

RCVD AUG 30 '10

OIL CONS. DIV.

DIST. 3

Energen Resources

Rio Arriba County, NM

Sec. 12-T32N-R5W

Carracas 12A #2H

Plan #2

30.039.30826

Design: Pathfinder MWD and Sperry MWD Survey

Sperry Drilling Services

Standard Report

22 July, 2010

Well Coordinates: 2,182,379.18 N, 1,331,927.92 E (36° 59' 34.01" N, 107° 18' 22.82" W)
Ground Level: 7,437.00 ft

Local Coordinate Origin:	Centered on Well Carracas 12A #2H
Viewing Datum:	KB @ 7452.00ft (D&J 1)
TVDs to System:	N
North Reference:	True
Unit System:	API - US Survey Feet - Custom

Geodetic Scale Factor Applied
Version: 2003.16 Build: 431

HALLIBURTON

Design Report for Carracas 12A #2H - Pathfinder MWD and Sperry MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
262.00	1.58	42.72	261.97	2.65	2.45	-1.28	0.60
Surveys from 262.00ft to 5239.00ft are Pathfinder MWD Surveys							
350.00	0.09	78.76	349.96	3.56	3.34	-1.76	1.71
440.00	0.09	290.84	439.96	3.60	3.34	-1.75	0.19
530.00	0.09	198.29	529.95	3.56	3.26	-1.69	0.14
620.00	0.09	340.41	619.95	3.56	3.21	-1.64	0.19
711.00	0.00	42.98	710.95	3.62	3.19	-1.60	0.10
801.00	0.00	260.69	800.95	3.62	3.19	-1.60	0.00
891.00	0.09	282.58	890.95	3.64	3.12	-1.53	0.10
981.00	0.09	144.67	980.95	3.60	3.09	-1.52	0.19
1,072.00	0.09	283.80	1,071.95	3.55	3.06	-1.51	0.19
1,163.00	0.09	4.14	1,162.95	3.64	3.00	-1.41	0.13
1,254.00	0.00	211.21	1,253.95	3.71	3.00	-1.39	0.10
1,347.00	0.09	283.63	1,346.95	3.73	2.93	-1.32	0.10
1,437.00	0.00	124.37	1,436.95	3.75	2.86	-1.25	0.10
1,529.00	0.09	246.10	1,528.95	3.72	2.80	-1.20	0.10
1,620.00	0.09	195.83	1,619.95	3.62	2.71	-1.16	0.08
1,714.00	0.09	202.77	1,713.95	3.48	2.66	-1.16	0.01
1,810.00	0.09	64.69	1,809.95	3.44	2.70	-1.21	0.18
1,906.00	0.09	24.97	1,905.95	3.55	2.80	-1.27	0.06
2,002.00	0.09	92.47	2,001.95	3.61	2.91	-1.34	0.10
2,097.00	0.09	188.27	2,096.95	3.53	2.97	-1.43	0.14
2,193.00	0.18	233.44	2,192.95	3.37	2.84	-1.37	0.14
2,289.00	0.09	93.61	2,288.95	3.27	2.80	-1.36	0.27
2,384.00	0.09	93.43	2,383.95	3.26	2.94	-1.51	0.00
2,478.00	0.00	127.62	2,477.95	3.26	3.02	-1.58	0.10
2,572.00	0.00	7.56	2,571.95	3.26	3.02	-1.58	0.00
2,667.00	0.09	232.12	2,666.95	3.21	2.96	-1.54	0.09
2,731.00	0.35	150.47	2,730.95	3.01	3.02	-1.67	0.54
2,763.00	0.79	149.95	2,762.95	2.74	3.17	-1.92	1.38
2,795.00	1.41	143.00	2,794.95	2.23	3.52	-2.43	1.98
2,827.00	1.85	132.19	2,826.93	1.57	4.14	-3.25	1.67
2,858.00	1.93	115.32	2,857.92	1.01	4.98	-4.24	1.81
2,890.00	1.93	92.64	2,889.90	0.76	6.01	-5.29	2.37
2,922.00	2.11	58.19	2,921.88	1.04	7.05	-6.14	3.78
2,953.00	2.46	23.74	2,952.86	1.95	7.80	-6.50	4.50
2,985.00	2.90	350.51	2,984.82	3.38	7.94	-6.10	4.97
3,017.00	4.40	332.06	3,016.76	5.26	7.24	-4.73	5.90
3,080.00	7.65	329.07	3,079.40	11.00	3.95	0.46	5.18
3,112.00	9.15	331.44	3,111.06	15.06	1.64	4.13	4.81
3,144.00	10.55	334.08	3,142.59	19.93	-0.86	8.27	4.60
3,175.00	11.96	336.45	3,172.99	25.42	-3.39	12.67	4.79
3,208.00	13.19	339.79	3,205.20	32.09	-6.05	17.64	4.33
3,240.00	14.51	342.43	3,236.27	39.34	-8.52	22.65	4.57
3,272.00	16.00	343.48	3,267.14	47.39	-10.99	27.95	4.74
3,304.00	17.67	344.45	3,297.77	56.30	-13.54	33.66	5.29
3,336.00	19.61	345.86	3,328.09	66.19	-16.16	39.79	6.22
3,367.00	21.54	346.56	3,357.11	76.77	-18.75	46.16	6.28
3,399.00	23.39	347.17	3,386.68	88.67	-21.53	53.20	5.83

Design Report for Carracas 12A #2H - Pathfinder MWD and Sperry MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
3,431.00	25.15	347.70	3,415.85	101.51	-24.39	60.67	5.54
3,462.00	27.17	347.26	3,443.67	114.85	-27.35	68.42	6.55
3,493.00	29.28	349.37	3,470.98	129.21	-30.31	76.54	7.53
3,524.00	31.13	349.64	3,497.77	144.54	-33.15	84.92	5.98
3,557.00	32.54	349.72	3,525.81	161.67	-36.27	94.24	4.27
3,589.00	33.77	349.46	3,552.60	178.88	-39.43	103.62	3.87
3,620.00	34.56	348.98	3,578.25	195.98	-42.69	113.05	2.69
3,652.00	36.23	348.43	3,604.33	214.16	-46.32	123.23	5.31
3,684.00	37.28	348.33	3,629.97	232.91	-50.18	133.84	3.29
3,716.00	38.87	348.06	3,655.16	252.23	-54.22	144.82	5.00
3,748.00	40.54	347.95	3,679.78	272.22	-58.46	156.26	5.22
3,780.00	42.30	347.79	3,703.77	292.92	-62.91	168.14	5.51
3,812.00	43.79	347.67	3,727.16	314.26	-67.56	180.45	4.66
3,843.00	45.20	347.46	3,749.27	335.48	-72.23	192.74	4.57
3,875.00	46.78	347.21	3,771.50	357.93	-77.28	205.84	4.97
3,906.00	48.54	347.26	3,792.38	380.28	-82.34	218.91	5.68
3,938.00	50.30	347.11	3,813.20	403.98	-87.73	232.79	5.51
3,970.00	52.14	347.18	3,833.24	428.30	-93.28	247.05	5.75
4,000.00	54.17	347.61	3,851.23	451.73	-98.52	260.69	6.86
4,032.00	55.84	347.71	3,869.58	477.33	-104.12	275.49	5.23
4,065.00	57.42	348.14	3,887.73	504.28	-109.89	290.93	4.91
4,095.00	59.36	348.03	3,903.46	529.28	-115.16	305.20	6.47
4,127.00	61.73	348.49	3,919.19	556.56	-120.83	320.68	7.51
4,159.00	64.63	348.46	3,933.63	584.54	-126.54	336.46	9.06
4,191.00	67.27	348.34	3,946.67	613.16	-132.41	352.63	8.26
4,222.00	69.82	348.36	3,958.00	641.42	-138.24	368.63	8.23
4,254.00	71.31	346.59	3,968.65	670.87	-144.78	385.74	6.99
4,286.00	71.93	343.86	3,978.74	700.23	-152.53	403.93	8.32
4,318.00	72.72	340.93	3,988.46	729.29	-161.75	423.37	9.07
4,350.00	72.81	337.94	3,997.94	757.90	-172.48	444.05	8.93
4,382.00	72.72	335.29	4,007.43	785.95	-184.61	465.81	7.91
4,414.00	72.63	332.78	4,016.96	813.41	-197.99	488.50	7.49
4,445.00	72.55	330.34	4,026.24	839.42	-212.07	511.31	7.51
4,477.00	72.72	328.41	4,035.79	865.70	-227.63	535.59	5.78
4,509.00	73.16	326.54	4,045.18	891.49	-244.08	560.50	5.75
4,541.00	73.34	324.44	4,054.40	916.74	-261.44	586.06	6.31
4,572.00	73.86	323.07	4,063.15	940.72	-279.02	611.36	4.56
4,604.00	74.39	322.24	4,071.90	965.19	-297.69	637.84	2.99
4,636.00	74.92	321.34	4,080.37	989.44	-316.78	664.62	3.18
4,668.00	74.83	320.33	4,088.72	1,013.39	-336.29	691.69	3.06
4,699.00	74.92	319.40	4,096.81	1,036.27	-355.58	718.15	2.91
4,731.00	75.27	318.37	4,105.04	1,059.57	-375.91	745.74	3.30
4,762.00	75.89	317.10	4,112.76	1,081.78	-396.10	772.79	4.44
4,793.00	76.94	316.07	4,120.04	1,103.67	-416.81	800.19	4.68
4,825.00	78.17	314.58	4,126.94	1,125.89	-438.78	828.89	5.95
4,857.00	78.52	312.52	4,133.41	1,147.48	-461.50	858.04	6.40
4,888.00	78.61	310.02	4,139.55	1,167.52	-484.33	886.72	7.91
4,920.00	78.96	307.99	4,145.78	1,187.28	-508.72	916.74	6.32
4,952.00	79.49	305.54	4,151.76	1,206.09	-533.90	947.14	7.70
4,984.00	79.67	303.34	4,157.55	1,223.89	-559.86	977.87	6.78
5,016.00	80.46	301.26	4,163.07	1,240.73	-586.50	1,008.88	6.86

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Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,048.00	81.07	298.77	4,168.21	1,256.53	-613.85	1,040.16	7.91
5,079.00	81.78	296.34	4,172.83	1,270.70	-641.02	1,070.67	8.08
5,085.00	82.12	296.13	4,173.67	1,273.33	-646.35	1,076.59	6.67
Top of Target Coal (Interpolated Point - Not a Survey Station)							
5,111.00	83.62	295.25	4,176.90	1,284.51	-669.60	1,102.34	6.67
5,143.00	85.56	294.31	4,179.91	1,297.87	-698.52	1,134.16	6.73
5,175.00	87.41	293.38	4,181.87	1,310.78	-727.73	1,166.08	6.47
5,207.00	88.99	292.06	4,182.88	1,323.13	-757.23	1,198.06	6.43
5,239.00	90.40	289.82	4,183.05	1,334.57	-787.12	1,230.05	8.27
Tie-On to Pathfinder MWD Survey							
5,286.00	91.97	286.85	4,182.08	1,349.35	-831.72	1,276.93	7.14
7" Casing Point (Interpolated Point - Not a Survey Station)							
5,318.00	93.03	284.83	4,180.68	1,358.07	-862.47	1,308.72	7.14
First Sperry MWD Survey							
5,366.00	90.68	289.19	4,179.13	1,372.10	-908.33	1,356.49	10.31
5,398.00	90.25	292.14	4,178.87	1,383.40	-938.27	1,388.48	9.32
5,429.00	89.38	292.66	4,178.97	1,395.21	-966.93	1,419.48	3.27
5,461.00	89.01	291.82	4,179.42	1,407.32	-996.54	1,451.47	2.87
5,493.00	89.51	291.83	4,179.83	1,419.21	-1,026.25	1,483.47	1.56
5,525.00	88.58	291.98	4,180.37	1,431.15	-1,055.93	1,515.47	2.94
5,556.00	87.22	291.76	4,181.50	1,442.69	-1,084.68	1,546.45	4.44
5,588.00	87.65	292.07	4,182.93	1,454.62	-1,114.34	1,578.41	1.66
5,620.00	88.46	292.21	4,184.02	1,466.67	-1,143.96	1,610.39	2.57
5,651.00	89.38	292.21	4,184.61	1,478.39	-1,172.66	1,641.39	2.97
5,683.00	90.56	292.73	4,184.62	1,490.62	-1,202.23	1,673.39	4.03
5,714.00	91.30	293.32	4,184.12	1,502.74	-1,230.75	1,704.38	3.05
5,746.00	92.16	293.38	4,183.15	1,515.42	-1,260.12	1,736.35	2.69
5,778.00	92.04	293.35	4,181.98	1,528.10	-1,289.47	1,768.32	0.39
5,809.00	92.04	291.39	4,180.88	1,539.89	-1,318.12	1,799.30	6.32
5,840.00	92.53	291.05	4,179.64	1,551.10	-1,347.00	1,830.27	1.92
5,872.00	93.52	290.84	4,177.95	1,562.53	-1,376.84	1,862.22	3.16
5,903.00	94.27	290.81	4,175.85	1,573.52	-1,405.75	1,893.15	2.42
5,935.00	92.96	289.69	4,173.83	1,584.58	-1,435.71	1,925.06	5.38
6,030.00	90.31	284.44	4,171.12	1,612.43	-1,526.45	2,019.63	6.19
6,093.00	90.25	282.04	4,170.81	1,626.86	-1,587.77	2,081.89	3.81
6,125.00	89.69	280.51	4,170.82	1,633.11	-1,619.15	2,113.32	5.09
6,157.00	88.83	279.24	4,171.24	1,638.60	-1,650.67	2,144.60	4.79
6,188.00	88.58	278.98	4,171.94	1,643.51	-1,681.28	2,174.81	1.16
6,218.00	88.70	278.99	4,172.65	1,648.19	-1,710.90	2,204.03	0.40
6,249.00	89.75	278.77	4,173.07	1,652.98	-1,741.52	2,234.22	3.46
6,279.00	90.25	278.08	4,173.07	1,657.37	-1,771.20	2,263.38	2.84
6,310.00	90.74	278.10	4,172.80	1,661.73	-1,801.89	2,293.46	1.58
6,340.00	90.37	278.25	4,172.51	1,666.00	-1,831.58	2,322.59	1.33
6,371.00	90.68	278.46	4,172.23	1,670.50	-1,862.25	2,352.71	1.21
6,400.00	91.11	278.05	4,171.77	1,674.67	-1,890.95	2,380.88	2.05
6,431.00	91.67	277.06	4,171.02	1,678.74	-1,921.67	2,410.88	3.67
6,460.00	91.30	275.75	4,170.27	1,681.98	-1,950.48	2,438.80	4.69
6,491.00	91.79	275.13	4,169.44	1,684.91	-1,981.33	2,468.50	2.55
6,521.00	91.85	274.11	4,168.48	1,687.33	-2,011.22	2,497.12	3.40
6,552.00	91.42	273.47	4,167.60	1,689.38	-2,042.14	2,526.55	2.49
6,582.00	91.61	272.62	4,166.80	1,690.97	-2,072.08	2,554.91	2.90

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Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
6,613.00	91.11	272.09	4,166.07	1,692.24	-2,103.05	2,584.09	2.35
6,644.00	91.54	271.82	4,165.35	1,693.30	-2,134.02	2,613.20	1.64
6,675.00	91.85	271.82	4,164.44	1,694.28	-2,164.99	2,642.28	1.00
6,706.00	92.10	271.65	4,163.37	1,695.22	-2,195.96	2,671.34	0.98
6,736.00	92.53	271.95	4,162.16	1,696.16	-2,225.92	2,699.47	1.75
6,767.00	92.16	271.37	4,160.89	1,697.06	-2,256.88	2,728.51	2.22
6,798.00	92.28	271.47	4,159.69	1,697.83	-2,287.85	2,757.51	0.50
6,828.00	92.28	271.41	4,158.49	1,698.58	-2,317.81	2,785.57	0.20
6,859.00	92.35	271.82	4,157.24	1,699.45	-2,348.78	2,814.60	1.34
6,889.00	92.84	272.55	4,155.88	1,700.60	-2,378.72	2,842.79	2.93
6,920.00	92.22	272.81	4,154.51	1,702.05	-2,409.66	2,872.02	2.17
6,951.00	92.35	273.23	4,153.28	1,703.68	-2,440.59	2,901.30	1.42
6,981.00	92.04	273.10	4,152.13	1,705.33	-2,470.52	2,929.67	1.12
7,012.00	92.28	273.18	4,150.96	1,707.03	-2,501.46	2,958.99	0.82
7,043.00	92.53	273.86	4,149.66	1,708.93	-2,532.37	2,988.36	2.34
7,074.00	92.84	274.43	4,148.21	1,711.17	-2,563.25	3,017.83	2.09
7,104.00	92.47	274.15	4,146.82	1,713.41	-2,593.14	3,046.37	1.55
7,135.00	91.79	273.24	4,145.67	1,715.41	-2,624.05	3,075.78	3.66
7,165.00	91.36	272.83	4,144.84	1,717.00	-2,654.00	3,104.14	1.98
7,194.00	90.99	270.99	4,144.25	1,717.96	-2,682.97	3,131.36	6.47
7,224.00	90.74	271.55	4,143.79	1,718.63	-2,712.96	3,159.41	2.04
7,255.00	90.37	271.53	4,143.49	1,719.46	-2,743.95	3,188.45	1.20
7,286.00	89.63	271.41	4,143.49	1,720.25	-2,774.94	3,217.48	2.42
7,316.00	89.81	271.48	4,143.64	1,721.01	-2,804.93	3,245.57	0.64
7,347.00	89.94	271.56	4,143.71	1,721.83	-2,835.92	3,274.60	0.49
7,378.00	90.25	272.33	4,143.66	1,722.89	-2,866.90	3,303.72	2.68
7,408.00	90.37	271.46	4,143.49	1,723.88	-2,896.88	3,331.89	2.93
7,439.00	88.09	270.66	4,143.91	1,724.45	-2,927.87	3,360.83	7.79
7,469.00	88.27	271.12	4,144.86	1,724.92	-2,957.86	3,388.80	1.65
7,500.00	88.45	271.32	4,145.75	1,725.58	-2,988.84	3,417.77	0.87
7,530.00	88.45	271.66	4,146.56	1,726.36	-3,018.81	3,445.85	1.13
7,561.00	88.64	271.85	4,147.35	1,727.31	-3,049.79	3,474.93	0.87
7,592.00	89.07	272.39	4,147.97	1,728.45	-3,080.76	3,504.07	2.23
7,621.00	89.20	273.06	4,148.41	1,729.83	-3,109.73	3,531.44	2.35
7,652.00	89.51	273.46	4,148.75	1,731.59	-3,140.67	3,560.79	1.63
7,683.00	89.38	273.89	4,149.05	1,733.58	-3,171.61	3,590.21	1.45
7,714.00	89.63	275.58	4,149.32	1,736.14	-3,202.50	3,619.81	5.51
7,745.00	89.75	275.38	4,149.49	1,739.10	-3,233.36	3,649.53	0.75
7,774.00	89.81	275.41	4,149.60	1,741.83	-3,262.23	3,677.31	0.23
7,805.00	89.81	275.02	4,149.70	1,744.64	-3,293.10	3,706.99	1.26
7,836.00	91.91	273.71	4,149.24	1,747.00	-3,324.01	3,736.53	7.98
7,867.00	92.90	272.95	4,147.94	1,748.80	-3,354.92	3,765.86	4.02
7,897.00	93.34	273.01	4,146.31	1,750.36	-3,384.84	3,794.18	1.48
7,926.00	92.85	272.78	4,144.74	1,751.82	-3,413.76	3,821.54	1.87
7,957.00	92.17	271.63	4,143.38	1,753.01	-3,444.71	3,850.68	4.31
7,988.00	92.29	270.94	4,142.18	1,753.71	-3,475.68	3,879.65	2.26
8,017.00	92.41	270.83	4,140.99	1,754.16	-3,504.65	3,906.67	0.56
8,048.00	93.27	270.62	4,139.45	1,754.55	-3,535.61	3,935.52	2.86
8,080.00	93.52	270.67	4,137.56	1,754.91	-3,567.55	3,965.27	0.80
8,112.00	93.76	271.05	4,135.52	1,755.39	-3,599.48	3,995.05	1.40
8,144.00	92.60	272.03	4,133.75	1,756.24	-3,631.42	4,024.98	4.74

Design Report for Carracas 12A #2H - Pathfinder MWD and Sperry MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
8,175.00	92.11	271.82	4,132.48	1,757.29	-3,662.37	4,054.07	1.72
8,207.00	91.67	271.51	4,131.42	1,758.21	-3,694.34	4,084.06	1.68
8,238.00	91.54	271.98	4,130.55	1,759.16	-3,725.32	4,113.12	1.57
8,270.00	91.17	272.48	4,129.80	1,760.40	-3,757.28	4,143.23	1.94
8,302.00	90.37	273.08	4,129.36	1,761.95	-3,789.24	4,173.43	3.12
8,334.00	90.49	273.08	4,129.12	1,763.67	-3,821.20	4,203.70	0.37
8,366.00	90.74	273.91	4,128.78	1,765.62	-3,853.13	4,234.04	2.71
8,398.00	90.99	274.59	4,128.30	1,768.00	-3,885.04	4,264.51	2.26
8,430.00	91.36	275.14	4,127.64	1,770.71	-3,916.92	4,295.08	2.07
8,462.00	91.24	275.70	4,126.92	1,773.73	-3,948.77	4,325.74	1.79
8,494.00	90.37	276.30	4,126.47	1,777.08	-3,980.59	4,356.49	3.30
8,525.00	90.49	276.11	4,126.23	1,780.43	-4,011.41	4,386.32	0.72
8,557.00	91.05	276.04	4,125.80	1,783.81	-4,043.22	4,417.09	1.76
8,589.00	91.54	275.80	4,125.08	1,787.11	-4,075.05	4,447.82	1.70
8,620.00	91.61	275.67	4,124.23	1,790.21	-4,105.88	4,477.57	0.48
8,652.00	91.18	275.40	4,123.45	1,793.29	-4,137.72	4,508.24	1.59
8,683.00	90.68	274.22	4,122.95	1,795.89	-4,168.61	4,537.85	4.13
8,715.00	89.07	274.88	4,123.02	1,798.43	-4,200.50	4,568.37	5.44
8,746.00	89.57	274.49	4,123.38	1,800.96	-4,231.40	4,597.96	2.05
8,778.00	89.81	275.88	4,123.56	1,803.86	-4,263.27	4,628.59	4.41
8,809.00	88.64	276.87	4,123.98	1,807.30	-4,294.07	4,658.44	4.94
8,841.00	88.95	277.91	4,124.65	1,811.41	-4,325.80	4,689.40	3.39
8,873.00	89.94	278.52	4,124.96	1,815.98	-4,357.47	4,720.47	3.63
8,904.00	91.17	280.67	4,124.66	1,821.15	-4,388.03	4,750.74	7.99
8,936.00	88.33	279.76	4,124.80	1,826.82	-4,419.52	4,782.06	9.32
8,968.00	88.64	280.68	4,125.64	1,832.50	-4,451.00	4,813.37	3.03
9,000.00	88.76	281.22	4,126.37	1,838.58	-4,482.41	4,844.77	1.73
9,032.00	88.95	282.41	4,127.01	1,845.13	-4,513.72	4,876.25	3.77
9,064.00	89.69	281.95	4,127.39	1,851.88	-4,545.00	4,907.78	2.72
9,127.00	90.68	282.43	4,127.19	1,865.18	-4,606.58	4,969.86	1.75
Final Sperry MWD Survey							
9,161.00	91.00	282.43	4,126.69	1,872.50	-4,639.78	5,003.38	0.94
Survey Projection to TD							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
262.00	261.97	2.65	2.45	Surveys from 262.00ft to 5239.00ft are Pathfinder MWD Surveys
5,085.00	4,173.67	1,273.33	-646.35	Top of Target Coal (Interpolated Point - Not a Survey Station)
5,239.00	4,183.05	1,334.57	-787.12	Tie-On to Pathfinder MWD Survey
5,286.00	4,182.08	1,349.35	-831.72	7" Casing Point (Interpolated Point - Not a Survey Station)
5,318.00	4,180.68	1,358.07	-862.47	First Sperry MWD Survey
9,127.00	4,127.19	1,865.18	-4,606.58	Final Sperry MWD Survey
9,161.00	4,126.69	1,872.50	-4,639.78	Survey Projection to TD

Design Report for Carracas 12A #2H - Pathfinder MWD and Sperry MWD Survey

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (ft)	Origin +E/-W (ft)	Start TVD (ft)
Target	Carracas 12A #2H_Plan2_BHL Tgt	292.02	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
262.00	5,239.00	Pathfinder MWD Surveys	MWD
5,318.00	9,161.00	Sperry MWD Surveys	MWD

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
5,286.00		7" Csg	7	8-3/4

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
Carracas 12A	0.00	0.00	4,195.00	1,877.42	-4,642.39	2,184,308.01	1,327,306.60	36° 59' 52.567 N	107° 19' 20.051 W
- actual wellpath misses target center by 68.54ft at 9161.00ft MD (4126.69 TVD, 1872.50 N, -4639.78 E)									
- Point									

North Reference Sheet for Sec. 12-T32N-R5W - Carracas 12A #2H - Plan #2

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.

Vertical Depths are relative to KB @ 7452.00ft (D&J 1). Northing and Easting are relative to Carracas 12A #2H

Coordinate System is US State Plane 1983, New Mexico Central Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Transverse Mercator (Gauss-Kruger)

Central Meridian is 106° 15' 0.000 W°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:0° 0' 0.000 N°

False Easting: 1,640,416.67ft, False Northing: 0.00ft, Scale Reduction: 1.00000886

Grid Coordinates of Well: 2,182,379.18 ft N, 1,331,927.92 ft E

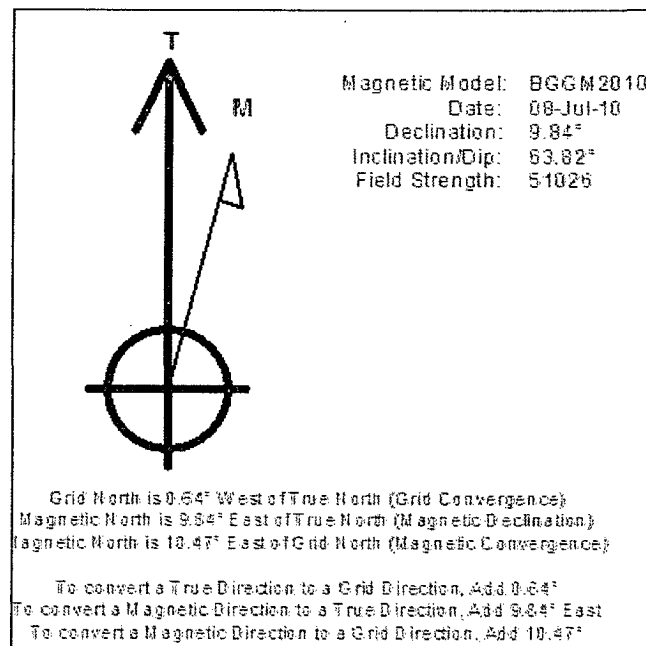
Geographical Coordinates of Well: 36° 59' 34.01" N, 107° 18' 22.82" W

Grid Convergence at Surface is: -0.64°

Based upon Minimum Curvature type calculations, at a Measured Depth of 9,161.00ft

the Bottom Hole Displacement is 5,003.38ft in the Direction of 291.98° (True).

Magnetic Convergence at surface is: -10.47° (8 July 2010, , BGGM2010)



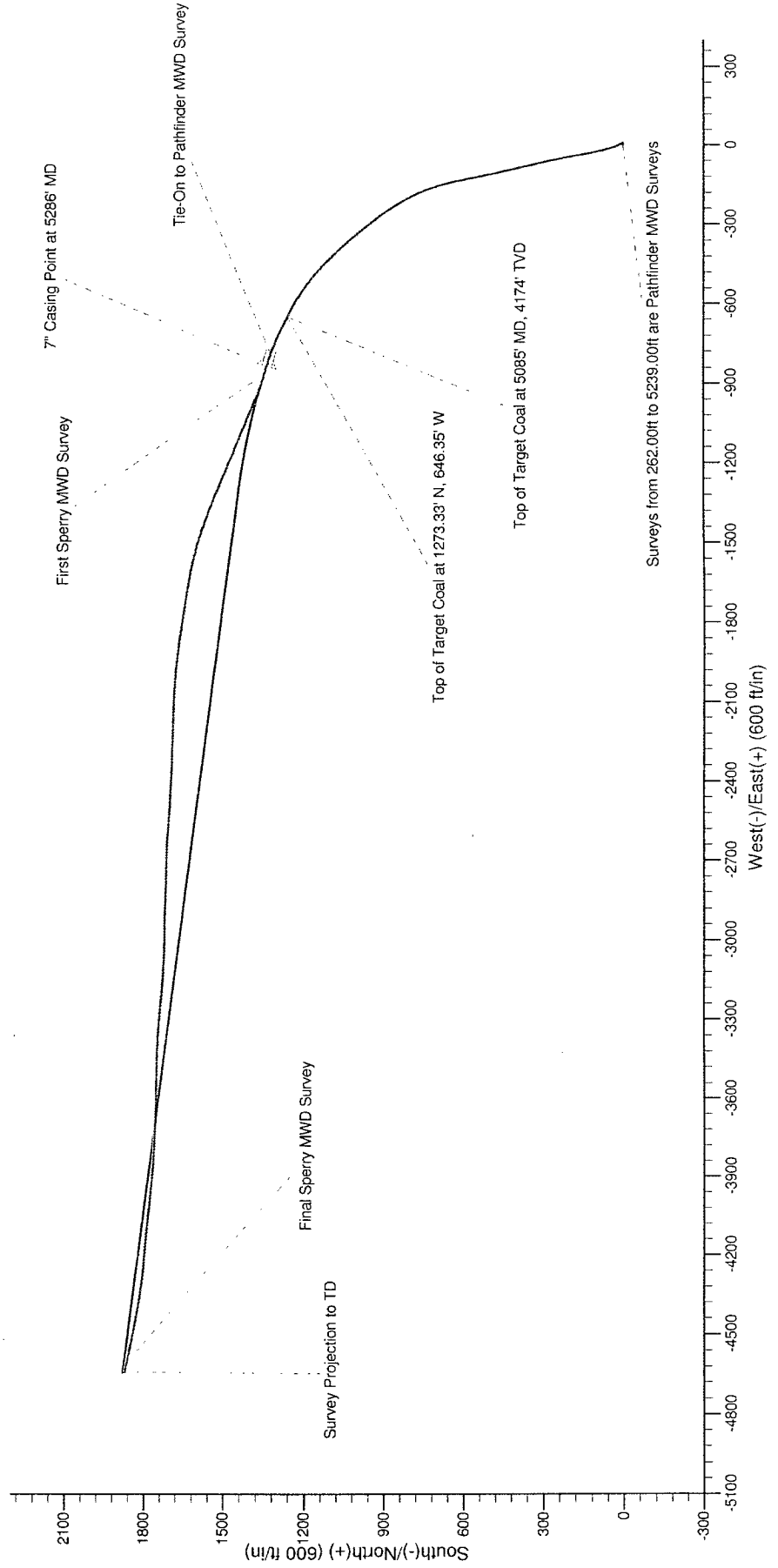
Project: Rio Arriba County, NM
Site: Sec. 12-T32N-R5W
Well: Carracas 12A #2H

Energen Resources

HALLIBURTON
Sperry Drilling

LEGEND

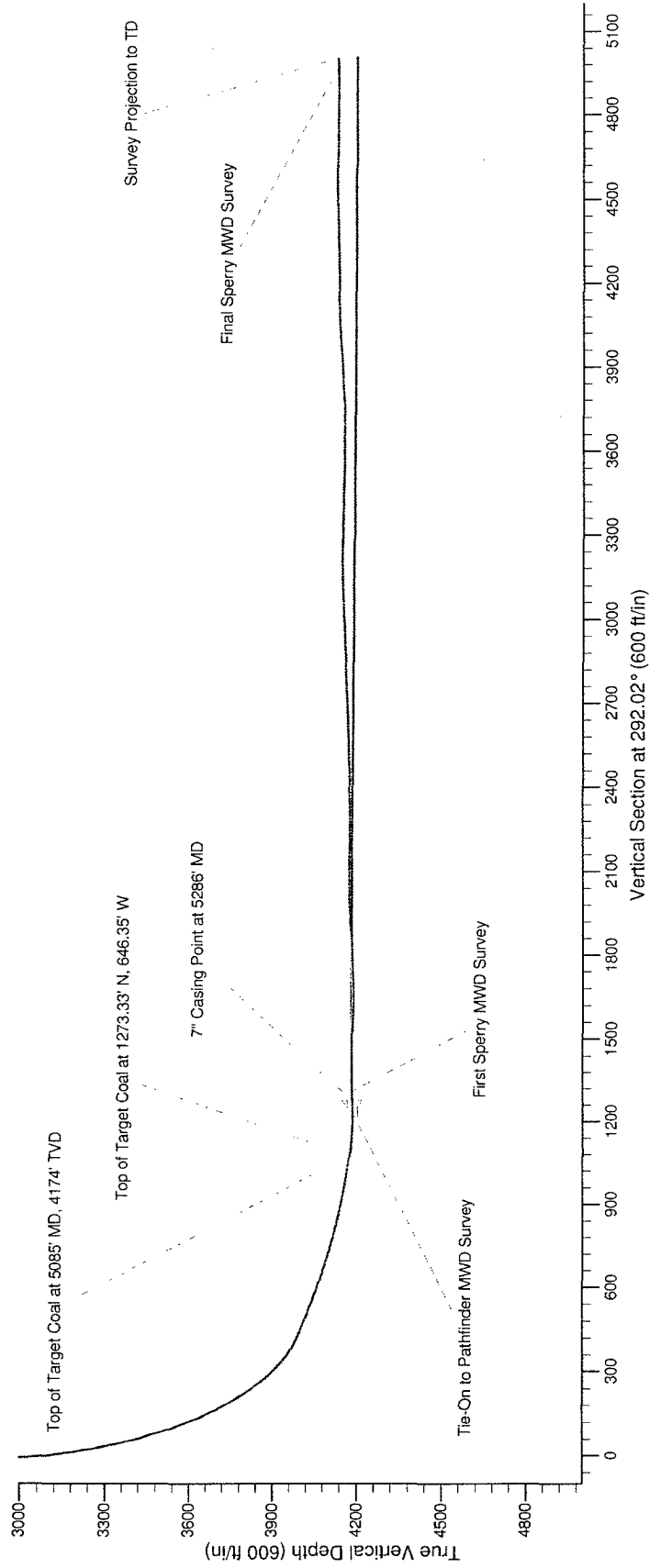
- Carracas 12A #2H, Plan #2, Plan #2 Proposal V0
- - - Pathfinder MWD and Sperry MWD Survey



Project: Rio Arriba County, NM
 Site: Sec. 12-T32N-R5W
 Well: Carracas 12A #2H

Energen Resources

HALLIBURTON
 Sperry Drilling



LEGEND

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