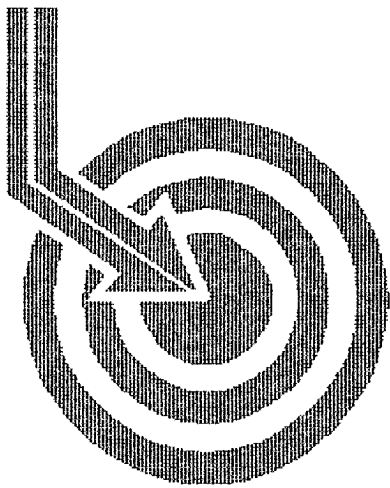




Scientific Drilling

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SEP 20 2010
HOBBSOCD

CIMAREX ENERGY

Field: Abo
Site: Chaves County, NM
Well: Ticonderoga 16 State Com #4 &
Wellpath: VH - Job #32K0510377
Survey: 05/18/10

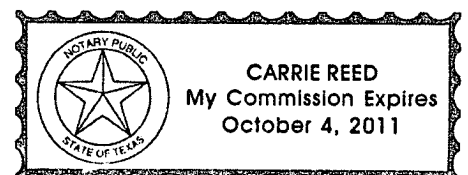
SUR @ P-16-15s-31e, 375/S & 375/E
BHL @ M-16-15s-31e, 366/S & 4901/E
API # 30-005-29062

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

Robert
Company Representative

Notarized this date 21st of June, 2010.

Carrie Reed
Notary Signature
County of Midland
State of Texas





Scientific Drilling International, Inc.

Survey Report

Company: CIMAREX ENERGY	Date: 5/21/2010	Time: 15:06:04	Page: 1
Field: Abo	Co-ordinate(NE) Reference:	Site: Chaves County, NM, Grid North	
Site: Chaves County, NM	Vertical (TVD) Reference:	SITE 0.0	
Well: Ticonderoga 16 State Com #4	Section (VS) Reference:	Well (0.00N,0.00E,359.72Azi)	
Wellpath: VH - Job #32K0510377	Survey Calculation Method: Minimum Curvature	Db: Sybase	

Survey: 05/18/10	Start Date: 5/18/2010
Company: Scientific Drilling Internatio	Engineer: Madrid w/Renegade
Tool: Keeper,Keeper Gyro	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	359.72	0.0	0.0	0.0	0.0	0.00	0.0	0.00
100.0	0.89	91.79	100.0	0.0	0.0	0.8	0.89	0.8	91.79
200.0	0.64	87.60	200.0	0.0	0.0	2.1	0.26	2.1	90.68
300.0	0.50	86.46	300.0	0.0	0.0	3.1	0.14	3.1	89.53
400.0	0.15	100.14	400.0	0.0	0.0	3.7	0.36	3.7	89.55
500.0	0.20	100.49	500.0	0.0	0.0	4.0	0.05	4.0	90.37
600.0	0.28	104.72	600.0	-0.1	-0.1	4.4	0.08	4.4	91.57
700.0	0.30	110.47	700.0	-0.3	-0.3	4.9	0.04	4.9	93.22
800.0	0.31	101.93	800.0	-0.4	-0.4	5.4	0.05	5.4	94.48
900.0	0.17	74.56	900.0	-0.5	-0.4	5.8	0.18	5.8	94.33
1000.0	0.16	135.68	1000.0	-0.5	-0.5	6.0	0.17	6.0	94.73
1100.0	0.31	142.40	1100.0	-0.8	-0.8	6.3	0.15	6.3	97.37
1200.0	0.45	132.21	1200.0	-1.3	-1.3	6.7	0.15	6.9	100.84
1300.0	0.42	141.51	1300.0	-1.9	-1.8	7.3	0.08	7.5	104.24
1400.0	0.45	133.42	1400.0	-2.4	-2.4	7.8	0.07	8.1	107.15
1500.0	0.29	152.49	1500.0	-2.9	-2.9	8.2	0.20	8.7	109.49
1600.0	0.36	148.62	1600.0	-3.4	-3.4	8.5	0.07	9.1	111.83
1700.0	0.37	160.13	1700.0	-4.0	-4.0	8.7	0.07	9.6	114.40
1800.0	0.62	114.67	1800.0	-4.5	-4.5	9.3	0.45	10.3	115.69
1900.0	1.22	85.62	1899.9	-4.7	-4.6	10.9	0.74	11.8	113.06
2000.0	1.79	88.61	1999.9	-4.6	-4.5	13.5	0.58	14.2	108.48
2100.0	2.25	85.12	2099.8	-4.4	-4.3	17.0	0.48	17.6	104.20
2200.0	2.90	82.92	2199.7	-3.9	-3.8	21.5	0.66	21.8	100.10
2300.0	3.11	78.97	2299.6	-3.1	-3.0	26.7	0.29	26.8	96.41
2400.0	2.99	76.05	2399.5	-2.0	-1.8	31.9	0.20	31.9	93.32
2500.0	2.52	70.50	2499.4	-0.7	-0.5	36.5	0.54	36.5	90.76
2600.0	2.00	67.13	2599.3	0.7	0.9	40.1	0.54	40.1	88.68
2700.0	1.68	62.90	2699.2	2.1	2.3	43.0	0.35	43.1	86.98
2800.0	1.49	59.04	2799.2	3.4	3.6	45.5	0.22	45.6	85.46
2900.0	1.37	59.11	2899.2	4.7	4.9	47.6	0.12	47.9	84.13
3000.0	0.97	55.78	2999.1	5.7	6.0	49.3	0.41	49.7	83.09
3100.0	0.79	45.82	3099.1	6.7	6.9	50.5	0.24	51.0	82.18
3200.0	0.74	40.26	3199.1	7.7	7.9	51.4	0.09	52.0	81.26
3300.0	0.61	25.95	3299.1	8.6	8.9	52.1	0.21	52.8	80.32
3400.0	0.49	6.87	3399.1	9.5	9.8	52.4	0.22	53.3	79.42
3500.0	0.54	11.95	3499.1	10.4	10.7	52.5	0.07	53.6	78.52
3600.0	0.55	10.13	3599.1	11.3	11.6	52.7	0.02	54.0	77.58
3700.0	0.65	6.76	3699.1	12.4	12.6	52.9	0.11	54.3	76.55
3800.0	0.58	6.88	3799.1	13.4	13.7	53.0	0.07	54.7	75.50
3900.0	0.68	13.16	3899.1	14.5	14.8	53.2	0.12	55.2	74.46
4000.0	0.70	14.63	3999.1	15.7	16.0	53.5	0.03	55.8	73.39
4100.0	0.72	16.87	4099.1	16.9	17.1	53.8	0.03	56.5	72.32
4200.0	0.75	19.63	4199.0	18.1	18.4	54.2	0.05	57.2	71.28
4300.0	0.61	12.67	4299.0	19.2	19.5	54.5	0.16	57.9	70.33
4400.0	0.61	11.33	4399.0	20.3	20.5	54.8	0.01	58.5	69.44
4500.0	0.56	13.28	4499.0	21.3	21.5	55.0	0.05	59.1	68.61
4600.0	0.54	15.48	4599.0	22.2	22.5	55.2	0.03	59.6	67.86
4700.0	0.54	17.48	4699.0	23.1	23.4	55.5	0.02	60.2	67.16
4800.0	0.56	19.59	4799.0	24.0	24.3	55.8	0.03	60.8	66.48



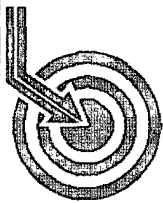
Scientific Drilling International, Inc.

Survey Report

Company: CIMAREX ENERGY	Date: 5/21/2010	Time: 15:06:04	Page: 2
Field: Abo	Co-ordinate(NE) Reference:	Site: Chaves County, NM, Grid North	
Site: Chaves County, NM	Vertical (TVD) Reference:	SITE 0.0	
Well: Ticonderoga 16 State Com #4	Section (VS) Reference:	Well (0.00N,0.00E,359.72Azi)	
Wellpath: VH - Job #32K0510377	Survey Calculation Method:	Minimum Curvature	Db: Sybase

Survey

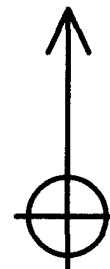
MD ft	Incl deg	Azim deg	TVD ft	VS ft	N/S ft	E/W ft	DLS deg/100ft	ClsD ft	ClsA deg
4900.0	0.58	18.35	4899.0	24.9	25.2	56.1	0.02	61.5	65.80
5000.0	0.48	12.55	4999.0	25.8	26.1	56.4	0.11	62.1	65.14
5100.0	0.43	17.67	5099.0	26.6	26.9	56.6	0.06	62.6	64.59
5200.0	0.24	23.55	5199.0	27.2	27.4	56.8	0.19	63.0	64.21
5300.0	0.18	358.56	5299.0	27.5	27.8	56.8	0.11	63.3	63.96
5400.0	0.09	322.76	5399.0	27.7	28.0	56.8	0.12	63.3	63.76
5500.0	0.23	326.99	5499.0	28.0	28.2	56.6	0.14	63.3	63.51
5600.0	0.58	330.28	5599.0	28.6	28.8	56.3	0.35	63.2	62.87
5700.0	0.71	326.02	5699.0	29.5	29.8	55.7	0.14	63.2	61.85
5800.0	0.81	324.86	5799.0	30.6	30.9	54.9	0.10	63.0	60.66
5900.0	0.86	329.15	5899.0	31.8	32.1	54.1	0.08	62.9	59.33
6000.0	0.86	344.35	5999.0	33.2	33.5	53.6	0.23	63.1	57.99
6100.0	0.92	347.32	6099.0	34.7	35.0	53.2	0.08	63.6	56.66
6200.0	0.99	345.46	6198.9	36.3	36.6	52.8	0.08	64.2	55.26
6300.0	0.85	333.20	6298.9	37.8	38.1	52.2	0.24	64.6	53.89
6400.0	0.74	329.29	6398.9	39.1	39.3	51.6	0.12	64.8	52.68
6500.0	0.74	337.50	6498.9	40.2	40.5	51.0	0.11	65.1	51.56
6600.0	0.70	328.59	6598.9	41.3	41.6	50.4	0.12	65.4	50.49
6700.0	0.80	324.20	6698.9	42.4	42.7	49.7	0.12	65.5	49.35
6800.0	0.75	326.92	6798.9	43.5	43.8	48.9	0.06	65.7	48.18
6900.0	0.79	327.61	6898.9	44.7	44.9	48.2	0.04	65.9	47.02
7000.0	0.71	307.89	6998.9	45.6	45.9	47.3	0.27	65.9	45.90
7100.0	0.93	328.21	7098.9	46.7	46.9	46.4	0.36	66.0	44.68
7200.0	0.74	329.09	7198.8	48.0	48.2	45.7	0.19	66.4	43.46
7300.0	0.92	336.64	7298.8	49.3	49.5	45.0	0.21	66.9	42.30
7400.0	0.88	346.09	7398.8	50.7	51.0	44.5	0.15	67.7	41.14
7500.0	0.70	14.30	7498.8	52.1	52.3	44.5	0.42	68.7	40.38
7600.0	0.76	35.96	7598.8	53.2	53.4	45.0	0.28	69.9	40.12
7700.0	1.09	36.66	7698.8	54.5	54.7	46.0	0.33	71.5	40.03
7800.0	1.07	47.08	7798.8	55.9	56.1	47.2	0.20	73.4	40.08
7900.0	1.11	48.25	7898.8	57.2	57.4	48.6	0.05	75.2	40.27
8000.0	1.29	60.49	7998.7	58.4	58.6	50.3	0.31	77.3	40.66
8100.0	1.69	66.25	8098.7	59.5	59.8	52.7	0.43	79.7	41.39
8118.0	1.61	70.65	8116.7	59.7	59.9	53.2	0.83	80.1	41.56



Scientific
Drilling

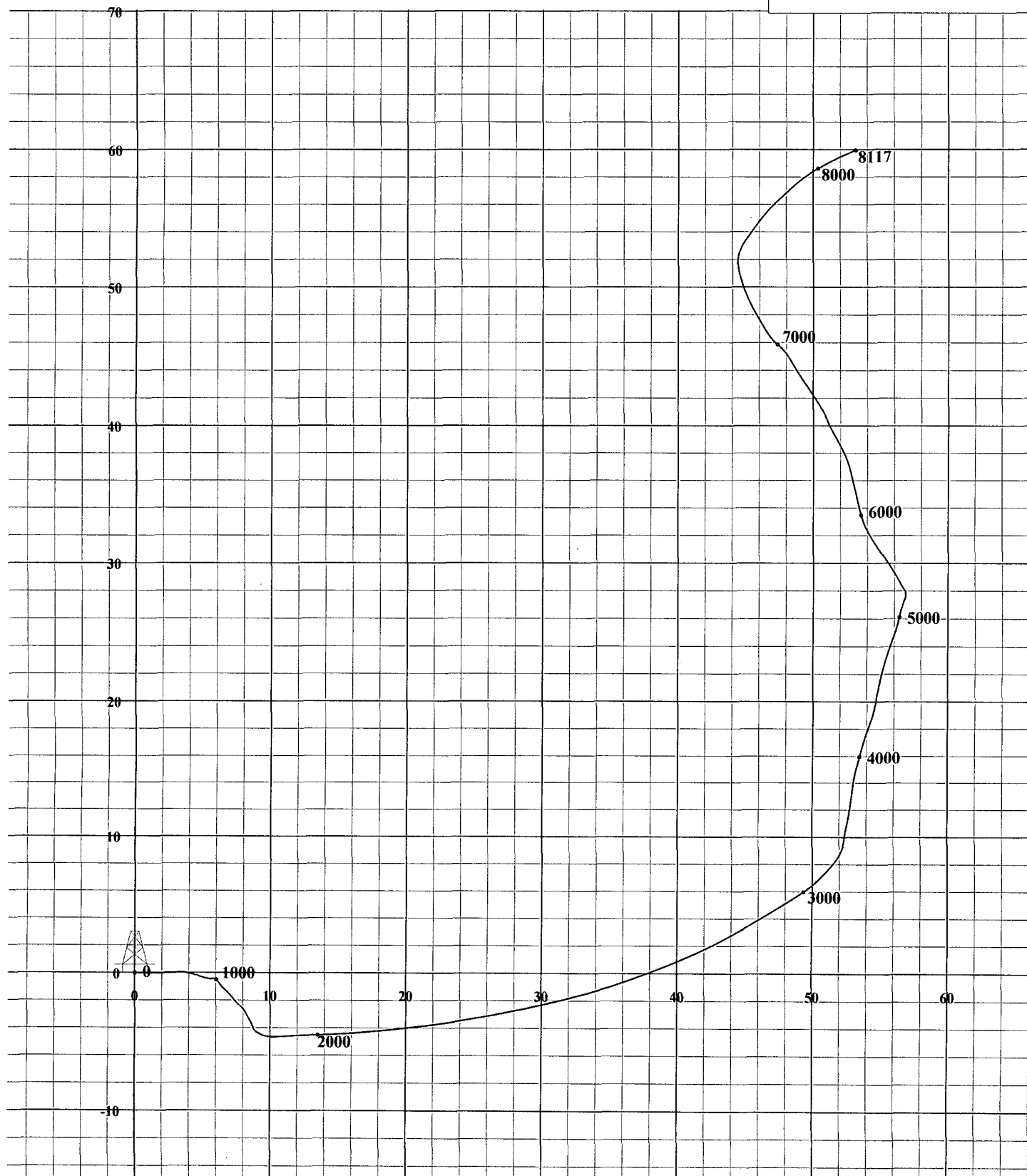
Field: Abo
Site: Chaves County, NM
Well: Ticonderoga 16 State Com #4
Survey: 05/18/10

G/T/M



Azimuths to Grid North
True North: 0.00°
Magnetic North: 0.00°
Magnetic Field
Dip Angle: 0.00°
Date: 5/21/2010
Model: igrf2000

South(-)/North(+) [10ft/in]



West(-)/East(+) [10ft/in]



Cimarex Energy Co.

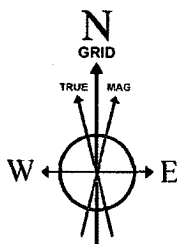
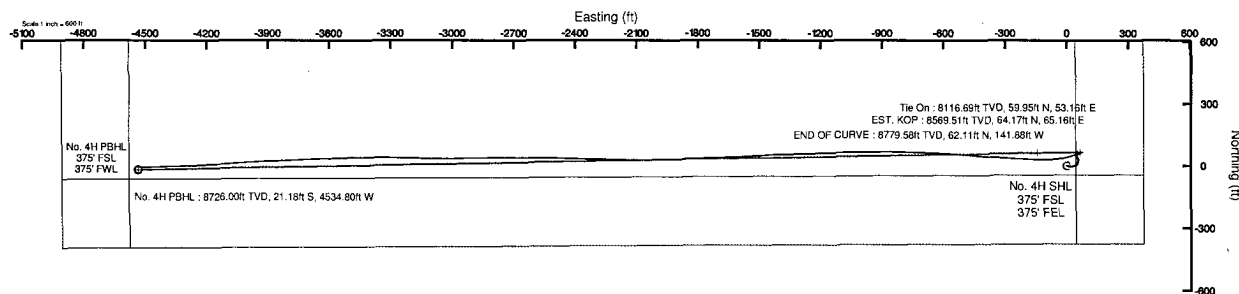
Location: Chaves County, NM
Field: (Ticonderoga) Sec 16, T15S, R31E
Facility: Ticonderoga 16 St Com No. 4H

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



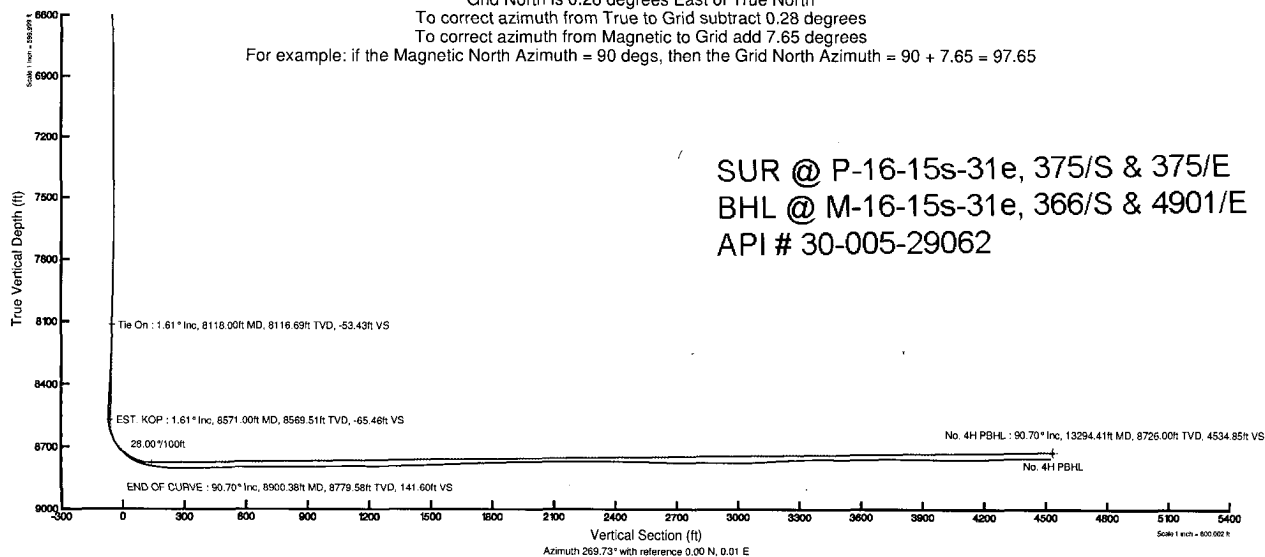
Well Profile Data								
Design Comment	MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (°/100ft)	VS (ft)
Tie On	8118.00	1.610	70.650	8116.69	59.95	53.16	0.00	-53.43
EST. KOP	8571.00	1.610	70.650	8569.51	64.17	65.16	0.00	-65.46
END OF CURVE	8900.38	90.699	268.914	8779.58	62.11	-141.88	28.00	141.60
No. 4H PBHL	13294.41	90.699	268.914	8726.00	-21.18	-4534.80	0.00	4534.85

Plot reference wellpath is Plan #2	
True vertical depths are referenced to Cactus 122 on No. 4H SHL (KB)	Grid System: NAD83 / TM New Mexico State Planes, Eastern Zone (3001), US feet
Measured depths are referenced to Cactus 122 on No. 4H SHL (KB)	North Reference: Grid north
Cactus 122 on No. 4H SHL (KB) to Mean Sea Level: 4438.5 feet	Scale: True distance
Mean Sea Level to Mud line (Facility: Ticonderoga 16 St Com No. 4H): -4410 feet	Depths are in feet
Coordinates are in feet referenced to SL	Created by: Victor Hernandez on 6/4/2010



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BGGM (1945.0 to 2011.0) Dip: 60.92° Field: 49228.8 nT
Magnetic North is 7.93 degrees East of True North (at 5/17/2010)
Grid North is 0.28 degrees East of True North
To correct azimuth from True to Grid subtract 0.28 degrees
To correct azimuth from Magnetic to Grid add 7.65 degrees
For example: if the Magnetic North Azimuth = 90 degs, then the Grid North Azimuth = 90 + 7.65 = 97.65



SUR @ P-16-15s-31e, 375/S & 375/E
BHL @ M-16-15s-31e, 366/S & 4901/E
API # 30-005-29062



Actual Wellpath Report

No. 4H AWP

Page 1 of 7



REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Chaves County, NM	Well	No. 4H
Field	(Ticonderoga) Sec 16, T15S, R31E	Wellbore	No. 4H AWB
Facility	Ticonderoga 16 St Com No. 4H		

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	0.999938	Report Generated	6/4/2010 at 8:52:05 AM
Convergence at slot	0.28° 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	0.01	698879.04	731431.23	33°00'34.729"N	103°49'09.864"W
Facility Reference Pt			698879.04	731431.23	33°00'34.729"N	103°49'09.865"W
Field Reference Pt			694286.00	734335.70	33°01'03.686"N	103°50'03.641"W

WELLPATH DATUM

Calculation method	Minimum curvature	Cactus 122 on No. 4H SHL (KB) to GL	28.50ft
Horizontal Reference Pt	SL	Cactus 122 on No. 4H SHL (KB) to Mean Sea Level	4438.50ft
Vertical Reference Pt	Cactus 122 on No. 4H SHL (KB)	GL to Mud Line (Facility)	0.00ft
MD Reference Pt	Cactus 122 on No. 4H SHL (KB)	Section Origin	N 0.00, E 0.01 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	269.73°



Actual Wellpath Report

No. 4H AWP

Page 2 of 7



REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Chaves County, NM	Well	No. 4H
Field	(Ticonderoga) Sec 16, T15S, R31E	Wellbore	No. 4H AWB
Facility	Ticonderoga 16 St Com No. 4H		

WELLPATH DATA (159 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	91.790	0.00	0.00	0.00	0.01	698879.04	731431.23	33°00'34.729"N	103°49'09.864"W	0.00
100.00	0.890	91.790	100.00	-0.78	-0.02	0.78	698879.82	731431.21	33°00'34.729"N	103°49'09.855"W	0.89
200.00	0.640	87.600	199.99	-2.11	-0.02	2.12	698881.15	731431.20	33°00'34.729"N	103°49'09.840"W	0.26
300.00	0.500	86.460	299.98	-3.10	0.03	3.11	698882.14	731431.26	33°00'34.729"N	103°49'09.828"W	0.14
400.00	0.150	100.140	399.98	-3.67	-0.03	3.67	698882.71	731431.26	33°00'34.729"N	103°49'09.821"W	0.36
500.00	0.200	100.490	499.98	-3.97	-0.02	3.97	698883.01	731431.20	33°00'34.729"N	103°49'09.818"W	0.05
600.00	0.280	104.720	599.98	-4.38	-0.12	4.38	698883.42	731431.11	33°00'34.728"N	103°49'09.813"W	0.08
700.00	0.300	110.470	699.98	-4.86	-0.27	4.86	698883.90	731430.96	33°00'34.726"N	103°49'09.807"W	0.04
800.00	0.310	101.930	799.98	-5.37	-0.42	5.37	698884.41	731430.81	33°00'34.725"N	103°49'09.801"W	0.05
900.00	0.170	74.560	899.98	-5.77	-0.44	5.78	698884.82	731430.79	33°00'34.725"N	103°49'09.797"W	0.18
1000.00	0.160	135.680	999.98	-6.01	-0.50	6.02	698885.06	731430.73	33°00'34.724"N	103°49'09.794"W	0.17
1100.00	0.310	142.400	1099.97	-6.28	-0.81	6.28	698885.32	731430.42	33°00'34.721"N	103°49'09.791"W	0.15
1200.00	0.450	132.210	1199.97	-6.73	-1.29	6.74	698885.77	731429.94	33°00'34.716"N	103°49'09.785"W	0.15
1300.00	0.420	141.510	1299.97	-7.25	-1.84	7.26	698886.29	731429.39	33°00'34.711"N	103°49'09.779"W	0.08
1400.00	0.450	133.420	1399.97	-7.76	-2.40	7.77	698886.81	731428.83	33°00'34.705"N	103°49'09.773"W	0.07
1500.00	0.290	152.490	1499.96	-8.16	-2.89	8.17	698887.21	731428.34	33°00'34.700"N	103°49'09.769"W	0.20
1600.00	0.360	148.620	1599.96	-8.43	-3.38	8.46	698887.49	731427.85	33°00'34.695"N	103°49'09.765"W	0.07
1700.00	0.370	160.130	1699.96	-8.70	-3.96	8.73	698887.76	731427.27	33°00'34.690"N	103°49'09.762"W	0.07
1800.00	0.620	114.670	1799.96	-9.30	-4.48	9.33	698888.36	731426.74	33°00'34.684"N	103°49'09.755"W	0.45
1900.00	1.220	85.620	1899.94	-10.86	-4.63	10.88	698889.92	731426.60	33°00'34.683"N	103°49'09.737"W	0.74
2000.00	1.790	88.610	1999.91	-13.48	-4.51	13.51	698892.54	731426.72	33°00'34.684"N	103°49'09.706"W	0.58
2100.00	2.250	85.120	2099.85	-17.00	-4.31	17.02	698896.06	731426.92	33°00'34.686"N	103°49'09.665"W	0.48
2200.00	2.900	82.920	2199.75	-21.47	-3.83	21.49	698900.52	731427.40	33°00'34.690"N	103°49'09.612"W	0.66
2300.00	3.110	78.970	2299.61	-26.64	-3.00	26.66	698905.70	731428.23	33°00'34.698"N	103°49'09.552"W	0.29
2400.00	2.990	76.050	2399.47	-31.84	-1.85	31.86	698910.89	731429.38	33°00'34.709"N	103°49'09.491"W	0.20
2500.00	2.520	70.500	2499.35	-36.45	-0.49	36.46	698915.49	731430.74	33°00'34.723"N	103°49'09.436"W	0.54
2600.00	2.000	67.130	2599.27	-40.14	0.93	40.14	698919.17	731432.16	33°00'34.737"N	103°49'09.393"W	0.54
2700.00	1.680	62.900	2699.22	-43.06	2.27	43.05	698922.08	731433.50	33°00'34.750"N	103°49'09.359"W	0.35
2800.00	1.490	59.040	2799.18	-45.48	3.61	45.47	698924.50	731434.84	33°00'34.763"N	103°49'09.330"W	0.22
2900.00	1.370	59.110	2899.15	-47.63	4.89	47.61	698926.64	731436.12	33°00'34.775"N	103°49'09.305"W	0.12



Actual Wellpath Report

No. 4H AWP

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REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Chaves County, NM	Well	No. 4H
Field	(Ticonderoga) Sec 16, T15S, R31E	Wellbore	No. 4H AWB
Facility	Ticonderoga 16 St Com No. 4H		

WELLPATH DATA (159 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	0.970	55.780	2999.13	-49.36	5.98	49.34	698928.37	731437.21	33°00'34.786"N	103°49'09.285"W	0.41
3100.00	0.790	45.820	3099.12	-50.56	6.94	50.53	698929.56	731438.17	33°00'34.795"N	103°49'09.271"W	0.24
3200.00	0.740	40.260	3199.11	-51.48	7.91	51.44	698930.48	731439.14	33°00'34.805"N	103°49'09.260"W	0.09
3300.00	0.610	25.950	3299.10	-52.13	8.88	52.09	698931.13	731440.11	33°00'34.815"N	103°49'09.252"W	0.21
3400.00	0.490	6.870	3399.10	-52.42	9.79	52.38	698931.41	731441.01	33°00'34.824"N	103°49'09.249"W	0.22
3500.00	0.540	11.950	3499.09	-52.57	10.67	52.53	698931.56	731441.90	33°00'34.832"N	103°49'09.247"W	0.07
3600.00	0.550	10.130	3599.09	-52.76	11.60	52.71	698931.74	731442.83	33°00'34.842"N	103°49'09.245"W	0.02
3700.00	0.650	6.760	3699.08	-52.91	12.64	52.86	698931.89	731443.87	33°00'34.852"N	103°49'09.243"W	0.11
3800.00	0.580	6.880	3799.08	-53.05	13.71	52.99	698932.02	731444.93	33°00'34.862"N	103°49'09.242"W	0.07
3900.00	0.680	13.160	3899.07	-53.25	14.79	53.18	698932.22	731446.01	33°00'34.873"N	103°49'09.239"W	0.12
4000.00	0.700	14.630	3999.07	-53.54	15.96	53.47	698932.50	731447.18	33°00'34.885"N	103°49'09.236"W	0.03
4100.00	0.720	16.870	4099.06	-53.88	17.15	53.81	698932.84	731448.38	33°00'34.896"N	103°49'09.232"W	0.03
4200.00	0.750	19.630	4199.05	-54.29	18.37	54.21	698933.24	731449.59	33°00'34.908"N	103°49'09.227"W	0.05
4300.00	0.610	12.670	4299.04	-54.63	19.50	54.55	698933.58	731450.73	33°00'34.920"N	103°49'09.223"W	0.16
4400.00	0.610	11.330	4399.04	-54.86	20.54	54.77	698933.80	731451.77	33°00'34.930"N	103°49'09.220"W	0.01
4500.00	0.560	13.280	4499.03	-55.08	21.54	54.99	698934.02	731452.77	33°00'34.940"N	103°49'09.218"W	0.05
4600.00	0.540	15.480	4599.03	-55.32	22.47	55.23	698934.26	731453.70	33°00'34.949"N	103°49'09.215"W	0.03
4700.00	0.540	17.480	4699.02	-55.60	23.37	55.49	698934.52	731454.60	33°00'34.958"N	103°49'09.212"W	0.02
4800.00	0.560	19.590	4799.02	-55.91	24.28	55.80	698934.83	731455.51	33°00'34.967"N	103°49'09.208"W	0.03
4900.00	0.580	18.350	4899.01	-56.23	25.22	56.12	698935.15	731456.45	33°00'34.976"N	103°49'09.204"W	0.02
5000.00	0.480	12.550	4999.01	-56.49	26.11	56.37	698935.40	731457.34	33°00'34.985"N	103°49'09.201"W	0.11
5100.00	0.430	17.670	5099.01	-56.70	26.88	56.58	698935.61	731458.11	33°00'34.993"N	103°49'09.199"W	0.06
5200.00	0.240	23.550	5199.00	-56.90	27.43	56.77	698935.81	731458.66	33°00'34.998"N	103°49'09.196"W	0.19
5300.00	0.180	358.560	5299.00	-56.98	27.78	56.85	698935.88	731459.01	33°00'35.001"N	103°49'09.195"W	0.11
5400.00	0.090	322.760	5399.00	-56.93	28.00	56.80	698935.83	731459.23	33°00'35.004"N	103°49'09.196"W	0.12
5500.00	0.230	326.990	5499.00	-56.77	28.23	56.65	698935.68	731459.46	33°00'35.006"N	103°49'09.198"W	0.14
5600.00	0.580	330.280	5599.00	-56.41	28.84	56.28	698935.32	731460.06	33°00'35.012"N	103°49'09.202"W	0.35
5700.00	0.710	326.020	5698.99	-55.82	29.79	55.69	698934.72	731461.02	33°00'35.021"N	103°49'09.209"W	0.14
5800.00	0.810	324.860	5798.98	-55.07	30.88	54.93	698933.97	731462.11	33°00'35.032"N	103°49'09.218"W	0.10
5900.00	0.860	329.150	5898.97	-54.29	32.10	54.14	698933.17	731463.33	33°00'35.044"N	103°49'09.227"W	0.08



Actual Wellpath Report

No. 4H AWP

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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Chaves County, NM	Well	No. 4H
Field	(Ticonderoga) Sec 16, T15S, R31E	Wellbore	No. 4H AWB
Facility	Ticonderoga 16 St Com No. 4H		

WELLPATH DATA (159 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]
6000.00	0.860	344.350	5998.96	-53.71	33.47	53.56	698932.59	731464.70	33°00'35.058"N	103°49'09.234"W	0.23
6100.00	0.920	347.320	6098.95	-53.33	34.98	53.18	698932.21	731466.20	33°00'35.073"N	103°49'09.238"W	0.08
6200.00	0.990	345.460	6198.94	-52.95	36.60	52.78	698931.82	731467.82	33°00'35.089"N	103°49'09.243"W	0.08
6300.00	0.850	333.200	6298.92	-52.40	38.09	52.23	698931.26	731469.32	33°00'35.104"N	103°49'09.249"W	0.24
6400.00	0.740	329.290	6398.91	-51.75	39.31	51.57	698930.60	731470.54	33°00'35.116"N	103°49'09.257"W	0.12
6500.00	0.740	337.500	6498.91	-51.17	40.46	50.99	698930.02	731471.69	33°00'35.127"N	103°49'09.263"W	0.11
6600.00	0.700	328.590	6598.90	-50.61	41.58	50.43	698929.46	731472.81	33°00'35.138"N	103°49'09.270"W	0.12
6700.00	0.800	324.200	6698.89	-49.89	42.67	49.70	698928.73	731473.90	33°00'35.149"N	103°49'09.278"W	0.12
6800.00	0.750	326.920	6798.88	-49.13	43.78	48.93	698927.97	731475.01	33°00'35.160"N	103°49'09.287"W	0.06
6900.00	0.790	327.610	6898.87	-48.41	44.91	48.21	698927.24	731476.14	33°00'35.171"N	103°49'09.296"W	0.04
7000.00	0.710	307.890	6998.86	-47.56	45.88	47.35	698926.38	731477.10	33°00'35.181"N	103°49'09.306"W	0.27
7100.00	0.930	328.210	7098.85	-46.65	46.95	46.43	698925.46	731478.17	33°00'35.192"N	103°49'09.317"W	0.36
7200.00	0.740	329.090	7198.84	-45.89	48.19	45.67	698924.71	731479.42	33°00'35.204"N	103°49'09.325"W	0.19
7300.00	0.920	336.640	7298.83	-45.25	49.48	45.02	698924.06	731480.71	33°00'35.217"N	103°49'09.333"W	0.21
7400.00	0.880	346.090	7398.82	-44.75	50.96	44.52	698923.55	731482.19	33°00'35.231"N	103°49'09.339"W	0.15
7500.00	0.700	14.300	7498.81	-44.73	52.30	44.49	698923.52	731483.53	33°00'35.245"N	103°49'09.339"W	0.42
7600.00	0.760	35.960	7598.80	-45.27	53.43	45.03	698924.06	731484.66	33°00'35.256"N	103°49'09.333"W	0.28
7700.00	1.090	36.660	7698.79	-46.23	54.73	45.98	698925.02	731485.96	33°00'35.269"N	103°49'09.321"W	0.33
7800.00	1.070	47.080	7798.77	-47.49	56.13	47.24	698926.27	731487.35	33°00'35.282"N	103°49'09.307"W	0.20
7900.00	1.110	48.250	7898.75	-48.90	57.41	48.64	698927.67	731488.64	33°00'35.295"N	103°49'09.290"W	0.05
8000.00	1.290	60.490	7998.73	-50.61	58.61	50.34	698929.38	731489.83	33°00'35.307"N	103°49'09.270"W	0.31
8100.00	1.690	66.250	8098.70	-52.95	59.76	52.67	698931.71	731490.98	33°00'35.318"N	103°49'09.243"W	0.43
8118.00	1.610	70.650	8116.69	-53.43	59.95	53.16	698932.19	731491.17	33°00'35.320"N	103°49'09.237"W	0.83
8452.00	3.200	71.000	8450.39	-66.69	64.54	66.40	698945.43	731495.76	33°00'35.365"N	103°49'09.081"W	0.48
8484.00	3.000	70.100	8482.34	-68.33	65.11	68.03	698947.06	731496.34	33°00'35.370"N	103°49'09.062"W	0.64
8514.00	2.800	73.900	8512.30	-69.77	65.58	69.47	698948.50	731496.81	33°00'35.375"N	103°49'09.045"W	0.92
8547.00	1.800	86.500	8545.27	-71.07	65.84	70.76	698949.79	731497.06	33°00'35.377"N	103°49'09.030"W	3.38
8579.00	6.100	242.600	8577.22	-70.05	65.09	69.75	698948.78	731496.31	33°00'35.370"N	103°49'09.042"W	24.31
8609.00	12.400	243.600	8606.82	-65.74	62.92	65.45	698944.48	731494.14	33°00'35.349"N	103°49'09.092"W	21.01
8642.00	20.900	247.700	8638.41	-57.08	59.10	56.81	698935.84	731490.33	33°00'35.311"N	103°49'09.194"W	25.99



Actual Wellpath Report

No. 4H AWP

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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Chaves County, NM	Well	No. 4H
Field	(Ticonderoga) Sec 16, T15S, R31E	Wellbore	No. 4H AWB
Facility	Ticonderoga 16 St Com No. 4H		

WELLPATH DATA (159 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]
8674.00	28.800	252.100	8667.42	-44.43	54.56	44.18	698923.21	731485.79	33°00'35.267"N	103°49'09.343"W	25.34
8706.00	36.100	253.100	8694.41	-28.02	49.44	27.80	698906.83	731480.67	33°00'35.217"N	103°49'09.535"W	22.87
8737.00	43.700	254.800	8718.17	-8.90	43.97	8.70	698887.73	731475.20	33°00'35.164"N	103°49'09.760"W	24.77
8769.00	50.600	258.800	8739.93	13.95	38.67	-14.13	698864.91	731469.89	33°00'35.113"N	103°49'10.028"W	23.42
8801.00	58.300	262.200	8758.52	39.63	34.41	-39.79	698839.25	731465.64	33°00'35.072"N	103°49'10.330"W	25.56
8832.00	65.700	264.800	8773.07	66.82	31.33	-66.96	698812.08	731462.56	33°00'35.043"N	103°49'10.649"W	24.99
8864.00	73.900	268.000	8784.11	96.77	29.47	-96.91	698782.13	731460.70	33°00'35.026"N	103°49'11.001"W	27.29
8894.00	78.900	271.300	8791.17	125.92	29.30	-126.05	698752.99	731460.53	33°00'35.025"N	103°49'11.343"W	19.80
8926.00	81.500	272.900	8796.61	157.42	30.46	-157.56	698721.48	731461.69	33°00'35.038"N	103°49'11.713"W	9.50
8957.00	83.100	272.400	8800.77	188.10	31.88	-188.25	698690.80	731463.11	33°00'35.054"N	103°49'12.073"W	-5.40
8989.00	86.400	272.700	8803.69	219.92	33.30	-220.08	698658.97	731464.53	33°00'35.069"N	103°49'12.447"W	10.35
9021.00	90.100	273.300	8804.67	251.85	34.97	-252.01	698627.04	731466.20	33°00'35.087"N	103°49'12.822"W	11.71
9052.00	90.200	273.900	8804.59	282.78	36.92	-282.95	698596.10	731468.15	33°00'35.108"N	103°49'13.185"W	1.96
9084.00	89.800	273.900	8804.59	314.70	39.10	-314.88	698564.18	731470.32	33°00'35.131"N	103°49'13.560"W	1.25
9116.00	90.400	274.000	8804.53	346.61	41.30	-346.80	698532.26	731472.53	33°00'35.155"N	103°49'13.935"W	-1.90
9179.00	91.500	274.600	8803.49	409.40	46.02	-409.61	698469.45	731477.25	33°00'35.204"N	103°49'14.672"W	1.99
9211.00	92.000	274.700	8802.51	441.27	48.62	-441.49	698437.57	731479.84	33°00'35.232"N	103°49'15.046"W	1.59
9274.00	91.600	273.800	8800.53	504.04	53.28	-504.29	698374.78	731484.51	33°00'35.281"N	103°49'15.783"W	1.56
9369.00	90.000	273.000	8799.21	598.83	58.92	-599.11	698279.97	731490.14	33°00'35.341"N	103°49'16.896"W	1.88
9464.00	90.100	271.700	8799.12	693.73	62.81	-694.03	698185.05	731494.04	33°00'35.384"N	103°49'18.011"W	-1.37
9559.00	90.000	271.400	8799.04	788.68	65.38	-788.99	698090.10	731496.61	33°00'35.414"N	103°49'19.126"W	0.33
9654.00	90.300	269.800	8798.79	883.67	66.38	-883.98	697995.11	731497.60	33°00'35.429"N	103°49'20.241"W	1.71
9749.00	91.500	269.200	8797.30	978.65	65.55	-978.96	697900.13	731496.77	33°00'35.425"N	103°49'21.356"W	1.41
9844.00	91.500	268.900	8794.81	1073.61	63.97	-1073.92	697805.19	731495.20	33°00'35.414"N	103°49'22.472"W	0.32
9939.00	88.700	268.200	8794.65	1168.58	61.57	-1168.88	697710.23	731492.79	33°00'35.395"N	103°49'23.587"W	3.04
10034.00	91.100	268.300	8794.81	1263.54	58.67	-1263.83	697615.29	731489.89	33°00'35.371"N	103°49'24.702"W	2.53
10129.00	91.100	268.000	8792.99	1358.49	55.60	-1358.76	697520.36	731486.83	33°00'35.345"N	103°49'25.817"W	0.32
10224.00	92.100	266.800	8790.34	1453.37	51.29	-1453.62	697425.51	731482.52	33°00'35.307"N	103°49'26.931"W	1.64
10319.00	92.300	265.900	8786.69	1548.13	45.25	-1548.36	697330.78	731476.48	33°00'35.251"N	103°49'28.044"W	0.97
10415.00	92.300	268.000	8782.84	1643.94	40.15	-1644.14	697235.00	731471.37	33°00'35.206"N	103°49'29.169"W	2.19



Actual Wellpath Report

No. 4H AWP

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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Chaves County, NM	Well	No. 4H
Field	(Ticonderoga) Sec 16, T15S, R31E	Wellbore	No. 4H AWB
Facility	Ticonderoga 16 St Com No. 4H		

WELLPATH DATA (159 stations)

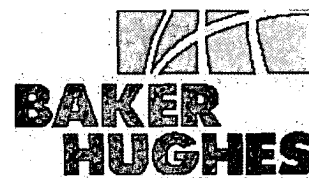
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [srv ft]	Grid North [srv ft]	Latitude	Longitude	DLS [°/100ft]
10509.00	92.200	267.800	8779.15	1737.82	36.70	-1738.00	697141.14	731467.93	33°00'35.176"N	103°49'30.271"W	0.24
10604.00	91.800	267.800	8775.83	1832.71	33.06	-1832.88	697046.28	731464.29	33°00'35.144"N	103°49'31.385"W	0.42
10699.00	91.100	268.500	8773.43	1927.64	29.99	-1927.79	696951.36	731461.22	33°00'35.119"N	103°49'32.500"W	1.04
10794.00	90.700	269.300	8771.93	2022.62	28.17	-2022.76	696856.40	731459.40	33°00'35.105"N	103°49'33.616"W	0.94
10889.00	90.000	270.300	8771.35	2117.61	27.84	-2117.76	696761.41	731459.07	33°00'35.106"N	103°49'34.731"W	1.28
10984.00	90.100	270.900	8771.27	2212.60	28.83	-2212.75	696666.42	731460.06	33°00'35.121"N	103°49'35.846"W	0.64
11079.00	90.000	271.200	8771.19	2307.58	30.58	-2307.74	696571.45	731461.80	33°00'35.143"N	103°49'36.962"W	0.33
11174.00	90.200	271.800	8771.02	2402.53	33.06	-2402.71	696476.48	731464.29	33°00'35.172"N	103°49'38.077"W	0.67
11269.00	89.200	271.000	8771.52	2497.49	35.38	-2497.67	696381.52	731466.61	33°00'35.199"N	103°49'39.192"W	1.35
11364.00	88.400	270.800	8773.51	2592.44	36.87	-2592.64	696286.56	731468.10	33°00'35.218"N	103°49'40.307"W	0.87
11459.00	88.700	270.100	8775.91	2687.41	37.62	-2687.61	696191.60	731468.85	33°00'35.230"N	103°49'41.422"W	0.80
11554.00	90.600	269.700	8776.49	2782.40	37.45	-2782.60	696096.61	731468.68	33°00'35.233"N	103°49'42.537"W	2.04
11649.00	89.400	269.500	8776.49	2877.40	36.79	-2877.60	696001.62	731468.02	33°00'35.231"N	103°49'43.653"W	1.28
11712.00	89.500	268.400	8777.10	2940.39	35.64	-2940.58	695938.64	731466.86	33°00'35.223"N	103°49'44.393"W	1.75
11744.00	89.300	268.100	8777.43	2972.38	34.66	-2972.56	695906.66	731465.89	33°00'35.215"N	103°49'44.768"W	1.13
11776.00	90.700	268.600	8777.43	3004.37	33.74	-3004.55	695874.68	731464.97	33°00'35.207"N	103°49'45.144"W	4.65
11839.00	93.000	270.600	8775.40	3067.32	33.30	-3067.51	695811.72	731464.53	33°00'35.206"N	103°49'45.883"W	4.84
11934.00	93.100	271.700	8770.34	3162.16	35.20	-3162.35	695716.89	731466.43	33°00'35.229"N	103°49'46.997"W	1.16
12029.00	92.700	271.500	8765.54	3256.99	37.85	-3257.19	695622.05	731469.08	33°00'35.260"N	103°49'48.110"W	0.47
12061.00	92.800	271.700	8764.00	3288.93	38.74	-3289.15	695590.10	731469.97	33°00'35.270"N	103°49'48.486"W	0.70
12093.00	92.200	270.600	8762.61	3320.89	39.39	-3321.11	695558.14	731470.61	33°00'35.278"N	103°49'48.861"W	3.91
12124.00	92.000	270.600	8761.47	3351.87	39.71	-3352.09	695527.17	731470.94	33°00'35.283"N	103°49'49.225"W	0.65
12156.00	91.200	270.200	8760.58	3383.85	39.93	-3384.07	695495.18	731471.16	33°00'35.286"N	103°49'49.600"W	2.79
12187.00	90.100	269.100	8760.23	3414.85	39.74	-3415.07	695464.19	731470.97	33°00'35.286"N	103°49'49.964"W	5.02
12219.00	89.400	268.600	8760.37	3446.85	39.10	-3447.06	695432.20	731470.33	33°00'35.281"N	103°49'50.340"W	2.69
12251.00	88.100	268.500	8761.06	3478.83	38.29	-3479.04	695400.22	731469.52	33°00'35.274"N	103°49'50.716"W	4.07
12282.00	89.900	268.400	8761.60	3509.82	37.45	-3510.03	695369.24	731468.68	33°00'35.268"N	103°49'51.079"W	5.82
12314.00	90.300	267.800	8761.55	3541.80	36.39	-3542.01	695337.26	731467.62	33°00'35.259"N	103°49'51.455"W	2.25
12409.00	91.500	268.100	8760.06	3636.74	32.99	-3636.93	695242.34	731464.22	33°00'35.230"N	103°49'52.570"W	1.30
12503.00	90.100	267.600	8758.74	3730.68	29.47	-3730.86	695148.42	731460.70	33°00'35.199"N	103°49'53.673"W	1.58



Actual Wellpath Report

No. 4H AWP

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REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 4H SHL
Area	Chaves County, NM	Well	No. 4H
Field	(Ticonderoga) Sec 16, T15S, R31E	Wellbore	No. 4H AWB
Facility	Ticonderoga 16 St Com No. 4H		

WELLPATH DATA (159 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]
12598.00	89.300	267.100	8759.24	3825.60	25.08	-3825.75	695053.53	731456.30	33°00'35.160"N	103°49'54.788"W	0.99
12693.00	89.800	267.000	8759.99	3920.49	20.19	-3920.62	694958.67	731451.42	33°00'35.116"N	103°49'55.902"W	0.54
12788.00	89.700	266.400	8760.40	4015.36	14.72	-4015.46	694863.83	731445.95	33°00'35.067"N	103°49'57.016"W	0.64
12883.00	90.800	266.500	8759.99	4110.20	8.84	-4110.28	694769.02	731440.07	33°00'35.013"N	103°49'58.130"W	1.16
12978.00	91.100	266.700	8758.41	4205.04	3.20	-4205.10	694674.21	731434.43	33°00'34.962"N	103°49'59.243"W	0.38
13073.00	91.500	267.800	8756.26	4299.93	-1.35	-4299.96	694579.35	731429.88	33°00'34.921"N	103°50'00.358"W	1.23
13168.00	91.000	268.100	8754.19	4394.86	-4.75	-4394.88	694484.44	731426.48	33°00'34.892"N	103°50'01.472"W	0.61
13245.00	90.200	267.900	8753.38	4471.82	-7.44	-4471.83	694407.50	731423.79	33°00'34.869"N	103°50'02.376"W	1.07
13299.00	90.200	267.900	8753.19	4525.79	-9.42	-4525.79	694353.54	731421.81	33°00'34.852"N	103°50'03.010"W	0.00

TARGETS									
Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [srv ft]	Grid North [srv ft]	Latitude	Longitude	Shape
No. 4H PBHL		8726.00	-21.18	-4534.80	694344.53	731410.05	33°00'34.736"N	103°50'03.116"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	8118.00	Generic gyro - continuous (Standard)	GYRO <100 - 8118>	No. 4H AWB
8118.00	13245.00	NaviTrak (Standard)	MWD	No. 4H AWB
13245.00	13299.00	Blind Drilling (std)	Projection to bit	No. 4H AWB