



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance federal 28-04M

Slot A-6

Survey: Survey #1

Survey Report - Geographic

20 October, 2015



Project: Mesa County, CO
Site: Piceance 28-05
Well: Piceance federal 28-04M
Wellbore: Slot A-6
Design: Design #2
Latitude: 39° 15' 3.740 N
Longitude: 107° 46' 46.150 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 28-04M, 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 28-04M

+N-S	+E-W	Northing	Ground Level:	Latitude	Longitude	Slot
0.0	0.0	1524423.25	7556.0	39° 15' 3.740 N	107° 46' 46.150 W	
			Easting 2354556.96			

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

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude	Shape
Piceance Federal 28-04M tgt	7908.0	676.9	1410.4	1525064.53	2355983.86	39° 15' 10.430 N	107° 46' 28.220 W	Circle (Radius: 50.0)

SECTION DETAILS

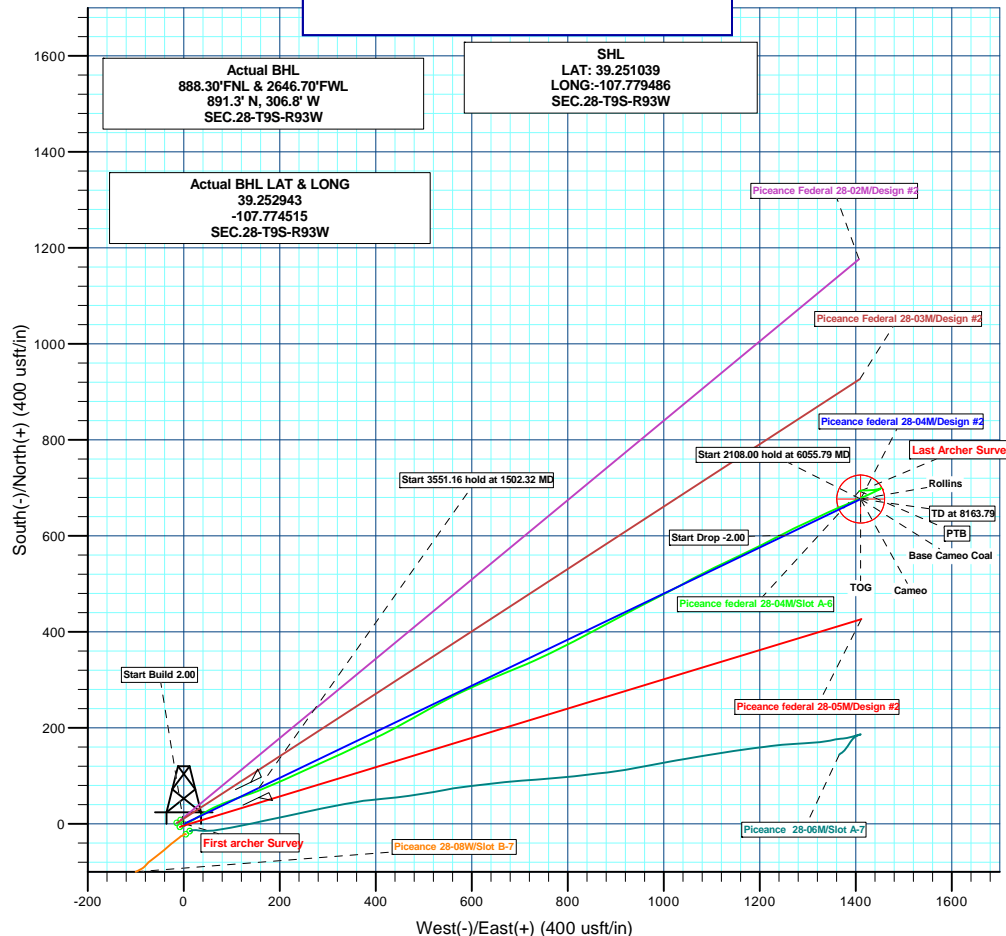
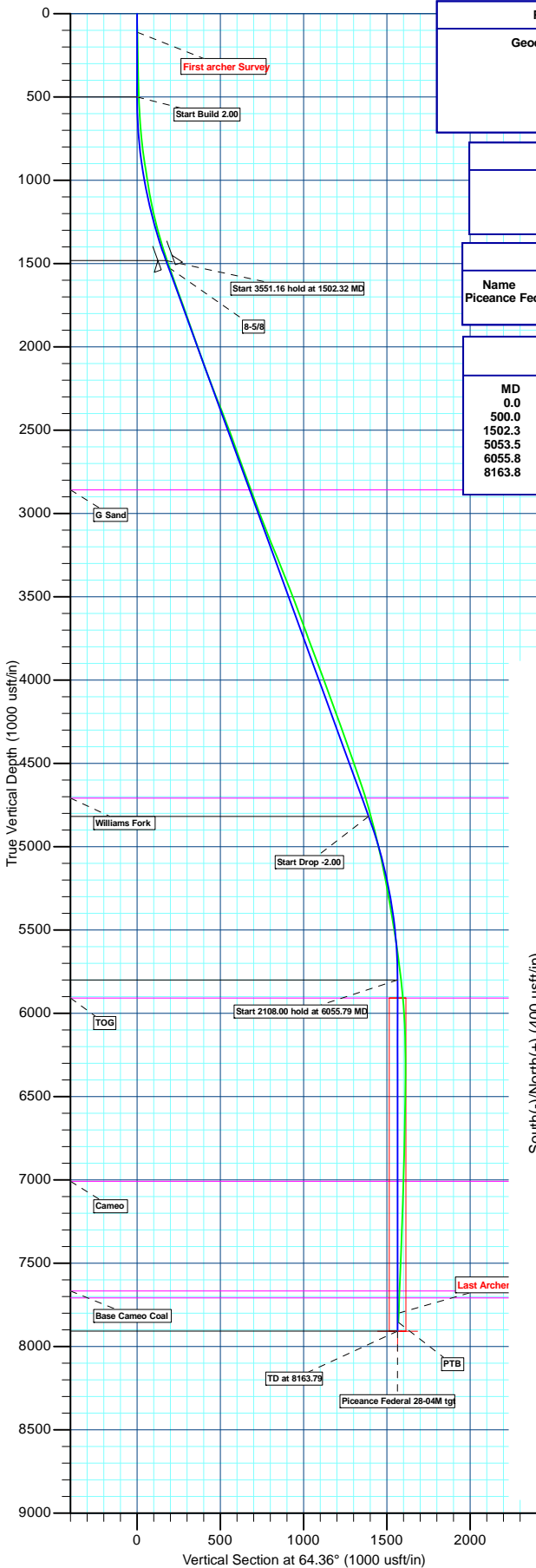
MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	Vsect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
1502.3	20.05	64.36	1482.0	75.1	156.5	2.00	64.36	173.6	Start 3551.16 hold at 1502.32 MD
5053.5	20.05	64.36	4818.0	601.8	1253.9	0.00	0.00	1390.8	Start Drop -2.00
6055.8	0.00	0.00	5800.0	676.9	1410.4	2.00	180.00	1564.4	Start 2108.00 hold at 6055.79 MD
8163.8	0.00	0.00	7908.0	676.9	1410.4	0.00	0.00	1564.4	TD at 8163.79



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
2858.0	2967.1	G Sand
4708.0	4936.4	Williams Fork
5908.0	6163.8	TOG
7008.0	7263.8	Cameo
7666.0	7921.8	Base Cameo Coal
7708.0	7963.8	Rollins



Plan: Design #2 (Piceance federal 28-04M/Slot A-6)

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



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-04M
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance federal 28-04M	North Reference:	True
Wellbore:	Slot A-6	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-6	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 federal 28-04M					
Well Position	+N/-S	0.00 usft	Northing:	1,524,423.248 usft	Latitude:	39.251039
	+E/-W	0.00 usft	Easting:	2,354,556.957 usft	Longitude:	-107.779486
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,556.00 usft

Wellbore	Slot A-6				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2015/04/27	9.73	65.47	51,742

Design	Slot A-6			
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	64.53

Survey Program	Date	2015/10/15		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
112.00	8,112.00	Survey #1 (Slot A-6)	MWD	MWD - Standard



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-04M
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance federal 28-04M	North Reference:	True
Wellbore:	Slot A-6	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-6	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	1,524,423.248	2,354,556.957	39.251039	-107.779486
First archer Survey									
112.00	1.19	56.48	111.99	0.64	0.97	1,524,423.865	2,354,557.942	39.251041	-107.779483
204.00	1.58	70.54	203.97	1.59	2.96	1,524,424.765	2,354,559.958	39.251043	-107.779476
296.00	1.54	70.98	295.93	2.42	5.33	1,524,425.531	2,354,562.342	39.251045	-107.779467
388.00	1.27	81.26	387.90	2.98	7.50	1,524,426.034	2,354,564.532	39.251047	-107.779460
480.00	1.27	88.65	479.88	3.15	9.53	1,524,426.162	2,354,566.563	39.251048	-107.779452
573.00	2.90	60.70	572.82	4.33	12.61	1,524,427.260	2,354,569.674	39.251051	-107.779442
665.00	4.26	59.47	664.64	7.21	17.59	1,524,430.009	2,354,574.717	39.251059	-107.779424
757.00	6.42	58.32	756.23	11.64	24.91	1,524,434.262	2,354,582.147	39.251071	-107.779398
849.00	8.17	58.59	847.48	17.75	34.86	1,524,440.119	2,354,592.255	39.251088	-107.779363
942.00	8.39	56.39	939.51	24.95	46.15	1,524,447.033	2,354,603.722	39.251107	-107.779323
1,034.00	9.62	64.04	1,030.38	32.03	58.66	1,524,453.798	2,354,616.398	39.251127	-107.779279
1,129.00	10.63	65.53	1,123.90	39.14	73.77	1,524,460.521	2,354,631.684	39.251146	-107.779226
1,224.00	13.49	69.92	1,216.80	46.57	92.16	1,524,467.492	2,354,650.251	39.251167	-107.779161
1,319.00	15.25	70.89	1,308.82	54.47	114.37	1,524,474.828	2,354,672.657	39.251188	-107.779082
1,414.00	17.67	70.72	1,399.92	63.32	139.79	1,524,483.040	2,354,698.289	39.251213	-107.778992
1,508.00	19.12	66.76	1,489.12	74.10	167.40	1,524,493.129	2,354,726.165	39.251242	-107.778895
1,601.00	19.82	67.29	1,576.80	86.20	195.94	1,524,504.506	2,354,754.999	39.251276	-107.778794
1,696.00	19.29	64.56	1,666.32	99.16	224.97	1,524,516.733	2,354,784.343	39.251311	-107.778692
1,791.00	20.04	65.53	1,755.78	112.64	253.96	1,524,529.485	2,354,813.658	39.251348	-107.778589
1,886.00	19.60	65.79	1,845.15	125.92	283.30	1,524,542.021	2,354,843.330	39.251385	-107.778486
1,981.00	18.37	66.23	1,934.98	138.49	311.54	1,524,553.877	2,354,871.870	39.251419	-107.778386
2,075.00	20.39	64.30	2,023.65	151.56	339.85	1,524,566.235	2,354,900.503	39.251455	-107.778286
2,170.00	19.42	65.53	2,112.98	165.28	369.14	1,524,579.215	2,354,930.126	39.251493	-107.778183
2,265.00	20.65	65.09	2,202.23	178.88	398.71	1,524,592.067	2,354,960.026	39.251530	-107.778078
2,360.00	21.93	62.37	2,290.74	194.16	429.62	1,524,606.570	2,354,991.312	39.251572	-107.777969
2,455.00	21.45	61.31	2,379.02	210.73	460.57	1,524,622.355	2,355,022.673	39.251617	-107.777860
2,550.00	21.14	59.20	2,467.53	227.84	490.53	1,524,638.709	2,355,053.046	39.251664	-107.777754
2,645.00	19.56	61.40	2,556.60	244.23	519.21	1,524,654.369	2,355,082.127	39.251709	-107.777653
2,739.00	20.04	64.48	2,645.05	258.70	547.56	1,524,668.125	2,355,110.832	39.251749	-107.777553
2,834.00	19.69	62.37	2,734.40	273.13	576.43	1,524,681.831	2,355,140.053	39.251789	-107.777451
2,929.00	20.76	66.23	2,823.54	287.34	606.02	1,524,695.294	2,355,169.990	39.251828	-107.777346
3,024.00	20.35	67.29	2,912.49	300.50	636.66	1,524,707.684	2,355,200.957	39.251864	-107.777238
3,119.00	19.91	66.06	3,001.69	313.45	666.68	1,524,719.868	2,355,231.295	39.251899	-107.777132
3,214.00	21.53	68.61	3,090.54	326.37	697.70	1,524,732.009	2,355,262.627	39.251935	-107.777022
3,309.00	22.81	64.92	3,178.52	340.53	730.61	1,524,745.343	2,355,295.885	39.251974	-107.776906
3,404.00	21.84	64.65	3,266.40	355.90	763.26	1,524,759.891	2,355,328.909	39.252016	-107.776791
3,499.00	21.92	63.07	3,354.56	371.50	795.04	1,524,774.685	2,355,361.069	39.252059	-107.776679
3,593.00	21.31	63.16	3,441.95	387.16	825.93	1,524,789.564	2,355,392.336	39.252102	-107.776569
3,688.00	21.14	61.05	3,530.51	403.25	856.32	1,524,804.883	2,355,423.123	39.252146	-107.776462
3,783.00	20.65	61.84	3,619.26	419.44	886.08	1,524,820.329	2,355,453.279	39.252190	-107.776357
3,878.00	19.69	62.63	3,708.43	434.71	915.06	1,524,834.860	2,355,482.634	39.252232	-107.776255
3,973.00	21.14	61.84	3,797.46	450.15	944.38	1,524,849.563	2,355,512.330	39.252275	-107.776151
4,068.00	20.70	63.16	3,886.20	465.82	974.46	1,524,864.469	2,355,542.798	39.252318	-107.776045
4,163.00	20.04	63.42	3,975.26	480.68	1,004.00	1,524,878.587	2,355,572.700	39.252359	-107.775941
4,257.00	20.21	61.05	4,063.52	495.75	1,032.61	1,524,892.931	2,355,601.681	39.252400	-107.775840
4,352.00	19.34	61.93	4,152.92	511.09	1,060.85	1,524,907.563	2,355,630.297	39.252442	-107.775740
4,447.00	20.79	62.89	4,242.15	526.18	1,089.74	1,524,921.919	2,355,659.556	39.252483	-107.775638
4,542.00	19.73	64.91	4,331.27	540.66	1,119.27	1,524,935.657	2,355,689.441	39.252523	-107.775534
4,637.00	19.47	64.92	4,420.77	554.17	1,148.13	1,524,948.439	2,355,718.633	39.252560	-107.775432
4,732.00	19.03	64.30	4,510.46	567.60	1,176.43	1,524,961.153	2,355,747.257	39.252597	-107.775332
4,827.00	18.72	62.28	4,600.35	581.41	1,203.88	1,524,974.268	2,355,775.046	39.252635	-107.775235
4,921.00	17.45	63.60	4,689.70	594.69	1,229.86	1,524,986.895	2,355,801.350	39.252672	-107.775143
5,016.00	16.39	62.63	4,780.59	607.19	1,254.52	1,524,998.768	2,355,826.318	39.252706	-107.775056



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-04M
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance federal 28-04M	North Reference:	True
Wellbore:	Slot A-6	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-6	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
5,111.00	14.19	64.56	4,872.22	618.35	1,276.94	1,525,009.368	2,355,849.011	39.252737	-107.774977
5,206.00	13.45	65.53	4,964.47	627.93	1,297.51	1,525,018.427	2,355,869.817	39.252763	-107.774904
5,301.00	12.39	62.98	5,057.07	637.14	1,316.65	1,525,027.151	2,355,889.178	39.252788	-107.774837
5,396.00	11.29	66.15	5,150.04	645.53	1,334.24	1,525,035.098	2,355,906.968	39.252811	-107.774774
5,491.00	10.33	65.53	5,243.36	652.82	1,350.49	1,525,041.976	2,355,923.404	39.252831	-107.774717
5,586.00	9.27	68.26	5,336.97	659.18	1,365.35	1,525,047.964	2,355,938.419	39.252849	-107.774665
5,681.00	10.15	65.79	5,430.61	665.45	1,380.10	1,525,053.859	2,355,953.314	39.252866	-107.774612
5,774.00	9.36	66.41	5,522.26	671.83	1,394.50	1,525,059.882	2,355,967.874	39.252883	-107.774562
5,869.00	7.87	66.94	5,616.19	677.47	1,407.57	1,525,065.192	2,355,981.076	39.252899	-107.774515
5,964.00	7.43	65.79	5,710.34	682.54	1,419.15	1,525,069.966	2,355,992.786	39.252913	-107.774475
6,059.00	6.06	63.86	5,804.68	687.27	1,429.26	1,525,074.440	2,356,003.006	39.252926	-107.774439
6,154.00	5.67	62.81	5,899.19	691.62	1,437.93	1,525,078.574	2,356,011.789	39.252938	-107.774408
6,249.00	3.47	70.28	5,993.88	694.74	1,444.81	1,525,081.516	2,356,018.746	39.252946	-107.774384
6,343.00	1.98	62.54	6,087.77	696.44	1,448.93	1,525,083.121	2,356,022.907	39.252951	-107.774369
6,438.00	0.97	42.94	6,182.74	697.79	1,450.94	1,525,084.415	2,356,024.944	39.252955	-107.774362
6,534.00	0.62	23.61	6,278.73	698.86	1,451.70	1,525,085.467	2,356,025.733	39.252958	-107.774360
6,628.00	0.18	42.50	6,372.73	699.44	1,452.00	1,525,086.034	2,356,026.050	39.252959	-107.774359
6,723.00	0.48	209.67	6,467.73	699.20	1,451.91	1,525,085.801	2,356,025.948	39.252958	-107.774359
6,818.00	0.88	238.94	6,562.72	698.48	1,451.08	1,525,085.099	2,356,025.108	39.252956	-107.774362
6,913.00	1.19	268.47	6,657.70	698.08	1,449.47	1,525,084.737	2,356,023.488	39.252955	-107.774367
7,008.00	1.89	245.35	6,752.67	697.40	1,447.06	1,525,084.118	2,356,021.062	39.252954	-107.774376
7,103.00	1.76	272.69	6,847.62	696.81	1,444.18	1,525,083.606	2,356,018.167	39.252952	-107.774386
7,198.00	1.66	263.81	6,942.58	696.73	1,441.36	1,525,083.597	2,356,015.340	39.252952	-107.774396
7,293.00	1.76	247.82	7,037.54	696.03	1,438.64	1,525,082.966	2,356,012.605	39.252950	-107.774406
7,388.00	1.41	263.28	7,132.50	695.34	1,436.13	1,525,082.342	2,356,010.076	39.252948	-107.774415
7,482.00	2.02	273.83	7,226.46	695.32	1,433.32	1,525,082.387	2,356,007.275	39.252948	-107.774424
7,577.00	1.80	262.93	7,321.41	695.25	1,430.17	1,525,082.395	2,356,004.123	39.252948	-107.774436
7,672.00	2.77	273.48	7,416.33	695.20	1,426.40	1,525,082.445	2,356,000.351	39.252948	-107.774449
7,767.00	2.77	266.18	7,511.22	695.19	1,421.82	1,525,082.546	2,355,995.771	39.252947	-107.774465
7,862.00	2.99	269.52	7,606.10	695.02	1,417.05	1,525,082.492	2,355,991.000	39.252947	-107.774482
7,957.00	1.76	264.08	7,701.02	694.84	1,413.12	1,525,082.420	2,355,987.068	39.252947	-107.774496
8,052.00	2.42	250.45	7,795.95	694.02	1,409.78	1,525,081.682	2,355,983.707	39.252944	-107.774508
Last Archer Survey									
8,056.00	2.11	262.05	7,799.95	693.98	1,409.63	1,525,081.647	2,355,983.554	39.252944	-107.774508
PTB - Piceance Federal 28-04M tgt									
8,112.00	2.11	262.05	7,855.91	693.70	1,407.59	1,525,081.414	2,355,981.505	39.252943	-107.774515

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
112.00	111.99	0.64	0.97	First archer Survey
8,056.00	7,799.95	693.98	1,409.63	Last Archer Survey
8,112.00	7,855.91	693.70	1,407.59	PTB

Checked By: _____ Approved By: _____ Date: _____