

Energen Resources

30-039-24420

Carson National Forest, SW S21, T32N, R4W

Carracas Mesa

Carracas 21 B #13

Final Survey

surface 920/S 810/W
B1#1 1036/S 1111/W md 4425 TVd 4206
B#2 1498/S 2163/W md 5663 TVd 4213

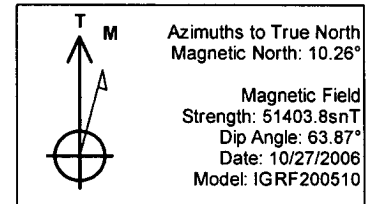
Plan: Actual Drill Path

Energen Resources - Survey

27 October, 2006



Project: Carson National Forest
Site: Carracas Mesa
Well: Carracas 21 B #13
Wellbore: Final Survey
Plan: Actual Drill Path (Carracas 21 B #13/Final Survey)



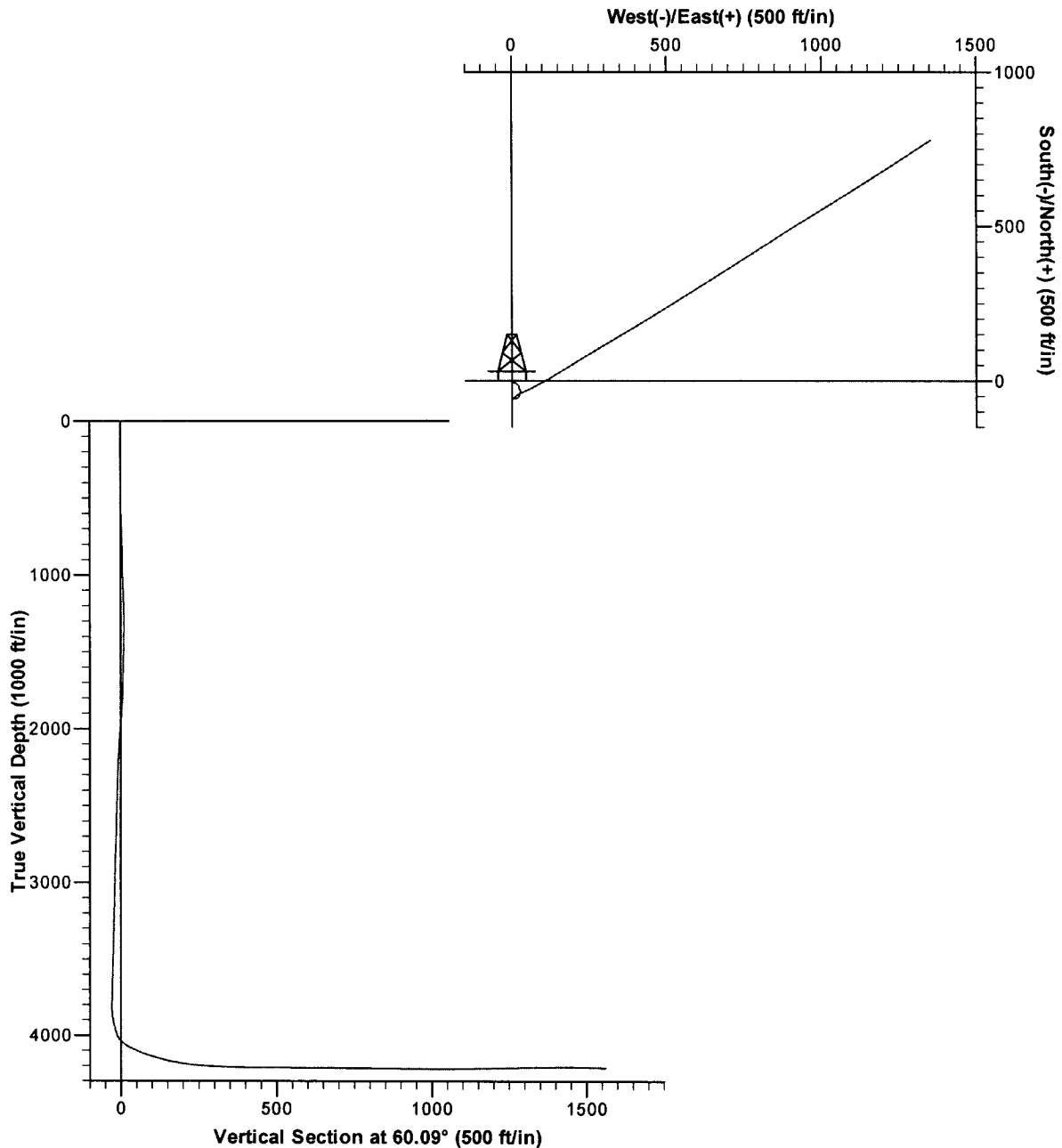
PROJECT DETAILS: Carson National Forest, SW S21, T32N, R4W

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Western Zone

System Datum: Mean Sea Level

SURFACE LOCATION

Easting: 2888817.51
Northing: 2171990.01



Energen

Energen Resources - Survey



Company:	Energen Resources	Local Co-ordinate Reference:	Well Carracas 21 B #13
Project:	Carson National Forest, SW S21, T32N ,R4W	TVD Reference:	AWS 450 @ 7408.0ft
Site:	Carracas Mesa	MD Reference:	AWS 450 @ 7408.0ft
Well:	Carracas 21 B #13	North Reference:	True
Wellbore:	Final Survey	Survey Calculation Method:	Minimum Curvature
Design:	Actual Drill Path	Database:	EDM 2003.16 Single User Db

Project:	Carson National Forest, SW S21, T32N ,R4W, S21, T32N, R4W		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Western Zone		

Site:	Carracas Mesa		
Site Position:		Northing:	2,171,990.01 ft
From:	Lat/Long	Easting:	2,888,817.51 ft
Position Uncertainty:	0.0 ft	Slot Radius:	"
		Latitude:	36° 58' 2.960 N
		Longitude:	107° 15' 57.740 W
		Grid Convergence:	0.34 °

Well:	Carracas 21 B #13		
Well Position	+N/-S	0.0 ft	Northing: 2,171,990.01 ft
	+E/-W	0.0 ft	Easting: 2,888,817.51 ft
Position Uncertainty	0.0 ft	Wellhead Elevation:	7,396.0 ft
		Ground Level:	7,396.0 ft

Wellbore	Final Survey				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF200510	10/27/2006	10.26	63.87	51,404

Design:	Actual Drill Path				
Audit Notes:					
Version:	1	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	60.09	

Survey Tool Program		Date	10/27/2006		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.0	0.0	Actual Drill Path (Final Survey)			

Planned Survey							
MD	TVD	Inc	Azi	V. Sec	N/S	E/W	
(ft)	(ft)	(°)	(°)	(ft)	(ft)	(ft)	
0.0	0.0	0.00	0.00	0.0	0.0	0.0	
100.0	100.0	0.21	194.75	-0.1	-0.2	0.0	
200.0	200.0	0.43	194.75	-0.5	-0.7	-0.2	
300.0	300.0	0.48	147.04	-0.8	-1.4	-0.1	
400.0	400.0	0.74	121.81	-0.4	-2.1	0.7	
500.0	500.0	0.99	122.81	0.3	-2.9	2.0	
600.0	600.0	1.23	123.41	1.1	-4.0	3.6	
700.0	699.9	1.51	116.35	2.4	-5.2	5.7	
800.0	799.9	1.80	111.53	4.1	-6.3	8.3	
900.0	899.8	1.88	116.99	5.9	-7.7	11.3	
1,000.0	999.8	1.97	122.00	7.6	-9.3	14.2	
1,100.0	1,099.7	1.98	132.22	9.0	-11.4	16.9	

Energen
Energen Resources - Survey



Company:	Energen Resources	Local Co-ordinate Reference:	Well Carracas 21 B #13
Project:	Carson National Forest, SW S21, T32N, R4W	TVD Reference:	AWS 450 @ 7408.0ft
Site:	Carracas Mesa	MD Reference:	AWS 450 @ 7408.0ft
Well:	Carracas 21 B #13	North Reference:	True
Wellbore:	Final Survey	Survey Calculation Method:	Minimum Curvature
Design:	Actual Drill Path	Database:	EDM 2003.16 Single User Db

Planned Survey						
MD (ft)	TVD (ft)	Inc (°)	Azi (°)	V. Sec (ft)	N/S (ft)	E/W (ft)
1,200.0	1,199.7	2.05	142.04	9.8	-13.9	19.3
1,300.0	1,299.6	2.03	148.98	10.0	-16.9	21.3
1,400.0	1,399.5	2.03	155.97	9.9	-20.0	22.9
1,500.0	1,499.5	2.14	156.73	9.5	-23.3	24.4
1,600.0	1,599.4	2.26	157.42	9.0	-26.9	25.9
1,700.0	1,699.3	2.57	171.60	8.0	-30.9	27.0
1,800.0	1,799.2	3.01	182.19	5.7	-35.8	27.2
1,900.0	1,899.1	3.01	192.08	2.6	-41.0	26.5
2,000.0	1,998.9	3.11	201.65	-1.3	-46.0	25.0
2,100.0	2,098.8	2.38	205.75	-5.1	-50.4	23.1
2,200.0	2,198.7	1.68	213.36	-8.2	-53.5	21.4
2,300.0	2,298.7	1.15	216.90	-10.4	-55.6	20.0
2,400.0	2,398.7	0.63	226.38	-11.8	-56.7	19.0
2,500.0	2,498.7	0.63	256.88	-12.9	-57.2	18.0
2,600.0	2,598.7	0.79	280.70	-13.9	-57.2	16.8
2,700.0	2,698.7	0.95	269.78	-15.2	-57.1	15.3
2,800.0	2,798.6	1.13	262.19	-16.8	-57.2	13.5
2,900.0	2,898.6	0.83	252.38	-18.4	-57.6	11.9
3,000.0	2,998.6	0.58	232.87	-19.6	-58.1	10.8
3,100.0	3,098.6	0.56	256.61	-20.6	-58.5	9.9
3,200.0	3,198.6	0.63	278.22	-21.5	-58.6	8.9
3,300.0	3,298.6	0.73	269.14	-22.5	-58.5	7.7
3,400.0	3,398.6	0.84	262.32	-23.7	-58.6	6.4
3,500.0	3,498.6	0.81	251.67	-25.1	-58.9	5.0
3,600.0	3,598.6	0.81	240.67	-26.5	-59.5	3.7
3,700.0	3,698.6	0.87	236.76	-27.9	-60.3	2.4
3,800.0	3,798.6	0.93	233.36	-29.5	-61.2	1.1 Directional Driller Tie In
3,900.0	3,898.5	4.70	48.56	-26.3	-58.9	3.6
4,003.0	4,000.5	10.50	49.00	-12.9	-50.0	13.8
4,010.0	4,007.4	12.92	53.05	-11.5	-49.1	14.9
4,020.0	4,017.0	16.44	56.78	-9.0	-47.6	17.0
4,030.0	4,026.5	20.00	59.22	-5.9	-46.0	19.7
4,037.0	4,033.1	22.51	60.48	-3.4	-44.7	21.8
4,040.0	4,035.8	23.72	60.88	-2.2	-44.1	22.9
4,050.0	4,044.8	27.78	61.99	2.2	-42.1	26.7
4,060.0	4,053.5	31.84	62.83	7.1	-39.8	31.1
4,068.0	4,060.2	35.09	63.38	11.5	-37.8	35.0
4,070.0	4,061.8	35.66	63.51	12.7	-37.2	36.1
4,080.0	4,069.8	38.51	64.12	18.7	-34.6	41.5
4,090.0	4,077.4	41.37	64.66	25.1	-31.8	47.3
4,100.0	4,084.8	44.23	65.14	31.9	-28.9	53.4
4,125.0	4,102.1	48.00	62.76	49.9	-21.0	69.6
4,132.0	4,106.7	49.07	62.15	55.1	-18.6	74.3
4,150.0	4,118.1	52.44	61.51	69.0	-12.0	86.5

Energen
Energen Resources - Survey



Company:	Energen Resources	Local Co-ordinate Reference:	Well Carracas 21 B #13
Project:	Carson National Forest, SW S21, T32N, R4W	TVD Reference:	AWS 450 @ 7408.0ft
Site:	Carracas Mesa	MD Reference:	AWS 450 @ 7408.0ft
Well:	Carracas 21 B #13	North Reference:	True
Wellbore:	Final Survey	Survey Calculation Method:	Minimum Curvature
Design:	Actual Drill Path	Database:	EDM 2003.16 Single User Db

Planned Survey						
MD (ft)	TVD (ft)	Inc (°)	Azi (°)	V. Sec (ft)	N/S (ft)	E/W (ft)
4,163.0	4,125.8	54.87	61.09	79.5	-7.0	95.7
4,175.0	4,132.6	56.52	60.95	89.4	-2.2	104.4
4,195.0	4,143.2	59.27	60.74	106.3	6.1	119.2
4,200.0	4,145.8	59.55	60.65	110.6	8.2	122.9
4,226.0	4,158.7	61.03	60.21	133.2	19.3	142.6
4,250.0	4,169.5	65.18	58.81	154.6	30.2	161.0
4,258.0	4,172.8	66.57	58.37	161.9	34.0	167.2
4,275.0	4,179.0	70.33	58.32	177.7	42.3	180.7
4,289.0	4,183.4	73.42	58.28	191.0	49.3	192.0
4,300.0	4,186.5	74.06	58.34	201.6	54.8	201.0
4,321.0	4,192.0	75.27	58.46	221.8	65.4	218.3
4,325.0	4,193.0	75.95	58.31	225.7	67.5	221.6
4,350.0	4,198.2	80.21	57.42	250.1	80.5	242.3
4,353.0	4,198.7	80.72	57.31	253.1	82.1	244.8
4,384.0	4,202.8	83.89	58.19	283.8	98.5	270.7
4,400.0	4,204.4	84.65	58.88	299.7	106.8	284.3
4,419.0	4,206.0	85.56	59.69	318.6	116.4	300.6
4,451.0	4,208.5	85.56	59.42	350.5	132.6	328.1
4,482.0	4,211.0	85.30	59.77	381.4	148.3	354.7
4,500.0	4,212.0	88.42	58.91	399.4	157.4	370.2
4,514.0	4,212.1	90.84	58.25	413.4	164.7	382.2
4,545.0	4,211.4	91.71	59.25	444.4	180.8	408.6
4,550.0	4,211.2	91.17	59.13	449.4	183.4	412.9
4,575.0	4,211.3	88.46	58.54	474.4	196.3	434.3
4,607.0	4,212.2	88.46	58.72	506.3	212.9	461.6
4,638.0	4,212.7	89.69	58.37	537.3	229.1	488.1
4,670.0	4,212.7	90.13	58.37	569.3	245.9	515.3
4,700.0	4,212.5	90.75	58.28	599.3	261.7	540.9
4,732.0	4,212.3	89.87	57.84	631.3	278.6	568.0
4,763.0	4,212.5	89.69	57.31	662.2	295.2	594.2
4,795.0	4,213.1	87.85	57.23	694.2	312.5	621.1
4,800.0	4,213.3	87.84	57.27	699.2	315.2	625.3
4,826.0	4,214.3	87.76	57.49	725.1	329.2	647.2
4,858.0	4,215.6	87.58	57.40	757.1	346.4	674.1
4,889.0	4,216.5	89.08	58.02	788.0	363.0	700.3
4,900.0	4,216.7	89.14	58.02	799.0	368.8	709.6
4,921.0	4,217.0	89.25	58.02	820.0	379.9	727.5
4,951.0	4,217.3	89.43	57.75	850.0	395.9	752.9
4,983.0	4,217.6	89.52	57.58	882.0	413.0	779.9
5,000.0	4,217.7	89.89	57.30	898.9	422.1	794.2
5,015.0	4,217.7	90.22	57.05	913.9	430.3	806.8
5,046.0	4,217.7	89.96	57.14	944.9	447.1	832.9
5,050.0	4,217.7	89.71	57.16	948.9	449.3	836.2
5,078.0	4,218.2	87.93	57.31	976.8	464.4	859.8

entry

Energen
Energen Resources - Survey



Company:	Energen Resources	Local Co-ordinate Reference:	Well Carracas 21 B #13
Project:	Carson National Forest, SW S21, T32N ,R4W	TVD Reference:	AWS 450 @ 7408.0ft
Site:	Carracas Mesa	MD Reference:	AWS 450 @ 7408.0ft
Well:	Carracas 21 B #13	North Reference:	True
Wellbore:	Final Survey	Survey Calculation Method:	Minimum Curvature
Design:	Actual Drill Path	Database:	EDM 2003.16 Single User Db

Planned Survey						
MD (ft)	TVD (ft)	Inc (°)	Azi (°)	V. Sec (ft)	N/S (ft)	E/W (ft)
5,109.0	4,219.2	88.55	57.31	1,007.8	481.1	885.8
5,141.0	4,220.1	88.29	57.14	1,039.7	498.5	912.7
5,150.0	4,220.3	89.16	57.40	1,048.7	503.3	920.3
5,172.0	4,220.2	91.28	58.02	1,070.7	515.1	938.9
5,204.0	4,219.4	91.71	58.54	1,102.7	531.9	966.1
5,236.0	4,218.3	91.98	58.54	1,134.6	548.6	993.4
5,267.0	4,217.2	92.33	58.28	1,165.6	564.8	1,019.8
5,299.0	4,215.8	92.42	58.46	1,197.6	581.6	1,047.0
5,300.0	4,215.8	92.43	58.46	1,198.6	582.1	1,047.9
5,330.0	4,214.5	92.59	58.46	1,228.5	597.8	1,073.4
5,361.0	4,213.1	92.68	58.37	1,259.5	614.0	1,099.8
5,393.0	4,211.8	91.80	57.31	1,291.4	631.0	1,126.8
5,400.0	4,211.6	91.80	57.27	1,298.4	634.8	1,132.7
5,425.0	4,210.8	91.80	57.14	1,323.4	648.3	1,153.7
5,456.0	4,209.9	91.63	57.40	1,354.3	665.1	1,179.8
5,488.0	4,209.4	90.13	56.96	1,386.3	682.4	1,206.7
5,500.0	4,209.3	90.30	56.96	1,398.2	689.0	1,216.8
5,520.0	4,209.2	90.57	56.96	1,418.2	699.9	1,233.5
5,551.0	4,209.2	89.25	56.87	1,449.2	716.8	1,259.5
5,583.0	4,209.5	89.69	56.70	1,481.1	734.3	1,286.3
5,600.0	4,209.9	88.05	56.60	1,498.1	743.7	1,300.5
5,614.0	4,210.5	86.70	56.52	1,512.0	751.4	1,312.1
5,663.0	4,213.3	86.70	56.52	1,560.9	778.4	1,352.9

Checked By: _____	Approved By: _____	Date: _____
-------------------	--------------------	-------------