

Results of Directional Survey

API number:	30-005-29101		
OGRID:		Operator:	CIMAREX ENERGY CO. OF COLORADO
		Property:	VALLEY FORGE 20 STATE COM # 3H

surface	ULSTR:	H	20	T	15S	R	31E
				1980	FNL	375	FEL

BH Loc	ULSTR:	E	20	T	15S	R	31E
13232	MD	8735.7	TVD	1992	FNL	4934	FEL

Top Perf/OH	ULSTR:	H	20	T	15S	R	31E
8234	MD	8233.6	TVD	1985	FNL	385	FEL

Bot Perf/OH	ULSTR:	E	20	T	15S	R	31E
13232	MD	8735.7	TVD	1992	FNL	4934	FEL

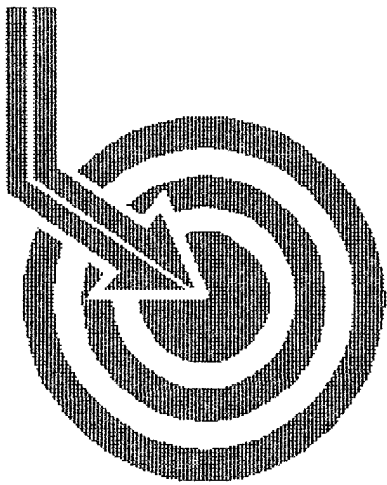
	MD	N/S	E/W	VD
	8232	-4.72	-10.34	8231.62
TOP PERFS/OH	8234	-4.73	-10.31	8233.62
	8532	-5.78	-6.11	8531.59
	13150	-8.79	-4477.48	8739.33
BOT PERFS/OH	13232	-11.79	-4559.36	8735.74
	13203	-10.73	-4530.40	8737.01

NEXT TO LAST	13150	-8.79	-4477.48	8739.33
LAST READING	13203	-10.73	-4530.40	8737.01
TD	13232	-11.79	-4559.36	8735.74

Surface Location	1980	FN	375	FE
Projected BHL	1992	FN	4934	FE
Location of				
Top Perfs/OH	1985	FN	385	FE
Bottom Perfs/OH	1992	FN	4934	FE

SUMMARY of Subsurface Locations

Surface Location	H-20-15S-31E	1980	FN	375	FE	Vert. Depth
Top Perfs/OH	H-20-15S-31E	1985	FN	385	FE	3233.62
Bottom Perfs/OH	E-20-15S-31E	1992	FN	4934	FE	8735.74
Projected TD	E-20-15S-31E	1992	FN	4934	FE	8735.74



30-005-29101

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CIMAREX ENERGY

Field: Wildcat
Site: Chaves County, NM
Well: Valley Forge 20 State Com #3H
Wellpath: VH - Job #32K061485
Survey: 06/30/10

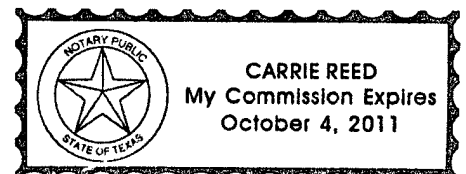
SUR @ H-20-15s-31e, 1980/N & 375/E
BHL @ E-20-15s-31e, 1992/N & 4934/E
API #30-005-29101

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

[Signature]
Company Representative

Notarized this date 4th of August, 2010.

Carrie Reed
Notary Signature
County of Midland
State of Texas





Scientific Drilling International, Inc.

Survey Report

Company: CIMAREX ENERGY
 Field: Wildcat
 Site: Chaves County, NM
 Well: Valley Forge 20 State Com #3H
 Wellpath: VH - Job #32K061485

Date: 7/12/2010 Time: 11:33:58 Page: 1
 Co-ordinate(NE) Reference: Site: Chaves County, NM, True North
 Vertical (TVD) Reference: SITE 0.0
 Section (VS) Reference: Well (0.00N,0.00E,269.79Azi)
 Survey Calculation Method: Minimum Curvature Db: Sybase

Survey: 06/30/10
 KSRG 0'-8232'

Start Date: 6/30/2010

Company: Scientific Drilling Internatio
 Tool: Keeper, Keeper Gyro

Engineer: Madrid w/Renegade
 Tied-to: From Surface

Survey

MD ft	Incl deg	Azim deg	TVD ft	VS ft	N/S ft	E/W ft	DLS deg/100ft	ClsD ft	ClsA deg
0.0	0.00	359.73	0.0	0.0	0.0	0.0	0.00	0.0	0.00
100.0	0.45	217.98	100.0	0.2	-0.3	-0.2	0.45	0.4	217.98
200.0	0.72	207.73	200.0	0.8	-1.2	-0.8	0.29	1.4	213.43
300.0	0.07	294.34	300.0	1.1	-1.7	-1.1	0.72	2.0	213.37
400.0	0.18	41.63	400.0	1.1	-1.6	-1.1	0.21	1.9	214.51
500.0	0.16	26.62	500.0	0.9	-1.3	-0.9	0.05	1.6	214.50
600.0	0.18	51.92	600.0	0.7	-1.1	-0.7	0.08	1.3	213.28
700.0	0.17	87.79	700.0	0.5	-1.0	-0.4	0.11	1.1	204.29
800.0	0.17	148.18	800.0	0.2	-1.1	-0.2	0.17	1.1	191.31
900.0	0.32	145.82	900.0	0.0	-1.5	0.0	0.15	1.5	179.55
1000.0	0.46	120.38	1000.0	-0.5	-1.9	0.5	0.22	2.0	164.91
1100.0	0.50	172.40	1100.0	-0.9	-2.5	0.9	0.42	2.7	160.14
1200.0	0.42	207.74	1200.0	-0.8	-3.3	0.8	0.29	3.4	166.28
1300.0	0.44	206.50	1300.0	-0.4	-4.0	0.5	0.02	4.0	173.33
1400.0	0.25	282.89	1400.0	-0.1	-4.3	0.1	0.45	4.3	178.93
1500.0	0.47	238.15	1500.0	0.5	-4.4	-0.5	0.34	4.5	186.20
1600.0	0.26	247.38	1600.0	1.1	-4.7	-1.0	0.22	4.8	192.37
1700.0	0.35	269.02	1700.0	1.6	-4.8	-1.6	0.14	5.1	197.84
1800.0	0.11	241.51	1800.0	2.0	-4.9	-1.9	0.26	5.3	201.72
1900.0	0.32	46.13	1900.0	1.8	-4.7	-1.8	0.43	5.1	201.11
2000.0	0.31	40.64	2000.0	1.5	-4.3	-1.4	0.03	4.6	198.49
2100.0	1.13	67.98	2100.0	0.4	-3.8	-0.4	0.87	3.8	185.45
2200.0	1.39	67.55	2199.9	-1.7	-2.9	1.7	0.26	3.4	150.18
2300.0	1.45	60.66	2299.9	-3.9	-1.8	3.9	0.18	4.3	115.27
2400.0	1.25	63.21	2399.9	-6.0	-0.7	6.0	0.21	6.0	96.96
2500.0	1.36	70.12	2499.9	-8.1	0.2	8.1	0.19	8.1	88.83
2600.0	1.15	63.08	2599.8	-10.1	1.0	10.1	0.26	10.1	84.20
2700.0	0.64	71.54	2699.8	-11.5	1.7	11.5	0.53	11.6	81.81
2800.0	0.59	46.23	2799.8	-12.4	2.2	12.4	0.27	12.6	80.00
2900.0	0.43	70.25	2899.8	-13.1	2.7	13.1	0.26	13.4	78.50
3000.0	0.41	62.19	2999.8	-13.8	3.0	13.8	0.06	14.1	77.88
3100.0	0.37	69.90	3099.8	-14.4	3.2	14.4	0.07	14.8	77.33
3200.0	0.16	44.72	3199.8	-14.8	3.5	14.8	0.24	15.2	76.89
3300.0	0.09	14.40	3299.8	-15.0	3.6	14.9	0.09	15.4	76.35
3400.0	0.11	322.54	3399.8	-14.9	3.8	14.9	0.09	15.4	75.76
3500.0	0.38	269.20	3499.8	-14.5	3.9	14.5	0.33	15.0	75.13
3600.0	0.45	258.44	3599.8	-13.8	3.8	13.8	0.10	14.3	74.72
3700.0	0.55	267.80	3699.8	-12.9	3.7	12.9	0.13	13.4	74.15
3800.0	0.64	266.34	3799.8	-11.9	3.6	11.9	0.09	12.4	73.08
3900.0	0.59	271.05	3899.8	-10.8	3.6	10.8	0.07	11.4	71.64
4000.0	0.58	268.49	3999.8	-9.8	3.6	9.8	0.03	10.4	69.89
4100.0	0.64	259.87	4099.8	-8.8	3.5	8.7	0.11	9.4	68.32
4200.0	0.50	250.19	4199.8	-7.8	3.2	7.8	0.17	8.4	67.46
4300.0	0.34	259.45	4299.8	-7.1	3.0	7.1	0.17	7.7	66.85
4400.0	0.34	244.21	4399.8	-6.5	2.8	6.5	0.09	7.1	66.44
4500.0	0.22	279.35	4499.8	-6.1	2.7	6.1	0.20	6.7	65.64
4600.0	0.21	288.72	4599.8	-5.7	2.8	5.7	0.04	6.4	63.55
4700.0	0.19	278.57	4699.8	-5.4	2.9	5.4	0.04	6.1	61.44
4800.0	0.17	248.87	4799.8	-5.1	2.9	5.1	0.09	5.8	60.27



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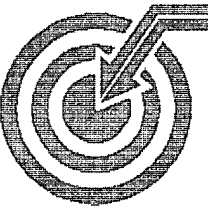
Survey Report

Company: CIMAREX ENERGY
 Field: Wildcat
 Site: Chaves County, NM
 Well: Valley Forge 20 State Com #3H
 Wellpath: VH - Job #32K061485

Date: 7/12/2010 Time: 11:33:58 Page: 2
 Co-ordinate(N/E) Reference: Site: Chaves County, NM, True North
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 Section (VS) Reference: Well (0.00N,0.00E,269.79Azi)
 Survey Calculation Method: Minimum Curvature Db: Sybase

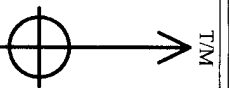
Survey

MD ft	Incl deg	Azim deg	TVD ft	VS ft	N/S ft	E/W ft	DLS deg/100ft	ClsD ft	ClsA deg
4900.0	0.45	246.01	4899.8	-4.6	2.7	4.6	0.28	5.3	59.60
5000.0	0.48	252.51	4999.8	-3.8	2.4	3.8	0.06	4.5	57.85
5100.0	0.37	296.11	5099.7	-3.1	2.4	3.1	0.33	3.9	52.31
5200.0	0.33	261.87	5199.7	-2.6	2.5	2.5	0.21	3.6	45.36
5300.0	0.38	269.10	5299.7	-1.9	2.5	1.9	0.07	3.1	38.00
5400.0	0.19	286.70	5399.7	-1.4	2.5	1.4	0.21	2.9	29.78
5500.0	0.20	276.51	5499.7	-1.1	2.6	1.1	0.04	2.8	23.18
5600.0	0.44	234.40	5599.7	-0.6	2.4	0.6	0.32	2.4	14.58
5700.0	0.25	221.99	5699.7	-0.2	2.0	0.2	0.20	2.0	4.56
5800.0	0.32	222.49	5799.7	0.2	1.6	-0.2	0.07	1.6	353.77
5900.0	0.59	259.38	5899.7	0.9	1.3	-0.9	0.39	1.6	326.48
6000.0	0.54	273.94	5999.7	1.8	1.3	-1.8	0.15	2.2	304.14
6100.0	0.66	267.66	6099.7	2.9	1.3	-2.9	0.14	3.2	293.56
6200.0	0.79	262.54	6199.7	4.1	1.1	-4.2	0.15	4.3	285.46
6300.0	0.81	272.70	6299.7	5.5	1.1	-5.5	0.14	5.6	281.15
6400.0	0.68	274.35	6399.7	6.8	1.2	-6.8	0.13	6.9	279.71
6500.0	0.50	265.31	6499.7	7.9	1.2	-7.9	0.20	8.0	278.53
6600.0	0.61	269.06	6599.7	8.8	1.1	-8.8	0.12	8.9	277.32
6700.0	0.45	287.73	6699.7	9.7	1.2	-9.7	0.23	9.8	277.29
6800.0	0.70	273.75	6799.7	10.7	1.4	-10.7	0.28	10.8	277.47
6900.0	0.37	286.07	6899.7	11.6	1.5	-11.6	0.35	11.7	277.51
7000.0	0.42	250.84	6999.7	12.3	1.5	-12.3	0.24	12.4	276.97
7100.0	0.67	264.51	7099.7	13.2	1.3	-13.2	0.28	13.3	275.73
7200.0	0.30	264.39	7199.7	14.1	1.2	-14.1	0.37	14.1	275.06
7300.0	0.38	230.17	7299.7	14.6	1.0	-14.6	0.21	14.6	273.95
7400.0	0.32	226.96	7399.7	15.0	0.6	-15.0	0.06	15.1	272.30
7500.0	0.33	175.15	7499.7	15.2	0.1	-15.2	0.28	15.2	270.48
7600.0	0.64	120.25	7599.7	14.7	-0.4	-14.7	0.52	14.7	268.29
7700.0	0.39	137.94	7699.7	14.0	-1.0	-14.0	0.29	14.0	266.02
7800.0	0.49	150.04	7799.6	13.6	-1.6	-13.6	0.14	13.7	263.28
7900.0	0.39	130.21	7899.6	13.1	-2.2	-13.1	0.18	13.3	260.51
8000.0	0.64	143.20	7999.6	12.5	-2.9	-12.5	0.27	12.8	257.13
8100.0	0.75	129.71	8099.6	11.7	-3.7	-11.7	0.20	12.2	252.30
8200.0	0.69	125.41	8199.6	10.7	-4.5	-10.7	0.08	11.6	247.18
8232.0	0.76	125.95	8231.6	10.4	-4.7	-10.3	0.22	11.4	245.44



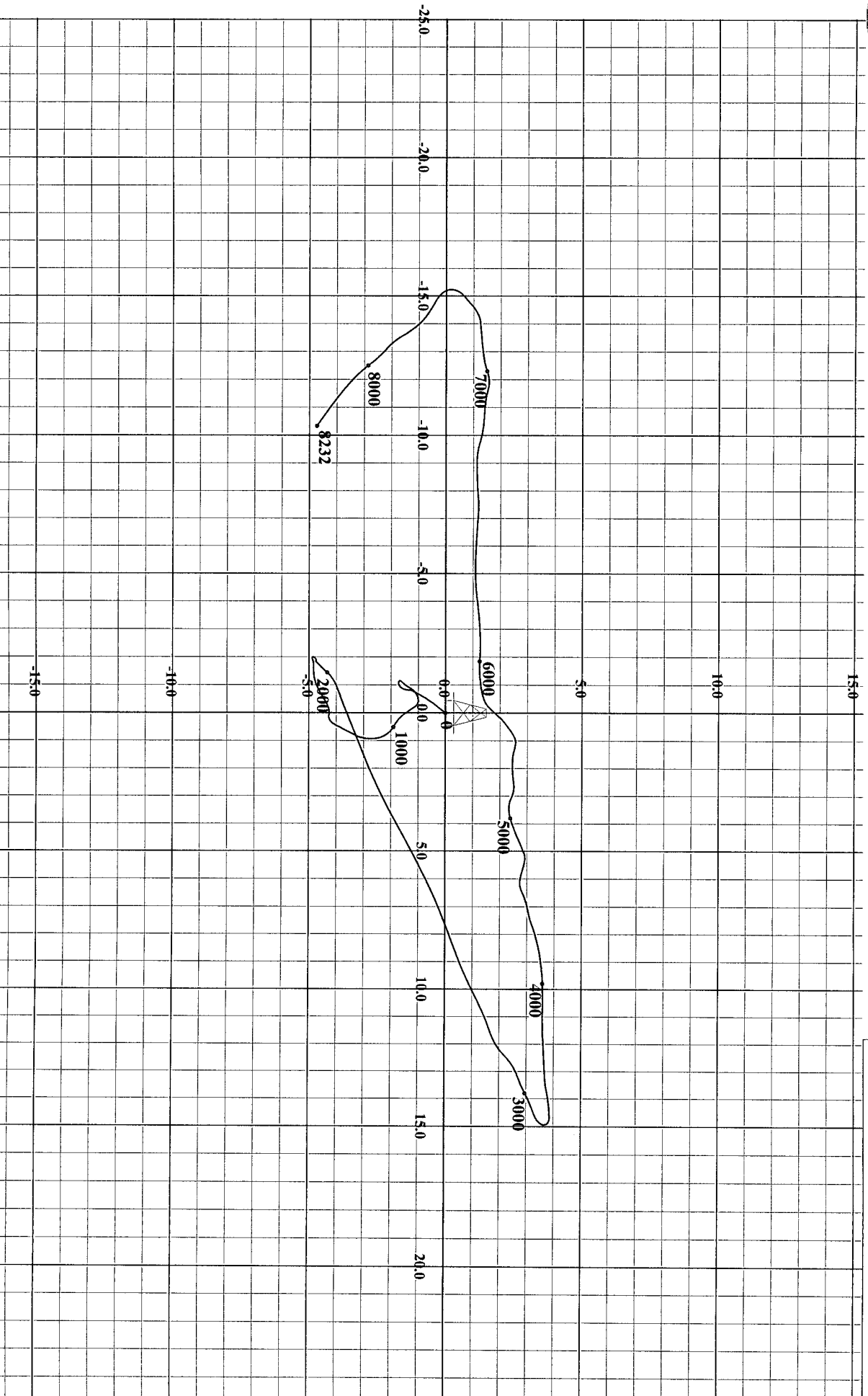
Scientific Drilling

Field: Wildcat
Site: Chaves County, NM
Well: Valley Forge 20 State Com #3H
Survey: 06/30/10



Azimuths to True North
Magnetic North: 0.00°
Strength: 0nT
Date: 7/12/2010
Model: iGrF2000

South(-)/North(+) [5ft/in]



West(-)/East(+) [5ft/in]



Cimarex Energy Co.

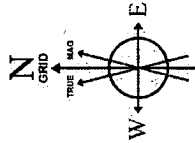
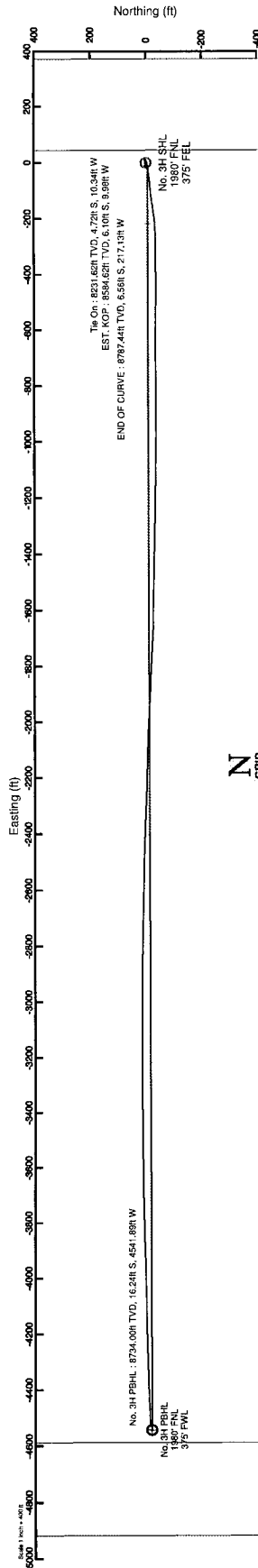
Location: Chaves County, NM
Field: (Valley) Sec 20, T15S, R31E
Facility: Valley Forge 20 State Com #3H

Split: No. 3H SHL
Well: No. 3H
Wellbore: No. 3H PWB



Well Profile Data

Design Comment	MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (°/100ft)	VS (ft)
Tie On	8232.00	0.760	125.950	8231.62	-4.72	-10.34	0.00	10.35
EST. KOP	8585.00	0.500	269.872	8584.62	-6.10	-9.98	0.34	10.00
END OF CURVE	8907.17	90.708	269.872	8787.44	-6.56	-217.13	28.00	217.15
No. 3H PBL	13232.28	90.708	269.872	8734.00	-16.24	-4541.89	0.00	4541.92



BGGM (1945.0 to 2011.0) Dip: 60.91° Field: 49212.3 nT
Magnetic North is 7.93 degrees East of True North
Grid North is 0.27 degrees East of True North
To correct azimuth from True to Grid add 0.27 degrees
To correct azimuth from Magnetic to Grid add 8.66 degrees
For example: if the Magnetic North Azimuth = 90 degs, then the Grid North Azimuth = 90 + 7.66 = 97.66

Plot reference wellpath is Plan #4 vs Actual <FINAL>	Grid System: NAD83 / TM New Mexico State Planes, Eastern Zone (3001), US feet
True vertical depths are referenced to Rig on No. 3H SHL (KB)	North Reference: Grid north
Measured depths are referenced to Rig on No. 3H SHL (KB)	Scale: True distance
Rig on No. 3H SHL (KB) to Mean Sea Level: 4449 feet	Depths are in feet
Mean Sea Level to Mud line (Facility: Valley Forge 20 State Com #3H): -4420 feet	Created by: Victor Hernandez on 7/12/2010
Coordinates are in feet referenced to SL	

Tie On: 0.76° Inc, 8232.00 MD, 8231.62 TVD, 10.35 VS

EST. KOP: 0.50° Inc, 8585.00 MD, 8584.62 TVD, 10.00 VS

28.00°/100'

END OF CURVE: 90.71° Inc, 8907.17 MD, 8787.44 TVD, 217.15 VS

No. 3H PBL: 90.71° Inc, 13232.28 MD, 8734.00 TVD, 4541.92 VS

Vertical Section (ft)

Scale: 1 inch = 400 ft



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Actual Wellpath Report
NOV 23 2010
No. 3H AWP
HOBBSOCD
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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 3H SHL
Area	Chaves County, NM	Well	No. 3H
Field	(Valley) Sec 20, T15S, R31E	Wellbore	No. 3H AWB
Facility	Valley Forge 20 State Com #3H		

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	Victor Hernandez
Scale	0.999936	Report Generated	7/12/2010 at 10:06:10 AM
Convergence at slot	0.27° East	Database/Source file	WA_Midland/No. 3H 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	693604.10	729052.40	33°00'11.443"N	103°50'11.942"W
Facility Reference Pt			693604.10	729052.40	33°00'11.443"N	103°50'11.942"W
Field Reference Pt			693616.10	726126.50	32°59'42.492"N	103°50'11.963"W

WELLPATH DATUM

Calculation method	Minimum curvature	Rig 122 on No. 3H SHL (KB) to GL	29.00ft
Horizontal Reference Pt	SL	Rig 122 on No. 3H SHL (KB) to Mean Sea Level	4449.00ft
Vertical Reference Pt	Rig 122 on No. 3H SHL (KB)	GL to Mud Line (Facility)	0.00ft
MD Reference Pt	Rig 122 on No. 3H SHL (KB)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	269.80°



Actual Wellpath Report

No. 3H AWP
Page 2 of 7



REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 3H SHL
Area	Chaves County, NM	Well	No. 3H
Field	(Valley) Sec 20, T15S, R31E	Wellbore	No. 3H AWB
Facility	Valley Forge 20 State Com #3H		

WELLPATH DATA (143 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]
0.00	0.000	217.980	0.00	0.00	0.00	0.00	693604.10	729052.40	33°00'11.443"N	103°50'11.942"W	0.00
100.00	0.450	217.980	100.00	0.24	-0.31	-0.24	693603.86	729052.09	33°00'11.440"N	103°50'11.945"W	0.45
200.00	0.720	207.730	199.99	0.78	-1.18	-0.78	693603.32	729051.22	33°00'11.431"N	103°50'11.951"W	0.29
300.00	0.070	294.340	299.99	1.13	-1.71	-1.12	693602.98	729050.69	33°00'11.426"N	103°50'11.955"W	0.72
400.00	0.180	41.630	399.99	1.08	-1.56	-1.07	693603.03	729050.84	33°00'11.427"N	103°50'11.955"W	0.21
500.00	0.160	26.620	499.99	0.91	-1.32	-0.91	693603.19	729051.08	33°00'11.430"N	103°50'11.953"W	0.05
600.00	0.180	51.920	599.99	0.73	-1.10	-0.72	693603.38	729051.30	33°00'11.432"N	103°50'11.951"W	0.08
700.00	0.170	87.790	699.99	0.45	-1.00	-0.45	693603.65	729051.40	33°00'11.433"N	103°50'11.947"W	0.11
800.00	0.170	148.180	799.99	0.23	-1.12	-0.22	693603.88	729051.28	33°00'11.432"N	103°50'11.945"W	0.17
900.00	0.320	145.820	899.99	-0.01	-1.47	0.01	693604.11	729050.93	33°00'11.428"N	103°50'11.942"W	0.15
1000.00	0.460	120.380	999.99	-0.51	-1.91	0.51	693604.61	729050.49	33°00'11.424"N	103°50'11.936"W	0.22
1100.00	0.500	172.400	1099.98	-0.91	-2.54	0.92	693605.02	729049.86	33°00'11.418"N	103°50'11.932"W	0.42
1200.00	0.420	207.740	1199.98	-0.79	-3.30	0.81	693604.91	729049.10	33°00'11.410"N	103°50'11.933"W	0.29
1300.00	0.440	206.500	1299.98	-0.45	-3.97	0.46	693604.56	729048.43	33°00'11.404"N	103°50'11.937"W	0.02
1400.00	0.250	282.890	1399.98	-0.06	-4.26	0.08	693604.18	729048.14	33°00'11.401"N	103°50'11.941"W	0.45
1500.00	0.470	238.150	1499.97	0.50	-4.43	-0.48	693603.62	729047.97	33°00'11.399"N	103°50'11.948"W	0.34
1600.00	0.260	247.380	1599.97	1.06	-4.74	-1.04	693603.06	729047.66	33°00'11.396"N	103°50'11.955"W	0.22
1700.00	0.350	269.020	1699.97	1.57	-4.83	-1.55	693602.55	729047.57	33°00'11.395"N	103°50'11.961"W	0.14
1800.00	0.110	241.510	1799.97	1.96	-4.88	-1.94	693602.16	729047.52	33°00'11.395"N	103°50'11.965"W	0.26
1900.00	0.320	46.130	1899.97	1.84	-4.73	-1.83	693602.27	729047.67	33°00'11.396"N	103°50'11.964"W	0.43
2000.00	0.310	40.640	1999.97	1.46	-4.33	-1.45	693602.65	729048.07	33°00'11.400"N	103°50'11.959"W	0.03
2100.00	1.130	67.980	2099.96	0.37	-3.76	-0.36	693603.74	729048.64	33°00'11.406"N	103°50'11.947"W	0.87
2200.00	1.390	67.550	2199.93	-1.67	-2.92	1.68	693605.78	729049.48	33°00'11.414"N	103°50'11.923"W	0.26
2300.00	1.450	60.660	2299.90	-3.89	-1.84	3.90	693608.00	729050.56	33°00'11.424"N	103°50'11.896"W	0.18
2400.00	1.250	63.210	2399.88	-5.97	-0.73	5.98	693610.08	729051.67	33°00'11.435"N	103°50'11.872"W	0.21
2500.00	1.360	70.120	2499.85	-8.07	0.17	8.07	693612.17	729052.57	33°00'11.444"N	103°50'11.847"W	0.19
2600.00	1.150	63.080	2599.83	-10.08	1.02	10.08	693614.18	729053.42	33°00'11.453"N	103°50'11.824"W	0.26
2700.00	0.640	71.540	2699.81	-11.51	1.65	11.50	693615.60	729054.05	33°00'11.459"N	103°50'11.807"W	0.53
2800.00	0.590	46.230	2799.81	-12.41	2.19	12.40	693616.50	729054.59	33°00'11.464"N	103°50'11.796"W	0.27
2900.00	0.430	70.250	2899.80	-13.14	2.67	13.13	693617.23	729055.07	33°00'11.469"N	103°50'11.788"W	0.26



Actual Wellpath Report

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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 3H SHL
Area	Chaves County, NM	Well	No. 3H
Field	(Valley) Sec 20, T15S, R31E	Wellbore	No. 3H AWP
Facility	Valley Forge 20 State Com #3H		

WELLPATH DATA (143 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]
3000.00	0.410	62.190	2999.80	-13.81	2.96	13.80	693617.90	729055.36	33°00'11.472"N	103°50'11.780"W	0.06
3100.00	0.370	69.900	3099.80	-14.43	3.24	14.42	693618.52	729055.64	33°00'11.474"N	103°50'11.773"W	0.07
3200.00	0.160	44.720	3199.80	-14.83	3.45	14.82	693618.92	729055.85	33°00'11.476"N	103°50'11.768"W	0.24
3300.00	0.090	14.400	3299.80	-14.95	3.63	14.94	693619.04	729056.03	33°00'11.478"N	103°50'11.767"W	0.09
3400.00	0.110	322.540	3399.80	-14.91	3.78	14.90	693619.00	729056.18	33°00'11.480"N	103°50'11.767"W	0.09
3500.00	0.380	269.200	3499.80	-14.52	3.85	14.51	693618.61	729056.25	33°00'11.480"N	103°50'11.772"W	0.33
3600.00	0.450	258.440	3599.79	-13.81	3.77	13.79	693617.89	729056.17	33°00'11.479"N	103°50'11.780"W	0.10
3700.00	0.550	267.800	3699.79	-12.94	3.67	12.93	693617.03	729056.07	33°00'11.479"N	103°50'11.790"W	0.13
3800.00	0.640	266.340	3799.79	-11.90	3.62	11.89	693615.99	729056.02	33°00'11.478"N	103°50'11.802"W	0.09
3900.00	0.590	271.050	3899.78	-10.83	3.59	10.82	693614.92	729055.99	33°00'11.478"N	103°50'11.815"W	0.07
4000.00	0.580	268.490	3999.77	-9.81	3.59	9.80	693613.90	729055.99	33°00'11.478"N	103°50'11.827"W	0.03
4100.00	0.640	259.870	4099.77	-8.75	3.48	8.74	693612.84	729055.87	33°00'11.477"N	103°50'11.839"W	0.11
4200.00	0.500	250.190	4199.76	-7.79	3.23	7.78	693611.88	729055.63	33°00'11.474"N	103°50'11.851"W	0.17
4300.00	0.340	259.450	4299.76	-7.09	3.03	7.08	693611.18	729055.43	33°00'11.472"N	103°50'11.859"W	0.17
4400.00	0.340	244.210	4399.76	-6.53	2.84	6.52	693610.62	729055.24	33°00'11.471"N	103°50'11.865"W	0.09
4500.00	0.220	279.350	4499.76	-6.07	2.75	6.06	693610.16	729055.15	33°00'11.470"N	103°50'11.871"W	0.20
4600.00	0.210	288.720	4599.76	-5.71	2.84	5.70	693609.80	729055.24	33°00'11.471"N	103°50'11.875"W	0.04
4700.00	0.190	278.570	4699.76	-5.37	2.92	5.36	693609.46	729055.32	33°00'11.471"N	103°50'11.879"W	0.04
4800.00	0.170	248.870	4799.76	-5.07	2.89	5.06	693609.16	729055.29	33°00'11.471"N	103°50'11.883"W	0.09
4900.00	0.450	246.010	4899.75	-4.57	2.68	4.56	693608.66	729055.08	33°00'11.469"N	103°50'11.888"W	0.28
5000.00	0.480	252.510	4999.75	-3.81	2.39	3.81	693607.91	729054.79	33°00'11.466"N	103°50'11.897"W	0.06
5100.00	0.370	296.110	5099.75	-3.12	2.41	3.12	693607.22	729054.81	33°00'11.467"N	103°50'11.905"W	0.33
5200.00	0.330	261.870	5199.75	-2.55	2.51	2.54	693606.64	729054.91	33°00'11.468"N	103°50'11.912"W	0.21
5300.00	0.380	269.100	5299.74	-1.93	2.46	1.92	693606.02	729054.86	33°00'11.467"N	103°50'11.919"W	0.07
5400.00	0.190	286.700	5399.74	-1.44	2.51	1.43	693605.53	729054.91	33°00'11.468"N	103°50'11.925"W	0.21
5500.00	0.200	276.510	5499.74	-1.11	2.57	1.10	693605.20	729054.97	33°00'11.468"N	103°50'11.929"W	0.04
5600.00	0.440	234.400	5599.74	-0.62	2.37	0.62	693604.72	729054.77	33°00'11.466"N	103°50'11.935"W	0.32
5700.00	0.250	221.990	5699.74	-0.17	1.98	0.16	693604.26	729054.38	33°00'11.462"N	103°50'11.940"W	0.20
5800.00	0.320	222.490	5799.74	0.17	1.62	-0.18	693603.92	729054.02	33°00'11.459"N	103°50'11.944"W	0.07
5900.00	0.590	259.380	5899.74	0.87	1.31	-0.87	693603.23	729053.71	33°00'11.456"N	103°50'11.952"W	0.39



Actual Wellpath Report

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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 3H SHL
Area	Chaves County, NM	Well	No. 3H
Field	(Valley) Sec 20, T15S, R31E	Wellbore	No. 3H AWB
Facility	Valley Forge 20 State Com #3H		

WELLPATH DATA (143 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]
6000.00	0.540	273.940	5999.73	1.84	1.25	-1.85	693602.25	729053.65	33°00'11.455"N	103°50'11.964"W	0.15
6100.00	0.660	267.660	6099.73	2.89	1.26	-2.89	693601.21	729053.66	33°00'11.455"N	103°50'11.976"W	0.14
6200.00	0.790	262.540	6199.72	4.15	1.15	-4.15	693599.95	729053.55	33°00'11.454"N	103°50'11.991"W	0.15
6300.00	0.810	272.700	6299.71	5.54	1.09	-5.54	693598.56	729053.49	33°00'11.454"N	103°50'12.007"W	0.14
6400.00	0.680	274.350	6399.70	6.83	1.17	-6.84	693597.26	729053.57	33°00'11.455"N	103°50'12.022"W	0.13
6500.00	0.500	265.310	6499.69	7.86	1.18	-7.87	693596.23	729053.58	33°00'11.455"N	103°50'12.034"W	0.20
6600.00	0.610	269.060	6599.69	8.83	1.14	-8.83	693595.27	729053.54	33°00'11.454"N	103°50'12.046"W	0.12
6700.00	0.450	287.730	6699.69	9.73	1.25	-9.74	693594.36	729053.65	33°00'11.456"N	103°50'12.056"W	0.23
6800.00	0.700	273.750	6799.68	10.72	1.41	-10.72	693593.38	729053.81	33°00'11.457"N	103°50'12.068"W	0.28
6900.00	0.370	286.070	6899.68	11.64	1.53	-11.64	693592.46	729053.93	33°00'11.459"N	103°50'12.079"W	0.35
7000.00	0.420	250.840	6999.67	12.29	1.50	-12.30	693591.80	729053.90	33°00'11.458"N	103°50'12.086"W	0.24
7100.00	0.670	264.510	7099.67	13.22	1.33	-13.23	693590.87	729053.73	33°00'11.457"N	103°50'12.097"W	0.28
7200.00	0.300	264.390	7199.66	14.07	1.25	-14.07	693590.03	729053.65	33°00'11.456"N	103°50'12.107"W	0.37
7300.00	0.380	230.170	7299.66	14.58	1.01	-14.58	693589.52	729053.41	33°00'11.454"N	103°50'12.113"W	0.21
7400.00	0.320	226.960	7399.66	15.04	0.61	-15.04	693589.06	729053.01	33°00'11.450"N	103°50'12.119"W	0.06
7500.00	0.330	175.150	7499.66	15.22	0.13	-15.22	693588.88	729052.53	33°00'11.445"N	103°50'12.121"W	0.28
7600.00	0.640	120.250	7599.66	14.72	-0.44	-14.72	693589.38	729051.96	33°00'11.439"N	103°50'12.115"W	0.52
7700.00	0.390	137.940	7699.65	14.01	-0.97	-14.01	693590.09	729051.43	33°00'11.434"N	103°50'12.107"W	0.29
7800.00	0.490	150.040	7799.65	13.57	-1.60	-13.56	693590.54	729050.80	33°00'11.428"N	103°50'12.102"W	0.14
7900.00	0.390	130.210	7899.65	13.10	-2.19	-13.09	693591.01	729050.21	33°00'11.422"N	103°50'12.096"W	0.18
8000.00	0.640	143.200	7999.64	12.51	-2.85	-12.50	693591.60	729049.55	33°00'11.415"N	103°50'12.089"W	0.27
8100.00	0.750	129.710	8099.64	11.67	-3.72	-11.66	693592.44	729048.68	33°00'11.407"N	103°50'12.079"W	0.20
8200.00	0.690	125.410	8199.63	10.68	-4.49	-10.66	693593.44	729047.91	33°00'11.399"N	103°50'12.068"W	0.08
8232.00	0.760	125.950	8231.62	10.35	-4.72	-10.34	693593.77	729047.68	33°00'11.397"N	103°50'12.064"W	0.22
8532.00	1.000	87.500	8531.59	6.13	-5.78	-6.11	693597.99	729046.62	33°00'11.386"N	103°50'12.014"W	0.21
8564.00	2.100	258.300	8563.59	6.43	-5.88	-6.40	693597.70	729046.52	33°00'11.385"N	103°50'12.018"W	9.66
8595.00	11.100	260.000	8594.35	9.93	-6.52	-9.91	693594.19	729045.88	33°00'11.379"N	103°50'12.059"W	29.04
8627.00	19.400	264.300	8625.20	18.27	-7.58	-18.24	693585.86	729044.82	33°00'11.369"N	103°50'12.157"W	26.16
8658.00	27.900	262.300	8653.57	30.61	-9.07	-30.58	693573.53	729043.33	33°00'11.355"N	103°50'12.302"W	27.54
8690.00	36.100	262.000	8680.68	47.40	-11.39	-47.36	693556.74	729041.01	33°00'11.332"N	103°50'12.499"W	25.63



Actual Wellpath Report

No. 3H AWP
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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 3H SHL
Area	Chaves County, NM	Well	No. 3H
Field	(Valley) Sec 20, T15S, R31E	Wellbore	No. 3H AWP
Facility	Valley Forge 20 State Com #3H		

WELLPATH DATA (143 stations)

MD	Inclination	Azimuth	TVD	Vert Sect	North	East	Grid East	Grid North	Latitude	Longitude	DLS
[ft]	[°]	[°]	[ft]	[ft]	[ft]	[ft]	[srv ft]	[srv ft]			[°/100ft]
8722.00	44.500	263.700	8705.07	67.93	-13.94	-67.88	693536.22	729038.47	33°00'11.308"N	103°50'12.740"W	26.47
8753.00	53.400	264.600	8725.40	91.17	-16.30	-91.11	693512.99	729036.10	33°00'11.286"N	103°50'13.013"W	28.79
8785.00	63.300	263.000	8742.18	118.23	-19.26	-118.16	693485.95	729033.14	33°00'11.258"N	103°50'13.331"W	31.23
8812.00	71.800	261.700	8752.48	142.95	-22.59	-142.87	693461.24	729029.81	33°00'11.226"N	103°50'13.621"W	31.79
8848.00	84.600	261.600	8759.82	177.76	-27.70	-177.66	693426.45	729024.71	33°00'11.177"N	103°50'14.030"W	35.56
8880.00	86.900	265.500	8762.20	209.47	-31.28	-209.36	693394.75	729021.12	33°00'11.143"N	103°50'14.402"W	14.12
8912.00	87.000	268.100	8763.90	241.38	-33.06	-241.26	693362.85	729019.34	33°00'11.127"N	103°50'14.777"W	8.12
8975.00	90.100	269.500	8765.49	304.34	-34.38	-304.22	693299.90	729018.02	33°00'11.117"N	103°50'15.516"W	5.40
9070.00	90.000	269.900	8765.41	399.34	-34.88	-399.22	693204.91	729017.52	33°00'11.116"N	103°50'16.632"W	0.43
9165.00	91.700	270.100	8764.00	494.33	-34.88	-494.20	693109.93	729017.52	33°00'11.121"N	103°50'17.747"W	1.80
9260.00	91.200	270.600	8761.60	589.29	-34.30	-589.17	693014.97	729018.10	33°00'11.131"N	103°50'18.862"W	0.74
9355.00	90.600	269.600	8760.10	684.27	-34.13	-684.16	692919.99	729018.27	33°00'11.137"N	103°50'19.977"W	1.23
9450.00	89.900	269.000	8759.69	779.27	-35.29	-779.15	692825.00	729017.11	33°00'11.130"N	103°50'21.093"W	0.97
9545.00	91.500	270.400	8758.53	874.26	-35.79	-874.13	692730.02	729016.61	33°00'11.129"N	103°50'22.208"W	2.24
9640.00	91.900	270.400	8755.71	969.21	-35.13	-969.09	692635.07	729017.27	33°00'11.140"N	103°50'23.323"W	0.42
9734.00	90.600	270.600	8753.66	1063.18	-34.31	-1063.06	692541.11	729018.09	33°00'11.153"N	103°50'24.426"W	1.40
9829.00	90.900	271.000	8752.42	1158.15	-32.98	-1158.04	692446.13	729019.42	33°00'11.170"N	103°50'25.541"W	0.53
9924.00	89.500	270.800	8752.09	1253.13	-31.49	-1253.03	692351.15	729020.91	33°00'11.190"N	103°50'26.657"W	1.49
10019.00	89.200	271.200	8753.16	1348.11	-29.83	-1348.01	692256.18	729022.57	33°00'11.210"N	103°50'27.772"W	0.53
10114.00	88.800	271.100	8754.82	1443.07	-27.92	-1442.97	692161.22	729024.48	33°00'11.234"N	103°50'28.887"W	0.43
10209.00	89.800	271.100	8755.98	1538.03	-26.10	-1537.95	692066.25	729026.30	33°00'11.256"N	103°50'30.002"W	1.05
10304.00	89.400	271.000	8756.64	1633.01	-24.36	-1632.93	691971.28	729028.04	33°00'11.278"N	103°50'31.117"W	0.43
10399.00	91.000	273.000	8756.31	1727.93	-21.05	-1727.86	691876.35	729031.36	33°00'11.315"N	103°50'32.232"W	2.70
10493.00	90.900	272.400	8754.75	1821.79	-16.62	-1821.75	691782.47	729035.78	33°00'11.363"N	103°50'33.334"W	0.65
10589.00	90.200	273.000	8753.83	1917.67	-12.10	-1917.63	691686.59	729040.30	33°00'11.412"N	103°50'34.459"W	0.96
10684.00	89.400	272.600	8754.16	2012.53	-7.46	-2012.52	691591.71	729044.95	33°00'11.462"N	103°50'35.573"W	0.94
10779.00	89.900	271.600	8754.74	2107.45	-3.97	-2107.45	691496.79	729048.43	33°00'11.501"N	103°50'36.688"W	1.18
10874.00	89.800	271.400	8754.99	2202.41	-1.49	-2202.42	691401.83	729050.91	33°00'11.530"N	103°50'37.803"W	0.24
10969.00	90.300	272.200	8754.91	2297.35	1.50	-2297.37	691306.88	729053.90	33°00'11.564"N	103°50'38.917"W	0.99
11064.00	89.700	272.700	8754.91	2392.25	5.56	-2392.28	691211.97	729057.96	33°00'11.609"N	103°50'40.032"W	0.82



Actual Wellpath Report

No. 3H AWP
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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 3H SHL
Area	Chaves County, NM	Well	No. 3H
Field	(Valley) Sec 20, T15S, R31E	Wellbore	No. 3H AWB
Facility	Valley Forge 20 State Com #3H		

WELLPATH DATA (143 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]
11159.00	90.200	271.400	8754.99	2487.17	8.96	-2487.22	691117.04	729061.35	33°00'11.647"N	103°50'41.146"W	1.47
11254.00	89.700	270.600	8755.08	2582.15	10.61	-2582.21	691022.07	729063.01	33°00'11.667"N	103°50'42.261"W	0.99
11349.00	89.700	271.500	8755.57	2677.13	12.35	-2677.19	690927.09	729064.75	33°00'11.689"N	103°50'43.376"W	0.95
11445.00	91.600	270.900	8754.49	2773.09	14.36	-2773.16	690831.13	729066.76	33°00'11.713"N	103°50'44.503"W	2.08
11540.00	89.400	270.900	8753.66	2868.06	15.86	-2868.13	690736.16	729068.26	33°00'11.732"N	103°50'45.618"W	2.32
11635.00	90.100	270.900	8754.07	2963.04	17.35	-2963.12	690641.18	729069.75	33°00'11.752"N	103°50'46.734"W	0.74
11730.00	88.900	269.400	8754.90	3058.03	17.60	-3058.11	690546.19	729070.00	33°00'11.758"N	103°50'47.849"W	2.02
11825.00	89.200	270.500	8756.47	3153.01	17.51	-3153.10	690451.21	729069.91	33°00'11.762"N	103°50'48.964"W	1.20
11920.00	89.000	269.700	8757.97	3248.00	17.68	-3248.08	690356.23	729070.08	33°00'11.768"N	103°50'50.080"W	0.87
12015.00	90.100	269.400	8758.71	3343.00	16.93	-3343.08	690261.24	729069.33	33°00'11.765"N	103°50'51.195"W	1.20
12111.00	90.100	270.000	8758.55	3438.99	16.43	-3439.08	690165.25	729068.83	33°00'11.764"N	103°50'52.322"W	0.62
12206.00	90.100	268.600	8758.38	3533.99	15.27	-3534.07	690070.27	729067.67	33°00'11.757"N	103°50'53.438"W	1.47
12300.00	91.700	269.300	8756.90	3627.96	13.55	-3628.03	689976.31	729065.95	33°00'11.744"N	103°50'54.541"W	1.86
12396.00	91.900	268.800	8753.89	3723.91	11.96	-3723.97	689880.37	729064.36	33°00'11.733"N	103°50'55.668"W	0.56
12491.00	91.200	268.500	8751.32	3818.85	9.72	-3818.91	689785.44	729062.12	33°00'11.715"N	103°50'56.783"W	0.80
12586.00	91.100	267.900	8749.41	3913.80	6.74	-3913.85	689690.51	729059.14	33°00'11.690"N	103°50'57.897"W	0.64
12681.00	90.900	268.900	8747.75	4008.75	4.09	-4008.79	689595.57	729056.48	33°00'11.668"N	103°50'59.012"W	1.07
12776.00	89.800	269.700	8747.17	4103.75	2.92	-4103.78	689500.59	729055.32	33°00'11.661"N	103°51'00.128"W	1.43
12871.00	91.100	268.200	8746.43	4198.73	1.18	-4198.76	689405.62	729053.58	33°00'11.648"N	103°51'01.243"W	2.09
12965.00	91.100	268.000	8744.62	4292.67	-1.93	-4292.69	689311.70	729050.47	33°00'11.621"N	103°51'02.346"W	0.21
13060.00	91.500	267.800	8742.47	4387.59	-5.41	-4387.60	689216.79	729046.99	33°00'11.591"N	103°51'03.461"W	0.47
13150.00	92.500	267.900	8739.33	4477.48	-8.79	-4477.48	689126.92	729043.61	33°00'11.562"N	103°51'04.516"W	1.12
13203.00	92.500	267.900	8737.01	4530.40	-10.73	-4530.40	689074.01	729041.67	33°00'11.545"N	103°51'05.138"W	0.00



Actual Wellpath Report

No. 3H AWP

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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 3H SHL
Area	Chaves County, NM	Well	No. 3H
Field	(Valley) Sec 20, T15S, R31E	Wellbore	No. 3H AWB
Facility	Valley Forge 20 State Com #3H		

TARGETS

Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [srv ft]	Grid North [srv ft]	Latitude	Longitude	Shape
No. 3H PBHL		8734.00	-16.24	-4541.89	689062.51	729036.16	33°00'11.491"N	103°51'05.273"W	point

WELLPATH COMPOSITION : Ref Wellbore: No. 3H AWB : Ref Wellpath: No. 3H AWP

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
0.00	8232.00	Generic gyro - continuous (Standard)	GYRO <100 - 8232>	No. 3H AWB
8232.00	13150.00	NaviTrak (Standard)	MWD <8532 - 13150>	No. 3H AWB
13150.00	13203.00	Blind Drilling (std)	Projection to bit	No. 3H AWB