



INTEQ

End of Well Report

Cimarex Energy Co.

Eddy County, NM

Irwin 13 Fed No. 4H

Key 884

Well Specifications

Well Name: Irwin 13 Fed No. 4H
Start Date: 12/27/2011
Client: Cimarex Energy Co.
Rig Name: Key 884
County: Eddy County, NM
Field: (Irwin) Sec 13, T19S, R30E

Well Location:

NAD83 / TM New Mexico State Planes, Eastern Zone (3001)

Grid Coordinates

Easting: 669106.70'
Northing: 602873.30'

Geographical Coordinates

Latitude: 32°39'23.972"N
Longitude: 103°55'05.427"W

RT: 3,425.00' above M.S.L.

Date TD Reached: 1/9/2012

Final Depth MD: 13,048.00'

Final Depth TVD: 8,688.11'



Cimarex Energy Co.

Location Eddy County, NM
 Field Irwin Sec 13, T19S, R30E
 Facility Irwin 13 Fed Site Location

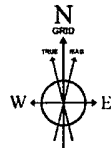
Slot No 4H SHL
 Well No. 4H
 Wellbore No 4H PWB



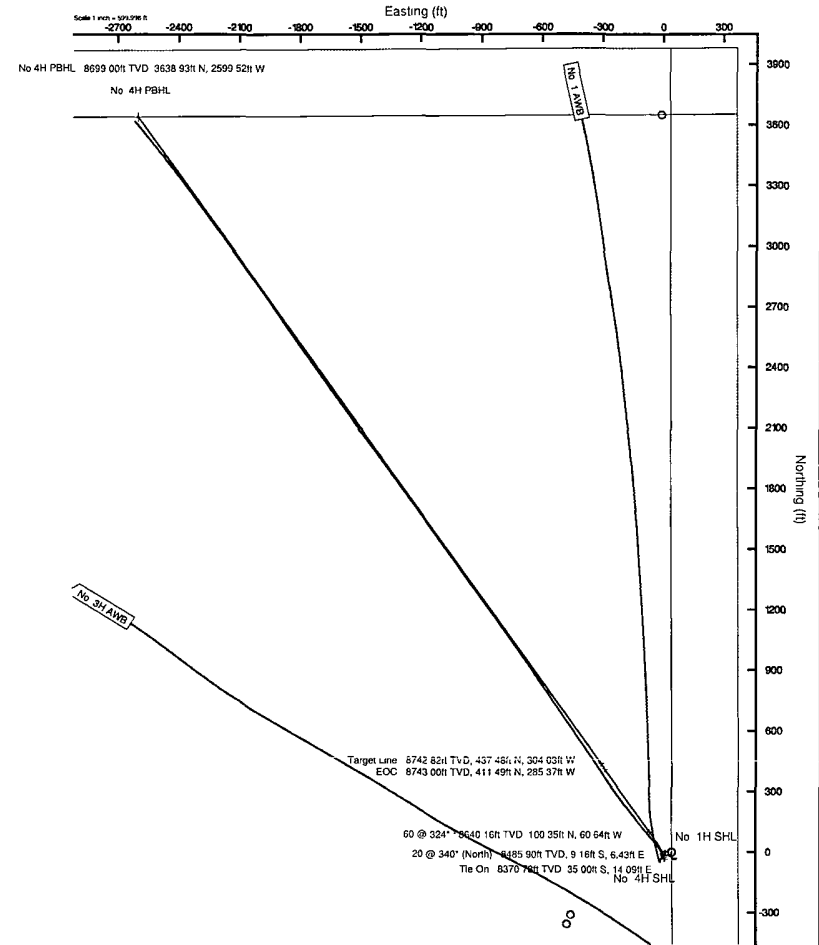
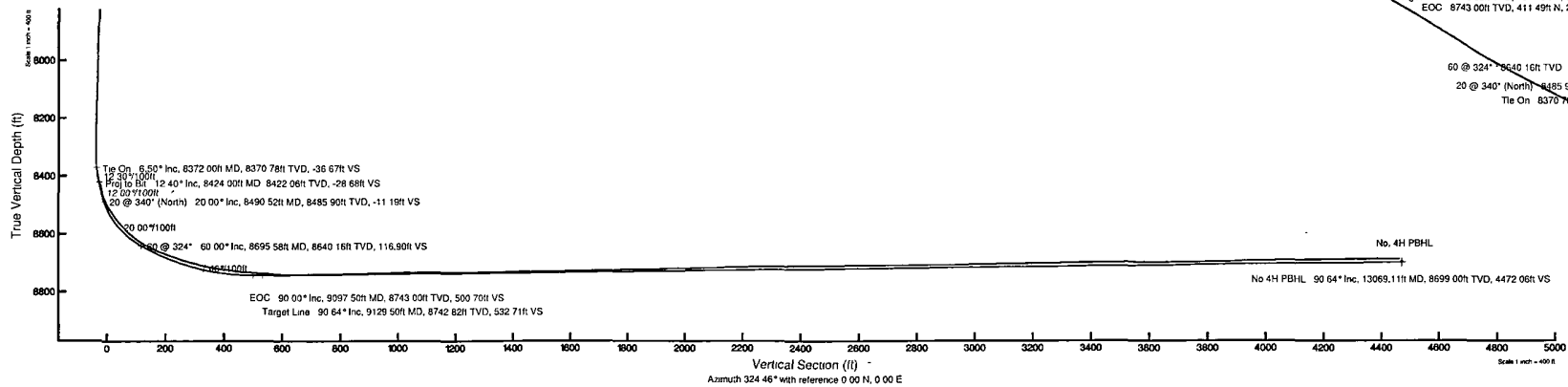
Well Profile Data								
Design Comment	MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (7100ft)	VS (ft)
Tie On	8372.00	6.50	333.100	8370.78	-35.00	14.09	0.00	-36.67
Prior to Bit	8424.00	12.40	349.000	8422.06	-28.89	11.69	12.30	-28.68
20 @ 340° (North)	8490.52	20.00	340.000	8485.90	-9.16	6.43	12.00	-11.19
60 @ 324°	8695.58	60.00	324.000	8640.16	100.35	-60.64	20.00	116.90
EOC	9097.50	90.00	324.300	8743.00	411.49	-285.37	7.45	500.70
Target Line	9129.50	90.637	324.359	8742.82	437.48	-304.03	2.00	532.71
No 4H PBHL	13069.11	90.637	324.359	8699.00	3638.93	-2589.52	0.00	4472.06

Plot reference wellpath is Plan #2
 True vertical depths are referenced to Rig on No. 4H SH (KB)
 Measured depths are referenced to Rig on No. 4H SH (KB)
 Rig on No. 4H SH (KB) to Mean Sea Level 3425 feet
 Mean Sea Level to Mud line (At Slot No. 4H SHL) 0 feet
 Coordinates are in feet referenced to Slot

Grid System: NAD83 / TM New Mexico SP, Eastern Zone (3001), US feet
 North Reference: Grid north
 Scale: True distance
 Depths are in feet
 Created by: genbry on 1/5/2012



BGGM (1945 0 to 2012 0) Dip 60 52° Field 48847 nT
 Magnetic North is 7.77 degrees East of True North (at 11/21/2011)
 Grid North is 0.22 degrees East of True North
 To correct azimuth from True to Grid subtract 0.22 degrees
 To correct azimuth from Magnetic to Grid add 7.55 degrees
 For example if the Magnetic North Azimuth = 90 degs, then the Grid North Azimuth = 90 + 7.55 = 97.55



Vertical Section (ft) - Azimuth 324.46° with reference 0 00 N, 0 00 E

Scale 1 inch = 400 ft



Actual Wellpath Report

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REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Eddy County, NM	Well	No. 4H
Field	(Irwin) Sec 13, T19S, R30E	Wellbore	No.4H AWB
Facility	Irwin 13 Fed Site Location		

REPORT SETUP INFORMATION			
Projection System	NAD83 / TM New Mexico SP, Eastern Zone (3001), US feet	Software System	WellArchitect@ 3.0.0
North Reference	Grid	User	Strosam
Scale	0.999928	Report Generated	1/12/2012 at 1:12:23 PM
Convergence at slot	0.22° East	Database/Source file	WA_Midland/No.4H_AWB.xml

WELLPATH LOCATION						
	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	-0.30	-50.00	669106.70	602873.30	32°39'23.972"N	103°55'05.427"W
Facility Reference Pt			669156.70	602873.60	32°39'23.973"N	103°55'04.842"W
Field Reference Pt			669156.70	602873.60	32°39'23.973"N	103°55'04.842"W

WELLPATH DATUM			
Calculation method	Minimum curvature	Rig on No. 4H SH (KB) to GL	3425.00ft
Horizontal Reference Pt	Slot	Rig on No. 4H SH (KB) to Mean Sea Level	3425.00ft
Vertical Reference Pt	Rig on No. 4H SH (KB)	Rig on No. 4H SH (KB) to Mud Line at Slot (No. 4H SHL)	3425.00ft
MD Reference Pt	Rig on No. 4H SH (KB)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	324.46°



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REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Eddy County, NM	Well	No. 4H
Field	(Irwin) Sec 13, T19S, R30E	Wellbore	No.4H AWP
Facility	Irwin 13 Fed Site Location		

WELLPATH DATA (226 stations)											
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]
0.00	0.000	151.090	0.00	0.00	0.00	0.00	669106.70	602873.30	32°39'23.972"N	103°55'05.427"W	0.00
63.50	0.570	151.090	63.50	-0.31	-0.28	0.15	669106.85	602873.02	32°39'23.969"N	103°55'05.425"W	0.90
125.50	0.850	146.860	125.49	-1.08	-0.93	0.55	669107.25	602872.37	32°39'23.963"N	103°55'05.421"W	0.46
187.50	1.020	144.950	187.49	-2.09	-1.77	1.12	669107.82	602871.53	32°39'23.955"N	103°55'05.414"W	0.28
249.50	0.990	154.270	249.48	-3.17	-2.70	1.67	669108.37	602870.60	32°39'23.945"N	103°55'05.408"W	0.27
311.50	0.840	175.090	311.47	-4.09	-3.64	1.94	669108.64	602869.66	32°39'23.936"N	103°55'05.405"W	0.58
373.50	0.630	221.650	373.46	-4.56	-4.35	1.75	669108.45	602868.95	32°39'23.929"N	103°55'05.407"W	0.99
435.30	0.700	238.000	435.26	-4.61	-4.80	1.21	669107.91	602868.50	32°39'23.925"N	103°55'05.413"W	0.33
497.30	0.770	243.960	497.25	-4.52	-5.18	0.51	669107.21	602868.12	32°39'23.921"N	103°55'05.421"W	0.17
559.30	0.570	241.290	559.25	-4.41	-5.51	-0.13	669106.57	602867.79	32°39'23.918"N	103°55'05.429"W	0.33
620.20	0.570	241.430	620.15	-4.34	-5.80	-0.66	669106.04	602867.50	32°39'23.915"N	103°55'05.435"W	0.00
681.50	0.590	243.700	681.44	-4.25	-6.09	-1.21	669105.49	602867.21	32°39'23.912"N	103°55'05.442"W	0.05
743.50	0.490	244.000	743.44	-4.15	-6.35	-1.74	669104.96	602866.95	32°39'23.909"N	103°55'05.448"W	0.16
805.00	0.460	238.030	804.94	-4.10	-6.59	-2.18	669104.52	602866.71	32°39'23.907"N	103°55'05.453"W	0.09
866.40	0.400	241.740	866.34	-4.05	-6.83	-2.58	669104.12	602866.47	32°39'23.905"N	103°55'05.458"W	0.11
928.10	0.410	242.750	928.04	-3.99	-7.03	-2.97	669103.73	602866.27	32°39'23.903"N	103°55'05.462"W	0.02
989.00	0.290	252.870	988.94	-3.91	-7.17	-3.31	669103.39	602866.13	32°39'23.901"N	103°55'05.466"W	0.22
1048.90	0.170	280.410	1048.83	-3.80	-7.20	-3.54	669103.16	602866.10	32°39'23.901"N	103°55'05.469"W	0.27
1112.40	0.380	29.970	1112.33	-3.65	-7.00	-3.53	669103.17	602866.30	32°39'23.903"N	103°55'05.469"W	0.73
1175.90	0.850	55.750	1175.83	-3.57	-6.56	-3.03	669103.67	602866.74	32°39'23.907"N	103°55'05.463"W	0.84
1239.40	1.160	54.210	1239.32	-3.58	-5.91	-2.12	669104.58	602867.39	32°39'23.914"N	103°55'05.452"W	0.49
1302.90	1.340	57.960	1302.81	-3.62	-5.14	-0.97	669105.73	602868.16	32°39'23.921"N	103°55'05.439"W	0.31
1366.50	1.580	63.410	1366.38	-3.80	-4.36	0.44	669107.14	602868.94	32°39'23.929"N	103°55'05.422"W	0.44
1430.00	1.630	62.600	1429.86	-4.07	-3.55	2.03	669108.73	602869.75	32°39'23.937"N	103°55'05.404"W	0.09
1493.50	1.610	63.740	1493.33	-4.34	-2.74	3.63	669110.33	602870.56	32°39'23.945"N	103°55'05.385"W	0.06
1557.00	1.720	62.260	1556.81	-4.61	-1.90	5.27	669111.97	602871.40	32°39'23.953"N	103°55'05.366"W	0.19
1620.50	1.840	61.470	1620.28	-4.87	-0.97	7.01	669113.71	602872.33	32°39'23.962"N	103°55'05.345"W	0.19
1684.00	2.010	59.930	1683.74	-5.10	0.07	8.87	669115.57	602873.37	32°39'23.973"N	103°55'05.323"W	0.28
1747.50	2.070	58.500	1747.20	-5.28	1.23	10.81	669117.51	602874.53	32°39'23.984"N	103°55'05.301"W	0.12
1811.00	1.890	56.540	1810.66	-5.40	2.41	12.66	669119.36	602875.71	32°39'23.996"N	103°55'05.279"W	0.30
1874.50	1.380	59.940	1874.14	-5.51	3.37	14.20	669120.90	602876.67	32°39'24.005"N	103°55'05.261"W	0.82
1938.00	0.930	62.480	1937.62	-5.66	3.99	15.32	669122.02	602877.29	32°39'24.011"N	103°55'05.248"W	0.71
2001.60	0.650	69.750	2001.22	-5.83	4.35	16.11	669122.81	602877.65	32°39'24.015"N	103°55'05.238"W	0.47
2065.10	0.560	89.390	2064.71	-6.10	4.48	16.76	669123.46	602877.78	32°39'24.016"N	103°55'05.231"W	0.35
2128.60	0.480	113.290	2128.21	-6.50	4.38	17.32	669124.02	602877.68	32°39'24.015"N	103°55'05.224"W	0.36
2192.10	0.540	134.930	2191.71	-7.03	4.06	17.77	669124.47	602877.36	32°39'24.012"N	103°55'05.219"W	0.32
2255.60	0.510	145.360	2255.21	-7.60	3.62	18.15	669124.84	602876.92	32°39'24.007"N	103°55'05.215"W	0.16
2319.10	0.420	153.400	2318.70	-8.12	3.18	18.41	669125.11	602876.48	32°39'24.003"N	103°55'05.212"W	0.17
2382.60	0.540	171.340	2382.20	-8.61	2.67	18.56	669125.26	602875.97	32°39'23.998"N	103°55'05.210"W	0.30
2446.10	0.490	165.110	2445.70	-9.13	2.12	18.67	669125.37	602875.42	32°39'23.992"N	103°55'05.209"W	0.12
2509.60	0.440	166.380	2509.20	-9.61	1.62	18.80	669125.50	602874.92	32°39'23.987"N	103°55'05.207"W	0.08
2573.10	0.430	159.710	2572.70	-10.07	1.16	18.94	669125.64	602874.46	32°39'23.983"N	103°55'05.206"W	0.08
2636.70	0.430	156.830	2636.29	-10.53	0.71	19.12	669125.82	602874.01	32°39'23.979"N	103°55'05.204"W	0.03
2700.20	0.410	158.390	2699.79	-10.99	0.28	19.30	669125.99	602873.58	32°39'23.974"N	103°55'05.201"W	0.04
2763.70	0.280	142.950	2763.29	-11.36	-0.05	19.47	669126.17	602873.25	32°39'23.971"N	103°55'05.199"W	0.25



Actual Wellpath Report

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REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Eddy County, NM	Well	No. 4H
Field	(Irwin) Sec 13, T19S, R30E	Wellbore	No.4H AWB
Facility	Irwin 13 Fed Site Location		

WELLPATH DATA (226 stations)											
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]
2827.20	0.260	149.930	2826.79	-11.66	-0.30	19.64	669126.34	602873.00	32°39'23.968"N	103°55'05.197"W	0.06
2890.70	0.150	114.780	2890.29	-11.88	-0.46	19.79	669126.48	602872.84	32°39'23.967"N	103°55'05.196"W	0.26
2954.20	0.230	124.760	2953.79	-12.07	-0.57	19.97	669126.66	602872.73	32°39'23.966"N	103°55'05.194"W	0.14
3017.70	0.330	101.090	3017.29	-12.32	-0.68	20.25	669126.95	602872.62	32°39'23.965"N	103°55'05.190"W	0.24
3081.20	0.110	66.540	3080.79	-12.47	-0.69	20.49	669127.18	602872.61	32°39'23.965"N	103°55'05.188"W	0.39
3144.70	0.100	10.080	3144.29	-12.44	-0.61	20.55	669127.25	602872.69	32°39'23.965"N	103°55'05.187"W	0.16
3208.20	0.160	329.760	3207.79	-12.31	-0.48	20.52	669127.21	602872.82	32°39'23.967"N	103°55'05.187"W	0.17
3271.80	0.150	321.170	3271.39	-12.14	-0.34	20.42	669127.12	602872.96	32°39'23.968"N	103°55'05.188"W	0.04
3335.30	0.170	324.070	3334.89	-11.97	-0.19	20.31	669127.01	602873.11	32°39'23.970"N	103°55'05.190"W	0.03
3398.80	0.440	323.210	3398.39	-11.63	0.08	20.11	669126.81	602873.38	32°39'23.972"N	103°55'05.192"W	0.43
3462.30	0.440	335.090	3461.88	-11.14	0.49	19.86	669126.56	602873.79	32°39'23.976"N	103°55'05.195"W	0.14
3525.80	0.470	334.280	3525.38	-10.65	0.95	19.65	669126.34	602874.25	32°39'23.981"N	103°55'05.197"W	0.05
3589.30	0.620	331.840	3588.88	-10.05	1.49	19.37	669126.07	602874.79	32°39'23.986"N	103°55'05.201"W	0.24
3652.80	0.690	313.990	3652.38	-9.33	2.05	18.93	669125.63	602875.35	32°39'23.992"N	103°55'05.206"W	0.34
3716.30	0.550	315.780	3715.87	-8.66	2.54	18.45	669125.14	602875.84	32°39'23.997"N	103°55'05.211"W	0.22
3779.80	0.360	317.360	3779.37	-8.16	2.90	18.10	669124.80	602876.20	32°39'24.000"N	103°55'05.215"W	0.30
3843.30	0.380	305.740	3842.87	-7.76	3.17	17.79	669124.49	602876.47	32°39'24.003"N	103°55'05.219"W	0.12
3906.80	0.420	331.260	3906.37	-7.33	3.50	17.51	669124.21	602876.80	32°39'24.006"N	103°55'05.222"W	0.28
3970.40	0.400	324.440	3969.97	-6.88	3.89	17.27	669123.97	602877.19	32°39'24.010"N	103°55'05.225"W	0.08
4033.90	0.360	315.750	4033.46	-6.46	4.21	17.00	669123.70	602877.51	32°39'24.013"N	103°55'05.228"W	0.11
4097.40	0.260	302.990	4096.96	-6.13	4.43	16.74	669123.44	602877.73	32°39'24.015"N	103°55'05.231"W	0.19
4160.90	0.260	295.510	4160.46	-5.87	4.57	16.49	669123.19	602877.87	32°39'24.017"N	103°55'05.234"W	0.05
4224.40	0.210	303.880	4223.96	-5.63	4.70	16.26	669122.96	602878.00	32°39'24.018"N	103°55'05.237"W	0.10
4287.90	0.140	304.640	4287.46	-5.45	4.81	16.10	669122.80	602878.11	32°39'24.019"N	103°55'05.239"W	0.11
4351.40	0.140	297.260	4350.96	-5.31	4.89	15.97	669122.67	602878.19	32°39'24.020"N	103°55'05.240"W	0.03
4414.90	0.180	285.410	4414.46	-5.16	4.95	15.80	669122.50	602878.25	32°39'24.021"N	103°55'05.242"W	0.08
4478.40	0.170	281.850	4477.96	-5.01	4.99	15.62	669122.31	602878.29	32°39'24.021"N	103°55'05.244"W	0.02
4541.90	0.180	240.390	4541.46	-4.93	4.96	15.44	669122.14	602878.26	32°39'24.021"N	103°55'05.246"W	0.20
4605.50	0.250	234.310	4605.06	-4.92	4.83	15.24	669121.94	602878.13	32°39'24.019"N	103°55'05.249"W	0.12
4669.00	0.260	235.720	4668.56	-4.92	4.67	15.01	669121.70	602877.97	32°39'24.018"N	103°55'05.251"W	0.02
4732.50	0.320	236.520	4732.06	-4.91	4.49	14.74	669121.44	602877.79	32°39'24.016"N	103°55'05.255"W	0.09
4796.00	0.370	233.540	4795.56	-4.91	4.27	14.43	669121.13	602877.57	32°39'24.014"N	103°55'05.258"W	0.08
4859.50	0.420	232.540	4859.06	-4.92	4.01	14.08	669120.78	602877.31	32°39'24.011"N	103°55'05.262"W	0.08
4923.00	0.450	229.870	4922.55	-4.95	3.71	13.70	669120.40	602877.01	32°39'24.008"N	103°55'05.267"W	0.06
4986.50	0.450	233.120	4986.05	-4.97	3.40	13.31	669120.01	602876.70	32°39'24.005"N	103°55'05.271"W	0.04
5050.00	0.440	227.010	5049.55	-5.01	3.08	12.93	669119.63	602876.38	32°39'24.002"N	103°55'05.276"W	0.08
5113.50	0.500	222.110	5113.05	-5.10	2.71	12.57	669119.27	602876.01	32°39'23.999"N	103°55'05.280"W	0.11
5177.10	0.590	225.030	5176.65	-5.21	2.27	12.15	669118.85	602875.57	32°39'23.994"N	103°55'05.285"W	0.15
5240.60	0.490	217.530	5240.14	-5.35	1.83	11.75	669118.45	602875.13	32°39'23.990"N	103°55'05.290"W	0.19
5304.10	0.450	218.260	5303.64	-5.50	1.41	11.43	669118.13	602874.71	32°39'23.986"N	103°55'05.293"W	0.06
5367.60	0.370	198.220	5367.14	-5.69	1.02	11.22	669117.92	602874.32	32°39'23.982"N	103°55'05.296"W	0.26
5431.10	0.530	187.100	5430.64	-6.02	0.54	11.12	669117.82	602873.84	32°39'23.977"N	103°55'05.297"W	0.29
5494.60	0.680	179.140	5494.13	-6.55	-0.13	11.09	669117.78	602873.17	32°39'23.971"N	103°55'05.298"W	0.27
5558.10	0.680	182.860	5557.63	-7.15	-0.88	11.07	669117.77	602872.42	32°39'23.963"N	103°55'05.298"W	0.07
5621.60	0.680	184.770	5621.12	-7.74	-1.64	11.02	669117.72	602871.67	32°39'23.956"N	103°55'05.298"W	0.04



Actual Wellpath Report

No.4H AWP
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REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Eddy County, NM	Well	No. 4H
Field	(Irwin) Sec 13, T19S, R30E	Wellbore	No.4H AWP
Facility	Irwin 13 Fed Site Location		

WELLPATH DATA (226 stations)											
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]
5685.10	0.790	191.990	5684.62	-8.32	-2.44	10.90	669117.60	602870.86	32°39'23.948"N	103°55'05.300"W	0.23
5748.60	0.740	199.390	5748.11	-8.85	-3.25	10.67	669117.37	602870.05	32°39'23.940"N	103°55'05.302"W	0.17
5812.10	0.660	196.700	5811.61	-9.31	-3.99	10.43	669117.13	602869.31	32°39'23.932"N	103°55'05.305"W	0.14
5875.70	0.490	189.450	5875.21	-9.73	-4.61	10.28	669116.98	602868.69	32°39'23.926"N	103°55'05.307"W	0.29
5939.20	0.480	172.210	5938.70	-10.16	-5.14	10.27	669116.97	602868.16	32°39'23.921"N	103°55'05.307"W	0.23
6002.70	0.540	169.630	6002.20	-10.66	-5.70	10.36	669117.06	602867.60	32°39'23.915"N	103°55'05.306"W	0.10
6066.20	0.490	190.940	6065.70	-11.12	-6.26	10.37	669117.06	602867.04	32°39'23.910"N	103°55'05.306"W	0.31
6129.70	0.510	201.130	6129.20	-11.46	-6.79	10.21	669116.91	602866.51	32°39'23.905"N	103°55'05.308"W	0.14
6193.20	0.490	213.160	6192.69	-11.72	-7.28	9.96	669116.66	602866.02	32°39'23.900"N	103°55'05.311"W	0.17
6256.70	0.460	219.400	6256.19	-11.88	-7.71	9.65	669116.35	602865.59	32°39'23.896"N	103°55'05.315"W	0.09
6320.20	0.480	227.230	6319.69	-11.98	-8.08	9.29	669115.99	602865.22	32°39'23.892"N	103°55'05.319"W	0.11
6383.70	0.570	242.730	6383.19	-11.97	-8.41	8.82	669115.52	602864.89	32°39'23.889"N	103°55'05.324"W	0.26
6447.30	0.740	251.720	6446.78	-11.80	-8.68	8.15	669114.85	602864.62	32°39'23.886"N	103°55'05.332"W	0.31
6510.80	1.030	259.150	6510.28	-11.44	-8.92	7.20	669113.90	602864.38	32°39'23.884"N	103°55'05.343"W	0.49
6574.30	1.110	267.530	6573.76	-10.87	-9.05	6.02	669112.72	602864.25	32°39'23.882"N	103°55'05.357"W	0.28
6637.80	1.130	265.840	6637.25	-10.20	-9.12	4.78	669111.48	602864.18	32°39'23.882"N	103°55'05.372"W	0.06
6701.30	1.040	270.510	6700.74	-9.54	-9.16	3.58	669110.28	602864.14	32°39'23.881"N	103°55'05.386"W	0.20
6764.80	0.980	272.560	6764.23	-8.87	-9.14	2.46	669109.16	602864.17	32°39'23.882"N	103°55'05.399"W	0.11
6828.30	1.030	260.150	6827.72	-8.28	-9.21	1.36	669108.06	602864.09	32°39'23.881"N	103°55'05.412"W	0.35
6891.80	1.200	240.200	6891.21	-7.97	-9.64	0.22	669106.92	602863.66	32°39'23.877"N	103°55'05.425"W	0.66
6955.30	1.090	223.810	6954.70	-8.01	-10.40	-0.78	669105.92	602862.90	32°39'23.869"N	103°55'05.437"W	0.54
7018.80	1.110	208.960	7018.19	-8.39	-11.38	-1.49	669105.21	602861.92	32°39'23.860"N	103°55'05.445"W	0.45
7082.40	1.150	207.350	7081.77	-8.95	-12.48	-2.08	669104.62	602860.82	32°39'23.849"N	103°55'05.452"W	0.08
7145.90	1.090	203.300	7145.26	-9.55	-13.60	-2.61	669104.09	602859.70	32°39'23.838"N	103°55'05.458"W	0.16
7209.40	0.880	192.680	7208.75	-10.19	-14.63	-2.96	669103.74	602858.67	32°39'23.828"N	103°55'05.462"W	0.44
7272.90	0.890	167.790	7272.24	-10.96	-15.59	-2.96	669103.74	602857.71	32°39'23.818"N	103°55'05.463"W	0.60
7336.40	1.110	147.360	7335.73	-12.03	-16.59	-2.53	669104.17	602856.71	32°39'23.808"N	103°55'05.457"W	0.65
7399.90	1.350	136.070	7399.22	-13.39	-17.65	-1.68	669105.02	602855.65	32°39'23.798"N	103°55'05.448"W	0.54
7463.40	1.600	129.330	7462.70	-14.98	-18.75	-0.47	669106.23	602854.55	32°39'23.787"N	103°55'05.434"W	0.48
7526.90	1.880	122.550	7526.17	-16.80	-19.87	1.09	669107.79	602853.43	32°39'23.776"N	103°55'05.415"W	0.55
7590.40	2.090	128.770	7589.63	-18.88	-21.16	2.87	669109.57	602852.14	32°39'23.763"N	103°55'05.395"W	0.47
7653.90	2.210	132.120	7653.09	-21.20	-22.70	4.68	669111.38	602850.60	32°39'23.747"N	103°55'05.373"W	0.27
7717.40	1.940	130.650	7716.54	-23.44	-24.22	6.41	669113.11	602849.08	32°39'23.732"N	103°55'05.353"W	0.43
7781.00	1.940	132.200	7780.11	-25.53	-25.65	8.02	669114.72	602847.65	32°39'23.718"N	103°55'05.335"W	0.08
7844.50	1.840	132.130	7843.57	-27.58	-27.05	9.57	669116.27	602846.25	32°39'23.704"N	103°55'05.316"W	0.16
7908.00	1.740	138.340	7907.04	-29.53	-28.46	10.97	669117.67	602844.84	32°39'23.690"N	103°55'05.300"W	0.34
7971.50	1.530	141.050	7970.52	-31.34	-29.84	12.14	669118.84	602843.46	32°39'23.677"N	103°55'05.286"W	0.35
8035.00	1.330	141.010	8034.00	-32.92	-31.07	13.14	669119.84	602842.23	32°39'23.664"N	103°55'05.275"W	0.31
8098.50	1.710	149.130	8097.47	-34.60	-32.46	14.09	669120.79	602840.85	32°39'23.651"N	103°55'05.264"W	0.69
8162.00	1.810	152.480	8160.95	-36.54	-34.16	15.04	669121.74	602839.14	32°39'23.634"N	103°55'05.253"W	0.23
8225.50	1.250	158.150	8224.42	-38.20	-35.69	15.76	669122.46	602837.61	32°39'23.618"N	103°55'05.244"W	0.91
8248.00	1.600	155.600	8246.92	-38.75	-36.20	15.98	669122.68	602837.10	32°39'23.613"N	103°55'05.242"W	1.58
8280.00	0.900	156.000	8278.91	-39.43	-36.84	16.27	669122.97	602836.46	32°39'23.607"N	103°55'05.239"W	2.19
8311.00	1.000	212.400	8309.90	-39.77	-37.29	16.22	669122.92	602836.01	32°39'23.603"N	103°55'05.239"W	2.91
8326.00	1.200	298.500	8324.90	-39.68	-37.33	16.01	669122.71	602835.98	32°39'23.602"N	103°55'05.242"W	10.06



Actual Wellpath Report

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REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Eddy County, NM	Well	No. 4H
Field	(Irwin) Sec 13, T19S, R30E	Wellbore	No.4H AWB
Facility	Irwin 13 Fed Site Location		

WELLPATH DATA (226 stations)											
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]
8341.00	3.000	304.800	8339.89	-39.17	-37.03	15.55	669122.25	602836.27	32°39'23.605"N	103°55'05.247"W	12.08
8372.00	6.500	333.100	8370.78	-36.67	-35.00	14.09	669120.79	602838.30	32°39'23.625"N	103°55'05.264"W	13.26
8406.00	11.100	336.500	8404.37	-31.57	-30.28	11.92	669118.62	602843.02	32°39'23.672"N	103°55'05.289"W	13.61
8436.00	15.700	337.800	8433.55	-24.79	-23.87	9.23	669115.93	602849.43	32°39'23.736"N	103°55'05.320"W	15.37
8470.00	20.900	335.100	8465.82	-14.34	-14.10	4.94	669111.64	602859.20	32°39'23.833"N	103°55'05.370"W	15.49
8502.00	26.700	333.300	8495.09	-1.62	-2.49	-0.70	669106.00	602870.81	32°39'23.948"N	103°55'05.435"W	18.26
8533.00	32.200	330.300	8522.07	13.49	10.91	-7.93	669098.77	602884.21	32°39'24.081"N	103°55'05.519"W	18.36
8565.00	36.900	325.400	8548.43	31.59	26.24	-17.62	669089.08	602899.54	32°39'24.233"N	103°55'05.632"W	17.05
8597.00	41.700	320.700	8573.19	51.83	42.40	-29.82	669076.88	602915.69	32°39'24.393"N	103°55'05.774"W	17.64
8629.00	47.000	319.300	8596.06	74.13	59.52	-44.21	669062.50	602932.81	32°39'24.563"N	103°55'05.941"W	16.84
8661.00	52.900	319.700	8616.64	98.52	78.14	-60.10	669046.60	602951.43	32°39'24.748"N	103°55'06.127"W	18.46
8685.00	57.000	320.400	8630.42	118.10	93.20	-72.72	669033.99	602966.49	32°39'24.897"N	103°55'06.273"W	17.25
8705.00	60.600	321.100	8640.78	135.17	106.44	-83.54	669023.17	602979.74	32°39'25.029"N	103°55'06.399"W	18.25
8736.00	65.900	321.800	8654.73	162.81	128.09	-100.78	669005.93	603001.38	32°39'25.243"N	103°55'06.600"W	17.22
8768.00	68.900	321.700	8667.03	192.31	151.29	-119.07	668987.64	603024.58	32°39'25.474"N	103°55'06.813"W	9.38
8800.00	70.100	322.300	8678.23	222.26	174.91	-137.52	668969.19	603048.19	32°39'25.708"N	103°55'07.028"W	4.14
8832.00	71.800	322.100	8688.68	252.48	198.80	-156.06	668950.65	603072.09	32°39'25.945"N	103°55'07.243"W	5.35
8863.00	73.200	321.900	8698.00	282.02	222.10	-174.26	668932.45	603095.39	32°39'26.177"N	103°55'07.455"W	4.56
8895.00	75.600	322.400	8706.60	312.81	246.44	-193.17	668913.55	603119.72	32°39'26.418"N	103°55'07.675"W	7.65
8927.00	78.400	322.500	8713.80	343.97	271.16	-212.17	668894.55	603144.44	32°39'26.663"N	103°55'07.896"W	8.76
8958.00	80.700	323.300	8719.42	374.44	295.47	-230.56	668876.16	603168.75	32°39'26.905"N	103°55'08.110"W	7.84
8990.00	82.200	323.500	8724.18	406.08	320.87	-249.42	668857.30	603194.15	32°39'27.157"N	103°55'08.330"W	4.73
9022.00	83.000	324.700	8728.30	437.81	346.58	-268.03	668838.69	603219.85	32°39'27.412"N	103°55'08.546"W	4.48
9054.00	84.200	324.800	8731.87	469.61	372.55	-286.38	668820.34	603245.82	32°39'27.669"N	103°55'08.760"W	3.76
9086.00	85.300	325.000	8734.80	501.48	398.62	-304.71	668802.02	603271.89	32°39'27.928"N	103°55'08.973"W	3.49
9117.00	86.400	325.700	8737.04	532.39	424.05	-322.28	668784.44	603297.32	32°39'28.180"N	103°55'09.177"W	4.20
9149.00	87.300	325.600	8738.80	564.33	450.43	-340.31	668766.41	603323.70	32°39'28.442"N	103°55'09.387"W	2.83
9181.00	87.800	325.700	8740.17	596.30	476.83	-358.35	668748.37	603350.09	32°39'28.704"N	103°55'09.597"W	1.59
9213.00	89.000	326.000	8741.06	628.28	503.30	-376.31	668730.42	603376.56	32°39'28.967"N	103°55'09.806"W	3.87
9245.00	90.100	326.000	8741.31	660.26	529.83	-394.20	668712.53	603403.09	32°39'29.230"N	103°55'10.014"W	3.44
9275.00	90.700	325.700	8741.10	690.25	554.65	-411.04	668695.69	603427.91	32°39'29.476"N	103°55'10.210"W	2.24
9308.00	90.800	325.800	8740.67	723.24	581.93	-429.61	668677.12	603455.18	32°39'29.747"N	103°55'10.426"W	0.43
9340.00	91.100	325.600	8740.14	755.23	608.36	-447.64	668659.09	603481.61	32°39'30.009"N	103°55'10.635"W	1.13
9402.00	91.500	325.700	8738.73	817.20	659.53	-482.62	668624.12	603532.78	32°39'30.517"N	103°55'11.042"W	0.67
9465.00	91.100	326.000	8737.31	880.17	711.66	-517.97	668588.76	603584.90	32°39'31.034"N	103°55'11.453"W	0.79
9529.00	91.500	325.700	8735.85	944.13	764.61	-553.89	668552.85	603637.85	32°39'31.559"N	103°55'11.871"W	0.78
9593.00	91.500	325.600	8734.18	1008.09	817.43	-589.99	668516.75	603690.67	32°39'32.083"N	103°55'12.291"W	0.16
9657.00	90.000	325.300	8733.34	1072.08	870.13	-626.28	668480.46	603743.37	32°39'32.606"N	103°55'12.713"W	2.39
9720.00	89.700	325.700	8733.50	1135.07	922.05	-661.97	668444.78	603795.29	32°39'33.121"N	103°55'13.128"W	0.79
9784.00	90.100	324.900	8733.62	1199.06	974.67	-698.40	668408.35	603847.90	32°39'33.643"N	103°55'13.552"W	1.40
9848.00	91.100	325.000	8732.95	1263.05	1027.06	-735.15	668371.60	603900.28	32°39'34.163"N	103°55'13.979"W	1.57
9911.00	91.500	324.800	8731.52	1326.03	1078.59	-771.37	668335.39	603951.81	32°39'34.674"N	103°55'14.400"W	0.71
9975.00	91.000	324.400	8730.12	1390.02	1130.75	-808.43	668298.33	604003.96	32°39'35.191"N	103°55'14.831"W	1.00
10038.00	90.700	324.000	8729.19	1453.01	1181.84	-845.28	668261.48	604055.05	32°39'35.698"N	103°55'15.260"W	0.79
10102.00	90.600	324.000	8728.46	1517.00	1233.61	-882.90	668223.87	604106.82	32°39'36.212"N	103°55'15.698"W	0.16



Actual Wellpath Report

No.4H AWP
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REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Eddy County, NM	Well	No. 4H
Field	(Irwin) Sec 13, T19S, R30E	Wellbore	No.4H AWP
Facility	Irwin 13 Fed Site Location		

WELLPATH DATA (226 stations)											
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [%/100ft]
10166.00	90.900	324.400	8727.62	1581.00	1285.51	-920.33	668186.44	604158.72	32°39'36.727"N	103°55'16.133"W	0.78
10229.00	91.000	324.500	8726.58	1643.99	1336.76	-956.96	668149.82	604209.97	32°39'37.236"N	103°55'16.559"W	0.22
10293.00	91.000	325.200	8725.46	1707.98	1389.09	-993.80	668112.98	604262.28	32°39'37.755"N	103°55'16.988"W	1.09
10356.00	91.400	324.200	8724.14	1770.96	1440.49	-1030.19	668076.58	604313.68	32°39'38.265"N	103°55'17.411"W	1.71
10420.00	91.100	324.700	8722.75	1834.95	1492.55	-1067.39	668039.39	604365.74	32°39'38.781"N	103°55'17.844"W	0.91
10483.00	91.400	324.400	8721.37	1897.93	1543.86	-1103.92	668002.86	604417.04	32°39'39.290"N	103°55'18.269"W	0.67
10547.00	91.100	324.800	8719.98	1961.92	1596.01	-1140.99	667965.80	604469.19	32°39'39.808"N	103°55'18.700"W	0.78
10609.00	90.700	324.200	8719.00	2023.91	1646.48	-1176.99	667929.80	604519.66	32°39'40.308"N	103°55'19.119"W	1.16
10673.00	91.500	323.600	8717.77	2087.89	1698.18	-1214.69	667892.10	604571.36	32°39'40.821"N	103°55'19.558"W	1.56
10736.00	91.700	323.800	8716.01	2150.86	1748.94	-1251.97	667854.82	604622.11	32°39'41.325"N	103°55'19.991"W	0.45
10800.00	91.000	324.600	8714.51	2214.84	1800.83	-1289.40	667817.40	604674.00	32°39'41.840"N	103°55'20.427"W	1.66
10864.00	91.400	323.900	8713.17	2278.83	1852.76	-1326.78	667780.02	604725.92	32°39'42.355"N	103°55'20.862"W	1.26
10928.00	90.800	324.300	8711.94	2342.81	1904.59	-1364.30	667742.50	604777.75	32°39'42.870"N	103°55'21.298"W	1.13
10991.00	91.000	323.100	8710.95	2405.80	1955.36	-1401.59	667705.21	604828.51	32°39'43.373"N	103°55'21.732"W	1.93
11055.00	90.300	323.000	8710.22	2469.78	2006.50	-1440.06	667666.74	604879.65	32°39'43.881"N	103°55'22.180"W	1.10
11119.00	90.500	323.500	8709.77	2533.76	2057.78	-1478.35	667628.46	604930.93	32°39'44.390"N	103°55'22.625"W	0.84
11182.00	90.300	324.300	8709.33	2596.75	2108.68	-1515.47	667591.34	604981.82	32°39'44.895"N	103°55'23.057"W	1.31
11246.00	89.900	324.600	8709.22	2660.75	2160.75	-1552.68	667554.13	605033.89	32°39'45.411"N	103°55'23.490"W	0.78
11310.00	89.600	324.500	8709.50	2724.75	2212.89	-1589.80	667517.02	605086.02	32°39'45.929"N	103°55'23.922"W	0.49
11373.00	90.500	324.100	8709.45	2787.75	2264.05	-1626.56	667480.26	605137.18	32°39'46.436"N	103°55'24.350"W	1.56
11437.00	90.700	324.700	8708.78	2851.75	2316.08	-1663.82	667443.01	605189.21	32°39'46.952"N	103°55'24.783"W	0.99
11500.00	90.800	324.200	8707.95	2914.74	2367.34	-1700.44	667406.38	605240.46	32°39'47.461"N	103°55'25.209"W	0.81
11564.00	90.900	324.900	8707.00	2978.74	2419.47	-1737.56	667369.27	605292.59	32°39'47.978"N	103°55'25.641"W	1.10
11628.00	91.100	324.400	8705.89	3042.73	2471.66	-1774.58	667332.25	605344.77	32°39'48.496"N	103°55'26.072"W	0.84
11691.00	91.300	325.400	8704.57	3105.71	2523.19	-1810.80	667296.04	605396.30	32°39'49.007"N	103°55'26.493"W	1.62
11755.00	91.400	324.900	8703.06	3169.69	2575.70	-1847.36	667259.48	605448.80	32°39'49.528"N	103°55'26.918"W	0.80
11818.00	91.000	325.900	8701.74	3232.66	2627.54	-1883.13	667223.71	605500.65	32°39'50.042"N	103°55'27.334"W	1.71
11882.00	91.100	325.700	8700.57	3296.63	2680.47	-1919.09	667187.75	605553.57	32°39'50.568"N	103°55'27.753"W	0.35
11945.00	90.700	325.400	8699.58	3359.62	2732.41	-1954.73	667152.12	605605.51	32°39'51.083"N	103°55'28.167"W	0.79
12009.00	90.500	324.200	8698.91	3423.61	2784.70	-1991.62	667115.23	605657.80	32°39'51.602"N	103°55'28.596"W	1.90
12072.00	91.100	323.900	8698.03	3486.60	2835.70	-2028.60	667078.25	605708.79	32°39'52.108"N	103°55'29.027"W	1.06
12136.00	89.600	323.700	8697.64	3550.59	2887.34	-2066.39	667040.46	605760.43	32°39'52.620"N	103°55'29.466"W	2.36
12200.00	89.900	323.700	8697.92	3614.59	2938.92	-2104.28	667002.57	605812.00	32°39'53.132"N	103°55'29.907"W	0.47
12263.00	90.000	324.100	8697.97	3677.58	2989.82	-2141.40	666965.46	605862.90	32°39'53.637"N	103°55'30.339"W	0.65
12327.00	90.000	324.300	8697.97	3741.58	3041.73	-2178.84	666928.02	605914.81	32°39'54.152"N	103°55'30.775"W	0.31
12390.00	90.600	323.300	8697.64	3804.58	3092.57	-2216.05	666890.82	605965.64	32°39'54.656"N	103°55'31.208"W	1.85
12454.00	90.800	323.800	8696.86	3868.56	3144.04	-2254.07	666852.80	606017.11	32°39'55.167"N	103°55'31.650"W	0.84
12518.00	91.700	324.000	8695.46	3932.55	3195.74	-2291.77	666815.10	606068.81	32°39'55.680"N	103°55'32.089"W	1.44
12581.00	92.000	324.200	8693.43	3995.51	3246.75	-2328.69	666778.18	606119.81	32°39'56.186"N	103°55'32.518"W	0.57
12645.00	91.000	323.300	8691.75	4059.48	3298.34	-2366.52	666740.36	606171.40	32°39'56.698"N	103°55'32.959"W	2.10
12709.00	90.300	322.600	8691.03	4123.46	3349.42	-2405.08	666701.80	606222.47	32°39'57.205"N	103°55'33.407"W	1.55
12772.00	90.700	323.500	8690.48	4186.43	3399.76	-2442.94	666663.94	606272.81	32°39'57.704"N	103°55'33.848"W	1.56
12835.00	91.000	322.200	8689.54	4249.40	3449.97	-2480.99	666625.90	606323.01	32°39'58.203"N	103°55'34.291"W	2.12
12899.00	90.500	321.200	8688.70	4313.32	3500.19	-2520.65	666586.24	606373.23	32°39'58.701"N	103°55'34.753"W	1.75
12966.00	90.100	320.400	8688.20	4410.12	3575.36	-2581.95	666524.94	606448.39	32°39'59.447"N	103°55'35.466"W	0.92



Actual Wellpath Report
No.4H AWP
 Page 7 of 7



REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Eddy County, NM	Well	No. 4H
Field	(Irwin) Sec 13, T19S, R30E	Wellbore	No.4H AWB
Facility	Irwin 13 Fed Site Location		

WELLPATH DATA (226 stations)											
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]
13048.00	90.100	321.000	8688.11	4462.01	3615.60	-2614.89	666492.01	606488.63	32°39'59.847"N	103°55'35.850"W	1.15

TARGETS										
Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape	
No. 4H PBHL		8699.00	3638.93	-2599.52	666507.37	606511.96	32°40'00.077"N	103°55'35.669"W	point	

WELLPATH COMPOSITION - Ref Wellbore: No.4H AWB Ref Wellpath: No.4H AWP				
Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
0.00	8225.50	Generic gyro - northseeking (Standard)	Ves Gyro <63.5-8225.5>	No.4H AWB
8225.50	13048.00	NaviTrak (MagCorr)	MWD NaviTrak <8248-XXXX>	No.4H AWB



A GYRO TECHNOLOGIES INC. COMPANY

PO Box 261021
Corpus Christi, Texas 78426
(361) 767-0602 • (800) 606-GYRO • Fax (361) 767-0612

January 13, 2012

Cimarex Energy Company
600 N. Marienfeld St., Ste. 600
Midland, TX 79701

Attn: Carolyn Larson

Re: **Irwin 13 Fed #4**

Please find enclosed a copy of the survey from 0' to 7,966' ran on the above referenced well.

If I can be of any further service, please do not hesitate to call me at 800-606-4976.

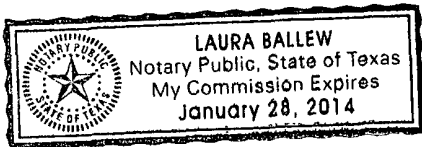
Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 13th day of January, A.D., 2012, by Keith Havelka.

Laura Ballew
Notary Public, State of Texas





Company: Cimarex
 Lease/Well: Irwin 13 Fed/#4
 Location: S13, T19s, R30e
 Rig Name: Key #884
 State/County: New Mexico/Eddy
 Latitude: 32.55
 GRID North is 0.21 Degrees East of True North
 VS-Azi: 324.46 Degrees

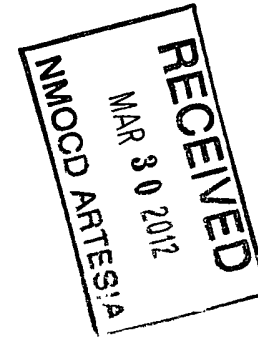


Depth Reference : RKB=18 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: irwin 13 fed #4_ed.ut
 Minimum Curvature Method
 Report Date/Time: 1/6/2012 / 09:44

Vaughn Energy Services
 Gardendale, Texas
 432-563-5444
 Surveyor: Seth Hardin
 Irwin 13 Fed #4



Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.66	149.85	100.00	-0.50	0.29	-0.58	0.58	149.85	0.66
200.00	0.85	157.27	199.99	-1.68	0.87	-1.87	1.89	152.74	0.21
300.00	0.91	159.36	299.98	-3.11	1.43	-3.36	3.42	155.24	0.07
400.00	0.57	224.03	399.97	-4.21	1.36	-4.22	4.42	162.05	0.84
500.00	0.44	233.92	499.97	-4.80	0.70	-4.31	4.85	171.68	0.16
600.00	0.54	256.99	599.96	-5.13	-0.07	-4.13	5.13	180.81	0.22
700.00	0.77	236.43	699.96	-5.61	-1.10	-3.93	5.72	191.06	0.33
800.00	0.65	237.19	799.95	-6.29	-2.14	-3.88	6.65	198.78	0.12
900.00	0.54	248.70	899.94	-6.78	-3.06	-3.73	7.43	204.32	0.16
1000.00	0.38	267.96	999.94	-6.96	-3.83	-3.44	7.94	208.84	0.22
1100.00	0.26	359.96	1099.94	-6.75	-4.16	-3.07	7.93	211.66	0.46
1200.00	1.11	54.26	1199.93	-5.96	-3.37	-2.89	6.85	209.53	0.99
1300.00	1.37	53.43	1299.91	-4.68	-1.63	-2.86	4.95	199.19	0.25
1400.00	1.50	60.50	1399.88	-3.32	0.47	-2.98	3.36	171.99	0.22
1500.00	1.59	64.83	1499.84	-2.09	2.86	-3.36	3.54	126.17	0.15
1600.00	1.70	67.72	1599.80	-0.94	5.48	-3.95	5.56	99.73	0.14
1700.00	2.01	63.67	1699.75	0.40	8.43	-4.57	8.44	87.29	0.34
1800.00	2.04	66.01	1799.68	1.90	11.62	-5.21	11.78	80.71	0.09

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	1.29	58.70	1899.64	3.21	14.21	-5.65	14.57	77.27	0.77
2000.00	0.82	74.46	1999.62	3.99	15.87	-5.98	16.36	75.89	0.55
2100.00	0.59	86.16	2099.62	4.22	17.08	-6.50	17.59	76.13	0.27
2200.00	0.37	112.98	2199.61	4.13	17.89	-7.04	18.36	77.01	0.31
2300.00	0.54	127.89	2299.61	3.71	18.56	-7.77	18.92	78.69	0.21
2400.00	0.48	178.90	2399.61	3.00	18.94	-8.56	19.17	80.99	0.44
2500.00	0.47	142.25	2499.60	2.26	19.20	-9.32	19.33	83.29	0.30
2600.00	0.44	176.28	2599.60	1.55	19.47	-10.06	19.53	85.44	0.27
2700.00	0.24	182.20	2699.60	0.96	19.49	-10.54	19.51	87.17	0.20
2800.00	0.30	109.74	2799.60	0.67	19.73	-10.92	19.74	88.06	0.32
2900.00	0.34	108.32	2899.60	0.48	20.26	-11.38	20.27	88.63	0.04
3000.00	0.28	133.02	2999.59	0.22	20.72	-11.86	20.72	89.38	0.15
3100.00	0.13	323.55	3099.59	0.15	20.83	-11.99	20.83	89.59	0.41
3200.00	0.11	286.40	3199.59	0.27	20.67	-11.80	20.68	89.26	0.08
3300.00	0.23	0.87	3299.59	0.49	20.59	-11.57	20.60	88.63	0.22
3400.00	0.51	324.77	3399.59	1.05	20.33	-10.96	20.36	87.03	0.36
3500.00	0.48	319.80	3499.59	1.74	19.81	-10.10	19.88	84.99	0.06
3600.00	0.57	317.69	3599.58	2.42	19.21	-9.19	19.36	82.82	0.09
3700.00	0.68	311.38	3699.58	3.18	18.43	-8.12	18.70	80.21	0.14
3800.00	0.38	300.41	3799.57	3.74	17.69	-7.24	18.08	78.05	0.32
3900.00	0.37	349.00	3899.57	4.23	17.34	-6.64	17.85	76.30	0.31
4000.00	0.50	313.33	3999.57	4.84	16.96	-5.92	17.64	74.06	0.29
4100.00	0.29	329.66	4099.57	5.36	16.51	-5.23	17.36	72.00	0.23
4200.00	0.23	277.64	4199.57	5.61	16.18	-4.84	17.13	70.87	0.24
4300.00	0.29	327.23	4299.56	5.85	15.85	-4.45	16.89	69.73	0.22
4400.00	0.25	353.95	4399.56	6.28	15.69	-4.00	16.90	68.17	0.13
4500.00	0.26	318.09	4499.56	6.67	15.51	-3.59	16.89	66.72	0.16
4600.00	0.36	257.77	4599.56	6.78	15.05	-3.24	16.51	65.76	0.32
4700.00	0.35	227.95	4699.56	6.50	14.51	-3.14	15.90	65.86	0.18
4800.00	0.14	231.95	4799.56	6.22	14.19	-3.19	15.49	66.32	0.21
4900.00	0.28	216.43	4899.56	5.95	13.95	-3.27	15.16	66.90	0.15
5000.00	0.31	223.68	4999.56	5.56	13.61	-3.39	14.70	67.80	0.04
5100.00	0.47	219.42	5099.55	5.05	13.17	-3.55	14.11	69.03	0.16
5200.00	0.48	215.47	5199.55	4.39	12.67	-3.79	13.41	70.88	0.04
5300.00	0.32	220.94	5299.55	3.84	12.24	-3.99	12.83	72.60	0.16
5400.00	0.31	210.16	5399.55	3.39	11.92	-4.17	12.39	74.12	0.06
5500.00	0.57	174.02	5499.54	2.66	11.84	-4.72	12.13	77.33	0.37
5600.00	0.67	193.07	5599.54	1.59	11.76	-5.54	11.86	82.29	0.23
5700.00	0.70	187.00	5699.53	0.41	11.55	-6.38	11.56	87.97	0.08

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5800.00	0.64	183.60	5799.52	-0.75	11.44	-7.26	11.46	93.77	0.08
5900.00	0.53	179.66	5899.52	-1.77	11.41	-8.07	11.54	98.82	0.11
6000.00	0.33	186.89	5999.52	-2.51	11.38	-8.66	11.65	102.46	0.21
6100.00	0.50	190.63	6099.51	-3.23	11.26	-9.17	11.71	106.00	0.18
6200.00	0.51	213.21	6199.51	-4.03	10.94	-9.64	11.66	110.25	0.20
6300.00	0.35	215.72	6299.51	-4.66	10.51	-9.90	11.50	113.89	0.16
6400.00	0.67	247.90	6399.50	-5.13	9.79	-9.86	11.05	117.65	0.42
6500.00	0.80	259.16	6499.49	-5.48	8.56	-9.43	10.16	122.63	0.19
6600.00	1.17	268.36	6599.48	-5.64	6.85	-8.57	8.88	129.45	0.40
6700.00	1.01	266.65	6699.46	-5.72	4.95	-7.53	7.57	139.12	0.16
6800.00	1.10	272.28	6799.44	-5.73	3.11	-6.47	6.52	151.51	0.13
6900.00	1.07	242.33	6899.43	-6.13	1.33	-5.76	6.27	167.75	0.56
7000.00	1.02	220.02	6999.41	-7.25	-0.07	-5.86	7.25	180.55	0.41
7100.00	1.15	205.98	7099.39	-8.83	-1.08	-6.56	8.90	187.00	0.30
7200.00	0.99	204.88	7199.38	-10.52	-1.89	-7.46	10.69	190.17	0.17
7300.00	0.80	171.23	7299.36	-11.99	-2.14	-8.51	12.18	190.14	0.55
7400.00	1.12	129.17	7399.35	-13.30	-1.28	-10.08	13.36	185.50	0.75
7500.00	1.59	125.88	7499.32	-14.72	0.60	-12.33	14.74	177.67	0.47
7600.00	2.02	130.52	7599.27	-16.68	3.06	-15.35	16.96	169.61	0.46
7700.00	1.99	125.83	7699.21	-18.84	5.81	-18.71	19.72	162.87	0.17
7800.00	2.05	131.23	7799.15	-21.04	8.57	-22.10	22.72	157.85	0.20
7900.00	1.74	131.02	7899.10	-23.22	11.06	-25.32	25.72	154.53	0.31
7966.00	1.62	141.73	7965.07	-24.61	12.39	-27.23	27.56	153.27	0.51



Vaughn Energy Services
Gardendale, Texas
432-563-5444
Surveyor: Seth Hardin
Irwin 13 Fed #4

