

30-015-37785

CIMAREX ENERGY

Shugart

Eddy County, NM

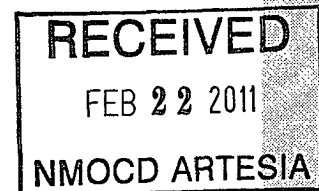
West Shugart "31" Federal Com #4

VH - Job #32K1010841

Survey: Actual

SDI Standard Survey Report

21 November, 2010



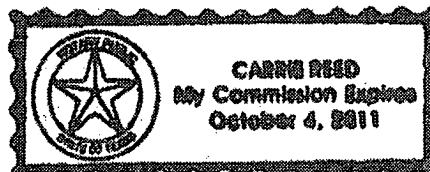
This survey is correct to the best of my knowledge and is supported by actual field data.

[Signature]

Notorized this date 22nd of November, 2010.

[Signature]

Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.
SDI Standard Survey Report

Company:	CIMAREX ENERGY	Local Co-ordinate Reference:	Well West Shugart "31" Federal Com #4
Project:	Shugart	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	West Shugart "31" Federal Com #4	North Reference:	Grid
Wellbore:	VH - Job #32K1010841	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K1010841	Database:	EDM-Regulatory

Project	Shugart		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean-Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Eddy County, NM		
Site Position:		Northing:	621,027.48 usft
From:	Lat/Long	Easting:	628,566.18 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 42' 23.780 N
		Longitude:	103° 54' 55.300 W
		Grid Convergence:	0.23 °

Well	West Shugart "31" Federal Com #4, Directional (Baker Inteq)		
Well Position	+N/-S	0.0 usft	Northing: 621,027.48 usft
	+E/-W	0.0 usft	Easting: 628,566.18 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 42' 23.780 N
		Longitude:	103° 54' 55.300 W
		Ground Level:	0.0 usft

Wellbore	VH - Job #32K1010841		
Magnetics	Model Name	Sample Date	Declination (°)
	BGGM2010	10/29/2010	7.92
			Dip Angle (°)
			60.60
			Field Strength (nT)
			48,995

Design	VH - Job #32K1010841		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction (°)
			98.34

Survey Program	Date 11/21/2010		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
100.0	8,600.0	Actual (VH - Job #32K1010841)	Keeper
			Description
			Keeper Gyro

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0	
100.0	0.14	110.70	100.0	0.0	0.1	110.70	0.1	
200.0	0.31	89.23	200.0	-0.1	0.5	99.41	0.5	
300.0	0.40	84.18	300.0	0.0	1.1	92.24	1.1	
400.0	0.28	117.60	400.0	-0.1	1.7	94.14	1.7	
500.0	0.36	132.24	500.0	-0.4	2.1	101.83	2.2	
600.0	0.52	49.64	600.0	-0.4	2.7	97.64	2.7	
700.0	0.71	355.14	700.0	0.5	3.0	79.66	3.1	
800.0	0.89	329.64	800.0	1.8	2.6	54.32	3.1	
900.0	0.80	9.39	900.0	3.2	2.3	35.49	3.9	
1,000.0	1.13	33.72	1,000.0	4.7	2.9	32.00	5.5	
1,100.0	0.90	44.81	1,099.9	6.1	4.0	33.60	7.3	

Scientific Drilling International, Inc.

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Company:	CIMAREX ENERGY	Local Co-ordinate Reference:	Well West Shugart "31" Federal Com #4
Project:	Shugart	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	West Shugart "31" Federal Com #4	North Reference:	Grid
Wellbore:	VH - Job #32K1010841	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K1010841	Database:	EDM-Regulatory

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
1,200.0	0.82	48.56	1,199.9	7.1	5.1	35.81	8.8	
1,300.0	0.91	45.87	1,299.9	8.1	6.2	37.46	10.3	
1,400.0	0.94	46.57	1,399.9	9.3	7.4	38.65	11.9	
1,500.0	1.31	41.38	1,499.9	10.7	8.8	39.35	13.8	
1,600.0	1.46	41.46	1,599.9	12.5	10.4	39.66	16.2	
1,700.0	1.75	51.20	1,699.8	14.4	12.4	40.70	19.0	
1,800.0	1.76	54.30	1,799.8	16.3	14.6	42.37	22.0	
1,900.0	1.74	55.10	1,899.7	18.0	17.3	43.86	25.0	
2,000.0	1.65	51.97	1,999.7	19.8	19.7	44.89	27.9	
2,100.0	1.65	48.94	2,099.6	21.6	21.9	45.41	30.8	
2,200.0	1.61	47.09	2,199.6	23.5	24.0	45.63	33.6	
2,300.0	1.90	44.31	2,299.5	25.6	26.2	45.63	36.7	
2,400.0	2.06	38.56	2,399.5	28.2	28.5	45.28	40.1	
2,500.0	1.45	25.21	2,499.4	30.8	30.2	44.40	43.1	
2,600.0	1.39	22.28	2,599.4	33.1	31.2	43.30	45.4	
2,700.0	1.24	26.67	2,699.4	35.1	32.1	42.41	47.6	
2,800.0	1.19	29.02	2,799.4	37.0	33.1	41.79	49.7	
2,900.0	0.87	34.19	2,899.3	38.6	34.0	41.42	51.4	
3,000.0	0.85	26.57	2,999.3	39.8	34.8	41.11	52.9	
3,100.0	0.81	25.16	3,099.3	41.2	35.4	40.71	54.3	
3,200.0	0.62	1.45	3,199.3	42.3	35.7	40.16	55.4	
3,300.0	0.49	352.53	3,299.3	43.3	35.7	39.49	56.1	
3,400.0	0.47	353.25	3,399.3	44.1	35.6	38.86	56.7	
3,500.0	0.46	340.54	3,499.3	44.9	35.4	38.24	57.2	
3,600.0	0.60	337.33	3,599.3	45.8	35.1	37.45	57.7	
3,700.0	0.56	350.80	3,699.3	46.7	34.8	36.65	58.3	
3,800.0	0.51	353.88	3,799.3	47.7	34.7	36.02	58.9	
3,900.0	0.41	310.17	3,899.3	48.3	34.3	35.38	59.3	
4,000.0	0.44	305.46	3,999.3	48.8	33.7	34.67	59.3	
4,100.0	0.53	272.30	4,099.3	49.0	33.0	33.92	59.1	
4,200.0	0.59	274.54	4,199.3	49.1	32.0	33.09	58.6	
4,300.0	0.72	280.46	4,299.3	49.2	30.9	32.08	58.1	
4,400.0	0.54	285.84	4,399.3	49.5	29.8	31.05	57.8	
4,500.0	0.38	265.91	4,499.3	49.6	29.0	30.33	57.5	
4,600.0	0.47	255.90	4,599.3	49.5	28.3	29.76	57.0	
4,700.0	0.44	252.00	4,699.3	49.3	27.5	29.19	56.4	
4,800.0	0.53	262.18	4,799.3	49.1	26.7	28.55	55.9	
4,900.0	0.55	266.60	4,899.2	49.0	25.8	27.74	55.3	
5,000.0	0.87	243.35	4,999.2	48.6	24.6	26.84	54.5	
5,100.0	0.84	236.81	5,099.2	47.9	23.3	25.96	53.2	
5,200.0	0.96	231.50	5,199.2	46.8	22.0	25.15	51.9	
5,300.0	0.96	230.08	5,299.2	45.9	20.7	24.32	50.4	
5,400.0	1.02	233.95	5,399.2	44.8	19.4	23.38	48.8	
5,500.0	0.91	228.28	5,499.2	43.8	18.1	22.43	47.4	

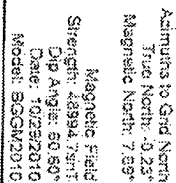
Scientific Drilling International, Inc.
SDI Standard Survey Report

Company:	CIMAREX ENERGY	Local Co-ordinate Reference:	Well West Shugart "31" Federal Com #4
Project:	Shugart	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	West Shugart "31" Federal Com #4	North Reference:	Grid
Wellbore:	VH - Job #32K1010841	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K1010841	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
5,600.0	0.94	221.61	5,598.2	42.6	16.9	21.66	45.9
5,700.0	1.04	226.08	5,699.1	41.4	15.7	20.81	44.3
5,800.0	0.99	229.38	5,799.1	40.2	14.4	19.74	42.7
5,900.0	1.04	227.53	5,899.1	39.0	13.1	18.55	41.2
6,000.0	1.71	288.99	5,999.1	38.4	10.9	15.90	39.9
6,100.0	1.85	274.58	6,099.0	38.5	7.8	11.51	39.3
6,200.0	1.79	282.75	6,199.0	39.0	4.7	6.88	39.2
6,300.0	1.82	283.32	6,298.9	39.7	1.6	2.36	39.7
6,400.0	2.08	284.91	6,398.9	40.5	-1.7	357.65	40.5
6,500.0	1.49	286.87	6,498.8	41.3	-4.7	353.57	41.6
6,600.0	1.63	278.10	6,598.8	41.9	-7.3	350.10	42.6
6,700.0	1.42	272.02	6,698.8	42.2	-10.0	346.71	43.3
6,800.0	1.38	266.44	6,798.7	42.1	-12.4	343.60	43.9
6,900.0	1.34	269.98	6,898.7	42.1	-14.8	340.65	44.6
7,000.0	1.40	301.65	6,998.7	42.7	-17.0	338.31	46.0
7,100.0	2.92	310.19	7,098.6	44.5	-19.4	336.47	48.5
7,200.0	2.19	310.29	7,198.6	46.9	-22.2	334.68	51.8
7,300.0	2.09	295.10	7,298.5	48.9	-25.3	332.85	55.0
7,400.0	2.04	297.50	7,398.4	50.5	-28.5	330.54	58.0
7,500.0	1.98	301.24	7,498.4	52.2	-31.6	328.83	61.0
7,600.0	0.89	280.25	7,598.3	53.2	-33.8	327.57	63.0
7,700.0	0.68	289.39	7,698.3	53.6	-35.1	326.74	64.0
7,800.0	0.84	348.80	7,798.3	54.5	-35.8	326.66	65.2
7,900.0	0.67	356.57	7,898.3	55.8	-38.0	327.15	66.4
8,000.0	1.20	353.45	7,998.3	57.4	-36.2	327.79	67.8
8,100.0	1.03	329.13	8,098.3	59.2	-36.7	328.18	69.7
8,200.0	1.15	275.98	8,198.3	60.1	-38.2	327.55	71.2
8,300.0	1.87	249.86	8,298.2	59.7	-40.6	325.80	72.2
8,400.0	1.58	231.26	8,398.2	59.3	-43.0	323.59	72.5
8,500.0	2.06	235.23	8,498.1	56.4	-45.6	321.08	72.5
8,600.0	2.20	241.31	8,598.1	54.5	-48.7	318.20	73.1

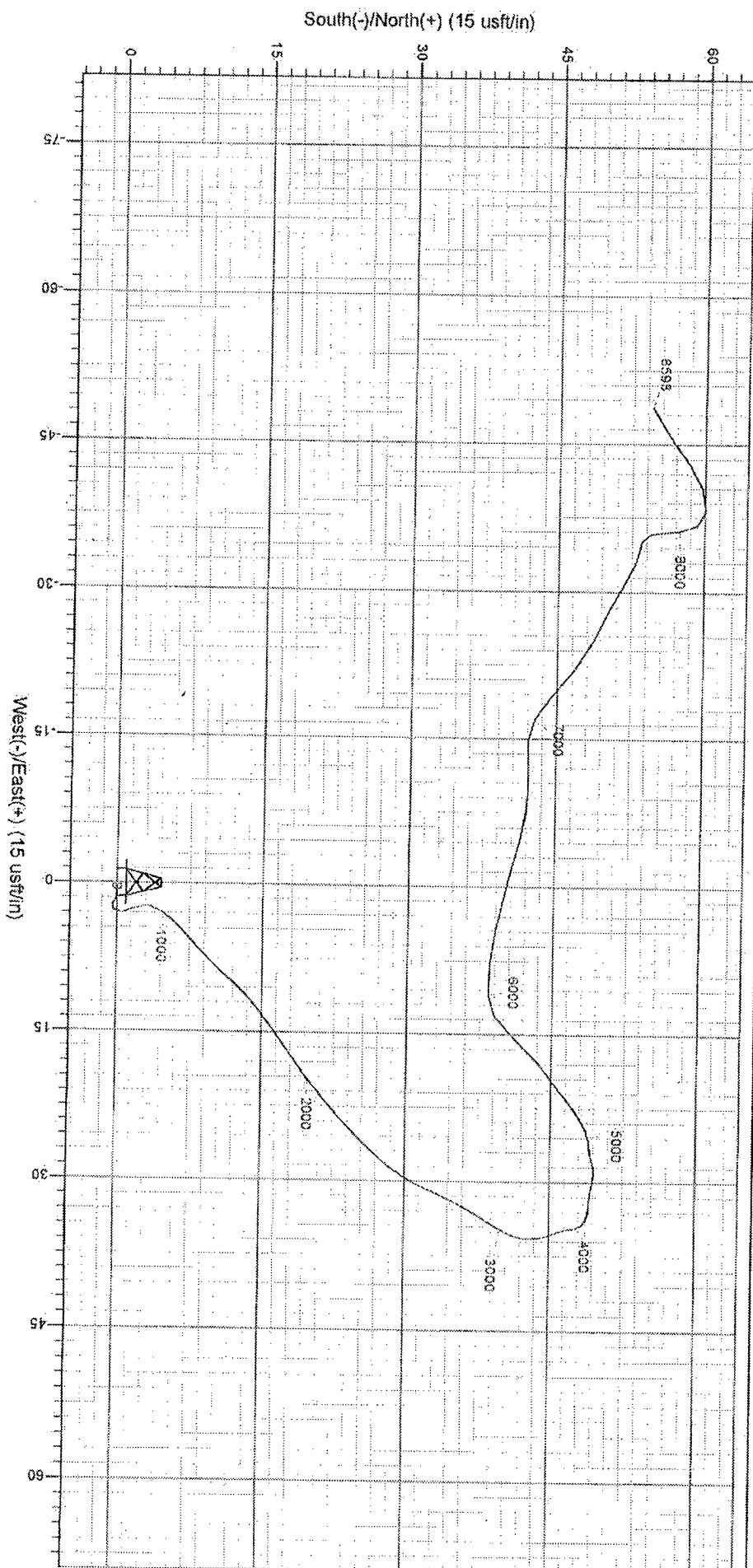


Project: Shugart
Eddy County, NM
Well: West Shugart "31" Federal Com #4
Wellbore: VH - Job #32K1010841
Design: VH - Job #32K1010841



WELL DETAILS: West Shugart "31" Federal Com #4
WELL @ 0.0ustf (Original Well Elev)

+N/-S	+E/-W	Northings	Eastings	Latitude	Longitude
0.0	0.0	621027.48	628566.18	32° 42' 23.780 N	103° 54' 55.300 W



PROJECT DETAILS: Shugart
Geodetic System: US State Plane 1927 (Exact solution)

Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level

SITE DETAILS: Eddy County, NM

Site Centre Latitude: 32° 42' 23.780 N
 Longitude: 103° 54' 55.300 W
 Positional Uncertainty: 0.0
 Convergence: 0.23
 Local North: Grid



Actual Wellpath Report

No. 4H AWP

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INTEQ

REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Eddy County, NM	Well	No. 4H
Field	(West Shugart) Sec 31, T18S, R31E	Wellbore	No. 4H AWB
Facility	West Shugart 31 Fed Com No. 4H	Sidetrack from	No. 4 AWB at 8300.00 MD

REPORT SETUP INFORMATION			
Projection System	NAD83 / TM New Mexico State Planes, Eastern Zone (3001), US feet	Software System	WellArchitect® 2.0
North Reference	Grid	User	Gomeoscr
Scale	0.999928	Report Generated	11/12/2010 at 8:07:23 AM
Convergence at slot	0.23° East	Database/Source file	WA Midland/No. 4H_AWB.xml

WELLPATH LOCATION						
	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[USft]	Northing[USft]	Latitude	Longitude
Slot Location	0.00	0.00	669901.10	621047.30	32°42'23.775"N	103°54'55.298"W
Facility Reference Pt			669901.10	621047.30	32°42'23.775"N	103°54'55.298"W
Field Reference Pt			669901.10	621047.30	32°42'23.775"N	103°54'55.298"W

WELLPATH DATUM			
Calculation method	Minimum curvature	Rig 115 on No. 4H SHL (GL) to GL	18.00ft
Horizontal Reference Pt	Slot	Rig 115 on No. 4H SHL (GL) to Mean Sea Level	3560.00ft
Vertical Reference Pt	Rig 115 on No. 4H SHL (GL)	GL to Mud Line (Facility)	0.00ft
MD Reference Pt	Rig 115 on No. 4H SHL (GL)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	98.34°



Actual Wellpath Report

No. 4H AWP

Page 2 of 6



INTEQ

REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Eddy County, NM	Well	No. 4H
Field	(West Shugart) Sec 31, T18S, R31E	Wellbore	No. 4H AWP
Facility	West Shugart 31 Fed Com No. 4H	Sidetrack from	No. 4 AWP at 8300.00 MD

WELLPATH DATA (170 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [serv ft]	Grid North [serv ft]	Latitude	Longitude	DLS [°/100ft]	Comments
0.00	0.000	110.700	0.00	0.00	0.00	0.00	669901.10	621047.30	32°42'23.775"N	103°54'55.298"W	0.00	
100.00	0.140	110.700	100.00	0.12	-0.04	0.11	669901.21	621047.26	32°42'23.774"N	103°54'55.296"W	0.14	
200.00	0.310	89.230	200.00	0.51	-0.08	0.50	669901.60	621047.22	32°42'23.774"N	103°54'55.292"W	0.19	
300.00	0.400	84.190	300.00	1.11	-0.04	1.12	669902.22	621047.26	32°42'23.774"N	103°54'55.284"W	0.10	
400.00	0.280	117.600	400.00	1.68	-0.12	1.68	669902.78	621047.18	32°42'23.773"N	103°54'55.278"W	0.23	
500.00	0.360	132.240	499.99	2.17	-0.45	2.13	669903.23	621046.85	32°42'23.770"N	103°54'55.273"W	0.11	
600.00	0.520	49.640	599.99	2.73	-0.36	2.71	669903.81	621046.94	32°42'23.771"N	103°54'55.266"W	0.59	
700.00	0.710	355.140	699.99	2.89	0.55	3.00	669904.10	621047.85	32°42'23.780"N	103°54'55.262"W	0.59	
800.00	0.890	329.640	799.98	2.26	1.84	2.56	669903.66	621049.14	32°42'23.793"N	103°54'55.268"W	0.39	
900.00	0.800	9.390	899.97	1.79	3.19	2.28	669903.38	621050.49	32°42'23.806"N	103°54'55.271"W	0.58	
1000.00	1.130	33.720	999.95	2.23	4.70	2.94	669904.04	621052.00	32°42'23.821"N	103°54'55.263"W	0.52	
1100.00	0.900	44.810	1099.94	3.12	6.08	4.04	669905.14	621053.38	32°42'23.835"N	103°54'55.250"W	0.30	
1200.00	0.820	48.560	1199.93	4.04	7.11	5.13	669906.23	621054.41	32°42'23.845"N	103°54'55.237"W	0.10	
1300.00	0.910	45.870	1299.92	4.99	8.14	6.24	669907.34	621055.44	32°42'23.855"N	103°54'55.224"W	0.10	
1400.00	0.940	46.570	1399.90	5.98	9.25	7.40	669908.50	621056.55	32°42'23.866"N	103°54'55.210"W	0.03	
1500.00	1.310	41.380	1499.88	7.11	10.68	8.75	669909.85	621057.98	32°42'23.880"N	103°54'55.195"W	0.38	
1600.00	1.460	41.460	1599.85	8.43	12.49	10.35	669911.45	621059.79	32°42'23.898"N	103°54'55.176"W	0.15	
1700.00	1.750	51.200	1699.81	10.17	14.40	12.39	669913.48	621061.70	32°42'23.917"N	103°54'55.152"W	0.40	
1800.00	1.760	54.300	1799.77	12.31	16.25	14.82	669915.92	621063.55	32°42'23.935"N	103°54'55.123"W	0.10	
1900.00	1.740	55.160	1899.72	14.52	18.02	17.32	669918.41	621065.32	32°42'23.952"N	103°54'55.094"W	0.03	
2000.00	1.650	51.970	1999.68	16.62	19.77	19.70	669920.79	621067.07	32°42'23.969"N	103°54'55.066"W	0.13	
2100.00	1.650	48.940	2099.64	18.55	21.60	21.92	669923.01	621068.90	32°42'23.988"N	103°54'55.040"W	0.09	
2200.00	1.610	47.090	2199.59	20.37	23.51	24.03	669925.13	621070.80	32°42'24.006"N	103°54'55.015"W	0.07	
2300.00	1.900	44.310	2299.55	22.22	25.65	26.22	669927.32	621072.95	32°42'24.027"N	103°54'54.990"W	0.30	
2400.00	2.060	38.560	2399.49	24.10	28.24	28.50	669929.59	621075.54	32°42'24.053"N	103°54'54.963"W	0.25	
2500.00	1.450	25.210	2499.44	25.37	30.79	30.15	669931.25	621078.09	32°42'24.078"N	103°54'54.934"W	0.73	
2600.00	1.390	22.280	2599.41	26.03	33.06	31.15	669932.25	621080.35	32°42'24.100"N	103°54'54.931"W	0.09	
2700.00	1.240	26.670	2699.38	26.66	35.15	32.10	669933.20	621082.44	32°42'24.121"N	103°54'54.920"W	0.18	
2800.00	1.190	29.020	2799.36	27.37	37.02	33.09	669934.19	621084.32	32°42'24.140"N	103°54'54.909"W	0.07	
2900.00	0.870	34.190	2899.35	28.07	38.56	34.02	669935.12	621085.85	32°42'24.155"N	103°54'54.898"W	0.33	
3000.00	0.850	26.570	2999.33	28.63	39.85	34.78	669935.87	621087.15	32°42'24.168"N	103°54'54.889"W	0.12	
3100.00	0.810	25.160	3099.32	29.07	41.15	35.41	669936.51	621088.45	32°42'24.180"N	103°54'54.881"W	0.04	
3200.00	0.620	1.450	3199.32	29.21	42.33	35.72	669936.82	621089.63	32°42'24.192"N	103°54'54.878"W	0.35	
3300.00	0.490	352.530	3299.31	29.03	43.30	35.68	669936.78	621090.59	32°42'24.202"N	103°54'54.878"W	0.16	
3400.00	0.470	353.250	3399.31	28.80	44.13	35.58	669936.68	621091.43	32°42'24.210"N	103°54'54.879"W	0.02	
3500.00	0.460	340.540	3499.30	28.51	44.91	35.40	669936.49	621092.21	32°42'24.218"N	103°54'54.881"W	0.10	
3600.00	0.600	337.330	3599.30	28.05	45.78	35.06	669936.16	621093.07	32°42'24.226"N	103°54'54.885"W	0.14	
3700.00	0.560	350.800	3699.30	27.64	46.74	34.78	669935.88	621094.04	32°42'24.236"N	103°54'54.888"W	0.14	
3800.00	0.510	353.880	3799.29	27.38	47.67	34.65	669935.75	621094.96	32°42'24.245"N	103°54'54.890"W	0.06	
3900.00	0.410	310.170	3899.29	26.96	48.34	34.33	669935.43	621095.64	32°42'24.252"N	103°54'54.893"W	0.35	
4000.00	0.440	305.460	3999.29	26.32	48.79	33.75	669934.85	621096.09	32°42'24.256"N	103°54'54.900"W	0.05	
4100.00	0.530	272.300	4099.28	25.51	49.03	32.97	669934.07	621096.33	32°42'24.258"N	103°54'54.909"W	0.29	
4200.00	0.590	274.540	4199.28	24.54	49.09	32.00	669933.10	621096.39	32°42'24.259"N	103°54'54.921"W	0.06	
4300.00	0.720	280.460	4299.27	23.40	49.25	30.87	669931.96	621096.55	32°42'24.261"N	103°54'54.934"W	0.15	
4400.00	0.540	285.840	4399.26	22.30	49.49	29.80	669930.89	621096.79	32°42'24.263"N	103°54'54.947"W	0.19	



Actual Wellpath Report

No. 4H AWP

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INTEQ

REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Eddy County, NM	Well	No. 4H
Field	(West Shugart) Sec 31, T18S, R31E	Wellbore	No. 4H AWP
Facility	West Shugart 31 Fed Com No. 4H	Sidetrack from	No. 4 AWP at 8300.00 MD

WELLPATH DATA (170 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [srv ft]	Grid North [srv ft]	Latitude	Longitude	DLS [°/100ft]	Comments
4500.00	0.380	265.910	4499.26	21.51	49.60	29.01	669930.11	621096.89	32°42'24.264"N	103°54'54.956"W	0.22	
4600.00	0.470	255.900	4599.26	20.81	49.47	28.28	669929.38	621096.77	32°42'24.263"N	103°54'54.964"W	0.12	
4700.00	0.440	252.000	4699.26	20.09	49.25	27.52	669928.62	621096.55	32°42'24.261"N	103°54'54.973"W	0.04	
4800.00	0.530	262.180	4799.25	19.30	49.07	26.70	669927.79	621096.37	32°42'24.259"N	103°54'54.983"W	0.12	
4900.00	0.550	266.600	4899.25	18.38	48.98	25.76	669926.86	621096.28	32°42'24.258"N	103°54'54.994"W	0.05	
5000.00	0.870	243.350	4999.24	17.29	48.61	24.60	669925.70	621095.91	32°42'24.255"N	103°54'55.007"W	0.42	
5100.00	0.840	236.810	5099.23	16.12	47.87	23.31	669924.41	621095.17	32°42'24.247"N	103°54'55.023"W	0.10	
5200.00	0.960	231.500	5199.22	15.00	46.95	22.04	669923.14	621094.24	32°42'24.238"N	103°54'55.037"W	0.15	
5300.00	0.960	230.080	5299.20	13.87	45.89	20.74	669921.84	621093.19	32°42'24.228"N	103°54'55.053"W	0.02	
5400.00	1.020	233.950	5399.19	12.68	44.83	19.38	669920.48	621092.12	32°42'24.217"N	103°54'55.069"W	0.09	
5500.00	0.910	228.280	5499.17	11.53	43.78	18.07	669919.17	621091.07	32°42'24.207"N	103°54'55.084"W	0.15	
5600.00	0.940	221.610	5599.16	10.57	42.63	16.93	669918.03	621089.93	32°42'24.196"N	103°54'55.097"W	0.11	
5700.00	1.040	226.080	5699.15	9.56	41.39	15.73	669916.83	621088.69	32°42'24.184"N	103°54'55.112"W	0.13	
5800.00	0.990	229.380	5799.13	8.44	40.20	14.42	669915.52	621087.50	32°42'24.172"N	103°54'55.127"W	0.08	
5900.00	1.040	227.530	5899.11	7.30	39.02	13.10	669914.20	621086.32	32°42'24.160"N	103°54'55.142"W	0.06	
6000.00	1.710	268.990	5999.09	5.25	38.38	10.94	669912.04	621085.68	32°42'24.154"N	103°54'55.168"W	1.16	
6100.00	1.850	274.580	6099.04	2.17	38.49	7.84	669908.93	621085.78	32°42'24.155"N	103°54'55.204"W	0.22	
6200.00	1.790	282.750	6198.99	-1.00	38.96	4.70	669905.80	621086.26	32°42'24.160"N	103°54'55.241"W	0.27	
6300.00	1.820	283.320	6298.94	-4.14	39.67	1.63	669902.73	621086.97	32°42'24.167"N	103°54'55.277"W	0.03	
6400.00	2.080	284.910	6398.88	-7.52	40.50	-1.66	669899.44	621087.80	32°42'24.175"N	103°54'55.315"W	0.27	
6500.00	1.490	286.870	6498.83	-10.61	41.35	-4.66	669896.44	621088.65	32°42'24.184"N	103°54'55.350"W	0.59	
6600.00	1.630	278.100	6598.79	-13.32	41.93	-7.31	669893.79	621089.22	32°42'24.190"N	103°54'55.381"W	0.28	
6700.00	1.420	272.020	6698.76	-15.97	42.17	-9.96	669891.14	621089.47	32°42'24.192"N	103°54'55.412"W	0.26	
6800.00	1.380	266.440	6798.73	-18.38	42.14	-12.40	669888.70	621089.44	32°42'24.192"N	103°54'55.441"W	0.14	
6900.00	1.340	269.960	6898.70	-20.72	42.06	-14.77	669886.33	621089.36	32°42'24.191"N	103°54'55.468"W	0.09	
7000.00	1.400	301.650	6998.67	-22.99	42.70	-16.98	669884.12	621090.00	32°42'24.198"N	103°54'55.494"W	0.75	
7100.00	2.020	310.190	7098.63	-25.61	44.48	-19.37	669881.73	621091.78	32°42'24.215"N	103°54'55.522"W	0.67	
7200.00	2.190	310.290	7198.56	-28.73	46.85	-22.17	669878.93	621094.15	32°42'24.239"N	103°54'55.555"W	0.17	
7300.00	2.090	295.190	7298.49	-32.10	48.87	-25.28	669875.82	621096.16	32°42'24.259"N	103°54'55.591"W	0.57	
7400.00	2.040	297.500	7398.43	-35.52	50.46	-28.51	669872.59	621097.76	32°42'24.275"N	103°54'55.629"W	0.10	
7500.00	1.980	301.240	7498.37	-38.80	52.18	-31.56	669869.54	621099.48	32°42'24.292"N	103°54'55.665"W	0.14	
7600.00	0.890	280.250	7598.33	-41.16	53.22	-33.80	669867.30	621100.51	32°42'24.302"N	103°54'55.691"W	1.19	
7700.00	0.680	289.390	7698.32	-42.52	53.55	-35.13	669865.97	621100.85	32°42'24.306"N	103°54'55.706"W	0.24	
7800.00	0.840	348.800	7798.32	-43.35	54.47	-35.83	669865.27	621101.76	32°42'24.315"N	103°54'55.714"W	0.77	
7900.00	0.670	356.570	7898.31	-43.71	55.77	-36.01	669865.09	621103.07	32°42'24.328"N	103°54'55.716"W	0.20	
8000.00	1.200	353.450	7998.30	-44.10	57.39	-36.16	669864.94	621104.69	32°42'24.344"N	103°54'55.718"W	0.53	
8100.00	1.030	329.130	8098.28	-44.94	59.21	-36.74	669864.36	621106.50	32°42'24.362"N	103°54'55.725"W	0.50	
8200.00	1.150	275.980	8198.26	-46.51	60.08	-38.20	669862.90	621107.38	32°42'24.371"N	103°54'55.742"W	0.98	
8300.00	1.670	249.860	8298.23	-48.79	59.68	-40.57	669860.53	621106.98	32°42'24.367"N	103°54'55.770"W	0.81	
8370.00	1.400	227.600	8368.21	-50.23	58.76	-42.16	669858.95	621106.05	32°42'24.358"N	103°54'55.788"W	0.93	
8401.00	2.300	108.800	8399.20	-49.86	58.30	-41.85	669859.25	621105.60	32°42'24.353"N	103°54'55.783"W	10.38	
8433.00	7.800	101.000	8431.06	-47.06	57.68	-39.11	669862.00	621104.97	32°42'24.347"N	103°54'55.753"W	17.28	
8465.00	15.300	98.100	8462.39	-40.66	56.67	-32.79	669868.32	621103.96	32°42'24.337"N	103°54'55.679"W	23.50	
8496.00	22.200	95.900	8491.73	-30.70	55.49	-22.90	669878.20	621102.78	32°42'24.325"N	103°54'55.563"W	22.37	
8528.00	29.800	95.500	8520.47	-16.70	54.10	-8.95	669892.15	621101.40	32°42'24.310"N	103°54'55.400"W	23.76	



Actual Wellpath Report

No. 4H AWP

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INTEQ

REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Eddy County, NM	Well	No. 4H
Field	(West Shugart) Sec 31, T18S, R31E	Wellbore	No. 4H AWP
Facility	West Shugart 31 Fed Com No. 4H	Sidetrack from	No. 4 AWP at 8300.00 MD

WELLPATH DATA (170 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [srv ft]	Grid North [srv ft]	Latitude	Longitude	DLS [°/100ft]	Comments
8560.00	37.300	95.600	8547.12	0.95	52.39	8.64	669909.74	621099.69	32°42'24.293"N	103°54'55.194"W	23.44	
8592.00	44.000	96.900	8571.38	21.77	50.11	29.35	669930.44	621097.40	32°42'24.269"N	103°54'54.952"W	21.10	
8623.00	51.800	97.600	8592.15	44.75	47.20	52.14	669953.24	621094.50	32°42'24.240"N	103°54'54.685"W	25.22	
8655.00	55.900	97.800	8611.02	70.58	43.74	77.75	669978.84	621091.03	32°42'24.204"N	103°54'54.386"W	12.82	
8687.00	57.800	98.400	8628.52	97.37	39.96	104.27	670005.36	621087.26	32°42'24.166"N	103°54'54.075"W	6.14	
8718.00	59.600	98.800	8644.63	123.86	36.00	130.46	670031.55	621083.30	32°42'24.126"N	103°54'53.769"W	5.91	
8750.00	61.400	99.300	8660.38	151.71	31.62	157.96	670059.05	621078.91	32°42'24.081"N	103°54'53.447"W	5.79	
8781.00	63.200	100.200	8674.79	179.14	26.97	185.01	670086.10	621074.27	32°42'24.034"N	103°54'53.131"W	6.35	
8813.00	65.300	100.800	8688.70	207.94	21.71	213.35	670114.43	621069.01	32°42'23.981"N	103°54'52.800"W	6.78	
8845.00	67.500	101.100	8701.51	237.23	16.14	242.13	670143.22	621063.44	32°42'23.925"N	103°54'52.463"W	6.93	
8877.00	69.500	101.300	8713.23	266.97	10.36	271.34	670172.42	621057.66	32°42'23.867"N	103°54'52.122"W	6.28	
8908.00	71.300	100.500	8723.63	296.14	4.84	300.02	670201.09	621052.14	32°42'23.811"N	103°54'51.786"W	6.29	
8940.00	73.200	100.500	8733.39	326.60	-0.71	329.98	670231.06	621046.59	32°42'23.755"N	103°54'51.436"W	5.94	
8972.00	75.900	100.400	8741.91	357.42	-6.31	360.31	670261.38	621040.99	32°42'23.698"N	103°54'51.081"W	8.44	
9003.00	78.700	100.100	8748.73	387.64	-11.69	390.07	670291.14	621035.61	32°42'23.644"N	103°54'50.733"W	9.08	
9035.00	81.600	100.100	8754.20	419.15	-17.22	421.10	670322.17	621030.08	32°42'23.588"N	103°54'50.370"W	9.06	
9067.00	84.500	100.900	8758.07	450.89	-23.01	452.33	670353.40	621024.30	32°42'23.529"N	103°54'50.005"W	9.40	
9099.00	87.000	101.100	8760.44	482.76	-29.09	483.65	670384.72	621018.21	32°42'23.468"N	103°54'49.639"W	7.84	
9131.00	88.000	100.900	8761.84	514.70	-35.19	515.04	670416.10	621012.11	32°42'23.406"N	103°54'49.272"W	3.19	
9195.00	89.400	99.900	8763.29	578.64	-46.74	577.97	670479.02	621000.56	32°42'23.290"N	103°54'48.536"W	2.69	
9258.00	90.600	99.500	8763.29	641.62	-57.36	640.06	670541.12	620989.95	32°42'23.182"N	103°54'47.810"W	2.01	
9321.00	91.100	98.600	8762.36	704.60	-67.27	702.27	670603.32	620980.04	32°42'23.082"N	103°54'47.082"W	1.63	
9385.00	91.500	97.900	8760.90	768.59	-76.45	765.59	670666.64	620970.86	32°42'22.988"N	103°54'46.341"W	1.26	
9448.00	90.300	98.100	8759.91	831.58	-85.21	827.97	670729.01	620962.09	32°42'22.899"N	103°54'45.612"W	1.93	
9512.00	90.300	98.000	8759.58	895.58	-94.18	891.34	670792.37	620953.13	32°42'22.808"N	103°54'44.871"W	0.16	
9575.00	90.400	97.700	8759.19	958.57	-102.78	953.75	670854.78	620944.53	32°42'22.720"N	103°54'44.141"W	0.50	
9639.00	90.700	97.500	8758.58	1022.56	-111.24	1017.18	670918.21	620936.06	32°42'22.634"N	103°54'43.399"W	0.56	
9702.00	90.800	96.800	8757.75	1085.54	-119.09	1079.69	670980.71	620928.22	32°42'22.554"N	103°54'42.668"W	1.12	
9765.00	89.500	96.800	8757.59	1148.52	-126.54	1142.24	671043.26	620920.76	32°42'22.478"N	103°54'41.936"W	2.06	
9829.00	89.500	96.600	8758.15	1212.49	-134.01	1205.80	671106.81	620913.30	32°42'22.401"N	103°54'41.192"W	0.31	
9892.00	90.200	96.300	8758.31	1275.46	-141.09	1268.40	671169.41	620906.22	32°42'22.329"N	103°54'40.460"W	1.21	
9955.00	89.200	96.500	8758.64	1338.42	-148.11	1331.01	671232.01	620899.20	32°42'22.257"N	103°54'39.728"W	1.62	
10019.00	88.200	96.800	8760.10	1402.37	-155.52	1394.56	671295.56	620891.79	32°42'22.181"N	103°54'38.984"W	1.63	
10082.00	87.800	97.800	8762.29	1465.32	-163.52	1457.01	671358.00	620883.79	32°42'22.100"N	103°54'38.254"W	1.71	
10145.00	88.200	98.600	8764.49	1528.28	-172.50	1519.33	671420.32	620874.81	32°42'22.008"N	103°54'37.525"W	1.42	
10209.00	88.000	99.300	8766.61	1592.25	-182.45	1582.51	671483.50	620864.86	32°42'21.907"N	103°54'36.786"W	1.14	
10272.00	88.000	99.200	8768.81	1655.20	-192.57	1644.66	671545.64	620854.74	32°42'21.805"N	103°54'36.059"W	0.16	
10336.00	88.300	99.000	8770.88	1719.16	-202.69	1707.82	671608.79	620844.63	32°42'21.702"N	103°54'35.321"W	0.56	
10399.00	88.600	99.000	8772.58	1782.13	-212.54	1770.02	671670.99	620834.77	32°42'21.602"N	103°54'34.593"W	0.48	
10463.00	88.800	98.800	8774.04	1846.11	-222.44	1833.23	671734.20	620824.88	32°42'21.502"N	103°54'33.854"W	0.44	
10526.00	89.000	98.300	8775.24	1909.10	-231.80	1895.52	671796.48	620815.51	32°42'21.407"N	103°54'33.125"W	0.85	
10589.00	89.300	97.800	8776.18	1972.09	-240.63	1957.89	671858.85	620806.69	32°42'21.317"N	103°54'32.396"W	0.93	
10653.00	89.700	97.600	8776.74	2036.09	-249.20	2021.31	671922.26	620798.12	32°42'21.229"N	103°54'31.654"W	0.70	
10716.00	90.300	97.300	8776.74	2099.08	-257.37	2083.78	671984.73	620789.95	32°42'21.146"N	103°54'30.923"W	1.06	
10779.00	90.700	97.300	8776.19	2162.07	-265.37	2146.27	672047.21	620781.95	32°42'21.065"N	103°54'30.193"W	0.63	



Actual Wellpath Report

No. 4H AWP

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INTEQ

REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Eddy County, NM	Well	No. 4H
Field	(West Shugart) Sec 31, T18S, R31E	Wellbore	No. 4H AWB
Facility	West Shugart 31 Fed Com No. 4H	Sidetrack from	No. 4 AWB at 8300.00 MD

WELLPATH DATA (170 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [srv ft]	Grid North [srv ft]	Latitude	Longitude	DLS [°/100ft]	Comments
10842.00	91.200	97.100	8775.14	2225.04	-273.27	2208.76	672109.70	620774.05	32°42'20.984"N	103°54'29.462"W	0.85	
10906.00	90.800	97.800	8774.03	2289.03	-281.57	2272.21	672173.14	620765.76	32°42'20.899"N	103°54'28.719"W	1.26	
10969.00	89.700	98.400	8773.75	2352.02	-290.44	2334.58	672235.51	620756.88	32°42'20.809"N	103°54'27.990"W	1.99	
11033.00	90.100	98.100	8773.86	2416.02	-299.63	2397.92	672298.84	620747.70	32°42'20.716"N	103°54'27.249"W	0.78	
11096.00	89.500	98.800	8774.08	2479.02	-308.88	2460.23	672361.15	620738.44	32°42'20.622"N	103°54'26.520"W	1.46	
11159.00	89.200	99.000	8774.80	2542.01	-318.63	2522.47	672423.39	620728.69	32°42'20.523"N	103°54'25.792"W	0.57	
11223.00	89.800	98.800	8775.36	2606.01	-328.53	2585.70	672486.61	620718.79	32°42'20.422"N	103°54'25.053"W	0.99	
11286.00	90.500	98.600	8775.19	2669.01	-338.06	2647.97	672548.88	620709.27	32°42'20.325"N	103°54'24.325"W	1.16	
11349.00	90.400	99.000	8774.70	2732.00	-347.70	2710.23	672611.13	620699.63	32°42'20.228"N	103°54'23.597"W	0.65	
11413.00	89.000	99.900	8775.03	2795.99	-358.20	2773.36	672674.25	620689.12	32°42'20.121"N	103°54'22.858"W	2.60	
11476.00	89.000	99.700	8776.13	2858.96	-368.93	2835.43	672736.32	620678.40	32°42'20.013"N	103°54'22.132"W	0.32	
11540.00	89.700	99.100	8776.86	2922.94	-379.38	2898.57	672799.45	620667.95	32°42'19.907"N	103°54'21.394"W	1.44	
11603.00	89.000	99.100	8777.57	2985.93	-389.34	2960.77	672861.65	620657.99	32°42'19.806"N	103°54'20.667"W	1.11	
11667.00	88.900	100.000	8778.75	3049.91	-399.96	3023.87	672924.75	620647.37	32°42'19.698"N	103°54'19.929"W	1.41	
11730.00	89.700	99.900	8779.51	3112.88	-410.84	3085.92	672986.79	620636.49	32°42'19.588"N	103°54'19.203"W	1.28	
11794.00	90.300	99.200	8779.51	3176.86	-421.46	3149.03	673049.90	620625.87	32°42'19.480"N	103°54'18.465"W	1.44	
11857.00	89.900	98.900	8779.40	3239.86	-431.37	3211.24	673112.11	620615.96	32°42'19.380"N	103°54'17.737"W	0.79	
11921.00	89.500	98.800	8779.74	3303.85	-441.22	3274.48	673175.34	620606.12	32°42'19.280"N	103°54'16.998"W	0.64	
11984.00	88.300	99.400	8780.95	3366.83	-451.18	3336.68	673237.53	620596.16	32°42'19.179"N	103°54'16.270"W	2.13	
12047.00	88.400	99.500	8782.76	3429.80	-461.52	3398.80	673299.64	620585.82	32°42'19.074"N	103°54'15.544"W	0.22	
12111.00	88.800	99.200	8784.33	3493.77	-471.91	3461.93	673362.77	620575.42	32°42'18.969"N	103°54'14.806"W	0.78	
12174.00	89.000	98.900	8785.54	3556.75	-481.82	3524.13	673424.97	620565.52	32°42'18.868"N	103°54'14.078"W	0.57	
12238.00	90.000	98.500	8786.09	3620.74	-491.50	3587.39	673488.22	620555.84	32°42'18.770"N	103°54'13.338"W	1.68	
12301.00	89.700	98.600	8786.26	3683.74	-500.87	3649.69	673550.52	620546.47	32°42'18.675"N	103°54'12.610"W	0.50	
12365.00	89.100	99.000	8786.93	3747.74	-510.66	3712.93	673613.76	620536.68	32°42'18.575"N	103°54'11.870"W	1.13	
12428.00	87.400	99.500	8788.85	3810.70	-520.78	3775.08	673675.90	620526.56	32°42'18.472"N	103°54'11.143"W	2.81	
12492.00	87.800	99.800	8791.53	3874.63	-531.50	3838.12	673738.94	620515.84	32°42'18.364"N	103°54'10.406"W	0.78	
12555.00	88.200	99.500	8793.73	3937.57	-542.05	3900.19	673801.00	620505.29	32°42'18.257"N	103°54'09.680"W	0.79	
12619.00	88.500	99.000	8795.58	4001.54	-552.33	3963.33	673864.14	620495.01	32°42'18.153"N	103°54'08.942"W	0.91	
12682.00	88.800	98.800	8797.06	4064.51	-562.08	4025.56	673926.36	620485.26	32°42'18.054"N	103°54'08.214"W	0.57	
12745.00	88.500	97.700	8798.54	4127.50	-571.12	4087.89	673988.68	620476.23	32°42'17.962"N	103°54'07.485"W	1.81	
12809.00	88.900	97.300	8800.00	4191.47	-579.47	4151.32	674052.12	620467.88	32°42'17.877"N	103°54'06.743"W	0.88	
12872.00	89.200	96.800	8801.04	4254.45	-587.20	4213.84	674114.63	620460.14	32°42'17.798"N	103°54'06.012"W	0.93	
12934.00	89.200	96.200	8801.91	4316.41	-594.22	4275.43	674176.22	620453.13	32°42'17.726"N	103°54'05.291"W	0.97	
12988.00	89.200	96.200	8802.66	4370.37	-600.05	4329.11	674229.89	620447.30	32°42'17.666"N	103°54'04.663"W	0.00	Proj to Bit



Actual Wellpath Report

No. 4H AWP

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INTEQ

REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Eddy County, NM	Well	No. 4H
Field	(West Shugart) Sec 31, T18S, R31E	Wellbore	No. 4H AWB
Facility	West Shugart 31 Fed Com No. 4H	Sidetrack from	No. 4 AWB at 8300.00 MD

TARGETS									
Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [srv ft]	Grid North [srv ft]	Latitude	Longitude	Shape
No. 4H Target		8758.00	-181.50	1438.89	671339.88	620865.81	32°42'21.922"N	103°54'38.467"W	point
No. 4H PBHL		8798.78	-635.75	4337.97	674238.75	620411.59	32°42'17.312"N	103°54'04.561"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	8300.00	Generic gyro - continuous (Standard)	SDI GYRO (100 - 8600)	No. 4 AWB
8300.00	12988.00	NaviTrak (Standard)	MWD	No. 4H AWB