



# **Piceance Energy, LLC**

**Mesa County, CO**

**Piceance 28-05**

**Piceance 28-07W**

**Slot B-4**

**Survey: Survey #1**

## **Survey Report - Geographic**

**20 October, 2015**



Project: Mesa County, CO  
Site: Piceance 28-05  
Well: Piceance 28-07W  
Wellbore: Slot B-4  
Design: Design #2  
Latitude: 39° 15' 3.910 N  
Longitude: 107° 46' 46.490 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 28-07W, 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 28-07W

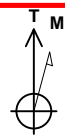
+N/-S	+E/-W	Northing	Ground Level:	Easting	Latitude	Longitude	Slot
0.0	0.0	1524441.11	7556.0	2354530.65	39° 15' 3.910 N	107° 46' 46.490 W	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance Federal 28-07W tgt	7850.0	-70.8	-317.8	1524378.30	2354211.18	39° 15' 3.210 N	107° 46' 50.530 W	Circle (Radius: 50.0)

### SECTION DETAILS

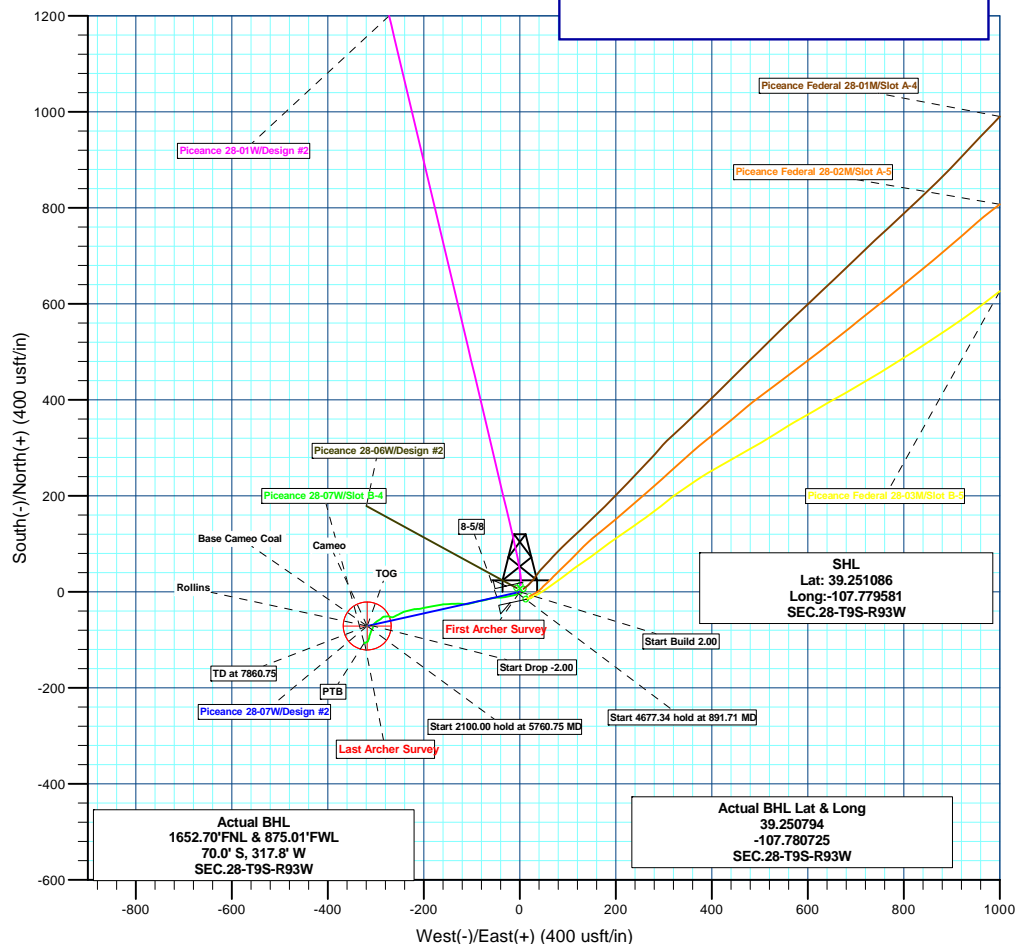
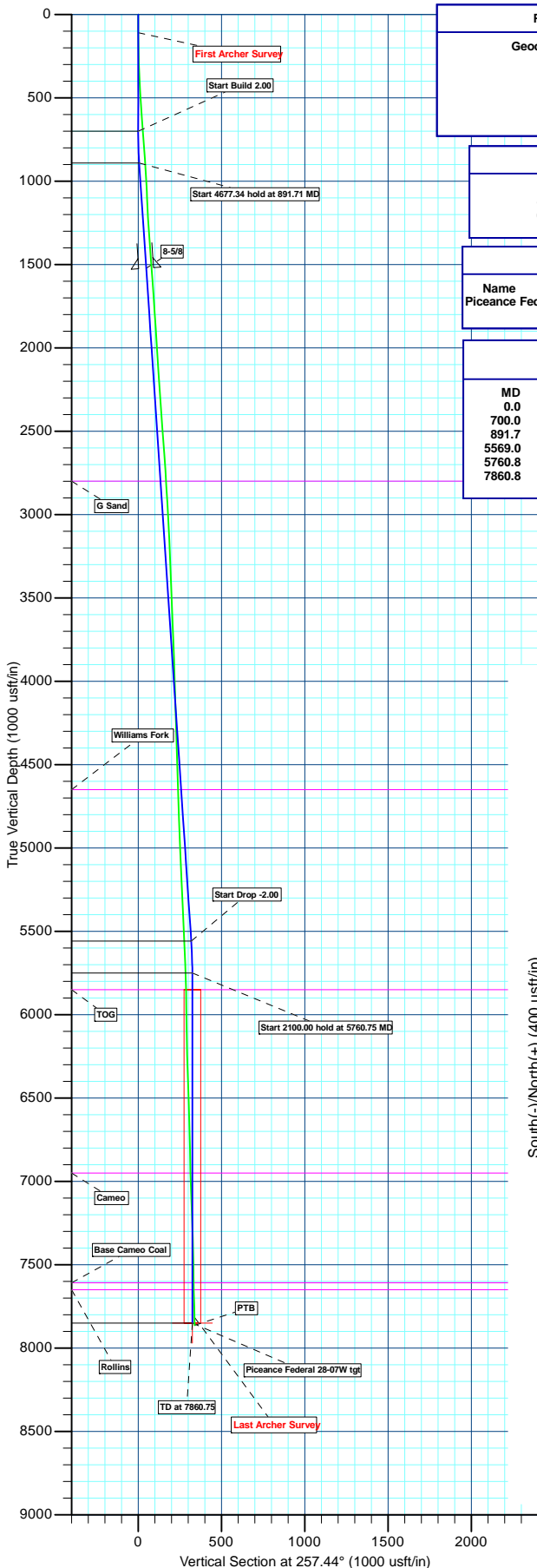
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
700.0	0.00	0.00	700.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
891.7	3.83	257.44	891.6	-1.4	-6.3	2.00	257.44	6.4	Start 4677.34 hold at 891.71 MD
5569.0	3.83	257.44	5558.4	-69.4	-311.5	0.00	0.00	319.2	Start Drop -2.00
5760.8	0.00	0.00	5750.0	-70.8	-317.8	2.00	180.00	325.6	Start 2100.00 hold at 5760.75 MD
7860.8	0.00	0.00	7850.0	-70.8	-317.8	0.00	0.00	325.6	TD at 7860.75



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
2800.0	2804.4	G Sand
4650.0	4658.6	Williams Fork
5850.0	5860.8	TOG
6950.0	6960.8	Cameo
7608.0	7618.8	Base Cameo Coal
7650.0	7660.8	Rollins



Plan: Design #2 (Piceance 28-07W/Slot B-4)

Created By: Ricky Osburn Date: 10:58, October 21 2015



# Archer

## Survey Report - Geographic

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance 28-07W
<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 28-07W	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot B-4	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot B-4	<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 28-07W					
Well Position	+N/-S	0.00 usft	Northing:	1,524,441.108 usft	Latitude:	39.251086
	+E/-W	0.00 usft	Easting:	2,354,530.651 usft	Longitude:	-107.779581
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,556.00 usft

<b>Wellbore</b>	Slot B-4				
<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-4			
<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	257.21

<b>Survey Program</b>	<b>Date</b>	2015/09/09		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
110.00	7,873.00	Survey #1 (Slot B-4)	MWD	MWD - Standard



# Archer

## Survey Report - Geographic

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance 28-07W
<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 28-07W	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot B-4	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot B-4	<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	1,524,441.108	2,354,530.651	39.251086	-107.779581	
First Archer Survey										
110.00	0.97	218.29	109.99	-0.73	-0.58	1,524,440.392	2,354,530.056	39.251084	-107.779583	
202.00	1.36	228.58	201.98	-2.06	-1.88	1,524,439.091	2,354,528.722	39.251080	-107.779587	
294.00	2.20	225.33	293.93	-4.03	-3.95	1,524,437.180	2,354,526.599	39.251075	-107.779595	
386.00	2.72	256.35	385.85	-5.78	-7.33	1,524,435.509	2,354,523.178	39.251070	-107.779606	
479.00	3.25	257.67	478.72	-6.87	-12.05	1,524,434.544	2,354,518.433	39.251067	-107.779623	
571.00	3.87	259.69	570.54	-7.98	-17.65	1,524,433.572	2,354,512.804	39.251064	-107.779643	
663.00	4.53	259.60	662.30	-9.19	-24.28	1,524,432.527	2,354,506.148	39.251061	-107.779666	
755.00	4.39	256.70	754.02	-10.66	-31.28	1,524,431.238	2,354,499.113	39.251057	-107.779691	
848.00	3.29	267.16	846.81	-11.61	-37.41	1,524,430.441	2,354,492.962	39.251054	-107.779713	
940.00	3.52	267.51	938.65	-11.86	-42.87	1,524,430.324	2,354,487.499	39.251053	-107.779732	
1,032.00	4.00	270.15	1,030.45	-11.98	-48.90	1,524,430.361	2,354,481.468	39.251053	-107.779753	
1,127.00	1.85	256.97	1,125.32	-12.31	-53.71	1,524,430.145	2,354,476.653	39.251052	-107.779770	
1,222.00	3.47	259.08	1,220.22	-13.20	-58.02	1,524,429.363	2,354,472.315	39.251050	-107.779785	
1,317.00	3.96	255.91	1,315.02	-14.55	-64.03	1,524,428.171	2,354,466.278	39.251046	-107.779807	
1,412.00	4.13	256.88	1,409.78	-16.12	-70.54	1,524,426.760	2,354,459.727	39.251042	-107.779830	
1,508.00	4.53	258.90	1,505.50	-17.64	-77.63	1,524,425.423	2,354,452.605	39.251038	-107.779855	
1,534.00	4.66	256.18	1,531.42	-18.09	-79.66	1,524,425.025	2,354,450.561	39.251036	-107.779862	
1,602.00	4.09	260.22	1,599.22	-19.16	-84.73	1,524,424.080	2,354,445.464	39.251033	-107.779880	
1,697.00	3.69	253.80	1,694.00	-20.59	-91.01	1,524,422.810	2,354,439.155	39.251030	-107.779902	
1,791.00	3.56	257.67	1,787.82	-22.05	-96.76	1,524,421.488	2,354,433.365	39.251026	-107.779922	
1,886.00	3.96	253.19	1,882.61	-23.63	-102.79	1,524,420.061	2,354,427.305	39.251021	-107.779944	
1,981.00	3.34	252.92	1,977.42	-25.39	-108.57	1,524,418.445	2,354,421.477	39.251016	-107.779964	
2,076.00	4.00	278.76	2,072.23	-25.70	-114.49	1,524,418.285	2,354,415.551	39.251015	-107.779985	
2,171.00	4.09	278.94	2,166.99	-24.67	-121.11	1,524,419.482	2,354,408.957	39.251018	-107.780008	
2,266.00	4.31	268.39	2,261.74	-24.25	-128.03	1,524,420.082	2,354,402.055	39.251019	-107.780033	
2,361.00	3.60	268.39	2,356.51	-24.43	-134.58	1,524,420.062	2,354,395.503	39.251019	-107.780056	
2,456.00	4.70	268.48	2,451.26	-24.62	-141.45	1,524,420.048	2,354,388.628	39.251018	-107.780080	
2,550.00	4.35	261.89	2,544.97	-25.22	-148.83	1,524,419.628	2,354,381.236	39.251017	-107.780106	
2,645.00	4.35	270.94	2,639.70	-25.67	-156.00	1,524,419.359	2,354,374.058	39.251016	-107.780131	
2,740.00	3.38	261.62	2,734.48	-26.02	-162.37	1,524,419.170	2,354,367.678	39.251015	-107.780154	
2,835.00	3.25	256.79	2,829.32	-27.04	-167.76	1,524,418.282	2,354,362.262	39.251012	-107.780173	
2,930.00	3.43	261.45	2,924.16	-28.08	-173.20	1,524,417.381	2,354,356.805	39.251009	-107.780192	
3,025.00	3.12	254.86	3,019.01	-29.18	-178.50	1,524,416.416	2,354,351.473	39.251006	-107.780211	
3,120.00	2.37	263.47	3,113.90	-30.08	-182.95	1,524,415.629	2,354,347.005	39.251003	-107.780227	
3,214.00	2.46	259.52	3,207.81	-30.67	-186.86	1,524,415.140	2,354,343.077	39.251002	-107.780240	
3,309.00	2.33	257.84	3,302.73	-31.44	-190.76	1,524,414.460	2,354,339.166	39.251000	-107.780254	
3,409.00	2.81	258.55	3,402.63	-32.36	-195.15	1,524,413.656	2,354,334.755	39.250997	-107.780270	
3,499.00	1.98	264.53	3,492.55	-32.94	-198.86	1,524,413.163	2,354,331.031	39.250996	-107.780283	
3,594.00	2.29	252.40	3,587.48	-33.67	-202.30	1,524,412.519	2,354,327.571	39.250994	-107.780295	
3,689.00	2.24	252.92	3,682.41	-34.79	-205.88	1,524,411.490	2,354,323.961	39.250991	-107.780308	
3,784.00	2.50	269.89	3,777.33	-35.34	-209.73	1,524,411.038	2,354,320.101	39.250989	-107.780321	
3,879.00	1.80	264.26	3,872.26	-35.50	-213.29	1,524,410.974	2,354,316.542	39.250989	-107.780334	
3,973.00	1.93	267.69	3,966.21	-35.71	-216.34	1,524,410.839	2,354,313.487	39.250988	-107.780345	
4,068.00	1.41	258.90	4,061.17	-36.00	-219.08	1,524,410.618	2,354,310.736	39.250987	-107.780354	
4,163.00	1.93	254.07	4,156.13	-36.66	-221.77	1,524,410.022	2,354,308.034	39.250985	-107.780364	
4,258.00	1.98	258.64	4,251.08	-37.42	-224.91	1,524,409.339	2,354,304.869	39.250983	-107.780375	
4,353.00	1.36	270.68	4,346.04	-37.73	-227.65	1,524,409.098	2,354,302.126	39.250982	-107.780384	
4,448.00	1.89	249.85	4,441.00	-38.26	-230.25	1,524,408.637	2,354,299.515	39.250981	-107.780394	
4,543.00	1.49	245.80	4,535.96	-39.31	-232.85	1,524,407.656	2,354,296.893	39.250978	-107.780403	
4,638.00	1.76	265.84	4,630.92	-39.92	-235.43	1,524,407.109	2,354,294.296	39.250976	-107.780412	
4,732.00	2.02	257.76	4,724.87	-40.37	-238.49	1,524,406.730	2,354,291.227	39.250975	-107.780423	
4,827.00	2.29	243.87	4,819.80	-41.57	-241.83	1,524,405.623	2,354,287.858	39.250972	-107.780435	
4,922.00	2.64	246.77	4,914.71	-43.26	-245.54	1,524,404.018	2,354,284.102	39.250967	-107.780448	



# Archer

## Survey Report - Geographic

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance 28-07W
<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 28-07W	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot B-4	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot B-4	<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	
5,017.00	2.20	237.81	5,009.63	-45.10	-249.09	1,524,402.274	2,354,280.504	39.250962	-107.780460	
5,112.00	2.46	245.54	5,104.55	-46.91	-252.49	1,524,400.544	2,354,277.060	39.250957	-107.780472	
5,207.00	2.72	250.46	5,199.45	-48.51	-256.47	1,524,399.046	2,354,273.041	39.250953	-107.780486	
5,301.00	2.77	231.83	5,293.35	-50.66	-260.36	1,524,396.995	2,354,269.101	39.250947	-107.780500	
5,396.00	3.03	254.68	5,388.23	-52.74	-264.59	1,524,395.019	2,354,264.823	39.250941	-107.780515	
5,491.00	3.08	297.57	5,483.11	-52.23	-269.27	1,524,395.655	2,354,260.153	39.250943	-107.780531	
5,586.00	2.20	278.15	5,578.01	-50.79	-273.34	1,524,397.196	2,354,256.123	39.250947	-107.780546	
5,681.00	2.72	261.89	5,672.92	-50.85	-277.38	1,524,397.238	2,354,252.086	39.250946	-107.780560	
5,775.00	2.20	265.05	5,766.83	-51.32	-281.38	1,524,396.868	2,354,248.070	39.250945	-107.780574	
5,870.00	0.79	244.22	5,861.80	-51.76	-283.79	1,524,396.486	2,354,245.653	39.250944	-107.780583	
5,965.00	0.62	243.17	5,956.79	-52.27	-284.84	1,524,395.996	2,354,244.592	39.250943	-107.780586	
6,060.00	1.19	242.46	6,051.78	-52.96	-286.17	1,524,395.342	2,354,243.242	39.250941	-107.780591	
6,155.00	1.54	209.24	6,146.75	-54.53	-287.67	1,524,393.810	2,354,241.705	39.250936	-107.780596	
6,249.00	1.71	237.81	6,240.72	-56.38	-289.47	1,524,392.006	2,354,239.855	39.250931	-107.780603	
6,344.00	1.63	236.93	6,335.68	-57.87	-291.80	1,524,390.573	2,354,237.487	39.250927	-107.780611	
6,439.00	1.98	243.87	6,430.63	-59.33	-294.41	1,524,389.179	2,354,234.845	39.250923	-107.780620	
6,534.00	2.11	235.70	6,525.57	-61.04	-297.33	1,524,387.544	2,354,231.885	39.250918	-107.780631	
6,629.00	2.50	229.98	6,620.49	-63.36	-300.36	1,524,385.303	2,354,228.796	39.250912	-107.780641	
6,724.00	0.97	221.02	6,715.45	-65.30	-302.47	1,524,383.417	2,354,226.634	39.250907	-107.780649	
6,818.00	2.11	206.60	6,809.41	-67.45	-303.77	1,524,381.303	2,354,225.283	39.250901	-107.780653	
6,914.00	2.33	194.83	6,905.34	-70.91	-305.06	1,524,377.870	2,354,223.906	39.250891	-107.780658	
7,009.00	3.60	203.79	7,000.21	-75.51	-306.76	1,524,373.318	2,354,222.094	39.250879	-107.780664	
7,104.00	4.31	203.79	7,094.98	-81.51	-309.40	1,524,367.390	2,354,219.301	39.250862	-107.780673	
7,199.00	4.48	198.08	7,189.70	-88.30	-311.99	1,524,360.664	2,354,216.540	39.250844	-107.780682	
7,293.00	3.56	189.11	7,283.47	-94.67	-313.60	1,524,354.334	2,354,214.779	39.250826	-107.780688	
7,388.00	2.46	210.47	7,378.34	-99.34	-315.10	1,524,349.704	2,354,213.161	39.250813	-107.780693	
7,483.00	1.45	191.05	7,473.29	-102.28	-316.36	1,524,346.799	2,354,211.824	39.250805	-107.780698	
7,578.00	1.36	249.14	7,568.26	-103.86	-317.64	1,524,345.251	2,354,210.501	39.250801	-107.780702	
7,673.00	1.54	243.87	7,663.23	-104.82	-319.84	1,524,344.343	2,354,208.278	39.250798	-107.780710	
7,768.00	1.05	238.07	7,758.21	-105.85	-321.73	1,524,343.368	2,354,206.368	39.250795	-107.780717	
Last Archer Survey										
7,825.00	1.54	263.56	7,815.19	-106.21	-322.93	1,524,343.036	2,354,205.155	39.250794	-107.780721	
Piceance Federal 28-07W tgt										
7,859.55	1.54	263.56	7,849.73	-106.31	-323.86	1,524,342.955	2,354,204.230	39.250794	-107.780724	
PTB										
7,873.00	1.54	263.56	7,863.18	-106.35	-324.22	1,524,342.923	2,354,203.869	39.250794	-107.780725	

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
110.00	109.99	-0.73	-0.58	First Archer Survey	
7,825.00	7,815.19	-106.21	-322.93	Last Archer Survey	
7,873.00	7,863.18	-106.35	-324.22	PTB	

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_