	633.7	-3,273.3	2,166,537.37	1,289,066.67	36° 56' 52.364 N	107° 27' 8.622 W
Legal Window1 - survey misses by 3223.6ft at 3546.0ft MD (2851.3 TVD, 205.7 N, -1484.0 E) - Rectangle (sides W1,327.0 H1,992.1 D0.0)	0.00	0.24	-3.0	0.0	0.0	2,165,862.81	1,292,331.80	36° 56' 46.100 N	107° 26' 28.300 W

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
3,548.0	2,852.2	205.9	-1,485.8	Interpolated PT Top of Whipstock
3,558.0	2,856.2	207.4	-1,494.8	KOP @ bottom of 3 degree Whipstock
3,721.0	2,891.3	249.3	-1,647.5	Interpolated PT Top of Coal
5,342.0	2,870.6	615.6	-3,216.4	BHL Lower Lat @ 5342'MD

Checked By: _____ Approved By: _____ Date: _____