



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance 28-01W

Slot A-3

Survey: Survey #1

Survey Report - Geographic

20 October, 2015



Project: Mesa County, CO
Site: Piceance 28-05
Well: Piceance 28-01W
Wellbore: Slot A-3
Design: Design #2
Latitude: 39° 15' 4.050 N
Longitude: 107° 46' 46.470 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 28-01W, 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 28-01W

+N-S	+E-W	Northing	Ground Level:	Latitude	Longitude	Slot
0.0	0.0	1524455.23	7556.0	39° 15' 4.050 N	107° 46' 46.470 W	
			Easting 2354532.58			

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

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude	Shape
Piceance 28-01W tgt	7896.0	1415.4	-328.0	1525878.42	2354240.19	39° 15' 18.040 N	107° 46' 50.640 W	Circle (Radius: 50.0)

SECTION DETAILS

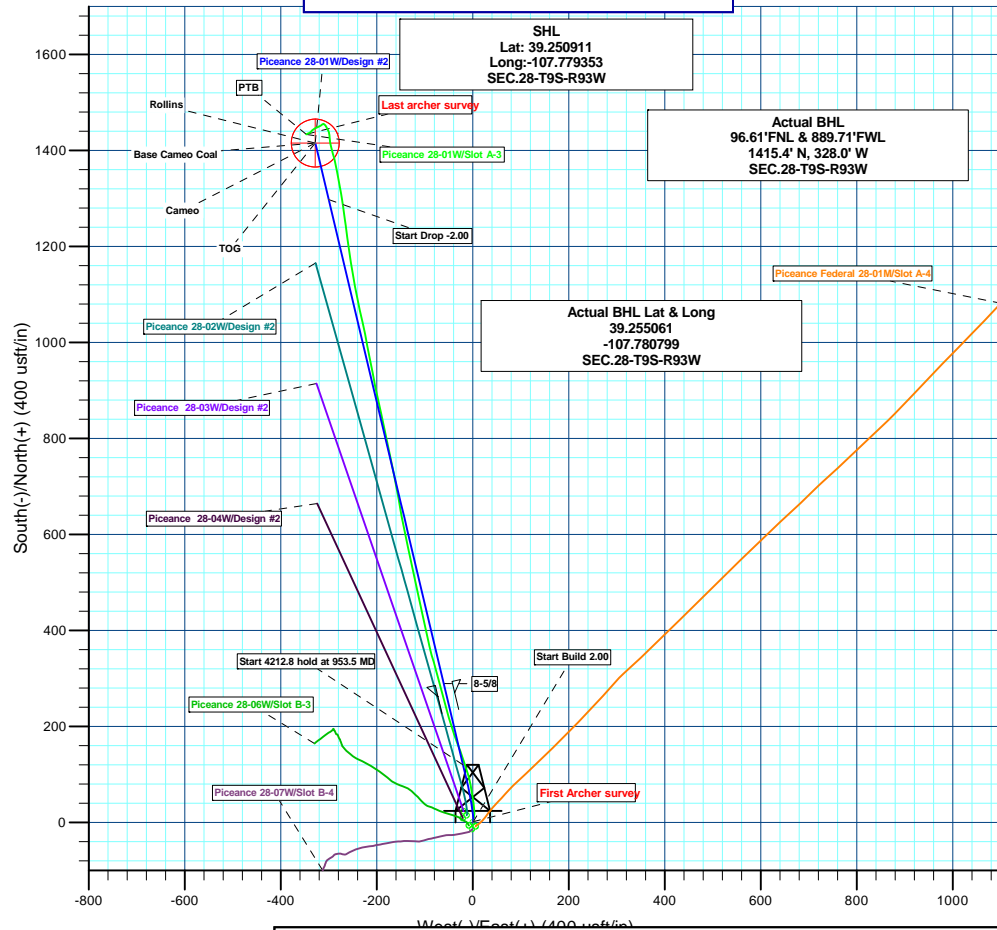
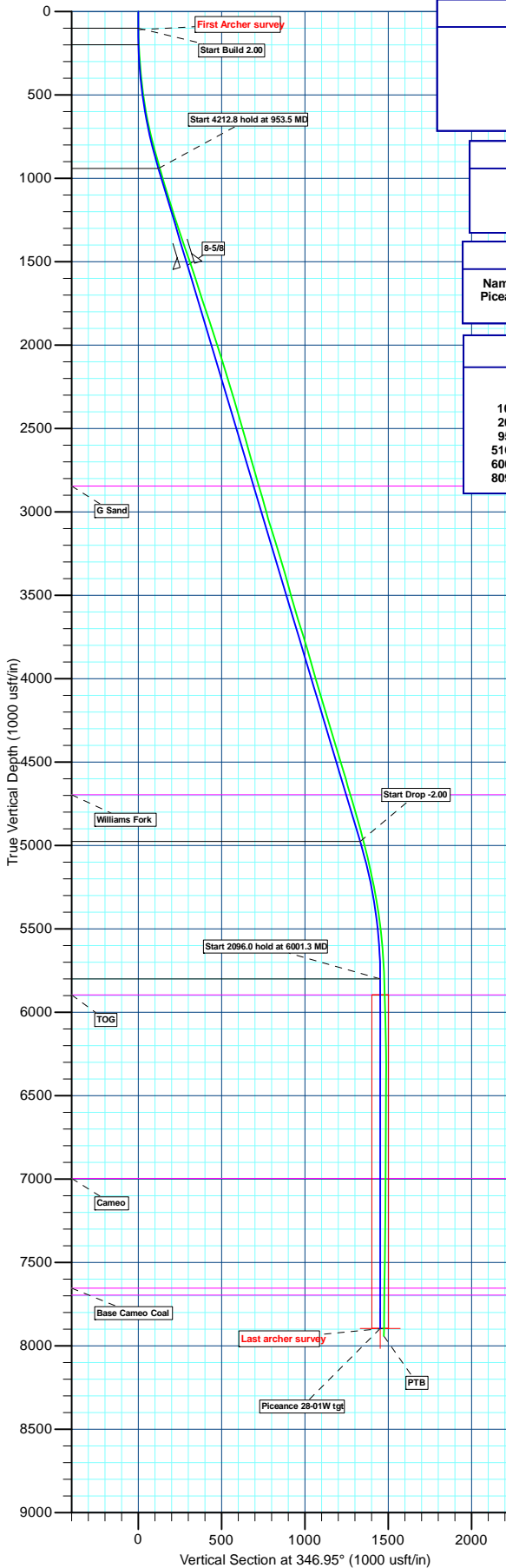
MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	Vsect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
100.0	0.00	0.00	100.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
200.0	2.00	20.00	200.0	1.6	0.6	2.00	20.00	1.5	Start DLS 2.00 TFO -37.45
953.5	16.70	346.63	941.6	120.0	-20.1	2.00	-37.45	121.4	Start 4212.8 hold at 953.5 MD
5166.3	16.70	346.63	4976.7	1297.8	-300.1	0.00	0.00	1332.1	Start Drop -2.00
6001.3	0.00	0.00	5800.0	1415.4	-328.0	2.00	180.00	1452.9	Start 2096.0 hold at 6001.3 MD
8097.3	0.00	0.00	7896.0	1415.4	-328.0	0.00	0.00	1452.9	TD at 8097.3



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

TVDPPath	MDPath	Formation
2846.0	2941.7	G Sand
4696.0	4873.2	Williams Fork
5896.0	6097.3	TOG
6996.0	7197.3	Cameo
7654.0	7855.3	Base Cameo Coal
7696.0	7897.3	Rollins



Plan: Design #2 (Piceance 28-01W/Slot A-3)

Created By: Ricky Osburn Date: 10:26, October 21 2015



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-01W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-01W	North Reference:	True
Wellbore:	Slot A-3	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-3	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 28-01W					
Well Position	+N/-S	0.00 usft	Northing:	1,524,455.228 usft	Latitude:	39.251125
	+E/-W	0.00 usft	Easting:	2,354,532.580 usft	Longitude:	-107.779575
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,556.00 usft

Wellbore	Slot A-3				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2015/04/27	9.73	65.47	51,742

Design	Slot A-3				
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	346.59

Survey Program	Date	2015/09/17			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
110.00	8,149.00	Survey #1 (Slot A-3)	MWD	MWD - Standard	



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-01W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-01W	North Reference:	True
Wellbore:	Slot A-3	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-3	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	1,524,455.228	2,354,532.580	39.251125	-107.779575
First Archer survey									
110.00	1.41	17.02	109.99	1.29	0.40	1,524,456.512	2,354,533.008	39.251129	-107.779574
202.00	3.12	18.17	201.91	4.76	1.51	1,524,459.944	2,354,534.207	39.251138	-107.779570
294.00	4.53	7.27	293.71	10.74	2.75	1,524,465.894	2,354,535.597	39.251154	-107.779565
386.00	5.58	2.00	385.35	18.81	3.36	1,524,473.951	2,354,536.415	39.251177	-107.779563
479.00	6.90	353.47	477.80	28.88	2.89	1,524,484.029	2,354,536.190	39.251204	-107.779565
571.00	9.36	354.61	568.87	41.82	1.56	1,524,496.999	2,354,535.184	39.251240	-107.779570
663.00	11.91	348.99	659.28	58.59	-0.96	1,524,513.827	2,354,533.089	39.251286	-107.779578
755.00	13.71	349.95	748.99	78.65	-4.68	1,524,533.969	2,354,529.878	39.251341	-107.779592
848.00	15.47	343.45	838.99	101.39	-10.13	1,524,556.843	2,354,524.993	39.251403	-107.779611
940.00	15.91	341.34	927.56	125.10	-17.66	1,524,580.733	2,354,518.061	39.251468	-107.779637
1,032.00	17.01	340.90	1,015.79	149.77	-26.10	1,524,605.601	2,354,510.244	39.251536	-107.779667
1,127.00	17.27	338.88	1,106.57	176.05	-35.73	1,524,632.119	2,354,501.279	39.251608	-107.779701
1,222.00	17.58	343.45	1,197.22	202.96	-44.90	1,524,659.249	2,354,492.788	39.251682	-107.779734
1,317.00	18.19	342.75	1,287.63	230.87	-53.38	1,524,687.367	2,354,485.007	39.251759	-107.779764
1,412.00	18.72	346.79	1,377.74	259.88	-61.26	1,524,716.559	2,354,477.856	39.251838	-107.779791
1,508.00	19.69	345.21	1,468.40	290.51	-68.91	1,524,747.377	2,354,470.978	39.251923	-107.779818
1,546.00	19.03	344.86	1,504.25	302.68	-72.16	1,524,759.625	2,354,468.032	39.251956	-107.779830
1,602.00	18.63	344.42	1,557.26	320.11	-76.95	1,524,777.168	2,354,463.684	39.252004	-107.779847
1,697.00	17.49	342.75	1,647.57	348.36	-85.26	1,524,805.619	2,354,456.086	39.252081	-107.779876
1,792.00	18.10	349.25	1,738.04	376.50	-92.25	1,524,833.920	2,354,449.808	39.252159	-107.779901
1,887.00	18.46	347.05	1,828.24	405.65	-98.37	1,524,863.221	2,354,444.418	39.252239	-107.779922
1,982.00	18.37	347.41	1,918.38	434.92	-105.00	1,524,892.646	2,354,438.521	39.252319	-107.779946
2,076.00	18.11	347.93	2,007.66	463.66	-111.29	1,524,921.538	2,354,432.960	39.252398	-107.779968
2,171.00	17.67	347.85	2,098.06	492.20	-117.41	1,524,950.216	2,354,427.556	39.252476	-107.779990
2,266.00	16.79	348.20	2,188.80	519.72	-123.25	1,524,977.880	2,354,422.408	39.252552	-107.780010
2,361.00	16.79	347.67	2,279.75	546.56	-128.99	1,525,004.852	2,354,417.347	39.252626	-107.780030
2,456.00	16.30	347.76	2,370.82	572.99	-134.74	1,525,031.421	2,354,412.256	39.252698	-107.780051
2,551.00	15.91	348.20	2,462.09	598.77	-140.23	1,525,057.325	2,354,407.415	39.252769	-107.780070
2,646.00	15.16	348.20	2,553.62	623.67	-145.43	1,525,082.354	2,354,402.839	39.252837	-107.780089
2,740.00	16.74	350.13	2,643.99	649.04	-150.27	1,525,107.837	2,354,398.642	39.252907	-107.780106
2,835.00	15.21	350.83	2,735.32	674.83	-154.60	1,525,133.721	2,354,394.959	39.252978	-107.780121
2,930.00	16.79	348.81	2,826.64	700.59	-159.25	1,525,159.594	2,354,390.958	39.253049	-107.780137
3,025.00	16.39	348.64	2,917.69	727.19	-164.55	1,525,186.320	2,354,386.324	39.253122	-107.780156
3,120.00	15.34	348.64	3,009.07	752.65	-169.67	1,525,211.901	2,354,381.849	39.253191	-107.780174
3,214.00	17.45	348.02	3,099.24	778.63	-175.04	1,525,238.008	2,354,377.128	39.253263	-107.780193
3,310.00	17.40	348.11	3,190.83	806.76	-180.99	1,525,266.275	2,354,371.890	39.253340	-107.780214
3,404.00	16.83	347.85	3,280.67	833.82	-186.75	1,525,293.468	2,354,366.811	39.253414	-107.780234
3,500.00	16.17	347.32	3,372.72	860.44	-192.61	1,525,320.234	2,354,361.621	39.253487	-107.780255
3,594.00	14.81	346.53	3,463.30	884.90	-198.28	1,525,344.823	2,354,356.565	39.253555	-107.780275
3,689.00	16.22	350.22	3,554.84	909.78	-203.36	1,525,369.828	2,354,352.108	39.253623	-107.780293
3,784.00	17.71	348.72	3,645.70	937.03	-208.44	1,525,397.194	2,354,347.713	39.253698	-107.780311
3,879.00	17.23	348.72	3,736.32	965.00	-214.02	1,525,425.294	2,354,342.838	39.253774	-107.780331
3,974.00	16.39	348.99	3,827.26	991.95	-219.33	1,525,452.374	2,354,338.204	39.253848	-107.780350
4,069.00	15.16	348.90	3,918.68	1,017.30	-224.28	1,525,477.837	2,354,333.890	39.253918	-107.780367
4,164.00	15.91	348.46	4,010.21	1,042.25	-229.28	1,525,502.902	2,354,329.521	39.253987	-107.780385
4,258.00	17.53	347.49	4,100.23	1,068.70	-234.92	1,525,529.481	2,354,324.542	39.254059	-107.780405
4,353.00	16.83	346.70	4,190.99	1,096.05	-241.19	1,525,556.982	2,354,318.967	39.254134	-107.780427
4,448.00	17.01	350.57	4,281.88	1,123.14	-246.63	1,525,584.203	2,354,314.208	39.254209	-107.780446
4,543.00	15.90	350.31	4,372.99	1,149.68	-251.10	1,525,610.842	2,354,310.408	39.254282	-107.780462
4,638.00	17.31	352.94	4,464.03	1,176.53	-255.02	1,525,637.788	2,354,307.156	39.254355	-107.780476
4,733.00	17.05	351.36	4,554.79	1,204.33	-258.85	1,525,665.670	2,354,304.025	39.254432	-107.780489
4,827.00	15.51	351.27	4,645.02	1,230.38	-262.83	1,525,691.810	2,354,300.702	39.254503	-107.780503
4,922.00	17.18	352.59	4,736.18	1,256.85	-266.57	1,525,718.366	2,354,297.629	39.254576	-107.780516



Archer

Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-01W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-01W	North Reference:	True
Wellbore:	Slot A-3	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-3	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
5,017.00	16.52	352.06	4,827.10	1,284.14	-270.24	1,525,745.740	2,354,294.640	39.254651	-107.780529
5,112.00	15.16	350.39	4,918.49	1,309.76	-274.18	1,525,771.457	2,354,291.344	39.254721	-107.780543
5,207.00	14.28	348.99	5,010.37	1,333.51	-278.49	1,525,795.306	2,354,287.630	39.254786	-107.780558
5,302.00	12.48	349.34	5,102.79	1,355.10	-282.63	1,525,816.993	2,354,284.036	39.254846	-107.780573
5,396.00	11.95	347.49	5,194.66	1,374.58	-286.62	1,525,836.570	2,354,280.540	39.254899	-107.780587
5,492.00	10.50	345.56	5,288.82	1,392.76	-290.95	1,525,854.847	2,354,276.663	39.254949	-107.780602
5,586.00	8.96	344.59	5,381.47	1,408.11	-295.03	1,525,870.297	2,354,272.968	39.254991	-107.780617
5,681.00	7.38	355.40	5,475.50	1,421.33	-297.49	1,525,883.570	2,354,270.845	39.255027	-107.780626
5,775.00	5.84	351.98	5,568.88	1,432.08	-298.64	1,525,894.349	2,354,269.964	39.255057	-107.780630
5,870.00	3.12	343.27	5,663.58	1,439.34	-300.06	1,525,901.646	2,354,268.728	39.255077	-107.780635
5,965.00	2.72	325.70	5,758.46	1,443.68	-302.07	1,525,906.033	2,354,266.822	39.255089	-107.780642
6,060.00	2.72	333.17	5,853.35	1,447.55	-304.36	1,525,909.963	2,354,264.633	39.255099	-107.780650
6,155.00	0.97	340.29	5,948.30	1,450.32	-305.65	1,525,912.763	2,354,263.414	39.255107	-107.780654
6,250.00	1.27	325.61	6,043.28	1,451.95	-306.52	1,525,914.410	2,354,262.589	39.255111	-107.780657
6,344.00	1.71	301.70	6,137.25	1,453.55	-308.30	1,525,916.051	2,354,260.848	39.255116	-107.780664
6,439.00	1.23	310.23	6,232.22	1,454.95	-310.28	1,525,917.504	2,354,258.900	39.255120	-107.780671
6,534.00	0.44	253.01	6,327.21	1,455.50	-311.41	1,525,918.084	2,354,257.786	39.255121	-107.780675
6,629.00	0.44	216.89	6,422.20	1,455.10	-311.98	1,525,917.700	2,354,257.209	39.255120	-107.780677
6,724.00	0.57	241.32	6,517.20	1,454.58	-312.61	1,525,917.197	2,354,256.562	39.255119	-107.780679
6,819.00	0.88	245.63	6,612.19	1,454.06	-313.69	1,525,916.697	2,354,255.470	39.255117	-107.780683
6,914.00	2.15	232.71	6,707.16	1,452.68	-315.77	1,525,915.369	2,354,253.354	39.255113	-107.780690
7,009.00	0.88	236.22	6,802.12	1,451.19	-317.80	1,525,913.935	2,354,251.293	39.255109	-107.780697
7,104.00	1.10	234.55	6,897.11	1,450.26	-319.15	1,525,913.034	2,354,249.921	39.255107	-107.780702
7,199.00	1.58	255.12	6,992.08	1,449.39	-321.15	1,525,912.220	2,354,247.891	39.255104	-107.780709
7,294.00	1.19	249.14	7,087.05	1,448.70	-323.34	1,525,911.587	2,354,245.687	39.255103	-107.780717
7,388.00	1.58	251.87	7,181.03	1,447.95	-325.49	1,525,910.890	2,354,243.525	39.255100	-107.780724
7,483.00	2.33	238.07	7,275.97	1,446.52	-328.37	1,525,909.534	2,354,240.607	39.255097	-107.780735
7,578.00	2.11	225.24	7,370.90	1,444.27	-331.25	1,525,907.354	2,354,237.670	39.255090	-107.780745
7,673.00	1.32	244.13	7,465.86	1,442.56	-333.48	1,525,905.702	2,354,235.402	39.255086	-107.780753
7,768.00	1.67	214.78	7,560.83	1,440.95	-335.25	1,525,904.133	2,354,233.588	39.255081	-107.780759
7,863.00	2.42	229.54	7,655.77	1,438.51	-337.57	1,525,901.753	2,354,231.211	39.255075	-107.780767
7,958.00	1.85	245.72	7,750.70	1,436.58	-340.49	1,525,899.895	2,354,228.240	39.255069	-107.780777
8,053.00	2.46	244.40	7,845.63	1,435.06	-343.73	1,525,898.465	2,354,224.967	39.255065	-107.780789
Last archer survey - Piceance 28-01W tgt									
8,103.00	1.71	238.77	7,895.60	1,434.21	-345.33	1,525,897.655	2,354,223.340	39.255063	-107.780795
PTB									
8,149.00	1.71	238.77	7,941.58	1,433.50	-346.51	1,525,896.973	2,354,222.149	39.255061	-107.780799



Archer

Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-01W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-01W	North Reference:	True
Wellbore:	Slot A-3	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-3	Database:	EDMDBBW

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
110.00	109.99	1.29	0.40	First Archer survey	
8,103.00	7,895.60	1,434.21	-345.33	Last archer survey	
8,149.00	7,941.58	1,433.50	-346.51	PTB	

Checked By:	_____	Approved By:	_____	Date:	_____
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