



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance federal 28-05M

Slot B-6

Survey: Survey #1

Survey Report - Geographic

20 October, 2015



Project: Mesa County, CO
Site: Piceance 28-05
Well: Piceance federal 28-05M
Wellbore: Slot B-6
Design: Design #2
Latitude: 39° 15' 3.680 N
Longitude: 107° 46' 46.250 W
Ground Level: 7556.0
Well @ 7578.0usft

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PROJECT DETAILS: Mesa County, CO

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Colorado Central Zone
System Datum: Mean Sea Level

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Piceance federal 28-05M, True North
Vertical (TVD) Reference: Well @ 7578.0usft
Section (VS) Reference: Slot - (0.0N, 0.0E)
Measured Depth Reference: Well @ 7578.0usft
Calculation Method: Minimum Curvature

WELL DETAILS: Piceance federal 28-05M

+N/-S	+E/-W	Northing	Ground Level:	Latitude	Longitude	Slot
0.0	0.0	1524417.38	7556.0	39° 15' 3.680 N	107° 46' 46.250 W	
			Easting 2354548.94			

WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance Federal 28-05M tgt	7903.0	433.1	1419.8	1524814.68	2355979.18	39° 15' 7.960 N	107° 46' 28.200 W	Circle (Radius: 50.0)

SECTION DETAILS

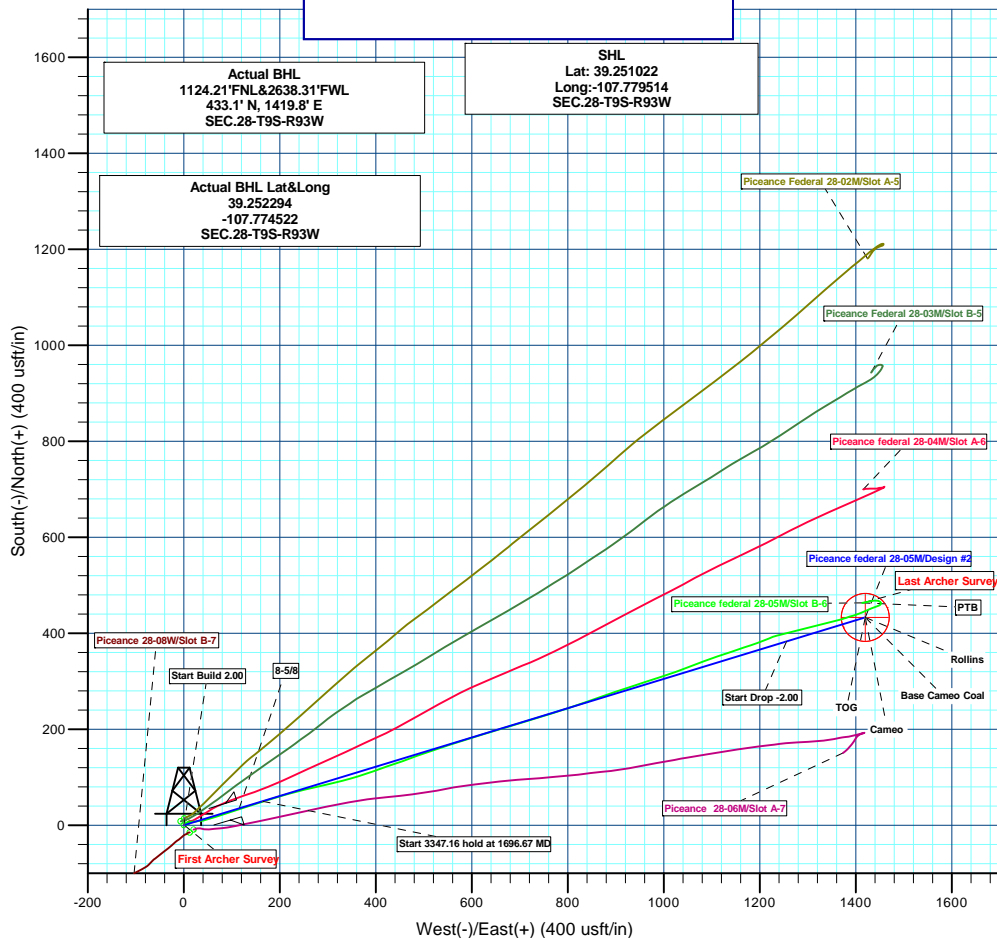
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
700.0	0.00	0.00	700.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
1696.7	19.93	73.04	1676.7	50.1	164.2	2.00	73.04	171.6	Start 3347.16 hold at 1696.67 MD
5043.8	19.93	73.04	4823.3	383.0	1255.7	0.00	0.00	1312.8	Start Drop -2.00
6040.5	0.00	0.00	5800.0	433.1	1419.8	2.00	180.00	1484.4	Start 2103.00 hold at 6040.50 MD
8143.5	0.00	0.00	7903.0	433.1	1419.8	0.00	0.00	1484.4	TD at 8143.50



Azimuths to True North
Magnetic North: 9.72°
Magnetic Field
Strength: 51741.9snT
Dip Angle: 65.47°
Date: 2015/04/27
Model: IGRF2010

FORMATION TOP DETAILS

TVDPATH	MDPATH	Formation
2853.0	2947.9	G Sand
4703.0	4915.8	Williams Fork
5903.0	6143.5	TOG
7003.0	7243.5	Cameo
7661.0	7901.5	Base Cameo Coal
7703.0	7943.5	Rollins



Plan: Design #2 (Piceance federal 28-05M/Slot B-6)

Created By: Ricky Osburn Date: 11:23, October 21 2015



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-05M
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance federal 28-05M	North Reference:	True
Wellbore:	Slot B-6	Survey Calculation Method:	Minimum Curvature
Design:	Slot B-6	Database:	EDMDBBW

Project	Mesa County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site	Piceance 28-05			
Site Position:		Northing:	1,524,375.785 usft	Latitude: 39.250911
From:	Lat/Long	Easting:	2,354,593.535 usft	Longitude: -107.779353
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"	Grid Convergence: -1.44 °

Well	Piceance federal 28-05M					
Well Position	+N/-S	0.00 usft	Northing:	1,524,417.377 usft	Latitude:	39.251022
	+E/-W	0.00 usft	Easting:	2,354,548.941 usft	Longitude:	-107.779514
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,556.00 usft

Wellbore	Slot B-6				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2015/04/27	9.73	65.47	51,742

Design	Slot B-6			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	71.85

Survey Program	Date	2015/10/20		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
110.00	8,125.00	Survey #1 (Slot B-6)	MWD	MWD - Standard



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-05M
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance federal 28-05M	North Reference:	True
Wellbore:	Slot B-6	Survey Calculation Method:	Minimum Curvature
Design:	Slot B-6	Database:	EDMDBBW

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	1,524,417.377	2,354,548.941	39.251022	-107.779514
First Archer Survey									
110.00	0.88	12.62	110.00	0.82	0.18	1,524,418.196	2,354,549.146	39.251024	-107.779513
202.00	1.23	46.02	201.98	2.20	1.05	1,524,419.549	2,354,550.045	39.251028	-107.779510
294.00	0.70	38.72	293.97	3.32	2.11	1,524,420.646	2,354,551.135	39.251031	-107.779506
386.00	1.58	68.17	385.95	4.23	3.64	1,524,421.518	2,354,552.686	39.251034	-107.779501
478.00	2.59	57.97	477.89	5.81	6.58	1,524,423.017	2,354,555.664	39.251038	-107.779491
571.00	3.30	89.61	570.77	6.94	11.04	1,524,424.038	2,354,560.150	39.251041	-107.779475
663.00	4.09	83.37	662.58	7.34	16.95	1,524,424.287	2,354,566.065	39.251042	-107.779454
755.00	3.87	88.03	754.36	7.82	23.31	1,524,424.612	2,354,572.437	39.251044	-107.779432
847.00	4.04	81.17	846.14	8.43	29.61	1,524,425.058	2,354,578.755	39.251045	-107.779409
940.00	5.27	82.93	938.83	9.46	37.09	1,524,425.899	2,354,586.255	39.251048	-107.779383
1,032.00	8.04	74.93	1,030.20	11.65	47.50	1,524,427.830	2,354,596.714	39.251054	-107.779346
1,127.00	10.06	70.80	1,124.02	16.11	61.75	1,524,431.928	2,354,611.074	39.251066	-107.779296
1,222.00	10.24	71.51	1,217.53	21.51	77.59	1,524,436.935	2,354,627.049	39.251081	-107.779240
1,317.00	10.99	72.47	1,310.90	26.92	94.24	1,524,441.922	2,354,643.822	39.251096	-107.779181
1,412.00	11.12	72.74	1,404.14	32.36	111.62	1,524,446.929	2,354,661.337	39.251111	-107.779120
1,506.00	13.18	72.30	1,496.03	38.31	130.49	1,524,452.402	2,354,680.348	39.251127	-107.779053
1,601.00	16.08	72.12	1,587.94	45.65	153.33	1,524,459.161	2,354,703.368	39.251148	-107.778972
1,696.00	16.79	72.56	1,679.06	53.80	178.94	1,524,466.667	2,354,729.177	39.251170	-107.778882
1,791.00	17.89	73.70	1,769.74	62.01	206.04	1,524,474.193	2,354,756.470	39.251192	-107.778786
1,886.00	19.51	75.29	1,859.72	70.13	235.39	1,524,481.578	2,354,786.016	39.251215	-107.778683
1,981.00	20.70	77.40	1,948.93	77.82	267.12	1,524,488.471	2,354,817.930	39.251236	-107.778571
2,075.00	19.95	77.92	2,037.08	84.80	299.02	1,524,494.649	2,354,849.990	39.251255	-107.778458
2,170.00	20.21	75.11	2,126.31	92.41	330.72	1,524,501.459	2,354,881.878	39.251276	-107.778346
2,265.00	20.70	71.77	2,215.32	101.88	362.53	1,524,510.128	2,354,913.913	39.251302	-107.778234
2,360.00	19.78	71.33	2,304.45	112.28	393.71	1,524,519.741	2,354,945.340	39.251330	-107.778124
2,455.00	20.43	71.07	2,393.66	122.80	424.62	1,524,529.487	2,354,976.507	39.251359	-107.778014
2,550.00	19.56	70.19	2,482.94	133.57	455.27	1,524,539.483	2,355,007.414	39.251389	-107.777906
2,645.00	20.39	70.54	2,572.22	144.47	485.83	1,524,549.616	2,355,038.244	39.251419	-107.777798
2,739.00	21.14	71.42	2,660.11	155.33	517.34	1,524,559.678	2,355,070.014	39.251449	-107.777687
2,834.00	19.69	70.80	2,749.14	166.05	548.69	1,524,569.610	2,355,101.626	39.251478	-107.777576
2,929.00	20.35	72.56	2,838.40	176.27	579.57	1,524,579.047	2,355,132.747	39.251506	-107.777467
3,024.00	21.49	73.97	2,927.14	186.02	612.05	1,524,587.985	2,355,165.466	39.251533	-107.777353
3,119.00	21.31	72.91	3,015.59	195.90	645.28	1,524,597.026	2,355,198.928	39.251560	-107.777235
3,214.00	20.52	73.18	3,104.33	205.79	677.71	1,524,606.100	2,355,231.604	39.251587	-107.777121
3,309.00	20.48	72.91	3,193.32	215.49	709.54	1,524,615.001	2,355,263.661	39.251614	-107.777008
3,404.00	19.86	72.47	3,282.49	225.24	740.81	1,524,623.958	2,355,295.169	39.251641	-107.776898
3,499.00	20.43	72.91	3,371.68	234.97	772.05	1,524,632.904	2,355,326.640	39.251667	-107.776788
3,593.00	21.23	71.77	3,459.53	245.12	803.89	1,524,642.248	2,355,358.731	39.251695	-107.776675
3,688.00	20.87	70.36	3,548.19	256.19	836.17	1,524,652.503	2,355,391.274	39.251726	-107.776561
3,783.00	19.95	70.89	3,637.23	267.18	867.42	1,524,662.709	2,355,422.792	39.251756	-107.776451
3,878.00	20.00	71.51	3,726.51	277.64	898.14	1,524,672.393	2,355,453.766	39.251784	-107.776342
3,973.00	20.87	71.77	3,815.53	288.08	929.62	1,524,682.046	2,355,485.498	39.251813	-107.776231
4,068.00	20.92	72.47	3,904.29	298.49	961.87	1,524,691.636	2,355,517.994	39.251842	-107.776117
4,163.00	20.43	71.33	3,993.17	308.90	993.75	1,524,701.249	2,355,550.127	39.251870	-107.776005
4,257.00	20.13	70.80	4,081.34	319.47	1,024.57	1,524,711.044	2,355,581.201	39.251899	-107.775896
4,352.00	19.51	68.78	4,170.71	330.59	1,054.79	1,524,721.400	2,355,611.697	39.251930	-107.775789
4,447.00	18.33	68.52	4,260.58	341.80	1,083.48	1,524,731.889	2,355,640.659	39.251961	-107.775688
4,542.00	18.15	71.59	4,350.81	351.95	1,111.42	1,524,741.328	2,355,668.845	39.251988	-107.775589
4,637.00	18.24	72.30	4,441.06	361.14	1,139.63	1,524,749.811	2,355,697.270	39.252014	-107.775489
4,732.00	18.11	71.24	4,531.32	370.41	1,167.77	1,524,758.371	2,355,725.638	39.252039	-107.775390
4,827.00	17.14	70.10	4,621.86	379.92	1,194.92	1,524,767.200	2,355,753.012	39.252065	-107.775294
4,921.00	15.64	67.82	4,712.04	389.42	1,219.67	1,524,776.075	2,355,778.001	39.252091	-107.775207
5,016.00	14.11	76.08	4,803.86	397.04	1,242.78	1,524,783.114	2,355,801.287	39.252112	-107.775125



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-05M
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance federal 28-05M	North Reference:	True
Wellbore:	Slot B-6	Survey Calculation Method:	Minimum Curvature
Design:	Slot B-6	Database:	EDMDBBW

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,111.00	12.96	76.34	4,896.22	402.34	1,264.37	1,524,787.873	2,355,823.005	39.252127	-107.775049
5,206.00	12.00	75.02	4,988.98	407.41	1,284.26	1,524,792.440	2,355,843.018	39.252141	-107.774979
5,301.00	10.50	75.11	5,082.15	412.19	1,302.17	1,524,796.767	2,355,861.039	39.252154	-107.774915
5,396.00	9.84	77.04	5,175.66	416.24	1,318.44	1,524,800.402	2,355,877.412	39.252165	-107.774858
5,491.00	9.23	75.90	5,269.34	419.91	1,333.74	1,524,803.694	2,355,892.800	39.252175	-107.774804
5,586.00	8.35	75.55	5,363.23	423.49	1,347.81	1,524,806.917	2,355,906.955	39.252185	-107.774754
5,681.00	7.47	76.52	5,457.32	426.65	1,360.50	1,524,809.759	2,355,919.715	39.252194	-107.774709
5,774.00	6.20	73.88	5,549.66	429.45	1,371.20	1,524,812.293	2,355,930.486	39.252201	-107.774672
5,869.00	4.88	72.21	5,644.21	432.11	1,379.98	1,524,814.731	2,355,939.326	39.252209	-107.774641
5,964.00	4.26	71.51	5,738.91	434.47	1,387.17	1,524,816.903	2,355,946.577	39.252215	-107.774615
6,059.00	5.63	73.62	5,833.55	436.90	1,394.99	1,524,819.140	2,355,954.453	39.252222	-107.774588
6,154.00	5.84	70.36	5,928.08	439.84	1,404.01	1,524,821.851	2,355,963.547	39.252230	-107.774556
6,249.00	6.41	66.59	6,022.54	443.57	1,413.43	1,524,825.345	2,355,973.056	39.252240	-107.774523
6,343.00	5.54	66.32	6,116.03	447.48	1,422.40	1,524,829.026	2,355,982.122	39.252251	-107.774491
6,438.00	4.75	66.15	6,210.64	450.91	1,430.20	1,524,832.262	2,355,990.003	39.252260	-107.774463
6,534.00	4.53	69.75	6,306.33	453.83	1,437.39	1,524,834.999	2,355,997.266	39.252268	-107.774438
6,628.00	3.30	71.16	6,400.11	455.99	1,443.44	1,524,837.006	2,356,003.362	39.252274	-107.774417
6,723.00	2.72	66.85	6,494.97	457.76	1,448.10	1,524,838.657	2,356,008.065	39.252279	-107.774400
6,818.00	1.54	51.03	6,589.91	459.45	1,451.16	1,524,840.269	2,356,011.172	39.252284	-107.774389
6,913.00	0.97	16.84	6,684.89	461.02	1,452.39	1,524,841.810	2,356,012.436	39.252288	-107.774385
7,008.00	1.05	1.19	6,779.87	462.66	1,452.64	1,524,843.443	2,356,012.728	39.252292	-107.774384
7,103.00	0.92	335.97	6,874.86	464.23	1,452.34	1,524,845.017	2,356,012.475	39.252297	-107.774385
7,198.00	1.32	305.03	6,969.84	465.55	1,451.14	1,524,846.372	2,356,011.302	39.252300	-107.774389
7,293.00	1.71	295.01	7,064.81	466.78	1,448.96	1,524,847.653	2,356,009.153	39.252304	-107.774397
7,388.00	1.98	279.72	7,159.76	467.65	1,446.06	1,524,848.602	2,356,006.274	39.252306	-107.774407
7,482.00	2.42	274.53	7,253.69	468.08	1,442.48	1,524,849.123	2,356,002.707	39.252307	-107.774420
7,577.00	2.72	266.80	7,348.59	468.12	1,438.23	1,524,849.262	2,355,998.459	39.252307	-107.774435
7,672.00	2.90	259.15	7,443.48	467.54	1,433.62	1,524,848.800	2,355,993.835	39.252306	-107.774451
7,767.00	2.68	257.48	7,538.37	466.60	1,429.09	1,524,847.980	2,355,989.285	39.252303	-107.774467
7,862.00	2.94	257.13	7,633.25	465.58	1,424.54	1,524,847.070	2,355,984.717	39.252300	-107.774483
7,957.00	2.50	258.19	7,728.15	464.61	1,420.14	1,524,846.214	2,355,980.291	39.252298	-107.774499
Last Archer Survey									
8,065.00	2.24	259.33	7,836.05	463.74	1,415.76	1,524,845.451	2,355,975.891	39.252295	-107.774514
PTB - Piceance Federal 28-05M tgt									
8,125.00	2.24	259.33	7,896.01	463.31	1,413.46	1,524,845.075	2,355,973.576	39.252294	-107.774522

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
110.00	110.00	0.82	0.18	First Archer Survey
8,065.00	7,836.05	463.74	1,415.76	Last Archer Survey
8,125.00	7,896.01	463.31	1,413.46	PTB

Checked By: _____	Approved By: _____	Date: _____
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