



# **Piceance Energy, LLC**

**Mesa County, CO**

**Piceance 28-10 Pad**

**Piceance Federal 28-07E**

**Slot A-3**

**Survey: Survey #1**

## **Survey Report - Geographic**

**23 December, 2015**



Project: Mesa County, CO  
 Site: Piceance 28-10 Pad  
 Well: Piceance Federal 28-07E  
 Wellbore: Slot A-3  
 Design: Design #2  
 Latitude: 39.246655  
 Longitude: -107.774892  
 Ground Level: 7679.00  
 Well @ 7701.00usft

# Archer

**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 28-07E, 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 28-07E**

+N-S	+E-W	Northing	Ground Level:	7679.00	Latitude	Slot
0.00	0.00	1522794.624	Easting	2355817.640	39.246655	-107.774892

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

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude	Shape
Piceance 28-07E tgt	8073.00	1504.53	1872.94	1524251.782	2357727.669	39.250786	-107.768278	Circle (Radius: 50.00)

**SECTION DETAILS**

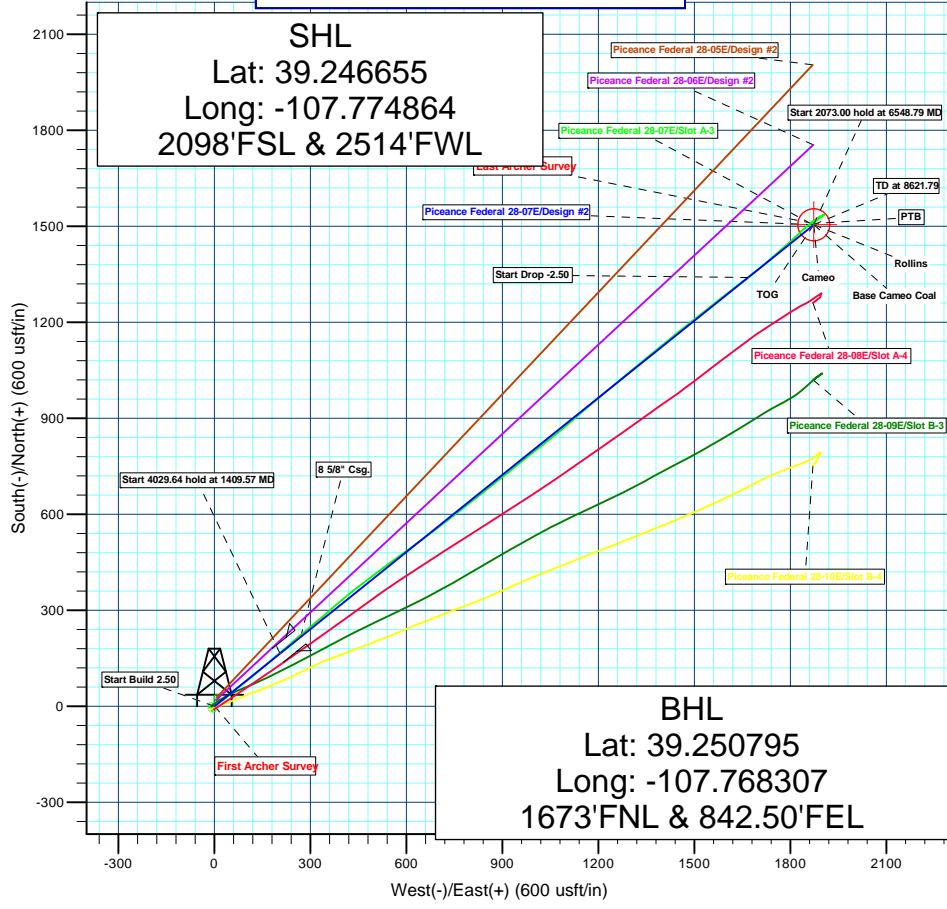
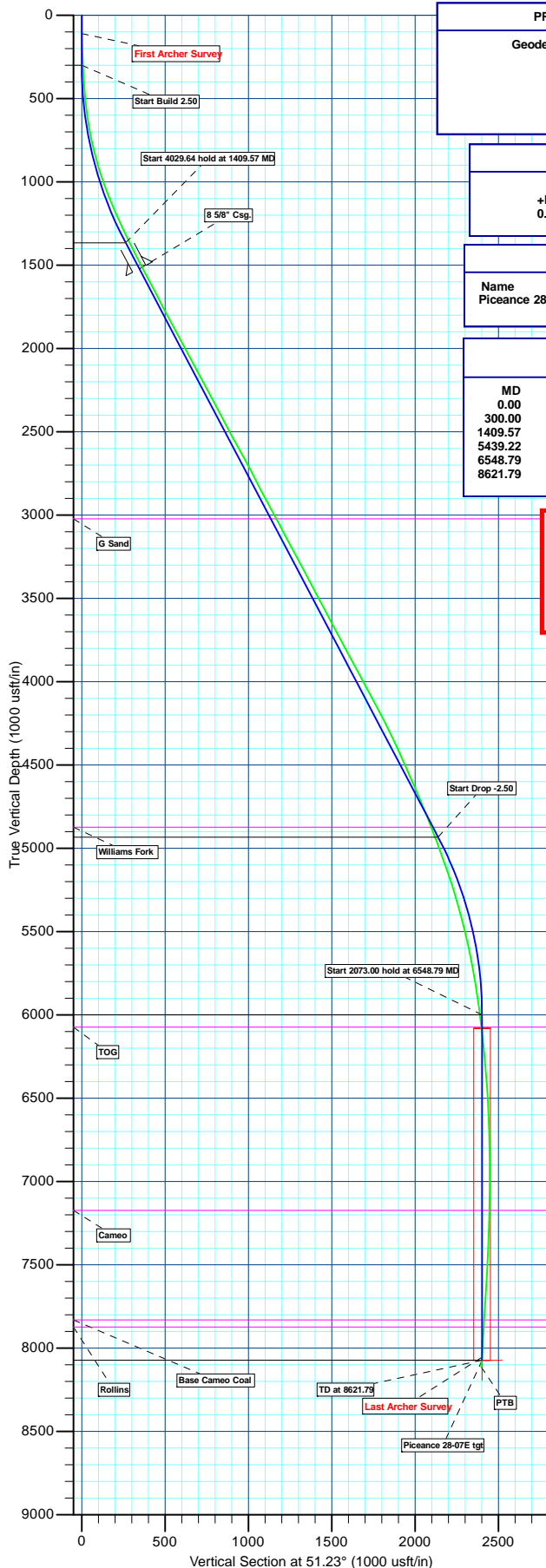
MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	V Sect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.50
1409.57	27.74	51.23	1366.73	164.95	205.34	2.50	51.23	263.39	Start 4029.64 hold at 1409.57 MD
5439.22	27.74	51.23	4933.27	1339.55	1667.60	0.00	0.00	2138.99	Start Drop -2.50
6548.79	0.00	0.00	6000.00	1504.49	1872.94	2.50	180.00	2402.38	Start 2073.00 hold at 6548.79 MD
8621.79	0.00	0.00	8073.00	1504.49	1872.94	0.00	0.00	2402.38	TD at 8621.79

**Azimuths to True North**  
 Magnetic North: 9.73°

Magnetic Field  
 Strength: 51746.6snT  
 Dip Angle: 65.47°  
 Date: 03/31/2015  
 Model: IGRF2010

**FORMATION TOP DETAILS**

TVDPATH	MDPATH	FORMATION
3023.00	3280.91	G Sand
4873.00	5371.13	Williams Fork
6073.00	6621.79	TOG
7173.00	7721.79	Cameo
7831.00	8379.79	Base Cameo Coal
7873.00	8421.79	Rollins





# Archer

## Survey Report - Geographic

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-07E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7701.00usft
<b>Site:</b>	Piceance 28-10 Pad	<b>MD Reference:</b>	Well @ 7701.00usft
<b>Well:</b>	Piceance Federal 28-07E	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot A-3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot A-3	<b>Database:</b>	EDMDBBW

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

<b>Site</b>	Piceance 28-10 Pad				
<b>Site Position:</b>		<b>Northing:</b>	1,522,822.786 usft	<b>Latitude:</b>	39.246733
<b>From:</b>	Lat/Long	<b>Easting:</b>	2,355,826.215 usft	<b>Longitude:</b>	-107.774864
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16"	<b>Grid Convergence:</b>	-1.43 °

<b>Well</b>	Piceance Federal 28-07E					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	1,522,794.624 usft	<b>Latitude:</b>	39.246655
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	2,355,817.640 usft	<b>Longitude:</b>	-107.774892
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	0.00 usft	<b>Ground Level:</b>	7,679.00 usft

<b>Wellbore</b>	Slot A-3				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	03/31/15	9.73	65.47	51,747

<b>Design</b>	Slot A-3				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	50.46	

<b>Survey Program</b>	<b>Date</b>	12/17/15			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
111.00	8,646.00	Survey #1 (Slot A-3)	MWD	MWD - Standard	



# Archer

## Survey Report - Geographic

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-07E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7701.00usft
<b>Site:</b>	Piceance 28-10 Pad	<b>MD Reference:</b>	Well @ 7701.00usft
<b>Well:</b>	Piceance Federal 28-07E	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot A-3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot A-3	<b>Database:</b>	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	1,522,794.624	2,355,817.640	39.246655	-107.774892	
<b>First Archer Survey</b>										
111.00	0.83	48.23	111.00	0.54	0.60	1,522,795.144	2,355,818.253	39.246657	-107.774890	
203.00	2.46	54.73	202.96	2.12	2.71	1,522,796.675	2,355,820.401	39.246661	-107.774882	
295.00	3.08	52.53	294.85	4.76	6.28	1,522,799.228	2,355,824.040	39.246669	-107.774869	
387.00	3.08	56.58	386.71	7.63	10.31	1,522,801.992	2,355,828.135	39.246676	-107.774855	
479.00	4.88	56.22	478.49	11.17	15.62	1,522,805.395	2,355,833.538	39.246686	-107.774837	
571.00	7.38	53.76	569.96	16.84	23.64	1,522,810.862	2,355,841.697	39.246702	-107.774808	
663.00	9.71	50.86	660.93	25.23	34.43	1,522,818.981	2,355,852.688	39.246725	-107.774770	
756.00	12.04	49.46	752.25	36.48	47.88	1,522,829.897	2,355,866.422	39.246756	-107.774723	
848.00	14.41	50.25	841.81	50.04	63.98	1,522,843.048	2,355,882.852	39.246793	-107.774666	
940.00	17.36	52.09	930.28	65.80	83.61	1,522,858.308	2,355,902.875	39.246836	-107.774596	
1,032.00	19.91	51.48	1,017.45	83.99	106.70	1,522,875.917	2,355,926.412	39.246886	-107.774515	
1,127.00	22.19	50.51	1,106.11	105.48	133.21	1,522,896.732	2,355,953.446	39.246945	-107.774421	
1,222.00	24.04	49.54	1,193.48	129.44	161.78	1,522,919.977	2,355,982.607	39.247011	-107.774320	
1,317.00	24.96	48.84	1,279.92	155.19	191.59	1,522,944.972	2,356,013.057	39.247082	-107.774215	
1,412.00	26.28	49.10	1,365.58	182.16	222.58	1,522,971.151	2,356,044.711	39.247156	-107.774106	
1,507.00	26.85	49.37	1,450.55	209.90	254.76	1,522,998.077	2,356,077.574	39.247232	-107.773992	
1,580.00	28.04	50.51	1,515.34	231.54	280.51	1,523,019.073	2,356,103.862	39.247291	-107.773901	
1,697.00	28.08	49.98	1,618.58	266.74	322.82	1,523,053.198	2,356,147.040	39.247388	-107.773752	
1,791.00	26.81	48.05	1,702.00	295.14	355.53	1,523,080.769	2,356,180.451	39.247466	-107.773636	
1,886.00	27.99	49.81	1,786.35	323.85	388.50	1,523,108.644	2,356,214.125	39.247545	-107.773520	
1,981.00	28.65	51.65	1,869.98	352.37	423.39	1,523,136.279	2,356,249.719	39.247623	-107.773397	
2,076.00	27.60	51.39	1,953.76	380.23	458.45	1,523,163.256	2,356,285.463	39.247699	-107.773273	
2,171.00	28.83	54.03	2,037.47	407.42	494.18	1,523,189.541	2,356,321.869	39.247774	-107.773147	
2,266.00	28.43	53.50	2,120.86	434.32	530.90	1,523,215.518	2,356,359.248	39.247848	-107.773017	
2,360.00	27.51	53.06	2,203.88	460.68	566.24	1,523,240.982	2,356,395.236	39.247920	-107.772892	
2,455.00	28.65	54.20	2,287.69	487.19	602.25	1,523,266.581	2,356,431.898	39.247993	-107.772765	
2,550.00	27.51	54.38	2,371.51	513.29	638.56	1,523,291.765	2,356,468.848	39.248065	-107.772637	
2,645.00	28.56	53.06	2,455.36	539.72	674.54	1,523,317.282	2,356,505.485	39.248137	-107.772510	
2,740.00	27.95	52.27	2,539.04	566.99	710.30	1,523,343.650	2,356,541.915	39.248212	-107.772383	
2,835.00	29.40	51.83	2,622.39	595.02	746.24	1,523,370.777	2,356,578.548	39.248289	-107.772257	
2,930.00	28.39	52.36	2,705.56	623.23	782.46	1,523,398.065	2,356,615.460	39.248367	-107.772129	
3,024.00	26.80	52.09	2,788.86	649.90	816.88	1,523,423.864	2,356,650.535	39.248440	-107.772007	
3,119.00	27.73	50.60	2,873.31	677.09	850.86	1,523,450.194	2,356,685.182	39.248514	-107.771887	
3,213.00	28.87	51.39	2,956.07	705.13	885.49	1,523,477.360	2,356,720.506	39.248591	-107.771765	
3,308.00	28.13	51.48	3,039.56	733.39	920.93	1,523,504.723	2,356,756.646	39.248669	-107.771640	
3,403.00	27.16	51.04	3,123.71	760.97	955.31	1,523,531.435	2,356,791.709	39.248745	-107.771518	
3,498.00	28.65	51.74	3,207.67	788.71	990.06	1,523,558.294	2,356,827.137	39.248821	-107.771396	
3,592.00	27.86	51.92	3,290.47	816.21	1,025.04	1,523,584.911	2,356,862.798	39.248896	-107.771272	
3,687.00	28.56	50.60	3,374.18	844.31	1,060.06	1,523,612.130	2,356,898.512	39.248974	-107.771148	
3,782.00	27.16	50.77	3,458.17	872.44	1,094.41	1,523,639.389	2,356,933.551	39.249051	-107.771027	
3,877.00	28.65	49.90	3,542.12	900.83	1,128.63	1,523,666.908	2,356,968.469	39.249129	-107.770906	
3,972.00	27.55	49.19	3,625.92	929.85	1,162.68	1,523,695.075	2,357,003.235	39.249208	-107.770786	
4,067.00	28.48	49.19	3,709.79	959.02	1,196.45	1,523,723.382	2,357,037.728	39.249288	-107.770667	
4,161.00	27.55	49.37	3,792.77	987.82	1,229.91	1,523,751.339	2,357,071.901	39.249368	-107.770549	
4,257.00	29.00	50.07	3,877.32	1,017.21	1,264.61	1,523,779.856	2,357,107.322	39.249448	-107.770426	
4,352.00	27.73	49.63	3,960.91	1,046.31	1,299.11	1,523,808.081	2,357,142.539	39.249528	-107.770304	
4,446.00	29.05	50.51	4,043.60	1,074.99	1,333.38	1,523,835.894	2,357,177.522	39.249607	-107.770183	
4,541.00	28.21	50.95	4,126.99	1,103.81	1,368.62	1,523,863.817	2,357,213.470	39.249686	-107.770059	
4,636.00	27.16	51.39	4,211.11	1,131.48	1,403.00	1,523,890.624	2,357,248.534	39.249762	-107.769937	
4,731.00	25.49	51.74	4,296.25	1,157.67	1,436.00	1,523,915.980	2,357,282.176	39.249834	-107.769821	
4,826.00	25.58	51.48	4,381.98	1,183.11	1,468.10	1,523,940.599	2,357,314.900	39.249904	-107.769707	
4,921.00	23.55	50.34	4,468.37	1,207.99	1,498.76	1,523,964.712	2,357,346.173	39.249972	-107.769599	
5,016.00	24.57	51.92	4,555.12	1,232.29	1,528.92	1,523,988.245	2,357,376.931	39.250039	-107.769493	



# Archer

## Survey Report - Geographic

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-07E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7701.00usft
<b>Site:</b>	Piceance 28-10 Pad	<b>MD Reference:</b>	Well @ 7701.00usft
<b>Well:</b>	Piceance Federal 28-07E	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot A-3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot A-3	<b>Database:</b>	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	23.91	51.74	4,641.74	1,256.39	1,559.58	1,524,011.572	2,357,408.188	39.250105	-107.769384	
5,206.00	22.50	52.88	4,729.06	1,279.28	1,589.19	1,524,033.716	2,357,438.365	39.250168	-107.769280	
5,301.00	20.43	51.65	4,817.46	1,300.54	1,616.69	1,524,054.281	2,357,466.389	39.250226	-107.769183	
5,396.00	21.53	51.39	4,906.16	1,321.71	1,643.32	1,524,074.773	2,357,493.536	39.250284	-107.769089	
5,491.00	20.39	52.80	4,994.88	1,342.59	1,670.12	1,524,094.980	2,357,520.855	39.250342	-107.768994	
5,586.00	20.08	52.18	5,084.01	1,362.60	1,696.19	1,524,114.327	2,357,547.412	39.250396	-107.768902	
5,681.00	18.06	49.37	5,173.80	1,382.19	1,720.25	1,524,133.310	2,357,571.957	39.250450	-107.768817	
5,776.00	16.88	49.63	5,264.41	1,400.71	1,741.93	1,524,151.284	2,357,594.098	39.250501	-107.768740	
5,871.00	15.38	48.75	5,355.67	1,417.96	1,761.91	1,524,168.020	2,357,614.505	39.250548	-107.768670	
5,966.00	14.55	48.23	5,447.45	1,434.21	1,780.29	1,524,183.810	2,357,633.278	39.250593	-107.768605	
6,061.00	13.05	46.82	5,539.70	1,449.50	1,797.01	1,524,198.676	2,357,650.378	39.250635	-107.768546	
6,156.00	11.82	46.82	5,632.47	1,463.50	1,811.92	1,524,212.296	2,357,665.641	39.250673	-107.768493	
6,251.00	10.37	48.58	5,725.69	1,475.81	1,825.43	1,524,224.270	2,357,679.452	39.250707	-107.768446	
6,346.00	8.92	47.00	5,819.35	1,486.49	1,837.23	1,524,234.651	2,357,691.515	39.250737	-107.768404	
6,441.00	8.26	48.05	5,913.28	1,496.08	1,847.69	1,524,243.971	2,357,702.213	39.250763	-107.768367	
6,536.00	7.12	48.93	6,007.43	1,504.51	1,857.21	1,524,252.160	2,357,711.936	39.250786	-107.768333	
6,631.00	6.72	47.00	6,101.74	1,512.17	1,865.71	1,524,259.604	2,357,720.628	39.250807	-107.768303	
6,726.00	5.67	55.52	6,196.18	1,518.62	1,873.64	1,524,265.851	2,357,728.721	39.250825	-107.768275	
6,822.00	5.05	59.12	6,291.76	1,523.47	1,881.18	1,524,270.514	2,357,736.376	39.250838	-107.768249	
6,917.00	4.70	63.34	6,386.42	1,527.36	1,888.25	1,524,274.228	2,357,743.538	39.250849	-107.768224	
7,012.00	3.38	61.15	6,481.18	1,530.46	1,894.18	1,524,277.177	2,357,749.545	39.250857	-107.768203	
7,107.00	2.59	61.67	6,576.05	1,532.83	1,898.52	1,524,279.437	2,357,753.946	39.250864	-107.768187	
7,202.00	1.80	61.32	6,670.98	1,534.56	1,901.72	1,524,281.091	2,357,757.186	39.250869	-107.768176	
7,297.00	1.36	61.41	6,765.94	1,535.82	1,904.02	1,524,282.289	2,357,759.516	39.250872	-107.768168	
7,392.00	0.57	57.10	6,860.93	1,536.62	1,905.40	1,524,283.050	2,357,760.922	39.250874	-107.768163	
7,487.00	0.13	99.73	6,955.93	1,536.85	1,905.91	1,524,283.276	2,357,761.431	39.250875	-107.768161	
7,582.00	0.53	195.35	7,050.93	1,536.41	1,905.90	1,524,282.834	2,357,761.410	39.250874	-107.768161	
7,677.00	0.97	212.14	7,145.92	1,535.31	1,905.35	1,524,281.743	2,357,760.838	39.250871	-107.768163	
7,772.00	1.58	233.68	7,240.89	1,533.85	1,903.87	1,524,280.324	2,357,759.319	39.250867	-107.768169	
7,867.00	2.07	243.08	7,335.85	1,532.30	1,901.29	1,524,278.837	2,357,756.696	39.250862	-107.768178	
7,962.00	2.42	239.39	7,430.77	1,530.50	1,898.03	1,524,277.121	2,357,753.396	39.250857	-107.768189	
8,057.00	3.30	233.24	7,525.65	1,527.84	1,894.11	1,524,274.562	2,357,749.414	39.250850	-107.768203	
8,152.00	3.65	231.04	7,620.48	1,524.31	1,889.57	1,524,271.139	2,357,744.785	39.250840	-107.768219	
8,247.00	3.60	232.44	7,715.29	1,520.59	1,884.86	1,524,267.539	2,357,739.978	39.250830	-107.768236	
8,342.00	3.34	234.03	7,810.11	1,517.14	1,880.25	1,524,264.212	2,357,735.289	39.250821	-107.768252	
8,437.00	3.60	239.12	7,904.94	1,513.99	1,875.45	1,524,261.177	2,357,730.412	39.250812	-107.768269	
8,532.00	3.43	238.60	7,999.76	1,510.97	1,870.47	1,524,258.291	2,357,725.352	39.250804	-107.768287	
<b>Last Archer Survey - Piceance 28-07E tgt</b>										
8,588.00	3.38	240.79	8,055.66	1,509.30	1,867.60	1,524,256.685	2,357,722.441	39.250799	-107.768297	
<b>PTB</b>										
8,646.00	3.38	240.79	8,113.56	1,507.63	1,864.61	1,524,255.092	2,357,719.415	39.250795	-107.768307	



# Archer

## Survey Report - Geographic

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-07E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7701.00usft
<b>Site:</b>	Piceance 28-10 Pad	<b>MD Reference:</b>	Well @ 7701.00usft
<b>Well:</b>	Piceance Federal 28-07E	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot A-3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot A-3	<b>Database:</b>	EDMDBBW

Survey Annotations					
	Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
			+N/-S (usft)	+E/-W (usft)	
	111.00	111.00	0.54	0.60	First Archer Survey
	8,588.00	8,055.66	1,509.30	1,867.60	Last Archer Survey
	8,646.00	8,113.56	1,507.63	1,864.61	PTB

Checked By: _____	Approved By: _____	Date: _____
-------------------	--------------------	-------------