

Energen Resources

Rio Arriba County

Carracas Mesa

Arboles 20A #10

30.039.30291

Wellbore #1

Design: Wellbore #1

Standard Survey Report

16 June, 2011

RCVD SEP 15 '11

OIL CONS. DTU.

DIST. 3

Survey Report

Company:	Energen Resources	Local Co-ordinate Reference:	Well Arboles 20A #10
Project:	Rio Arriba County	TVD Reference:	WELL @ 7410.0usft (Original Well Elev)
Site:	Carracas Mesa	MD Reference:	WELL @ 7410.0usft (Original Well Elev)
Well:	Arboles 20A #10	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

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

Site	Carracas Mesa			
Site Position:		Northing:	2,173,117.10 usft	Latitude: 36° 58' 3.684 N
From:	Map	Easting:	1,343,532.65 usft	Longitude: 107° 15' 58.572 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence: -0 61 °

Well	Arboles 20A #10			
Well Position	+N/-S	0.0 usft	Northing:	2,173,117.10 usft
	+E/-W	0.0 usft	Easting:	1,343,532.65 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft	Ground Level: 7,395.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	IGRF2010	06/16/11	(°)	(°)	(nT)
			9.71	63.75	50,923

Design	Wellbore #1			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	266.94

Survey Program	Date 06/16/11			
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
272.0	9,100.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
272.0	0.44	296.73	272.0	0.5	-0.9	0.9	0.16	0.16	0.00
363.0	0.06	139.49	363.0	0.6	-1.2	1.2	0.54	-0.42	-172.79
456.0	0.09	214.88	456.0	0.5	-1.2	1.2	0.10	0.03	81.06
547.0	0.10	165.88	547.0	0.4	-1.2	1.2	0.09	0.01	-53.85
636.0	0.11	208.81	636.0	0.2	-1.3	1.3	0.09	0.01	48.24
727.0	0.14	33.05	727.0	0.2	-1.2	1.2	0.27	0.03	-193.14
819.0	0.04	195.85	819.0	0.3	-1.2	1.2	0.19	-0.11	176.96
909.0	0.14	7.99	909.0	0.4	-1.2	1.2	0.20	0.11	191.27
1,000.0	0.12	343.08	1,000.0	0.6	-1.2	1.2	0.07	-0.02	-27.37

Survey Report

Company: Energen Resources
Project: Rio Arriba County
Site: Carracas Mesa
Well: Arboles 20A #10
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Arboles 20A #10
TVD Reference: WELL @ 7410.0usft (Original Well Elev)
MD Reference: WELL @ 7410.0usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,094.0	0.06	291.79	1,094.0	0.7	-1.3	1.2	0.10	-0.06	-54.56
1,183.0	0.10	339.08	1,183.0	0.8	-1.3	1.3	0.08	0.04	53.13
1,274.0	0.09	174.77	1,274.0	0.8	-1.4	1.3	0.21	-0.01	-180.56
1,367.0	0.09	118.23	1,367.0	0.7	-1.3	1.3	0.09	0.00	-60.80
1,461.0	0.09	179.74	1,461.0	0.6	-1.2	1.2	0.10	0.00	65.44
1,557.0	0.03	213.48	1,557.0	0.5	-1.2	1.2	0.07	-0.06	35.15
1,652.0	0.09	197.51	1,652.0	0.4	-1.3	1.3	0.06	0.06	-16.81
1,748.0	0.12	160.52	1,748.0	0.2	-1.3	1.3	0.08	0.03	-38.53
1,842.0	0.06	93.87	1,842.0	0.1	-1.2	1.2	0.12	-0.06	-70.90
1,938.0	0.10	15.16	1,938.0	0.2	-1.1	1.1	0.11	0.04	-81.99
2,033.0	0.15	224.49	2,033.0	0.2	-1.2	1.2	0.25	0.05	-158.60
2,128.0	0.23	128.21	2,128.0	0.0	-1.1	1.1	0.30	0.08	-101.35
2,224.0	0.06	137.19	2,224.0	-0.2	-0.9	0.9	0.18	-0.18	9.35
2,320.0	0.09	27.27	2,320.0	-0.2	-0.9	0.9	0.13	0.03	-114.50
2,415.0	0.06	301.38	2,415.0	-0.1	-0.9	0.9	0.11	-0.03	-90.41
2,511.0	0.06	284.14	2,511.0	0.0	-1.0	1.0	0.02	0.00	-17.96
2,607.0	0.84	264.40	2,607.0	-0.1	-1.7	1.7	0.82	0.81	-20.56
2,671.0	3.47	258.55	2,670.9	-0.5	-4.1	4.1	4.12	4.11	-9.14
2,734.0	4.84	256.59	2,733.8	-1.5	-8.5	8.6	2.19	2.17	-3.11
2,797.0	6.73	253.31	2,796.4	-3.2	-14.7	14.8	3.04	3.00	-5.21
2,861.0	9.50	250.11	2,859.8	-6.1	-23.2	23.5	4.38	4.33	-5.00
2,925.0	11.48	250.23	2,922.7	-10.0	-34.2	34.7	3.09	3.09	0.19
2,988.0	12.87	251.14	2,984.3	-14.4	-46.7	47.4	2.23	2.21	1.44
3,020.0	14.28	254.15	3,015.4	-16.6	-53.9	54.7	4.93	4.41	9.41
3,052.0	15.41	256.52	3,046.3	-18.7	-61.8	62.7	4.01	3.53	7.41
3,116.0	17.92	260.03	3,107.7	-22.4	-79.8	80.9	4.22	3.92	5.48
3,180.0	20.77	259.32	3,168.0	-26.2	-100.6	101.9	4.47	4.45	-1.11
3,212.0	21.60	259.15	3,197.9	-28.4	-112.0	113.4	2.60	2.59	-0.53
3,244.0	22.70	257.96	3,227.5	-30.8	-123.8	125.3	3.71	3.44	-3.72
3,276.0	23.62	257.20	3,256.9	-33.5	-136.1	137.7	3.02	2.88	-2.38
3,306.0	24.51	256.84	3,284.3	-36.2	-148.0	149.8	3.01	2.97	-1.20
3,338.0	26.12	256.55	3,313.3	-39.4	-161.4	163.2	5.05	5.03	-0.91
3,369.0	27.65	256.76	3,340.9	-42.6	-175.0	177.0	4.94	4.94	0.68
3,401.0	28.58	256.54	3,369.1	-46.1	-189.7	191.9	2.92	2.91	-0.69
3,433.0	29.76	256.95	3,397.1	-49.7	-204.8	207.2	3.74	3.69	1.28
3,465.0	30.51	257.08	3,424.7	-53.3	-220.5	223.0	2.35	2.34	0.41
3,497.0	31.69	257.08	3,452.1	-57.0	-236.6	239.3	3.69	3.69	0.00
3,529.0	32.59	257.56	3,479.2	-60.7	-253.2	256.1	2.92	2.81	1.50
3,561.0	33.37	257.78	3,506.1	-64.4	-270.2	273.3	2.47	2.44	0.69
3,592.0	34.71	257.63	3,531.8	-68.1	-287.2	290.4	4.33	4.32	-0.48
3,624.0	36.46	258.65	3,557.8	-71.9	-305.4	308.8	5.77	5.47	3.19
3,656.0	38.12	259.18	3,583.2	-75.7	-324.4	328.0	5.28	5.19	1.66
3,688.0	39.49	259.94	3,608.2	-79.3	-344.2	347.9	4.53	4.28	2.38
3,720.0	41.00	260.01	3,632.6	-82.9	-364.5	368.4	4.72	4.72	0.22

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 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well Arboles 20A #10
 TVD Reference: WELL @ 7410.0usft (Original Well Elev)
 MD Reference: WELL @ 7410.0usft (Original Well Elev)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM 5000 1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/S (usft)	+E/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,752.0	42.70	260.10	3,656.4	-86.6	-385.5	389.6	5.32	5.31	0.28
3,784.0	44.14	259.77	3,679.7	-90.4	-407.2	411.4	4.56	4.50	-1.03
3,816.0	45.43	259.43	3,702.4	-94.5	-429.4	433.8	4.10	4.03	-1.06
3,848.0	46.65	259.20	3,724.6	-98.8	-452.0	456.6	3.85	3.81	-0.72
3,880.0	47.89	258.91	3,746.3	-103.2	-475.1	479.9	3.93	3.88	-0.91
3,912.0	49.13	259.44	3,767.5	-107.7	-498.6	503.7	4.07	3.88	1.66
3,943.0	50.46	259.73	3,787.5	-112.0	-521.9	527.1	4.35	4.29	0.94
3,975.0	51.46	259.78	3,807.7	-116.4	-546.4	551.8	3.13	3.13	0.16
4,007.0	52.23	260.09	3,827.5	-120.8	-571.1	576.8	2.52	2.41	0.97
4,038.0	52.97	260.39	3,846.3	-125.0	-595.4	601.2	2.51	2.39	0.97
4,070.0	53.69	260.77	3,865.4	-129.2	-620.7	626.7	2.44	2.25	1.19
4,096.0	54.31	261.61	3,880.7	-132.4	-641.5	647.7	3.54	2.38	3.23
4,128.0	55.37	261.27	3,899.1	-136.3	-667.4	673.7	3.42	3.31	-1.06
4,160.0	56.79	261.79	3,917.0	-140.2	-693.7	700.2	4.64	4.44	1.63
4,192.0	57.86	261.91	3,934.2	-144.0	-720.3	727.0	3.36	3.34	0.38
4,224.0	59.47	262.12	3,950.9	-147.8	-747.4	754.2	5.06	5.03	0.66
4,256.0	60.05	261.81	3,967.0	-151.7	-774.8	781.8	2.00	1.81	-0.97
4,288.0	60.70	261.17	3,982.8	-155.8	-802.3	809.4	2.67	2.03	-2.00
4,319.0	61.73	260.38	3,997.7	-160.2	-829.1	836.5	4.00	3.32	-2.55
4,351.0	63.18	260.15	4,012.5	-165.0	-857.1	864.6	4.58	4.53	-0.72
4,383.0	63.93	260.62	4,026.8	-169.8	-885.3	893.1	2.69	2.34	1.47
4,415.0	64.62	260.98	4,040.7	-174.4	-913.8	921.8	2.38	2.16	1.13
4,447.0	65.46	261.05	4,054.2	-178.9	-942.4	950.6	2.63	2.63	0.22
4,479.0	66.73	261.09	4,067.2	-183.4	-971.3	979.7	3.97	3.97	0.13
4,510.0	67.82	261.18	4,079.1	-187.8	-999.6	1,008.2	3.53	3.52	0.29
4,542.0	68.88	261.50	4,090.9	-192.3	-1,029.0	1,037.8	3.44	3.31	1.00
4,574.0	69.81	261.81	4,102.2	-196.7	-1,058.6	1,067.6	3.04	2.91	0.97
4,606.0	70.73	261.93	4,113.0	-200.9	-1,088.4	1,097.6	2.90	2.88	0.38
4,638.0	71.73	262.27	4,123.3	-205.1	-1,118.4	1,127.8	3.28	3.13	1.06
4,670.0	73.13	262.43	4,133.0	-209.2	-1,148.7	1,158.2	4.40	4.38	0.50
4,702.0	74.81	262.89	4,141.8	-213.1	-1,179.2	1,188.9	5.43	5.25	1.44
4,734.0	76.61	263.22	4,149.7	-216.8	-1,209.9	1,219.8	5.71	5.63	1.03
4,766.0	78.11	262.95	4,156.7	-220.6	-1,240.9	1,250.9	4.76	4.69	-0.84
4,798.0	79.54	262.63	4,162.9	-224.5	-1,272.1	1,282.3	4.58	4.47	-1.00
4,829.0	81.22	262.76	4,168.1	-228.4	-1,302.4	1,312.7	5.44	5.42	0.42
4,861.0	83.22	263.13	4,172.4	-232.3	-1,333.9	1,344.4	6.35	6.25	1.16
4,893.0	83.66	263.04	4,176.1	-236.1	-1,365.4	1,376.1	1.40	1.38	-0.28
4,916.0	83.84	262.69	4,178.6	-239.0	-1,388.1	1,398.9	1.73	0.80	-1.54
Top Of Coal @ 4916' MD; 4179' TVD									
4,928.0	83.94	262.50	4,179.9	-240.5	-1,399.9	1,410.8	1.73	0.80	-1.54
4,957.0	85.44	262.50	4,182.5	-244.3	-1,428.6	1,439.6	5.17	5.17	0.00
4,984.0	87.08	263.12	4,184.3	-247.7	-1,455.3	1,466.4	6.49	6.07	2.30
5,078.0	89.96	266.98	4,186.7	-255.8	-1,548.9	1,560.3	5.12	3.06	4.11

Survey Report

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Site: Carracas Mesa
Well: Arboles 20A #10
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference:
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North Reference:
Survey Calculation Method:
Database:

Well Arboles 20A #10
WELL @ 7410.0usft (Original Well Elev)
WELL @ 7410.0usft (Original Well Elev)
Grid
Minimum Curvature
EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,110.0	90.13	269.75	4,186.7	-256.7	-1,580.9	1,592.3	8.67	0.53	8.66
5,142.0	90.92	271.75	4,186.4	-256.3	-1,612.9	1,624.2	6.72	2.47	6.25
5,173.0	89.87	269.83	4,186.2	-255.8	-1,643.9	1,655.2	7.06	-3.39	-6.19
5,205.0	90.48	268.46	4,186.1	-256.3	-1,675.9	1,687.1	4.69	1.91	-4.28
5,237.0	90.31	268.01	4,185.9	-257.3	-1,707.8	1,719.1	1.50	-0.53	-1.41
5,269.0	89.60	268.26	4,185.9	-258.3	-1,739.8	1,751.1	2.35	-2.22	0.78
5,301.0	89.43	268.39	4,186.2	-259.3	-1,771.8	1,783.1	0.67	-0.53	0.41
5,333.0	89.96	268.77	4,186.4	-260.1	-1,803.8	1,815.1	2.04	1.66	1.19
5,364.0	90.57	269.19	4,186.2	-260.6	-1,834.8	1,846.1	2.39	1.97	1.35
5,396.0	90.75	268.76	4,185.8	-261.2	-1,866.8	1,878.1	1.46	0.56	-1.34
5,428.0	90.66	267.71	4,185.4	-262.2	-1,898.8	1,910.0	3.29	-0.28	-3.28
5,460.0	90.22	266.41	4,185.2	-263.8	-1,930.7	1,942.0	4.29	-1.38	-4.06
5,491.0	89.34	265.26	4,185.3	-266.1	-1,961.6	1,973.0	4.67	-2.84	-3.71
5,523.0	89.87	265.54	4,185.5	-268.6	-1,993.5	2,005.0	1.87	1.66	0.88
5,555.0	90.31	267.55	4,185.5	-270.6	-2,025.5	2,037.0	6.43	1.38	6.28
5,584.0	90.31	267.56	4,185.3	-271.8	-2,054.4	2,066.0	0.03	0.00	0.03
5,615.0	90.48	268.15	4,185.1	-273.0	-2,085.4	2,097.0	1.98	0.55	1.90
5,645.0	90.04	268.01	4,185.0	-274.0	-2,115.4	2,127.0	1.54	-1.47	-0.47
5,675.0	89.69	267.93	4,185.1	-275.0	-2,145.4	2,157.0	1.20	-1.17	-0.27
5,707.0	89.87	267.91	4,185.2	-276.2	-2,177.4	2,189.0	0.57	0.56	-0.06
5,738.0	89.52	267.72	4,185.3	-277.4	-2,208.3	2,220.0	1.28	-1.13	-0.61
5,768.0	89.52	268.10	4,185.6	-278.5	-2,238.3	2,250.0	1.27	0.00	1.27
5,799.0	90.22	269.21	4,185.7	-279.2	-2,269.3	2,281.0	4.23	2.26	3.58
5,829.0	90.84	269.95	4,185.4	-279.4	-2,299.3	2,310.9	3.22	2.07	2.47
5,860.0	91.89	271.29	4,184.6	-279.1	-2,330.3	2,341.9	5.49	3.39	4.32
5,891.0	92.51	271.42	4,183.5	-278.3	-2,361.3	2,372.8	2.04	2.00	0.42
5,922.0	91.98	270.77	4,182.2	-277.7	-2,392.2	2,403.7	2.70	-1.71	-2.10
5,952.0	92.24	270.84	4,181.1	-277.3	-2,422.2	2,433.6	0.90	0.87	0.23
5,982.0	92.15	270.46	4,180.0	-277.0	-2,452.2	2,463.5	1.30	-0.30	-1.27
6,013.0	91.71	270.06	4,178.9	-276.8	-2,483.2	2,494.4	1.92	-1.42	-1.29
6,043.0	90.92	268.82	4,178.3	-277.1	-2,513.2	2,524.4	4.90	-2.63	-4.13
6,073.0	91.10	269.41	4,177.7	-277.6	-2,543.2	2,554.3	2.06	0.60	1.97
6,104.0	91.45	269.57	4,177.0	-277.9	-2,574.1	2,585.3	1.24	1.13	0.52
6,134.0	91.54	269.61	4,176.3	-278.1	-2,604.1	2,615.3	0.33	0.30	0.13
6,165.0	91.10	269.32	4,175.5	-278.4	-2,635.1	2,646.2	1.70	-1.42	-0.94
6,196.0	90.40	269.05	4,175.1	-278.8	-2,666.1	2,677.2	2.42	-2.26	-0.87
6,227.0	90.22	268.18	4,175.0	-279.6	-2,697.1	2,708.2	2.87	-0.58	-2.81
6,257.0	89.52	267.04	4,175.0	-280.8	-2,727.1	2,738.2	4.46	-2.33	-3.80
6,288.0	90.31	267.15	4,175.1	-282.4	-2,758.0	2,769.2	2.57	2.55	0.35
6,318.0	90.75	266.78	4,174.8	-284.0	-2,788.0	2,799.2	1.92	1.47	-1.23
6,348.0	90.75	266.92	4,174.4	-285.6	-2,817.9	2,829.2	0.47	0.00	0.47
6,379.0	90.92	268.19	4,174.0	-287.0	-2,848.9	2,860.2	4.13	0.55	4.10
6,409.0	90.66	269.53	4,173.5	-287.5	-2,878.9	2,890.2	4.55	-0.87	4.47
6,439.0	90.92	269.58	4,173.1	-287.8	-2,908.9	2,920.1	0.88	0.87	0.17

Survey Report

Company:	Energen Resources	Local Co-ordinate Reference:	Well Arboles 20A #10
Project:	Rio Arriba County	TVD Reference:	WELL @ 7410.0usft (Original Well Elev)
Site:	Carracas Mesa	MD Reference:	WELL @ 7410.0usft (Original Well Elev)
Well:	Arboles 20A #10	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,470.0	90.92	269.29	4,172.6	-288.1	-2,939.9	2,951.1	0.94	0.00	-0.94
6,500.0	91.36	270.26	4,172.0	-288.2	-2,969.9	2,981.0	3.55	1.47	3.23
6,531.0	91.71	270.56	4,171.2	-288.0	-3,000.9	3,012.0	1.49	1.13	0.97
6,562.0	91.80	270.41	4,170.3	-287.7	-3,031.9	3,042.9	0.56	0.29	-0.48
6,592.0	91.80	269.75	4,169.3	-287.7	-3,061.8	3,072.8	2.20	0.00	-2.20
6,622.0	91.89	270.53	4,168.4	-287.6	-3,091.8	3,102.8	2.62	0.30	2.60
6,653.0	91.28	270.65	4,167.5	-287.3	-3,122.8	3,133.7	2.01	-1.97	0.39
6,684.0	90.84	271.64	4,166.9	-286.7	-3,153.8	3,164.6	3.49	-1.42	3.19
6,715.0	90.75	271.64	4,166.5	-285.8	-3,184.8	3,195.5	0.29	-0.29	0.00
6,744.0	90.92	272.24	4,166.1	-284.8	-3,213.8	3,224.4	2.15	0.59	2.07
6,775.0	91.45	271.88	4,165.4	-283.7	-3,244.7	3,255.3	2.07	1.71	-1.16
6,806.0	91.63	272.32	4,164.6	-282.5	-3,275.7	3,286.1	1.53	0.58	1.42
6,835.0	91.36	272.17	4,163.8	-281.4	-3,304.7	3,315.0	1.06	-0.93	-0.52
6,865.0	91.36	271.26	4,163.1	-280.5	-3,334.7	3,344.9	3.03	0.00	-3.03
6,895.0	90.40	270.61	4,162.7	-280.0	-3,364.6	3,374.8	3.86	-3.20	-2.17
6,925.0	89.87	270.29	4,162.6	-279.8	-3,394.6	3,404.7	2.06	-1.77	-1.07
6,956.0	90.22	270.23	4,162.6	-279.6	-3,425.6	3,435.7	1.15	1.13	-0.19
6,987.0	90.48	270.31	4,162.4	-279.5	-3,456.6	3,466.6	0.88	0.84	0.26
7,016.0	90.75	270.39	4,162.1	-279.3	-3,485.6	3,495.6	0.97	0.93	0.28
7,047.0	90.84	270.12	4,161.6	-279.2	-3,516.6	3,526.5	0.92	0.29	-0.87
7,078.0	90.84	269.96	4,161.2	-279.2	-3,547.6	3,557.5	0.52	0.00	-0.52
7,108.0	91.36	270.66	4,160.6	-279.0	-3,577.6	3,587.4	2.91	1.73	2.33
7,139.0	91.45	270.63	4,159.8	-278.7	-3,608.6	3,618.4	0.31	0.29	-0.10
7,169.0	90.92	270.96	4,159.2	-278.2	-3,638.6	3,648.3	2.08	-1.77	1.10
7,200.0	90.92	270.59	4,158.7	-277.8	-3,669.6	3,679.2	1.19	0.00	-1.19
7,229.0	91.01	269.70	4,158.2	-277.7	-3,698.6	3,708.2	3.08	0.31	-3.07
7,260.0	90.84	269.87	4,157.7	-277.9	-3,729.6	3,739.1	0.78	-0.55	0.55
7,291.0	91.01	269.44	4,157.2	-278.0	-3,760.6	3,770.1	1.49	0.55	-1.39
7,321.0	90.57	268.65	4,156.8	-278.5	-3,790.6	3,800.0	3.01	-1.47	-2.63
7,353.0	89.69	267.93	4,156.8	-279.5	-3,822.6	3,832.0	3.55	-2.75	-2.25
7,383.0	90.75	267.69	4,156.6	-280.7	-3,852.5	3,862.0	3.62	3.53	-0.80
7,414.0	90.57	268.10	4,156.3	-281.8	-3,883.5	3,893.0	1.44	-0.58	1.32
7,446.0	91.19	268.24	4,155.8	-282.8	-3,915.5	3,925.0	1.99	1.94	0.44
7,476.0	90.75	267.99	4,155.3	-283.8	-3,945.5	3,955.0	1.69	-1.47	-0.83
7,508.0	89.87	267.48	4,155.1	-285.1	-3,977.5	3,987.0	3.18	-2.75	-1.59
7,538.0	90.22	267.78	4,155.1	-286.3	-4,007.4	4,017.0	1.54	1.17	1.00
7,569.0	89.78	267.76	4,155.1	-287.5	-4,038.4	4,048.0	1.42	-1.42	-0.06
7,601.0	90.04	267.96	4,155.1	-288.7	-4,070.4	4,080.0	1.03	0.81	0.63
7,632.0	90.04	267.95	4,155.1	-289.8	-4,101.4	4,111.0	0.03	0.00	-0.03
7,663.0	89.78	267.90	4,155.2	-290.9	-4,132.3	4,142.0	0.85	-0.84	-0.16
7,693.0	89.96	267.88	4,155.2	-292.0	-4,162.3	4,172.0	0.60	0.60	-0.07
7,724.0	89.78	268.13	4,155.3	-293.1	-4,193.3	4,203.0	0.99	-0.58	0.81
7,755.0	90.40	270.08	4,155.3	-293.6	-4,224.3	4,233.9	6.60	2.00	6.29

Survey Report

Company:	Energen Resources	Local Co-ordinate Reference:	Well Arboles 20A #10
Project:	Rio Arriba County	TVD Reference:	WELL @ 7410.0usft (Original Well Elev)
Site:	Carracas Mesa	MD Reference:	WELL @ 7410.0usft (Original Well Elev)
Well:	Arboles 20A #10	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,786.0	90.13	269.88	4,155.1	-293.6	-4,255.3	4,264.9	1.08	-0.87	-0.65
7,817.0	90.04	269.50	4,155.1	-293.8	-4,286.3	4,295.9	1.26	-0.29	-1.23
7,848.0	90.13	269.53	4,155.0	-294.0	-4,317.3	4,326.8	0.31	0.29	0.10
7,878.0	90.22	269.38	4,154.9	-294.3	-4,347.3	4,356.8	0.58	0.30	-0.50
7,909.0	90.48	269.82	4,154.7	-294.5	-4,378.3	4,387.8	1.65	0.84	1.42
7,940.0	92.33	271.18	4,154.0	-294.3	-4,409.3	4,418.7	7.41	5.97	4.39
7,970.0	92.42	271.06	4,152.7	-293.7	-4,439.3	4,448.6	0.50	0.30	-0.40
8,001.0	91.80	270.28	4,151.6	-293.3	-4,470.2	4,479.5	3.21	-2.00	-2.52
8,032.0	91.36	270.00	4,150.7	-293.2	-4,501.2	4,510.5	1.68	-1.42	-0.90
8,064.0	91.36	269.72	4,150.0	-293.3	-4,533.2	4,542.4	0.87	0.00	-0.88
8,096.0	91.80	270.03	4,149.1	-293.4	-4,565.2	4,574.3	1.68	1.38	0.97
8,128.0	91.54	270.06	4,148.2	-293.4	-4,597.2	4,606.3	0.82	-0.81	0.09
8,160.0	91.45	270.23	4,147.3	-293.3	-4,629.2	4,638.2	0.60	-0.28	0.53
8,192.0	91.10	269.94	4,146.6	-293.2	-4,661.2	4,670.2	1.42	-1.09	-0.91
8,224.0	91.01	269.17	4,146.0	-293.5	-4,693.2	4,702.1	2.42	-0.28	-2.41
8,255.0	91.28	269.24	4,145.4	-293.9	-4,724.1	4,733.1	0.90	0.87	0.23
8,287.0	90.66	269.64	4,144.9	-294.2	-4,756.1	4,765.1	2.31	-1.94	1.25
8,319.0	90.75	269.32	4,144.5	-294.5	-4,788.1	4,797.0	1.04	0.28	-1.00
8,351.0	90.92	269.58	4,144.0	-294.8	-4,820.1	4,829.0	0.97	0.53	0.81
8,382.0	91.19	269.52	4,143.4	-295.1	-4,851.1	4,860.0	0.89	0.87	-0.19
8,414.0	91.36	269.61	4,142.7	-295.3	-4,883.1	4,891.9	0.60	0.53	0.28
8,446.0	91.28	269.62	4,142.0	-295.5	-4,915.1	4,923.9	0.25	-0.25	0.03
8,478.0	91.36	269.45	4,141.2	-295.8	-4,947.1	4,955.8	0.59	0.25	-0.53
8,510.0	91.10	270.69	4,140.6	-295.8	-4,979.1	4,987.8	3.96	-0.81	3.88
8,541.0	90.75	270.99	4,140.1	-295.3	-5,010.1	5,018.7	1.49	-1.13	0.97
8,573.0	90.75	272.01	4,139.6	-294.5	-5,042.1	5,050.6	3.19	0.00	3.19
8,604.0	91.19	272.44	4,139.1	-293.3	-5,073.0	5,081.5	1.98	1.42	1.39
8,636.0	90.84	271.88	4,138.6	-292.1	-5,105.0	5,113.3	2.06	-1.09	-1.75
8,668.0	91.71	271.95	4,137.8	-291.0	-5,137.0	5,145.2	2.73	2.72	0.22
8,700.0	92.07	271.73	4,136.8	-290.0	-5,169.0	5,177.1	1.32	1.13	-0.69
8,732.0	91.63	271.44	4,135.8	-289.1	-5,200.9	5,208.9	1.65	-1.38	-0.91
8,764.0	91.19	271.43	4,135.0	-288.3	-5,232.9	5,240.8	1.38	-1.38	-0.03
8,795.0	90.57	271.56	4,134.5	-287.5	-5,263.9	5,271.7	2.04	-2.00	0.42
8,827.0	90.40	271.63	4,134.2	-286.6	-5,295.9	5,303.6	0.57	-0.53	0.22
8,859.0	91.80	271.54	4,133.6	-285.7	-5,327.9	5,335.5	4.38	4.38	-0.28
8,891.0	91.98	270.61	4,132.5	-285.1	-5,359.8	5,367.4	2.96	0.56	-2.91
8,923.0	92.33	270.80	4,131.3	-284.7	-5,391.8	5,399.3	1.24	1.09	0.59
8,954.0	92.42	270.88	4,130.1	-284.2	-5,422.8	5,430.2	0.39	0.29	0.26
8,986.0	90.75	270.22	4,129.2	-283.9	-5,454.8	5,462.1	5.61	-5.22	-2.06
9,018.0	90.22	271.14	4,128.9	-283.6	-5,486.8	5,494.1	3.32	-1.66	2.88
9,040.0	90.31	271.35	4,128.8	-283.1	-5,508.8	5,516.0	1.04	0.41	0.95
9,100.0	90.31	271.35	4,128.5	-281.7	-5,568.7	5,575.8	0.00	0.00	0.00

Proj TD @ 9100'MD;4129'TVD

Survey Report

Company:	Energen Resources	Local Co-ordinate Reference:	Well Arboles 20A #10
Project:	Rio Arriba County	TVD Reference:	WELL @ 7410.0usft (Original Well Elev)
Site:	Carracas Mesa	MD Reference:	WELL @ 7410.0usft (Original Well Elev)
Well:	Arboles 20A #10	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N-S (usft)	+E-W (usft)	
4,916.0	4,178.6	-239.0	-1,388.1	Top Of Coal @ 4916'MD;4179'TVD
9,100.0	4,128.5	-281.7	-5,568.7	Proj TD @ 9100'MD;4129'TVD

Checked By: _____ Approved By: _____ Date: _____