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30-015-38659

Cimarex Energy Co. (Midland)

Eddy County (NM83E)

Sec 27-T18S-R29E

Empire A Fed Com #3H

Wellbore #1

Survey: Survey #2

Standard Survey Report

02 August, 2011

Great White Directional Services

Survey Report

Company:	Cimarex Energy Co. (Midland)	Local Co-ordinate Reference:	Well Empire A Fed Com #3H
Project:	Eddy County (NM83E)	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Sec 27-T18S-R29E	MD Reference	WELL @ 0.0usft (Original Well Elev)
Well:	Empire A Fed Com #3H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000 1 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 27-T18S-R29E		
Site Position:	From:	Map	
Position Uncertainty:	0 0 usft	Slot Radius	13-3/16 "
Northing:	622,900.90 usft	Latitude	32° 42' 43.618 N
Easting:	622,778.80 usft	Longitude	104° 4' 6.754 W
Grid Convergence:			0.14 "

Well	Empire A Fed Com #3H		
Well Position	+N/-S	0 0 usft	Northing:
	+E/-W	0 0 usft	Easting:
Position Uncertainty	0 0 usft	Wellhead Elevation:	usft
			Ground Level:
			0.0 usft

Wellbore	Wellbore #1		
Magetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010	06/14/11	7.85
			Dip Angle
			(°)
			60.55
			Field Strength
			(nT)
			48,881

Design	Wellbore #1		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			357.95

Survey Program	Date 08/01/11		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
116.5	7,481.0	Gyro (Wellbore #1)	MWD
7,481.0	12,275.0	Survey #2 (Wellbore #1)	MWD
			Description
			MWD - Standard
			MWD - Standard

Survey	Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn
	Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Rate
	(usft)			(usft)			(usft)	(°/100usft)	(°/100usft)	(°/100usft)
	7,481.0	0.98	5.03	7,476.0	51.1	-173.2	57.2	0.00	0.00	0.00
	7,529.0	1.10	351.40	7,524.0	52.0	-173.3	58.1	0.57	0.25	-28.40
	7,563.0	1.50	4.80	7,558.0	52.7	-173.3	58.9	1.47	1.18	39.41
	7,594.0	7.10	354.40	7,588.9	55.0	-173.4	61.2	18.16	18.06	-33.55
	7,626.0	13.10	357.00	7,620.4	60.6	-173.8	66.8	18.80	18.75	8.13
	7,658.0	19.20	359.00	7,651.1	69.5	-174.1	75.7	19.14	19.06	6.25
	7,689.0	25.00	0.20	7,679.8	81.2	-174.2	87.3	18.77	18.71	3.87
	7,721.0	30.90	0.20	7,708.1	96.2	-174.1	102.3	18.44	18.44	0.00
	7,752.0	37.00	0.00	7,733.8	113.5	-174.1	119.6	19.68	19.68	-0.65
	7,784.0	43.20	1.30	7,758.3	134.1	-173.8	140.2	19.55	19.38	4.06

Great White Directional Services

Survey Report

Company: Cimarex Energy Co. (Midland)
 Project: Eddy County (N1483E)
 Site: Sec 27-T18S-R29E
 Well: Empire A Fed Com #3H
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well Empire A Fed Com #3H
 TVD Reference: WELL @ 0 0usft (Original Well Elev)
 MD Reference: WELL @ 0 0usft (Original Well Elev)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM 5000 1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,815.0	49.30	1.90	7,779.7	156.4	-173.2	162.5	19.73	19.68	1.94
7,847.0	55.20	1.90	7,799.3	181.7	-172.4	187.8	18.44	18.44	0.00
7,879.0	61.20	2.10	7,816.1	208.9	-171.4	214.9	18.76	18.75	0.63
7,910.0	67.30	2.50	7,829.6	236.8	-170.3	242.7	19.71	19.68	1.29
7,942.0	73.80	2.90	7,840.2	266.9	-168.9	272.8	20.35	20.31	1.25
7,974.0	80.00	2.90	7,847.5	298.0	-167.3	303.8	19.38	19.38	0.00
7,986.0	82.70	2.90	7,849.3	309.9	-166.7	315.6	22.50	22.50	0.00
8,003.0	86.40	3.00	7,850.9	326.8	-165.8	332.5	21.77	21.76	0.59
8,035.0	90.60	2.40	7,851.7	358.7	-164.3	364.3	13.26	13.13	-1.88
8,066.0	91.00	2.90	7,851.3	389.7	-162.9	395.2	2.07	1.29	1.61
8,098.0	91.60	3.00	7,850.6	421.6	-161.2	427.1	1.90	1.88	0.31
8,129.0	91.60	3.50	7,849.7	452.6	-159.5	458.0	1.61	0.00	1.61
8,192.0	91.00	3.20	7,848.3	515.4	-155.8	520.7	1.06	-0.95	-0.48
8,256.0	91.10	3.90	7,847.1	579.3	-151.8	584.3	1.10	0.16	1.09
8,319.0	90.00	2.50	7,846.5	642.2	-148.3	647.1	2.83	-1.75	-2.22
8,382.0	90.10	3.80	7,846.5	705.1	-144.9	709.8	2.07	0.16	2.06
8,446.0	89.60	2.10	7,846.6	769.0	-141.6	773.6	2.77	-0.78	-2.66
8,509.0	89.30	1.10	7,847.2	832.0	-139.8	836.4	1.66	-0.48	-1.59
8,572.0	89.10	0.00	7,848.1	895.0	-139.2	899.4	1.77	-0.32	-1.75
8,635.0	89.30	359.30	7,849.0	958.0	-139.6	962.3	1.16	0.32	-1.11
8,699.0	89.40	358.80	7,849.7	1,021.9	-140.6	1,026.3	0.80	0.16	-0.78
8,763.0	89.40	359.60	7,850.4	1,085.9	-141.5	1,090.3	1.25	0.00	1.25
8,826.0	89.50	359.80	7,851.0	1,148.9	-141.9	1,153.3	0.35	0.16	0.32
8,888.0	89.40	359.20	7,851.6	1,210.9	-142.4	1,215.2	0.98	-0.16	-0.97
8,952.0	89.30	359.40	7,852.3	1,274.9	-143.2	1,279.2	0.35	-0.16	0.31
9,015.0	89.70	0.60	7,852.9	1,337.9	-143.2	1,342.2	2.01	0.63	1.90
9,078.0	90.70	0.60	7,852.6	1,400.9	-142.5	1,405.1	1.59	1.59	0.00
9,142.0	91.00	0.60	7,851.7	1,464.9	-141.9	1,469.0	0.47	0.47	0.00
9,205.0	91.30	0.60	7,850.4	1,527.0	-141.2	1,532.0	0.48	0.48	0.00
9,269.0	92.10	1.50	7,848.5	1,591.8	-140.0	1,595.8	1.88	1.25	1.41
9,333.0	91.80	0.20	7,846.3	1,655.8	-139.1	1,659.7	2.08	-0.47	-2.03
9,395.0	91.00	359.30	7,844.8	1,717.8	-139.3	1,721.7	1.94	-1.29	-1.45
9,459.0	89.50	359.40	7,844.6	1,781.8	-140.6	1,785.6	2.73	-2.34	-1.41
9,522.0	89.60	353.60	7,845.1	1,844.7	-142.3	1,848.6	0.35	0.16	0.32
9,586.0	89.90	353.10	7,845.3	1,908.7	-144.1	1,912.6	0.91	0.47	-0.78
9,649.0	90.20	358.10	7,845.3	1,971.7	-146.2	1,975.6	0.48	0.48	0.00
9,712.0	90.30	357.80	7,845.0	2,034.6	-148.5	2,038.6	0.50	0.16	-0.48
9,776.0	90.50	358.50	7,844.6	2,098.6	-150.5	2,102.6	1.14	0.31	1.09
9,840.0	91.10	358.70	7,843.7	2,162.6	-152.1	2,166.6	0.99	0.94	0.31
9,904.0	91.00	359.00	7,842.5	2,226.6	-153.4	2,230.6	0.49	-0.16	0.47
9,966.0	90.70	358.60	7,841.6	2,288.5	-154.7	2,292.6	0.81	-0.48	-0.65
10,030.0	91.00	358.50	7,840.6	2,352.5	-156.3	2,356.6	0.49	0.47	-0.16
10,093.0	92.10	358.00	7,838.9	2,415.4	-158.2	2,419.6	1.92	1.75	-0.79

Great White Directional Services

Survey Report

Company: Cimarex Energy Co. (Midland)
 Project: Eddy County (NM83E)
 Site: Sec 27-T18S-R29E
 Well: Empire A Fed Com #3H
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well Empire A Fed Com #3H
 TVD Reference: WELL @ 0.0usft (Original Well Elev)
 MD Reference: WELL @ 0.0usft (Original Well Elev)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM 5000 1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,156.0	92.50	357.90	7,836.4	2,478.4	-160.5	2,482.5	0.65	0.63	-0.16
10,220.0	91.80	358.00	7,834.0	2,542.3	-162.8	2,546.5	1.10	-1.09	0.16
10,283.0	90.30	358.80	7,832.8	2,605.2	-164.5	2,609.4	2.70	-2.38	1.27
10,347.0	90.40	359.00	7,832.4	2,669.2	-165.7	2,673.4	0.35	0.16	0.31
10,410.0	90.90	358.90	7,831.7	2,732.2	-166.9	2,736.4	0.81	0.79	-0.16
10,473.0	91.60	359.10	7,830.3	2,795.2	-168.0	2,799.4	1.16	1.11	0.32
10,537.0	92.50	358.90	7,828.1	2,859.1	-169.1	2,863.3	1.44	1.41	-0.31
10,598.0	91.70	358.60	7,825.8	2,920.1	-170.4	2,924.3	1.40	-1.31	-0.49
10,661.0	90.20	358.90	7,824.8	2,983.0	-171.8	2,987.3	2.43	-2.38	0.48
10,724.0	90.20	359.10	7,824.6	3,046.0	-172.9	3,050.3	0.32	0.00	0.32
10,787.0	90.80	358.90	7,824.0	3,109.0	-174.0	3,113.3	1.00	0.95	-0.32
10,851.0	91.10	359.80	7,822.9	3,173.0	-174.7	3,177.2	1.48	0.47	1.41
10,915.0	90.70	1.10	7,821.9	3,237.0	-174.2	3,241.2	2.12	-0.63	2.03
10,978.0	90.40	1.20	7,821.3	3,300.0	-173.0	3,304.1	0.50	-0.48	0.16
11,041.0	91.20	0.90	7,820.5	3,363.0	-171.8	3,367.0	1.36	1.27	-0.48
11,104.0	91.70	0.80	7,818.9	3,425.9	-170.9	3,429.9	0.81	0.79	-0.16
11,167.0	92.00	0.80	7,816.8	3,488.9	-170.0	3,492.7	0.48	0.48	0.00
11,230.0	92.20	0.60	7,814.5	3,551.9	-169.2	3,555.6	0.45	0.32	-0.32
11,291.0	93.10	0.90	7,811.7	3,612.8	-168.4	3,616.5	1.56	1.48	0.49
11,354.0	91.50	1.10	7,809.2	3,675.7	-167.3	3,679.4	2.56	-2.54	0.32
11,417.0	92.20	0.60	7,807.1	3,738.7	-166.4	3,742.2	1.37	1.11	-0.79
11,481.0	91.60	0.00	7,805.0	3,802.6	-166.1	3,806.1	1.33	-0.94	-0.94
11,544.0	91.70	359.90	7,803.2	3,865.6	-166.1	3,869.1	0.22	0.16	-0.16
11,607.0	90.90	0.00	7,801.8	3,928.6	-166.2	3,932.0	1.28	-1.27	0.16
11,670.0	90.60	0.50	7,801.0	3,991.6	-165.9	3,995.0	0.93	-0.48	0.79
11,734.0	91.60	359.90	7,799.7	4,055.6	-165.7	4,058.9	1.82	1.56	-0.94
11,797.0	92.70	359.90	7,797.4	4,118.5	-165.8	4,121.8	1.75	1.75	0.00
11,860.0	93.50	0.00	7,794.0	4,181.4	-165.9	4,184.7	1.28	1.27	0.16
11,923.0	91.50	0.60	7,791.2	4,244.4	-165.5	4,247.6	3.31	-3.17	0.95
11,987.0	92.00	0.70	7,789.2	4,308.3	-164.8	4,311.5	0.80	0.78	0.16
12,050.0	93.10	359.90	7,786.4	4,371.3	-164.5	4,374.4	2.16	1.75	-1.27
12,114.0	93.20	1.00	7,782.9	4,435.2	-164.0	4,438.2	1.72	0.16	1.72
12,177.0	91.80	1.00	7,780.2	4,498.1	-162.9	4,501.1	2.22	-2.22	0.00
12,226.0	91.50	0.90	7,778.8	4,547.1	-162.1	4,550.0	0.65	-0.61	-0.20
Last MWD Survey									
12,275.0	91.20	0.60	7,777.6	4,596.1	-161.3	4,598.9	0.65	-0.61	-0.20
Projection to Bit - PBHL 7796' - 7840' - Empire #3H PBHL - 7840' Landing									

Great White Directional Services

Survey Report

Company: Cimarex Energy Co (Midland)
 Project: Eddy County (NM83E)
 Site: Sec 27-T18S-R29E
 Well: Empire A Fed Coni #3H
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well Empire A Fed Coni #3H
 TVD Reference: WELL @ 0.0usft (Original Well Elev)
 MD Reference: WELL @ 0.0usft (Original Well Elev)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM 5000 1 Single User Db

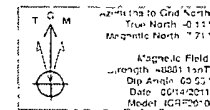
Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
12,226.0	7,778.8	4,547.1	-162.1	Last MWD Survey
12,275.0	7,777.6	4,596.1	-161.3	Projection to Bit

Checked By: _____ Approved By: _____ Date: _____



Company: Cimarex Energy Co. (Midland)
 Project: Eddy County (NM63E)
 Site: Sec 27-T18S-R29E
 Well: Empire A Fed Com #3H
 Wellbore: Wellbore #1
 Design: Plan #7
 Lat: 32° 42' 43.618 N
 Long: 104° 4' 6.754 W
 GL: 0.0
 KB: WELL @ 0.0ust (Original Well Elev)



REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Empire A Fed Com #3H, Grid North
 Vertical (TVD) Reference: WELL @ 0.0ust (Original Well Elev)
 Section (VS) Reference: Slot - (0.0N, 0.0E)
 Measured Depth Reference: WELL @ 0.0ust (Original Well Elev)
 Calculation Method: Minimum Curvature

WELL DETAILS: Empire A Fed Com #3H

+N/-S	+E/-W	Northing	Ground Level Easting	Latitude	Longitude	Slot
0.0	0.0	622900.90	622778.80	32° 42' 43.618 N	104° 4' 6.754 W	

WELLBORE TARGET DETAILS (LAT/LONG)

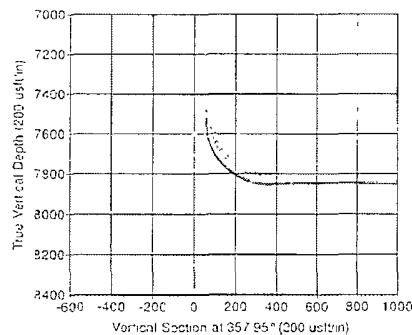
Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
PBHL 7795'	7796.0	4614.1	-164.8	32° 43' 29.279 N	104° 4' 8.548 W	Point
7840' Landing	7840.0	4614.1	-164.8	32° 43' 29.279 N	104° 4' 8.548 W	Point

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dlog	TFace	VSect	Annotation
7549.3	1.08	1.58	7543.5	52.3	-173.2	0.00	0.00	58.4	Tie In Gyro
7555.0	1.09	1.91	7549.2	52.4	-173.2	0.21	32.17	58.6	KOP - 19.33°/100 DLS
8018.1	90.59	0.10	7840.0	351.9	-172.5	19.33	-1.81	357.8	EOC - Hold to TD
12280.6	90.59	0.10	7796.0	4614.1	-164.8	0.00	0.00	4617.1	TD at 12280.6

FORMATION TOP DETAILS

No formation data is available



PROJECT DETAILS: Eddy County (NM63E)
 Geodetic System: US State Plane 1983
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: New Mexico Eastern Zone
 System Datum: Mean Sea Level

SITE DETAILS: Sec 27-T18S-R29E
 Site Centre Latitude: 32° 42' 43.618 N
 Longitude: 104° 4' 6.754 W
 Portional Uncertainty: 0.0
 Convergence: 0.14
 Local North: Grid

