



# **Piceance Energy, LLC**

**Mesa County, CO**

**Piceance 28-05**

**Piceance Federal 28-03M**

**Slot B-5**

**Survey: Survey #1**

## **Survey Report - Geographic**

**20 October, 2015**



Project: Mesa County, CO  
Site: Piceance 28-05  
Well: Piceance Federal 28-03M  
Wellbore: Slot B-5  
Design: Design #2  
Latitude: 39° 15' 3.760 N  
Longitude: 107° 46' 46.330 W  
Ground Level: 7556.0  
Well @ 7578.0usft

# 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 28-03M, 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 28-03M

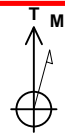
+N/-S	+E/-W	Northing	Ground Level:	Easting	Latitude	Longitude	Slot
0.0	0.0	1524425.63	7556.0	2354542.85	39° 15' 3.760 N	107° 46' 46.330 W	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance Federal 28-03M tgt	7913.0	924.8	1422.9	1525314.39	2355988.55	39° 15' 12.900 N	107° 46' 28.240 W	Circle (Radius: 50.0)

### SECTION DETAILS

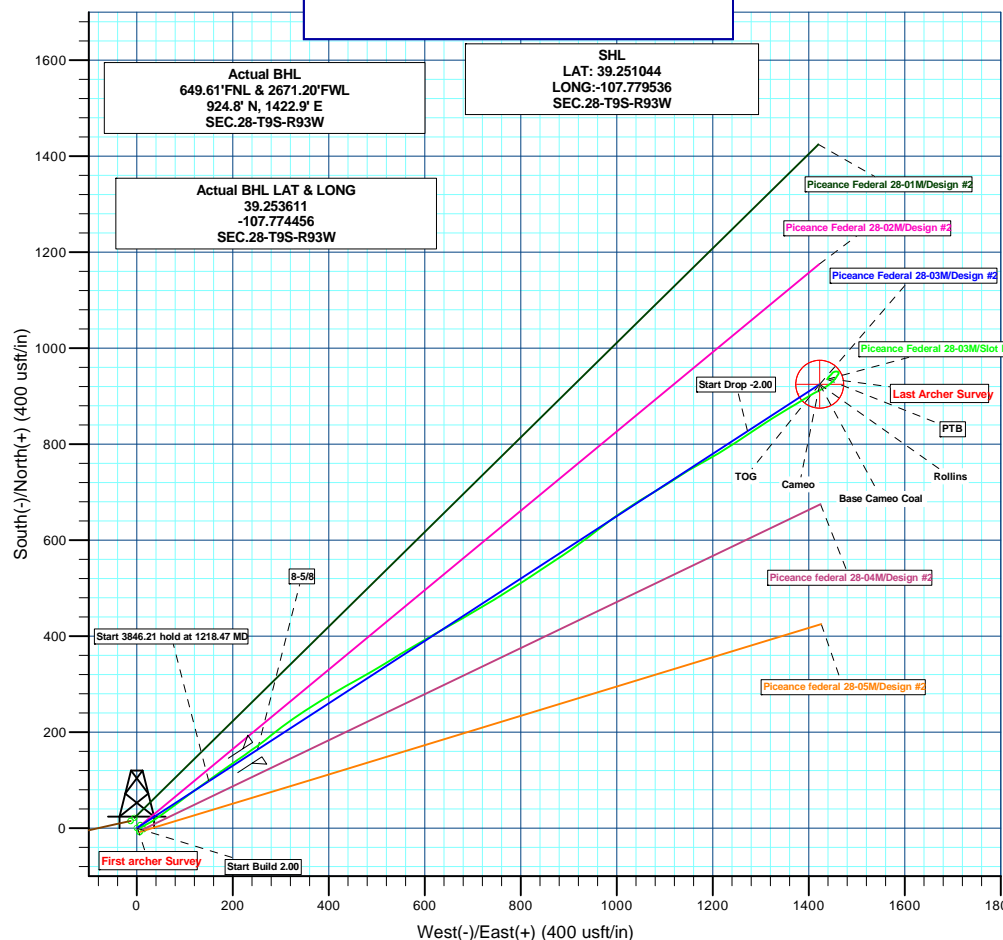
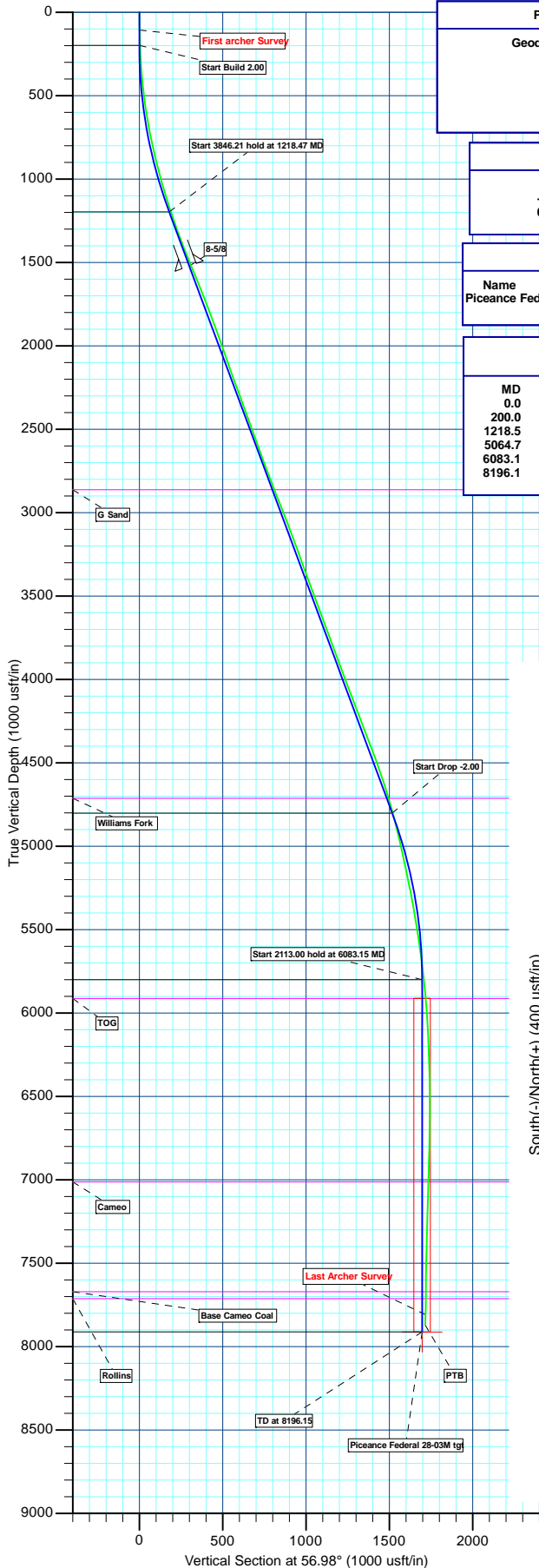
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
1218.5	20.37	56.98	1197.2	97.6	150.2	2.00	56.98	179.1	Start 3846.21 hold at 1218.47 MD
5064.7	20.37	56.98	4802.8	827.1	1272.7	0.00	0.00	1517.9	Start Drop -2.00
6083.1	0.00	0.00	5800.0	924.8	1422.9	2.00	180.00	1697.0	Start 2113.00 hold at 6083.15 MD
8196.1	0.00	0.00	7913.0	924.8	1422.9	0.00	0.00	1697.0	TD at 8196.15



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
2863.0	2995.4	G Sand
4713.0	4968.8	Williams Fork
5913.0	6196.1	TOG
7013.0	7296.1	Cameo
7671.0	7954.1	Base Cameo Coal
7713.0	7996.1	Rollins



Plan: Design #2 (Piceance Federal 28-03M/Slot B-5)

Created By: Ricky Osburn Date: 11:19, October 21 2015



# Archer

## Survey Report - Geographic

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-03M
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7578.00usft
<b>Site:</b>	Piceance 28-05	<b>MD Reference:</b>	Well @ 7578.00usft
<b>Well:</b>	Piceance Federal 28-03M	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot B-5	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot B-5	<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 28-05			
<b>Site Position:</b>		<b>Northing:</b>	1,524,375.785 usft	<b>Latitude:</b> 39.250911
<b>From:</b>	Lat/Long	<b>Easting:</b>	2,354,593.535 usft	<b>Longitude:</b> -107.779353
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16"	<b>Grid Convergence:</b> -1.44 °

Well	Piceance Federal 28-03M					
Well Position	+N/-S	0.00 usft	Northing:	1,524,425.626 usft	Latitude:	39.251044
	+E/-W	0.00 usft	Easting:	2,354,542.853 usft	Longitude:	-107.779536
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,556.00 usft

<b>Wellbore</b>	Slot B-5				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	2015/04/27	9.73	65.47	51,742

<b>Design</b>	Slot B-5			
<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	57.35

<b>Survey Program</b>	<b>Date</b>	2015/08/26		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
108.00	8,152.00	Survey #1 (Slot B-5)	MWD	MWD - Standard



## Archer

### Survey Report - Geographic

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-03M
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7578.00usft
<b>Site:</b>	Piceance 28-05	<b>MD Reference:</b>	Well @ 7578.00usft
<b>Well:</b>	Piceance Federal 28-03M	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot B-5	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot B-5	<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	1,524,425.626	2,354,542.853	39.251044	-107.779536	
First archer Survey										
108.00	1.63	73.44	107.99	0.44	1.47	1,524,426.026	2,354,544.336	39.251046	-107.779531	
200.00	2.11	69.31	199.94	1.41	4.31	1,524,426.926	2,354,547.198	39.251048	-107.779521	
292.00	3.52	77.31	291.82	2.63	8.65	1,524,428.036	2,354,551.567	39.251052	-107.779506	
385.00	5.63	62.19	384.52	5.38	15.47	1,524,430.620	2,354,558.455	39.251059	-107.779481	
477.00	6.11	64.12	476.04	9.63	23.87	1,524,434.650	2,354,566.956	39.251071	-107.779452	
569.00	7.82	56.48	567.36	15.22	33.49	1,524,440.001	2,354,576.717	39.251086	-107.779418	
661.00	10.15	54.46	658.23	23.39	45.31	1,524,447.871	2,354,588.734	39.251109	-107.779376	
753.00	11.38	54.98	748.61	33.31	59.34	1,524,457.437	2,354,603.008	39.251136	-107.779327	
846.00	13.45	53.67	839.43	44.99	75.57	1,524,468.700	2,354,619.525	39.251168	-107.779269	
938.00	14.50	51.91	928.70	58.43	93.25	1,524,481.697	2,354,637.542	39.251205	-107.779207	
1,030.00	16.39	54.98	1,017.38	72.98	112.95	1,524,495.753	2,354,657.598	39.251245	-107.779137	
1,125.00	17.27	55.07	1,108.31	88.75	135.49	1,524,510.949	2,354,680.525	39.251288	-107.779058	
1,220.00	17.53	52.96	1,198.96	105.44	158.47	1,524,527.060	2,354,703.918	39.251334	-107.778977	
1,315.00	19.69	54.54	1,288.99	123.35	182.93	1,524,544.346	2,354,728.819	39.251383	-107.778890	
1,410.00	20.79	55.95	1,378.12	142.07	209.93	1,524,562.388	2,354,756.286	39.251434	-107.778795	
1,505.00	22.15	53.93	1,466.53	162.06	238.38	1,524,581.653	2,354,785.225	39.251489	-107.778694	
1,542.00	22.90	54.37	1,500.71	170.36	249.87	1,524,589.663	2,354,796.919	39.251512	-107.778654	
1,599.00	22.85	53.49	1,553.22	183.41	267.78	1,524,602.255	2,354,815.150	39.251548	-107.778590	
1,694.00	22.15	50.33	1,641.00	205.81	296.39	1,524,623.938	2,354,844.315	39.251609	-107.778489	
1,789.00	20.74	56.65	1,729.43	226.50	324.23	1,524,643.916	2,354,872.667	39.251666	-107.778391	
1,884.00	20.70	54.63	1,818.28	245.46	351.98	1,524,662.181	2,354,900.877	39.251718	-107.778293	
1,979.00	20.30	60.08	1,907.28	263.40	379.95	1,524,679.414	2,354,929.295	39.251768	-107.778194	
2,073.00	19.82	60.34	1,995.57	279.42	407.93	1,524,694.726	2,354,957.669	39.251812	-107.778096	
2,168.00	18.37	59.99	2,085.34	294.88	434.89	1,524,709.503	2,354,985.008	39.251854	-107.778000	
2,263.00	20.52	60.61	2,174.92	310.54	462.37	1,524,724.469	2,355,012.866	39.251897	-107.777903	
2,358.00	20.26	59.47	2,263.97	327.07	491.04	1,524,740.271	2,355,041.947	39.251942	-107.777802	
2,453.00	19.95	58.32	2,353.18	343.94	519.00	1,524,756.431	2,355,070.322	39.251989	-107.777703	
2,548.00	19.16	57.44	2,442.70	360.84	545.94	1,524,772.652	2,355,097.670	39.252035	-107.777608	
2,643.00	20.21	61.66	2,532.15	377.02	573.52	1,524,788.136	2,355,125.651	39.252080	-107.777511	
2,737.00	20.08	59.38	2,620.40	392.95	601.70	1,524,803.351	2,355,154.220	39.252123	-107.777411	
2,832.00	21.09	60.26	2,709.34	409.73	630.57	1,524,819.407	2,355,183.508	39.252169	-107.777309	
2,927.00	19.73	60.96	2,798.37	425.99	659.44	1,524,834.941	2,355,212.768	39.252214	-107.777207	
3,022.00	22.02	59.55	2,887.13	442.81	688.81	1,524,851.011	2,355,242.557	39.252260	-107.777104	
3,117.00	21.65	58.76	2,975.31	460.92	719.15	1,524,868.358	2,355,273.339	39.252310	-107.776997	
3,212.00	21.01	58.06	3,063.81	479.02	748.58	1,524,885.712	2,355,303.219	39.252360	-107.776893	
3,307.00	20.61	59.29	3,152.61	496.57	777.41	1,524,902.532	2,355,332.478	39.252408	-107.776791	
3,402.00	20.39	56.57	3,241.59	514.22	805.60	1,524,919.476	2,355,361.100	39.252456	-107.776691	
3,497.00	19.07	56.57	3,331.01	531.89	832.36	1,524,936.467	2,355,388.299	39.252505	-107.776597	
3,591.00	20.52	57.01	3,419.46	549.32	859.00	1,524,953.224	2,355,415.364	39.252553	-107.776503	
3,686.00	19.82	56.13	3,508.63	567.37	886.34	1,524,970.575	2,355,443.146	39.252602	-107.776406	
3,781.00	21.31	54.10	3,597.58	586.47	913.70	1,524,988.982	2,355,470.975	39.252655	-107.776310	
3,879.00	20.39	53.58	3,689.16	607.04	941.86	1,525,008.846	2,355,499.645	39.252711	-107.776210	
3,971.00	20.57	51.56	3,775.34	626.61	967.41	1,525,027.762	2,355,525.684	39.252765	-107.776120	
4,066.00	20.48	54.10	3,864.32	646.73	993.95	1,525,047.211	2,355,552.715	39.252820	-107.776026	
4,161.00	20.21	57.27	3,953.39	665.35	1,021.22	1,525,065.139	2,355,580.441	39.252871	-107.775930	
4,255.00	19.69	58.06	4,041.75	682.50	1,048.31	1,525,081.611	2,355,607.960	39.252918	-107.775834	
4,350.00	20.92	59.47	4,130.85	699.59	1,076.51	1,525,097.981	2,355,636.572	39.252965	-107.775735	
4,445.00	21.45	58.06	4,219.43	717.39	1,105.86	1,525,115.045	2,355,666.359	39.253014	-107.775631	
4,540.00	21.40	56.57	4,307.86	736.13	1,135.06	1,525,133.044	2,355,696.025	39.253065	-107.775528	
4,635.00	20.52	60.70	4,396.58	753.83	1,164.05	1,525,150.009	2,355,725.447	39.253114	-107.775425	
4,730.00	19.73	60.34	4,485.78	769.91	1,192.50	1,525,165.374	2,355,754.296	39.253158	-107.775325	
4,825.00	19.60	59.20	4,575.24	786.00	1,220.12	1,525,180.770	2,355,782.313	39.253202	-107.775227	
4,919.00	17.40	57.09	4,664.38	801.72	1,245.47	1,525,195.841	2,355,808.044	39.253246	-107.775138	



# Archer

## Survey Report - Geographic

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-03M
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7578.00usft
<b>Site:</b>	Piceance 28-05	<b>MD Reference:</b>	Well @ 7578.00usft
<b>Well:</b>	Piceance Federal 28-03M	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot B-5	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot B-5	<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	
5,014.00	15.51	56.65	4,755.48	816.42	1,268.01	1,525,209.972	2,355,830.943	39.253286	-107.775058	
5,109.00	14.19	54.98	4,847.31	830.08	1,288.15	1,525,223.128	2,355,851.427	39.253323	-107.774987	
5,204.00	12.88	57.27	4,939.67	842.49	1,306.60	1,525,235.069	2,355,870.176	39.253357	-107.774922	
5,299.00	13.18	58.06	5,032.22	853.95	1,324.70	1,525,246.066	2,355,888.556	39.253389	-107.774858	
5,394.00	11.65	59.47	5,125.00	864.55	1,342.15	1,525,256.228	2,355,906.270	39.253418	-107.774796	
5,489.00	11.78	58.67	5,218.02	874.46	1,358.69	1,525,265.724	2,355,923.059	39.253445	-107.774738	
5,584.00	10.68	58.59	5,311.20	884.09	1,374.49	1,525,274.955	2,355,939.093	39.253472	-107.774682	
5,678.00	9.71	59.03	5,403.71	892.71	1,388.72	1,525,283.214	2,355,953.536	39.253495	-107.774632	
5,772.00	9.18	59.47	5,496.44	900.60	1,401.98	1,525,290.767	2,355,966.985	39.253517	-107.774585	
5,867.00	8.31	60.96	5,590.33	907.78	1,414.51	1,525,297.633	2,355,979.691	39.253537	-107.774541	
5,962.00	7.07	58.94	5,684.48	914.13	1,425.52	1,525,303.704	2,355,990.858	39.253554	-107.774502	
6,057.00	6.64	63.16	5,778.80	919.63	1,435.43	1,525,308.950	2,356,000.901	39.253569	-107.774467	
6,152.00	5.67	50.33	5,873.25	925.10	1,443.94	1,525,314.210	2,356,009.550	39.253584	-107.774437	
6,247.00	3.96	43.29	5,967.92	930.49	1,449.80	1,525,319.446	2,356,015.545	39.253599	-107.774416	
6,341.00	3.30	44.79	6,061.73	934.77	1,453.93	1,525,323.623	2,356,019.783	39.253611	-107.774402	
6,436.00	2.90	33.19	6,156.59	938.72	1,457.18	1,525,327.492	2,356,023.123	39.253622	-107.774390	
6,531.00	2.42	31.78	6,251.49	942.44	1,459.55	1,525,331.148	2,356,025.587	39.253632	-107.774382	
6,626.00	2.02	30.20	6,346.41	945.59	1,461.45	1,525,334.251	2,356,027.564	39.253641	-107.774375	
6,721.00	1.14	21.59	6,441.38	947.92	1,462.64	1,525,336.546	2,356,028.812	39.253647	-107.774371	
6,816.00	1.05	324.72	6,536.36	949.51	1,462.48	1,525,338.139	2,356,028.697	39.253651	-107.774371	
6,911.00	1.41	291.76	6,631.34	950.65	1,460.89	1,525,339.323	2,356,027.138	39.253654	-107.774377	
7,006.00	1.10	279.72	6,726.32	951.24	1,458.91	1,525,339.959	2,356,025.169	39.253656	-107.774384	
7,101.00	1.49	267.33	6,821.29	951.33	1,456.78	1,525,340.109	2,356,023.040	39.253656	-107.774392	
7,196.00	1.58	254.14	6,916.26	950.92	1,454.28	1,525,339.757	2,356,020.536	39.253655	-107.774400	
7,291.00	1.58	254.50	7,011.22	950.21	1,451.76	1,525,339.112	2,356,017.998	39.253653	-107.774409	
7,386.00	1.45	216.79	7,106.19	948.90	1,449.78	1,525,337.850	2,356,015.983	39.253650	-107.774416	
7,480.00	1.98	220.92	7,200.15	946.72	1,448.00	1,525,335.715	2,356,014.153	39.253644	-107.774423	
7,575.00	2.11	229.36	7,295.09	944.34	1,445.60	1,525,333.397	2,356,011.692	39.253637	-107.774431	
7,670.00	1.63	215.74	7,390.04	942.10	1,443.49	1,525,331.215	2,356,009.520	39.253631	-107.774439	
7,765.00	1.58	227.25	7,485.00	940.12	1,441.73	1,525,329.274	2,356,007.720	39.253625	-107.774445	
7,860.00	0.35	187.43	7,579.99	938.94	1,440.73	1,525,328.123	2,356,006.692	39.253622	-107.774448	
7,955.00	0.70	174.08	7,674.98	938.08	1,440.76	1,525,327.258	2,356,006.692	39.253620	-107.774448	
8,050.00	1.05	239.11	7,769.98	937.05	1,440.07	1,525,326.251	2,356,005.980	39.253617	-107.774451	
Last Archer Survey										
8,090.00	1.58	214.24	7,809.97	936.41	1,439.45	1,525,325.623	2,356,005.339	39.253615	-107.774453	
PTB - Piceance Federal 28-03M tgt										
8,152.00	1.58	214.24	7,871.94	934.99	1,438.48	1,525,324.234	2,356,004.342	39.253611	-107.774456	



# Archer

## Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-03M
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance Federal 28-03M	North Reference:	True
Wellbore:	Slot B-5	Survey Calculation Method:	Minimum Curvature
Design:	Slot B-5	Database:	EDMDBBW

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
108.00	107.99	0.44	1.47	First archer Survey	
8,090.00	7,809.97	936.41	1,439.45	Last Archer Survey	
8,152.00	7,871.94	934.99	1,438.48	PTB	

Checked By:	_____	Approved By:	_____	Date:	_____
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