



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance 28-07M

Slot A-8

Survey: Survey #1

Survey Report - Geographic

20 October, 2015



Project: Mesa County, CO
Site: Piceance 28-05
Well: Piceance 28-07M
Wellbore: Slot A-8
Design: Design #2
Latitude: 39° 15' 3.510 N
Longitude: 107° 46' 45.910 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 28-07M, 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 28-07M

+N/-S	+E/-W	Northing	Ground Level:	Easting	Latitude	Longitude	Slot
0.0	0.0	1524399.51	7556.0	2354575.25	39° 15' 3.510 N	107° 46' 45.910 W	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance Federal 28-07M tgt	7891.0	-49.5	1345.9	1524316.23	2355919.49	39° 15' 3.020 N	107° 46' 28.800 W	Circle (Radius: 50.0)

SECTION DETAILS

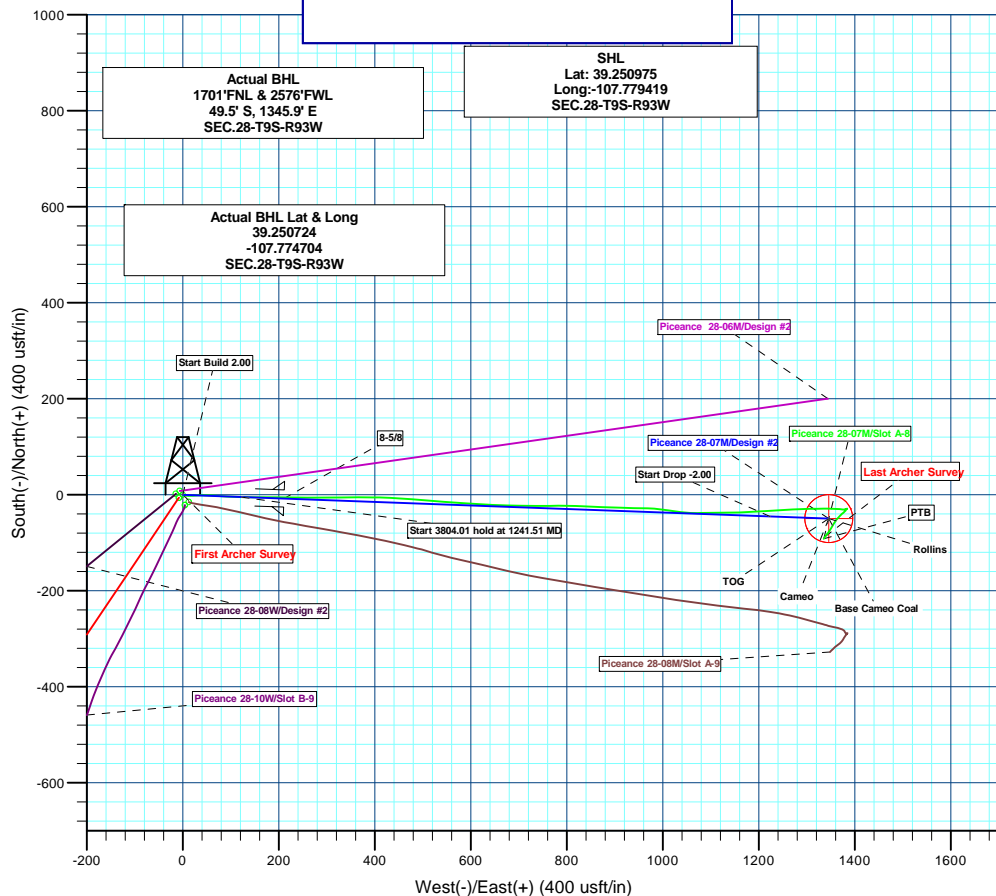
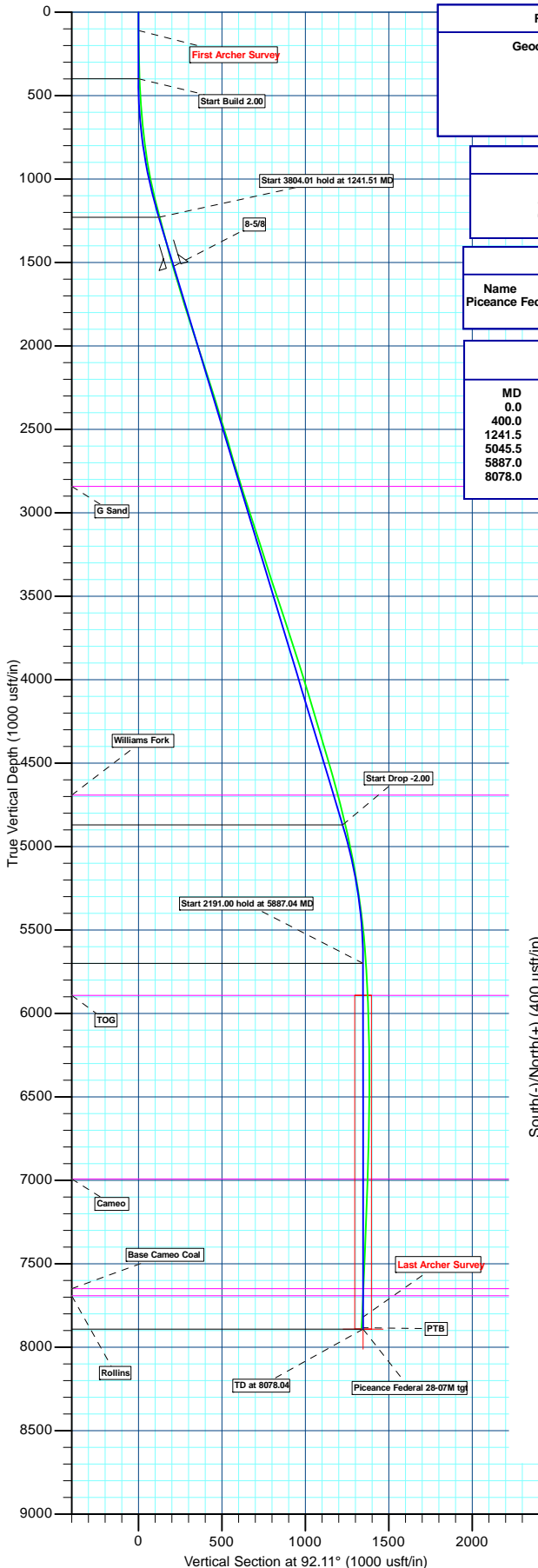
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
1241.5	16.83	92.11	1229.5	-4.5	122.6	2.00	92.11	122.7	Start 3804.01 hold at 1241.51 MD
5045.5	16.83	92.11	4870.5	-45.0	1223.3	0.00	0.00	1224.1	Start Drop -2.00
5887.0	0.00	0.00	5700.0	-49.5	1345.9	2.00	180.00	1346.8	Start 2191.00 hold at 5887.04 MD
8078.0	0.00	0.00	7891.0	-49.5	1345.9	0.00	0.00	1346.8	TD at 8078.04



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
2841.0	2925.2	G Sand
4691.0	4858.0	Williams Fork
5891.0	6078.0	TOG
6991.0	7178.0	Cameo
7649.0	7836.0	Base Cameo Coal
7691.0	7878.0	Rollins



Plan: Design #2 (Piceance 28-07M/Slot A-8)

Created By: Ricky Osburn Date: 10:55, October 21 2015



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-07M
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-07M	North Reference:	True
Wellbore:	Slot A-8	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-8	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 28-07M					
Well Position	+N/-S	0.00 usft	Northing:	1,524,399.507 usft	Latitude:	39.250975
	+E/-W	0.00 usft	Easting:	2,354,575.246 usft	Longitude:	-107.779419
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,556.00 usft

Wellbore	Slot A-8				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2015/04/27	9.73	65.47	51,742

Design	Slot A-8			
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	92.12

Survey Program	Date	2015/08/01		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
111.00	8,075.00	Survey #1 (Slot A-8)	MWD	MWD - Standard



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-07M
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-07M	North Reference:	True
Wellbore:	Slot A-8	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-8	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	1,524,399.507	2,354,575.246	39.250975	-107.779419	
First Archer Survey										
111.00	0.92	95.94	111.00	-0.09	0.89	1,524,399.393	2,354,576.129	39.250975	-107.779416	
203.00	1.14	94.62	202.98	-0.24	2.53	1,524,399.202	2,354,577.772	39.250974	-107.779410	
295.00	1.36	112.82	294.96	-0.74	4.45	1,524,398.656	2,354,579.678	39.250973	-107.779404	
387.00	1.49	116.07	386.93	-1.69	6.53	1,524,397.655	2,354,581.734	39.250970	-107.779396	
479.00	3.08	92.95	478.86	-2.34	10.08	1,524,396.914	2,354,585.259	39.250969	-107.779384	
572.00	5.14	85.39	571.61	-2.14	16.72	1,524,396.953	2,354,591.911	39.250969	-107.779360	
664.00	5.27	86.18	663.23	-1.52	25.05	1,524,397.357	2,354,600.247	39.250971	-107.779331	
756.00	6.33	87.33	754.76	-1.00	34.33	1,524,397.642	2,354,609.539	39.250972	-107.779298	
848.00	8.26	91.19	846.01	-0.91	46.00	1,524,397.448	2,354,621.213	39.250972	-107.779257	
940.00	9.89	92.69	936.86	-1.41	60.50	1,524,396.576	2,354,635.696	39.250971	-107.779206	
1,032.00	12.30	94.36	1,027.13	-2.53	78.17	1,524,395.017	2,354,653.328	39.250968	-107.779143	
1,127.00	14.11	91.99	1,119.62	-3.70	99.83	1,524,393.303	2,354,674.956	39.250965	-107.779067	
1,222.00	14.59	91.45	1,211.65	-4.41	123.37	1,524,392.008	2,354,698.465	39.250963	-107.778984	
1,317.00	14.68	90.76	1,303.57	-4.87	147.37	1,524,390.943	2,354,722.444	39.250962	-107.778899	
1,412.00	14.37	90.23	1,395.53	-5.08	171.19	1,524,390.138	2,354,746.256	39.250961	-107.778815	
1,507.00	16.44	90.32	1,487.12	-5.20	196.43	1,524,389.383	2,354,771.479	39.250961	-107.778726	
1,601.00	17.18	91.11	1,577.10	-5.54	223.61	1,524,388.358	2,354,798.644	39.250960	-107.778630	
1,696.00	16.17	90.05	1,668.10	-5.82	250.86	1,524,387.391	2,354,825.885	39.250959	-107.778534	
1,791.00	17.80	90.32	1,758.96	-5.92	278.61	1,524,386.602	2,354,853.624	39.250959	-107.778436	
1,886.00	17.53	89.17	1,849.48	-5.79	307.44	1,524,386.005	2,354,882.445	39.250959	-107.778334	
1,981.00	17.49	89.00	1,940.07	-5.33	336.02	1,524,385.744	2,354,911.026	39.250960	-107.778233	
2,076.00	18.68	90.40	2,030.38	-5.19	365.51	1,524,385.147	2,354,940.508	39.250961	-107.778129	
2,171.00	17.97	89.88	2,120.56	-5.27	395.38	1,524,384.322	2,354,970.365	39.250960	-107.778023	
2,266.00	17.84	93.22	2,210.96	-6.05	424.56	1,524,382.804	2,354,999.521	39.250958	-107.777920	
2,360.00	17.01	92.86	2,300.65	-7.55	452.67	1,524,380.604	2,355,027.583	39.250954	-107.777821	
2,455.00	17.36	94.80	2,391.41	-9.43	480.67	1,524,378.023	2,355,055.529	39.250949	-107.777722	
2,550.00	17.27	95.24	2,482.10	-11.90	508.84	1,524,374.843	2,355,083.624	39.250942	-107.777623	
2,645.00	16.79	94.01	2,572.94	-14.15	536.57	1,524,371.901	2,355,111.289	39.250936	-107.777525	
2,740.00	16.08	93.57	2,664.06	-15.93	563.39	1,524,369.450	2,355,138.055	39.250931	-107.777430	
2,834.00	16.88	93.83	2,754.19	-17.65	590.00	1,524,367.061	2,355,164.613	39.250926	-107.777336	
2,929.00	16.66	93.39	2,845.15	-19.38	617.35	1,524,364.648	2,355,191.917	39.250922	-107.777239	
3,024.00	18.11	92.78	2,935.81	-20.90	645.69	1,524,362.416	2,355,220.213	39.250918	-107.777139	
3,119.00	18.37	91.55	3,026.04	-22.02	675.41	1,524,360.550	2,355,249.888	39.250914	-107.777034	
3,214.00	18.19	90.76	3,116.24	-22.62	705.20	1,524,359.201	2,355,279.654	39.250913	-107.776929	
3,309.00	18.11	90.23	3,206.52	-22.88	734.79	1,524,358.203	2,355,309.230	39.250912	-107.776825	
3,404.00	17.80	89.79	3,296.89	-22.88	764.07	1,524,357.462	2,355,338.506	39.250912	-107.776721	
3,499.00	17.27	89.44	3,387.48	-22.69	792.70	1,524,356.935	2,355,367.123	39.250913	-107.776620	
3,594.00	18.54	93.04	3,477.88	-23.36	821.88	1,524,355.540	2,355,396.283	39.250911	-107.776517	
3,688.00	18.54	92.34	3,567.00	-24.76	851.74	1,524,353.389	2,355,426.094	39.250907	-107.776412	
3,783.00	18.19	91.81	3,657.16	-25.84	881.65	1,524,351.554	2,355,455.968	39.250904	-107.776306	
3,878.00	17.84	91.81	3,747.50	-26.77	911.01	1,524,349.889	2,355,485.302	39.250901	-107.776202	
3,973.00	17.67	91.72	3,837.98	-27.66	939.97	1,524,348.271	2,355,514.226	39.250899	-107.776100	
4,068.00	17.58	90.84	3,928.52	-28.31	968.73	1,524,346.906	2,355,542.958	39.250897	-107.775999	
4,163.00	17.53	97.35	4,019.10	-30.35	997.26	1,524,344.150	2,355,571.435	39.250892	-107.775898	
4,258.00	17.45	99.19	4,109.71	-34.45	1,025.52	1,524,339.337	2,355,599.574	39.250880	-107.775798	
4,352.00	16.39	91.55	4,199.65	-37.06	1,052.69	1,524,336.046	2,355,626.675	39.250873	-107.775702	
4,447.00	16.17	90.84	4,290.84	-37.62	1,079.32	1,524,334.822	2,355,653.278	39.250872	-107.775608	
4,542.00	16.48	89.00	4,382.01	-37.58	1,106.02	1,524,334.193	2,355,679.970	39.250872	-107.775514	
4,637.00	16.79	89.17	4,473.04	-37.14	1,133.21	1,524,333.945	2,355,707.165	39.250873	-107.775418	
4,732.00	15.64	88.29	4,564.26	-36.56	1,159.73	1,524,333.860	2,355,733.692	39.250874	-107.775324	
4,827.00	15.25	86.98	4,655.83	-35.52	1,185.01	1,524,334.266	2,355,758.987	39.250877	-107.775235	
4,922.00	14.59	86.45	4,747.62	-34.12	1,209.42	1,524,335.052	2,355,783.433	39.250881	-107.775149	
5,017.00	14.24	85.75	4,839.63	-32.52	1,233.02	1,524,336.067	2,355,807.061	39.250886	-107.775065	



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-07M
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-07M	North Reference:	True
Wellbore:	Slot A-8	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-8	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	12.35	87.50	4,931.11	-31.22	1,254.59	1,524,336.820	2,355,828.661	39.250889	-107.774989	
5,206.00	11.60	87.50	5,024.04	-30.36	1,274.29	1,524,337.186	2,355,848.368	39.250892	-107.774920	
5,301.00	9.98	88.29	5,117.36	-29.70	1,292.06	1,524,337.402	2,355,866.151	39.250893	-107.774857	
5,491.00	8.44	88.65	5,304.90	-28.88	1,322.46	1,524,337.459	2,355,896.560	39.250896	-107.774749	
5,586.00	6.90	90.05	5,399.05	-28.72	1,335.13	1,524,337.300	2,355,909.237	39.250896	-107.774705	
5,681.00	6.64	90.23	5,493.39	-28.75	1,346.33	1,524,336.992	2,355,920.432	39.250896	-107.774665	
5,775.00	4.79	94.45	5,586.92	-29.07	1,355.68	1,524,336.431	2,355,929.769	39.250895	-107.774632	
5,870.00	4.04	93.57	5,681.63	-29.59	1,362.97	1,524,335.732	2,355,937.048	39.250894	-107.774606	
5,964.00	2.99	89.52	5,775.46	-29.78	1,368.73	1,524,335.402	2,355,942.798	39.250893	-107.774586	
6,059.00	2.42	101.21	5,870.35	-30.14	1,373.18	1,524,334.922	2,355,947.233	39.250892	-107.774570	
6,154.00	1.80	86.10	5,965.29	-30.43	1,376.63	1,524,334.547	2,355,950.681	39.250891	-107.774558	
6,249.00	1.85	79.68	6,060.24	-30.06	1,379.63	1,524,334.848	2,355,953.686	39.250892	-107.774548	
6,344.00	1.19	70.01	6,155.20	-29.44	1,382.06	1,524,335.398	2,355,956.137	39.250894	-107.774539	
6,439.00	0.75	62.72	6,250.19	-28.82	1,383.54	1,524,335.983	2,355,957.631	39.250896	-107.774534	
6,534.00	0.31	191.30	6,345.19	-28.79	1,384.05	1,524,336.004	2,355,958.134	39.250896	-107.774532	
6,628.00	0.75	235.86	6,439.18	-29.38	1,383.49	1,524,335.423	2,355,957.561	39.250894	-107.774534	
6,723.00	0.75	210.11	6,534.18	-30.27	1,382.66	1,524,334.557	2,355,956.712	39.250892	-107.774537	
6,818.00	1.49	225.58	6,629.16	-31.67	1,381.47	1,524,333.185	2,355,955.483	39.250888	-107.774541	
6,913.00	1.32	204.66	6,724.13	-33.53	1,380.13	1,524,331.361	2,355,954.098	39.250883	-107.774546	
7,008.00	1.45	231.91	6,819.10	-35.27	1,378.73	1,524,329.660	2,355,952.653	39.250878	-107.774551	
7,103.00	1.93	236.48	6,914.06	-36.89	1,376.45	1,524,328.093	2,355,950.333	39.250874	-107.774559	
7,198.00	2.68	224.70	7,008.98	-39.36	1,373.55	1,524,325.705	2,355,947.376	39.250867	-107.774569	
7,293.00	3.65	223.38	7,103.84	-43.13	1,369.91	1,524,322.020	2,355,943.643	39.250856	-107.774582	
7,388.00	4.17	221.10	7,198.62	-47.93	1,365.56	1,524,317.330	2,355,939.176	39.250843	-107.774597	
7,482.00	4.17	218.64	7,292.37	-53.18	1,361.18	1,524,312.197	2,355,934.666	39.250829	-107.774613	
7,577.00	4.31	212.66	7,387.11	-58.88	1,357.10	1,524,306.598	2,355,930.440	39.250813	-107.774627	
7,672.00	4.31	211.34	7,481.84	-64.93	1,353.32	1,524,300.641	2,355,926.507	39.250797	-107.774641	
7,767.00	4.26	211.52	7,576.57	-70.99	1,349.61	1,524,294.679	2,355,922.655	39.250780	-107.774654	
7,862.00	4.57	214.24	7,671.29	-77.13	1,345.64	1,524,288.644	2,355,918.528	39.250763	-107.774668	
7,957.00	4.57	218.81	7,765.99	-83.21	1,341.14	1,524,282.681	2,355,913.875	39.250746	-107.774684	
Last Archer Survey										
8,015.00	4.92	215.56	7,823.79	-87.03	1,338.24	1,524,278.931	2,355,910.886	39.250736	-107.774694	
PTB - Piceance Federal 28-07M tgt										
8,075.00	4.92	215.56	7,883.57	-91.22	1,335.25	1,524,274.821	2,355,907.789	39.250724	-107.774704	

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
111.00	111.00	-0.09	0.89	First Archer Survey	
8,015.00	7,823.79	-87.03	1,338.24	Last Archer Survey	
8,075.00	7,883.57	-91.22	1,335.25	PTB	

Checked By: _____	Approved By: _____	Date: _____
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