



# **Piceance Energy, LLC**

**Mesa County, CO**

**Piceance 28-05**

**Piceance 28-08W**

**Slot B-7**

**Survey: Survey #1**

## **Survey Report - Geographic**

**20 October, 2015**



Project: Mesa County, CO  
Site: Piceance 28-05  
Well: Piceance 28-08W  
Wellbore: Slot B-7  
Design: Design #2  
Latitude: 39° 15' 3.530 N  
Longitude: 107° 46' 46.090 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 28-08W, 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 28-08W

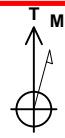
+N/-S	+E/-W	Northing	Ground Level	Easting	Latitude	Longitude	Slot
0.0	0.0	1524401.89	7556.0	2354561.14	39° 15' 3.530 N	107° 46' 46.090 W	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance Federal 28-08W tgt	7840.0	-282.3	-347.7	1524128.45	2354206.48	39° 15' 0.740 N	107° 46' 50.510 W	Circle (Radius: 50.0)

### SECTION DETAILS

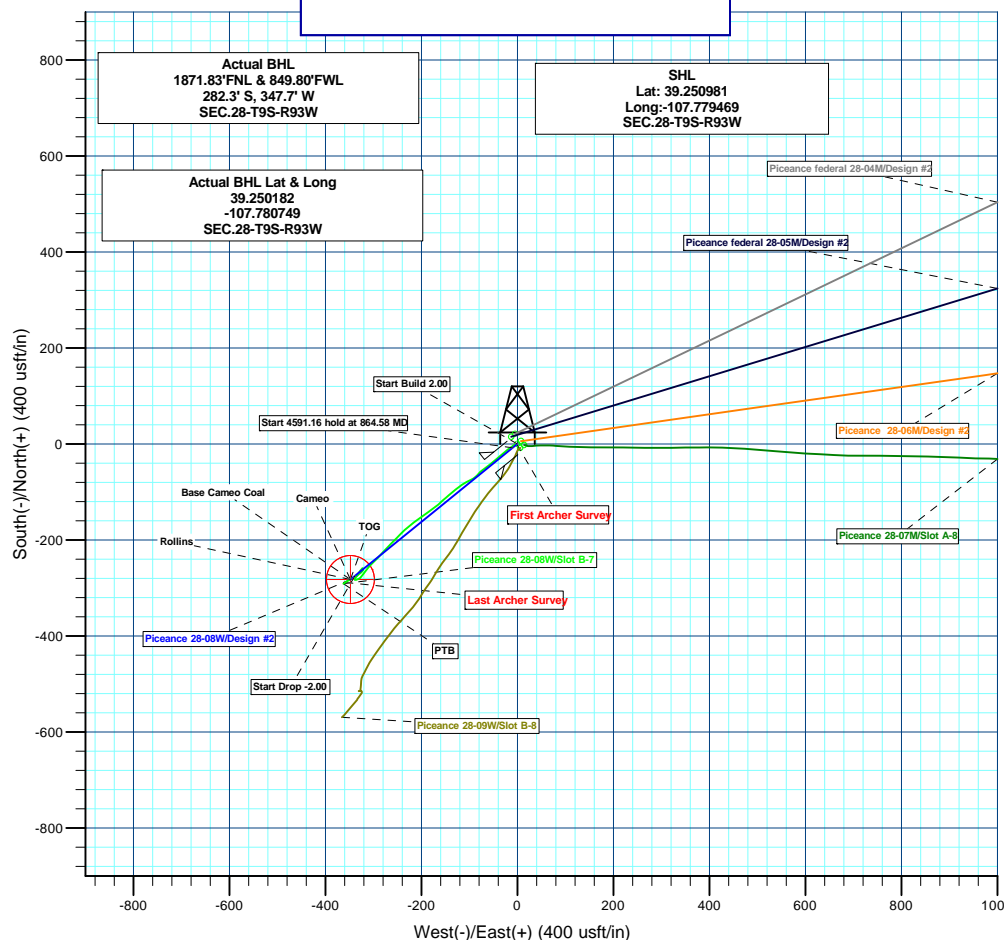
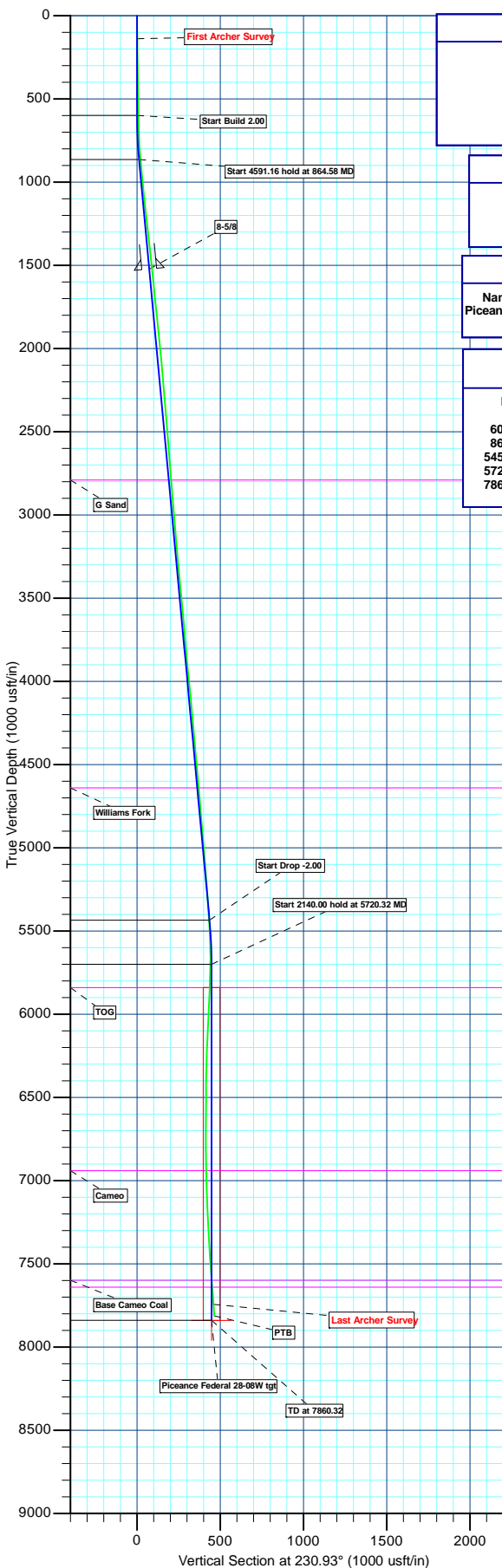
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
600.0	0.00	0.00	600.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
864.6	5.29	230.93	864.2	-7.7	-9.5	2.00	230.93	12.2	Start 4591.16 hold at 864.58 MD
5455.7	5.29	230.93	5435.8	-274.6	-338.2	0.00	0.00	435.6	Start Drop -2.00
5720.3	0.00	0.00	5700.0	-282.3	-347.7	2.00	180.00	447.8	Start 2140.00 hold at 5720.32 MD
7860.3	0.00	0.00	7840.0	-282.3	-347.7	0.00	0.00	447.8	TD at 7860.32



Azimuths to True North  
Magnetic North: 9.72°  
Magnetic Field  
Strength: 51741.8snT  
Dip Angle: 65.47°  
Date: 2015/04/27  
Model: IGRF2010

### FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2790.0	2798.6	G Sand
4640.0	4656.5	Williams Fork
5840.0	5860.3	TOG
6940.0	6960.3	Cameo
7598.0	7618.3	Base Cameo Coal
7640.0	7660.3	Rollins



Plan: Design #2 (Piceance 28-08W/Slot B-7)

Created By: Ricky Osburn Date: 11:03, October 21 2015



# Archer

## Survey Report - Geographic

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance 28-08W
<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 28-08W	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot B-7	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot B-7	<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		

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 28-08W					
Well Position	+N/-S	0.00 usft	Northing:	1,524,401.886 usft	Latitude:	39.250981
	+E/-W	0.00 usft	Easting:	2,354,561.142 usft	Longitude:	-107.779469
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,556.00 usft

<b>Wellbore</b>	Slot B-7				
<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-7				
<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	233.08	

<b>Survey Program</b>	<b>Date</b>	2015/08/10			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
139.00	7,834.00	Survey #1 (Slot B-7)	MWD	MWD - Standard	



# Archer

## Survey Report - Geographic

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance 28-08W
<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 28-08W	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot B-7	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot B-7	<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	1,524,401.886	2,354,561.142	39.250981	-107.779469	
First Archer Survey										
139.00	1.14	273.57	138.99	0.09	-1.38	1,524,402.006	2,354,559.764	39.250981	-107.779474	
201.00	0.92	263.46	200.98	0.07	-2.49	1,524,402.016	2,354,558.654	39.250981	-107.779478	
293.00	1.10	239.11	292.97	-0.47	-3.98	1,524,401.516	2,354,557.149	39.250979	-107.779484	
385.00	0.83	213.71	384.95	-1.48	-5.11	1,524,400.537	2,354,555.997	39.250976	-107.779487	
477.00	0.97	229.45	476.94	-2.54	-6.07	1,524,399.501	2,354,555.009	39.250974	-107.779491	
569.00	1.41	257.13	568.92	-3.30	-7.77	1,524,398.785	2,354,553.295	39.250971	-107.779497	
661.00	0.62	249.05	660.91	-3.73	-9.33	1,524,398.395	2,354,551.717	39.250970	-107.779502	
753.00	3.47	232.26	752.84	-5.61	-12.00	1,524,396.580	2,354,549.003	39.250965	-107.779512	
846.00	4.83	228.39	845.60	-9.93	-17.15	1,524,392.387	2,354,543.743	39.250953	-107.779530	
938.00	4.83	238.32	937.27	-14.54	-23.35	1,524,387.938	2,354,537.437	39.250941	-107.779552	
1,030.00	5.93	225.58	1,028.87	-19.90	-30.04	1,524,382.747	2,354,530.614	39.250926	-107.779576	
1,125.00	6.37	230.24	1,123.32	-26.70	-37.59	1,524,376.133	2,354,522.889	39.250907	-107.779602	
1,220.00	6.32	229.71	1,217.74	-33.46	-45.63	1,524,369.585	2,354,514.683	39.250889	-107.779631	
1,315.00	6.33	234.72	1,312.16	-39.86	-53.90	1,524,363.388	2,354,506.261	39.250871	-107.779660	
1,410.00	6.11	227.78	1,406.60	-46.28	-61.92	1,524,357.169	2,354,498.083	39.250853	-107.779688	
1,532.00	6.11	236.65	1,527.91	-54.22	-72.15	1,524,349.496	2,354,487.655	39.250832	-107.779724	
1,600.00	6.11	225.76	1,595.53	-58.73	-77.77	1,524,345.124	2,354,481.928	39.250819	-107.779744	
1,695.00	5.49	220.22	1,690.04	-65.73	-84.32	1,524,338.293	2,354,475.198	39.250800	-107.779767	
1,789.00	6.37	240.52	1,783.55	-71.73	-91.77	1,524,332.481	2,354,467.605	39.250784	-107.779793	
1,884.00	5.71	242.37	1,878.02	-76.51	-100.54	1,524,327.918	2,354,458.713	39.250770	-107.779824	
1,979.00	5.76	242.81	1,972.55	-80.88	-108.97	1,524,323.761	2,354,450.179	39.250758	-107.779854	
2,074.00	5.27	234.37	2,067.11	-85.60	-116.75	1,524,319.237	2,354,442.276	39.250745	-107.779882	
2,169.00	5.36	232.08	2,161.70	-90.87	-123.80	1,524,314.147	2,354,435.100	39.250731	-107.779907	
2,264.00	5.41	229.71	2,256.28	-96.50	-130.72	1,524,308.700	2,354,428.045	39.250716	-107.779931	
2,359.00	4.39	231.47	2,350.93	-101.66	-136.98	1,524,303.697	2,354,421.657	39.250701	-107.779953	
2,454.00	4.70	226.90	2,445.63	-106.58	-142.66	1,524,298.917	2,354,415.849	39.250688	-107.779973	
2,548.00	4.83	231.64	2,539.31	-111.67	-148.58	1,524,293.980	2,354,409.808	39.250674	-107.779994	
2,643.00	4.22	225.23	2,634.01	-116.61	-154.20	1,524,289.179	2,354,404.068	39.250660	-107.780014	
2,738.00	4.53	229.10	2,728.74	-121.53	-159.51	1,524,284.396	2,354,398.629	39.250647	-107.780033	
2,833.00	3.69	226.99	2,823.49	-126.07	-164.59	1,524,279.983	2,354,393.446	39.250634	-107.780051	
2,928.00	5.45	229.89	2,918.18	-131.06	-170.27	1,524,275.135	2,354,387.636	39.250621	-107.780071	
3,023.00	5.01	236.48	3,012.79	-136.26	-177.18	1,524,270.112	2,354,380.599	39.250606	-107.780095	
3,117.00	4.31	235.77	3,106.48	-140.51	-183.52	1,524,266.019	2,354,374.152	39.250595	-107.780118	
3,212.00	4.35	238.68	3,201.21	-144.40	-189.55	1,524,262.291	2,354,368.027	39.250584	-107.780139	
3,307.00	5.93	233.49	3,295.82	-149.19	-196.57	1,524,257.676	2,354,360.886	39.250571	-107.780164	
3,402.00	5.84	231.38	3,390.32	-155.12	-204.29	1,524,251.935	2,354,353.019	39.250555	-107.780191	
3,497.00	5.19	236.21	3,484.88	-160.53	-211.64	1,524,246.715	2,354,345.539	39.250540	-107.780217	
3,592.00	5.36	231.29	3,579.48	-165.70	-218.68	1,524,241.728	2,354,338.378	39.250526	-107.780242	
3,687.00	5.01	232.17	3,674.09	-171.01	-225.41	1,524,236.580	2,354,331.508	39.250511	-107.780265	
3,782.00	4.79	223.21	3,768.75	-176.45	-231.41	1,524,231.297	2,354,325.381	39.250496	-107.780287	
3,876.00	4.70	230.59	3,862.42	-181.76	-237.07	1,524,226.135	2,354,319.587	39.250481	-107.780307	
3,971.00	6.28	224.70	3,956.99	-187.92	-243.73	1,524,220.139	2,354,312.773	39.250465	-107.780330	
4,066.00	5.45	221.54	4,051.49	-194.99	-250.38	1,524,213.238	2,354,305.951	39.250445	-107.780354	
4,161.00	5.36	225.76	4,146.07	-201.46	-256.55	1,524,206.923	2,354,299.620	39.250427	-107.780375	
4,256.00	4.97	226.37	4,240.68	-207.40	-262.71	1,524,201.144	2,354,293.315	39.250411	-107.780397	
4,351.00	5.49	223.03	4,335.29	-213.56	-268.79	1,524,195.137	2,354,287.083	39.250394	-107.780419	
4,446.00	5.10	220.31	4,429.88	-220.10	-274.62	1,524,188.744	2,354,281.088	39.250376	-107.780439	
4,541.00	5.19	229.21	4,524.50	-226.13	-280.60	1,524,182.869	2,354,274.954	39.250360	-107.780460	
4,635.00	4.75	220.04	4,618.15	-231.89	-286.33	1,524,177.257	2,354,269.088	39.250344	-107.780481	
4,730.00	4.75	221.01	4,712.82	-237.87	-291.44	1,524,171.407	2,354,263.828	39.250327	-107.780499	
4,825.00	4.79	227.34	4,807.49	-243.52	-296.94	1,524,165.891	2,354,258.190	39.250312	-107.780518	
4,920.00	5.19	223.65	4,902.13	-249.32	-302.82	1,524,160.244	2,354,252.164	39.250296	-107.780539	
5,015.00	4.57	223.56	4,996.79	-255.17	-308.39	1,524,154.534	2,354,246.445	39.250280	-107.780558	



# Archer

## Survey Report - Geographic

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance 28-08W
<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 28-08W	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot B-7	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot B-7	<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
5,109.00	5.05	218.28	5,090.46	-261.13	-313.54	1,524,148.703	2,354,241.153	39.250264	-107.780577
5,204.00	4.35	216.44	5,185.14	-267.31	-318.27	1,524,142.643	2,354,236.269	39.250247	-107.780593
5,299.00	4.66	215.12	5,279.84	-273.37	-322.63	1,524,136.699	2,354,231.759	39.250230	-107.780609
5,394.00	3.69	229.12	5,374.59	-278.52	-327.16	1,524,131.657	2,354,227.099	39.250216	-107.780625
5,489.00	2.94	246.15	5,469.43	-281.51	-331.70	1,524,128.786	2,354,222.486	39.250208	-107.780641
5,584.00	2.55	258.01	5,564.33	-282.93	-335.99	1,524,127.470	2,354,218.156	39.250204	-107.780656
5,679.00	0.88	320.06	5,659.29	-282.81	-338.53	1,524,127.654	2,354,215.624	39.250204	-107.780665
5,773.00	1.63	25.67	5,753.27	-281.06	-338.41	1,524,129.409	2,354,215.784	39.250209	-107.780664
5,868.00	2.50	27.83	5,848.20	-278.01	-336.86	1,524,132.419	2,354,217.412	39.250217	-107.780659
5,963.00	2.99	37.49	5,943.10	-274.21	-334.39	1,524,136.154	2,354,219.982	39.250228	-107.780650
6,058.00	2.94	33.27	6,037.97	-270.20	-331.54	1,524,140.085	2,354,222.926	39.250239	-107.780640
6,152.00	2.55	37.58	6,131.86	-266.53	-328.94	1,524,143.691	2,354,225.615	39.250249	-107.780631
6,247.00	2.11	38.81	6,226.78	-263.49	-326.56	1,524,146.668	2,354,228.076	39.250257	-107.780623
6,342.00	1.10	41.18	6,321.74	-261.44	-324.86	1,524,148.674	2,354,229.823	39.250263	-107.780617
6,437.00	0.44	4.09	6,416.73	-260.39	-324.24	1,524,149.708	2,354,230.476	39.250266	-107.780614
6,532.00	0.53	43.91	6,511.73	-259.71	-323.90	1,524,150.380	2,354,230.823	39.250267	-107.780613
6,627.00	0.83	48.57	6,606.72	-258.94	-323.08	1,524,151.131	2,354,231.663	39.250270	-107.780610
6,721.00	0.44	113.26	6,700.72	-258.63	-322.24	1,524,151.418	2,354,232.512	39.250270	-107.780607
6,816.00	0.75	162.03	6,795.71	-259.37	-321.71	1,524,150.669	2,354,233.021	39.250268	-107.780606
6,912.00	1.54	174.43	6,891.69	-261.25	-321.40	1,524,148.780	2,354,233.293	39.250263	-107.780604
7,006.00	1.76	216.18	6,985.66	-263.67	-322.13	1,524,146.377	2,354,232.502	39.250257	-107.780607
7,102.00	2.24	214.77	7,081.60	-266.40	-324.07	1,524,143.695	2,354,230.494	39.250249	-107.780614
7,197.00	2.50	236.30	7,176.52	-269.08	-326.85	1,524,141.091	2,354,227.646	39.250242	-107.780624
7,291.00	2.64	233.58	7,270.43	-271.50	-330.30	1,524,138.756	2,354,224.138	39.250235	-107.780636
7,386.00	3.16	240.35	7,365.30	-274.10	-334.33	1,524,136.263	2,354,220.038	39.250228	-107.780650
7,481.00	4.22	241.31	7,460.11	-277.07	-339.67	1,524,133.425	2,354,214.623	39.250220	-107.780669
7,576.00	4.53	242.19	7,554.83	-280.50	-346.06	1,524,130.158	2,354,208.155	39.250210	-107.780691
7,671.00	4.39	233.23	7,649.54	-284.42	-352.29	1,524,126.389	2,354,201.827	39.250200	-107.780713
Last Archer Survey									
7,765.00	4.13	238.68	7,743.28	-288.34	-358.06	1,524,122.622	2,354,195.958	39.250189	-107.780734
PTB - Piceance Federal 28-08W tgt									
7,834.00	4.13	238.68	7,812.10	-290.92	-362.31	1,524,120.146	2,354,191.649	39.250182	-107.780749

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
139.00	138.99	0.09	-1.38	First Archer Survey
7,765.00	7,743.28	-288.34	-358.06	Last Archer Survey
7,834.00	7,812.10	-290.92	-362.31	PTB

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