



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance 28-10W

Slot B-9

Plan: Design #1

Standard Planning Report

29 April, 2015

Archer



Project: Mesa County, CO
Site: Piceance 28-05
Well: Piceance 28-10W
Wellbore: Slot B-9
Design: Design #1
Latitude: 39° 15' 3.300 N
Longitude: 107° 46' 45.850 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 28-10W, 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 28-10W

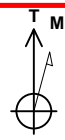
+N/-S	+E/-W	Northing	Ground Level: Easting	Latitude	Longitude	Slot
0.0	0.0	1524378.15	7556.0 2354579.43	39° 15' 3.300 N	107° 46' 45.850 W	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance Federal 28-10W tgt	7817.0	-758.8	-364.2	1523628.76	2354196.29	39° 14' 55.800 N	107° 46' 50.480 W	Circle (Radius: 50.0)

SECTION DETAILS

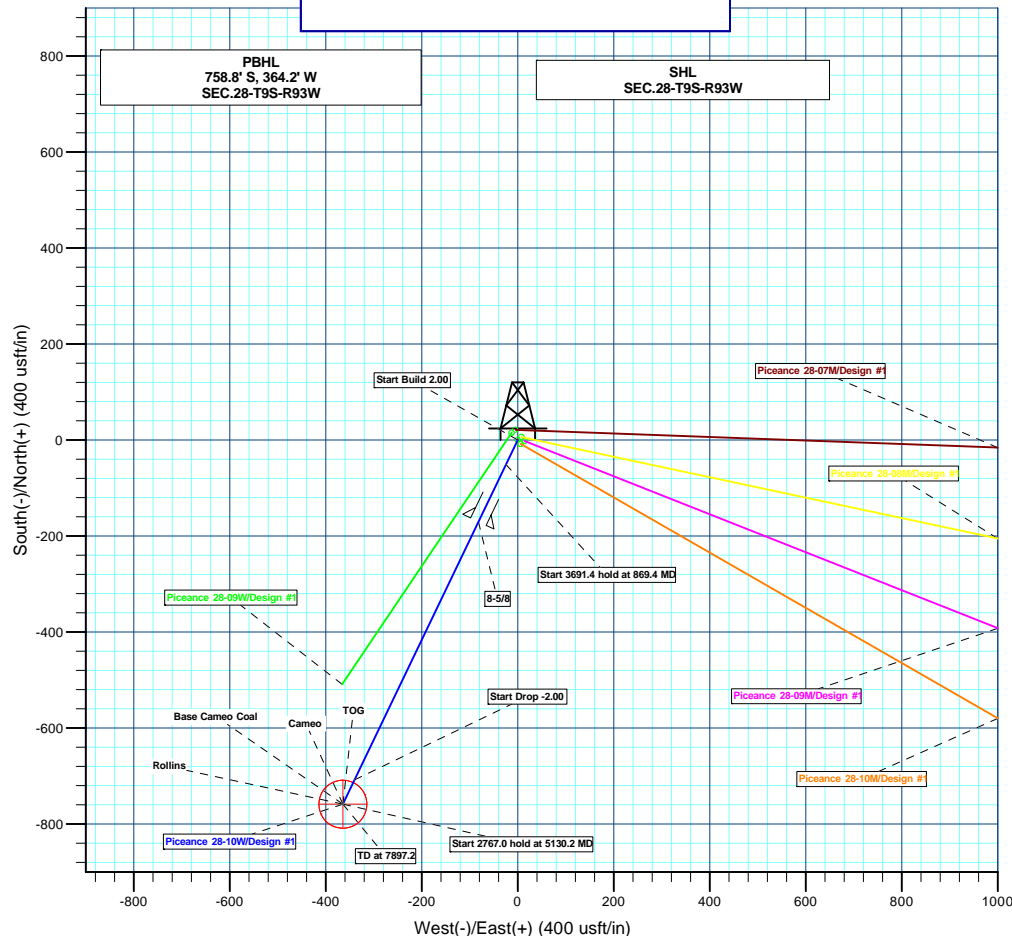
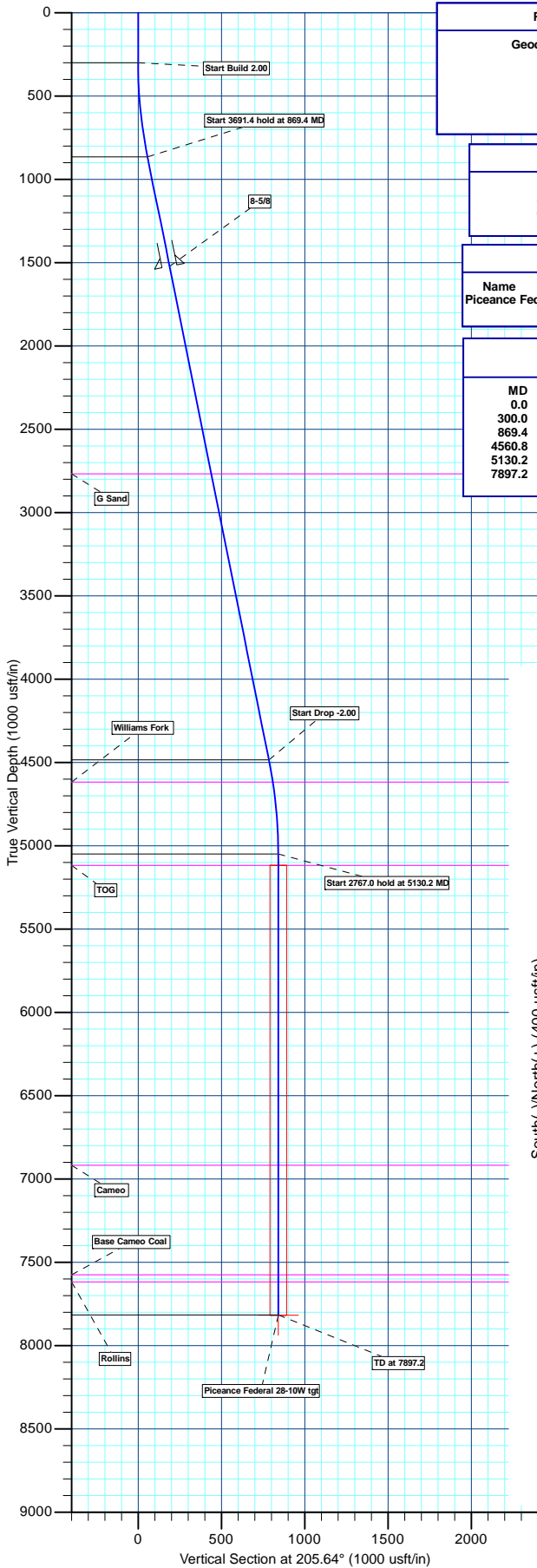
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
300.0	0.00	0.00	300.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
869.4	11.39	205.64	865.7	-50.8	-24.4	2.00	205.64	56.4	Start 3691.4 hold at 869.4 MD
4560.8	11.39	205.64	4484.3	-707.9	-339.8	0.00	0.00	785.3	Start Drop -2.00
5130.2	0.00	0.00	5050.0	-758.8	-364.2	2.00	180.00	841.7	Start 2767.0 hold at 5130.2 MD
7897.2	0.00	0.00	7817.0	-758.8	-364.2	0.00	0.00	841.7	TD at 7897.2



Azimuths to True North
Magnetic North: 9.72°
Magnetic Field
Strength: 51741.8snT
Dip Angle: 65.47°
Date: 2015/04/27
Model: IGRF2010

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2767.0	2808.9	G Sand
4617.0	4695.5	Williams Fork
5117.0	5197.2	TOG
6917.0	6997.2	Cameo
7575.0	7655.2	Base Cameo Coal
7617.0	7697.2	Rollins



Plan: Design #1 (Piceance 28-10W/Slot B-9)

Created By: Ricky Osburn Date: 8:42, April 29 2015



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Planning Report

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Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-10W
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 28-10W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-9		
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 28-10W					
Well Position	+N/-S	2.0 usft	Northing:	1,524,378.15 usft	Latitude:	39° 15' 3.300 N
	+E/-W	-14.2 usft	Easting:	2,354,579.43 usft	Longitude:	107° 46' 45.850 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,556.0 usft

Wellbore	Slot B-9				
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	205.64

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	
300.0	0.00	0.00	300.0	0.0	0.0	0.00	0.00	0.00	0.00	
869.4	11.39	205.64	865.7	-50.8	-24.4	2.00	2.00	0.00	205.64	
4,560.8	11.39	205.64	4,484.3	-707.9	-339.8	0.00	0.00	0.00	0.00	
5,130.2	0.00	0.00	5,050.0	-758.8	-364.2	2.00	-2.00	0.00	180.00	
7,897.2	0.00	0.00	7,817.0	-758.8	-364.2	0.00	0.00	0.00	0.00	Piceance Federal 28-



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-10W
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 28-10W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-9		
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
Start Build 2.00									
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	2.00	205.64	400.0	-1.6	-0.8	1.7	2.00	2.00	0.00
500.0	4.00	205.64	499.8	-6.3	-3.0	7.0	2.00	2.00	0.00
600.0	6.00	205.64	599.5	-14.1	-6.8	15.7	2.00	2.00	0.00
700.0	8.00	205.64	698.7	-25.1	-12.1	27.9	2.00	2.00	0.00
800.0	10.00	205.64	797.5	-39.2	-18.8	43.5	2.00	2.00	0.00
Start 3691.4 hold at 869.4 MD									
869.4	11.39	205.64	865.7	-50.8	-24.4	56.4	2.00	2.00	0.00
900.0	11.39	205.64	895.7	-56.3	-27.0	62.4	0.00	0.00	0.00
1,000.0	11.39	205.64	993.7	-74.1	-35.6	82.2	0.00	0.00	0.00
1,100.0	11.39	205.64	1,091.7	-91.9	-44.1	101.9	0.00	0.00	0.00
1,200.0	11.39	205.64	1,189.7	-109.7	-52.7	121.7	0.00	0.00	0.00
1,300.0	11.39	205.64	1,287.8	-127.5	-61.2	141.4	0.00	0.00	0.00
1,400.0	11.39	205.64	1,385.8	-145.3	-69.7	161.2	0.00	0.00	0.00
1,500.0	11.39	205.64	1,483.8	-163.1	-78.3	180.9	0.00	0.00	0.00
8-5/8									
1,538.9	11.39	205.64	1,522.0	-170.0	-81.6	188.6	0.00	0.00	0.00
1,600.0	11.39	205.64	1,581.9	-180.9	-86.8	200.7	0.00	0.00	0.00
1,700.0	11.39	205.64	1,679.9	-198.7	-95.4	220.4	0.00	0.00	0.00
1,800.0	11.39	205.64	1,777.9	-216.5	-103.9	240.1	0.00	0.00	0.00
1,900.0	11.39	205.64	1,876.0	-234.3	-112.5	259.9	0.00	0.00	0.00
2,000.0	11.39	205.64	1,974.0	-252.1	-121.0	279.6	0.00	0.00	0.00
2,100.0	11.39	205.64	2,072.0	-269.9	-129.6	299.4	0.00	0.00	0.00
2,200.0	11.39	205.64	2,170.1	-287.7	-138.1	319.1	0.00	0.00	0.00
2,300.0	11.39	205.64	2,268.1	-305.5	-146.6	338.9	0.00	0.00	0.00
2,400.0	11.39	205.64	2,366.1	-323.3	-155.2	358.6	0.00	0.00	0.00
2,500.0	11.39	205.64	2,464.2	-341.1	-163.7	378.4	0.00	0.00	0.00
2,600.0	11.39	205.64	2,562.2	-358.9	-172.3	398.1	0.00	0.00	0.00
2,700.0	11.39	205.64	2,660.2	-376.7	-180.8	417.9	0.00	0.00	0.00
2,800.0	11.39	205.64	2,758.3	-394.5	-189.4	437.6	0.00	0.00	0.00
G Sand									
2,808.9	11.39	205.64	2,767.0	-396.1	-190.1	439.4	0.00	0.00	0.00
2,900.0	11.39	205.64	2,856.3	-412.3	-197.9	457.3	0.00	0.00	0.00
3,000.0	11.39	205.64	2,954.3	-430.1	-206.5	477.1	0.00	0.00	0.00
3,100.0	11.39	205.64	3,052.3	-447.9	-215.0	496.8	0.00	0.00	0.00
3,200.0	11.39	205.64	3,150.4	-465.7	-223.5	516.6	0.00	0.00	0.00
3,300.0	11.39	205.64	3,248.4	-483.5	-232.1	536.3	0.00	0.00	0.00
3,400.0	11.39	205.64	3,346.4	-501.3	-240.6	556.1	0.00	0.00	0.00
3,500.0	11.39	205.64	3,444.5	-519.1	-249.2	575.8	0.00	0.00	0.00
3,600.0	11.39	205.64	3,542.5	-536.9	-257.7	595.6	0.00	0.00	0.00
3,700.0	11.39	205.64	3,640.5	-554.7	-266.3	615.3	0.00	0.00	0.00
3,800.0	11.39	205.64	3,738.6	-572.5	-274.8	635.0	0.00	0.00	0.00
3,900.0	11.39	205.64	3,836.6	-590.3	-283.4	654.8	0.00	0.00	0.00
4,000.0	11.39	205.64	3,934.6	-608.1	-291.9	674.5	0.00	0.00	0.00
4,100.0	11.39	205.64	4,032.7	-625.9	-300.4	694.3	0.00	0.00	0.00
4,200.0	11.39	205.64	4,130.7	-643.7	-309.0	714.0	0.00	0.00	0.00
4,300.0	11.39	205.64	4,228.7	-661.5	-317.5	733.8	0.00	0.00	0.00
4,400.0	11.39	205.64	4,326.8	-679.3	-326.1	753.5	0.00	0.00	0.00
4,500.0	11.39	205.64	4,424.8	-697.1	-334.6	773.3	0.00	0.00	0.00
Start Drop -2.00									



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-10W
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 28-10W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-9		
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)
4,560.8	11.39	205.64	4,484.3	-707.9	-339.8	785.3	0.00	0.00	0.00
4,600.0	10.60	205.64	4,522.9	-714.7	-343.0	792.7	2.00	-2.00	0.00
Williams Fork									
4,695.5	8.69	205.64	4,617.0	-729.1	-350.0	808.7	2.00	-2.00	0.00
4,700.0	8.60	205.64	4,621.5	-729.7	-350.3	809.4	2.00	-2.00	0.00
4,800.0	6.60	205.64	4,720.6	-741.6	-356.0	822.7	2.00	-2.00	0.00
4,900.0	4.60	205.64	4,820.1	-750.4	-360.2	832.4	2.00	-2.00	0.00
5,000.0	2.60	205.64	4,919.9	-756.1	-362.9	838.7	2.00	-2.00	0.00
5,100.0	0.60	205.64	5,019.8	-758.6	-364.1	841.5	2.00	-2.00	0.00
Start 2767.0 hold at 5130.2 MD									
5,130.2	0.00	0.00	5,050.0	-758.8	-364.2	841.7	2.00	-2.00	511.88
TOG									
5,197.2	0.00	0.00	5,117.0	-758.8	-364.2	841.7	0.00	0.00	0.00
5,200.0	0.00	0.00	5,119.8	-758.8	-364.2	841.7	0.00	0.00	0.00
5,300.0	0.00	0.00	5,219.8	-758.8	-364.2	841.7	0.00	0.00	0.00
5,400.0	0.00	0.00	5,319.8	-758.8	-364.2	841.7	0.00	0.00	0.00
5,500.0	0.00	0.00	5,419.8	-758.8	-364.2	841.7	0.00	0.00	0.00
5,600.0	0.00	0.00	5,519.8	-758.8	-364.2	841.7	0.00	0.00	0.00
5,700.0	0.00	0.00	5,619.8	-758.8	-364.2	841.7	0.00	0.00	0.00
5,800.0	0.00	0.00	5,719.8	-758.8	-364.2	841.7	0.00	0.00	0.00
5,900.0	0.00	0.00	5,819.8	-758.8	-364.2	841.7	0.00	0.00	0.00
6,000.0	0.00	0.00	5,919.8	-758.8	-364.2	841.7	0.00	0.00	0.00
6,100.0	0.00	0.00	6,019.8	-758.8	-364.2	841.7	0.00	0.00	0.00
6,200.0	0.00	0.00	6,119.8	-758.8	-364.2	841.7	0.00	0.00	0.00
6,300.0	0.00	0.00	6,219.8	-758.8	-364.2	841.7	0.00	0.00	0.00
6,400.0	0.00	0.00	6,319.8	-758.8	-364.2	841.7	0.00	0.00	0.00
6,500.0	0.00	0.00	6,419.8	-758.8	-364.2	841.7	0.00	0.00	0.00
6,600.0	0.00	0.00	6,519.8	-758.8	-364.2	841.7	0.00	0.00	0.00
6,700.0	0.00	0.00	6,619.8	-758.8	-364.2	841.7	0.00	0.00	0.00
6,800.0	0.00	0.00	6,719.8	-758.8	-364.2	841.7	0.00	0.00	0.00
6,900.0	0.00	0.00	6,819.8	-758.8	-364.2	841.7	0.00	0.00	0.00
Cameo									
6,997.2	0.00	0.00	6,917.0	-758.8	-364.2	841.7	0.00	0.00	0.00
7,000.0	0.00	0.00	6,919.8	-758.8	-364.2	841.7	0.00	0.00	0.00
7,100.0	0.00	0.00	7,019.8	-758.8	-364.2	841.7	0.00	0.00	0.00
7,200.0	0.00	0.00	7,119.8	-758.8	-364.2	841.7	0.00	0.00	0.00
7,300.0	0.00	0.00	7,219.8	-758.8	-364.2	841.7	0.00	0.00	0.00
7,400.0	0.00	0.00	7,319.8	-758.8	-364.2	841.7	0.00	0.00	0.00
7,500.0	0.00	0.00	7,419.8	-758.8	-364.2	841.7	0.00	0.00	0.00
7,600.0	0.00	0.00	7,519.8	-758.8	-364.2	841.7	0.00	0.00	0.00
Base Cameo Coal									
7,655.2	0.00	0.00	7,575.0	-758.8	-364.2	841.7	0.00	0.00	0.00
Rollins									
7,697.2	0.00	0.00	7,617.0	-758.8	-364.2	841.7	0.00	0.00	0.00
7,700.0	0.00	0.00	7,619.8	-758.8	-364.2	841.7	0.00	0.00	0.00
7,800.0	0.00	0.00	7,719.8	-758.8	-364.2	841.7	0.00	0.00	0.00
TD at 7897.2									
7,897.2	0.00	0.00	7,817.0	-758.8	-364.2	841.7	0.00	0.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-10W
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 28-10W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-9		
Design:	Design #1		

Design Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
Piceance Federal 28-10' - plan hits target center - Circle (radius 50.0)	0.00	0.00	7,817.0	-758.8	-364.2	1,523,628.76	2,354,196.29	39° 14' 55.800 N	107° 46' 50.480 W

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,538.9	1,522.0	8-5/8	8-5/8	12-1/4

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,808.9	2,767.0	G Sand		0.00	
4,695.5	4,617.0	Williams Fork		0.00	
5,197.2	5,117.0	TOG		0.00	
6,997.2	6,917.0	Cameo		0.00	
7,655.2	7,575.0	Base Cameo Coal		0.00	
7,697.2	7,617.0	Rollins		0.00	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
300.0	300.0	0.0	0.0	Start Build 2.00	
869.4	865.7	-50.8	-24.4	Start 3691.4 hold at 869.4 MD	
4,560.8	4,484.3	-707.9	-339.8	Start Drop -2.00	
5,130.2	5,050.0	-758.8	-364.2	Start 2767.0 hold at 5130.2 MD	
7,897.2	7,817.0	-758.8	-364.2	TD at 7897.2	



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance Federal 28-10W

Slot B-9

Design #1

Anticollision Report

28 April, 2015

Archer



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-10W
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 28-10W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-9	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	7,897.2	Design #1 (Slot B-9)	MWD	MWD - Standard	

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Piceance 28-05						
Piceance Federal 28-07M - Slot A-8 - Design #1	300.0	300.0	21.8	20.7	20.257	CC, ES
Piceance Federal 28-07M - Slot A-8 - Design #1	500.0	499.9	27.5	25.5	13.970	SF
Piceance Federal 28-08M - Slot A-9 - Design #1	200.0	200.0	9.9	9.3	15.901	CC, ES
Piceance Federal 28-08M - Slot A-9 - Design #1	300.0	299.7	11.1	10.1	10.496	SF
Piceance Federal 28-09M - Slot A-10 - Design #1	200.0	200.0	14.3	13.7	22.888	CC, ES
Piceance Federal 28-09M - Slot A-10 - Design #1	400.0	398.7	21.6	20.1	14.537	SF
Piceance Federal 28-09W - Slot B-8 - Design #1	278.2	278.4	18.9	18.0	19.626	CC
Piceance Federal 28-09W - Slot B-8 - Design #1	300.0	300.1	19.0	17.9	17.852	ES
Piceance Federal 28-09W - Slot B-8 - Design #1	1,300.0	1,297.8	40.2	32.8	5.393	SF
Piceance Federal 28-10M - Slot B-10 - Design #1	100.0	100.0	10.3	10.1	58.479	CC, ES
Piceance Federal 28-10M - Slot B-10 - Design #1	300.0	299.0	16.9	15.8	15.785	SF

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
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	-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	CC, ES	
400.0	400.0	400.0	400.0	0.7	0.8	144.49	21.2	-4.7	23.2	21.6	1.52	15.274		
500.0	499.8	499.9	499.9	0.9	1.0	154.39	21.2	-3.0	27.5	25.5	1.97	13.970	SF	
600.0	599.5	599.1	598.9	1.2	1.2	168.62	21.0	2.2	36.3	33.8	2.45	14.789		
700.0	698.7	697.0	696.5	1.4	1.4	-179.25	20.7	10.7	51.2	48.2	2.97	17.257		
800.0	797.5	793.3	792.1	1.8	1.7	-170.77	20.3	22.2	72.5	69.0	3.50	20.727		
900.0	895.7	887.6	885.2	2.1	2.0	-165.11	19.7	36.6	99.7	95.7	4.02	24.772		
1,000.0	993.7	980.0	976.1	2.5	2.3	-161.00	19.1	53.8	130.3	125.7	4.54	28.725		
1,100.0	1,091.7	1,070.8	1,064.7	2.9	2.7	-157.70	18.4	73.4	163.4	158.3	5.08	32.146		
1,200.0	1,189.7	1,159.7	1,150.8	3.4	3.1	-154.94	17.6	95.4	199.0	193.4	5.66	35.156		
1,300.0	1,287.8	1,246.7	1,234.4	3.8	3.5	-152.57	16.7	119.4	237.2	230.9	6.26	37.858		
1,400.0	1,385.8	1,331.7	1,315.3	4.2	4.0	-150.51	15.7	145.3	277.8	270.9	6.89	40.331		
1,500.0	1,483.8	1,415.5	1,394.4	4.6	4.5	-148.67	14.7	173.2	320.8	313.2	7.53	42.608		

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 28-10W
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 28-10W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-9	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.0 usft
Piceance 28-05 - Piceance Federal 28-07M - Slot A-8 - Design #1													Offset Well Error:	0.0 usft
Survey Program: 0-MWD														
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	1,581.9	1,504.9	1,478.3	5.1	5.1	-147.07	13.6	203.9	364.8	356.6	8.20	44.490		
1,700.0	1,679.9	1,594.3	1,562.3	5.5	5.7	-145.81	12.4	234.6	409.0	400.1	8.87	46.110		
1,800.0	1,777.9	1,683.6	1,646.2	5.9	6.4	-144.79	11.3	265.2	453.3	443.8	9.55	47.491		
1,900.0	1,876.0	1,773.0	1,730.2	6.4	7.0	-143.96	10.2	295.9	497.8	487.5	10.22	48.683		
2,000.0	1,974.0	1,862.4	1,814.1	6.8	7.6	-143.26	9.1	326.5	542.3	531.3	10.91	49.718		
2,100.0	2,072.0	1,951.7	1,898.0	7.2	8.2	-142.67	7.9	357.2	586.8	575.2	11.59	50.626		
2,200.0	2,170.1	2,041.1	1,982.0	7.7	8.9	-142.16	6.8	387.8	631.4	619.1	12.28	51.427		
2,300.0	2,268.1	2,130.5	2,065.9	8.1	9.5	-141.71	5.7	418.5	676.0	663.1	12.97	52.139		
2,400.0	2,366.1	2,219.9	2,149.9	8.5	10.2	-141.33	4.5	449.1	720.7	707.0	13.66	52.775		
2,500.0	2,464.2	2,309.2	2,233.8	9.0	10.8	-140.98	3.4	479.8	765.4	751.0	14.35	53.347		
2,600.0	2,562.2	2,398.6	2,317.8	9.4	11.4	-140.68	2.3	510.4	810.1	795.1	15.04	53.863		
2,700.0	2,660.2	2,488.0	2,401.7	9.8	12.1	-140.41	1.2	541.1	854.8	839.1	15.73	54.332		
2,800.0	2,758.3	2,577.3	2,485.7	10.3	12.7	-140.16	0.0	571.7	899.6	883.1	16.43	54.759		
2,900.0	2,856.3	2,666.7	2,569.6	10.7	13.4	-139.94	-1.1	602.4	944.3	927.2	17.12	55.150		
3,000.0	2,954.3	2,756.1	2,653.5	11.1	14.0	-139.73	-2.2	633.0	989.1	971.2	17.82	55.508		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-10W
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 28-10W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-9	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design		Piceance 28-05 - Piceance Federal 28-08M - Slot A-9 - Design #1												Offset Site Error:		0.0 usft
Survey Program:		0-MWD												Offset Well Error:		0.0 usft
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	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	56.674				
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	CC, ES			
300.0	300.0	299.7	299.7	0.5	0.5	59.17	5.7	9.6	11.1	10.1	1.06	10.496	SF			
400.0	400.0	399.2	399.0	0.7	0.7	-137.49	4.6	14.6	16.6	15.1	1.50	11.051				
500.0	499.8	497.9	497.4	0.9	1.0	-134.67	2.8	23.0	27.7	25.7	1.97	14.071				
600.0	599.5	595.5	594.3	1.2	1.3	-134.36	0.4	34.5	44.1	41.6	2.47	17.853				
700.0	698.7	691.6	689.2	1.4	1.6	-134.70	-2.7	49.0	65.8	62.8	3.01	21.843				
800.0	797.5	785.7	781.6	1.8	1.9	-135.11	-6.4	66.2	92.6	89.0	3.59	25.786				
900.0	895.7	877.6	871.3	2.1	2.3	-135.53	-10.5	85.9	124.2	120.0	4.19	29.621				
1,000.0	993.7	967.7	958.5	2.5	2.8	-135.57	-15.2	107.9	159.0	154.2	4.80	33.107				
1,100.0	1,091.7	1,055.9	1,043.3	2.9	3.3	-135.12	-20.4	132.0	196.2	190.7	5.44	36.087				
1,200.0	1,189.7	1,142.3	1,125.4	3.4	3.8	-134.44	-25.9	158.1	235.7	229.6	6.09	38.700				
1,300.0	1,287.8	1,231.1	1,209.2	3.8	4.4	-133.68	-32.0	186.8	277.1	270.4	6.77	40.920				
1,400.0	1,385.8	1,322.0	1,294.9	4.2	5.0	-133.08	-38.3	216.4	318.7	311.3	7.47	42.683				
1,500.0	1,483.8	1,412.9	1,380.7	4.6	5.6	-132.63	-44.6	246.0	360.3	352.2	8.17	44.116				
1,600.0	1,581.9	1,503.8	1,466.4	5.1	6.2	-132.26	-50.9	275.6	402.0	393.1	8.88	45.285				
1,700.0	1,679.9	1,594.7	1,552.1	5.5	6.9	-131.97	-57.2	305.1	443.6	434.0	9.59	46.253				
1,800.0	1,777.9	1,685.6	1,637.8	5.9	7.5	-131.72	-63.5	334.7	485.2	474.9	10.31	47.068				
1,900.0	1,876.0	1,776.5	1,723.6	6.4	8.1	-131.52	-69.8	364.3	526.9	515.8	11.03	47.762				
2,000.0	1,974.0	1,867.4	1,809.3	6.8	8.8	-131.34	-76.1	393.9	568.5	556.8	11.76	48.359				
2,100.0	2,072.0	1,958.3	1,895.0	7.2	9.4	-131.19	-82.4	423.5	610.2	597.7	12.48	48.878				
2,200.0	2,170.1	2,049.2	1,980.7	7.7	10.0	-131.06	-88.7	453.0	651.8	638.6	13.21	49.333				
2,300.0	2,268.1	2,140.1	2,066.5	8.1	10.7	-130.94	-95.0	482.6	693.5	679.5	13.94	49.734				
2,400.0	2,366.1	2,231.0	2,152.2	8.5	11.3	-130.84	-101.3	512.2	735.1	720.5	14.68	50.091				
2,500.0	2,464.2	2,321.9	2,237.9	9.0	11.9	-130.75	-107.6	541.8	776.8	761.4	15.41	50.410				
2,600.0	2,562.2	2,412.8	2,323.6	9.4	12.6	-130.67	-113.9	571.3	818.5	802.3	16.14	50.697				
2,700.0	2,660.2	2,503.7	2,409.3	9.8	13.2	-130.59	-120.2	600.9	860.1	843.3	16.88	50.957				
2,800.0	2,758.3	2,594.6	2,495.1	10.3	13.9	-130.52	-126.5	630.5	901.8	884.2	17.62	51.193				
2,900.0	2,856.3	2,685.5	2,580.8	10.7	14.5	-130.46	-132.8	660.1	943.5	925.1	18.35	51.407				
3,000.0	2,954.3	2,776.4	2,666.5	11.1	15.1	-130.41	-139.1	689.6	985.1	966.0	19.09	51.604				



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-10W
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 28-10W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-9	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-09M - Slot A-10 - 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	98.10	-2.0	14.2	14.3					
100.0	100.0	100.0	100.0	0.1	0.1	98.10	-2.0	14.2	14.3	14.1	0.18	81.576		
200.0	200.0	200.0	200.0	0.3	0.3	98.10	-2.0	14.2	14.3	13.7	0.62	22.888 CC, ES		
300.0	300.0	299.5	299.5	0.5	0.5	99.54	-2.6	15.8	16.0	14.9	1.06	15.097		
400.0	400.0	398.7	398.5	0.7	0.7	-107.56	-4.5	20.6	21.6	20.1	1.48	14.537 SF		
500.0	499.8	497.3	496.7	0.9	1.0	-112.70	-7.7	28.5	31.7	29.8	1.93	16.429		
600.0	599.5	594.8	593.6	1.2	1.3	-117.49	-12.0	39.4	46.6	44.2	2.42	19.240		
700.0	698.7	691.1	688.7	1.4	1.6	-121.05	-17.5	53.2	66.5	63.5	2.97	22.401		
800.0	797.5	785.6	781.6	1.8	1.9	-123.55	-24.0	69.6	91.2	87.6	3.56	25.603		
900.0	895.7	878.3	871.9	2.1	2.4	-125.39	-31.4	88.5	120.5	116.3	4.20	28.725		
1,000.0	993.7	969.2	960.0	2.5	2.8	-126.31	-39.8	109.6	152.9	148.1	4.84	31.574		
1,100.0	1,091.7	1,058.5	1,045.7	2.9	3.3	-126.40	-49.0	132.9	187.8	182.3	5.52	34.042		
1,200.0	1,189.7	1,146.1	1,129.0	3.4	3.8	-126.04	-58.9	158.1	225.1	218.9	6.21	36.230		
1,300.0	1,287.8	1,231.9	1,209.8	3.8	4.4	-125.44	-69.6	185.1	264.8	257.9	6.93	38.195		
1,400.0	1,385.8	1,323.2	1,295.2	4.2	5.1	-124.83	-81.4	215.0	305.5	297.8	7.68	39.801		
1,500.0	1,483.8	1,414.5	1,380.7	4.6	5.7	-124.36	-93.2	244.8	346.3	337.9	8.43	41.100		
1,600.0	1,581.9	1,505.8	1,466.1	5.1	6.4	-123.98	-105.0	274.6	387.1	377.9	9.18	42.150		
1,700.0	1,679.9	1,597.1	1,551.6	5.5	7.0	-123.68	-116.8	304.5	427.8	417.9	9.95	43.015		
1,800.0	1,777.9	1,688.4	1,637.1	5.9	7.7	-123.43	-128.6	334.3	468.6	457.9	10.71	43.738		
1,900.0	1,876.0	1,779.6	1,722.5	6.4	8.4	-123.23	-140.4	364.2	509.4	498.0	11.49	44.351		
2,000.0	1,974.0	1,870.9	1,808.0	6.8	9.1	-123.05	-152.2	394.0	550.2	538.0	12.26	44.877		
2,100.0	2,072.0	1,962.2	1,893.4	7.2	9.7	-122.90	-164.0	423.8	591.1	578.0	13.04	45.332		
2,200.0	2,170.1	2,053.5	1,978.9	7.7	10.4	-122.76	-175.8	453.7	631.9	618.0	13.82	45.729		
2,300.0	2,268.1	2,144.8	2,064.4	8.1	11.1	-122.64	-187.6	483.5	672.7	658.1	14.60	46.079		
2,400.0	2,366.1	2,236.1	2,149.8	8.5	11.8	-122.54	-199.4	513.3	713.5	698.1	15.38	46.390		
2,500.0	2,464.2	2,327.3	2,235.3	9.0	12.4	-122.45	-211.2	543.2	754.3	738.1	16.16	46.667		
2,600.0	2,562.2	2,418.6	2,320.7	9.4	13.1	-122.37	-223.0	573.0	795.1	778.2	16.95	46.916		
2,700.0	2,660.2	2,509.9	2,406.2	9.8	13.8	-122.29	-234.8	602.9	836.0	818.2	17.73	47.140		
2,800.0	2,758.3	2,601.2	2,491.6	10.3	14.5	-122.22	-246.6	632.7	876.8	858.3	18.52	47.344		
2,900.0	2,856.3	2,692.5	2,577.1	10.7	15.2	-122.16	-258.4	662.5	917.6	898.3	19.31	47.529		
3,000.0	2,954.3	2,783.8	2,662.6	11.1	15.8	-122.10	-270.2	692.4	958.4	938.3	20.09	47.698		
3,100.0	3,052.3	2,875.0	2,748.0	11.6	16.5	-122.05	-282.0	722.2	999.2	978.4	20.88	47.854		

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 28-10W
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 28-10W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-9	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	-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	112.455		
200.0	200.0	200.2	200.1	0.3	0.3	-44.66	13.7	-13.6	19.3	18.7	0.61	31.674		
278.2	278.2	278.4	278.2	0.5	0.5	-56.02	10.6	-15.7	18.9	18.0	0.96	19.626 CC		
300.0	300.0	300.1	299.9	0.5	0.5	-60.35	9.4	-16.5	19.0	17.9	1.06	17.852 ES		
400.0	400.0	399.6	399.1	0.7	0.8	74.65	2.2	-21.3	20.9	19.4	1.52	13.767		
500.0	499.8	499.0	497.7	0.9	1.1	60.62	-7.8	-28.1	25.2	23.2	2.00	12.573		
600.0	599.5	598.9	596.6	1.2	1.4	54.13	-19.2	-35.8	29.5	27.0	2.52	11.713		
700.0	698.7	698.8	695.6	1.4	1.8	54.12	-30.6	-43.4	32.0	28.9	3.08	10.377		
800.0	797.5	798.8	794.6	1.8	2.1	59.11	-42.0	-51.1	32.5	28.8	3.71	8.755		
900.0	895.7	898.6	893.5	2.1	2.4	69.28	-53.4	-58.8	32.0	27.5	4.45	7.179		
925.4	920.6	924.0	918.7	2.2	2.5	72.25	-56.3	-60.7	31.9	27.3	4.66	6.858		
1,000.0	993.7	998.4	992.4	2.5	2.8	80.91	-64.7	-66.4	32.3	27.0	5.26	6.144		
1,100.0	1,091.7	1,098.2	1,091.2	2.9	3.1	91.88	-76.1	-74.1	33.9	27.9	6.05	5.603		
1,200.0	1,189.7	1,198.0	1,190.0	3.4	3.5	101.54	-87.5	-81.8	36.6	29.8	6.79	5.394		
1,300.0	1,287.8	1,297.8	1,288.9	3.8	3.8	109.68	-98.9	-89.4	40.2	32.8	7.46	5.393 SF		
1,400.0	1,385.8	1,397.5	1,387.7	4.2	4.2	116.37	-110.2	-97.1	44.5	36.4	8.08	5.511		
1,500.0	1,483.8	1,497.3	1,486.6	4.6	4.5	121.83	-121.6	-104.8	49.3	40.6	8.66	5.696		
1,600.0	1,581.9	1,597.1	1,585.4	5.1	4.8	126.29	-133.0	-112.4	54.4	45.2	9.21	5.912		
1,700.0	1,679.9	1,696.9	1,684.2	5.5	5.2	129.96	-144.4	-120.1	59.9	50.1	9.75	6.140		
1,800.0	1,777.9	1,796.7	1,783.1	5.9	5.5	133.02	-155.7	-127.8	65.5	55.2	10.28	6.369		
1,900.0	1,876.0	1,896.5	1,881.9	6.4	5.9	135.59	-167.1	-135.4	71.3	60.5	10.81	6.593		
2,000.0	1,974.0	1,996.3	1,980.8	6.8	6.2	137.76	-178.5	-143.1	77.2	65.8	11.34	6.807		
2,100.0	2,072.0	2,096.0	2,079.6	7.2	6.6	139.63	-189.8	-150.8	83.2	71.3	11.86	7.011		
2,200.0	2,170.1	2,195.8	2,178.4	7.7	6.9	141.25	-201.2	-158.4	89.2	76.8	12.39	7.203		
2,300.0	2,268.1	2,295.6	2,277.3	8.1	7.3	142.65	-212.6	-166.1	95.4	82.4	12.91	7.384		
2,400.0	2,366.1	2,395.4	2,376.1	8.5	7.6	143.89	-224.0	-173.8	101.5	88.1	13.44	7.554		
2,500.0	2,464.2	2,495.2	2,475.0	9.0	8.0	144.98	-235.3	-181.4	107.8	93.8	13.97	7.713		
2,600.0	2,562.2	2,595.0	2,573.8	9.4	8.3	145.96	-246.7	-189.1	114.0	99.5	14.50	7.862		
2,700.0	2,660.2	2,694.8	2,672.6	9.8	8.6	146.83	-258.1	-196.8	120.3	105.3	15.04	8.002		
2,800.0	2,758.3	2,794.5	2,771.5	10.3	9.0	147.62	-269.5	-204.4	126.6	111.1	15.57	8.134		
2,900.0	2,856.3	2,894.3	2,870.3	10.7	9.3	148.33	-280.8	-212.1	133.0	116.9	16.10	8.258		
3,000.0	2,954.3	2,994.1	2,969.1	11.1	9.7	148.98	-292.2	-219.8	139.3	122.7	16.64	8.374		
3,100.0	3,052.3	3,093.9	3,068.0	11.6	10.0	149.57	-303.6	-227.4	145.7	128.5	17.17	8.484		
3,200.0	3,150.4	3,193.7	3,166.8	12.0	10.4	150.11	-315.0	-235.1	152.1	134.4	17.71	8.587		
3,300.0	3,248.4	3,293.5	3,265.7	12.4	10.7	150.60	-326.3	-242.7	158.5	140.2	18.25	8.684		
3,400.0	3,346.4	3,393.3	3,364.5	12.9	11.1	151.06	-337.7	-250.4	164.9	146.1	18.79	8.777		
3,500.0	3,444.5	3,493.0	3,463.3	13.3	11.4	151.49	-349.1	-258.1	171.3	152.0	19.33	8.864		
3,600.0	3,542.5	3,592.8	3,562.2	13.8	11.8	151.88	-360.4	-265.7	177.7	157.9	19.87	8.946		
3,700.0	3,640.5	3,692.6	3,661.0	14.2	12.1	152.25	-371.8	-273.4	184.2	163.8	20.41	9.025		
3,800.0	3,738.6	3,792.4	3,759.9	14.6	12.4	152.59	-383.2	-281.1	190.6	169.7	20.95	9.099		
3,900.0	3,836.6	3,892.2	3,858.7	15.1	12.8	152.91	-394.6	-288.7	197.1	175.6	21.49	9.170		
4,000.0	3,934.6	3,992.0	3,957.5	15.5	13.1	153.21	-405.9	-296.4	203.5	181.5	22.03	9.238		
4,100.0	4,032.7	4,091.8	4,056.4	15.9	13.5	153.49	-417.3	-304.1	210.0	187.4	22.57	9.302		
4,200.0	4,130.7	4,191.6	4,155.2	16.4	13.8	153.75	-428.7	-311.7	216.4	193.3	23.12	9.363		
4,300.0	4,228.7	4,291.3	4,254.1	16.8	14.2	154.00	-440.1	-319.4	222.9	199.2	23.66	9.422		
4,400.0	4,326.8	4,391.1	4,352.9	17.3	14.5	154.23	-451.4	-327.1	229.4	205.2	24.20	9.478		
4,500.0	4,424.8	4,490.9	4,451.7	17.7	14.9	154.45	-462.8	-334.7	235.9	211.1	24.75	9.531		
4,600.0	4,522.9	4,590.7	4,550.6	18.1	15.2	154.66	-474.2	-342.4	242.1	216.8	25.29	9.574		
4,700.0	4,621.5	4,690.6	4,649.6	18.4	15.6	154.58	-485.6	-350.1	245.8	220.0	25.81	9.522		
4,800.0	4,720.6	4,784.4	4,742.6	18.6	15.8	154.34	-495.2	-356.5	247.5	221.2	26.25	9.428		
4,900.0	4,820.1	4,877.7	4,835.5	18.8	16.0	154.16	-502.2	-361.3	248.7	222.1	26.61	9.346		

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 28-10W
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 28-10W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-9	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		
5,000.0	4,919.9	4,971.0	4,928.6	19.0	16.1	154.05	-506.7	-364.3	249.5	222.6	26.91	9.271		
5,100.0	5,019.8	5,064.3	5,021.9	19.1	16.3	154.00	-508.8	-365.7	249.9	222.7	27.16	9.199		
5,200.0	5,119.8	5,162.2	5,119.8	19.2	16.4	-0.36	-508.9	-365.8	249.9	222.5	27.45	9.105		
5,300.0	5,219.8	5,262.2	5,219.8	19.3	16.5	-0.36	-508.9	-365.8	249.9	222.2	27.74	9.008		
5,400.0	5,319.8	5,362.2	5,319.8	19.4	16.6	-0.36	-508.9	-365.8	249.9	221.9	28.04	8.912		
5,500.0	5,419.8	5,462.2	5,419.8	19.5	16.8	-0.36	-508.9	-365.8	249.9	221.6	28.34	8.817		
5,600.0	5,519.8	5,562.2	5,519.8	19.6	16.9	-0.36	-508.9	-365.8	249.9	221.2	28.65	8.723		
5,700.0	5,619.8	5,662.2	5,619.8	19.8	17.0	-0.36	-508.9	-365.8	249.9	220.9	28.96	8.629		
5,800.0	5,719.8	5,762.2	5,719.8	19.9	17.1	-0.36	-508.9	-365.8	249.9	220.6	29.27	8.537		
5,900.0	5,819.8	5,862.2	5,819.8	20.0	17.3	-0.36	-508.9	-365.8	249.9	220.3	29.59	8.445		
6,000.0	5,919.8	5,962.2	5,919.8	20.1	17.4	-0.36	-508.9	-365.8	249.9	220.0	29.91	8.355		
6,100.0	6,019.8	6,062.2	6,019.8	20.2	17.5	-0.36	-508.9	-365.8	249.9	219.7	30.24	8.265		
6,200.0	6,119.8	6,162.2	6,119.8	20.3	17.7	-0.36	-508.9	-365.8	249.9	219.3	30.56	8.177		
6,300.0	6,219.8	6,262.2	6,219.8	20.5	17.8	-0.36	-508.9	-365.8	249.9	219.0	30.89	8.089		
6,400.0	6,319.8	6,362.2	6,319.8	20.6	18.0	-0.36	-508.9	-365.8	249.9	218.7	31.23	8.003		
6,500.0	6,419.8	6,462.2	6,419.8	20.7	18.1	-0.36	-508.9	-365.8	249.9	218.3	31.56	7.918		
6,600.0	6,519.8	6,562.2	6,519.8	20.8	18.3	-0.36	-508.9	-365.8	249.9	218.0	31.90	7.833		
6,700.0	6,619.8	6,662.2	6,619.8	21.0	18.4	-0.36	-508.9	-365.8	249.9	217.7	32.24	7.750		
6,800.0	6,719.8	6,762.2	6,719.8	21.1	18.5	-0.36	-508.9	-365.8	249.9	217.3	32.59	7.669		
6,900.0	6,819.8	6,862.2	6,819.8	21.2	18.7	-0.36	-508.9	-365.8	249.9	217.0	32.93	7.588		
7,000.0	6,919.8	6,962.2	6,919.8	21.4	18.8	-0.36	-508.9	-365.8	249.9	216.6	33.28	7.508		
7,100.0	7,019.8	7,062.2	7,019.8	21.5	19.0	-0.36	-508.9	-365.8	249.9	216.3	33.64	7.430		
7,200.0	7,119.8	7,162.2	7,119.8	21.6	19.2	-0.36	-508.9	-365.8	249.9	215.9	33.99	7.352		
7,300.0	7,219.8	7,262.2	7,219.8	21.8	19.3	-0.36	-508.9	-365.8	249.9	215.6	34.35	7.276		
7,400.0	7,319.8	7,362.2	7,319.8	21.9	19.5	-0.36	-508.9	-365.8	249.9	215.2	34.70	7.201		
7,500.0	7,419.8	7,462.2	7,419.8	22.0	19.6	-0.36	-508.9	-365.8	249.9	214.8	35.06	7.127		
7,600.0	7,519.8	7,562.2	7,519.8	22.2	19.8	-0.36	-508.9	-365.8	249.9	214.5	35.43	7.054		
7,700.0	7,619.8	7,662.2	7,619.8	22.3	19.9	-0.36	-508.9	-365.8	249.9	214.1	35.79	6.982		
7,800.0	7,719.8	7,762.2	7,719.8	22.5	20.1	-0.36	-508.9	-365.8	249.9	213.7	36.16	6.911		
7,897.2	7,817.0	7,859.4	7,817.0	22.6	20.3	-0.36	-508.9	-365.8	249.9	213.4	36.52	6.844		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-10W
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 28-10W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-9	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-10M - Slot B-10 - 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	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	199.6	199.6	0.3	0.3	138.97	-9.0	7.8	11.9	11.3	0.61	19.319		
300.0	300.0	299.0	298.9	0.5	0.5	133.21	-11.5	12.3	16.9	15.8	1.07	15.785 SF		
400.0	400.0	397.9	397.4	0.7	0.8	-80.62	-15.8	19.7	25.1	23.6	1.51	16.648		
500.0	499.8	496.0	494.8	0.9	1.1	-90.03	-21.7	30.0	36.8	34.8	1.95	18.860		
600.0	599.5	593.1	590.6	1.2	1.4	-97.77	-29.2	43.0	52.7	50.3	2.45	21.561		
700.0	698.7	688.7	684.6	1.4	1.8	-103.54	-38.1	58.5	73.2	70.2	3.00	24.369		
800.0	797.5	782.7	776.3	1.8	2.2	-107.73	-48.5	76.5	98.1	94.5	3.62	27.066		
900.0	895.7	874.8	865.4	2.1	2.7	-110.91	-60.0	96.6	127.3	123.0	4.31	29.568		
1,000.0	993.7	965.3	952.2	2.5	3.2	-112.88	-72.7	118.7	159.8	154.8	5.02	31.855		
1,100.0	1,091.7	1,054.1	1,036.6	2.9	3.8	-113.74	-86.6	142.8	194.9	189.2	5.75	33.922		
1,200.0	1,189.7	1,141.2	1,118.4	3.4	4.4	-113.98	-101.4	168.5	232.5	226.0	6.49	35.824		
1,300.0	1,287.8	1,228.9	1,200.0	3.8	5.0	-113.87	-117.5	196.5	272.4	265.1	7.26	37.496		
1,400.0	1,385.8	1,320.4	1,284.9	4.2	5.7	-113.72	-134.5	226.1	312.7	304.7	8.05	38.859		
1,500.0	1,483.8	1,411.9	1,369.8	4.6	6.4	-113.61	-151.5	255.7	353.1	344.2	8.84	39.934		
1,600.0	1,581.9	1,503.4	1,454.7	5.1	7.1	-113.52	-168.5	285.2	393.4	383.8	9.64	40.802		
1,700.0	1,679.9	1,594.9	1,539.6	5.5	7.9	-113.45	-185.5	314.8	433.8	423.3	10.45	41.513		
1,800.0	1,777.9	1,686.4	1,624.5	5.9	8.6	-113.39	-202.5	344.4	474.1	462.8	11.26	42.107		
1,900.0	1,876.0	1,777.9	1,709.4	6.4	9.3	-113.34	-219.5	374.0	514.4	502.4	12.07	42.609		
2,000.0	1,974.0	1,869.4	1,794.3	6.8	10.0	-113.30	-236.6	403.6	554.8	541.9	12.89	43.039		
2,100.0	2,072.0	1,960.9	1,879.2	7.2	10.7	-113.26	-253.6	433.2	595.1	581.4	13.71	43.410		
2,200.0	2,170.1	2,052.4	1,964.1	7.7	11.5	-113.23	-270.6	462.8	635.4	620.9	14.53	43.734		
2,300.0	2,268.1	2,143.9	2,049.0	8.1	12.2	-113.20	-287.6	492.4	675.8	660.4	15.35	44.019		
2,400.0	2,366.1	2,235.4	2,133.9	8.5	12.9	-113.18	-304.6	522.0	716.1	700.0	16.18	44.271		
2,500.0	2,464.2	2,326.9	2,218.7	9.0	13.6	-113.16	-321.6	551.6	756.5	739.5	17.00	44.496		
2,600.0	2,562.2	2,418.4	2,303.6	9.4	14.3	-113.14	-338.6	581.1	796.8	779.0	17.83	44.698		
2,700.0	2,660.2	2,509.9	2,388.5	9.8	15.1	-113.12	-355.7	610.7	837.1	818.5	18.65	44.880		
2,800.0	2,758.3	2,601.4	2,473.4	10.3	15.8	-113.10	-372.7	640.3	877.5	858.0	19.48	45.045		
2,900.0	2,856.3	2,692.9	2,558.3	10.7	16.5	-113.09	-389.7	669.9	917.8	897.5	20.31	45.195		
3,000.0	2,954.3	2,784.4	2,643.2	11.1	17.2	-113.07	-406.7	699.5	958.2	937.0	21.14	45.332		
3,100.0	3,052.3	2,875.9	2,728.1	11.6	18.0	-113.06	-423.7	729.1	998.5	976.5	21.97	45.458		

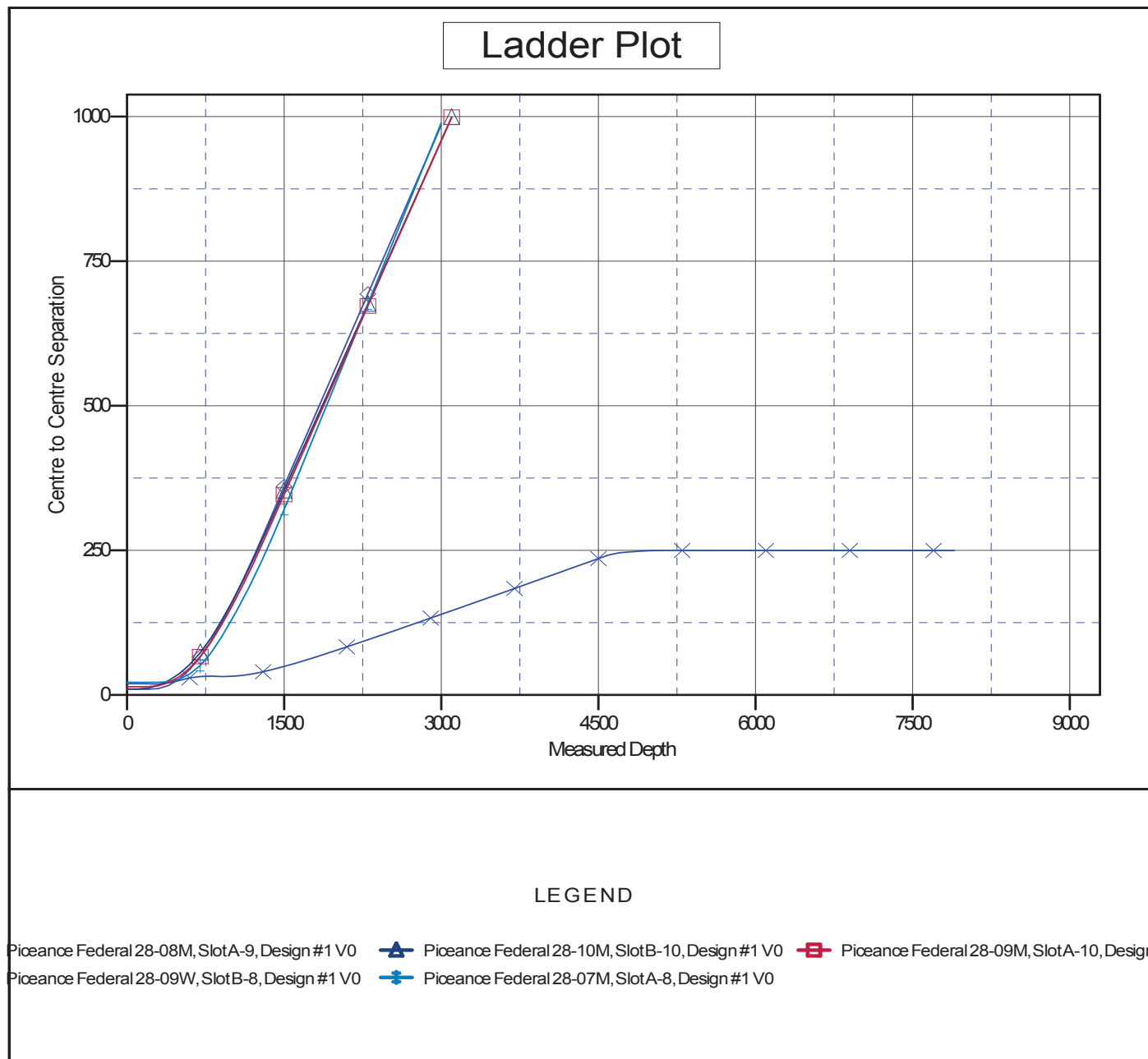
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-10W
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 28-10W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-9	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 28-10W
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 28-10W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
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Reference Well:	Piceance Federal 28-10W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-9	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 28-10W

Coordinate System is US State Plane 1983, Colorado Central Zone

Grid Convergence at Surface is: -1.44°

