



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance 28-03W

Slot A-1

Survey: Survey #1

Survey Report - Geographic

20 October, 2015



Project: Mesa County, CO
Site: Piceance 28-05
Well: Piceance 28-03W
Wellbore: Slot A-1
Design: Design #2
Latitude: 39° 15' 4.280 N
Longitude: 107° 46' 46.710 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 (NE) Reference: Well Piceance 28-03W, 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 28-03W

+N/-S	+E/-W	Northing	Ground Level:	Latitude	Longitude	Slot
0.0	0.0	1524478.96	7556.0	39° 15' 4.280 N	107° 46' 46.710 W	
			Easting 2354514.29			

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance federal 28-03W tgt	7883.0	891.3	-306.8	1525377.72	2354229.98	39° 15' 13.090 N	107° 46' 50.610 W	Circle (Radius: 50.0)

SECTION DETAILS

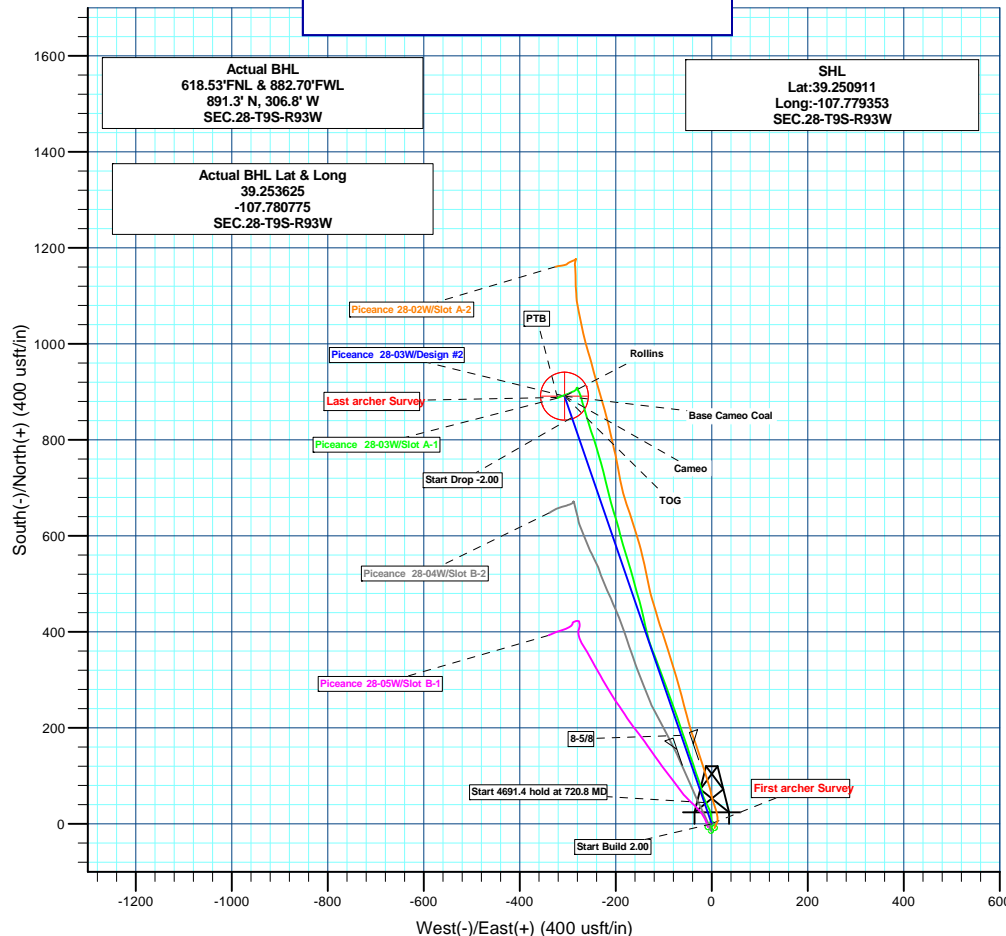
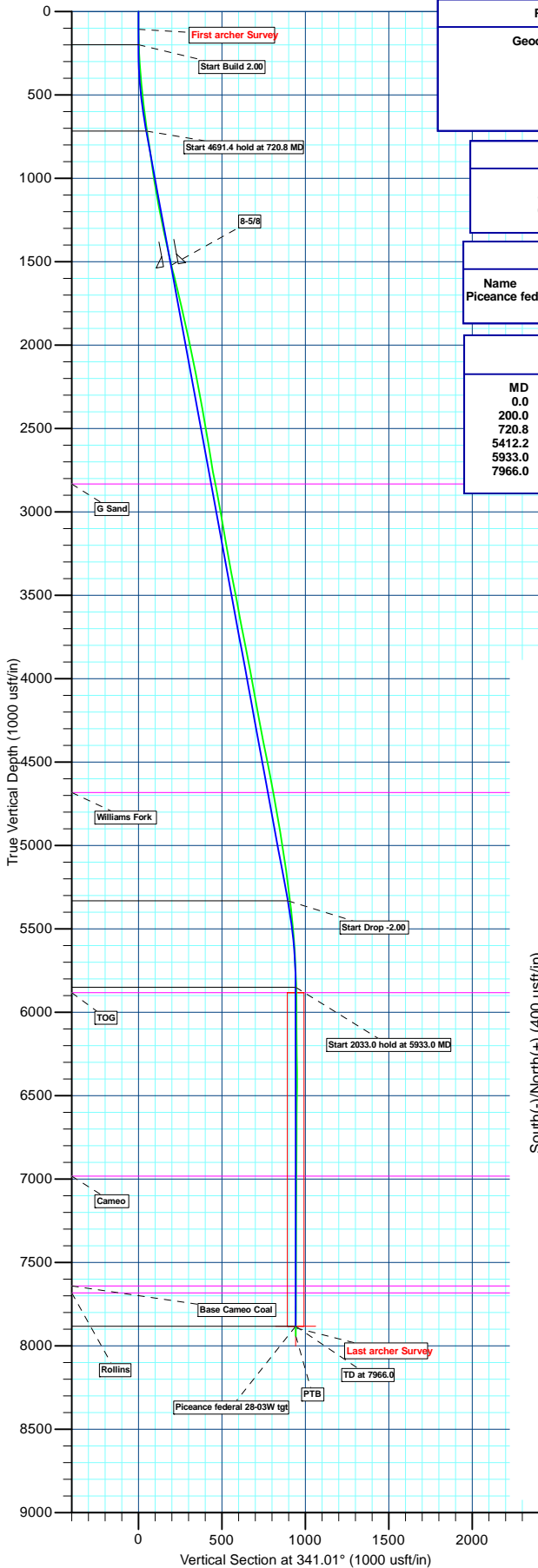
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
720.8	10.42	341.01	718.0	44.6	-15.4	2.00	341.01	47.2	Start 4691.4 hold at 720.8 MD
5412.2	10.42	341.01	5332.0	846.7	-291.4	0.00	0.00	895.4	Start Drop -2.00
5933.0	0.00	0.00	5850.0	891.3	-306.8	2.00	180.00	942.6	Start 2033.0 hold at 5933.0 MD
7966.0	0.00	0.00	7883.0	891.3	-306.8	0.00	0.00	942.6	TD at 7966.0



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
2833.0	2871.3	G Sand
4683.0	4752.3	Williams Fork
5883.0	5966.0	TOG
6983.0	7066.0	Cameo
7641.0	7724.0	Base Cameo Coal
7683.0	7766.0	Rollins



Plan: Design #2 (Piceance 28-03W/Slot A-1)

Created By: Ricky Osburn Date: 10:32, October 21 2015



Archer

Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-03W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-03W	North Reference:	True
Wellbore:	Slot A-1	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-1	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 28-03W			
Well Position	+N/-S	0.00 usft	Northing:	1,524,478.964 usft
	+E/-W	0.00 usft	Easting:	2,354,514.290 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level: 7,556.00 usft

Wellbore	Slot A-1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2015/04/27	9.73	65.47	51,742

Design	Slot A-1			
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	342.19

Survey Program	Date	2015/10/05		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
108.00	8,026.00	Survey #1 (Slot A-1)	MWD	MWD - Standard



Archer

Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-03W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-03W	North Reference:	True
Wellbore:	Slot A-1	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-1	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	1,524,478.964	2,354,514.290	39.251189	-107.779642	
First archer Survey										
108.00	1.01	8.54	107.99	0.94	0.14	1,524,479.901	2,354,514.455	39.251191	-107.779641	
200.00	1.81	347.79	199.97	3.16	-0.05	1,524,482.127	2,354,514.324	39.251198	-107.779642	
292.00	3.39	353.95	291.87	7.29	-0.64	1,524,486.266	2,354,513.834	39.251209	-107.779644	
385.00	4.78	0.35	384.63	13.90	-0.91	1,524,492.880	2,354,513.734	39.251227	-107.779645	
477.00	6.00	343.62	476.23	22.35	-2.24	1,524,501.358	2,354,512.613	39.251250	-107.779650	
569.00	7.24	335.53	567.61	32.24	-6.00	1,524,511.339	2,354,509.105	39.251277	-107.779663	
661.00	7.48	333.67	658.86	42.88	-11.05	1,524,522.106	2,354,504.317	39.251307	-107.779681	
754.00	8.39	335.46	750.97	54.48	-16.56	1,524,533.838	2,354,499.106	39.251338	-107.779700	
846.00	8.40	353.04	841.99	67.25	-20.16	1,524,546.703	2,354,495.825	39.251373	-107.779713	
938.00	8.88	340.89	932.96	80.64	-23.30	1,524,560.158	2,354,493.023	39.251410	-107.779724	
1,030.00	8.92	338.17	1,023.85	93.97	-28.27	1,524,573.610	2,354,488.382	39.251447	-107.779742	
1,125.00	9.49	341.95	1,117.63	108.25	-33.44	1,524,588.018	2,354,483.577	39.251486	-107.779760	
1,220.00	11.07	341.68	1,211.10	124.35	-38.73	1,524,604.251	2,354,478.689	39.251530	-107.779778	
1,315.00	12.22	340.98	1,304.14	142.52	-44.88	1,524,622.564	2,354,473.003	39.251580	-107.779800	
1,411.00	12.61	341.51	1,397.90	162.06	-51.51	1,524,642.267	2,354,466.861	39.251634	-107.779824	
1,506.00	12.96	340.80	1,490.54	181.96	-58.30	1,524,662.327	2,354,460.570	39.251688	-107.779848	
1,532.00	13.05	340.72	1,515.88	187.48	-60.23	1,524,667.897	2,354,458.781	39.251704	-107.779854	
1,601.00	14.06	341.33	1,582.95	202.78	-65.49	1,524,683.318	2,354,453.911	39.251746	-107.779873	
1,696.00	13.71	341.33	1,675.18	224.37	-72.79	1,524,705.093	2,354,447.158	39.251805	-107.779899	
1,791.00	13.01	340.36	1,767.61	245.11	-79.98	1,524,726.004	2,354,440.482	39.251862	-107.779924	
1,886.00	12.70	339.66	1,860.22	264.97	-87.21	1,524,746.041	2,354,433.759	39.251916	-107.779950	
1,981.00	12.17	340.36	1,953.00	284.20	-94.20	1,524,765.434	2,354,427.248	39.251969	-107.779974	
2,076.00	11.47	339.66	2,045.98	302.48	-100.85	1,524,783.883	2,354,421.060	39.252019	-107.779998	
2,170.00	11.16	340.01	2,138.15	319.80	-107.21	1,524,801.349	2,354,415.138	39.252067	-107.780020	
2,266.00	10.81	339.05	2,232.39	336.93	-113.61	1,524,818.642	2,354,409.175	39.252114	-107.780043	
2,360.00	10.37	338.52	2,324.79	353.04	-119.85	1,524,834.899	2,354,403.331	39.252158	-107.780065	
2,455.00	10.33	337.90	2,418.25	368.89	-126.19	1,524,850.901	2,354,397.395	39.252202	-107.780087	
2,550.00	9.58	346.50	2,511.82	384.47	-131.24	1,524,866.602	2,354,392.738	39.252244	-107.780105	
2,645.00	9.36	346.25	2,605.53	399.66	-134.92	1,524,881.880	2,354,389.438	39.252286	-107.780118	
2,739.00	8.75	346.17	2,698.36	414.02	-138.45	1,524,896.332	2,354,386.274	39.252326	-107.780131	
2,834.00	11.16	347.84	2,791.92	430.03	-142.11	1,524,912.425	2,354,383.012	39.252370	-107.780144	
2,929.00	10.60	345.29	2,885.21	447.47	-146.27	1,524,929.963	2,354,379.296	39.252417	-107.780158	
3,024.00	10.55	344.93	2,978.60	464.32	-150.75	1,524,946.919	2,354,375.240	39.252464	-107.780174	
3,119.00	10.15	344.32	3,072.05	480.78	-155.27	1,524,963.484	2,354,371.131	39.252509	-107.780190	
3,214.00	9.84	344.58	3,165.61	496.66	-159.69	1,524,979.475	2,354,367.110	39.252552	-107.780206	
3,309.00	9.14	343.88	3,259.31	511.73	-163.95	1,524,994.651	2,354,363.236	39.252594	-107.780221	
3,404.00	11.69	344.41	3,352.74	528.26	-168.63	1,525,011.285	2,354,358.970	39.252639	-107.780237	
3,499.00	10.94	342.65	3,445.89	546.13	-173.90	1,525,029.286	2,354,354.145	39.252688	-107.780256	
3,593.00	10.67	342.56	3,538.22	562.95	-179.17	1,525,046.229	2,354,349.301	39.252734	-107.780274	
3,688.00	9.80	343.09	3,631.71	579.07	-184.16	1,525,062.476	2,354,344.719	39.252779	-107.780292	
3,783.00	11.91	346.60	3,725.01	596.35	-188.78	1,525,079.860	2,354,340.530	39.252826	-107.780308	
3,878.00	11.11	344.42	3,818.09	614.70	-193.51	1,525,098.325	2,354,336.262	39.252877	-107.780325	
3,973.00	10.85	343.35	3,911.36	632.08	-198.53	1,525,115.829	2,354,331.680	39.252924	-107.780343	
4,068.00	10.11	341.07	4,004.77	648.54	-203.80	1,525,132.410	2,354,326.827	39.252969	-107.780361	
4,163.00	10.90	346.52	4,098.18	665.16	-208.60	1,525,149.147	2,354,322.447	39.253015	-107.780378	
4,258.00	10.46	345.20	4,191.53	682.23	-212.90	1,525,166.322	2,354,318.580	39.253062	-107.780393	
4,352.00	9.45	346.34	4,284.12	697.98	-216.90	1,525,182.166	2,354,314.974	39.253105	-107.780408	
4,447.00	12.08	346.25	4,377.44	715.22	-221.10	1,525,199.503	2,354,311.203	39.253153	-107.780422	
4,542.00	11.55	345.02	4,470.42	734.06	-225.92	1,525,218.462	2,354,306.856	39.253204	-107.780439	
4,637.00	10.72	344.93	4,563.64	751.78	-230.68	1,525,236.295	2,354,302.546	39.253253	-107.780456	
4,732.00	9.98	342.30	4,657.09	768.15	-235.48	1,525,252.784	2,354,298.158	39.253298	-107.780473	
4,827.00	10.85	344.85	4,750.52	784.63	-240.32	1,525,269.374	2,354,293.734	39.253343	-107.780490	
4,922.00	9.93	343.18	4,843.97	801.10	-245.03	1,525,285.958	2,354,289.441	39.253388	-107.780507	



Archer

Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-03W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-03W	North Reference:	True
Wellbore:	Slot A-1	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-1	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
5,016.00	9.14	340.36	4,936.67	815.89	-249.88	1,525,300.865	2,354,284.959	39.253429	-107.780524
5,111.00	8.61	339.93	5,030.53	829.67	-254.86	1,525,314.772	2,354,280.330	39.253467	-107.780542
5,206.00	8.39	346.60	5,124.49	843.10	-258.90	1,525,328.291	2,354,276.622	39.253504	-107.780556
5,301.00	7.60	345.02	5,218.56	855.91	-262.13	1,525,341.179	2,354,273.714	39.253539	-107.780567
5,396.00	6.68	339.13	5,312.83	867.14	-265.73	1,525,352.497	2,354,270.405	39.253570	-107.780580
5,491.00	5.89	344.58	5,407.26	877.00	-268.99	1,525,362.438	2,354,267.389	39.253597	-107.780592
5,586.00	5.45	345.64	5,501.79	886.07	-271.41	1,525,371.565	2,354,265.202	39.253622	-107.780600
5,681.00	4.31	340.28	5,596.45	893.80	-273.73	1,525,379.352	2,354,263.073	39.253643	-107.780608
5,775.00	2.50	334.21	5,690.28	898.97	-275.81	1,525,384.574	2,354,261.120	39.253657	-107.780616
5,869.00	2.24	320.41	5,784.20	902.23	-277.88	1,525,387.887	2,354,259.139	39.253666	-107.780623
5,964.00	0.97	0.76	5,879.16	904.47	-279.05	1,525,390.150	2,354,258.023	39.253672	-107.780627
6,059.00	0.62	16.66	5,974.15	905.77	-278.89	1,525,391.442	2,354,258.214	39.253676	-107.780627
6,154.00	0.48	8.67	6,069.15	906.65	-278.68	1,525,392.323	2,354,258.443	39.253678	-107.780626
6,249.00	0.70	346.96	6,164.14	907.61	-278.75	1,525,393.283	2,354,258.396	39.253681	-107.780626
6,344.00	0.79	298.70	6,259.13	908.49	-279.46	1,525,394.180	2,354,257.713	39.253683	-107.780629
6,439.00	0.40	270.32	6,354.13	908.81	-280.37	1,525,394.519	2,354,256.815	39.253684	-107.780632
6,534.00	0.92	235.86	6,449.12	908.38	-281.33	1,525,394.117	2,354,255.842	39.253683	-107.780635
6,628.00	0.48	166.25	6,543.12	907.57	-281.86	1,525,393.325	2,354,255.291	39.253681	-107.780637
6,723.00	0.62	162.30	6,638.11	906.70	-281.61	1,525,392.443	2,354,255.520	39.253678	-107.780636
6,818.00	0.40	217.85	6,733.11	905.95	-281.66	1,525,391.693	2,354,255.454	39.253676	-107.780636
6,913.00	1.14	228.66	6,828.10	905.06	-282.57	1,525,390.830	2,354,254.519	39.253674	-107.780640
7,008.00	1.49	230.50	6,923.07	903.65	-284.23	1,525,389.462	2,354,252.821	39.253670	-107.780645
7,103.00	1.01	223.47	7,018.05	902.26	-285.76	1,525,388.107	2,354,251.258	39.253666	-107.780651
7,198.00	1.27	250.72	7,113.03	901.30	-287.33	1,525,387.192	2,354,249.665	39.253663	-107.780656
7,293.00	1.85	250.45	7,208.00	900.44	-289.77	1,525,386.393	2,354,247.205	39.253661	-107.780665
7,388.00	1.89	247.64	7,302.95	899.33	-292.66	1,525,385.356	2,354,244.284	39.253658	-107.780675
7,482.00	2.15	241.49	7,396.89	897.90	-295.65	1,525,384.000	2,354,241.266	39.253654	-107.780686
7,577.00	2.06	244.56	7,491.83	896.32	-298.75	1,525,382.495	2,354,238.120	39.253650	-107.780697
7,672.00	3.25	253.80	7,586.72	894.83	-302.88	1,525,381.114	2,354,233.956	39.253646	-107.780711
7,767.00	3.16	249.40	7,681.57	893.16	-307.92	1,525,379.568	2,354,228.878	39.253641	-107.780729
7,862.00	3.34	243.51	7,776.42	891.00	-312.85	1,525,377.537	2,354,223.898	39.253635	-107.780746
7,958.00	3.16	250.19	7,872.27	888.86	-317.84	1,525,375.519	2,354,218.853	39.253629	-107.780764
Piceance federal 28-03W tgt									
7,968.12	3.09	246.17	7,882.37	888.66	-318.35	1,525,375.327	2,354,218.337	39.253629	-107.780766
Last archer Survey									
7,979.00	3.03	241.66	7,893.24	888.40	-318.87	1,525,375.085	2,354,217.809	39.253628	-107.780768
PTB									
8,026.00	3.03	241.66	7,940.17	887.22	-321.06	1,525,373.961	2,354,215.594	39.253625	-107.780775



Archer

Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-03W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-03W	North Reference:	True
Wellbore:	Slot A-1	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-1	Database:	EDMDBBW

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
108.00	107.99	0.94	0.14	First archer Survey	
7,979.00	7,893.24	888.40	-318.87	Last archer Survey	
8,026.00	7,940.17	887.22	-321.06	PTB	

Checked By: _____	Approved By: _____	Date: _____
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