



Energen Resources

Rio Arriba County, NM
Carracas Mesa (Carracas 20 B #1)
Carracas 20 B #1
OH

Survey: EOW Survey

Energen EOW Report

06 July, 2007

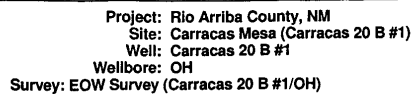
30-039-29895
Surface 1115/N 1400/W
BHL 963/N 2554/E MD 4813 Tvd 4189
BHL 853/N 735/E MD 6638 Tvd 4214

RCVD JUL2007
OIL CONS. DIV.
DIST. 3

PATHFINDER
ENERGY SERVICES

7-20-07
H

02/7/07
D



PATHFINDER
ENERGY SERVICES
EOW Plot

WELL DETAILS: Carracas 20 B #1

Ground Elevation:: 7391.0
RKB Elevation: 15' RKB @ 7406.0ft (Patterson #741)
Rig Name: Patterson #741

+N-S	+E-W	Northing	Easting	Latitude	Longitude
0.0	0.0	2176320.24	1338895.48	36° 58' 34.860 N	107° 16' 56.136 W

Azimuths to True North
Magnetic North: 10.20°

**Magnetic Field
Strength: 51347.4snT
Dip Angle: 63.86°
Date: 6/9/2007
Model: IGRF200510**

PROJECT DETAILS: Rio Arriba County, NM
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Central Zone

System Datum: Mean Sea Level
Local North: No north reference data is available

ing Shoe @ 4795 MD

Projection To Bit @ 6638 MD

Survey: EOW Survey (Carracas 20 B #1/ON)

Created By: Nate Bingham Date: 8:51, July 06 2007

Checked: _____ Date: _____

Company: Energen Resources
Project: Rio Arriba County, NM
Site: Carracas Mesa (Carracas 20 B #1)
Well: Carracas 20 B #1
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well Carracas 20 B #1
TVD Reference: 15' RKB @ 7406.0ft (Patterson #741)
MD Reference: 15' RKB @ 7406.0ft (Patterson #741)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

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

Site:	Carracas Mesa (Carracas 20 B #1)		
Site Position:		Northing:	2,176,320.24 ft
From: Map		Easting:	1,338,895.48 ft
Position Uncertainty:	0.0 ft	Slot Radius:	"
		Latitude:	36° 58' 34.860 N
		Longitude:	107° 16' 56.136 W
		Grid Convergence:	-0.62 °

Well:	Carracas 20 B #1		
Well Position		Northing:	2,176,320.24 ft
+N/-S	0.0 ft	Easting:	1,338,895.48 ft
+E/-W	0.0 ft	Wellhead Elevation:	ft
Position Uncertainty	0.0 ft	Latitude:	36° 58' 34.860 N
		Longitude:	107° 16' 56.136 W
		Ground Level:	7,391.0 ft

Wellbore:	OH				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	IGRF200510	6/9/2007	(°)	(°)	(nT)
			10.20	63.86	51,347

Design:	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:		Depth From (TVD)	+N/-S	+E/-W	Direction
		(ft)	(ft)	(ft)	(°)
		0.0	0.0	0.0	75.21

Survey Program	Date	7/6/2007			
From	To	Survey (Wellbore)	Tool Name	Description	
(ft)	(ft)				
380.0	4,004.0	Survey #1 (OH)	Pathfinder	Pathfinder MWD	

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MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	V. Sec (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)
0.0	0.00	0.00	0.0	-7,406.0	0.0	0.0	0.0	0.00
380.0	0.97	204.35	380.0	-7,026.0	-2.0	-2.9	-1.3	0.26
518.0	0.53	185.19	518.0	-6,888.0	-3.0	-4.6	-1.9	0.36
644.0	0.79	159.44	644.0	-6,762.0	-3.1	-6.0	-1.6	0.31
769.0	1.06	120.15	768.9	-6,637.1	-2.2	-7.4	-0.3	0.54
894.0	1.67	100.64	893.9	-6,512.1	0.3	-8.3	2.5	0.61
1,015.0	2.99	84.99	1,014.8	-6,391.2	5.0	-8.4	7.4	1.20
1,136.0	3.78	77.61	1,135.6	-6,270.4	12.1	-7.2	14.4	0.74
1,257.0	4.92	63.37	1,256.3	-6,149.7	21.1	-4.1	22.9	1.29
1,377.0	5.98	66.19	1,375.7	-6,030.3	32.3	0.8	33.2	0.91
1,498.0	5.80	66.54	1,496.1	-5,909.9	44.6	5.7	44.6	0.15
1,619.0	6.86	68.12	1,616.3	-5,789.7	57.8	10.9	56.9	0.89
1,740.0	6.51	67.33	1,736.5	-5,669.5	71.8	16.2	70.0	0.30
1,861.0	7.65	62.06	1,856.6	-5,549.4	86.4	22.6	83.4	1.08
1,982.0	7.74	62.85	1,976.5	-5,429.5	102.2	30.1	97.8	0.11
2,104.0	8.97	57.66	2,097.2	-5,308.8	119.3	39.0	113.1	1.18
2,223.0	9.23	56.08	2,214.7	-5,191.3	137.2	49.2	128.9	0.30
2,348.0	9.15	56.78	2,338.1	-5,067.9	156.1	60.3	145.5	0.11
2,474.0	8.97	56.17	2,462.5	-4,943.5	174.9	71.2	162.1	0.16
2,504.0	8.97	54.41	2,492.2	-4,913.8	179.3	73.9	165.9	0.91
2,535.0	9.06	55.20	2,522.8	-4,883.2	183.8	76.7	169.9	0.49
2,567.0	8.97	59.42	2,554.4	-4,851.6	188.6	79.4	174.1	2.08
2,598.0	9.32	70.84	2,585.0	-4,821.0	193.4	81.5	178.5	5.95
2,629.0	9.67	81.74	2,615.6	-4,790.4	198.5	82.7	183.5	5.90
2,661.0	9.58	88.86	2,647.1	-4,758.9	203.8	83.1	188.8	3.73
2,692.0	8.71	94.49	2,677.7	-4,728.3	208.5	83.0	193.7	4.02
2,724.0	7.91	94.66	2,709.4	-4,696.6	212.9	82.6	198.3	2.50

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MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	V. Sec (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)
2,755.0	7.39	94.22	2,740.1	-4,665.9	216.8	82.3	202.5	1.69
2,785.0	6.68	90.18	2,769.9	-4,636.1	220.3	82.1	206.1	2.88
2,817.0	6.42	85.52	2,801.7	-4,604.3	223.8	82.3	209.8	1.85
2,848.0	6.07	83.68	2,832.5	-4,573.5	227.2	82.6	213.1	1.30
2,880.0	6.16	83.06	2,864.3	-4,541.7	230.5	83.0	216.5	0.35
2,911.0	6.24	86.23	2,895.1	-4,510.9	233.8	83.3	219.8	1.13
2,942.0	7.30	89.21	2,925.9	-4,480.1	237.4	83.4	223.5	3.60
2,974.0	7.91	90.09	2,957.6	-4,448.4	241.5	83.4	227.7	1.94
3,005.0	8.09	90.44	2,988.3	-4,417.7	245.7	83.4	232.0	0.60
3,038.0	8.27	90.62	3,021.0	-4,385.0	250.2	83.4	236.7	0.55
3,068.0	8.18	90.09	3,050.7	-4,355.3	254.3	83.4	241.0	0.39
3,099.0	8.71	91.24	3,081.3	-4,324.7	258.7	83.3	245.6	1.79
3,130.0	9.58	92.99	3,112.0	-4,294.0	263.4	83.1	250.5	2.95
3,160.0	10.20	93.34	3,141.5	-4,264.5	268.3	82.8	255.7	2.08
3,191.0	10.46	94.40	3,172.0	-4,234.0	273.6	82.5	261.2	1.04
3,223.0	10.29	94.22	3,203.5	-4,202.5	279.0	82.0	266.9	0.54
3,254.0	10.38	95.72	3,234.0	-4,172.0	284.3	81.5	272.5	0.92
3,286.0	11.17	96.16	3,265.4	-4,140.6	289.9	80.9	278.4	2.48
3,317.0	12.57	96.42	3,295.8	-4,110.2	295.8	80.2	284.8	4.52
3,348.0	13.63	94.58	3,325.9	-4,080.1	302.4	79.6	291.8	3.67
3,379.0	15.04	92.73	3,356.0	-4,050.0	309.7	79.1	299.4	4.78
3,409.0	16.71	91.06	3,384.8	-4,021.2	317.6	78.8	307.6	5.77
3,472.0	20.49	91.50	3,444.5	-3,961.5	336.9	78.3	327.7	6.00
3,503.0	21.72	91.24	3,473.5	-3,932.5	347.6	78.1	338.9	3.98
3,535.0	22.60	90.44	3,503.1	-3,902.9	359.2	77.9	350.9	2.91
3,565.0	24.09	90.00	3,530.6	-3,875.4	370.7	77.9	362.8	5.00
3,597.0	25.68	88.95	3,559.7	-3,846.3	383.7	78.0	376.3	5.16

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3,628.0	27.26	88.33	3,587.4	-3,818.6	397.2	78.3	390.1	5.17
3,657.0	28.84	87.46	3,613.0	-3,793.0	410.5	78.8	403.7	5.63
3,690.0	30.34	86.31	3,641.7	-3,764.3	426.4	79.7	420.0	4.86
3,722.0	31.04	85.79	3,669.2	-3,736.8	442.5	80.8	436.3	2.34
3,753.0	31.74	85.45	3,695.7	-3,710.3	458.4	82.1	452.4	2.33
3,785.0	32.36	84.94	3,722.8	-3,683.2	475.1	83.5	469.3	2.11
3,816.0	32.98	84.38	3,748.9	-3,657.1	491.6	85.1	486.0	2.23
3,847.0	33.85	83.59	3,774.8	-3,631.2	508.5	86.8	503.0	3.14
3,878.0	35.09	82.48	3,800.3	-3,605.7	525.8	89.0	520.4	4.48
3,910.0	36.40	81.12	3,826.3	-3,579.7	544.4	91.6	538.9	4.79
3,941.0	37.72	80.86	3,851.0	-3,555.0	563.0	94.6	557.3	4.29
3,972.0	39.04	80.78	3,875.3	-3,530.7	582.1	97.6	576.3	4.26
4,004.0	40.19	81.08	3,900.0	-3,506.0	602.5	100.9	596.5	3.64
4,034.0	41.24	81.20	3,922.7	-3,483.3	621.9	103.9	615.8	3.51
4,067.0	42.47	81.22	3,947.3	-3,458.7	643.8	107.2	637.6	3.73
4,095.0	45.11	80.85	3,967.5	-3,438.5	663.1	110.3	656.7	9.47
4,127.0	48.54	80.60	3,989.4	-3,416.6	686.3	114.0	679.7	10.73
4,158.0	51.97	81.86	4,009.2	-3,396.8	710.0	117.6	703.3	11.50
4,189.0	53.55	82.74	4,028.0	-3,378.0	734.5	120.9	727.7	5.58
4,220.0	55.49	83.16	4,046.0	-3,360.0	759.5	124.0	752.8	6.35
4,252.0	57.51	83.68	4,063.6	-3,342.4	785.9	127.1	779.3	6.46
4,283.0	59.62	84.19	4,079.8	-3,326.2	812.1	129.9	805.6	6.95
4,346.0	64.46	87.34	4,109.3	-3,296.7	866.7	134.0	861.1	8.86
4,377.0	66.74	88.41	4,122.1	-3,283.9	894.3	135.0	889.3	8.00
4,408.0	68.94	87.98	4,133.8	-3,272.2	922.3	135.9	918.0	7.21
4,440.0	71.58	88.69	4,144.6	-3,261.4	951.6	136.8	948.1	8.51
4,471.0	73.60	88.01	4,153.9	-3,252.1	980.4	137.6	977.6	6.84

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4,534.0	78.52	89.43	4,169.1	-3,236.9	1,039.8	139.0	1,038.8	8.11
4,565.0	80.46	87.58	4,174.8	-3,231.2	1,069.5	139.8	1,069.2	8.58
4,597.0	82.92	88.20	4,179.4	-3,226.6	1,100.4	141.0	1,100.9	7.92
4,628.0	85.30	87.47	4,182.6	-3,223.4	1,130.5	142.1	1,131.7	8.03
4,659.0	86.79	87.66	4,184.7	-3,221.3	1,160.7	143.4	1,162.6	4.85
4,691.0	87.05	86.85	4,186.4	-3,219.6	1,191.9	145.0	1,194.5	2.65
4,722.0	87.85	86.25	4,187.8	-3,218.2	1,222.3	146.8	1,225.4	3.22
4,795.0	89.82	86.72	4,189.3	-3,216.7	1,293.8	151.3	1,298.2	2.77
Casing Shoe								
4,813.0	90.31	86.83	4,189.3	-3,216.7	1,311.5	152.3	1,316.2	2.79
4,843.0	89.96	88.13	4,189.2	-3,216.8	1,340.8	153.6	1,346.2	4.49
4,874.0	89.16	88.87	4,189.4	-3,216.6	1,371.0	154.5	1,377.2	3.52
4,905.0	88.64	88.85	4,190.0	-3,216.0	1,401.1	155.1	1,408.2	1.68
4,936.0	89.43	88.81	4,190.5	-3,215.5	1,431.2	155.7	1,439.1	2.55
4,968.0	91.01	88.78	4,190.4	-3,215.6	1,462.3	156.4	1,471.1	4.94
4,999.0	90.92	89.23	4,189.9	-3,216.1	1,492.4	156.9	1,502.1	1.48
5,030.0	90.31	88.59	4,189.6	-3,216.4	1,522.5	157.5	1,533.1	2.85
5,062.0	89.52	87.64	4,189.6	-3,216.4	1,553.7	158.6	1,565.1	3.86
5,093.0	87.36	86.79	4,190.5	-3,215.5	1,584.0	160.1	1,596.1	7.49
5,124.0	87.93	87.36	4,191.7	-3,214.3	1,614.3	161.6	1,627.0	2.60
5,154.0	89.43	87.10	4,192.4	-3,213.6	1,643.7	163.1	1,656.9	5.07
5,185.0	89.08	86.08	4,192.8	-3,213.2	1,674.1	164.9	1,687.9	3.48
5,247.0	90.13	87.96	4,193.3	-3,212.7	1,734.7	168.2	1,749.8	3.47
5,279.0	90.13	87.35	4,193.2	-3,212.8	1,766.0	169.5	1,781.8	1.91
5,310.0	89.43	87.15	4,193.3	-3,212.7	1,796.3	171.0	1,812.7	2.35
5,342.0	89.87	86.56	4,193.5	-3,212.5	1,827.6	172.7	1,844.7	2.30
5,373.0	90.48	86.09	4,193.4	-3,212.6	1,858.1	174.7	1,875.6	2.48

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5,404.0	90.22	86.06	4,193.2	-3,212.8	1,888.5	176.8	1,906.5	0.84
5,435.0	88.46	85.59	4,193.6	-3,212.4	1,919.0	179.1	1,937.5	5.88
5,467.0	90.22	85.97	4,193.9	-3,212.1	1,950.4	181.4	1,969.4	5.63
5,498.0	89.87	85.75	4,193.9	-3,212.1	1,980.9	183.7	2,000.3	1.33
5,529.0	89.52	85.18	4,194.1	-3,211.9	2,011.4	186.1	2,031.2	2.16
5,561.0	89.78	85.04	4,194.3	-3,211.7	2,042.9	188.8	2,063.1	0.92
5,592.0	89.52	84.69	4,194.5	-3,211.5	2,073.5	191.6	2,094.0	1.41
5,623.0	90.13	83.34	4,194.6	-3,211.4	2,104.1	194.9	2,124.8	4.78
5,654.0	91.36	82.78	4,194.2	-3,211.8	2,134.8	198.6	2,155.6	4.36
5,685.0	91.28	82.41	4,193.4	-3,212.6	2,165.5	202.6	2,186.3	1.22
5,716.0	91.10	82.56	4,192.8	-3,213.2	2,196.3	206.6	2,217.0	0.76
5,748.0	90.84	82.29	4,192.3	-3,213.7	2,228.0	210.9	2,248.7	1.17
5,779.0	88.37	82.24	4,192.5	-3,213.5	2,258.8	215.0	2,279.4	7.97
5,810.0	86.79	81.62	4,193.8	-3,212.2	2,289.6	219.4	2,310.1	5.47
5,842.0	86.79	81.86	4,195.6	-3,210.4	2,321.3	224.0	2,341.7	0.75
5,873.0	86.26	81.78	4,197.4	-3,208.6	2,352.0	228.4	2,372.4	1.73
5,904.0	86.09	81.35	4,199.5	-3,206.5	2,382.8	232.9	2,402.9	1.49
5,935.0	83.80	82.10	4,202.2	-3,203.8	2,413.5	237.4	2,433.5	7.77
5,966.0	86.09	84.12	4,205.0	-3,201.0	2,444.0	241.1	2,464.2	9.83
6,029.0	89.25	92.01	4,207.5	-3,198.5	2,505.3	243.2	2,527.0	13.48
6,060.0	90.40	92.85	4,207.6	-3,198.4	2,535.0	241.9	2,558.0	4.59
6,091.0	91.10	93.23	4,207.2	-3,198.8	2,564.5	240.2	2,588.9	2.57
6,123.0	90.57	92.41	4,206.8	-3,199.2	2,595.0	238.6	2,620.9	3.05
6,154.0	89.08	91.03	4,206.9	-3,199.1	2,624.7	237.7	2,651.9	6.55
6,217.0	89.43	89.42	4,207.7	-3,198.3	2,685.5	237.5	2,714.9	2.62
6,248.0	88.29	87.35	4,208.3	-3,197.7	2,715.7	238.3	2,745.8	7.62
6,279.0	90.57	86.63	4,208.6	-3,197.4	2,746.0	240.0	2,776.8	7.71

Company: Energen Resources
Project: Rio Arriba County, NM
Site: Carracas Mesa (Carracas 20 B #1)
Well: Carracas 20 B #1
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well Carracas 20 B #1
TVD Reference: 15' RKB @ 7406.0ft (Patterson #741)
MD Reference: 15' RKB @ 7406.0ft (Patterson #741)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	V. Sec (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)
6,310.0	90.48	86.14	4,208.3	-3,197.7	2,776.4	241.9	2,807.7	1.61
6,342.0	88.64	84.86	4,208.6	-3,197.4	2,807.9	244.4	2,839.6	7.00
6,373.0	89.25	85.80	4,209.1	-3,196.9	2,838.4	247.0	2,870.5	3.61
6,405.0	88.99	86.61	4,209.6	-3,196.4	2,869.9	249.1	2,902.5	2.66
6,436.0	87.76	86.61	4,210.5	-3,195.5	2,900.2	250.9	2,933.4	3.97
6,467.0	89.25	86.61	4,211.3	-3,194.7	2,930.6	252.7	2,964.3	4.81
6,498.0	89.78	87.49	4,211.6	-3,194.4	2,960.9	254.3	2,995.3	3.31
6,530.0	89.25	86.83	4,211.8	-3,194.2	2,992.2	255.9	3,027.2	2.65
6,561.0	88.72	86.15	4,212.4	-3,193.6	3,022.6	257.8	3,058.2	2.78
6,567.0	88.55	86.59	4,212.5	-3,193.5	3,028.5	258.2	3,064.2	7.86
6,638.0	88.55	86.59	4,214.3	-3,191.7	3,098.1	262.4	3,135.0	0.00

Projection To Bit

Company: Energen Resources
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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
BHL (20 B #1) - survey misses by 80.0ft at 6619.1ft MD (4213.9 TVD, 261.3 N, 3116.1 E) - Point	0.00	0.00	4,188.0	336.9	3,112.3	2,176,623.39	1,342,011.25	36° 58' 38.189 N	107° 16' 17.781 W

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
4,795.0	4,189.3	151.3	1,298.2	Casing Shoe
6,638.0	4,214.3	262.4	3,135.0	Projection To Bit

Checked By: _____ Approved By: _____ Date: _____