



Cimarex Energy Co., Inc.

Ward Co., Texas

Cimarex-University 18-38 #2H

Cimarex-University 18-38 #2H

Lateral

Survey: MWD Survey #1

Standard Survey Report

07 January, 2008





Black Viper Energy

Survey Report



Company:	Cimarex Energy Co., Inc.	Local Co-ordinate Reference:	Well Cimarex-University 18-38 #2H
Project:	Ward Co., Texas	TVD Reference:	Rig KB @ 2812.00ft (Key Rig #92 KB Elev)
Site:	Cimarex-University 18-38 #2H	MD Reference:	Rig KB @ 2812.00ft (Key Rig #92 KB Elev)
Well:	Cimarex-University 18-38 #2H	North Reference:	Grid
Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
Design:	Lateral	Database:	EDM 2003.14.1.0 Server DB

Project	Ward Co., Texas		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	Texas Central 4203		

Site	Cimarex-University 18-38 #2H			
Site Position:		Northing:	715,197.40 ft	Latitude: 31° 35' 55.942 N
From:	Map	Easting:	1,070,805.16 ft	Longitude: 103° 19' 5.350 W
Position Uncertainty:	0.00 ft	Slot Radius:	"	Grid Convergence: -1.54 °

Well	Cimarex-University 18-38 #2H			
Well Position	+N/-S	0.00 ft	Northing:	715,197.40 ft
	+E/-W	0.00 ft	Easting:	1,070,805.16 ft
Position Uncertainty	0.00 ft		Wellhead Elevation:	ft
			Ground Level:	2,796.00 ft

Wellbore	Lateral				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	11/20/2007	7.84	59.74	48,648

Design	Lateral			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 11,200.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	218.33

Survey Program	Date	01/02/2008			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
100.00	11,200.00	Gyro Survey (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s	
11,200.00	15,525.00	MWD Survey #1 (Lateral)	MWD	MWD - Standard	

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
11,200.00	0.64	207.55	11,195.39	-13.99	-31.51	30.51	0.00	0.00	0.00
11,313.00	19.70	218.50	11,306.10	-29.60	-43.77	50.36	16.88	16.87	9.69
First MWD Survey									
11,356.00	30.80	226.50	11,344.94	-42.89	-56.31	68.57	26.95	25.81	18.60
11,366.00	32.30	223.00	11,353.47	-46.61	-59.99	73.77	23.67	15.00	-35.00
11,376.00	34.80	220.10	11,361.80	-50.75	-63.65	79.28	29.69	25.00	-29.00
11,388.00	37.60	218.70	11,371.48	-56.23	-68.14	86.37	24.33	23.33	-11.67
11,398.00	40.30	219.40	11,379.26	-61.11	-72.10	92.65	27.36	27.00	7.00
11,408.00	43.10	220.30	11,386.72	-66.21	-76.37	99.30	28.63	28.00	9.00
11,418.00	45.50	221.60	11,393.88	-71.49	-80.95	106.28	25.66	24.00	13.00
11,428.00	47.80	223.00	11,400.74	-76.86	-85.84	113.53	25.15	23.00	14.00
11,438.00	50.40	223.40	11,407.29	-82.37	-91.01	121.06	26.18	26.00	4.00



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Site:	Cimarex-University 18-38 #2H	MD Reference:	Rig KB @ 2812.00ft (Key Rig #92 KB Elev)
Well:	Cimarex-University 18-38 #2H	North Reference:	Grid
Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
Design:	Lateral	Database:	EDM 2003.14.1.0 Server DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
11,450.00	52.60	223.50	11,414.76	-89.19	-97.47	130.41	18.34	18.33	0.83
11,460.00	54.70	224.00	11,420.69	-95.01	-103.04	138.43	21.38	21.00	5.00
11,470.00	56.80	224.10	11,426.32	-100.95	-108.79	146.66	21.02	21.00	1.00
11,481.00	58.90	224.10	11,432.17	-107.63	-115.27	155.92	19.09	19.09	0.00
11,491.00	60.80	223.90	11,437.19	-113.85	-121.28	164.53	19.08	19.00	-2.00
11,501.00	63.30	223.60	11,441.88	-120.23	-127.38	173.32	25.14	25.00	-3.00
11,513.00	65.40	224.20	11,447.07	-128.03	-134.89	184.08	18.07	17.50	5.00
11,523.00	67.50	224.40	11,451.07	-134.59	-141.29	193.20	21.08	21.00	2.00
11,533.00	69.60	224.30	11,454.72	-141.24	-147.79	202.46	21.02	21.00	-1.00
11,545.00	72.00	224.00	11,458.67	-149.37	-155.69	213.73	20.14	20.00	-2.50
11,555.00	74.10	224.00	11,461.59	-156.26	-162.33	223.25	21.00	21.00	0.00
11,565.00	76.20	224.00	11,464.15	-163.21	-169.04	232.87	21.00	21.00	0.00
11,577.00	78.40	223.80	11,466.79	-171.64	-177.16	244.52	18.41	18.33	-1.67
11,587.00	80.80	223.50	11,468.59	-178.76	-183.95	254.31	24.18	24.00	-3.00
11,597.00	82.90	223.80	11,470.01	-185.92	-190.78	264.17	21.21	21.00	3.00
11,608.00	85.10	224.30	11,471.16	-193.78	-198.39	275.05	20.50	20.00	4.55
11,640.00	90.40	219.70	11,472.42	-217.53	-219.77	306.94	21.92	16.56	-14.38
11,671.00	91.40	218.50	11,471.93	-241.59	-239.32	337.93	5.04	3.23	-3.87
11,703.00	92.20	218.30	11,470.92	-266.65	-259.18	369.92	2.58	2.50	-0.63
11,735.00	92.20	218.10	11,469.69	-291.78	-278.96	401.89	0.62	0.00	-0.63
11,767.00	92.90	218.00	11,468.27	-316.95	-298.66	433.86	2.21	2.19	-0.31
11,798.00	92.10	218.20	11,466.92	-341.33	-317.77	464.83	2.66	-2.58	0.65
11,830.00	91.30	218.70	11,465.97	-366.38	-337.66	496.82	2.95	-2.50	1.56
11,862.00	90.20	218.30	11,465.55	-391.42	-357.58	528.81	3.66	-3.44	-1.25
11,894.00	88.80	218.20	11,465.83	-416.55	-377.39	560.81	4.39	-4.38	-0.31
11,926.00	88.80	218.20	11,466.50	-441.69	-397.17	592.80	0.00	0.00	0.00
11,958.00	89.50	218.40	11,466.97	-466.80	-417.00	624.80	2.28	2.19	0.63
11,990.00	89.70	218.70	11,467.20	-491.82	-436.95	656.80	1.13	0.63	0.94
12,021.00	89.50	218.50	11,467.41	-516.05	-456.29	687.80	0.91	-0.65	-0.65
12,053.00	90.80	218.70	11,467.33	-541.06	-476.25	719.80	4.11	4.06	0.63
12,085.00	90.80	218.70	11,466.88	-566.03	-496.26	751.79	0.00	0.00	0.00
12,116.00	91.00	219.00	11,466.40	-590.17	-515.70	782.79	1.16	0.65	0.97
12,147.00	90.70	218.10	11,465.94	-614.41	-535.02	813.78	3.06	-0.97	-2.90
12,179.00	91.30	218.00	11,465.38	-639.60	-554.74	845.78	1.90	1.88	-0.31
12,211.00	92.50	217.90	11,464.32	-664.82	-574.40	877.76	3.76	3.75	-0.31
12,243.00	93.10	217.80	11,462.75	-690.06	-594.02	909.72	1.90	1.88	-0.31
12,274.00	92.10	218.20	11,461.35	-714.46	-613.08	940.69	3.47	-3.23	1.29
12,306.00	92.70	217.90	11,460.01	-739.64	-632.79	972.66	2.10	1.88	-0.94
12,338.00	93.10	217.60	11,458.39	-764.91	-652.35	1,004.61	1.56	1.25	-0.94
12,370.00	92.40	217.00	11,456.85	-790.34	-671.72	1,036.57	2.88	-2.19	-1.88
12,402.00	91.90	216.90	11,455.65	-815.89	-690.94	1,068.54	1.59	-1.56	-0.31
12,434.00	91.40	217.00	11,454.73	-841.45	-710.17	1,100.52	1.59	-1.56	0.31
12,466.00	91.70	216.60	11,453.87	-867.07	-729.33	1,132.49	1.56	0.94	-1.25
12,498.00	92.00	216.10	11,452.83	-892.83	-748.29	1,164.46	1.82	0.94	-1.56
12,529.00	91.90	216.50	11,451.78	-917.80	-766.63	1,195.42	1.33	-0.32	1.29
12,561.00	92.00	216.50	11,450.69	-943.50	-785.66	1,227.39	0.31	0.31	0.00
12,593.00	92.40	216.20	11,449.46	-969.26	-804.61	1,259.34	1.56	1.25	-0.94
12,625.00	90.60	216.70	11,448.62	-994.99	-823.61	1,291.31	5.84	-5.63	1.56
12,656.00	89.30	217.00	11,448.65	-1,019.79	-842.20	1,322.30	4.30	-4.19	0.97
12,688.00	89.40	216.90	11,449.01	-1,045.37	-861.44	1,354.29	0.44	0.31	-0.31
12,720.00	89.50	216.60	11,449.32	-1,071.00	-880.58	1,386.28	0.99	0.31	-0.94
12,752.00	89.90	216.50	11,449.49	-1,096.71	-899.64	1,418.26	1.29	1.25	-0.31
12,784.00	89.80	216.60	11,449.57	-1,122.42	-918.70	1,450.25	0.44	-0.31	0.31
12,815.00	90.50	216.90	11,449.49	-1,147.26	-937.24	1,481.24	2.46	2.26	0.97



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Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
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Survey									
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12,847.00	91.20	217.60	11,449.02	-1,172.73	-956.61	1,513.23	3.09	2.19	2.19
12,879.00	91.40	217.30	11,448.29	-1,198.12	-976.06	1,545.21	1.13	0.63	-0.94
12,910.00	91.80	217.30	11,447.42	-1,222.77	-994.84	1,576.20	1.29	1.29	0.00
12,942.00	92.30	217.10	11,446.28	-1,248.25	-1,014.18	1,608.17	1.68	1.56	-0.63
12,974.00	91.90	217.00	11,445.11	-1,273.77	-1,033.45	1,640.14	1.29	-1.25	-0.31
13,005.00	92.10	216.60	11,444.03	-1,298.58	-1,052.00	1,671.11	1.44	0.65	-1.29
13,037.00	92.10	216.70	11,442.85	-1,324.23	-1,071.09	1,703.08	0.31	0.00	0.31
13,069.00	91.10	217.10	11,441.96	-1,349.81	-1,090.30	1,735.05	3.37	-3.13	1.25
13,101.00	90.60	217.20	11,441.48	-1,375.31	-1,109.62	1,767.04	1.59	-1.56	0.31
13,133.00	90.50	217.90	11,441.18	-1,400.68	-1,129.12	1,799.04	2.21	-0.31	2.19
13,164.00	90.00	218.50	11,441.04	-1,425.04	-1,148.29	1,830.04	2.52	-1.61	1.94
13,196.00	91.10	218.60	11,440.74	-1,450.07	-1,168.23	1,862.03	3.45	3.44	0.31
13,228.00	91.30	219.40	11,440.07	-1,474.93	-1,188.37	1,894.02	2.58	0.63	2.50
13,260.00	92.20	218.90	11,439.09	-1,499.74	-1,208.56	1,926.01	3.22	2.81	-1.56
13,292.00	93.70	219.40	11,437.44	-1,524.52	-1,228.74	1,957.96	4.94	4.69	1.56
13,323.00	93.20	220.20	11,435.58	-1,548.29	-1,248.54	1,988.89	3.04	-1.61	2.58
13,355.00	93.40	219.60	11,433.73	-1,572.80	-1,269.04	2,020.83	1.97	0.63	-1.88
13,387.00	93.20	219.40	11,431.89	-1,597.45	-1,289.36	2,052.77	0.88	-0.63	-0.63
13,419.00	91.80	218.60	11,430.50	-1,622.30	-1,309.48	2,084.73	5.04	-4.38	-2.50
13,451.00	90.90	218.70	11,429.74	-1,647.28	-1,329.46	2,116.72	2.83	-2.81	0.31
13,483.00	91.30	218.90	11,429.13	-1,672.21	-1,349.50	2,148.72	1.40	1.25	0.63
13,515.00	91.70	218.70	11,428.29	-1,697.14	-1,369.55	2,180.71	1.40	1.25	-0.63
13,547.00	92.00	218.70	11,427.26	-1,722.10	-1,389.54	2,212.69	0.94	0.94	0.00
13,578.00	92.00	218.30	11,426.17	-1,746.35	-1,408.83	2,243.67	1.29	0.00	-1.29
13,610.00	92.20	218.70	11,425.00	-1,771.38	-1,428.74	2,275.65	1.40	0.63	1.25
13,642.00	92.40	218.50	11,423.72	-1,796.37	-1,448.69	2,307.62	0.88	0.63	-0.63
13,674.00	92.50	217.90	11,422.35	-1,821.49	-1,468.46	2,339.59	1.90	0.31	-1.88
13,706.00	92.50	218.60	11,420.95	-1,846.60	-1,488.25	2,371.56	2.19	0.00	2.19
13,738.00	92.40	217.50	11,419.59	-1,871.77	-1,507.95	2,403.53	3.45	-0.31	-3.44
13,770.00	92.40	217.60	11,418.25	-1,897.12	-1,527.44	2,435.50	0.31	0.00	0.31
13,803.00	92.10	217.20	11,416.95	-1,923.31	-1,547.47	2,468.47	1.51	-0.91	-1.21
13,834.00	92.40	217.40	11,415.73	-1,947.96	-1,566.24	2,499.44	1.16	0.97	0.65
13,866.00	92.70	217.20	11,414.31	-1,973.39	-1,585.61	2,531.40	1.13	0.94	-0.63
13,898.00	92.30	217.50	11,412.91	-1,998.80	-1,605.01	2,563.37	1.56	-1.25	0.94
13,929.00	92.30	217.80	11,411.67	-2,023.32	-1,623.93	2,594.34	0.97	0.00	0.97
13,961.00	92.20	218.00	11,410.41	-2,048.56	-1,643.57	2,626.32	0.70	-0.31	0.63
13,993.00	92.10	218.10	11,409.21	-2,073.74	-1,663.28	2,658.29	0.44	-0.31	0.31
14,024.00	91.90	218.20	11,408.13	-2,098.10	-1,682.42	2,689.27	0.72	-0.65	0.32
14,056.00	91.80	218.00	11,407.10	-2,123.27	-1,702.15	2,721.26	0.70	-0.31	-0.63
14,088.00	92.00	218.00	11,406.04	-2,148.47	-1,721.84	2,753.24	0.63	0.63	0.00
14,119.00	92.40	218.00	11,404.85	-2,172.88	-1,740.91	2,784.22	1.29	1.29	0.00
14,150.00	91.80	217.90	11,403.71	-2,197.31	-1,759.96	2,815.19	1.96	-1.94	-0.32
14,182.00	91.90	217.90	11,402.68	-2,222.55	-1,779.61	2,847.18	0.31	0.31	0.00
14,214.00	92.70	218.10	11,401.39	-2,247.74	-1,799.30	2,879.15	2.58	2.50	0.63
14,246.00	92.70	218.11	11,399.89	-2,272.90	-1,819.02	2,911.11	0.03	0.00	0.03
14,278.00	92.40	217.90	11,398.46	-2,298.09	-1,838.70	2,943.08	1.14	-0.94	-0.66
14,310.00	91.80	217.50	11,397.29	-2,323.39	-1,858.26	2,975.06	2.25	-1.88	-1.25
14,341.00	91.80	218.10	11,396.32	-2,347.87	-1,877.25	3,006.04	1.93	0.00	1.94
14,373.00	92.10	218.80	11,395.23	-2,372.92	-1,897.14	3,038.02	2.38	0.94	2.19
14,405.00	92.10	218.70	11,394.05	-2,397.86	-1,917.15	3,070.00	0.31	0.00	-0.31
14,436.00	92.20	218.80	11,392.89	-2,422.01	-1,936.54	3,100.98	0.46	0.32	0.32
14,468.00	93.00	219.40	11,391.44	-2,446.82	-1,956.70	3,132.94	3.12	2.50	1.88
14,500.00	92.80	219.30	11,389.82	-2,471.54	-1,976.97	3,164.89	0.70	-0.63	-0.31
14,532.00	92.40	218.80	11,388.37	-2,496.36	-1,997.11	3,196.86	2.00	-1.25	-1.56
14,564.00	92.20	219.00	11,387.09	-2,521.24	-2,017.19	3,228.83	0.88	-0.63	0.63



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Site:	Cimarex-University 18-38 #2H	MD Reference:	Rig KB @ 2812.00ft (Key Rig #92 KB Elev)
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Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
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14,595.00	91.90	218.90	11,385.98	-2,545.34	-2,036.66	3,259.81	1.02	-0.97	-0.32
14,627.00	91.80	219.30	11,384.94	-2,570.16	-2,056.83	3,291.79	1.29	-0.31	1.25
14,659.00	91.50	219.00	11,384.02	-2,594.96	-2,077.03	3,323.77	1.33	-0.94	-0.94
14,691.00	91.50	219.00	11,383.18	-2,619.82	-2,097.16	3,355.76	0.00	0.00	0.00
14,722.00	91.00	219.30	11,382.51	-2,643.86	-2,116.73	3,386.75	1.88	-1.61	0.97
14,754.00	90.60	219.00	11,382.06	-2,668.67	-2,136.93	3,418.74	1.56	-1.25	-0.94
14,786.00	90.20	219.00	11,381.84	-2,693.54	-2,157.06	3,450.74	1.25	-1.25	0.00
14,818.00	89.90	219.00	11,381.81	-2,718.41	-2,177.20	3,482.74	0.94	-0.94	0.00
14,850.00	90.50	219.40	11,381.70	-2,743.21	-2,197.43	3,514.73	2.25	1.88	1.25
14,882.00	90.90	219.50	11,381.31	-2,767.91	-2,217.76	3,546.73	1.29	1.25	0.31
14,913.00	90.70	219.20	11,380.87	-2,791.88	-2,237.41	3,577.72	1.16	-0.65	-0.97
14,945.00	90.80	219.40	11,380.46	-2,816.64	-2,257.68	3,609.71	0.70	0.31	0.63
14,976.00	89.80	218.60	11,380.29	-2,840.74	-2,277.19	3,640.71	4.13	-3.23	-2.58
15,008.00	89.30	217.90	11,380.54	-2,865.86	-2,297.00	3,672.71	2.69	-1.56	-2.19
15,040.00	89.20	217.90	11,380.96	-2,891.11	-2,316.65	3,704.70	0.31	-0.31	0.00
15,071.00	89.10	218.10	11,381.42	-2,915.54	-2,335.74	3,735.70	0.72	-0.32	0.65
15,103.00	89.10	217.90	11,381.93	-2,940.75	-2,355.44	3,767.69	0.62	0.00	-0.63
15,135.00	89.20	218.10	11,382.40	-2,965.97	-2,375.13	3,799.69	0.70	0.31	0.63
15,167.00	89.60	217.90	11,382.74	-2,991.18	-2,394.83	3,831.69	1.40	1.25	-0.63
15,199.00	90.30	218.40	11,382.76	-3,016.34	-2,414.60	3,863.69	2.69	2.19	1.56
15,231.00	90.80	218.90	11,382.46	-3,041.33	-2,434.59	3,895.68	2.21	1.56	1.56
15,263.00	91.70	219.10	11,381.76	-3,066.20	-2,454.72	3,927.67	2.88	2.81	0.63
15,294.00	92.00	219.40	11,380.76	-3,090.19	-2,474.32	3,958.65	1.37	0.97	0.97
15,325.00	92.00	219.50	11,379.68	-3,114.11	-2,494.01	3,989.63	0.32	0.00	0.32
15,357.00	91.80	219.80	11,378.62	-3,138.74	-2,514.42	4,021.60	1.13	-0.63	0.94
15,389.00	91.50	219.90	11,377.69	-3,163.30	-2,534.91	4,053.58	0.99	-0.94	0.31
15,420.00	91.60	219.90	11,376.86	-3,187.07	-2,554.79	4,084.56	0.32	0.32	0.00
15,452.00	91.70	220.10	11,375.93	-3,211.57	-2,575.35	4,116.53	0.70	0.31	0.63
15,478.00	91.50	220.10	11,375.21	-3,231.45	-2,592.09	4,142.51	0.77	-0.77	0.00
Last MWD Survey									
15,525.01	90.60	216.96	11,374.13	-3,286.64	-2,598.03	4,189.48	6.95	-1.92	-6.68
Proj. To Bit - PBHL#13[CU18-38#2H]									



Black Viper Energy Survey Report



Company:	Cimarex Energy Co., Inc.	Local Co-ordinate Reference:	Well Cimarex-University 18-38 #2H
Project:	Ward Co., Texas	TVD Reference:	Rig KB @ 2812.00ft (Key Rig #92 KB Elev)
Site:	Cimarex-University 18-38 #2H	MD Reference:	Rig KB @ 2812.00ft (Key Rig #92 KB Elev)
Well:	Cimarex-University 18-38 #2H	North Reference:	Grid
Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
Design:	Lateral	Database:	EDM 2003.14.1.0 Server 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
PBHL#13[CU18-38#2H] - survey hits target - Point	0.00	0.00	11,374.13	-3,286.64	-2,598.03	711,910.76	1,068,207.13	31° 35' 22.735 N	103° 19' 34.357 W
PBHL#4[CU18-38#2H] - survey misses by 1.84ft at 15525.01ft MD (11374.13 TVD, -3286.64 N, -2598.03 E) - Point	0.00	0.00	11,372.29	-3,286.64	-2,598.03	711,910.76	1,068,207.13	31° 35' 22.735 N	103° 19' 34.357 W
z1 - survey misses by 11195.44ft at 11200.00ft MD (11195.39 TVD, -13.99 N, -31.51 E) - Point	0.00	0.00	0.00	0.00	0.00	715,197.40	1,070,805.16	31° 35' 55.942 N	103° 19' 5.350 W
PBHL#5[CU18-38#2H] - survey misses by 41.21ft at 15524.54ft MD (11374.35 TVD, -3267.84 N, -2621.08 E) - Point	0.00	0.00	11,402.87	-3,286.64	-2,598.03	711,910.76	1,068,207.13	31° 35' 22.735 N	103° 19' 34.357 W
PBHL#7[CU18-38#2H] - survey misses by 31.56ft at 15524.83ft MD (11374.35 TVD, -3268.07 N, -2621.26 E) - Point	0.00	0.00	11,384.93	-3,286.64	-2,598.03	711,910.76	1,068,207.13	31° 35' 22.735 N	103° 19' 34.357 W
PBHL#2[CU18-38#2H] - survey misses by 66.78ft at 15524.02ft MD (11374.36 TVD, -3267.43 N, -2620.77 E) - Point	0.00	0.00	11,434.13	-3,286.64	-2,598.03	711,910.76	1,068,207.13	31° 35' 22.735 N	103° 19' 34.357 W
PBHL#3[CU18-38#2H] - survey misses by 58.58ft at 15524.17ft MD (11374.36 TVD, -3267.55 N, -2620.86 E) - Point	0.00	0.00	11,424.81	-3,286.64	-2,598.03	711,910.76	1,068,207.13	31° 35' 22.735 N	103° 19' 34.357 W
PBHL#9[CU18-38#2H] - survey misses by 2.84ft at 15525.01ft MD (11374.13 TVD, -3286.64 N, -2598.03 E) - Point	0.00	0.00	11,371.29	-3,286.64	-2,598.03	711,910.76	1,068,207.13	31° 35' 22.735 N	103° 19' 34.357 W
PBHL#12[CU18-38#2H] - survey misses by 12.47ft at 15525.01ft MD (11374.13 TVD, -3286.64 N, -2598.03 E) - Point	0.00	0.00	11,361.66	-3,286.64	-2,598.03	711,910.76	1,068,207.13	31° 35' 22.735 N	103° 19' 34.357 W
PBHL#10[CU18-38#2H] - survey misses by 17.11ft at 15525.01ft MD (11374.13 TVD, -3286.64 N, -2598.03 E) - Point	0.00	0.00	11,357.02	-3,286.64	-2,598.03	711,910.76	1,068,207.13	31° 35' 22.735 N	103° 19' 34.357 W
PBHL#6[CU18-38#2H] - survey misses by 32.29ft at 15524.80ft MD (11374.35 TVD, -3268.05 N, -2621.24 E) - Point	0.00	0.00	11,386.93	-3,286.64	-2,598.03	711,910.76	1,068,207.13	31° 35' 22.735 N	103° 19' 34.357 W
PBHL#8[CU18-38#2H] - survey misses by 29.73ft at 15525.01ft MD (11374.35 TVD, -3268.21 N, -2621.36 E) - Point	0.00	0.00	11,374.29	-3,286.64	-2,598.03	711,910.76	1,068,207.13	31° 35' 22.735 N	103° 19' 34.357 W
PBHL#11[CU18-38#2H] - survey misses by 19.11ft at 15525.01ft MD (11374.13 TVD, -3286.64 N, -2598.03 E) - Point	0.00	0.00	11,355.02	-3,286.64	-2,598.03	711,910.76	1,068,207.13	31° 35' 22.735 N	103° 19' 34.357 W

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
11,313.00	11,306.10	-29.60	-43.77	First MWD Survey
15,478.00	11,375.21	-3,231.45	-2,592.09	Last MWD Survey
15,525.00	11,373.98	-3,267.39	-2,622.36	Proj. To Bit

Checked By: _____ Approved By: _____ Date: _____



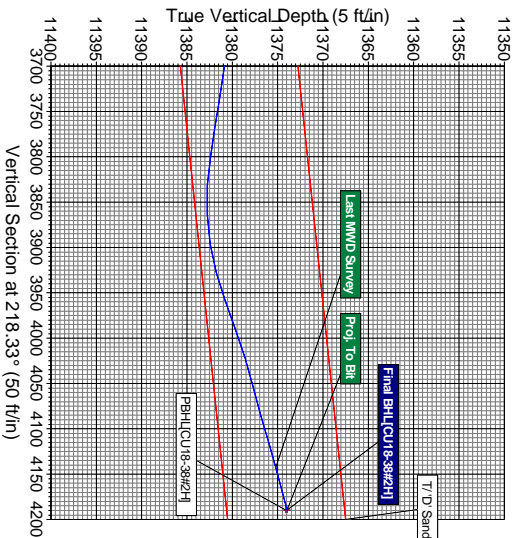
Project Ward Co., Texas
Site: Cimarex-University 18-38 #2H
Well: Cimarex-University 18-38 #2H
Walkline: lateral

Plan: Plan #13a

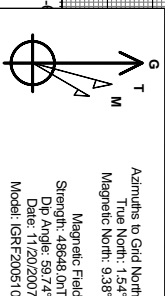
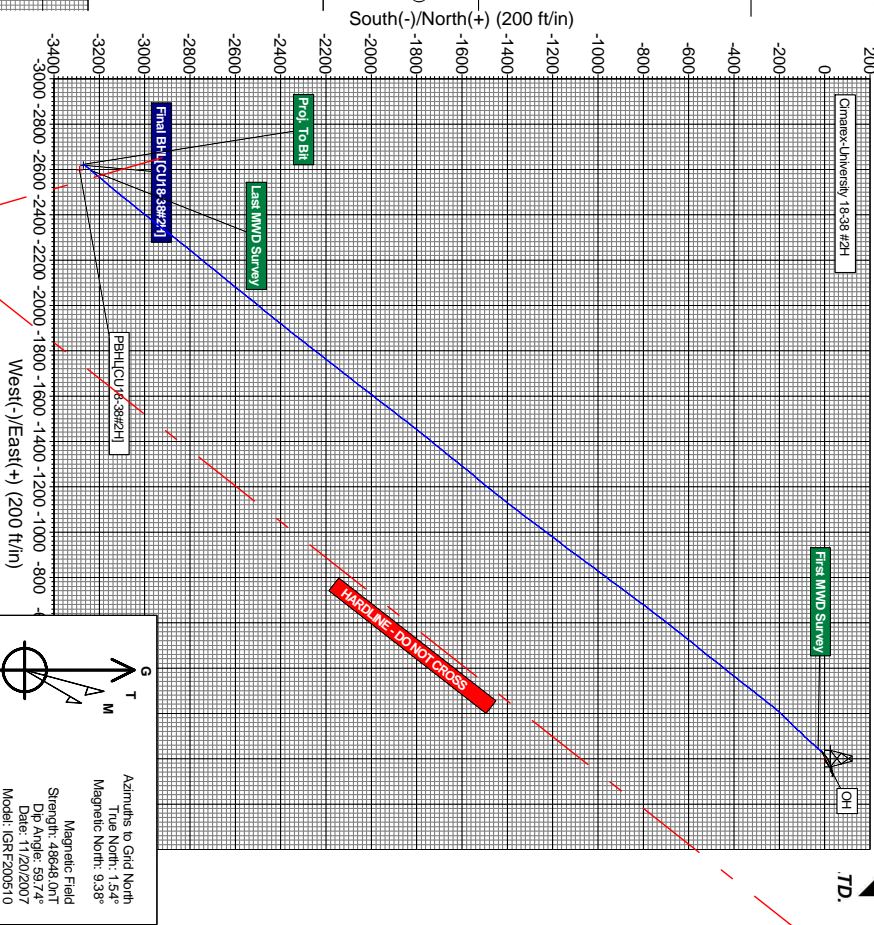


Terminus (Cimarex-University 18-38 #2H lateral)

MD	Inc	Azi	TVD	+N-S	+E/W	Dleg	Tface	VSec
15525.01	90.60	216.96	11374.13	-3286.64	-2598.03	0.03	-179.83	4189.48



PROJECT DETAILS: Ward Co., Texas
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 83 (NADCON CONUS)
Ellipsoid: Clarke 1886
Zone: Texas Central 4203
System Datum: Mean Sea Level



ANNOTATIONS

TVD	MD	Annotation
11383.48	14675.00	Dip: 2.0° / 100 :: Turn 4.0°
11382.85	14700.00	Dip: 3.0° / 100 :: Turn 0.20°
11382.53	14720.00	EOT - Hold 90.0° Inc.: 216.86° Azi.

CIMAREX-UNIVERSITY 18-38 #2H

Vertical Section at 218.33° (200 ft/in)

Plan: Final Plot (Cimarex-University 18-38 #2H lateral)
Created By: L.D. Burton Date: January 7, 2008

Cimarex-University 18-38 #2H - MWD Survey #1

Company:
Survey / Plan:
Wellbore Type:

Cimarex Energy Co., Inc.
Cimarex-University 18-38 #2H - MWD Survey #1
Horizontal

Ward Co., Texas
Cimarex-University 18-38 #2H



	Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	
Reference	0	0	0	0	0	0	0	0	
Tie In	11200	0.638	207.549	11195.39	-13.99	-31.51	30.51	0	Gyro
First MWD Survey	11313	19.7	218.5	11306.1	-29.6	-43.77	50.36	16.88	MWD
	11356	30.8	226.5	11344.94	-42.89	-56.31	68.57	26.95	MWD
	11366	32.3	223	11353.47	-46.61	-59.99	73.77	23.67	MWD
	11376	34.8	220.1	11361.8	-50.75	-63.65	79.28	29.69	MWD
	11388	37.6	218.7	11371.48	-56.23	-68.14	86.37	24.33	MWD
	11398	40.3	219.4	11379.26	-61.11	-72.1	92.65	27.36	MWD
	11408	43.1	220.3	11386.72	-66.21	-76.37	99.3	28.63	MWD
	11418	45.5	221.6	11393.88	-71.49	-80.95	106.28	25.66	MWD
	11428	47.8	223	11400.74	-76.86	-85.84	113.53	25.15	MWD
	11438	50.4	223.4	11407.29	-82.37	-91.01	121.06	26.18	MWD
	11450	52.6	223.5	11414.76	-89.19	-97.47	130.41	18.34	MWD
	11460	54.7	224	11420.69	-95.01	-103.04	138.43	21.38	MWD
	11470	56.8	224.1	11426.32	-100.95	-108.79	146.66	21.02	MWD
	11481	58.9	224.1	11432.17	-107.63	-115.27	155.92	19.09	MWD
	11491	60.8	223.9	11437.19	-113.85	-121.28	164.53	19.08	MWD
	11501	63.3	223.6	11441.88	-120.23	-127.38	173.32	25.14	MWD
	11513	65.4	224.2	11447.07	-128.03	-134.89	184.08	18.07	MWD
	11523	67.5	224.4	11451.07	-134.59	-141.29	193.2	21.08	MWD
	11533	69.6	224.3	11454.72	-141.24	-147.79	202.46	21.02	MWD
	11545	72	224	11458.67	-149.37	-155.69	213.73	20.14	MWD
	11555	74.1	224	11461.59	-156.26	-162.33	223.25	21	MWD
	11565	76.2	224	11464.15	-163.21	-169.04	232.87	21	MWD
	11577	78.4	223.8	11466.79	-171.64	-177.16	244.52	18.41	MWD
	11587	80.8	223.5	11468.59	-178.76	-183.95	254.31	24.18	MWD
	11597	82.9	223.8	11470.01	-185.92	-190.78	264.17	21.21	MWD
	11608	85.1	224.3	11471.16	-193.78	-198.39	275.05	20.5	MWD
	11640	90.4	219.7	11472.42	-217.53	-219.77	306.94	21.92	MWD
	11671	91.4	218.5	11471.93	-241.59	-239.32	337.93	5.04	MWD
	11703	92.2	218.3	11470.92	-266.65	-259.18	369.92	2.58	MWD
	11735	92.2	218.1	11469.69	-291.78	-278.96	401.89	0.62	MWD
	11767	92.9	218	11468.27	-316.95	-298.66	433.86	2.21	MWD
	11798	92.1	218.2	11466.92	-341.33	-317.77	464.83	2.66	MWD
	11830	91.3	218.7	11465.97	-366.38	-337.66	496.82	2.95	MWD
	11862	90.2	218.3	11465.55	-391.42	-357.58	528.81	3.66	MWD
	11894	88.8	218.2	11465.83	-416.55	-377.39	560.81	4.39	MWD
	11926	88.8	218.2	11466.5	-441.69	-397.17	592.8	0	MWD
	11958	89.5	218.4	11466.97	-466.8	-417	624.8	2.28	MWD
	11990	89.7	218.7	11467.2	-491.82	-436.95	656.8	1.13	MWD
	12021	89.5	218.5	11467.41	-516.05	-456.29	687.8	0.91	MWD
	12053	90.8	218.7	11467.33	-541.06	-476.25	719.8	4.11	MWD
	12085	90.8	218.7	11466.88	-566.03	-496.26	751.79	0	MWD
	12116	91	219	11466.4	-590.17	-515.7	782.79	1.16	MWD
	12147	90.7	218.1	11465.94	-614.41	-535.02	813.78	3.06	MWD
	12179	91.3	218	11465.38	-639.6	-554.74	845.78	1.9	MWD
	12211	92.5	217.9	11464.32	-664.82	-574.4	877.76	3.76	MWD

	12243	93.1	217.8	11462.75	-690.06	-594.02	909.72	1.9	MWD
	12274	92.1	218.2	11461.35	-714.46	-613.08	940.69	3.47	MWD
	12306	92.7	217.9	11460.01	-739.64	-632.79	972.66	2.1	MWD
	12338	93.1	217.6	11458.39	-764.91	-652.35	1004.61	1.56	MWD
	12370	92.4	217	11456.85	-790.34	-671.72	1036.57	2.88	MWD
	12402	91.9	216.9	11455.65	-815.89	-690.94	1068.54	1.59	MWD
	12434	91.4	217	11454.73	-841.45	-710.17	1100.52	1.59	MWD
	12466	91.7	216.6	11453.87	-867.07	-729.33	1132.49	1.56	MWD
	12498	92	216.1	11452.83	-892.83	-748.29	1164.46	1.82	MWD
	12529	91.9	216.5	11451.78	-917.8	-766.63	1195.42	1.33	MWD
	12561	92	216.5	11450.69	-943.5	-785.66	1227.39	0.31	MWD
	12593	92.4	216.2	11449.46	-969.26	-804.61	1259.34	1.56	MWD
	12625	90.6	216.7	11448.62	-994.99	-823.61	1291.31	5.84	MWD
	12656	89.3	217	11448.65	-1019.79	-842.2	1322.3	4.3	MWD
	12688	89.4	216.9	11449.01	-1045.37	-861.44	1354.29	0.44	MWD
	12720	89.5	216.6	11449.32	-1071	-880.58	1386.28	0.99	MWD
	12752	89.9	216.5	11449.49	-1096.71	-899.64	1418.26	1.29	MWD
	12784	89.8	216.6	11449.57	-1122.42	-918.7	1450.25	0.44	MWD
	12815	90.5	216.9	11449.49	-1147.26	-937.24	1481.24	2.46	MWD
	12847	91.2	217.6	11449.02	-1172.73	-956.61	1513.23	3.09	MWD
	12879	91.4	217.3	11448.29	-1198.12	-976.06	1545.21	1.13	MWD
	12910	91.8	217.3	11447.42	-1222.77	-994.84	1576.2	1.29	MWD
	12942	92.3	217.1	11446.28	-1248.25	-1014.18	1608.17	1.68	MWD
	12974	91.9	217	11445.11	-1273.77	-1033.45	1640.14	1.29	MWD
	13005	92.1	216.6	11444.03	-1298.58	-1052	1671.11	1.44	MWD
	13037	92.1	216.7	11442.85	-1324.23	-1071.09	1703.08	0.31	MWD
	13069	91.1	217.1	11441.96	-1349.81	-1090.3	1735.05	3.37	MWD
	13101	90.6	217.2	11441.48	-1375.31	-1109.62	1767.04	1.59	MWD
	13133	90.5	217.9	11441.18	-1400.68	-1129.12	1799.04	2.21	MWD
	13164	90	218.5	11441.04	-1425.04	-1148.29	1830.04	2.52	MWD
	13196	91.1	218.6	11440.74	-1450.07	-1168.23	1862.03	3.45	MWD
	13228	91.3	219.4	11440.07	-1474.93	-1188.37	1894.02	2.58	MWD
	13260	92.2	218.9	11439.09	-1499.74	-1208.56	1926.01	3.22	MWD
	13292	93.7	219.4	11437.44	-1524.52	-1228.74	1957.96	4.94	MWD
	13323	93.2	220.2	11435.58	-1548.29	-1248.54	1988.89	3.04	MWD
	13355	93.4	219.6	11433.73	-1572.8	-1269.04	2020.83	1.97	MWD
	13387	93.2	219.4	11431.89	-1597.45	-1289.36	2052.77	0.88	MWD
	13419	91.8	218.6	11430.5	-1622.3	-1309.48	2084.73	5.04	MWD
	13451	90.9	218.7	11429.74	-1647.28	-1329.46	2116.72	2.83	MWD
	13483	91.3	218.9	11429.13	-1672.21	-1349.5	2148.72	1.4	MWD
	13515	91.7	218.7	11428.29	-1697.14	-1369.55	2180.71	1.4	MWD
	13547	92	218.7	11427.26	-1722.1	-1389.54	2212.69	0.94	MWD
	13578	92	218.3	11426.17	-1746.35	-1408.83	2243.67	1.29	MWD
	13610	92.2	218.7	11425	-1771.38	-1428.74	2275.65	1.4	MWD
	13642	92.4	218.5	11423.72	-1796.37	-1448.69	2307.62	0.88	MWD
	13674	92.5	217.9	11422.35	-1821.49	-1468.46	2339.59	1.9	MWD
	13706	92.5	218.6	11420.95	-1846.6	-1488.25	2371.56	2.19	MWD
	13738	92.4	217.5	11419.59	-1871.77	-1507.95	2403.53	3.45	MWD
	13770	92.4	217.6	11418.25	-1897.12	-1527.44	2435.5	0.31	MWD
	13803	92.1	217.2	11416.95	-1923.31	-1547.47	2468.47	1.51	MWD
	13834	92.4	217.4	11415.73	-1947.96	-1566.24	2499.44	1.16	MWD
	13866	92.7	217.2	11414.31	-1973.39	-1585.61	2531.4	1.13	MWD
	13898	92.3	217.5	11412.91	-1998.8	-1605.01	2563.37	1.56	MWD
	13929	92.3	217.8	11411.67	-2023.32	-1623.93	2594.34	0.97	MWD
	13961	92.2	218	11410.41	-2048.56	-1643.57	2626.32	0.7	MWD
	13993	92.1	218.1	11409.21	-2073.74	-1663.28	2658.29	0.44	MWD
	14024	91.9	218.2	11408.13	-2098.1	-1682.42	2689.27	0.72	MWD
	14056	91.8	218	11407.1	-2123.27	-1702.15	2721.26	0.7	MWD

	14088	92	218	11406.04	-2148.47	-1721.84	2753.24	0.63	MWD
	14119	92.4	218	11404.85	-2172.88	-1740.91	2784.22	1.29	MWD
	14150	91.8	217.9	11403.71	-2197.31	-1759.96	2815.19	1.96	MWD
	14182	91.9	217.9	11402.68	-2222.55	-1779.61	2847.18	0.31	MWD
	14214	92.7	218.1	11401.39	-2247.74	-1799.3	2879.15	2.58	MWD
	14246	92.7	218.11	11399.89	-2272.9	-1819.02	2911.11	0.03	MWD
	14278	92.4	217.9	11398.46	-2298.09	-1838.7	2943.08	1.14	MWD
	14310	91.8	217.5	11397.29	-2323.39	-1858.26	2975.06	2.25	MWD
	14341	91.8	218.1	11396.32	-2347.87	-1877.25	3006.04	1.93	MWD
	14373	92.1	218.8	11395.23	-2372.92	-1897.14	3038.02	2.38	MWD
	14405	92.1	218.7	11394.05	-2397.86	-1917.15	3070	0.31	MWD
	14436	92.2	218.8	11392.89	-2422.01	-1936.54	3100.98	0.46	MWD
	14468	93	219.4	11391.44	-2446.82	-1956.7	3132.94	3.12	MWD
	14500	92.8	219.3	11389.82	-2471.54	-1976.97	3164.89	0.7	MWD
	14532	92.4	218.8	11388.37	-2496.36	-1997.11	3196.86	2	MWD
	14564	92.2	219	11387.09	-2521.24	-2017.19	3228.83	0.88	MWD
	14595	91.9	218.9	11385.98	-2545.34	-2036.66	3259.81	1.02	MWD
	14627	91.8	219.3	11384.94	-2570.16	-2056.83	3291.79	1.29	MWD
	14659	91.5	219	11384.02	-2594.96	-2077.03	3323.77	1.33	MWD
	14691	91.5	219	11383.18	-2619.82	-2097.16	3355.76	0	MWD
	14722	91	219.3	11382.51	-2643.86	-2116.73	3386.75	1.88	MWD
	14754	90.6	219	11382.06	-2668.67	-2136.93	3418.74	1.56	MWD
	14786	90.2	219	11381.84	-2693.54	-2157.06	3450.74	1.25	MWD
	14818	89.9	219	11381.81	-2718.41	-2177.2	3482.74	0.94	MWD
	14850	90.5	219.4	11381.7	-2743.21	-2197.43	3514.73	2.25	MWD
	14882	90.9	219.5	11381.31	-2767.91	-2217.76	3546.73	1.29	MWD
	14913	90.7	219.2	11380.87	-2791.88	-2237.41	3577.72	1.16	MWD
	14945	90.8	219.4	11380.46	-2816.64	-2257.68	3609.71	0.7	MWD
	14976	89.8	218.6	11380.29	-2840.74	-2277.19	3640.71	4.13	MWD
	15008	89.3	217.9	11380.54	-2865.86	-2297	3672.71	2.69	MWD
	15040	89.2	217.9	11380.96	-2891.11	-2316.65	3704.7	0.31	MWD
	15071	89.1	218.1	11381.42	-2915.54	-2335.74	3735.7	0.72	MWD
	15103	89.1	217.9	11381.93	-2940.75	-2355.44	3767.69	0.62	MWD
	15135	89.2	218.1	11382.4	-2965.97	-2375.13	3799.69	0.7	MWD
	15167	89.6	217.9	11382.74	-2991.18	-2394.83	3831.69	1.4	MWD
	15199	90.3	218.4	11382.76	-3016.34	-2414.6	3863.69	2.69	MWD
	15231	90.8	218.9	11382.46	-3041.33	-2434.59	3895.68	2.21	MWD
	15263	91.7	219.1	11381.76	-3066.2	-2454.72	3927.67	2.88	MWD
	15294	92	219.4	11380.76	-3090.19	-2474.32	3958.65	1.37	MWD
	15325	92	219.5	11379.68	-3114.11	-2494.01	3989.63	0.32	MWD
	15357	91.8	219.8	11378.62	-3138.74	-2514.42	4021.6	1.13	MWD
	15389	91.5	219.9	11377.69	-3163.3	-2534.91	4053.58	0.99	MWD
	15420	91.6	219.9	11376.86	-3187.07	-2554.79	4084.56	0.32	MWD
	15452	91.7	220.1	11375.93	-3211.57	-2575.35	4116.53	0.7	MWD
Last MWD Survey FINAL BHL	15478	91.5	220.1	11375.21	-3231.45	-2592.09	4142.51	0.77	MWD
	15525	91.5	210.1	11373.97	-3269.84	-2619.07	4189.36	21.27	MWD

All data are in feet unless otherwise stated. Directions and coordinates are relative to Grid North.

Vertical depths are relative to Rig KB. Northings and Eastings are relative to Well.

The Dogleg Severity is in Degrees per 100 feet.

Vertical Section is from Site and calculated along an Azimuth of 218.326° (Grid).

Coordinate System is NAD 1927 (NADCON CONUS) US State Plane 1927 (Exact solution), Texas Central 4203.

Central meridian is -100.333°.

Grid Convergence at Surface is -1.537°.

Based upon Minimum Curvature type calculations, at a Measured Depth of 15525.00ft.,

the Bottom Hole Displacement is 4189.44ft., in the Direction of 218.326° (Grid).

Cimarex-University 18-38 #2H - MWD Survey #1