



Piceance Energy, LLC

Mesa County, CO

Piceance 28-10 Pad

Piceance Federal 28-19E

Slot A-9

Survey: Survey #1

Survey Report - Geographic

23 December, 2015



Project: Mesa County, CO
Site: Piceance 28-10 Pad
Well: Piceance Federal 28-19E
Wellbore: Slot A-9
Design: Design #2
Latitude: 39.246414
Longitude: -107.774967
Ground Level: 7679.00
Well @ 7701.00usft

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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 28-19E, True North
Vertical (TVD) Reference: Well @ 7701.00usft
Section (VS) Reference: Slot - (0.00N, 0.00E)
Measured Depth Reference: Well @ 7701.00usft
Calculation Method: Minimum Curvature

WELL DETAILS: Piceance Federal 28-19E

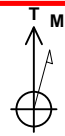
+N/-S	+E/-W	Northing	Ground Level: Easting	Latitude	Longitude	Slot
0.00	0.00	1522707.191	2355794.203	39.246414	-107.774967	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance 28-19E tgt	7959.00	-1406.20	1911.71	1521253.568	2357670.106	39.242553	-107.768217	Circle (Radius: 50.00)

SECTION DETAILS

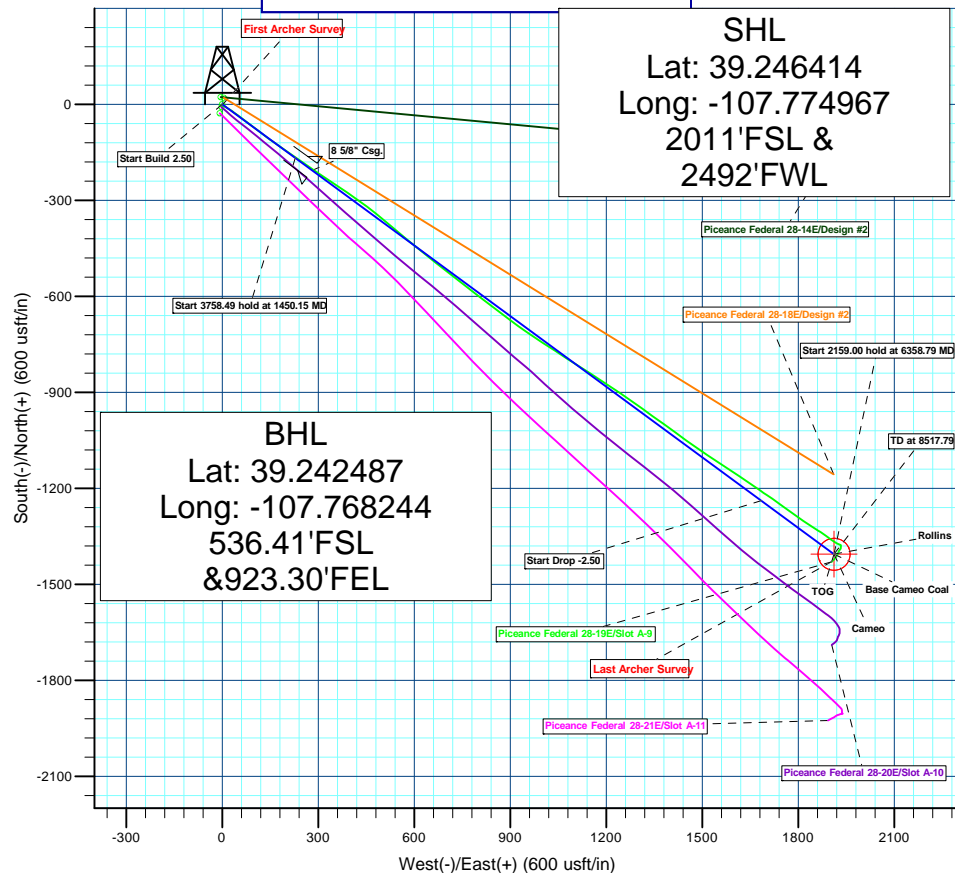
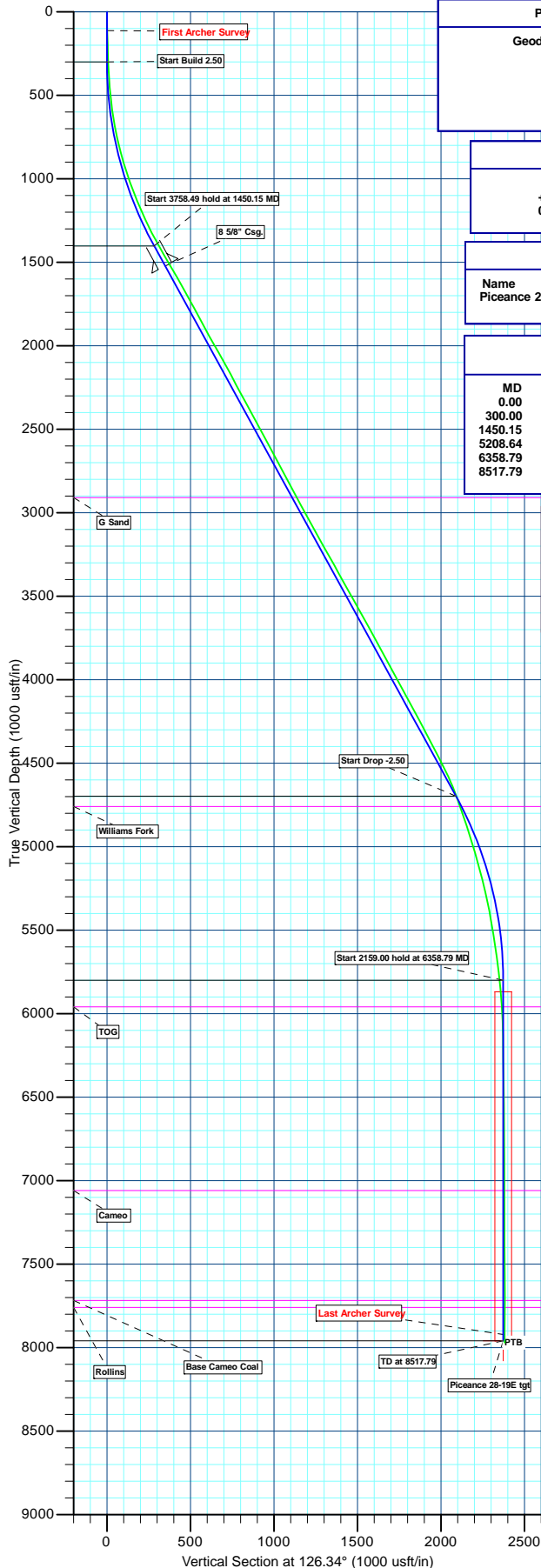
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.50
1450.15	28.75	126.34	1402.48	-167.45	227.64	2.50	126.34	282.59	Start 3758.49 hold at 1450.15 MD
5208.64	28.75	126.34	4697.52	-1238.75	1684.07	0.00	0.00	2090.60	Start Drop -2.50
6358.79	0.00	0.00	5800.00	-1406.20	1911.71	2.50	180.00	2373.19	Start 2159.00 hold at 6358.79 MD
8517.79	0.00	0.00	7959.00	-1406.20	1911.71	0.00	0.00	2373.19	TD at 8517.79



Azimuths to True North
Magnetic North: 9.73°
Magnetic Field
Strength: 51746.4snT
Dip Angle: 65.47°
Date: 03/31/2015
Model: IGRF2010

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2909.00	3168.56	G Sand
4759.00	5278.19	Williams Fork
5959.00	6517.79	TOG
7059.00	7617.79	Cameo
7717.00	8275.79	Base Cameo Coal
7759.00	8317.79	Rollins



Plan: Design #2 (Piceance Federal 28-19E/Slot A-9)

Created By: Ricky Osburn Date: 13:23, January 21 2016



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-19E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Well:	Piceance Federal 28-19E	North Reference:	True
Wellbore:	Slot A-9	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-9	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 28-10 Pad				
Site Position:		Northing:	1,522,822.786 usft	Latitude:	39.246733
From:	Lat/Long	Easting:	2,355,826.215 usft	Longitude:	-107.774864
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"	Grid Convergence:	-1.43 °

Well	Piceance Federal 28-19E					
Well Position	+N/-S	0.00 usft	Northing:	1,522,707.191 usft	Latitude:	39.246414
	+E/-W	0.00 usft	Easting:	2,355,794.203 usft	Longitude:	-107.774967
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,679.00 usft

Wellbore	Slot A-9				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	03/31/15	9.73	65.47	51,746

Design	Slot A-9				
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	125.27

Survey Program	Date	10/30/15			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
113.00	8,511.00	Survey #1 (Slot A-9)	MWD	MWD - Standard	



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-19E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Well:	Piceance Federal 28-19E	North Reference:	True
Wellbore:	Slot A-9	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-9	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	1,522,707.191	2,355,794.203	39.246414	-107.774967	
First Archer Survey										
113.00	1.54	131.02	112.99	-1.00	1.15	1,522,706.166	2,355,795.324	39.246411	-107.774963	
205.00	1.71	131.37	204.95	-2.72	3.11	1,522,704.399	2,355,797.243	39.246406	-107.774956	
297.00	2.90	129.44	296.87	-5.10	5.94	1,522,701.943	2,355,800.010	39.246400	-107.774946	
389.00	3.12	132.07	388.75	-8.26	9.59	1,522,698.696	2,355,803.586	39.246391	-107.774933	
482.00	5.27	116.87	481.49	-11.88	15.28	1,522,694.929	2,355,809.183	39.246381	-107.774913	
574.00	7.43	123.20	572.93	-17.05	24.03	1,522,689.544	2,355,817.798	39.246367	-107.774882	
666.00	10.11	125.75	663.84	-25.03	35.56	1,522,681.281	2,355,829.128	39.246345	-107.774841	
758.00	12.61	125.48	754.03	-35.58	50.30	1,522,670.367	2,355,843.592	39.246316	-107.774789	
850.00	14.90	126.89	843.39	-48.51	67.94	1,522,656.999	2,355,860.903	39.246281	-107.774727	
942.00	17.23	128.91	931.79	-64.17	88.00	1,522,640.841	2,355,880.570	39.246238	-107.774656	
1,034.00	19.42	127.06	1,019.12	-81.94	110.81	1,522,622.497	2,355,902.928	39.246189	-107.774575	
1,129.00	21.80	126.80	1,108.03	-102.03	137.54	1,522,601.747	2,355,929.149	39.246134	-107.774481	
1,223.00	23.86	124.78	1,194.67	-123.34	167.14	1,522,579.709	2,355,958.201	39.246075	-107.774376	
1,318.00	25.75	124.43	1,280.90	-145.97	199.94	1,522,556.265	2,355,990.430	39.246013	-107.774261	
1,413.00	28.78	124.69	1,365.33	-170.65	235.78	1,522,530.687	2,356,025.633	39.245945	-107.774134	
1,508.00	29.71	124.60	1,448.22	-197.04	273.96	1,522,503.355	2,356,063.143	39.245873	-107.773999	
1,576.00	30.23	124.87	1,507.13	-216.39	301.87	1,522,483.307	2,356,090.565	39.245820	-107.773901	
1,695.00	29.97	122.85	1,610.09	-249.64	351.42	1,522,448.826	2,356,139.266	39.245728	-107.773726	
1,790.00	29.22	125.31	1,692.70	-275.92	390.28	1,522,421.586	2,356,177.454	39.245656	-107.773589	
1,885.00	28.21	124.60	1,776.01	-302.07	427.69	1,522,394.504	2,356,214.193	39.245584	-107.773456	
1,980.00	28.26	127.77	1,859.71	-328.60	463.95	1,522,367.078	2,356,249.780	39.245512	-107.773328	
2,075.00	28.52	129.88	1,943.29	-356.92	499.13	1,522,337.889	2,356,284.242	39.245434	-107.773204	
2,170.00	30.28	129.96	2,026.05	-386.84	534.90	1,522,307.076	2,356,319.247	39.245352	-107.773078	
2,264.00	29.09	129.52	2,107.71	-416.61	570.69	1,522,276.426	2,356,354.284	39.245270	-107.772952	
2,359.00	27.42	129.52	2,191.39	-445.22	605.38	1,522,246.950	2,356,388.247	39.245191	-107.772829	
2,454.00	28.43	129.17	2,275.33	-473.43	639.79	1,522,217.893	2,356,421.937	39.245114	-107.772708	
2,549.00	29.49	128.03	2,358.45	-502.12	675.74	1,522,188.312	2,356,457.159	39.245035	-107.772581	
2,644.00	28.52	127.86	2,441.53	-530.44	712.07	1,522,159.085	2,356,492.763	39.244957	-107.772452	
2,739.00	27.51	127.94	2,525.40	-557.85	747.28	1,522,130.803	2,356,527.276	39.244882	-107.772328	
2,834.00	27.99	127.86	2,609.47	-585.02	782.18	1,522,102.765	2,356,561.489	39.244808	-107.772205	
2,928.00	27.73	126.62	2,692.58	-611.61	817.15	1,522,075.315	2,356,595.780	39.244735	-107.772081	
3,023.00	27.86	127.33	2,776.62	-638.25	852.54	1,522,047.793	2,356,630.492	39.244661	-107.771956	
3,118.00	28.30	127.42	2,860.44	-665.40	888.07	1,522,019.767	2,356,665.336	39.244587	-107.771831	
3,212.00	28.52	126.54	2,943.12	-692.30	923.80	1,521,991.980	2,356,700.378	39.244513	-107.771705	
3,307.00	29.84	123.90	3,026.06	-718.98	961.64	1,521,964.353	2,356,737.540	39.244440	-107.771571	
3,401.00	29.27	122.93	3,107.83	-744.52	1,000.34	1,521,937.856	2,356,775.588	39.244370	-107.771435	
3,496.00	28.34	123.28	3,191.07	-769.52	1,038.68	1,521,911.905	2,356,813.294	39.244301	-107.771299	
3,591.00	29.84	123.11	3,274.09	-794.80	1,077.33	1,521,885.660	2,356,851.298	39.244232	-107.771163	
3,686.00	28.34	121.79	3,357.10	-819.60	1,116.30	1,521,859.902	2,356,889.631	39.244163	-107.771025	
3,781.00	29.49	124.16	3,440.26	-844.61	1,154.82	1,521,833.935	2,356,927.510	39.244095	-107.770889	
3,876.00	29.44	122.85	3,522.97	-870.40	1,193.78	1,521,807.173	2,356,965.814	39.244024	-107.770752	
3,971.00	29.05	122.67	3,605.87	-895.51	1,232.81	1,521,781.089	2,357,004.203	39.243955	-107.770614	
4,066.00	29.09	126.27	3,688.90	-921.63	1,270.85	1,521,754.031	2,357,041.575	39.243883	-107.770479	
4,160.00	28.87	125.39	3,771.14	-948.29	1,307.77	1,521,726.454	2,357,077.818	39.243810	-107.770349	
4,255.00	27.77	125.04	3,854.76	-974.28	1,344.59	1,521,699.551	2,357,113.974	39.243739	-107.770219	
4,350.00	28.74	125.57	3,938.44	-1,000.27	1,381.29	1,521,672.647	2,357,150.011	39.243667	-107.770089	
4,445.00	27.99	125.57	4,022.04	-1,026.53	1,418.00	1,521,645.482	2,357,186.053	39.243595	-107.769960	
4,540.00	28.17	127.06	4,105.86	-1,053.01	1,454.03	1,521,618.106	2,357,221.407	39.243523	-107.769833	
4,635.00	28.13	124.52	4,189.62	-1,079.21	1,490.37	1,521,590.998	2,357,257.087	39.243451	-107.769704	
4,730.00	28.70	124.43	4,273.18	-1,104.80	1,527.64	1,521,564.485	2,357,293.701	39.243380	-107.769573	
4,825.00	28.65	122.32	4,356.53	-1,129.88	1,565.70	1,521,538.466	2,357,331.123	39.243311	-107.769438	
4,920.00	27.33	123.46	4,440.41	-1,154.08	1,603.14	1,521,513.334	2,357,367.947	39.243245	-107.769306	
5,015.00	26.19	124.34	4,525.24	-1,177.93	1,638.65	1,521,488.602	2,357,402.844	39.243180	-107.769181	



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-19E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Well:	Piceance Federal 28-19E	North Reference:	True
Wellbore:	Slot A-9	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-9	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
5,110.00	23.47	124.78	4,611.45	-1,200.55	1,671.50	1,521,465.165	2,357,435.122	39.243117	-107.769065
5,205.00	20.52	123.72	4,699.52	-1,220.59	1,700.90	1,521,444.397	2,357,464.004	39.243062	-107.768961
5,300.00	18.59	125.75	4,789.04	-1,238.68	1,727.04	1,521,425.655	2,357,489.685	39.243013	-107.768869
5,395.00	17.45	125.57	4,879.38	-1,255.81	1,750.91	1,521,407.930	2,357,513.124	39.242966	-107.768784
5,490.00	17.67	126.10	4,969.95	-1,272.59	1,774.15	1,521,390.572	2,357,535.933	39.242920	-107.768702
5,585.00	16.61	125.39	5,060.73	-1,288.95	1,796.87	1,521,373.650	2,357,558.235	39.242875	-107.768622
5,679.00	14.50	123.72	5,151.29	-1,303.27	1,817.61	1,521,358.819	2,357,578.614	39.242835	-107.768549
5,774.00	13.54	124.43	5,243.45	-1,316.16	1,836.68	1,521,345.456	2,357,597.350	39.242800	-107.768482
5,869.00	11.56	121.00	5,336.18	-1,327.35	1,854.01	1,521,333.834	2,357,614.398	39.242769	-107.768420
5,963.00	10.33	123.11	5,428.47	-1,336.81	1,869.15	1,521,324.003	2,357,629.290	39.242743	-107.768367
6,058.00	9.18	125.57	5,522.10	-1,345.87	1,882.44	1,521,314.611	2,357,642.358	39.242718	-107.768320
6,153.00	8.13	125.39	5,616.01	-1,354.17	1,894.09	1,521,306.024	2,357,653.787	39.242696	-107.768279
6,248.00	6.77	124.78	5,710.21	-1,361.25	1,904.16	1,521,298.689	2,357,663.683	39.242676	-107.768243
6,343.00	6.37	125.83	5,804.58	-1,367.53	1,913.03	1,521,292.190	2,357,672.395	39.242659	-107.768212
6,438.00	4.88	118.19	5,899.13	-1,372.52	1,920.87	1,521,287.001	2,357,680.102	39.242645	-107.768184
6,533.00	3.03	105.18	5,993.90	-1,375.09	1,926.85	1,521,284.285	2,357,686.021	39.242638	-107.768163
6,628.00	1.54	111.24	6,088.82	-1,376.21	1,930.47	1,521,283.075	2,357,689.605	39.242635	-107.768150
6,722.00	0.70	115.55	6,182.80	-1,376.92	1,932.16	1,521,282.328	2,357,691.282	39.242633	-107.768144
6,817.00	0.79	160.90	6,277.79	-1,377.78	1,932.90	1,521,281.440	2,357,691.998	39.242631	-107.768142
6,912.00	0.97	168.37	6,372.78	-1,379.19	1,933.28	1,521,280.025	2,357,692.339	39.242627	-107.768141
7,007.00	1.45	182.79	6,467.76	-1,381.18	1,933.38	1,521,278.035	2,357,692.393	39.242621	-107.768140
7,102.00	1.58	183.14	6,562.73	-1,383.69	1,933.25	1,521,275.530	2,357,692.200	39.242615	-107.768141
7,197.00	1.71	195.53	6,657.69	-1,386.36	1,932.80	1,521,272.869	2,357,691.682	39.242607	-107.768142
7,292.00	0.79	196.85	6,752.66	-1,388.35	1,932.23	1,521,270.892	2,357,691.063	39.242602	-107.768144
7,387.00	0.83	221.90	6,847.66	-1,389.49	1,931.58	1,521,269.769	2,357,690.385	39.242599	-107.768147
7,481.00	1.36	216.71	6,941.64	-1,390.89	1,930.46	1,521,268.397	2,357,689.229	39.242595	-107.768150
7,576.00	1.80	209.24	7,036.60	-1,393.10	1,929.05	1,521,266.227	2,357,687.771	39.242589	-107.768155
7,671.00	1.27	222.51	7,131.57	-1,395.18	1,927.61	1,521,264.186	2,357,686.280	39.242583	-107.768161
7,766.00	1.01	200.63	7,226.55	-1,396.74	1,926.61	1,521,262.652	2,357,685.234	39.242579	-107.768164
7,861.00	1.76	199.66	7,321.52	-1,398.89	1,925.82	1,521,260.514	2,357,684.395	39.242573	-107.768167
7,955.00	2.64	200.28	7,415.45	-1,402.28	1,924.59	1,521,257.156	2,357,683.074	39.242564	-107.768171
8,050.00	3.91	208.19	7,510.29	-1,407.19	1,922.30	1,521,252.308	2,357,680.664	39.242550	-107.768179
8,145.00	3.47	213.64	7,605.10	-1,412.44	1,919.18	1,521,247.139	2,357,677.410	39.242536	-107.768190
8,240.00	4.22	216.89	7,699.88	-1,417.63	1,915.48	1,521,242.044	2,357,673.591	39.242521	-107.768203
8,335.00	3.52	223.57	7,794.67	-1,422.54	1,911.38	1,521,237.240	2,357,669.361	39.242508	-107.768218
8,430.00	3.34	225.50	7,889.50	-1,426.59	1,907.39	1,521,233.288	2,357,665.277	39.242497	-107.768232
Last Archer Survey									
8,463.00	3.38	223.74	7,922.44	-1,427.97	1,906.03	1,521,231.946	2,357,663.884	39.242493	-107.768237
Piceance 28-19E tgt									
8,498.34	3.38	223.74	7,957.72	-1,429.47	1,904.59	1,521,230.477	2,357,662.407	39.242489	-107.768242
PTB									
8,511.00	3.38	223.74	7,970.36	-1,430.01	1,904.08	1,521,229.951	2,357,661.877	39.242487	-107.768244



Archer

Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-19E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Well:	Piceance Federal 28-19E	North Reference:	True
Wellbore:	Slot A-9	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-9	Database:	EDMDBBW

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
113.00	112.99	-1.00	1.15	First Archer Survey	
8,463.00	7,922.44	-1,427.97	1,906.03	Last Archer Survey	
8,511.00	7,970.36	-1,430.01	1,904.08	PTB	

Checked By:	_____	Approved By:	_____	Date:	_____
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