



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance 28-08W

Slot B-7

Plan: Design #1

Standard Planning Report

29 April, 2015

Archer



Archer
Planning Report

Archer

Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-08W
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7578.0usft
Project:	Mesa County, CO	MD Reference:	Well @ 7578.0usft
Site:	Piceance 28-05	North Reference:	True
Well:	Piceance 28-08W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-7		
Design:	Design #1		

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:	1,524,375.79 usft	Latitude:	39° 15' 3.280 N
From:	Lat/Long	Easting:	2,354,593.53 usft	Longitude:	107° 46' 45.670 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	-1.44 °

Well	Piceance 28-08W					
Well Position	+N/-S	25.3 usft	Northing:	1,524,401.89 usft	Latitude:	39° 15' 3.530 N
	+E/-W	-33.0 usft	Easting:	2,354,561.14 usft	Longitude:	107° 46' 46.090 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,556.0 usft

Wellbore	Slot B-7				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2015/04/27	9.73	65.47	51,742

Design	Design #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	230.93

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
600.0	0.00	0.00	600.0	0.0	0.0	0.00	0.00	0.00	0.00	
908.6	6.17	230.93	908.0	-10.5	-12.9	2.00	2.00	0.00	230.93	
4,764.9	6.17	230.93	4,742.0	-271.8	-334.8	0.00	0.00	0.00	0.00	
5,073.5	0.00	0.00	5,050.0	-282.3	-347.7	2.00	-2.00	0.00	180.00	
7,863.5	0.00	0.00	7,840.0	-282.3	-347.7	0.00	0.00	0.00	0.00	Piceance Federal 28-1



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-08W
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Project:	Mesa County, CO	MD Reference:	Well @ 7578.0usft
Site:	Piceance 28-05	North Reference:	True
Well:	Piceance 28-08W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-7		
Design:	Design #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
Start Build 2.00									
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	2.00	230.93	700.0	-1.1	-1.4	1.7	2.00	2.00	0.00
800.0	4.00	230.93	799.8	-4.4	-5.4	7.0	2.00	2.00	0.00
Start 3856.3 hold at 908.6 MD									
908.6	6.17	230.93	908.0	-10.5	-12.9	16.6	2.00	2.00	0.00
1,000.0	6.17	230.93	998.9	-16.7	-20.5	26.4	0.00	0.00	0.00
1,100.0	6.17	230.93	1,098.3	-23.4	-28.9	37.2	0.00	0.00	0.00
1,200.0	6.17	230.93	1,197.7	-30.2	-37.2	47.9	0.00	0.00	0.00
1,300.0	6.17	230.93	1,297.1	-37.0	-45.6	58.7	0.00	0.00	0.00
1,400.0	6.17	230.93	1,396.6	-43.8	-53.9	69.4	0.00	0.00	0.00
1,500.0	6.17	230.93	1,496.0	-50.5	-62.3	80.2	0.00	0.00	0.00
8-5/8									
1,526.2	6.17	230.93	1,522.0	-52.3	-64.4	83.0	0.00	0.00	0.00
1,600.0	6.17	230.93	1,595.4	-57.3	-70.6	90.9	0.00	0.00	0.00
1,700.0	6.17	230.93	1,694.8	-64.1	-79.0	101.7	0.00	0.00	0.00
1,800.0	6.17	230.93	1,794.2	-70.9	-87.3	112.4	0.00	0.00	0.00
1,900.0	6.17	230.93	1,893.7	-77.6	-95.6	123.2	0.00	0.00	0.00
2,000.0	6.17	230.93	1,993.1	-84.4	-104.0	134.0	0.00	0.00	0.00
2,100.0	6.17	230.93	2,092.5	-91.2	-112.3	144.7	0.00	0.00	0.00
2,200.0	6.17	230.93	2,191.9	-98.0	-120.7	155.5	0.00	0.00	0.00
2,300.0	6.17	230.93	2,291.3	-104.8	-129.0	166.2	0.00	0.00	0.00
2,400.0	6.17	230.93	2,390.8	-111.5	-137.4	177.0	0.00	0.00	0.00
2,500.0	6.17	230.93	2,490.2	-118.3	-145.7	187.7	0.00	0.00	0.00
2,600.0	6.17	230.93	2,589.6	-125.1	-154.1	198.5	0.00	0.00	0.00
2,700.0	6.17	230.93	2,689.0	-131.9	-162.4	209.2	0.00	0.00	0.00
2,800.0	6.17	230.93	2,788.4	-138.6	-170.8	220.0	0.00	0.00	0.00
G Sand									
2,801.6	6.17	230.93	2,790.0	-138.7	-170.9	220.1	0.00	0.00	0.00
2,900.0	6.17	230.93	2,887.9	-145.4	-179.1	230.7	0.00	0.00	0.00
3,000.0	6.17	230.93	2,987.3	-152.2	-187.5	241.5	0.00	0.00	0.00
3,100.0	6.17	230.93	3,086.7	-159.0	-195.8	252.2	0.00	0.00	0.00
3,200.0	6.17	230.93	3,186.1	-165.7	-204.2	263.0	0.00	0.00	0.00
3,300.0	6.17	230.93	3,285.5	-172.5	-212.5	273.7	0.00	0.00	0.00
3,400.0	6.17	230.93	3,385.0	-179.3	-220.9	284.5	0.00	0.00	0.00
3,500.0	6.17	230.93	3,484.4	-186.1	-229.2	295.2	0.00	0.00	0.00
3,600.0	6.17	230.93	3,583.8	-192.8	-237.6	306.0	0.00	0.00	0.00
3,700.0	6.17	230.93	3,683.2	-199.6	-245.9	316.7	0.00	0.00	0.00
3,800.0	6.17	230.93	3,782.6	-206.4	-254.2	327.5	0.00	0.00	0.00
3,900.0	6.17	230.93	3,882.1	-213.2	-262.6	338.2	0.00	0.00	0.00
4,000.0	6.17	230.93	3,981.5	-220.0	-270.9	349.0	0.00	0.00	0.00
4,100.0	6.17	230.93	4,080.9	-226.7	-279.3	359.7	0.00	0.00	0.00
4,200.0	6.17	230.93	4,180.3	-233.5	-287.6	370.5	0.00	0.00	0.00
4,300.0	6.17	230.93	4,279.7	-240.3	-296.0	381.2	0.00	0.00	0.00
4,400.0	6.17	230.93	4,379.2	-247.1	-304.3	392.0	0.00	0.00	0.00
4,500.0	6.17	230.93	4,478.6	-253.8	-312.7	402.7	0.00	0.00	0.00
4,600.0	6.17	230.93	4,578.0	-260.6	-321.0	413.5	0.00	0.00	0.00
Williams Fork									



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Site:	Piceance 28-05	North Reference:	True
Well:	Piceance 28-08W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-7		
Design:	Design #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,662.4	6.17	230.93	4,640.0	-264.8	-326.2	420.2	0.00	0.00	0.00
4,700.0	6.17	230.93	4,677.4	-267.4	-329.4	424.2	0.00	0.00	0.00
Start Drop -2.00									
4,764.9	6.17	230.93	4,742.0	-271.8	-334.8	431.2	0.00	0.00	0.00
4,800.0	5.47	230.93	4,776.9	-274.0	-337.6	434.8	2.00	-2.00	0.00
4,900.0	3.47	230.93	4,876.6	-278.9	-343.6	442.6	2.00	-2.00	0.00
5,000.0	1.47	230.93	4,976.5	-281.7	-347.0	446.9	2.00	-2.00	0.00
Start 2790.0 hold at 5073.5 MD									
5,073.5	0.00	0.00	5,050.0	-282.3	-347.7	447.8	2.00	-2.00	175.49
5,100.0	0.00	0.00	5,076.5	-282.3	-347.7	447.8	0.00	0.00	0.00
TOG									
5,163.5	0.00	0.00	5,140.0	-282.3	-347.7	447.8	0.00	0.00	0.00
5,200.0	0.00	0.00	5,176.5	-282.3	-347.7	447.8	0.00	0.00	0.00
5,300.0	0.00	0.00	5,276.5	-282.3	-347.7	447.8	0.00	0.00	0.00
5,400.0	0.00	0.00	5,376.5	-282.3	-347.7	447.8	0.00	0.00	0.00
5,500.0	0.00	0.00	5,476.5	-282.3	-347.7	447.8	0.00	0.00	0.00
5,600.0	0.00	0.00	5,576.5	-282.3	-347.7	447.8	0.00	0.00	0.00
5,700.0	0.00	0.00	5,676.5	-282.3	-347.7	447.8	0.00	0.00	0.00
5,800.0	0.00	0.00	5,776.5	-282.3	-347.7	447.8	0.00	0.00	0.00
5,900.0	0.00	0.00	5,876.5	-282.3	-347.7	447.8	0.00	0.00	0.00
6,000.0	0.00	0.00	5,976.5	-282.3	-347.7	447.8	0.00	0.00	0.00
6,100.0	0.00	0.00	6,076.5	-282.3	-347.7	447.8	0.00	0.00	0.00
6,200.0	0.00	0.00	6,176.5	-282.3	-347.7	447.8	0.00	0.00	0.00
6,300.0	0.00	0.00	6,276.5	-282.3	-347.7	447.8	0.00	0.00	0.00
6,400.0	0.00	0.00	6,376.5	-282.3	-347.7	447.8	0.00	0.00	0.00
6,500.0	0.00	0.00	6,476.5	-282.3	-347.7	447.8	0.00	0.00	0.00
6,600.0	0.00	0.00	6,576.5	-282.3	-347.7	447.8	0.00	0.00	0.00
6,700.0	0.00	0.00	6,676.5	-282.3	-347.7	447.8	0.00	0.00	0.00
6,800.0	0.00	0.00	6,776.5	-282.3	-347.7	447.8	0.00	0.00	0.00
6,900.0	0.00	0.00	6,876.5	-282.3	-347.7	447.8	0.00	0.00	0.00
Cameo									
6,963.5	0.00	0.00	6,940.0	-282.3	-347.7	447.8	0.00	0.00	0.00
7,000.0	0.00	0.00	6,976.5	-282.3	-347.7	447.8	0.00	0.00	0.00
7,100.0	0.00	0.00	7,076.5	-282.3	-347.7	447.8	0.00	0.00	0.00
7,200.0	0.00	0.00	7,176.5	-282.3	-347.7	447.8	0.00	0.00	0.00
7,300.0	0.00	0.00	7,276.5	-282.3	-347.7	447.8	0.00	0.00	0.00
7,400.0	0.00	0.00	7,376.5	-282.3	-347.7	447.8	0.00	0.00	0.00
7,500.0	0.00	0.00	7,476.5	-282.3	-347.7	447.8	0.00	0.00	0.00
7,600.0	0.00	0.00	7,576.5	-282.3	-347.7	447.8	0.00	0.00	0.00
Base Cameo Coal									
7,621.5	0.00	0.00	7,598.0	-282.3	-347.7	447.8	0.00	0.00	0.00
Rollins									
7,663.5	0.00	0.00	7,640.0	-282.3	-347.7	447.8	0.00	0.00	0.00
7,700.0	0.00	0.00	7,676.5	-282.3	-347.7	447.8	0.00	0.00	0.00
7,800.0	0.00	0.00	7,776.5	-282.3	-347.7	447.8	0.00	0.00	0.00
TD at 7863.5									
7,863.5	0.00	0.00	7,840.0	-282.3	-347.7	447.8	0.00	0.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-08W
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7578.0usft
Project:	Mesa County, CO	MD Reference:	Well @ 7578.0usft
Site:	Piceance 28-05	North Reference:	True
Well:	Piceance 28-08W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-7		
Design:	Design #1		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
Piceance Federal 28-08' - plan hits target center - Circle (radius 50.0)	0.00	0.00	7,840.0	-282.3	-347.7	1,524,128.45	2,354,206.48	39° 15' 0.740 N	107° 46' 50.510 W

Casing Points				
Measured Depth	Vertical Depth	Name		Hole Diameter
(usft)	(usft)			(")
1,526.2	1,522.0	8-5/8		12-1/4

Formations					
Measured Depth	Vertical Depth	Name		Dip	Dip Direction
(usft)	(usft)		Lithology	(°)	(°)
2,801.6	2,790.0	G Sand		0.00	
4,662.4	4,640.0	Williams Fork		0.00	
5,163.5	5,140.0	TOG		0.00	
6,963.5	6,940.0	Cameo		0.00	
7,621.5	7,598.0	Base Cameo Coal		0.00	
7,663.5	7,640.0	Rollins		0.00	

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates		Comment	
(usft)	(usft)	+N/-S (usft)	+E/-W (usft)		
600.0	600.0	0.0	0.0	Start Build 2.00	
908.6	908.0	-10.5	-12.9	Start 3856.3 hold at 908.6 MD	
4,764.9	4,742.0	-271.8	-334.8	Start Drop -2.00	
5,073.5	5,050.0	-282.3	-347.7	Start 2790.0 hold at 5073.5 MD	
7,863.5	7,840.0	-282.3	-347.7	TD at 7863.5	



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance Federal 28-08W

Slot B-7

Design #1

Anticollision Report

28 April, 2015

Archer



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-08W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-08W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-7	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Reference	Design #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,000.0 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date	2015/04/28		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.0	7,863.5	Design #1 (Slot B-7)	MWD	MWD - Standard	

Summary								
		Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)		Between Ellipses (usft)	Separation Factor	Warning
Site Name	Offset Well - Wellbore - Design							
Piceance 28-05								
	Piceance federal 28-04M - Slot A-6 - Design #1	500.0	500.0	21.8	19.8	11.028	CC, ES	
	Piceance federal 28-04M - Slot A-6 - Design #1	700.0	699.2	25.5	22.7	8.966	SF	
	Piceance federal 28-05M - Slot B-6 - Design #1	635.6	635.6	19.7	17.1	7.655	CC	
	Piceance federal 28-05M - Slot B-6 - Design #1	700.0	700.0	19.8	16.9	6.937	ES	
	Piceance federal 28-05M - Slot B-6 - Design #1	800.0	799.8	20.8	17.6	6.375	SF	
	Piceance Federal 28-06M - Slot A-7 - Design #1	300.0	300.0	9.9	8.9	9.248	CC, ES	
	Piceance Federal 28-06M - Slot A-7 - Design #1	400.0	399.7	11.5	10.0	7.584	SF	
	Piceance Federal 28-07M - Slot A-8 - Design #1	400.0	400.0	14.3	12.8	9.386	CC, ES	
	Piceance Federal 28-07M - Slot A-8 - Design #1	500.0	499.5	16.0	14.1	8.178	SF	
	Piceance Federal 28-09W - Slot B-8 - Design #1	100.0	100.0	10.3	10.1	58.479	CC, ES	
	Piceance Federal 28-09W - Slot B-8 - Design #1	7,863.5	7,870.4	250.2	214.2	6.948	SF	

Offset Design		Piceance 28-05 - Piceance federal 28-04M - Slot A-6 - Design #1											Offset Site Error:		0.0 usf
Survey Program:		0-MWD											Offset Well Error:		0.0 usf
Reference		Offset		Semi Major Axis			Distance								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
0.0	0.0	0.0	0.0	0.0	0.0	-12.52	21.2	-4.7	21.8						
100.0	100.0	100.0	100.0	0.1	0.1	-12.52	21.2	-4.7	21.8	21.6	0.18	124.139			
200.0	200.0	200.0	200.0	0.3	0.3	-12.52	21.2	-4.7	21.8	21.1	0.62	34.830			
300.0	300.0	300.0	300.0	0.5	0.5	-12.52	21.2	-4.7	21.8	20.7	1.07	20.257			
400.0	400.0	400.0	400.0	0.8	0.8	-12.52	21.2	-4.7	21.8	20.2	1.52	14.282			
500.0	500.0	500.0	500.0	1.0	1.0	-12.52	21.2	-4.7	21.8	19.8	1.97	11.028	CC, ES		
600.0	600.0	599.8	599.8	1.2	1.2	-8.16	22.0	-3.2	22.2	19.8	2.42	9.201			
700.0	700.0	699.2	699.0	1.4	1.4	135.48	24.2	1.5	25.5	22.7	2.85	8.966	SF		
800.0	799.8	797.5	797.0	1.6	1.7	153.20	27.9	9.2	35.6	32.3	3.30	10.790			
900.0	899.5	894.1	892.9	1.8	1.9	165.45	33.0	19.7	53.8	50.0	3.77	14.253			
1,000.0	998.9	988.8	986.4	2.1	2.2	172.53	39.2	32.8	78.2	74.0	4.21	18.585			
1,100.0	1,098.3	1,081.7	1,077.7	2.3	2.5	176.73	46.7	48.3	106.3	101.7	4.65	22.890			
1,200.0	1,197.7	1,172.7	1,166.6	2.6	2.9	179.47	55.3	66.2	137.7	132.6	5.09	27.080			
1,300.0	1,297.1	1,261.8	1,252.8	2.9	3.3	-178.60	64.8	86.1	172.2	166.7	5.53	31.140			
1,400.0	1,396.6	1,348.7	1,336.3	3.1	3.7	-177.17	75.2	107.8	209.6	203.6	5.98	35.071			
1,500.0	1,496.0	1,433.5	1,417.0	3.4	4.2	-176.08	86.5	131.2	249.8	243.4	6.43	38.883			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-08W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-08W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-7	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance federal 28-04M - Slot A-6 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
1,600.0	1,595.4	1,516.0	1,494.8	3.7	4.7	-175.21	98.4	156.0	292.8	285.9	6.88	42.568		
1,700.0	1,694.8	1,600.0	1,573.2	4.0	5.2	-174.47	111.5	183.3	338.3	330.9	7.34	46.101		
1,800.0	1,794.2	1,674.1	1,641.5	4.3	5.8	-173.92	123.9	209.2	386.2	378.4	7.78	49.637		
1,900.0	1,893.7	1,749.7	1,710.4	4.6	6.3	-173.43	137.3	237.1	436.5	428.3	8.23	53.025		
2,000.0	1,993.1	1,833.2	1,786.0	4.9	7.0	-172.97	152.7	269.2	488.3	479.6	8.71	56.094		
2,100.0	2,092.5	1,918.6	1,863.2	5.2	7.7	-172.59	168.5	302.1	540.2	531.0	9.18	58.858		
2,200.0	2,191.9	2,004.1	1,940.5	5.5	8.5	-172.27	184.3	335.0	592.0	582.4	9.65	61.322		
2,300.0	2,291.3	2,089.6	2,017.8	5.8	9.2	-172.01	200.0	367.8	643.9	633.8	10.14	63.522		
2,400.0	2,390.8	2,175.0	2,095.1	6.1	9.9	-171.78	215.8	400.7	695.8	685.2	10.62	65.501		
2,500.0	2,490.2	2,260.5	2,172.4	6.4	10.7	-171.59	231.6	433.6	747.7	736.6	11.11	67.290		
2,600.0	2,589.6	2,345.9	2,249.7	6.7	11.4	-171.42	247.4	466.4	799.6	788.0	11.60	68.914		
2,700.0	2,689.0	2,431.4	2,327.0	7.0	12.1	-171.28	263.1	499.3	851.5	839.4	12.10	70.393		
2,800.0	2,788.4	2,516.8	2,404.3	7.3	12.9	-171.14	278.9	532.2	903.4	890.8	12.59	71.745		
2,900.0	2,887.9	2,602.3	2,481.6	7.6	13.6	-171.03	294.7	565.0	955.3	942.2	13.09	72.984		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-08W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-08W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-7	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	-39.67	15.2	-12.6	19.7					
100.0	100.0	100.0	100.0	0.1	0.1	-39.67	15.2	-12.6	19.7	19.5	0.18	112.456		
200.0	200.0	200.0	200.0	0.3	0.3	-39.67	15.2	-12.6	19.7	19.1	0.62	31.552		
300.0	300.0	300.0	300.0	0.5	0.5	-39.67	15.2	-12.6	19.7	18.6	1.07	18.351		
400.0	400.0	400.0	400.0	0.8	0.8	-39.67	15.2	-12.6	19.7	18.2	1.52	12.937		
500.0	500.0	500.0	500.0	1.0	1.0	-39.67	15.2	-12.6	19.7	17.7	1.97	9.990		
600.0	600.0	600.0	600.0	1.2	1.2	-39.67	15.2	-12.6	19.7	17.3	2.42	8.137		
635.6	635.6	635.6	635.6	1.3	1.3	90.04	15.2	-12.6	19.7	17.1	2.58	7.655 CC		
700.0	700.0	700.0	700.0	1.4	1.4	94.46	15.2	-12.6	19.8	16.9	2.85	6.937 ES		
800.0	799.8	799.8	799.8	1.6	1.7	113.69	15.7	-10.9	20.8	17.6	3.27	6.375 SF		
900.0	899.5	898.7	898.5	1.8	1.9	141.65	17.2	-6.0	27.8	24.1	3.73	7.460		
1,000.0	998.9	996.1	995.5	2.1	2.1	160.67	19.6	2.0	42.9	38.7	4.17	10.282		
1,100.0	1,098.3	1,092.1	1,090.9	2.3	2.3	170.98	23.0	13.0	63.0	58.4	4.60	13.684		
1,200.0	1,197.7	1,186.7	1,184.3	2.6	2.6	177.14	27.2	26.9	87.1	82.0	5.04	17.280		
1,300.0	1,297.1	1,279.5	1,275.6	2.9	2.9	-178.81	32.2	43.3	114.7	109.2	5.48	20.922		
1,400.0	1,396.6	1,370.5	1,364.4	3.1	3.2	-175.97	38.0	62.1	145.5	139.6	5.93	24.551		
1,500.0	1,496.0	1,459.6	1,450.7	3.4	3.6	-173.86	44.4	83.2	179.5	173.1	6.38	28.138		
1,600.0	1,595.4	1,546.5	1,534.3	3.7	4.0	-172.23	51.4	106.2	216.4	209.5	6.83	31.671		
1,700.0	1,694.8	1,631.4	1,615.0	4.0	4.5	-170.94	59.0	131.0	256.1	248.8	7.29	35.146		
1,800.0	1,794.2	1,714.0	1,692.9	4.3	5.0	-169.89	67.0	157.3	298.5	290.7	7.74	38.544		
1,900.0	1,893.7	1,794.3	1,767.9	4.6	5.5	-169.02	75.4	184.9	343.4	335.2	8.20	41.885		
2,000.0	1,993.1	1,872.4	1,839.9	4.9	6.1	-168.29	84.2	213.7	390.9	382.2	8.66	45.149		
2,100.0	2,092.5	1,948.2	1,909.0	5.2	6.6	-167.67	93.3	243.4	440.7	431.6	9.11	48.354		
2,200.0	2,191.9	2,028.7	1,981.7	5.5	7.3	-167.09	103.4	276.5	492.4	482.8	9.59	51.356		
2,300.0	2,291.3	2,114.0	2,058.7	5.8	8.0	-166.58	114.1	311.8	544.4	534.3	10.07	54.075		
2,400.0	2,390.8	2,199.4	2,135.7	6.1	8.7	-166.17	124.9	347.1	596.4	585.8	10.55	56.523		
2,500.0	2,490.2	2,284.8	2,212.7	6.4	9.5	-165.82	135.6	382.4	648.4	637.3	11.04	58.730		
2,600.0	2,589.6	2,370.1	2,289.7	6.7	10.2	-165.52	146.4	417.6	700.4	688.8	11.53	60.734		
2,700.0	2,689.0	2,455.5	2,366.6	7.0	11.0	-165.26	157.2	452.9	752.4	740.4	12.03	62.559		
2,800.0	2,788.4	2,540.8	2,443.6	7.3	11.7	-165.04	167.9	488.2	804.4	791.9	12.52	64.228		
2,900.0	2,887.9	2,626.2	2,520.6	7.6	12.5	-164.84	178.7	523.5	856.5	843.4	13.02	65.757		
3,000.0	2,987.3	2,711.6	2,597.6	7.9	13.2	-164.67	189.4	558.7	908.5	895.0	13.53	67.163		
3,100.0	3,086.7	2,796.9	2,674.6	8.2	14.0	-164.52	200.2	594.0	960.6	946.5	14.03	68.459		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-08W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-08W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-7	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-06M - Slot A-7 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	52.34	6.1	7.9	9.9					
100.0	100.0	100.0	100.0	0.1	0.1	52.34	6.1	7.9	9.9	9.8	0.18	56.673		
200.0	200.0	200.0	200.0	0.3	0.3	52.34	6.1	7.9	9.9	9.3	0.62	15.901		
300.0	300.0	300.0	300.0	0.5	0.5	52.34	6.1	7.9	9.9	8.9	1.07	9.248 CC, ES		
400.0	400.0	399.7	399.6	0.8	0.8	56.62	6.3	9.6	11.5	10.0	1.51	7.584 SF		
500.0	500.0	499.1	498.9	1.0	1.0	64.41	7.0	14.7	16.3	14.4	1.96	8.349		
600.0	600.0	598.0	597.5	1.2	1.2	70.42	8.3	23.2	24.8	22.3	2.42	10.218		
700.0	700.0	696.0	694.8	1.4	1.5	-157.71	9.9	34.9	38.3	35.4	2.87	13.343		
800.0	799.8	792.4	790.0	1.6	1.8	-157.21	12.0	49.7	58.3	55.0	3.33	17.529		
900.0	899.5	886.5	882.4	1.8	2.1	-157.45	14.5	67.1	84.7	80.9	3.80	22.271		
1,000.0	998.9	978.3	972.0	2.1	2.5	-157.80	17.3	87.0	115.9	111.7	4.25	27.294		
1,100.0	1,098.3	1,068.2	1,059.0	2.3	2.9	-157.83	20.5	109.2	150.1	145.4	4.70	31.947		
1,200.0	1,197.7	1,156.0	1,143.3	2.6	3.4	-157.71	24.0	133.5	187.2	182.1	5.16	36.282		
1,300.0	1,297.1	1,241.6	1,224.7	2.9	3.9	-157.51	27.7	159.7	227.1	221.4	5.63	40.352		
1,400.0	1,396.6	1,328.5	1,306.7	3.1	4.5	-157.28	31.8	188.4	269.3	263.2	6.11	44.090		
1,500.0	1,496.0	1,419.0	1,391.8	3.4	5.1	-157.10	36.1	218.7	311.9	305.3	6.59	47.345		
1,600.0	1,595.4	1,509.5	1,477.0	3.7	5.7	-156.96	40.4	248.9	354.5	347.4	7.07	50.117		
1,700.0	1,694.8	1,599.9	1,562.2	4.0	6.3	-156.85	44.7	279.1	397.1	389.5	7.56	52.488		
1,800.0	1,794.2	1,690.4	1,647.3	4.3	6.9	-156.76	49.0	309.4	439.7	431.6	8.06	54.532		
1,900.0	1,893.7	1,780.9	1,732.5	4.6	7.6	-156.69	53.3	339.6	482.3	473.7	8.56	56.312		
2,000.0	1,993.1	1,871.4	1,817.6	4.9	8.2	-156.63	57.6	369.9	524.9	515.8	9.07	57.873		
2,100.0	2,092.5	1,961.8	1,902.8	5.2	8.8	-156.57	61.9	400.1	567.5	557.9	9.58	59.252		
2,200.0	2,191.9	2,052.3	1,988.0	5.5	9.4	-156.53	66.2	430.3	610.1	600.0	10.09	60.478		
2,300.0	2,291.3	2,142.8	2,073.1	5.8	10.1	-156.49	70.5	460.6	652.7	642.1	10.60	61.574		
2,400.0	2,390.8	2,233.2	2,158.3	6.1	10.7	-156.46	74.8	490.8	695.3	684.2	11.11	62.558		
2,500.0	2,490.2	2,323.7	2,243.4	6.4	11.3	-156.43	79.1	521.0	737.9	726.2	11.63	63.448		
2,600.0	2,589.6	2,414.2	2,328.6	6.7	12.0	-156.40	83.4	551.3	780.5	768.3	12.15	64.254		
2,700.0	2,689.0	2,504.7	2,413.7	7.0	12.6	-156.38	87.7	581.5	823.1	810.4	12.66	64.989		
2,800.0	2,788.4	2,595.1	2,498.9	7.3	13.2	-156.35	92.0	611.8	865.7	852.5	13.18	65.661		
2,900.0	2,887.9	2,685.6	2,584.1	7.6	13.9	-156.33	96.3	642.0	908.3	894.6	13.70	66.277		
3,000.0	2,987.3	2,776.1	2,669.2	7.9	14.5	-156.32	100.6	672.2	950.9	936.7	14.23	66.844		
3,100.0	3,086.7	2,866.5	2,754.4	8.2	15.2	-156.30	105.0	702.5	993.5	978.7	14.75	67.368		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-08W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-08W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-7	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-07M - Slot A-8 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	98.13	-2.0	14.2	14.3					
100.0	100.0	100.0	100.0	0.1	0.1	98.13	-2.0	14.2	14.3	14.1	0.18	81.583		
200.0	200.0	200.0	200.0	0.3	0.3	98.13	-2.0	14.2	14.3	13.7	0.62	22.890		
300.0	300.0	300.0	300.0	0.5	0.5	98.13	-2.0	14.2	14.3	13.2	1.07	13.313		
400.0	400.0	400.0	400.0	0.8	0.8	98.13	-2.0	14.2	14.3	12.8	1.52	9.386 CC, ES		
500.0	500.0	499.5	499.4	1.0	1.0	97.49	-2.1	15.9	16.0	14.1	1.96	8.178 SF		
600.0	600.0	598.7	598.5	1.2	1.2	96.18	-2.3	21.0	21.2	18.8	2.40	8.850		
700.0	700.0	697.3	696.8	1.4	1.4	-138.01	-2.6	29.6	31.1	28.3	2.83	10.989		
800.0	799.8	794.6	793.4	1.6	1.7	-142.21	-3.0	41.3	47.2	43.9	3.27	14.408		
900.0	899.5	890.1	887.7	1.8	2.0	-145.51	-3.6	56.0	69.4	65.7	3.74	18.566		
1,000.0	998.9	983.6	979.6	2.1	2.3	-147.67	-4.2	73.4	96.6	92.5	4.19	23.088		
1,100.0	1,098.3	1,075.4	1,069.1	2.3	2.7	-148.63	-4.9	93.3	127.0	122.4	4.64	27.361		
1,200.0	1,197.7	1,165.2	1,156.1	2.6	3.1	-149.02	-5.8	115.7	160.3	155.2	5.11	31.394		
1,300.0	1,297.1	1,253.1	1,240.5	2.9	3.6	-149.11	-6.7	140.2	196.5	190.9	5.58	35.218		
1,400.0	1,396.6	1,338.8	1,322.1	3.1	4.1	-149.04	-7.6	166.5	235.4	229.4	6.06	38.866		
1,500.0	1,496.0	1,424.2	1,402.6	3.4	4.6	-148.88	-8.7	195.1	277.0	270.4	6.55	42.317		
1,600.0	1,595.4	1,514.8	1,487.7	3.7	5.2	-148.73	-9.8	226.2	319.3	312.2	7.05	45.309		
1,700.0	1,694.8	1,605.4	1,572.8	4.0	5.8	-148.61	-11.0	257.3	361.6	354.1	7.55	47.906		
1,800.0	1,794.2	1,696.0	1,657.9	4.3	6.5	-148.52	-12.1	288.3	403.9	395.9	8.06	50.138		
1,900.0	1,893.7	1,786.6	1,743.0	4.6	7.1	-148.44	-13.3	319.4	446.2	437.7	8.57	52.071		
2,000.0	1,993.1	1,877.2	1,828.1	4.9	7.7	-148.38	-14.4	350.5	488.5	479.5	9.09	53.760		
2,100.0	2,092.5	1,967.8	1,913.2	5.2	8.4	-148.33	-15.5	381.6	530.9	521.3	9.61	55.247		
2,200.0	2,191.9	2,058.4	1,998.3	5.5	9.0	-148.28	-16.7	412.6	573.2	563.0	10.13	56.564		
2,300.0	2,291.3	2,149.1	2,083.4	5.8	9.6	-148.25	-17.8	443.7	615.5	604.8	10.66	57.736		
2,400.0	2,390.8	2,239.7	2,168.5	6.1	10.3	-148.21	-19.0	474.8	657.8	646.6	11.19	58.787		
2,500.0	2,490.2	2,330.3	2,253.6	6.4	10.9	-148.18	-20.1	505.9	700.1	688.4	11.72	59.733		
2,600.0	2,589.6	2,420.9	2,338.7	6.7	11.6	-148.16	-21.3	536.9	742.4	730.2	12.25	60.589		
2,700.0	2,689.0	2,511.5	2,423.8	7.0	12.2	-148.13	-22.4	568.0	784.8	772.0	12.79	61.366		
2,800.0	2,788.4	2,602.1	2,508.9	7.3	12.9	-148.11	-23.5	599.1	827.1	813.8	13.32	62.075		
2,900.0	2,887.9	2,692.7	2,594.0	7.6	13.5	-148.09	-24.7	630.1	869.4	855.5	13.86	62.724		
3,000.0	2,987.3	2,783.3	2,679.1	7.9	14.2	-148.08	-25.8	661.2	911.7	897.3	14.40	63.321		
3,100.0	3,086.7	2,873.9	2,764.2	8.2	14.8	-148.06	-27.0	692.3	954.0	939.1	14.94	63.870		
3,200.0	3,186.1	2,964.5	2,849.3	8.5	15.5	-148.05	-28.1	723.4	996.3	980.9	15.48	64.378		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-08W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-08W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-7	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-09W - Slot B-8 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	142.14	-8.1	6.3	10.3					
100.0	100.0	100.0	100.0	0.1	0.1	142.14	-8.1	6.3	10.3	10.1	0.18	58.479	CC, ES	
200.0	200.0	199.8	199.8	0.3	0.3	150.84	-9.5	5.3	10.9	10.3	0.61	17.937		
300.0	300.0	299.5	299.3	0.5	0.5	170.11	-13.8	2.4	14.1	13.0	1.06	13.278		
400.0	400.0	398.6	398.0	0.8	0.8	-173.49	-21.0	-2.4	21.2	19.7	1.54	13.733		
500.0	500.0	497.0	495.7	1.0	1.1	-163.65	-30.9	-9.1	32.5	30.4	2.06	15.769		
600.0	600.0	596.1	593.9	1.2	1.4	-158.43	-42.2	-16.7	45.7	43.2	2.58	17.698		
700.0	700.0	695.3	692.2	1.4	1.7	-27.17	-53.5	-24.3	57.7	54.8	2.89	19.949		
800.0	799.8	794.9	790.8	1.6	2.1	-27.04	-64.8	-31.9	66.6	63.3	3.34	19.968		
900.0	899.5	894.7	889.7	1.8	2.4	-28.21	-76.2	-39.6	72.4	68.6	3.81	19.024		
1,000.0	998.9	994.6	988.6	2.1	2.8	-29.99	-87.6	-47.3	76.5	72.2	4.27	17.908		
1,100.0	1,098.3	1,094.5	1,087.6	2.3	3.1	-31.59	-99.0	-55.0	80.6	75.9	4.75	16.973		
1,200.0	1,197.7	1,194.4	1,186.5	2.6	3.4	-33.04	-110.4	-62.6	84.8	79.6	5.24	16.184		
1,300.0	1,297.1	1,294.3	1,285.5	2.9	3.8	-34.35	-121.7	-70.3	89.1	83.3	5.74	15.509		
1,400.0	1,396.6	1,394.2	1,384.4	3.1	4.1	-35.55	-133.1	-78.0	93.3	87.1	6.25	14.928		
1,500.0	1,496.0	1,494.1	1,483.3	3.4	4.5	-36.63	-144.5	-85.6	97.7	90.9	6.77	14.424		
1,600.0	1,595.4	1,594.0	1,582.3	3.7	4.8	-37.63	-155.9	-93.3	102.0	94.7	7.29	13.984		
1,700.0	1,694.8	1,693.9	1,681.2	4.0	5.2	-38.54	-167.3	-101.0	106.4	98.6	7.82	13.597		
1,800.0	1,794.2	1,793.8	1,780.2	4.3	5.5	-39.38	-178.7	-108.7	110.8	102.4	8.36	13.255		
1,900.0	1,893.7	1,893.6	1,879.1	4.6	5.9	-40.16	-190.0	-116.3	115.2	106.3	8.90	12.949		
2,000.0	1,993.1	1,993.5	1,978.1	4.9	6.2	-40.88	-201.4	-124.0	119.7	110.2	9.44	12.676		
2,100.0	2,092.5	2,093.4	2,077.0	5.2	6.6	-41.54	-212.8	-131.7	124.1	114.1	9.99	12.430		
2,200.0	2,191.9	2,193.3	2,175.9	5.5	6.9	-42.16	-224.2	-139.4	128.6	118.1	10.53	12.208		
2,300.0	2,291.3	2,293.2	2,274.9	5.8	7.3	-42.74	-235.6	-147.0	133.1	122.0	11.08	12.007		
2,400.0	2,390.8	2,393.1	2,373.8	6.1	7.6	-43.28	-247.0	-154.7	137.6	126.0	11.64	11.823		
2,500.0	2,490.2	2,493.0	2,472.8	6.4	7.9	-43.79	-258.4	-162.4	142.1	129.9	12.19	11.655		
2,600.0	2,589.6	2,592.9	2,571.7	6.7	8.3	-44.27	-269.7	-170.1	146.6	133.9	12.75	11.500		
2,700.0	2,689.0	2,692.8	2,670.7	7.0	8.6	-44.71	-281.1	-177.7	151.2	137.9	13.31	11.358		
2,800.0	2,788.4	2,792.7	2,769.6	7.3	9.0	-45.13	-292.5	-185.4	155.7	141.8	13.87	11.227		
2,900.0	2,887.9	2,892.5	2,868.5	7.6	9.3	-45.53	-303.9	-193.1	160.3	145.8	14.43	11.105		
3,000.0	2,987.3	2,992.4	2,967.5	7.9	9.7	-45.91	-315.3	-200.7	164.8	149.8	14.99	10.993		
3,100.0	3,086.7	3,092.3	3,066.4	8.2	10.0	-46.26	-326.7	-208.4	169.4	153.8	15.56	10.888		
3,200.0	3,186.1	3,192.2	3,165.4	8.5	10.4	-46.60	-338.1	-216.1	174.0	157.8	16.12	10.790		
3,300.0	3,285.5	3,292.1	3,264.3	8.8	10.7	-46.92	-349.4	-223.8	178.5	161.9	16.69	10.698		
3,400.0	3,385.0	3,392.0	3,363.3	9.1	11.1	-47.22	-360.8	-231.4	183.1	165.9	17.26	10.612		
3,500.0	3,484.4	3,491.9	3,462.2	9.4	11.4	-47.51	-372.2	-239.1	187.7	169.9	17.82	10.532		
3,600.0	3,583.8	3,591.8	3,561.1	9.7	11.8	-47.78	-383.6	-246.8	192.3	173.9	18.39	10.456		
3,700.0	3,683.2	3,691.7	3,660.1	10.0	12.1	-48.04	-395.0	-254.5	196.9	177.9	18.96	10.385		
3,800.0	3,782.6	3,791.6	3,759.0	10.3	12.4	-48.29	-406.4	-262.1	201.5	182.0	19.53	10.317		
3,900.0	3,882.1	3,891.4	3,858.0	10.6	12.8	-48.53	-417.7	-269.8	206.1	186.0	20.10	10.254		
4,000.0	3,981.5	3,991.3	3,956.9	10.9	13.1	-48.76	-429.1	-277.5	210.7	190.0	20.67	10.193		
4,100.0	4,080.9	4,091.2	4,055.8	11.2	13.5	-48.98	-440.5	-285.1	215.3	194.1	21.24	10.136		
4,200.0	4,180.3	4,191.1	4,154.8	11.6	13.8	-49.19	-451.9	-292.8	219.9	198.1	21.81	10.082		
4,300.0	4,279.7	4,291.0	4,253.7	11.9	14.2	-49.39	-463.3	-300.5	224.6	202.2	22.39	10.031		
4,400.0	4,379.2	4,390.9	4,352.7	12.2	14.5	-49.58	-474.7	-308.2	229.2	206.2	22.96	9.982		
4,500.0	4,478.6	4,490.8	4,451.6	12.5	14.9	-49.77	-486.1	-315.8	233.8	210.3	23.53	9.935		
4,600.0	4,578.0	4,590.7	4,550.6	12.8	15.2	-49.94	-497.4	-323.5	238.4	214.3	24.11	9.891		
4,700.0	4,677.4	4,690.6	4,649.5	13.1	15.6	-50.12	-508.8	-331.2	243.1	218.4	24.68	9.849		
4,800.0	4,776.9	4,797.7	4,755.8	13.4	15.8	-50.49	-519.6	-338.4	246.5	221.3	25.21	9.778		
4,900.0	4,876.6	4,905.4	4,863.1	13.6	16.0	-50.86	-527.1	-343.5	248.5	222.9	25.63	9.697		
5,000.0	4,976.5	5,013.1	4,970.7	13.7	16.2	-51.07	-531.2	-346.3	249.6	223.7	25.98	9.609		
5,100.0	5,076.5	5,118.8	5,076.5	13.9	16.3	179.82	-532.2	-346.9	249.9	223.6	26.31	9.499		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-08W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-08W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-7	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

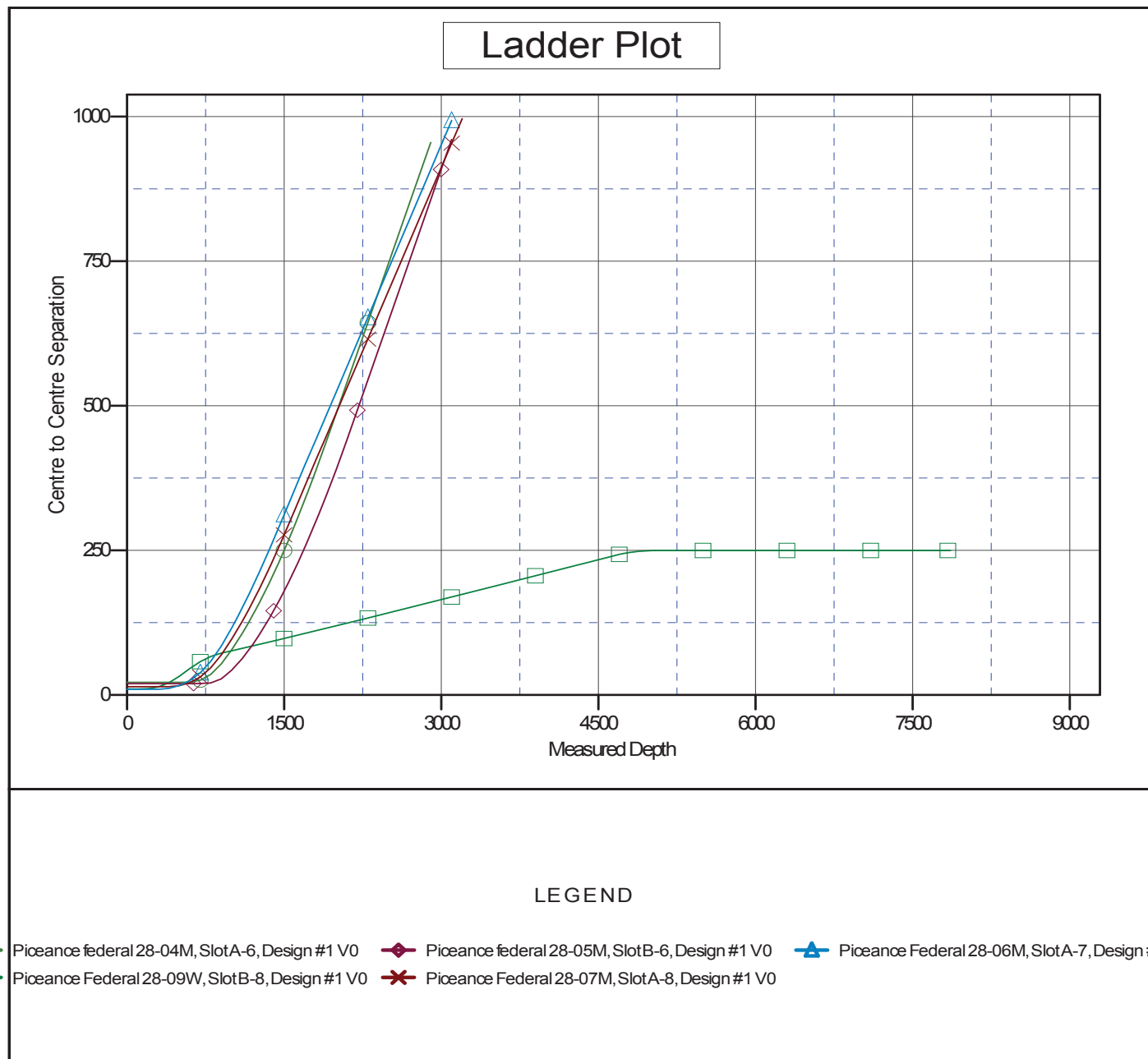
Offset Design Piceance 28-05 - Piceance Federal 28-09W - Slot B-8 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
5,200.0	5,176.5	5,218.8	5,176.5	14.0	16.5	179.82	-532.2	-346.9	249.9	223.3	26.62	9.388		
5,300.0	5,276.5	5,318.8	5,276.5	14.2	16.6	179.82	-532.2	-346.9	249.9	223.0	26.94	9.277		
5,400.0	5,376.5	5,418.8	5,376.5	14.4	16.7	179.82	-532.2	-346.9	249.9	222.6	27.26	9.168		
5,500.0	5,476.5	5,518.8	5,476.5	14.5	16.8	179.82	-532.2	-346.9	249.9	222.3	27.58	9.060		
5,600.0	5,576.5	5,618.8	5,576.5	14.7	17.0	179.82	-532.2	-346.9	249.9	222.0	27.91	8.954		
5,700.0	5,676.5	5,718.8	5,676.5	14.8	17.1	179.82	-532.2	-346.9	249.9	221.7	28.24	8.849		
5,800.0	5,776.5	5,818.8	5,776.5	15.0	17.2	179.82	-532.2	-346.9	249.9	221.3	28.57	8.746		
5,900.0	5,876.5	5,918.8	5,876.5	15.2	17.4	179.82	-532.2	-346.9	249.9	221.0	28.91	8.644		
6,000.0	5,976.5	6,018.8	5,976.5	15.3	17.5	179.82	-532.2	-346.9	249.9	220.6	29.25	8.543		
6,100.0	6,076.5	6,118.8	6,076.5	15.5	17.6	179.82	-532.2	-346.9	249.9	220.3	29.59	8.444		
6,200.0	6,176.5	6,218.8	6,176.5	15.6	17.8	179.82	-532.2	-346.9	249.9	220.0	29.94	8.346		
6,300.0	6,276.5	6,318.8	6,276.5	15.8	17.9	179.82	-532.2	-346.9	249.9	219.6	30.29	8.250		
6,400.0	6,376.5	6,418.8	6,376.5	16.0	18.0	179.82	-532.2	-346.9	249.9	219.3	30.64	8.156		
6,500.0	6,476.5	6,518.8	6,476.5	16.2	18.2	179.82	-532.2	-346.9	249.9	218.9	30.99	8.063		
6,600.0	6,576.5	6,618.8	6,576.5	16.3	18.3	179.82	-532.2	-346.9	249.9	218.5	31.35	7.971		
6,700.0	6,676.5	6,718.8	6,676.5	16.5	18.5	179.82	-532.2	-346.9	249.9	218.2	31.71	7.881		
6,800.0	6,776.5	6,818.8	6,776.5	16.7	18.6	179.82	-532.2	-346.9	249.9	217.8	32.07	7.792		
6,900.0	6,876.5	6,918.8	6,876.5	16.9	18.8	179.82	-532.2	-346.9	249.9	217.5	32.43	7.705		
7,000.0	6,976.5	7,018.8	6,976.5	17.0	18.9	179.82	-532.2	-346.9	249.9	217.1	32.80	7.619		
7,100.0	7,076.5	7,118.8	7,076.5	17.2	19.1	179.82	-532.2	-346.9	249.9	216.7	33.17	7.535		
7,200.0	7,176.5	7,218.8	7,176.5	17.4	19.2	179.82	-532.2	-346.9	249.9	216.4	33.53	7.452		
7,300.0	7,276.5	7,318.8	7,276.5	17.6	19.4	179.82	-532.2	-346.9	249.9	216.0	33.91	7.370		
7,400.0	7,376.5	7,418.8	7,376.5	17.8	19.6	179.82	-532.2	-346.9	249.9	215.6	34.28	7.290		
7,500.0	7,476.5	7,518.8	7,476.5	17.9	19.7	179.82	-532.2	-346.9	249.9	215.2	34.65	7.211		
7,600.0	7,576.5	7,618.8	7,576.5	18.1	19.9	179.82	-532.2	-346.9	249.9	214.9	35.03	7.134		
7,700.0	7,676.5	7,718.8	7,676.5	18.3	20.0	179.82	-532.2	-346.9	249.9	214.5	35.41	7.057		
7,800.0	7,776.5	7,818.8	7,776.5	18.5	20.2	179.82	-532.2	-346.9	249.9	214.1	35.79	6.982		
7,837.4	7,813.9	7,856.3	7,813.9	18.6	20.3	179.82	-532.2	-346.9	249.9	214.0	35.93	6.955		
7,863.5	7,840.0	7,870.4	7,828.0	18.6	20.3	179.82	-532.2	-346.9	250.2	214.2	36.01	6.948 SF		



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-08W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-08W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-7	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Reference Depths are relative to Well @ 7578.0usft
Offset Depths are relative to Offset Datum
Central Meridian is 105° 30' 0.000 W

Coordinates are relative to: Piceance Federal 28-08W
Coordinate System is US State Plane 1983, Colorado Central Zone
Grid Convergence at Surface is: -1.44°





Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-08W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-08W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-7	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Reference Depths are relative to Well @ 7578.0usft
Offset Depths are relative to Offset Datum
Central Meridian is 105° 30' 0.000 W

Coordinates are relative to: Piceance Federal 28-08W
Coordinate System is US State Plane 1983, Colorado Central Zone
Grid Convergence at Surface is: -1.44°

