



Energen Resources

Rio Arriba County, NM
S-21, T-30N, R-4W
San Juan 30-4 Unit #40
OH

RCVD OCT 24 '07

OIL CONS. DIV.

DIST. 3

Survey: EOW Survey

End of Well Survey

05 September, 2007

30-039-25538

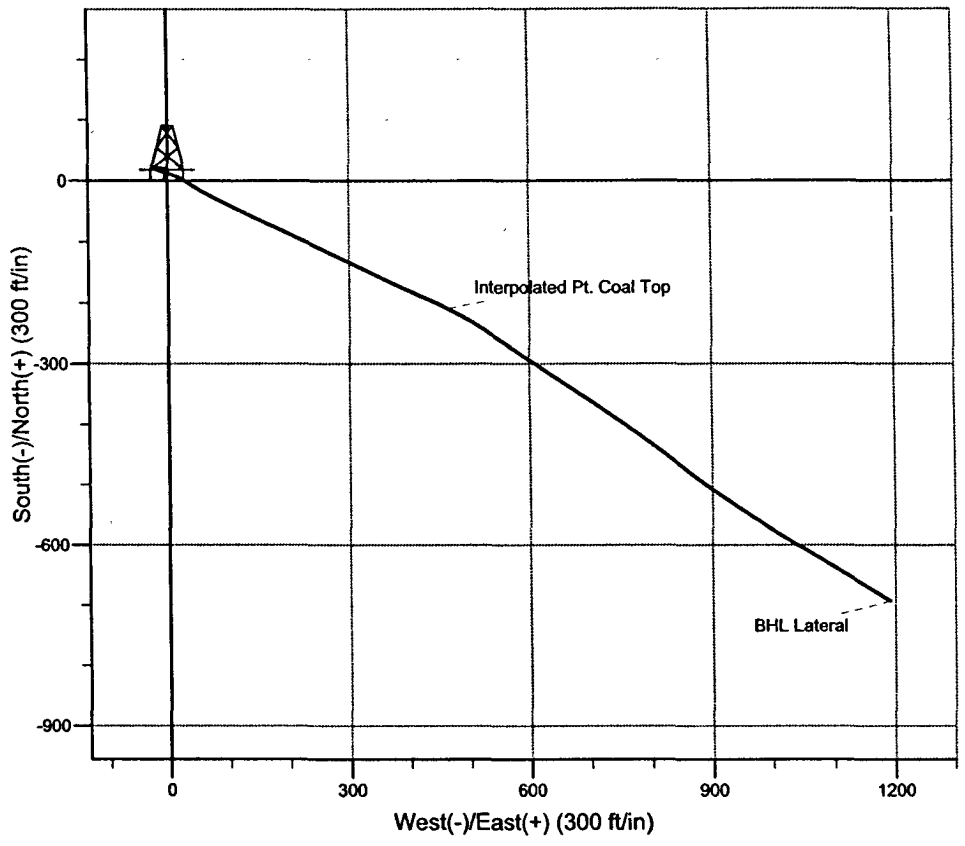
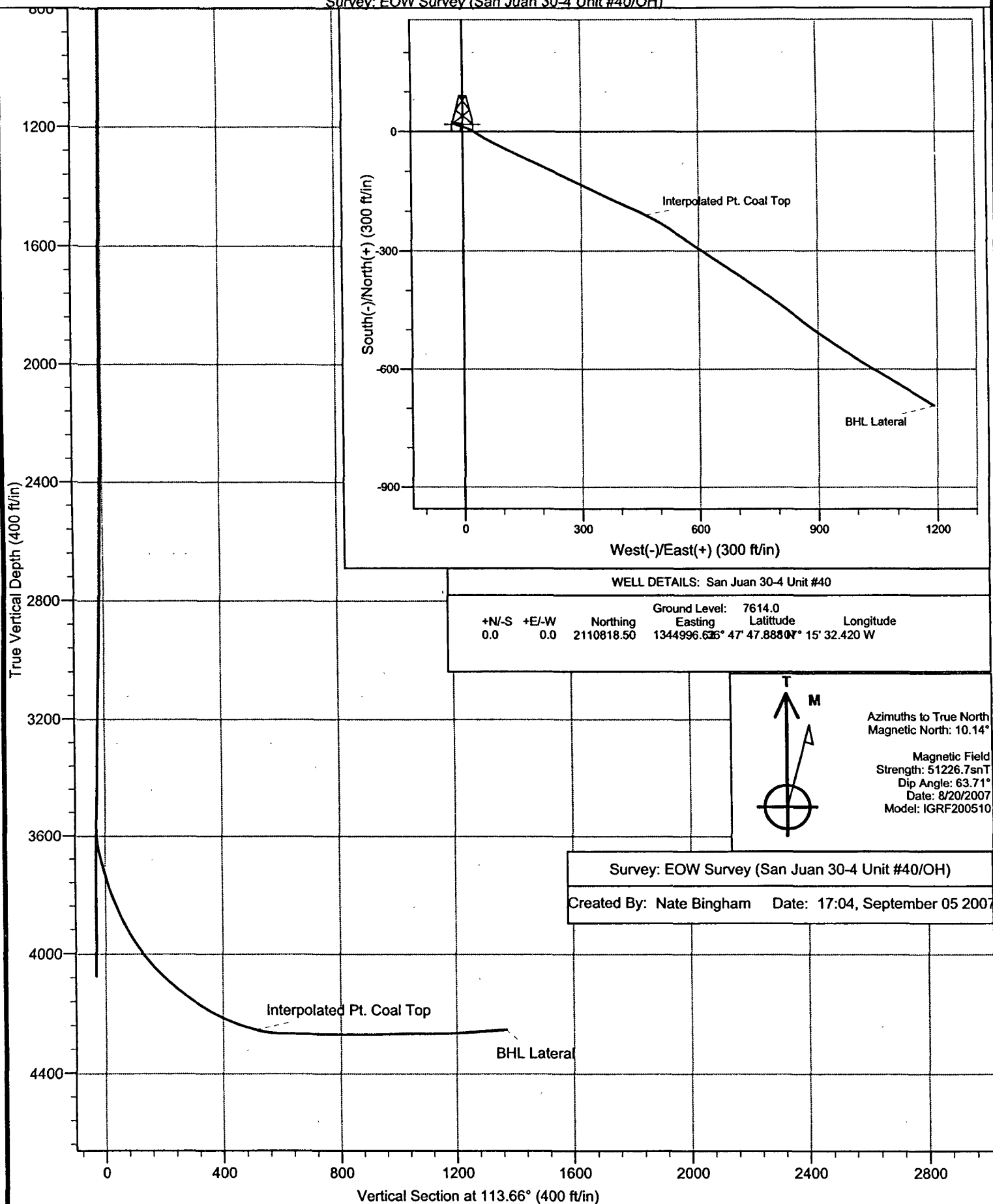
Surface: 2450/S 2270/E

Lateral Origin: T2232/S 1786/E ML 45198
BITL: I 1756/S 1079/E TW 4257
4252 Twd

PATHFINDER
ENERGY SERVICES

66

Survey: EOW Survey (San Juan 30-4 Unit #40/OH)



WELL DETAILS: San Juan 30-4 Unit #40

+N/-S	+E/-W	Northing	Ground Level:	Easting	Latitude	Longitude
0.0	0.0	2110818.50	7614.0	1344996.636	47° 47.8850' N	105° 15' 32.420 W



Azimuths to True North
Magnetic North: 10.14°

Magnetic Field
Strength: 51226.7snT
Dip Angle: 63.71°
Date: 8/20/2007
Model: IGRF200510

Survey: EOW Survey (San Juan 30-4 Unit #40/OH)

Created By: Nate Bingham Date: 17:04, September 05 2007

Company:	Energen Resources	Local Co-ordinate Reference:	Well San Juan 30-4 Unit #40
Project:	Rio Arriba County, NM	TVD Reference:	RKB=12' @ 7626.0ft (Unit #40)
Site:	S-21, T-30N, R-4W	MD Reference:	RKB=12' @ 7626.0ft (Unit #40)
Well:	San Juan 30-4 Unit #40	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 2003.16 Single User Db

Project	Rio Arriba County, NM		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Central Zone		

Site	S-21, T-30N, R-4W		
Site Position:		Northing:	2,110,818.50 ft
From:	Lat/Long	Easting:	1,344,996.62 ft
Position Uncertainty:	0.0 ft	Slot Radius:	"
		Latitude:	36° 47' 47.888 N
		Longitude:	107° 15' 32.420 W
		Grid Convergence:	-0.60

Well	San Juan 30-4 Unit #40		
Well Position	+N/-S 0.0 ft	Northing:	2,110,818.50 ft
	+E/-W 0.0 ft	Easting:	1,344,996.62 ft
Position Uncertainty	0.0 ft	Wellhead Elevation:	ft
		Ground Level:	7,614.0 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	8/20/2007	10.14	63.71	51,227

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	113.66	

Survey Program	Date 9/5/2007				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
3,599.0	5,373.0	EOW Survey (OH)	Pathfinder	Pathfinder MWD	

Survey							
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)
3,547.0	1.04	266.96	3,546.6	20.4	-22.1	0.00	-28.4
Interpolated Pt. Top of Whipstock							
3,599.0	6.80	111.90	3,598.5	19.2	-19.7	14.92	-25.7
3,631.0	9.20	106.60	3,630.2	17.7	-15.5	7.84	-21.3
3,664.0	11.50	108.50	3,662.7	15.9	-9.8	7.05	-15.4
3,696.0	13.90	108.80	3,693.9	13.7	-3.2	7.50	-8.4
3,728.0	15.80	107.20	3,724.8	11.2	4.6	6.07	-0.2
3,759.0	17.20	110.90	3,754.6	8.3	12.9	5.64	8.5
3,791.0	19.00	117.30	3,785.0	4.2	22.0	8.37	18.5
3,823.0	21.00	121.50	3,815.0	-1.2	31.5	7.69	29.3
3,854.0	23.00	122.00	3,843.8	-7.3	41.4	6.48	40.8
3,885.0	24.80	120.60	3,872.1	-13.8	52.1	6.09	53.3



Pathfinder Energy Services
End of Well Survey



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Site: S-21, T-30N, R-4W
Well: San Juan 30-4 Unit #40
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well San Juan 30-4 Unit #40
TVD Reference: RKB=12' @ 7626.0ft (Unit #40)
MD Reference: RKB=12' @ 7626.0ft (Unit #40)
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)
3,917.0	27.20	118.30	3,900.9	-20.7	64.3	8.13	67.2
3,949.0	30.50	116.50	3,928.9	-27.8	78.1	10.66	82.6
3,981.0	33.50	116.00	3,956.0	-35.3	93.3	9.41	99.6
4,013.0	36.30	115.30	3,982.3	-43.2	109.8	8.84	117.9
4,045.0	38.70	114.90	4,007.7	-51.5	127.4	7.54	137.3
4,076.0	41.50	114.70	4,031.4	-59.8	145.5	9.04	157.3
4,107.0	44.50	114.20	4,054.0	-68.6	164.8	9.74	178.4
4,139.0	47.20	114.40	4,076.3	-78.0	185.7	8.45	201.4
4,171.0	49.30	115.10	4,097.6	-88.0	207.4	6.76	225.3
4,203.0	51.70	115.40	4,118.0	-98.6	229.7	7.53	250.0
4,235.0	53.50	115.50	4,137.4	-109.5	252.7	5.63	275.4
4,266.0	55.40	115.80	4,155.5	-120.4	275.4	6.18	300.6
4,297.0	57.40	115.80	4,172.6	-131.6	298.6	6.45	326.4
4,329.0	60.50	115.60	4,189.1	-143.5	323.3	9.70	353.8
4,361.0	63.60	115.30	4,204.1	-155.7	348.9	9.72	382.0
4,393.0	66.10	114.20	4,217.7	-167.8	375.2	8.41	411.0
4,425.0	69.30	114.20	4,229.8	-179.9	402.2	10.00	440.6
4,456.0	71.80	113.80	4,240.2	-191.8	428.9	8.16	469.8
4,490.0	74.60	116.50	4,250.0	-205.7	458.3	11.21	502.3
4,498.0	75.54	116.50	4,252.1	-209.1	465.2	11.72	510.1
Interpolated Pt. Coal Top							
4,519.0	78.00	116.50	4,256.9	-218.2	483.5	11.72	530.5
4,551.0	83.30	122.50	4,262.1	-233.8	511.0	24.83	561.8
4,582.0	88.30	124.30	4,264.3	-250.8	536.8	17.14	592.3
4,614.0	89.80	124.10	4,264.9	-268.8	563.2	4.73	623.8
4,645.0	88.20	123.00	4,265.4	-285.9	589.1	6.26	654.3
4,677.0	89.30	123.70	4,266.1	-303.5	615.8	4.07	685.8
4,709.0	89.50	123.50	4,266.4	-321.2	642.5	0.88	717.3
4,741.0	88.60	123.70	4,267.0	-338.9	669.1	2.88	748.9
4,773.0	88.90	124.20	4,267.7	-356.8	695.6	1.82	780.3
4,804.0	89.70	124.80	4,268.0	-374.3	721.2	3.23	810.8
4,835.0	91.00	125.20	4,267.9	-392.1	746.6	4.39	841.2
4,868.0	90.40	126.60	4,267.5	-411.4	773.3	4.62	873.4
4,899.0	90.10	126.50	4,267.3	-429.9	798.2	1.02	903.6
4,932.0	89.40	127.80	4,267.5	-449.8	824.5	4.47	935.7
4,964.0	91.40	128.20	4,267.2	-469.5	849.7	6.37	966.7
4,995.0	93.70	127.50	4,265.9	-488.5	874.2	7.75	996.8
5,027.0	89.00	125.20	4,265.1	-507.5	899.9	16.35	1,028.0
5,058.0	89.90	124.20	4,265.4	-525.1	925.4	4.34	1,058.4
5,090.0	90.70	124.40	4,265.2	-543.2	951.9	2.58	1,089.8
5,122.0	89.70	123.30	4,265.1	-561.0	978.4	4.65	1,121.3
5,162.0	91.40	122.10	4,264.7	-582.6	1,012.1	5.20	1,160.8
5,177.0	92.50	121.50	4,264.2	-590.5	1,024.8	8.35	1,175.7
5,194.0	92.80	121.80	4,263.4	-599.4	1,039.3	2.49	1,192.5
5,225.0	93.10	121.70	4,261.8	-615.7	1,065.6	1.02	1,223.1



Pathfinder Energy Services
End of Well Survey



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Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well San Juan 30-4 Unit #40
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North Reference: True
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Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)
5,257.0	93.60	121.80	4,260.0	-632.5	1,092.8	1.59	1,254.8
5,289.0	93.90	121.30	4,257.9	-649.2	1,120.0	1.82	1,286.4
5,321.0	93.90	121.80	4,255.7	-665.9	1,147.2	1.56	1,318.0
5,373.0	93.90	122.61	4,252.2	-693.6	1,191.1	1.55	1,369.3

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
Drill Window	0.00	0.00	0.0	0.0	0.0	2,110,818.50	1,344,996.62	36° 47' 47.888 N	107° 15' 32.420 W
- survey misses by 3546.8ft at 3547.0ft MD (3546.6 TVD, 20.4 N, -22.1 E)									
- Rectangle (sides W1,971.0 H1,606.0 D0.0)									
PBHL San Juan 30-4	0.00	0.00	4,268.0	-659.9	1,506.2	2,110,142.75	1,346,495.82	36° 47' 41.363 N	107° 15' 13.901 W
- survey misses by 317.3ft at 5373.0ft MD (4252.2 TVD, -693.6 N, 1191.1 E)									
- Point									

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
3,547.0	3,546.6	20.4	-22.1	Interpolated Pt. Top of Whipstock
4,498.0	4,252.1	-209.1	465.2	Interpolated Pt. Coal Top
5,373.0	4,252.2	-693.6	1,191.1	BHL Lateral

Checked By: _____ Approved By: _____ Date: _____