

Cimarex Energy Co.

Eddy County (NM83E)

Sec 23-T25S-R26E

Pintail 23 Fed #4

Wellbore #1

Survey: MWD Surveys

Standard Survey Report

01 July, 2009

Great White Directional Services

Survey Report

Company:	Cimarex Energy Co.	Local Co-ordinate Reference:	Well Pintail 23 Fed #4
Project:	Eddy County, (NM83E)	TVD Reference:	WELL @ 0.0ft (Original Well Elev)
Site:	Sec 23-T25S-R26E	MD Reference:	WELL @ 0.0ft (Original Well Elev)
Well:	Pintail 23 Fed #4	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 2003.16 Single User Db

Project		Eddy County (NM83E)	
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site		Sec 23-T25S-R26E			
Site Position:		Northing:	407,021.87ft	Latitude:	32° 7' 8.278 N
From:	Map	Easting:	561,065.25ft	Longitude:	104° 16' 10.598 W
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.03 °

Well:	Pintail 23 Fed #4					
Well Position	+N/-S	0.0 ft	Northing:	405,659.90 ft	Latitude:	32° 6' 54.792 N
	+E/-W	0.0 ft	Easting:	562,399.29 ft	Longitude:	104° 15' 55.095 W
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	0.0 ft

Wellbore		Wellbore #1			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	2009/06/03	8.12	60.03	48,729

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	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	188.09	

Survey Program		Date: 2009/07/01		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
2,802.0	5,200.0	MWD Surveys (Wellbore #1)	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)	
2,703.6	0.57	333.15	2,702.0	29.0	35.7	-33.7	0.00	0.00	0.00	
2,802.0	1.10	242.90	2,800.4	29.0	34.7	-33.6	1.26	0.54	-91.68	
First MWD Survey										
2,833.0	4.70	192.00	2,831.4	27.6	34.1	-32.1	13.21	11.61	-164.19	
2,866.0	11.90	182.40	2,864.0	22.9	33.7	-27.4	22.14	21.82	-29.09	
2,897.0	17.00	177.60	2,894.0	15.2	33.8	-19.8	16.89	16.45	-15.48	
2,929.0	26.20	180.40	2,923.7	3.4	33.9	-8.1	28.92	28.75	8.75	
2,961.0	37.20	187.00	2,950.9	-13.3	32.7	8.6	36.00	34.37	20.62	
2,992.0	46.40	195.70	2,974.0	-33.5	28.5	29.2	35.02	29.68	28.06	
3,024.0	57.20	196.80	2,993.8	-57.6	21.4	54.0	33.86	33.75	3.44	
3,056.0	68.60	197.10	3,008.4	-84.8	13.1	82.1	35.63	35.62	0.94	
3,085.0	79.70	197.40	3,016.3	-111.4	4.9	109.6	38.29	38.28	1.03	
3,117.0	90.30	197.40	3,019.1	-141.8	-4.6	141.0	33.12	33.12	0.00	

Great White Directional Services

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Site:	Sec 23-T25S-R26E	MD Reference:	WELL @ 0.0ft (Original Well Elev)
Well:	Pintail 23 Fed #4	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 2003.16 Single User Db

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)
3,148.0	89.80	196.70	3,019.0	-171.4	-13.7	171.6	2.77	-1.61	-2.26
3,180.0	89.70	196.60	3,019.2	-202.1	-22.9	203.3	0.44	-0.31	-0.31
3,213.0	90.50	195.10	3,019.1	-233.8	-31.9	236.0	5.15	2.42	-4.55
3,245.0	90.50	195.30	3,018.8	-264.7	-40.3	267.7	0.62	0.00	0.62
3,276.0	90.80	193.70	3,018.5	-294.7	-48.1	298.5	5.25	0.97	-5.16
3,308.0	90.50	192.00	3,018.1	-325.9	-55.2	330.4	5.39	-0.94	-5.31
3,340.0	90.90	191.80	3,017.7	-357.2	-61.8	362.4	1.40	1.25	-0.62
3,372.0	91.60	189.80	3,017.0	-388.6	-67.8	394.3	6.62	2.19	-6.25
3,404.0	91.40	190.10	3,016.2	-420.1	-73.3	426.3	1.13	-0.62	0.94
3,435.0	91.20	190.10	3,015.5	-450.7	-78.7	457.3	0.65	-0.65	0.00
3,477.0	91.20	188.20	3,014.6	-492.1	-85.4	499.2	4.52	0.00	-4.52
3,499.0	91.20	187.60	3,014.1	-513.9	-88.4	521.2	2.73	0.00	-2.73
3,531.0	91.20	188.20	3,013.5	-545.6	-92.8	553.2	1.87	0.00	1.87
3,563.0	90.90	187.80	3,012.9	-577.3	-97.3	585.2	1.56	-0.94	-1.25
3,594.0	90.90	187.70	3,012.4	-608.0	-101.5	616.2	0.32	0.00	-0.32
3,625.0	90.60	186.90	3,012.0	-638.7	-105.4	647.2	2.76	-0.97	-2.58
3,656.0	90.50	187.20	3,011.7	-669.5	-109.2	678.2	1.02	-0.32	0.97
3,688.0	90.50	187.50	3,011.4	-701.2	-113.3	710.2	0.94	0.00	0.94
3,719.0	90.60	187.30	3,011.1	-732.0	-117.3	741.2	0.72	0.32	-0.65
3,750.0	90.60	187.60	3,010.8	-762.7	-121.3	772.2	0.97	0.00	0.97
3,782.0	90.50	186.50	3,010.5	-794.5	-125.2	804.2	3.45	-0.31	-3.44
3,813.0	89.80	185.90	3,010.4	-825.3	-128.6	835.2	2.97	-2.26	-1.94
3,845.0	89.80	185.60	3,010.5	-857.1	-131.8	867.1	0.94	0.00	-0.94
3,876.0	89.60	185.50	3,010.7	-888.0	-134.8	898.1	0.72	-0.65	-0.32
3,908.0	89.70	185.60	3,010.9	-919.8	-137.9	930.1	0.44	0.31	0.31
3,939.0	89.70	185.30	3,011.0	-950.7	-140.8	961.0	0.97	0.00	-0.97
3,972.0	89.80	185.50	3,011.2	-983.5	-143.9	994.0	0.68	0.30	0.61
4,004.0	89.50	186.20	3,011.4	-1,015.4	-147.2	1,026.0	2.38	-0.94	2.19
4,035.0	89.80	186.00	3,011.6	-1,046.2	-150.5	1,057.0	1.16	0.97	-0.65
4,067.0	90.70	186.40	3,011.4	-1,078.0	-153.9	1,088.9	3.08	2.81	1.25
4,099.0	90.90	187.00	3,011.0	-1,109.8	-157.7	1,120.9	1.98	0.62	1.87
4,130.0	91.00	187.10	3,010.5	-1,140.5	-161.5	1,151.9	0.46	0.32	0.32
4,162.0	91.30	186.90	3,009.8	-1,172.3	-165.4	1,183.9	1.13	0.94	-0.62
4,193.0	91.40	187.50	3,009.1	-1,203.0	-169.3	1,214.9	1.96	0.32	1.94
4,225.0	90.70	189.00	3,008.5	-1,234.7	-173.9	1,246.9	5.17	-2.19	4.69
4,256.0	90.70	189.30	3,008.1	-1,265.3	-178.8	1,277.9	0.97	0.00	0.97
4,288.0	90.70	189.40	3,007.7	-1,296.9	-184.0	1,309.9	0.31	0.00	0.31
4,320.0	90.80	189.30	3,007.3	-1,328.5	-189.2	1,341.9	0.44	0.31	-0.31
4,352.0	90.90	189.80	3,006.8	-1,360.0	-194.5	1,373.8	1.59	0.31	1.56
4,383.0	90.90	189.60	3,006.4	-1,390.6	-199.7	1,404.8	0.65	0.00	-0.65
4,415.0	90.70	189.30	3,005.9	-1,422.1	-205.0	1,436.8	1.13	-0.62	-0.94
4,447.0	88.90	189.40	3,006.0	-1,453.7	-210.2	1,468.8	5.63	-5.62	0.31
4,479.0	89.00	189.10	3,006.6	-1,485.3	-215.3	1,500.8	0.99	0.31	-0.94
4,511.0	89.00	189.20	3,007.2	-1,516.9	-220.4	1,532.8	0.31	0.00	0.31
4,543.0	89.20	189.50	3,007.7	-1,548.4	-225.6	1,564.8	1.13	0.62	0.94
4,575.0	89.30	189.30	3,008.1	-1,580.0	-230.8	1,596.8	0.70	0.31	-0.62
4,606.0	90.20	189.20	3,008.2	-1,610.6	-235.8	1,627.8	2.92	2.90	-0.32
4,638.0	90.10	189.20	3,008.1	-1,642.2	-240.9	1,659.7	0.31	-0.31	0.00
4,670.0	89.90	188.60	3,008.1	-1,673.8	-245.9	1,691.7	1.98	-0.62	-1.87
4,702.0	90.50	189.00	3,008.0	-1,705.4	-250.8	1,723.7	2.25	1.87	1.25
4,733.0	90.50	189.00	3,007.8	-1,736.0	-255.6	1,754.7	0.00	0.00	0.00
4,765.0	90.40	188.80	3,007.5	-1,767.7	-260.6	1,786.7	0.70	-0.31	-0.62
4,797.0	91.70	189.10	3,006.9	-1,799.3	-265.5	1,818.7	4.17	4.06	0.94
4,829.0	91.50	188.70	3,006.0	-1,830.9	-270.5	1,850.7	1.40	-0.62	-1.25

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Site:	Sec 23-T25S-R26E	MD Reference:	WELL @ 0.0ft (Original Well Elev)
Well:	Pintail 23 Fed #4	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 2003.16 Single User 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)	
4,860.0	91.90	188.90	3,005.1	-1,861.5	-275.2	1,881.7	1.44	1.29	0.65	
4,892.0	92.20	189.40	3,004.0	-1,893.1	-280.3	1,913.7	1.82	0.94	1.56	
4,924.0	92.10	189.30	3,002.8	-1,924.6	-285.5	1,945.6	0.44	-0.31	-0.31	
4,955.0	91.80	189.10	3,001.7	-1,955.2	-290.5	1,976.6	1.16	-0.97	-0.65	
4,987.0	91.50	188.70	3,000.8	-1,986.8	-295.4	2,008.6	1.56	-0.94	-1.25	
5,019.0	91.40	188.70	3,000.0	-2,018.4	-300.3	2,040.6	0.31	-0.31	0.00	
5,050.0	90.90	188.30	2,999.4	-2,049.1	-304.8	2,071.6	2.07	-1.61	-1.29	
5,081.0	90.40	186.40	2,999.0	-2,079.8	-308.8	2,102.6	6.34	-1.61	-6.13	
5,113.0	90.50	185.90	2,998.7	-2,111.6	-312.2	2,134.6	1.59	0.31	-1.56	
5,145.0	90.80	185.80	2,998.4	-2,143.5	-315.5	2,166.5	0.99	0.94	-0.31	
5,160.0	90.80	185.80	2,998.2	-2,158.4	-317.0	2,181.5	0.00	0.00	0.00	
Last MWD Survey										
5,200.0	91.90	185.00	2,997.2	-2,198.2	-320.8	2,221.5	3.40	2.75	-2.00	
Proj to TD - Pintail 23 Fed #4 PBHL										

Targets										
Target Name	hit/miss target	Dip Angle (°)	Dip Dir (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Pintail 23 Fed #4 PBT	-	0.00	0.00	2,994.0	-2,572.1	-411.5	403,087.81	561,987.81	32° 6' 29.340 N	104° 15' 59.898 W
- survey misses by 384.8ft at 5200.0ft MD (2997.2 TVD, -2198.2 N, -320.8 E)	-									
- Point	-									

Survey Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
2,802.0	2,800.4	29.0	34.7	First MWD Survey	
5,160.0	2,998.2	-2,158.4	-317.0	Last MWD Survey	
5,200.0	2,997.2	-2,198.2	-320.8	Proj to TD	

Checked By: _____ Approved By: _____ Date: _____