



Energen Resources

Carson Natl Forest-S29, T32N, R4W

Carracas Mesa

Arboles 29 A #11

3rd Lateral

30-039-29954

Survey: EOW Survey 3rd Lateral

RCVD OCT 15 '07

OIL CONS. DIV.

End of Well Survey

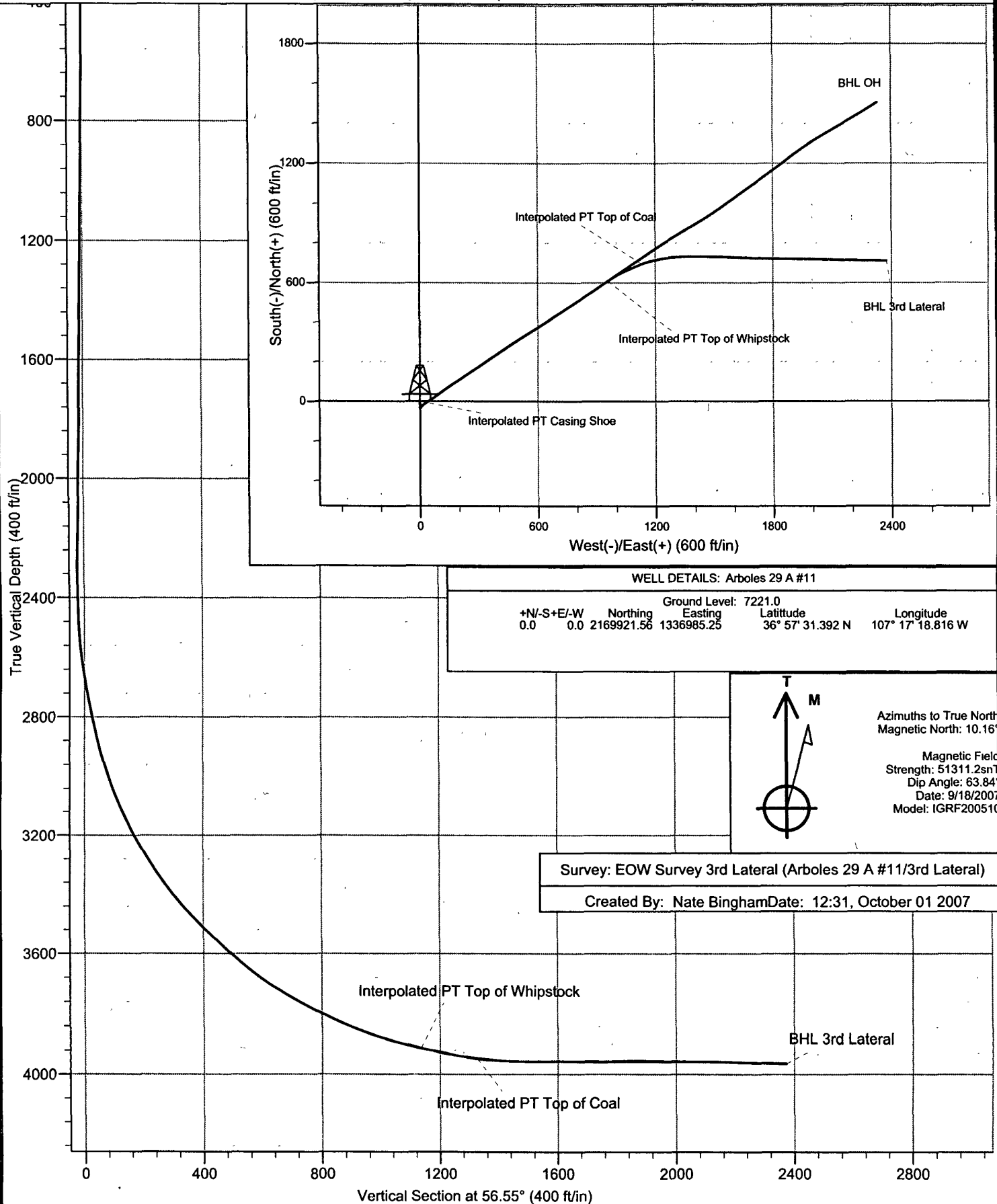
01 October, 2007

DIST. 3
Lateral Origin 1552/N 736/W
B/L 1585/N 1657/W

PATHFINDER
ENERGY SERVICES

40

Survey: EOW Survey 3rd Lateral (Arboles 29 A #11/3rd Lateral)



Company: Energen Resources
Project: Carson Natl Forest-S29, T32N, R4W
Site: Carracas Mesa
Well: Arboles 29 A #11
Wellbore: 3rd Lateral
Design: 3rd Lateral

Local Co-ordinate Reference: Well Arboles 29 A #11
TVD Reference: KB @ 7233.0ft (AWS #580)
MD Reference: KB @ 7233.0ft (AWS #580)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Project:	Carson Natl Forest-S29, T32N, R4W
Map System:	US State Plane 1983
Geo Datum:	North American Datum 1983
Map Zone:	New Mexico Central Zone

System Datum: Mean Sea Level

Site Carracas Mesa

Site Position:		Northing:	2,169,921.56	ft	Latitude:	36° 57' 31.392 N
From:	Lat/Long	Easting:	1,336,985.25	ft	Longitude:	107° 17' 18.816 W
Position Uncertainty:	0.0	Slot Radius:		"	Grid Convergence:	-0.62

Well Arboles 29 A #11

Well Position	+N/-S	0.0	ft	Northing:	2,169,921.56	ft	Latitude:	36° 57' 31.392 N
	+E/-W	0.0	ft	Easting:	1,336,985.25	ft	Longitude:	107° 17' 18.816 W
Position Uncertainty		0.0	ft	Wellhead Elevation:	7,221.0	ft	Ground Level:	7,221.0 ft

Wellbore 3rd Lateral

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	9/18/2007	10.16	63.84	51,311

Design 3rd Lateral

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	56.55

Survey Program _____ **Date** 10/1/2007

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
226.0	5,915.0	EOW Survey 3rd Lateral (3rd Lateral)	Pathfinder	Pathfinder MWD

Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0
226.0	0.14	174.56	226.0	-0.3	0.0	0.06	-0.1
Interpolated PT Casing Shoe							
290.0	0.18	174.56	290.0	-0.5	0.0	0.06	-0.2
595.0	0.79	163.75	595.0	-2.9	0.7	0.20	-1.1
934.0	1.14	179.48	933.9	-8.6	1.4	0.13	-3.6
1,250.0	1.32	178.07	1,249.9	-15.3	1.5	0.06	-7.2
1,560.0	1.23	165.33	1,559.8	-22.1	2.5	0.10	-10.1
1,874.0	1.49	181.76	1,873.7	-29.5	3.2	0.15	-13.6
2,187.0	1.41	202.24	2,186.6	-37.1	1.6	0.17	-19.1
2,278.0	1.41	209.98	2,277.6	-39.1	0.6	0.21	-21.0
2,339.0	0.44	50.72	2,338.6	-39.6	0.4	3.00	-21.5



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 TVD Reference: KB @ 7233.0ft (AWS #580)
 MD Reference: KB @ 7233.0ft (AWS #580)
 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)
2,399.0	1.76	41.14	2,398.6	-38.8	1.2	2.21	-20.3
2,461.0	1.76	44.74	2,460.5	-37.4	2.5	0.18	-18.5
2,522.0	3.96	44.48	2,521.5	-35.2	4.7	3.61	-15.5
2,582.0	7.12	43.07	2,581.2	-31.0	8.7	5.27	-9.9
2,642.0	9.06	44.48	2,640.6	-24.9	14.5	3.25	-1.6
2,703.0	9.94	50.10	2,700.7	-18.1	21.9	2.09	8.3
2,764.0	10.99	55.02	2,760.7	-11.4	30.7	2.26	19.3
2,826.0	12.49	59.33	2,821.4	-4.6	41.3	2.80	31.9
2,885.0	14.60	57.49	2,878.8	2.6	53.1	3.65	45.7
2,947.0	16.36	55.82	2,938.5	11.8	66.9	2.93	62.3
3,009.0	19.35	52.56	2,997.5	22.9	82.3	5.08	81.3
3,073.0	21.72	53.27	3,057.5	36.4	100.2	3.72	103.7
3,135.0	24.27	53.97	3,114.5	50.8	119.7	4.14	127.9
3,198.0	26.73	55.20	3,171.4	66.5	141.8	3.99	155.0
3,261.0	29.37	56.17	3,227.0	83.2	166.3	4.25	184.6
3,324.0	31.48	56.43	3,281.3	100.9	192.8	3.36	216.5
3,388.0	34.73	55.73	3,334.9	120.4	221.8	5.11	251.4
3,451.0	37.72	55.99	3,385.7	141.3	252.6	4.75	288.7
3,514.0	40.80	56.34	3,434.5	163.5	285.7	4.90	328.5
3,577.0	43.18	55.11	3,481.3	187.2	320.6	4.00	370.7
3,640.0	45.64	55.46	3,526.3	212.3	356.8	3.92	414.7
3,703.0	47.66	55.64	3,569.6	238.2	394.6	3.21	460.5
3,767.0	48.10	55.90	3,612.5	264.9	433.8	0.75	508.0
3,829.0	51.70	56.34	3,652.4	291.4	473.2	5.83	555.4
3,893.0	56.19	57.66	3,690.1	319.5	516.6	7.21	607.1
3,956.0	59.71	58.10	3,723.5	347.9	561.8	5.62	660.5
4,019.0	61.20	56.78	3,754.6	377.4	608.0	2.99	715.3
4,082.0	63.84	56.78	3,783.6	408.0	654.7	4.19	771.2
4,145.0	64.81	57.40	3,810.9	438.9	702.4	1.78	828.0
4,208.0	67.01	56.43	3,836.6	470.3	750.6	3.76	885.5
4,270.0	70.26	56.78	3,859.2	502.0	798.8	5.27	943.2
4,332.0	73.07	56.78	3,878.7	534.3	848.0	4.53	1,002.1
4,395.0	75.10	55.38	3,896.0	568.1	898.3	3.87	1,062.6
4,457.0	77.12	55.55	3,910.9	602.2	947.9	3.27	1,122.8
4,470.0	77.86	55.62	3,913.7	609.4	958.3	5.72	1,135.5
Interpolated PT Top of Whipstock							
4,568.0	79.14	65.28	3,933.3	656.7	1,041.8	9.75	1,231.2
4,599.0	79.40	64.88	3,939.1	669.5	1,069.4	1.52	1,261.3
4,631.0	81.69	66.65	3,944.3	682.5	1,098.2	9.00	1,292.5
4,662.0	83.80	68.33	3,948.2	694.2	1,126.6	8.67	1,322.7
4,666.0	83.94	68.86	3,948.7	695.7	1,130.3	13.72	1,326.5
Interpolated PT Top of Coal							
4,725.0	86.09	76.70	3,953.8	713.1	1,186.4	13.72	1,382.9
4,756.0	87.05	79.11	3,955.6	719.5	1,216.6	8.36	1,411.7
4,788.0	87.76	81.30	3,957.1	725.0	1,248.1	7.19	1,441.0

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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)
4,819.0	89.08	83.84	3,958.0	729.0	1,278.9	9.23	1,468.9
4,850.0	89.43	86.72	3,958.4	731.5	1,309.8	9.36	1,496.0
4,881.0	89.96	88.17	3,958.5	732.9	1,340.7	4.98	1,522.6
4,913.0	90.84	89.80	3,958.3	733.5	1,372.7	5.79	1,549.7
4,944.0	90.04	90.04	3,958.1	733.5	1,403.7	2.69	1,575.5
4,975.0	90.13	89.83	3,958.0	733.6	1,434.7	0.74	1,601.4
5,007.0	90.66	90.41	3,957.8	733.5	1,466.7	2.46	1,628.1
5,038.0	89.34	91.09	3,957.8	733.1	1,497.7	4.79	1,653.7
5,069.0	88.72	90.97	3,958.3	732.5	1,528.7	2.04	1,679.3
5,101.0	88.81	91.02	3,959.0	732.0	1,560.7	0.32	1,705.7
5,132.0	89.69	91.48	3,959.4	731.3	1,591.7	3.20	1,731.1
5,163.0	90.92	92.11	3,959.2	730.3	1,622.7	4.46	1,756.5
5,195.0	91.17	93.31	3,958.7	728.8	1,654.6	3.83	1,782.3
5,257.0	91.45	92.87	3,957.2	725.5	1,716.5	0.84	1,832.1
5,287.0	89.60	91.86	3,957.0	724.2	1,746.5	7.03	1,856.4
5,318.0	89.60	91.13	3,957.2	723.4	1,777.5	2.35	1,881.8
5,348.0	89.78	91.18	3,957.3	722.8	1,807.5	0.62	1,906.5
5,379.0	89.78	91.30	3,957.5	722.2	1,838.5	0.39	1,932.0
5,410.0	89.34	90.40	3,957.7	721.7	1,869.5	3.23	1,957.6
5,441.0	88.99	90.14	3,958.2	721.5	1,900.5	1.41	1,983.4
5,473.0	89.60	89.89	3,958.6	721.5	1,932.4	2.06	2,010.1
5,504.0	89.60	90.15	3,958.8	721.5	1,963.4	0.84	2,036.0
5,535.0	89.87	90.33	3,958.9	721.4	1,994.4	1.05	2,061.7
5,567.0	89.96	91.47	3,959.0	720.9	2,026.4	3.57	2,088.2
5,598.0	90.31	92.03	3,958.9	719.9	2,057.4	2.13	2,113.5
5,629.0	89.25	91.76	3,959.0	718.9	2,088.4	3.53	2,138.8
5,661.0	88.29	91.54	3,959.7	718.0	2,120.4	3.08	2,165.0
5,692.0	88.29	91.40	3,960.6	717.2	2,151.4	0.45	2,190.4
5,723.0	88.64	90.90	3,961.4	716.6	2,182.3	1.97	2,215.9
5,754.0	88.83	91.52	3,962.1	715.9	2,213.3	2.09	2,241.4
5,785.0	89.08	91.55	3,962.7	715.1	2,244.3	0.81	2,266.8
5,817.0	88.81	90.98	3,963.3	714.4	2,276.3	1.97	2,293.1
5,915.0	88.81	90.98	3,965.3	712.7	2,374.3	0.00	2,373.9

BHL 3rd Lateral

Company: Energen Resources
Project: Carson Natl Forest-S29, T32N, R4W
Site: Carracas Mesa
Well: Arboles 29 A #11
Wellbore: 3rd Lateral
Design: 3rd Lateral

Local Co-ordinate Reference: Well Arboles 29 A #11
TVD Reference: KB @ 7233.0ft (AWS #580)
MD Reference: KB @ 7233.0ft (AWS #580)
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
Land Curve #3 - survey misses by 6.8ft at 4889.6ft MD (3958.5 TVD, 733.2 N, 1349.3 E) - Point	0.00	0.00	3,960.0	726.5	1,349.4	2,170,633.31	1,338,342.49	36° 57' 38.575 N	107° 17' 2.190 W
Td Lateral #3 - survey misses by 14.8ft at 5915.0ft MD (3965.3 TVD, 712.7 N, 2374.3 E) - Point	0.00	0.00	3,960.0	726.5	2,374.9	2,170,622.13	1,339,367.93	36° 57' 38.574 N	107° 16' 49.555 W
Top Of Whipstock - survey misses by 1.4ft at 4458.9ft MD (3911.3 TVD, 603.2 N, 949.4 E) - Point	0.00	0.00	3,912.0	602.2	949.9	2,170,513.37	1,337,941.66	36° 57' 37.346 N	107° 17' 7.112 W
Drill Window - survey hits target - Rectangle (sides W1,970.0 H1,314.7 D0.0)	0.00	0.00	0.0	0.0	0.0	2,169,921.56	1,336,985.25	36° 57' 31.392 N	107° 17' 18.816 W

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
226.0	226.0	-0.3	0.0	Interpolated PT Casing Shoe
4,470.0	3,913.7	609.4	958.3	Interpolated PT Top of Whipstock
4,666.0	3,948.7	695.7	1,130.3	Interpolated PT Top of Coal
5,915.0	3,965.3	712.7	2,374.3	BHL 3rd Lateral

Checked By: _____ Approved By: _____ Date: _____