

Results of Directional Survey

API number:	30-025-40475		
OGRID:		Operator:	CIMAREX ENERGY CO. OF COLORADO
		Property:	HALLERTA 4 FEDERAL # 4H

surface	ULSTR:	A	04	T 26S	R 32E
				330 FNL	660 FEL

BH Loc	ULSTR:	P	04	T 26S	R 32E
13484	MD	9109.5	TVD	271 FSL	889 FEL
				5009 FNL	

Top Perf/OH	ULSTR:	A	04	T 26S	R 32E
9073	MD	9010.2	TVD	638 FNL	678 FEL

Bot Perf/OH	ULSTR:	P	04	T 26S	R 32E
13481	MD	9109.7	TVD	274 FSL	889 FEL
				5006 FNL	

	MD	N/S	E/W	VD
	9042	-285.58	-16.07	8988.81
TOP PERFS/OH	9073	-307.90	-18.47	9010.18
	9074	-308.62	-18.55	9010.87
	13430	-4625.39	-227.33	9112.35
BOT PERFS/OH	13481	-4676.31	-228.76	9109.69
	13484	-4679.30	-228.84	9109.53

NEXT TO LAST	13430	-4625.39	-227.33	9112.35
LAST READING	13484	-4679.30	-228.84	9109.53
TD	13484	-4679.30	-228.84	9109.53

Surface Location	330	FN	660	FE
Projected BHL	5009	FN	889	FE
Location of				
Top Perfs/OH	638	FN	678	FE
Bottom Perfs/OH	5006	FN	889	FE

SUMMARY of Subsurface Locations

Surface Location	A-04-26S-32E	330	FN	660	FE	Vert. Depth
Top Perfs/OH	A-04-26S-32E	638	FN	678	FE	9010.18
Bottom Perfs/OH	P-04-26S-32E	5006	FN	889	FE	9109.69
Projected TD	P-04-26S-32E	5009	FN	889	FE	9109.53



Actual Wellpath Report

No. 4H ST 01 AWP

Page 1 of 6



REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Lea County, NM	Well	No. 4H ST 01
Field	(Hallertau) Sec 4, T26S, R32E	Wellbore	No. 4H ST 01 AWB
Facility	Hallertau 4 Federal No. 4H	Sidetrack from	No. 4H AWB at 5996.60 MD

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	Harrkol
Scale	0.999957	Report Generated	7/18/2012 at 10:33:38 AM
Convergence at slot	0.35° East	Database/Source file	WA Midland/No. 4H_ST_01_AWB.xml

WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	0.00	0.00	745669.47	393012.62	32°04'43.514"N	103°40'25.012"W
Facility Reference Pt			745669.47	393012.62	32°04'43.514"N	103°40'25.012"W
Field Reference Pt			745669.47	393012.62	32°04'43.514"N	103°40'25.012"W

WELLPATH DATUM

Calculation method	Minimum curvature	Cactus 101 (RT) to Facility Vertical Datum	19.00ft
Horizontal Reference Pt	Slot	Cactus 101 (RT) to Mean Sea Level	3331.00ft
Vertical Reference Pt	Cactus 101 (RT)	Cactus 101 (RT) to Mud Line at Slot (No. 4H SHL)	19.00ft
MD Reference Pt	Cactus 101 (RT)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	182.89°



Actual Wellpath Report

No. 4H ST 01 AWP
Page 2 of 6



REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Lea County, NM	Well	No. 4H ST 01
Field	(Hallertau) Sec 4, T26S, R32E	Wellbore	No. 4H ST 01 AWB
Facility	Hallertau 4 Federal No. 4H	Sidetrack from	No. 4H AWB at 5996.60 MD

WELLPATH DATA (168 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]	Comments
0.00	0.000	186.580	0.00	0.00	0.00	0.00	745669.47	393012.62	32°04'43.514"N	103°40'25.012"W	0.00	
51.00	0.560	186.580	51.00	0.25	-0.25	-0.03	745669.44	393012.37	32°04'43.511"N	103°40'25.012"W	1.10	
146.90	0.990	192.510	146.89	1.53	-1.52	-0.26	745669.21	393011.10	32°04'43.499"N	103°40'25.015"W	0.46	
241.30	1.190	192.850	241.27	3.30	-3.27	-0.66	745668.81	393009.35	32°04'43.482"N	103°40'25.020"W	0.21	
335.60	1.310	193.870	335.55	5.33	-5.28	-1.13	745668.34	393007.35	32°04'43.462"N	103°40'25.026"W	0.13	
429.90	1.500	194.770	429.82	7.59	-7.51	-1.71	745667.76	393005.11	32°04'43.440"N	103°40'25.032"W	0.20	
524.30	1.530	198.730	524.19	10.01	-9.90	-2.43	745667.04	393002.72	32°04'43.416"N	103°40'25.041"W	0.12	
618.60	1.700	201.270	618.45	12.55	-12.40	-3.34	745666.13	393000.22	32°04'43.391"N	103°40'25.052"W	0.20	
713.00	2.310	211.340	712.79	15.55	-15.33	-4.83	745664.64	392997.29	32°04'43.363"N	103°40'25.069"W	0.74	
807.40	2.490	219.530	807.11	18.87	-18.54	-7.13	745662.34	392994.09	32°04'43.331"N	103°40'25.096"W	0.41	
901.70	2.530	221.370	901.32	22.14	-21.68	-9.81	745659.66	392990.94	32°04'43.300"N	103°40'25.128"W	0.10	
996.00	2.640	216.910	995.52	25.57	-24.98	-12.49	745656.98	392987.65	32°04'43.268"N	103°40'25.159"W	0.24	
1090.40	2.950	204.710	1089.81	29.63	-28.92	-14.81	745654.66	392983.70	32°04'43.229"N	103°40'25.186"W	0.71	
1184.80	2.840	212.470	1184.09	33.92	-33.10	-17.08	745652.39	392979.52	32°04'43.187"N	103°40'25.213"W	0.43	
1279.10	2.910	219.600	1278.27	37.87	-36.92	-19.86	745649.61	392975.71	32°04'43.150"N	103°40'25.245"W	0.39	
1373.50	2.620	224.560	1372.56	41.40	-40.30	-22.90	745646.57	392972.32	32°04'43.117"N	103°40'25.281"W	0.40	
1467.80	1.840	230.600	1466.79	44.03	-42.80	-25.58	745643.89	392969.83	32°04'43.092"N	103°40'25.312"W	0.86	
1562.20	1.100	247.750	1561.16	45.44	-44.10	-27.59	745641.88	392968.52	32°04'43.079"N	103°40'25.336"W	0.90	
1656.50	1.080	252.710	1655.44	46.13	-44.71	-29.28	745640.19	392967.91	32°04'43.073"N	103°40'25.355"W	0.10	
1750.80	0.210	298.910	1749.74	46.36	-44.89	-30.28	745639.19	392967.73	32°04'43.072"N	103°40'25.367"W	1.00	
1845.20	1.040	26.360	1844.13	45.50	-44.04	-30.05	745639.42	392968.58	32°04'43.080"N	103°40'25.364"W	1.11	
1939.60	1.500	18.690	1938.51	43.52	-42.10	-29.27	745640.20	392970.52	32°04'43.099"N	103°40'25.355"W	0.52	
2033.90	1.090	19.370	2032.78	41.47	-40.08	-28.58	745640.89	392972.54	32°04'43.119"N	103°40'25.347"W	0.44	
2128.30	0.280	355.870	2127.18	40.38	-39.01	-28.30	745641.17	392973.62	32°04'43.130"N	103°40'25.344"W	0.89	
2222.60	0.050	303.990	2221.48	40.13	-38.75	-28.35	745641.12	392973.87	32°04'43.132"N	103°40'25.344"W	0.27	
2316.90	0.130	124.130	2315.78	40.17	-38.79	-28.30	745641.17	392973.83	32°04'43.132"N	103°40'25.344"W	0.19	
2411.30	0.370	101.580	2410.18	40.27	-38.91	-27.91	745641.56	392973.71	32°04'43.131"N	103°40'25.339"W	0.27	
2505.70	0.500	99.920	2504.57	40.37	-39.04	-27.21	745642.27	392973.58	32°04'43.129"N	103°40'25.331"W	0.14	
2600.00	0.490	94.610	2598.87	40.43	-39.15	-26.40	745643.07	392973.47	32°04'43.128"N	103°40'25.322"W	0.05	
2694.30	0.480	100.850	2693.17	40.50	-39.25	-25.61	745643.86	392973.37	32°04'43.127"N	103°40'25.312"W	0.06	
2788.70	0.620	115.380	2787.56	40.75	-39.55	-24.76	745644.71	392973.07	32°04'43.124"N	103°40'25.303"W	0.21	
2883.10	0.660	127.420	2881.96	41.25	-40.10	-23.86	745645.61	392972.52	32°04'43.119"N	103°40'25.292"W	0.15	
2977.40	0.600	129.840	2976.25	41.85	-40.74	-23.05	745646.42	392971.88	32°04'43.112"N	103°40'25.283"W	0.07	
3071.80	0.520	117.890	3070.65	42.33	-41.26	-22.30	745647.17	392971.36	32°04'43.107"N	103°40'25.274"W	0.15	
3166.10	0.700	102.090	3164.94	42.60	-41.58	-21.35	745648.12	392971.04	32°04'43.104"N	103°40'25.263"W	0.26	
3260.40	1.030	90.930	3259.23	42.67	-41.72	-19.94	745649.53	392970.91	32°04'43.102"N	103°40'25.247"W	0.39	
3354.80	1.060	84.250	3353.61	42.51	-41.64	-18.23	745651.24	392970.98	32°04'43.103"N	103°40'25.227"W	0.13	
3449.20	0.860	80.670	3448.00	42.23	-41.44	-16.66	745652.81	392971.18	32°04'43.105"N	103°40'25.209"W	0.22	
3543.50	0.540	85.960	3542.29	42.02	-41.29	-15.52	745653.95	392971.33	32°04'43.106"N	103°40'25.195"W	0.35	
3637.80	0.370	77.480	3636.59	41.89	-41.20	-14.78	745654.69	392971.43	32°04'43.107"N	103°40'25.187"W	0.19	
3732.20	0.340	69.860	3730.99	41.70	-41.03	-14.22	745655.25	392971.59	32°04'43.109"N	103°40'25.180"W	0.06	
3826.60	0.320	61.000	3825.39	41.45	-40.81	-13.72	745655.75	392971.81	32°04'43.111"N	103°40'25.174"W	0.06	
3920.90	0.570	95.230	3919.68	41.33	-40.72	-13.03	745656.45	392971.90	32°04'43.112"N	103°40'25.166"W	0.38	
4015.30	0.840	104.160	4014.08	41.48	-40.94	-11.89	745657.58	392971.69	32°04'43.110"N	103°40'25.153"W	0.31	
4109.60	0.910	105.470	4108.37	41.78	-41.31	-10.50	745658.98	392971.32	32°04'43.106"N	103°40'25.137"W	0.08	



Actual Wellpath Report

No. 4H ST 01 AWP

Page 3 of 6



REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Lea County, NM	Well	No. 4H ST 01
Field	(Hallertau) Sec 4, T26S, R32E	Wellbore	No. 4H ST 01 AWB
Facility	Hallertau 4 Federal No. 4H	Sidetrack from	No. 4H AWB at 5996.60 MD

WELLPATH DATA (168 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]	Comments
4203.90	1.030	114.910	4202.65	42.26	-41.86	-9.00	745660.47	392970.76	32°04'43.100"N	103°40'25.120"W	0.21	
4298.30	1.150	126.980	4297.04	43.11	-42.79	-7.48	745661.99	392969.83	32°04'43.091"N	103°40'25.102"W	0.27	
4392.60	0.770	131.720	4391.32	44.04	-43.78	-6.25	745663.22	392968.84	32°04'43.081"N	103°40'25.088"W	0.41	
4487.00	0.530	129.580	4485.72	44.70	-44.48	-5.44	745664.03	392968.14	32°04'43.074"N	103°40'25.078"W	0.26	
4581.40	0.220	140.820	4580.11	45.09	-44.90	-4.99	745664.48	392967.72	32°04'43.070"N	103°40'25.073"W	0.34	
4675.70	0.190	161.490	4674.41	45.37	-45.19	-4.82	745664.65	392967.43	32°04'43.067"N	103°40'25.071"W	0.08	
4770.10	0.130	150.000	4768.81	45.61	-45.43	-4.72	745664.75	392967.19	32°04'43.065"N	103°40'25.070"W	0.07	
4864.40	0.340	158.490	4863.11	45.95	-45.78	-4.57	745664.90	392966.84	32°04'43.061"N	103°40'25.068"W	0.23	
4958.80	0.410	162.760	4957.51	46.53	-46.37	-4.36	745665.11	392966.26	32°04'43.055"N	103°40'25.066"W	0.08	
5053.10	0.600	170.770	5051.81	47.33	-47.17	-4.18	745665.29	392965.45	32°04'43.047"N	103°40'25.064"W	0.21	
5147.40	0.620	186.290	5146.10	48.32	-48.17	-4.16	745665.31	392964.45	32°04'43.038"N	103°40'25.064"W	0.18	
5241.80	0.740	194.360	5240.49	49.42	-49.27	-4.37	745665.10	392963.35	32°04'43.027"N	103°40'25.066"W	0.16	
5336.10	0.700	198.730	5334.79	50.58	-50.40	-4.70	745664.77	392962.22	32°04'43.015"N	103°40'25.070"W	0.07	
5430.50	0.670	200.740	5429.18	51.66	-51.47	-5.08	745664.39	392961.16	32°04'43.005"N	103°40'25.075"W	0.04	
5524.90	0.850	209.550	5523.57	52.81	-52.59	-5.62	745663.85	392960.03	32°04'42.994"N	103°40'25.081"W	0.23	
5619.20	0.920	214.980	5617.86	54.07	-53.82	-6.40	745663.07	392958.80	32°04'42.982"N	103°40'25.090"W	0.12	
5713.60	0.880	215.310	5712.25	55.33	-55.03	-7.26	745662.21	392957.59	32°04'42.970"N	103°40'25.100"W	0.04	
5807.90	0.890	214.800	5806.54	56.56	-56.22	-8.09	745661.38	392956.40	32°04'42.958"N	103°40'25.110"W	0.01	
5902.30	1.050	210.560	5900.92	57.95	-57.57	-8.95	745660.52	392955.05	32°04'42.945"N	103°40'25.120"W	0.19	
5996.60	0.960	204.050	5995.21	59.45	-59.04	-9.71	745659.76	392953.59	32°04'42.930"N	103°40'25.129"W	0.15	
6024.00	1.600	196.400	6022.60	60.04	-59.61	-9.91	745659.56	392953.01	32°04'42.925"N	103°40'25.131"W	2.41	
6059.00	2.800	182.300	6057.58	61.37	-60.94	-10.09	745659.38	392951.69	32°04'42.912"N	103°40'25.134"W	3.74	
6091.00	4.700	182.100	6089.51	63.46	-63.03	-10.17	745659.30	392949.60	32°04'42.891"N	103°40'25.135"W	5.94	
6122.00	5.600	180.600	6120.38	66.24	-65.81	-10.23	745659.24	392946.81	32°04'42.863"N	103°40'25.136"W	2.94	
6154.00	5.900	180.200	6152.22	69.44	-69.01	-10.25	745659.22	392943.61	32°04'42.832"N	103°40'25.136"W	0.95	
6186.00	6.100	180.400	6184.05	72.79	-72.36	-10.27	745659.20	392940.26	32°04'42.799"N	103°40'25.137"W	0.63	
6250.00	6.000	180.500	6247.69	79.52	-79.10	-10.32	745659.15	392933.52	32°04'42.732"N	103°40'25.138"W	0.16	
6313.00	5.000	178.600	6310.40	85.55	-85.14	-10.28	745659.19	392927.48	32°04'42.672"N	103°40'25.138"W	1.61	
6377.00	3.100	187.000	6374.24	90.06	-89.65	-10.43	745659.04	392922.98	32°04'42.627"N	103°40'25.140"W	3.10	
6408.00	2.800	183.100	6405.19	91.65	-91.24	-10.57	745658.90	392921.39	32°04'42.612"N	103°40'25.141"W	1.16	
6504.00	1.300	183.100	6501.13	95.09	-94.67	-10.75	745658.72	392917.96	32°04'42.578"N	103°40'25.144"W	1.56	
6600.00	0.400	151.700	6597.12	96.46	-96.05	-10.65	745658.82	392916.58	32°04'42.564"N	103°40'25.143"W	1.02	
6695.00	0.300	138.900	6692.12	96.93	-96.53	-10.33	745659.14	392916.10	32°04'42.559"N	103°40'25.139"W	0.13	
6790.00	0.300	140.200	6787.12	97.29	-96.91	-10.01	745659.46	392915.72	32°04'42.556"N	103°40'25.135"W	0.01	
6885.00	0.100	173.900	6882.12	97.55	-97.18	-9.84	745659.63	392915.45	32°04'42.553"N	103°40'25.133"W	0.24	
6980.00	0.200	211.100	6977.12	97.78	-97.40	-9.92	745659.55	392915.22	32°04'42.551"N	103°40'25.134"W	0.14	
7075.00	0.400	194.800	7072.11	98.25	-97.87	-10.09	745659.38	392914.76	32°04'42.546"N	103°40'25.136"W	0.23	
7171.00	0.100	270.200	7168.11	98.58	-98.19	-10.26	745659.21	392914.43	32°04'42.543"N	103°40'25.138"W	0.40	
7266.00	0.400	257.300	7263.11	98.68	-98.26	-10.67	745658.80	392914.36	32°04'42.542"N	103°40'25.143"W	0.32	
7361.00	0.300	210.300	7358.11	98.99	-98.55	-11.11	745658.36	392914.07	32°04'42.539"N	103°40'25.148"W	0.31	
7457.00	0.400	228.000	7454.11	99.44	-98.99	-11.49	745657.98	392913.63	32°04'42.535"N	103°40'25.153"W	0.15	
7552.00	0.300	153.100	7549.11	99.89	-99.44	-11.62	745657.85	392913.19	32°04'42.531"N	103°40'25.154"W	0.46	
7647.00	0.200	122.800	7644.11	100.19	-99.75	-11.37	745658.10	392912.88	32°04'42.528"N	103°40'25.151"W	0.17	
7743.00	0.500	211.900	7740.11	100.64	-100.19	-11.45	745658.02	392912.43	32°04'42.523"N	103°40'25.152"W	0.56	
7838.00	1.300	122.900	7835.10	101.54	-101.13	-10.77	745658.70	392911.49	32°04'42.514"N	103°40'25.144"W	1.46	



Actual Wellpath Report

No. 4H ST 01 AWP
Page 4 of 6



REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Lea County, NM	Well	No. 4H ST 01
Field	(Hallertau) Sec 4, T26S, R32E	Wellbore	No. 4H ST 01 AWB
Facility	Hallertau 4 Federal No. 4H	Sidetrack from	No. 4H AWB at 5996.60 MD

WELLPATH DATA (168 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]	Comments
7933.00	0.900	99.800	7930.08	102.17	-101.84	-9.13	745660.34	392910.78	32°04'42.507"N	103°40'25.125"W	0.62	
8028.00	0.700	105.700	8025.07	102.39	-102.13	-7.83	745661.64	392910.50	32°04'42.504"N	103°40'25.110"W	0.23	
8123.00	0.600	97.100	8120.06	102.56	-102.35	-6.78	745662.69	392910.28	32°04'42.502"N	103°40'25.098"W	0.15	
8218.00	0.800	111.300	8215.06	102.80	-102.65	-5.67	745663.80	392909.98	32°04'42.499"N	103°40'25.085"W	0.28	
8314.00	0.700	144.700	8311.05	103.48	-103.37	-4.71	745664.76	392909.26	32°04'42.491"N	103°40'25.074"W	0.46	
8409.00	0.700	156.300	8406.04	104.45	-104.37	-4.14	745665.33	392908.25	32°04'42.481"N	103°40'25.068"W	0.15	
8505.00	0.600	145.300	8502.04	105.37	-105.32	-3.62	745665.85	392907.30	32°04'42.472"N	103°40'25.062"W	0.17	
8550.00	0.600	159.500	8547.03	105.78	-105.74	-3.40	745666.07	392906.89	32°04'42.468"N	103°40'25.059"W	0.33	
8599.00	1.400	165.600	8596.02	106.58	-106.56	-3.16	745666.31	392906.07	32°04'42.460"N	103°40'25.056"W	1.64	
8630.00	3.900	173.500	8626.99	107.99	-107.97	-2.95	745666.52	392904.65	32°04'42.446"N	103°40'25.054"W	8.13	
8662.00	7.800	175.400	8658.82	111.21	-111.22	-2.65	745666.82	392901.40	32°04'42.414"N	103°40'25.051"W	12.20	
8694.00	12.000	178.200	8690.33	116.68	-116.71	-2.37	745667.10	392895.91	32°04'42.359"N	103°40'25.048"W	13.21	
8726.00	15.600	180.700	8721.40	124.30	-124.34	-2.32	745667.15	392888.28	32°04'42.284"N	103°40'25.048"W	11.40	
8757.00	19.300	182.600	8750.97	133.59	-133.63	-2.60	745666.87	392878.99	32°04'42.192"N	103°40'25.052"W	12.07	
8789.00	22.300	183.000	8780.88	144.95	-144.98	-3.16	745666.31	392867.65	32°04'42.080"N	103°40'25.059"W	9.39	
8820.00	25.600	183.500	8809.21	157.54	-157.54	-3.88	745665.59	392855.09	32°04'41.955"N	103°40'25.068"W	10.67	
8851.00	28.400	185.900	8836.83	171.60	-171.56	-5.04	745664.43	392841.06	32°04'41.817"N	103°40'25.083"W	9.69	
8883.00	31.300	187.300	8864.58	187.49	-187.38	-6.88	745662.59	392825.25	32°04'41.660"N	103°40'25.105"W	9.32	
8915.00	34.200	185.800	8891.49	204.76	-204.58	-8.85	745660.62	392808.05	32°04'41.490"N	103°40'25.129"W	9.41	
8947.00	37.400	184.400	8917.44	223.46	-223.22	-10.50	745658.97	392789.41	32°04'41.306"N	103°40'25.150"W	10.32	
8979.00	40.500	183.900	8942.33	243.57	-243.28	-11.96	745657.51	392769.35	32°04'41.107"N	103°40'25.168"W	9.74	
9010.00	42.200	186.000	8965.60	264.04	-263.68	-13.73	745655.74	392748.95	32°04'40.906"N	103°40'25.190"W	7.08	
9042.00	44.800	186.200	8988.81	286.03	-285.58	-16.07	745653.40	392727.05	32°04'40.689"N	103°40'25.219"W	8.14	
9074.00	48.000	186.100	9010.87	309.16	-308.62	-18.55	745650.92	392704.02	32°04'40.461"N	103°40'25.250"W	10.00	
9106.00	51.200	185.200	9031.61	333.50	-332.87	-20.95	745648.52	392679.77	32°04'40.221"N	103°40'25.279"W	10.23	
9138.00	54.700	184.800	9050.89	359.02	-358.30	-23.17	745646.30	392654.33	32°04'39.970"N	103°40'25.307"W	10.98	
9170.00	58.600	183.100	9068.48	385.74	-384.97	-25.00	745644.47	392627.67	32°04'39.706"N	103°40'25.330"W	12.97	
9202.00	62.400	183.000	9084.23	413.58	-412.77	-26.48	745642.99	392599.87	32°04'39.431"N	103°40'25.349"W	11.88	
9234.00	66.000	182.600	9098.16	442.39	-441.54	-27.89	745641.58	392571.10	32°04'39.146"N	103°40'25.368"W	11.31	
9265.00	69.500	183.000	9109.89	471.08	-470.20	-29.29	745640.18	392542.44	32°04'38.863"N	103°40'25.386"W	11.35	
9297.00	73.600	183.000	9120.02	501.42	-500.50	-30.88	745638.59	392512.14	32°04'38.563"N	103°40'25.406"W	12.81	
9329.00	77.900	182.600	9127.89	532.43	-531.47	-32.39	745637.08	392481.17	32°04'38.257"N	103°40'25.426"W	13.49	
9361.00	82.200	182.600	9133.42	563.94	-562.95	-33.82	745635.65	392449.69	32°04'37.945"N	103°40'25.445"W	13.44	
9393.00	87.700	183.100	9136.24	595.81	-594.78	-35.41	745634.06	392417.87	32°04'37.631"N	103°40'25.466"W	17.26	
9418.00	91.200	183.800	9136.48	620.80	-619.73	-36.91	745632.56	392392.92	32°04'37.384"N	103°40'25.485"W	14.28	
9514.00	93.000	184.600	9132.96	716.71	-715.40	-43.94	745625.53	392297.25	32°04'36.438"N	103°40'25.574"W	2.05	
9610.00	92.200	184.300	9128.61	812.57	-811.01	-51.38	745618.09	392201.65	32°04'35.492"N	103°40'25.667"W	0.89	
9705.00	88.900	183.200	9127.69	907.54	-905.79	-57.59	745611.88	392106.87	32°04'34.554"N	103°40'25.746"W	3.66	
9801.00	90.300	183.700	9128.36	1003.53	-1001.61	-63.37	745606.11	392011.06	32°04'33.607"N	103°40'25.820"W	1.55	
9896.00	89.700	183.300	9128.36	1098.52	-1096.43	-69.17	745600.31	391916.24	32°04'32.669"N	103°40'25.894"W	0.76	
9992.00	90.500	182.700	9128.20	1194.52	-1192.30	-74.19	745595.28	391820.37	32°04'31.720"N	103°40'25.959"W	1.04	
10087.00	89.500	182.200	9128.20	1289.52	-1287.21	-78.25	745591.22	391725.47	32°04'30.781"N	103°40'26.013"W	1.18	
10182.00	89.800	181.900	9128.78	1384.51	-1382.15	-81.65	745587.82	391630.53	32°04'29.842"N	103°40'26.059"W	0.45	
10278.00	90.100	181.000	9128.86	1480.48	-1478.12	-84.08	745585.39	391534.57	32°04'28.893"N	103°40'26.094"W	0.99	
10374.00	91.400	180.000	9127.60	1576.38	-1574.10	-84.92	745584.56	391438.59	32°04'27.943"N	103°40'26.111"W	1.71	



Actual Wellpath Report

No. 4H ST 01 AWP

Page 5 of 6



REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Lea County, NM	Well	No. 4H ST 01
Field	(Hallertau) Sec 4, T26S, R32E	Wellbore	No. 4H ST 01 AWB
Facility	Hallertau 4 Federal No. 4H	Sidetrack from	No. 4H AWB at 5996.60 MD

WELLPATH DATA (168 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]	Comments
10469.00	90.000	181.800	9126.44	1671.31	-1669.08	-86.41	745583.07	391343.62	32°04'27.003"N	103°40'26.135"W	2.40	
10565.00	90.900	182.400	9125.69	1767.30	-1765.01	-89.93	745579.55	391247.69	32°04'26.054"N	103°40'26.183"W	1.13	
10660.00	90.000	181.900	9124.94	1862.28	-1859.94	-93.49	745575.98	391152.77	32°04'25.115"N	103°40'26.231"W	1.08	
10755.00	87.900	180.900	9126.68	1957.23	-1954.89	-95.81	745573.66	391057.82	32°04'24.176"N	103°40'26.264"W	2.45	
10851.00	89.500	180.300	9128.86	2053.12	-2050.85	-96.82	745572.66	390961.86	32°04'23.226"N	103°40'26.283"W	1.78	
10947.00	90.500	179.200	9128.86	2148.98	-2146.85	-96.40	745573.08	390865.87	32°04'22.276"N	103°40'26.285"W	1.55	
11042.00	90.400	180.800	9128.12	2243.85	-2241.84	-96.40	745573.08	390770.88	32°04'21.336"N	103°40'26.292"W	1.69	
11137.00	90.000	182.400	9127.78	2338.82	-2336.80	-99.05	745570.42	390675.92	32°04'20.397"N	103°40'26.329"W	1.74	
11233.00	88.500	183.200	9129.04	2434.81	-2432.67	-103.74	745565.74	390580.05	32°04'19.448"N	103°40'26.390"W	1.77	
11329.00	91.700	183.400	9128.87	2530.80	-2528.50	-109.26	745560.21	390484.23	32°04'18.501"N	103°40'26.461"W	3.34	
11424.00	91.900	184.100	9125.89	2625.74	-2623.25	-115.47	745554.00	390389.49	32°04'17.563"N	103°40'26.540"W	0.77	
11520.00	90.900	185.100	9123.54	2721.66	-2718.91	-123.17	745546.30	390293.83	32°04'16.617"N	103°40'26.637"W	1.47	
11615.00	91.000	183.700	9121.97	2816.62	-2813.62	-130.46	745539.02	390199.13	32°04'15.681"N	103°40'26.728"W	1.48	
11710.00	91.900	182.100	9119.56	2911.58	-2908.46	-135.26	745534.21	390104.29	32°04'14.742"N	103°40'26.791"W	1.93	
11805.00	90.500	182.800	9117.58	3006.55	-3003.35	-139.32	745530.15	390009.41	32°04'13.804"N	103°40'26.845"W	1.65	
11901.00	92.400	182.900	9115.15	3102.52	-3099.20	-144.09	745525.38	389913.56	32°04'12.856"N	103°40'26.907"W	1.98	
11996.00	91.800	183.100	9111.66	3197.46	-3194.00	-149.06	745520.41	389818.76	32°04'11.918"N	103°40'26.971"W	0.67	
12091.00	92.200	184.500	9108.35	3292.38	-3288.73	-155.35	745514.12	389724.04	32°04'10.981"N	103°40'27.051"W	1.53	
12186.00	89.500	183.600	9106.94	3387.34	-3383.48	-162.06	745507.41	389629.30	32°04'10.044"N	103°40'27.136"W	3.00	
12281.00	92.700	184.100	9105.12	3482.30	-3478.23	-168.44	745501.04	389534.55	32°04'09.106"N	103°40'27.217"W	3.41	
12376.00	90.300	183.200	9102.63	3577.25	-3573.00	-174.48	745494.99	389439.78	32°04'08.169"N	103°40'27.294"W	2.70	
12472.00	89.100	183.700	9103.13	3673.24	-3668.82	-180.26	745489.22	389343.97	32°04'07.221"N	103°40'27.367"W	1.35	
12567.00	90.000	183.900	9103.88	3768.23	-3763.61	-186.56	745482.92	389249.18	32°04'06.284"N	103°40'27.447"W	0.97	
12662.00	89.300	184.000	9104.46	3863.21	-3858.38	-193.10	745476.38	389154.41	32°04'05.346"N	103°40'27.530"W	0.74	
12758.00	89.300	183.100	9105.63	3959.19	-3954.19	-199.04	745470.43	389058.61	32°04'04.399"N	103°40'27.606"W	0.94	
12852.00	90.100	182.600	9106.12	4053.19	-4048.07	-203.72	745465.76	388964.73	32°04'03.470"N	103°40'27.667"W	1.00	
12948.00	88.100	182.700	9107.63	4149.17	-4143.95	-208.16	745461.32	388868.86	32°04'02.521"N	103°40'27.725"W	2.09	
13043.00	89.700	182.400	9109.46	4244.15	-4238.83	-212.38	745457.10	388773.98	32°04'01.583"N	103°40'27.781"W	1.71	
13138.00	87.600	183.100	9111.69	4339.12	-4333.69	-216.94	745452.54	388679.12	32°04'00.644"N	103°40'27.841"W	2.33	
13233.00	88.800	182.100	9114.68	4434.07	-4428.55	-221.24	745448.24	388584.27	32°03'59.706"N	103°40'27.898"W	1.64	
13329.00	90.400	181.700	9115.35	4530.05	-4524.49	-224.43	745445.05	388488.34	32°03'58.757"N	103°40'27.941"W	1.72	
13430.00	93.000	181.600	9112.35	4630.97	-4625.39	-227.33	745442.15	388387.44	32°03'57.759"N	103°40'27.982"W	2.58	
13484.00	93.000	181.600	9109.53	4684.88	-4679.30	-228.84	745440.64	388333.53	32°03'57.225"N	103°40'28.004"W	0.00	Projection to bit



Actual Wellpath Report

No. 4H ST 01 AWP
Page 6 of 6



REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Lea County, NM	Well	No. 4H ST 01
Field	(Hallertau) Sec 4, T26S, R32E	Wellbore	No. 4H ST 01 AWB
Facility	Hallertau 4 Federal No. 4H	Sidetrack from	No. 4H AWB at 5996.60 MD

TARGETS									
Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
Hallertau 4 Federal No. 4H (Rev-0)		9121.00	-4686.23	-236.48	745433.00	388326.60	32°03'57.157"N	103°40'28.093"W	rectangle

WELLPATH COMPOSITION - Ref Wellbore: No. 4H ST 01 AWB Ref Wellpath: No. 4H ST 01 AWP				
Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
0.00	5996.60	Generic gyro - northseeking (Standard)	Gyrodata / Gyros <51.00-6374.00>	No. 4H AWB
5996.60	13430.00	NaviTrak (Standard)	BHI / Navitrak MWD 8-3/4" - <6024-13430>	No. 4H ST 01 AWB
13430.00	13484.00	Blind Drilling (std)	Projection to bit	No. 4H ST 01 AWB