



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance 28-04W

Slot B-2

Survey: Survey #1

Survey Report - Geographic

20 October, 2015



Project: Mesa County, CO
Site: Piceance 28-05
Well: Piceance 28-04W
Wellbore: Slot B-2
Design: Design #2
Latitude: 39° 15' 4.140 N
Longitude: 107° 46' 46.730 W
Ground Level: 7556.0
Well @ 7578.0usft

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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 28-04W, 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 28-04W

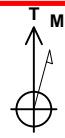
+N/-S	+E/-W	Northing	Ground Level:	7556.0	Latitude	Longitude	Slot
0.0	0.0	1524464.84	Easting	2354512.36	39° 15' 4.140 N	107° 46' 46.730 W	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance Federal 28-04W tgt	7876.0	655.6	-303.6	1525127.86	2354225.28	39° 15' 10.620 N	107° 46' 50.590 W	Circle (Radius: 50.0)

SECTION DETAILS

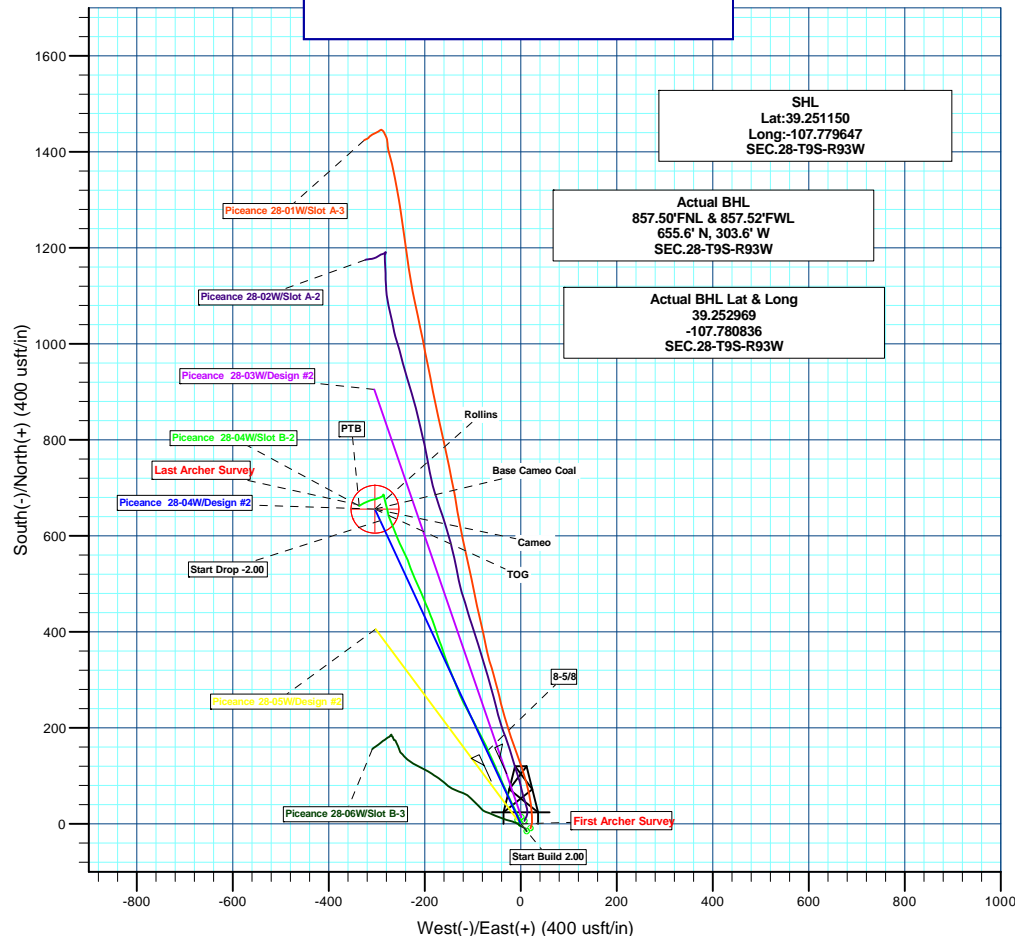
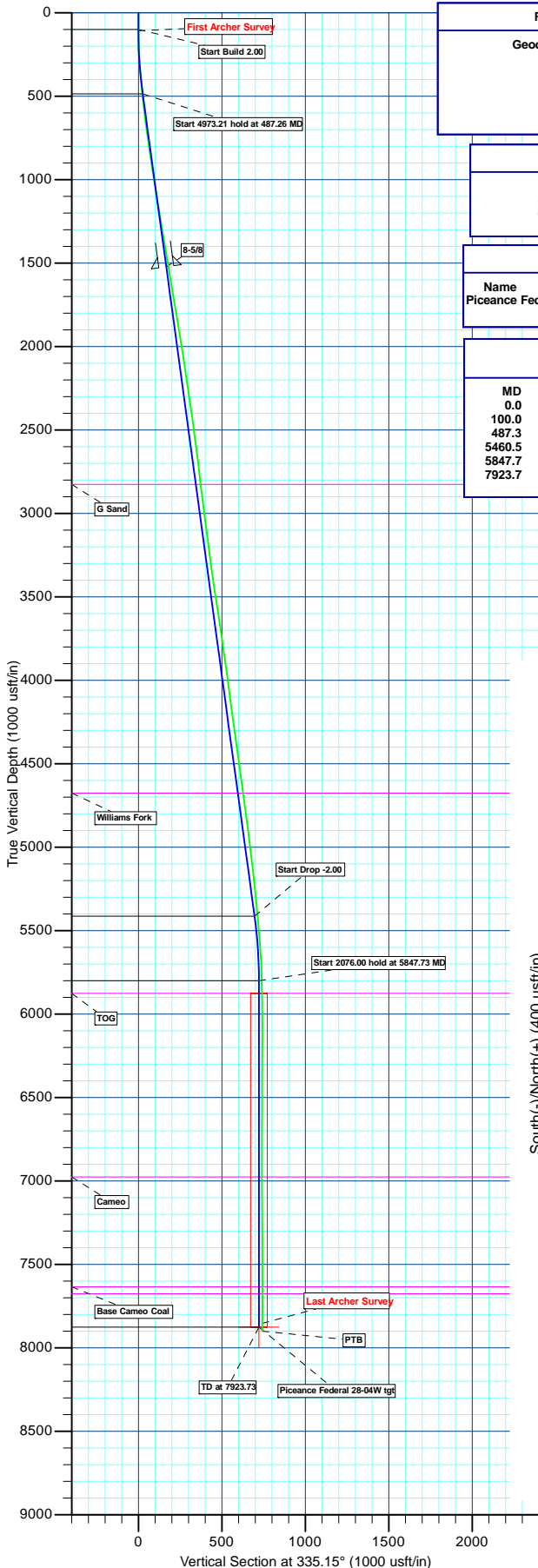
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
100.0	0.00	0.00	100.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
487.3	7.75	335.15	486.1	23.7	-11.0	2.00	335.15	26.1	Start 4973.21 hold at 487.26 MD
5460.5	7.75	335.15	5413.9	631.9	-292.6	0.00	0.00	696.4	Start Drop -2.00
5847.7	0.00	0.00	5800.0	655.6	-303.6	2.00	180.00	722.5	Start 2076.00 hold at 5847.73 MD
7923.7	0.00	0.00	7876.0	655.6	-303.6	0.00	0.00	722.5	TD at 7923.73



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
2826.0	2848.7	G Sand
4676.0	4715.8	Williams Fork
5876.0	5923.7	TOG
6976.0	7023.7	Cameo
7634.0	7681.7	Base Cameo Coal
7676.0	7723.7	Rollins



Plan: Design #2 (Piceance 28-04W/Slot B-2)

Created By: Ricky Osburn Date: 10:34, October 21 2015



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-04W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-04W	North Reference:	True
Wellbore:	Slot B-2	Survey Calculation Method:	Minimum Curvature
Design:	Slot B-2	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 28-05			
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 28-04W			
Well Position	+N/-S	0.00 usft	Northing:	1,524,464.844 usft
	+E/-W	0.00 usft	Easting:	2,354,512.362 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level: 7,556.00 usft

Wellbore	Slot B-2				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2015/04/27	9.73	65.47	51,742

Design	Slot B-2			
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	336.14

Survey Program	Date	2015/09/25		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
108.00	7,953.00	Survey #1 (Slot B-2)	MWD	MWD - Standard



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-04W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-04W	North Reference:	True
Wellbore:	Slot B-2	Survey Calculation Method:	Minimum Curvature
Design:	Slot B-2	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	1,524,464.844	2,354,512.362	39.251150	-107.779647	
First Archer Survey										
108.00	0.57	290.09	108.00	0.18	-0.50	1,524,465.041	2,354,511.863	39.251150	-107.779649	
200.00	1.45	333.60	199.98	1.38	-1.45	1,524,466.264	2,354,510.946	39.251154	-107.779652	
292.00	4.04	355.48	291.87	5.66	-2.22	1,524,470.556	2,354,510.280	39.251165	-107.779655	
385.00	5.54	337.02	384.55	13.06	-4.24	1,524,478.004	2,354,508.455	39.251186	-107.779662	
477.00	5.89	331.84	476.09	21.31	-8.20	1,524,486.351	2,354,504.702	39.251208	-107.779676	
569.00	6.81	338.17	567.53	30.53	-12.45	1,524,495.680	2,354,500.679	39.251234	-107.779691	
661.00	7.34	330.96	658.83	40.74	-17.33	1,524,506.001	2,354,496.055	39.251262	-107.779708	
754.00	7.65	335.62	751.04	51.57	-22.77	1,524,516.967	2,354,490.890	39.251292	-107.779728	
846.00	8.39	335.09	842.14	63.23	-28.13	1,524,528.762	2,354,485.829	39.251324	-107.779747	
938.00	8.83	337.11	933.10	75.83	-33.70	1,524,541.491	2,354,480.573	39.251358	-107.779766	
1,031.00	9.27	336.85	1,024.94	89.29	-39.42	1,524,555.094	2,354,475.192	39.251395	-107.779786	
1,126.00	10.11	335.09	1,118.59	103.89	-45.94	1,524,569.851	2,354,469.040	39.251435	-107.779809	
1,220.00	8.92	337.29	1,211.29	118.09	-52.23	1,524,584.210	2,354,463.109	39.251474	-107.779832	
1,315.00	8.70	333.95	1,305.17	131.34	-58.23	1,524,597.606	2,354,457.445	39.251511	-107.779853	
1,411.00	9.49	337.46	1,399.96	145.17	-64.45	1,524,611.590	2,354,451.572	39.251549	-107.779875	
1,506.00	9.05	333.77	1,493.72	159.11	-70.76	1,524,625.680	2,354,445.619	39.251587	-107.779897	
1,532.00	9.98	334.56	1,519.37	162.98	-72.63	1,524,629.594	2,354,443.845	39.251597	-107.779904	
1,603.00	9.93	332.89	1,589.30	173.98	-78.06	1,524,640.732	2,354,438.690	39.251628	-107.779923	
1,698.00	9.80	333.33	1,682.89	188.50	-85.42	1,524,655.428	2,354,431.695	39.251668	-107.779949	
1,792.00	9.67	332.72	1,775.54	202.67	-92.63	1,524,669.770	2,354,424.844	39.251706	-107.779974	
1,887.00	9.23	332.45	1,869.25	216.51	-99.81	1,524,683.792	2,354,418.012	39.251744	-107.780000	
1,982.00	9.10	332.01	1,963.04	229.90	-106.86	1,524,697.354	2,354,411.301	39.251781	-107.780025	
2,077.00	8.66	332.10	2,056.90	242.86	-113.74	1,524,710.477	2,354,404.756	39.251817	-107.780049	
2,172.00	8.61	331.49	2,150.82	255.43	-120.48	1,524,723.211	2,354,398.332	39.251851	-107.780073	
2,267.00	8.17	338.08	2,244.81	267.94	-126.39	1,524,735.867	2,354,392.734	39.251886	-107.780094	
2,362.00	8.22	339.40	2,338.84	280.56	-131.30	1,524,748.606	2,354,388.142	39.251920	-107.780111	
2,457.00	8.00	337.11	2,432.89	293.00	-136.26	1,524,761.173	2,354,383.495	39.251954	-107.780128	
2,551.00	7.78	338.52	2,526.00	304.95	-141.14	1,524,773.239	2,354,378.923	39.251987	-107.780146	
2,646.00	7.34	337.38	2,620.17	316.53	-145.82	1,524,784.938	2,354,374.526	39.252019	-107.780162	
2,741.00	6.72	339.93	2,714.46	327.36	-150.07	1,524,795.863	2,354,370.558	39.252049	-107.780177	
2,836.00	6.37	337.90	2,808.84	337.46	-153.96	1,524,806.061	2,354,366.922	39.252076	-107.780191	
2,931.00	7.51	342.03	2,903.14	348.25	-157.85	1,524,816.945	2,354,363.296	39.252106	-107.780205	
3,026.00	7.78	341.60	2,997.30	360.26	-161.80	1,524,829.046	2,354,359.653	39.252139	-107.780219	
3,120.00	7.47	340.01	3,090.46	372.04	-165.90	1,524,840.925	2,354,355.853	39.252171	-107.780233	
3,215.00	7.34	340.28	3,184.67	383.55	-170.05	1,524,852.541	2,354,351.985	39.252203	-107.780248	
3,310.00	6.99	341.33	3,278.93	394.74	-173.95	1,524,863.825	2,354,348.368	39.252234	-107.780262	
3,405.00	8.04	343.26	3,373.11	406.58	-177.72	1,524,875.754	2,354,344.903	39.252266	-107.780275	
3,500.00	8.83	339.22	3,467.08	419.76	-182.22	1,524,889.042	2,354,340.734	39.252302	-107.780291	
3,595.00	8.88	338.96	3,560.95	433.42	-187.44	1,524,902.830	2,354,335.859	39.252340	-107.780309	
3,690.00	8.44	337.99	3,654.87	446.73	-192.68	1,524,916.264	2,354,330.950	39.252376	-107.780328	
3,785.00	8.26	336.59	3,748.86	459.45	-198.01	1,524,929.120	2,354,325.946	39.252411	-107.780346	
3,879.00	8.31	337.90	3,841.88	471.94	-203.24	1,524,941.738	2,354,321.023	39.252446	-107.780365	
3,974.00	8.13	336.06	3,935.91	484.44	-208.55	1,524,954.367	2,354,316.030	39.252480	-107.780384	
4,069.00	7.87	335.97	4,029.98	496.52	-213.93	1,524,966.578	2,354,310.960	39.252513	-107.780403	
4,164.00	7.38	333.60	4,124.14	507.93	-219.29	1,524,978.114	2,354,305.887	39.252545	-107.780422	
4,259.00	7.78	339.22	4,218.31	519.41	-224.28	1,524,989.713	2,354,301.182	39.252576	-107.780439	
4,354.00	7.56	340.10	4,312.46	531.29	-228.69	1,525,001.708	2,354,297.073	39.252609	-107.780455	
4,449.00	7.73	341.68	4,406.62	543.23	-232.83	1,525,013.749	2,354,293.239	39.252641	-107.780469	
4,544.00	7.95	333.86	4,500.73	555.20	-237.73	1,525,025.832	2,354,288.638	39.252674	-107.780487	
4,638.00	7.73	333.68	4,593.85	566.70	-243.40	1,525,037.472	2,354,283.261	39.252706	-107.780507	
4,733.00	6.81	332.95	4,688.09	577.44	-248.79	1,525,048.348	2,354,278.138	39.252735	-107.780526	
4,828.00	7.73	338.43	4,782.33	588.40	-253.70	1,525,059.426	2,354,273.504	39.252765	-107.780543	
4,923.00	7.56	336.67	4,876.48	600.08	-258.53	1,525,071.223	2,354,268.975	39.252798	-107.780560	



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-04W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-04W	North Reference:	True
Wellbore:	Slot B-2	Survey Calculation Method:	Minimum Curvature
Design:	Slot B-2	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	
5,018.00	7.51	338.87	4,970.66	611.61	-263.24	1,525,082.867	2,354,264.553	39.252829	-107.780577	
5,112.00	7.03	338.34	5,063.90	622.69	-267.58	1,525,094.048	2,354,260.495	39.252860	-107.780592	
5,207.00	6.42	335.00	5,158.25	632.90	-271.97	1,525,104.372	2,354,256.362	39.252888	-107.780608	
5,302.00	6.72	348.71	5,252.63	643.17	-275.30	1,525,114.717	2,354,253.288	39.252916	-107.780619	
5,397.00	5.89	346.96	5,347.06	653.37	-277.49	1,525,124.969	2,354,251.356	39.252944	-107.780627	
5,492.00	5.36	343.18	5,441.60	662.36	-279.87	1,525,134.022	2,354,249.199	39.252969	-107.780636	
5,587.00	4.22	346.08	5,536.27	670.00	-282.00	1,525,141.713	2,354,247.266	39.252990	-107.780643	
5,682.00	3.87	347.84	5,631.03	676.53	-283.51	1,525,148.276	2,354,245.914	39.253007	-107.780648	
5,776.00	1.76	350.00	5,724.91	681.05	-284.43	1,525,152.820	2,354,245.109	39.253020	-107.780652	
5,871.00	0.92	345.81	5,819.88	683.23	-284.87	1,525,155.007	2,354,244.724	39.253026	-107.780653	
5,966.00	0.92	328.24	5,914.87	684.62	-285.46	1,525,156.409	2,354,244.170	39.253030	-107.780655	
6,061.00	0.92	312.77	6,009.86	685.78	-286.42	1,525,157.599	2,354,243.238	39.253033	-107.780659	
6,156.00	0.48	123.63	6,104.86	686.08	-286.65	1,525,157.902	2,354,243.017	39.253034	-107.780659	
6,250.00	0.22	111.94	6,198.86	685.80	-286.15	1,525,157.604	2,354,243.505	39.253033	-107.780658	
6,345.00	0.22	108.07	6,293.85	685.67	-285.81	1,525,157.471	2,354,243.845	39.253033	-107.780657	
6,440.00	0.35	183.74	6,388.85	685.33	-285.66	1,525,157.121	2,354,243.990	39.253032	-107.780656	
6,535.00	0.44	201.32	6,483.85	684.70	-285.81	1,525,156.496	2,354,243.823	39.253030	-107.780657	
6,630.00	0.88	238.94	6,578.85	683.98	-286.57	1,525,155.799	2,354,243.048	39.253028	-107.780659	
6,724.00	1.19	237.97	6,672.83	683.09	-288.01	1,525,154.945	2,354,241.580	39.253025	-107.780664	
6,819.00	1.32	236.92	6,767.81	681.97	-289.77	1,525,153.869	2,354,239.799	39.253022	-107.780670	
6,915.00	1.80	241.40	6,863.77	680.64	-292.02	1,525,152.601	2,354,237.517	39.253019	-107.780678	
7,009.00	2.02	254.50	6,957.72	679.50	-294.91	1,525,151.524	2,354,234.596	39.253016	-107.780689	
7,105.00	1.71	251.42	7,053.67	678.59	-297.90	1,525,150.691	2,354,231.586	39.253013	-107.780699	
7,200.00	1.71	243.60	7,148.63	677.50	-300.51	1,525,149.675	2,354,228.947	39.253010	-107.780708	
7,294.00	2.20	253.88	7,242.57	676.38	-303.50	1,525,148.626	2,354,225.930	39.253007	-107.780719	
7,389.00	2.24	262.93	7,337.50	675.65	-307.09	1,525,147.982	2,354,222.318	39.253005	-107.780732	
7,484.00	2.90	254.76	7,432.41	674.79	-311.25	1,525,147.226	2,354,218.137	39.253003	-107.780746	
7,579.00	3.65	248.61	7,527.25	673.05	-316.39	1,525,145.621	2,354,212.961	39.252998	-107.780765	
7,674.00	3.65	244.56	7,622.06	670.65	-321.94	1,525,143.359	2,354,207.356	39.252991	-107.780784	
7,768.00	3.56	241.93	7,715.87	667.99	-327.21	1,525,140.834	2,354,202.014	39.252984	-107.780803	
7,863.00	3.30	239.20	7,810.70	665.20	-332.16	1,525,138.171	2,354,196.994	39.252976	-107.780820	
Last Archer Survey - Piceance Federal 28-04W tgt										
7,906.00	3.30	236.74	7,853.63	663.89	-334.26	1,525,136.911	2,354,194.864	39.252973	-107.780828	
PTB										
7,953.00	3.30	236.74	7,900.55	662.41	-336.52	1,525,135.485	2,354,192.565	39.252969	-107.780836	

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
108.00	108.00	0.18	-0.50	First Archer Survey	
7,906.00	7,853.63	663.89	-334.26	Last Archer Survey	
7,953.00	7,900.55	662.41	-336.52	PTB	

Checked By: _____	Approved By: _____	Date: _____
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