



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance 28-08M

Slot A-9

Plan: Design #1

Standard Planning Report

29 April, 2015

Archer



Project: Mesa County, CO
Site: Piceance 28-05
Well: Piceance 28-08M
Wellbore: Slot A-9
Design: Design #1
Latitude: 39° 15' 3.360 N
Longitude: 107° 46' 45.750 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 28-08M, 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 28-08M

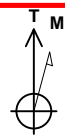
+N/-S	+E/-W	Northing	Ground Level:	Latitude	Longitude	Slot
0.0	0.0	1524384.02	7556.0	39° 15' 3.360 N	107° 46' 45.750 W	
			Easting 2354587.45			

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance Federal 28-08M tgt	7886.0	-284.2	1334.9	1524066.38	2355914.80	39° 15' 0.550 N	107° 46' 28.780 W	Circle (Radius: 50.0)

SECTION DETAILS

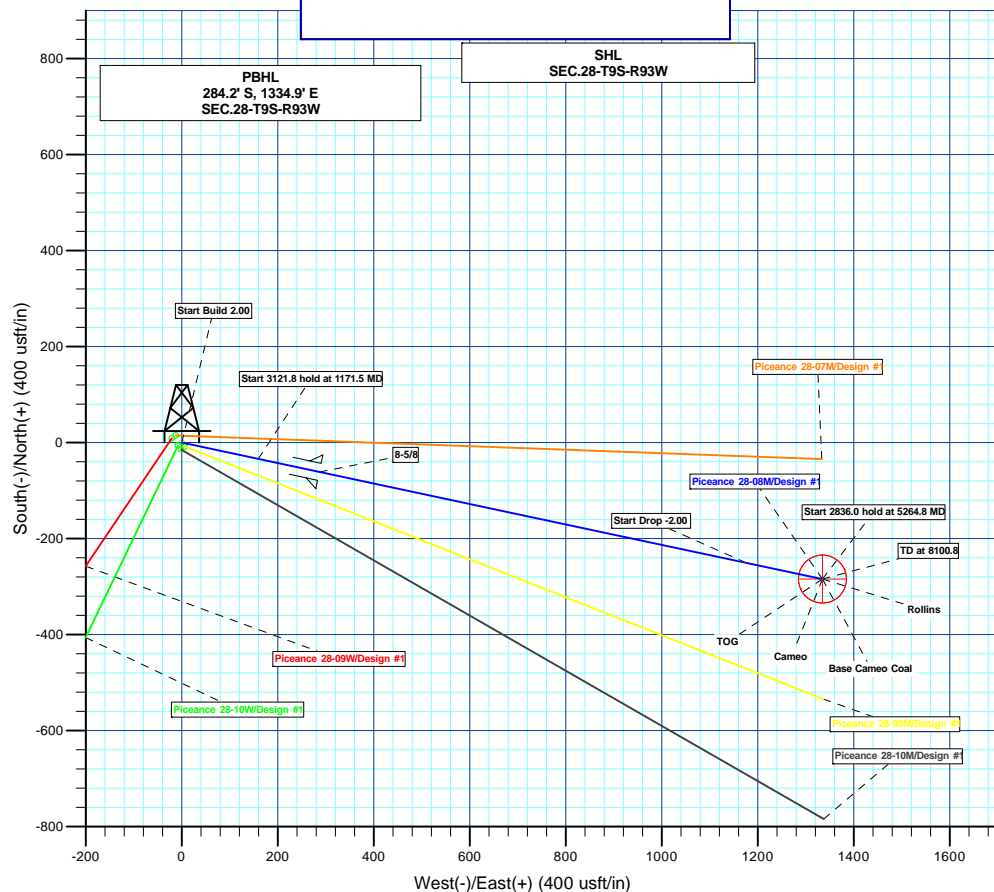
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
1171.5	19.43	102.02	1153.0	-34.0	159.6	2.00	102.02	163.2	Start 3121.8 hold at 1171.5 MD
4293.3	19.43	102.02	4097.0	-250.3	1175.3	0.00	0.00	1201.7	Start Drop -2.00
5264.8	0.00	0.00	5050.0	-284.2	1334.9	2.00	180.00	1364.8	Start 2836.0 hold at 5264.8 MD
8100.8	0.00	0.00	7886.0	-284.2	1334.9	0.00	0.00	1364.8	TD at 8100.8



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
2836.0	2956.2	G Sand
4686.0	4899.8	Williams Fork
5186.0	5400.8	TOG
6986.0	7200.8	Cameo
7644.0	7858.8	Base Cameo Coal
7686.0	7900.8	Rollins



Plan: Design #1 (Piceance 28-08M/Slot A-9)

Created By: Ricky Osburn Date: 8:35, April 29 2015



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Planning Report

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Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-08M
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 28-08M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-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 28-08M					
Well Position	+N/-S	8.1 usft	Northing:	1,524,384.02 usft	Latitude:	39° 15' 3.360 N
	+E/-W	-6.3 usft	Easting:	2,354,587.45 usft	Longitude:	107° 46' 45.750 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,556.0 usft

Wellbore	Slot A-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	102.02

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	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,171.5	19.43	102.02	1,153.0	-34.0	159.6	2.00	2.00	0.00	102.02	
4,293.3	19.43	102.02	4,097.0	-250.3	1,175.3	0.00	0.00	0.00	0.00	
5,264.8	0.00	0.00	5,050.0	-284.2	1,334.9	2.00	-2.00	0.00	180.00	
8,100.8	0.00	0.00	7,886.0	-284.2	1,334.9	0.00	0.00	0.00	0.00	Piceance Federal 28-0



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-08M
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 28-08M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-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
Start Build 2.00									
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	2.00	102.02	300.0	-0.4	1.7	1.7	2.00	2.00	0.00
400.0	4.00	102.02	399.8	-1.5	6.8	7.0	2.00	2.00	0.00
500.0	6.00	102.02	499.5	-3.3	15.3	15.7	2.00	2.00	0.00
600.0	8.00	102.02	598.7	-5.8	27.3	27.9	2.00	2.00	0.00
700.0	10.00	102.02	697.5	-9.1	42.6	43.5	2.00	2.00	0.00
800.0	12.00	102.02	795.6	-13.0	61.2	62.6	2.00	2.00	0.00
900.0	14.00	102.02	893.1	-17.7	83.2	85.1	2.00	2.00	0.00
1,000.0	16.00	102.02	989.6	-23.1	108.5	111.0	2.00	2.00	0.00
1,100.0	18.00	102.02	1,085.3	-29.2	137.1	140.2	2.00	2.00	0.00
Start 3121.8 hold at 1171.5 MD									
1,171.5	19.43	102.02	1,153.0	-34.0	159.6	163.2	2.00	2.00	0.00
1,200.0	19.43	102.02	1,179.9	-36.0	168.8	172.6	0.00	0.00	0.00
1,300.0	19.43	102.02	1,274.2	-42.9	201.4	205.9	0.00	0.00	0.00
1,400.0	19.43	102.02	1,368.5	-49.8	233.9	239.2	0.00	0.00	0.00
1,500.0	19.43	102.02	1,462.8	-56.7	266.5	272.4	0.00	0.00	0.00
8-5/8									
1,562.8	19.43	102.02	1,522.0	-61.1	286.9	293.3	0.00	0.00	0.00
1,600.0	19.43	102.02	1,557.1	-63.7	299.0	305.7	0.00	0.00	0.00
1,700.0	19.43	102.02	1,651.4	-70.6	331.5	339.0	0.00	0.00	0.00
1,800.0	19.43	102.02	1,745.7	-77.5	364.1	372.2	0.00	0.00	0.00
1,900.0	19.43	102.02	1,840.0	-84.5	396.6	405.5	0.00	0.00	0.00
2,000.0	19.43	102.02	1,934.3	-91.4	429.1	438.8	0.00	0.00	0.00
2,100.0	19.43	102.02	2,028.6	-98.3	461.7	472.0	0.00	0.00	0.00
2,200.0	19.43	102.02	2,122.9	-105.2	494.2	505.3	0.00	0.00	0.00
2,300.0	19.43	102.02	2,217.2	-112.2	526.8	538.6	0.00	0.00	0.00
2,400.0	19.43	102.02	2,311.5	-119.1	559.3	571.8	0.00	0.00	0.00
2,500.0	19.43	102.02	2,405.8	-126.0	591.8	605.1	0.00	0.00	0.00
2,600.0	19.43	102.02	2,500.1	-132.9	624.4	638.4	0.00	0.00	0.00
2,700.0	19.43	102.02	2,594.4	-139.9	656.9	671.6	0.00	0.00	0.00
2,800.0	19.43	102.02	2,688.7	-146.8	689.4	704.9	0.00	0.00	0.00
2,900.0	19.43	102.02	2,783.0	-153.7	722.0	738.2	0.00	0.00	0.00
G Sand									
2,956.2	19.43	102.02	2,836.0	-157.6	740.3	756.8	0.00	0.00	0.00
3,000.0	19.43	102.02	2,877.3	-160.7	754.5	771.4	0.00	0.00	0.00
3,100.0	19.43	102.02	2,971.6	-167.6	787.1	804.7	0.00	0.00	0.00
3,200.0	19.43	102.02	3,066.0	-174.5	819.6	838.0	0.00	0.00	0.00
3,300.0	19.43	102.02	3,160.3	-181.4	852.1	871.2	0.00	0.00	0.00
3,400.0	19.43	102.02	3,254.6	-188.4	884.7	904.5	0.00	0.00	0.00
3,500.0	19.43	102.02	3,348.9	-195.3	917.2	937.8	0.00	0.00	0.00
3,600.0	19.43	102.02	3,443.2	-202.2	949.7	971.0	0.00	0.00	0.00
3,700.0	19.43	102.02	3,537.5	-209.2	982.3	1,004.3	0.00	0.00	0.00
3,800.0	19.43	102.02	3,631.8	-216.1	1,014.8	1,037.6	0.00	0.00	0.00
3,900.0	19.43	102.02	3,726.1	-223.0	1,047.4	1,070.8	0.00	0.00	0.00
4,000.0	19.43	102.02	3,820.4	-229.9	1,079.9	1,104.1	0.00	0.00	0.00
4,100.0	19.43	102.02	3,914.7	-236.9	1,112.4	1,137.4	0.00	0.00	0.00
4,200.0	19.43	102.02	4,009.0	-243.8	1,145.0	1,170.6	0.00	0.00	0.00
Start Drop -2.00									
4,293.3	19.43	102.02	4,097.0	-250.3	1,175.3	1,201.7	0.00	0.00	0.00
4,300.0	19.30	102.02	4,103.3	-250.7	1,177.5	1,203.9	2.00	-2.00	0.00
4,400.0	17.30	102.02	4,198.2	-257.3	1,208.2	1,235.3	2.00	-2.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-08M
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 28-08M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-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)
4,500.0	15.30	102.02	4,294.2	-263.1	1,235.6	1,263.3	2.00	-2.00	0.00
4,600.0	13.30	102.02	4,391.1	-268.3	1,259.8	1,288.0	2.00	-2.00	0.00
4,700.0	11.30	102.02	4,488.8	-272.7	1,280.6	1,309.3	2.00	-2.00	0.00
4,800.0	9.30	102.02	4,587.2	-276.4	1,298.1	1,327.2	2.00	-2.00	0.00
Williams Fork									
4,899.8	7.30	102.02	4,686.0	-279.4	1,312.2	1,341.6	2.00	-2.00	0.00
4,900.0	7.30	102.02	4,686.2	-279.4	1,312.2	1,341.6	2.00	-2.00	0.00
5,000.0	5.30	102.02	4,785.5	-281.7	1,322.9	1,352.6	2.00	-2.00	0.00
5,100.0	3.30	102.02	4,885.3	-283.3	1,330.3	1,360.1	2.00	-2.00	0.00
5,200.0	1.30	102.02	4,985.2	-284.1	1,334.2	1,364.1	2.00	-2.00	0.00
Start 2836.0 hold at 5264.8 MD									
5,264.8	0.00	0.00	5,050.0	-284.2	1,334.9	1,364.8	2.00	-2.00	-157.36
5,300.0	0.00	0.00	5,085.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
5,400.0	0.00	0.00	5,185.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
TOG									
5,400.8	0.00	0.00	5,186.0	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
5,500.0	0.00	0.00	5,285.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
5,600.0	0.00	0.00	5,385.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
5,700.0	0.00	0.00	5,485.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
5,800.0	0.00	0.00	5,585.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
5,900.0	0.00	0.00	5,685.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
6,000.0	0.00	0.00	5,785.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
6,100.0	0.00	0.00	5,885.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
6,200.0	0.00	0.00	5,985.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
6,300.0	0.00	0.00	6,085.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
6,400.0	0.00	0.00	6,185.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
6,500.0	0.00	0.00	6,285.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
6,600.0	0.00	0.00	6,385.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
6,700.0	0.00	0.00	6,485.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
6,800.0	0.00	0.00	6,585.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
6,900.0	0.00	0.00	6,685.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
7,000.0	0.00	0.00	6,785.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
7,100.0	0.00	0.00	6,885.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
7,200.0	0.00	0.00	6,985.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
Cameo									
7,200.8	0.00	0.00	6,986.0	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
7,300.0	0.00	0.00	7,085.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
7,400.0	0.00	0.00	7,185.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
7,500.0	0.00	0.00	7,285.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
7,600.0	0.00	0.00	7,385.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
7,700.0	0.00	0.00	7,485.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
7,800.0	0.00	0.00	7,585.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
Base Cameo Coal									
7,858.8	0.00	0.00	7,644.0	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
7,900.0	0.00	0.00	7,685.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
Rollins									
7,900.8	0.00	0.00	7,686.0	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
8,000.0	0.00	0.00	7,785.2	-284.2	1,334.9	1,364.8	0.00	0.00	0.00
TD at 8100.8									
8,100.8	0.00	0.00	7,886.0	-284.2	1,334.9	1,364.8	0.00	0.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-08M
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 28-08M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-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 28-08M	0.00	0.00	7,886.0	-284.2	1,334.9	1,524,066.38	2,355,914.80	39° 15' 0.550 N	107° 46' 28.780 W
- plan hits target center									
- Circle (radius 50.0)									

Casing Points				
Measured Depth	Vertical Depth		Casing Diameter	Hole Diameter
(usft)	(usft)	Name	(")	(")
1,562.8	1,522.0	8-5/8	8-5/8	12-1/4

Formations					
Measured Depth	Vertical Depth			Dip	Dip Direction
(usft)	(usft)	Name	Lithology	(°)	(°)
2,956.2	2,836.0	G Sand		0.00	
4,899.8	4,686.0	Williams Fork		0.00	
5,400.8	5,186.0	TOG		0.00	
7,200.8	6,986.0	Cameo		0.00	
7,858.8	7,644.0	Base Cameo Coal		0.00	
7,900.8	7,686.0	Rollins		0.00	

Plan Annotations				
Measured Depth	Vertical Depth	Local Coordinates		
(usft)	(usft)	+N/-S (usft)	+E/-W (usft)	Comment
200.0	200.0	0.0	0.0	Start Build 2.00
1,171.5	1,153.0	-34.0	159.6	Start 3121.8 hold at 1171.5 MD
4,293.3	4,097.0	-250.3	1,175.3	Start Drop -2.00
5,264.8	5,050.0	-284.2	1,334.9	Start 2836.0 hold at 5264.8 MD
8,100.8	7,886.0	-284.2	1,334.9	TD at 8100.8



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance Federal 28-08M

Slot A-9

Design #1

Anticollision Report

28 April, 2015

Archer



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-08M
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 28-08M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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	8,100.8	Design #1 (Slot A-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	200.0	200.0	19.7	19.1	31.553	CC, ES
Piceance Federal 28-07M - Slot A-8 - Design #1	8,100.8	8,103.6	249.9	187.5	4.003	SF
Piceance Federal 28-09M - Slot A-10 - Design #1	200.0	200.0	10.2	9.6	16.396	CC
Piceance Federal 28-09M - Slot A-10 - Design #1	300.0	299.7	10.4	9.3	9.785	ES
Piceance Federal 28-09M - Slot A-10 - Design #1	8,100.0	8,115.3	250.0	187.7	4.010	SF
Piceance Federal 28-09W - Slot B-8 - Design #1	100.0	100.0	22.4	22.2	127.696	CC
Piceance Federal 28-09W - Slot B-8 - Design #1	200.0	199.8	22.8	22.1	37.202	ES
Piceance Federal 28-09W - Slot B-8 - Design #1	400.0	398.1	36.1	34.5	22.292	SF
Piceance Federal 28-10M - Slot B-10 - Design #1	100.0	100.0	14.3	14.1	81.288	CC, ES
Piceance Federal 28-10M - Slot B-10 - Design #1	8,100.0	8,141.8	500.0	437.3	7.972	SF
Piceance Federal 28-10W - Slot B-9 - Design #1	200.0	200.0	9.9	9.3	15.901	CC, ES
Piceance Federal 28-10W - Slot B-9 - Design #1	300.0	300.0	11.1	10.1	10.314	SF

Offset Design		Piceance 28-05 - Piceance Federal 28-07M - Slot A-8 - Design #1											Offset Site Error:		0.0 usf
Survey Program:		0-MWD											Offset Well Error:		0.0 usf
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		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor			
							+N/-S (usft)	+E/-W (usft)							
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	112.457			
200.0	200.0	200.0	200.0	0.3	0.3	-39.67	15.2	-12.6	19.7	19.1	0.62	31.553	CC, ES		
300.0	300.0	300.0	300.0	0.5	0.5	-144.61	15.2	-12.6	21.1	20.0	1.08	19.461			
400.0	399.8	399.8	399.8	0.7	0.8	-151.38	15.2	-12.6	25.6	24.0	1.57	16.266			
500.0	499.5	500.4	500.4	1.0	1.0	-156.90	15.1	-10.8	32.0	29.9	2.06	15.522			
600.0	598.7	601.2	601.1	1.3	1.2	-159.72	14.9	-5.5	38.9	36.3	2.55	15.238			
700.0	697.5	702.3	701.7	1.6	1.4	-160.97	14.6	3.3	46.0	43.0	3.06	15.054			
800.0	795.6	803.5	802.2	2.0	1.7	-161.25	14.1	15.8	53.4	49.8	3.58	14.899			
900.0	893.1	905.0	902.4	2.4	2.0	-160.91	13.5	31.8	60.9	56.8	4.14	14.733			
1,000.0	989.6	1,006.7	1,002.2	3.0	2.4	-160.16	12.8	51.4	68.7	64.0	4.73	14.532			
1,100.0	1,085.3	1,108.6	1,101.4	3.5	2.8	-159.11	12.0	74.6	76.6	71.3	5.37	14.279			
1,200.0	1,179.9	1,210.8	1,200.0	4.2	3.3	-157.85	11.0	101.3	84.7	78.6	6.06	13.973			
1,300.0	1,274.2	1,313.2	1,297.8	4.8	3.9	-155.82	9.9	131.6	90.6	83.8	6.83	13.266			
1,400.0	1,368.5	1,415.4	1,394.3	5.5	4.5	-152.77	8.6	165.4	93.7	86.0	7.75	12.095			
1,500.0	1,462.8	1,515.2	1,488.1	6.2	5.2	-149.46	7.4	199.6	96.0	87.2	8.80	10.911			

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 28-08M
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 28-08M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-9	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
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	1,557.1	1,615.1	1,581.8	6.9	5.9	-146.32	6.1	233.8	98.6	88.7	9.95	9.909		
1,700.0	1,651.4	1,714.9	1,675.6	7.6	6.6	-143.35	4.8	268.1	101.5	90.3	11.19	9.071		
1,800.0	1,745.7	1,814.7	1,769.3	8.3	7.3	-140.55	3.6	302.3	104.7	92.2	12.50	8.374		
1,900.0	1,840.0	1,914.5	1,863.1	9.0	8.0	-137.92	2.3	336.5	108.0	94.2	13.86	7.794		
2,000.0	1,934.3	2,014.4	1,956.9	9.7	8.7	-135.45	1.1	370.8	111.6	96.4	15.27	7.310		
2,100.0	2,028.6	2,114.2	2,050.6	10.4	9.4	-133.14	-0.2	405.0	115.4	98.7	16.72	6.906		
2,200.0	2,122.9	2,214.0	2,144.4	11.1	10.1	-130.99	-1.5	439.2	119.4	101.2	18.19	6.565		
2,300.0	2,217.2	2,313.8	2,238.1	11.8	10.8	-128.97	-2.7	473.5	123.5	103.8	19.68	6.278		
2,400.0	2,311.5	2,413.6	2,331.9	12.5	11.5	-127.08	-4.0	507.7	127.8	106.6	21.18	6.033		
2,500.0	2,405.8	2,513.5	2,425.7	13.2	12.3	-125.32	-5.2	541.9	132.2	109.5	22.70	5.824		
2,600.0	2,500.1	2,613.3	2,519.4	13.9	13.0	-123.67	-6.5	576.2	136.7	112.5	24.22	5.645		
2,700.0	2,594.4	2,713.1	2,613.2	14.6	13.7	-122.13	-7.8	610.4	141.3	115.6	25.74	5.490		
2,800.0	2,688.7	2,812.9	2,706.9	15.3	14.4	-120.69	-9.0	644.6	146.0	118.8	27.27	5.355		
2,900.0	2,783.0	2,912.8	2,800.7	16.0	15.1	-119.33	-10.3	678.9	150.8	122.0	28.80	5.238		
3,000.0	2,877.3	3,012.6	2,894.5	16.7	15.8	-118.07	-11.5	713.1	155.7	125.4	30.32	5.135		
3,100.0	2,971.6	3,112.4	2,988.2	17.4	16.6	-116.87	-12.8	747.4	160.7	128.8	31.85	5.045		
3,200.0	3,066.0	3,212.2	3,082.0	18.1	17.3	-115.76	-14.1	781.6	165.7	132.3	33.37	4.965		
3,300.0	3,160.3	3,312.1	3,175.7	18.8	18.0	-114.70	-15.3	815.8	170.8	135.9	34.89	4.894		
3,400.0	3,254.6	3,411.9	3,269.5	19.5	18.7	-113.71	-16.6	850.1	175.9	139.5	36.41	4.832		
3,500.0	3,348.9	3,511.7	3,363.3	20.2	19.5	-112.78	-17.8	884.3	181.1	143.2	37.92	4.775		
3,600.0	3,443.2	3,611.5	3,457.0	20.9	20.2	-111.89	-19.1	918.5	186.3	146.9	39.43	4.725		
3,700.0	3,537.5	3,711.4	3,550.8	21.6	20.9	-111.06	-20.3	952.8	191.6	150.6	40.93	4.680		
3,800.0	3,631.8	3,811.2	3,644.5	22.3	21.6	-110.27	-21.6	987.0	196.9	154.4	42.44	4.639		
3,900.0	3,726.1	3,911.0	3,738.3	23.0	22.3	-109.52	-22.9	1,021.2	202.2	158.3	43.94	4.602		
4,000.0	3,820.4	4,010.8	3,832.1	23.7	23.1	-108.81	-24.1	1,055.5	207.6	162.2	45.43	4.569		
4,100.0	3,914.7	4,110.6	3,925.8	24.5	23.8	-108.13	-25.4	1,089.7	213.0	166.1	46.92	4.539		
4,200.0	4,009.0	4,210.5	4,019.6	25.2	24.5	-107.49	-26.6	1,123.9	218.4	170.0	48.41	4.512		
4,300.0	4,103.3	4,310.3	4,113.4	25.9	25.2	-106.89	-27.9	1,158.2	223.9	174.0	49.90	4.487		
4,400.0	4,198.2	4,409.2	4,206.8	26.4	25.8	-106.34	-29.1	1,190.6	229.0	177.9	51.12	4.480		
4,500.0	4,294.2	4,508.1	4,301.3	26.9	26.3	-105.82	-30.2	1,219.8	233.6	181.4	52.17	4.478		
4,600.0	4,391.1	4,607.2	4,396.9	27.3	26.8	-105.32	-31.1	1,245.8	237.6	184.5	53.10	4.474		
4,700.0	4,488.8	4,706.3	4,493.4	27.7	27.2	-104.86	-32.0	1,268.4	241.1	187.1	53.93	4.470		
4,800.0	4,587.2	4,805.5	4,590.7	28.0	27.5	-104.41	-32.7	1,287.7	244.0	189.3	54.65	4.464		
4,900.0	4,686.2	4,904.8	4,688.7	28.2	27.8	-103.98	-33.3	1,303.7	246.3	191.1	55.26	4.457		
5,000.0	4,785.5	5,004.2	4,787.3	28.5	28.0	-103.56	-33.7	1,316.2	248.1	192.3	55.77	4.448		
5,100.0	4,885.3	5,103.7	4,886.3	28.6	28.2	-103.15	-34.1	1,325.3	249.3	193.1	56.18	4.436		
5,200.0	4,985.2	5,203.2	4,985.7	28.7	28.4	-102.74	-34.3	1,331.0	249.8	193.4	56.49	4.422		
5,300.0	5,085.2	5,302.8	5,085.2	28.8	28.5	-0.37	-34.4	1,333.3	249.9	193.2	56.71	4.406		
5,339.1	5,124.3	5,341.9	5,124.3	28.9	28.5	-0.36	-34.4	1,333.3	249.9	193.1	56.78	4.401		
5,400.0	5,185.2	5,402.7	5,185.2	28.9	28.6	-0.36	-34.4	1,333.3	249.9	193.0	56.88	4.394		
5,500.0	5,285.2	5,502.7	5,285.2	29.0	28.6	-0.36	-34.4	1,333.3	249.9	192.9	57.05	4.381		
5,600.0	5,385.2	5,602.7	5,385.2	29.1	28.7	-0.36	-34.4	1,333.3	249.9	192.7	57.22	4.368		
5,700.0	5,485.2	5,702.7	5,485.2	29.2	28.8	-0.36	-34.4	1,333.3	249.9	192.5	57.39	4.354		
5,800.0	5,585.2	5,802.7	5,585.2	29.2	28.9	-0.36	-34.4	1,333.3	249.9	192.3	57.57	4.341		
5,900.0	5,685.2	5,902.7	5,685.2	29.3	29.0	-0.36	-34.4	1,333.3	249.9	192.1	57.75	4.327		
6,000.0	5,785.2	6,002.7	5,785.2	29.4	29.1	-0.36	-34.4	1,333.3	249.9	192.0	57.94	4.313		
6,100.0	5,885.2	6,102.7	5,885.2	29.5	29.2	-0.36	-34.4	1,333.3	249.9	191.8	58.12	4.299		
6,200.0	5,985.2	6,202.7	5,985.2	29.6	29.3	-0.36	-34.4	1,333.3	249.9	191.6	58.31	4.285		
6,300.0	6,085.2	6,302.7	6,085.2	29.7	29.4	-0.36	-34.4	1,333.3	249.9	191.4	58.51	4.271		
6,400.0	6,185.2	6,402.7	6,185.2	29.8	29.5	-0.36	-34.4	1,333.3	249.9	191.2	58.70	4.257		
6,500.0	6,285.2	6,502.7	6,285.2	29.9	29.6	-0.36	-34.4	1,333.3	249.9	191.0	58.90	4.243		
6,600.0	6,385.2	6,602.7	6,385.2	30.0	29.7	-0.36	-34.4	1,333.3	249.9	190.8	59.10	4.228		

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 28-08M
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 28-08M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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		Highside Toolface (°)	Offset Wellbore Centre		Distance				Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
6,700.0	6,485.2	6,702.7	6,485.2	30.1	29.8	-0.36	-34.4	1,333.3	249.9	190.6	59.30	4.214		
6,800.0	6,585.2	6,802.7	6,585.2	30.2	29.9	-0.36	-34.4	1,333.3	249.9	190.4	59.51	4.199		
6,900.0	6,685.2	6,902.7	6,685.2	30.3	30.0	-0.36	-34.4	1,333.3	249.9	190.2	59.72	4.185		
7,000.0	6,785.2	7,002.7	6,785.2	30.4	30.1	-0.36	-34.4	1,333.3	249.9	190.0	59.93	4.170		
7,100.0	6,885.2	7,102.7	6,885.2	30.5	30.2	-0.36	-34.4	1,333.3	249.9	189.8	60.15	4.155		
7,200.0	6,985.2	7,202.7	6,985.2	30.6	30.3	-0.36	-34.4	1,333.3	249.9	189.5	60.36	4.140		
7,300.0	7,085.2	7,302.7	7,085.2	30.7	30.4	-0.36	-34.4	1,333.3	249.9	189.3	60.58	4.125		
7,400.0	7,185.2	7,402.7	7,185.2	30.8	30.5	-0.36	-34.4	1,333.3	249.9	189.1	60.80	4.110		
7,500.0	7,285.2	7,502.7	7,285.2	30.9	30.6	-0.36	-34.4	1,333.3	249.9	188.9	61.03	4.095		
7,600.0	7,385.2	7,602.7	7,385.2	31.0	30.8	-0.36	-34.4	1,333.3	249.9	188.6	61.26	4.080		
7,700.0	7,485.2	7,702.7	7,485.2	31.2	30.9	-0.36	-34.4	1,333.3	249.9	188.4	61.49	4.064		
7,800.0	7,585.2	7,802.7	7,585.2	31.3	31.0	-0.36	-34.4	1,333.3	249.9	188.2	61.72	4.049		
7,900.0	7,685.2	7,902.7	7,685.2	31.4	31.1	-0.36	-34.4	1,333.3	249.9	187.9	61.95	4.034		
8,000.0	7,785.2	8,002.7	7,785.2	31.5	31.2	-0.36	-34.4	1,333.3	249.9	187.7	62.19	4.018		
8,100.0	7,885.2	8,102.7	7,885.2	31.6	31.3	-0.36	-34.4	1,333.3	249.9	187.5	62.43	4.003		
8,100.8	7,886.0	8,103.6	7,886.0	31.6	31.3	-0.36	-34.4	1,333.3	249.9	187.5	62.43	4.003 SF		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-08M
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 28-08M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)						
0.0	0.0	0.0	0.0	0.0	0.0	142.10	-8.1	6.3	10.2					
100.0	100.0	100.0	100.0	0.1	0.1	142.10	-8.1	6.3	10.2	10.1	0.18	58.437		
200.0	200.0	200.0	200.0	0.3	0.3	142.10	-8.1	6.3	10.2	9.6	0.62	16.396 CC		
300.0	300.0	299.7	299.7	0.5	0.5	41.40	-8.7	7.9	10.4	9.3	1.06	9.785 ES		
400.0	399.8	399.4	399.2	0.7	0.7	45.09	-10.6	12.7	10.9	9.4	1.52	7.219		
500.0	499.5	499.1	498.5	1.0	1.0	50.47	-13.8	20.8	11.9	9.9	2.00	5.958		
600.0	598.7	598.7	597.4	1.3	1.3	56.60	-18.3	32.1	13.4	10.9	2.53	5.293		
700.0	697.5	698.4	695.9	1.6	1.6	62.64	-24.0	46.5	15.5	12.4	3.15	4.920		
800.0	795.6	798.0	793.7	2.0	2.0	68.04	-31.0	64.1	18.3	14.4	3.89	4.696		
900.0	893.1	897.6	890.7	2.4	2.4	72.59	-39.2	84.9	21.6	16.9	4.75	4.553		
1,000.0	989.6	997.2	986.9	3.0	2.9	76.30	-48.6	108.8	25.6	19.9	5.75	4.456		
1,100.0	1,085.3	1,096.7	1,082.1	3.5	3.5	79.29	-59.3	135.7	30.3	23.4	6.90	4.387		
1,200.0	1,179.9	1,196.2	1,176.2	4.2	4.2	81.48	-71.1	165.7	35.5	27.3	8.18	4.341		
1,300.0	1,274.2	1,295.9	1,269.6	4.8	4.9	80.81	-84.0	198.2	41.5	32.0	9.50	4.366		
1,400.0	1,368.5	1,395.7	1,363.1	5.5	5.6	80.10	-96.9	230.8	47.5	36.6	10.83	4.385		
1,500.0	1,462.8	1,495.5	1,456.5	6.2	6.3	79.54	-109.8	263.4	53.5	41.3	12.17	4.396		
1,600.0	1,557.1	1,595.3	1,550.0	6.9	7.0	79.10	-122.7	296.0	59.5	46.0	13.52	4.403		
1,700.0	1,651.4	1,695.1	1,643.4	7.6	7.8	78.74	-135.6	328.7	65.5	50.7	14.87	4.407		
1,800.0	1,745.7	1,795.0	1,736.9	8.3	8.5	78.44	-148.5	361.3	71.6	55.3	16.23	4.410		
1,900.0	1,840.0	1,894.8	1,830.3	9.0	9.2	78.18	-161.4	393.9	77.6	60.0	17.59	4.411		
2,000.0	1,934.3	1,994.6	1,923.8	9.7	10.0	77.97	-174.3	426.6	83.6	64.7	18.95	4.412		
2,100.0	2,028.6	2,094.4	2,017.2	10.4	10.7	77.78	-187.2	459.2	89.6	69.3	20.32	4.412		
2,200.0	2,122.9	2,194.2	2,110.7	11.1	11.4	77.62	-200.1	491.8	95.7	74.0	21.68	4.412		
2,300.0	2,217.2	2,294.0	2,204.1	11.8	12.2	77.47	-213.0	524.4	101.7	78.7	23.05	4.412		
2,400.0	2,311.5	2,393.9	2,297.5	12.5	12.9	77.34	-225.9	557.1	107.7	83.3	24.42	4.412		
2,500.0	2,405.8	2,493.7	2,391.0	13.2	13.7	77.23	-238.8	589.7	113.8	88.0	25.79	4.411		
2,600.0	2,500.1	2,593.5	2,484.4	13.9	14.4	77.12	-251.7	622.3	119.8	92.6	27.16	4.411		
2,700.0	2,594.4	2,693.3	2,577.9	14.6	15.2	77.03	-264.6	654.9	125.8	97.3	28.53	4.410		
2,800.0	2,688.7	2,793.1	2,671.3	15.3	15.9	76.95	-277.5	687.6	131.9	102.0	29.91	4.410		
2,900.0	2,783.0	2,893.0	2,764.8	16.0	16.7	76.87	-290.4	720.2	137.9	106.6	31.28	4.409		
3,000.0	2,877.3	2,992.8	2,858.2	16.7	17.4	76.80	-303.3	752.8	143.9	111.3	32.65	4.408		
3,100.0	2,971.6	3,092.6	2,951.7	17.4	18.1	76.73	-316.2	785.5	150.0	115.9	34.03	4.408		
3,200.0	3,066.0	3,192.4	3,045.1	18.1	18.9	76.67	-329.1	818.1	156.0	120.6	35.40	4.407		
3,300.0	3,160.3	3,292.2	3,138.6	18.8	19.6	76.62	-342.0	850.7	162.0	125.3	36.77	4.407		
3,400.0	3,254.6	3,392.0	3,232.0	19.5	20.4	76.56	-354.9	883.3	168.1	129.9	38.15	4.406		
3,500.0	3,348.9	3,491.9	3,325.5	20.2	21.1	76.52	-367.8	916.0	174.1	134.6	39.52	4.405		
3,600.0	3,443.2	3,591.7	3,418.9	20.9	21.9	76.47	-380.7	948.6	180.1	139.3	40.90	4.405		
3,700.0	3,537.5	3,691.5	3,512.4	21.6	22.6	76.43	-393.6	981.2	186.2	143.9	42.27	4.404		
3,800.0	3,631.8	3,791.3	3,605.8	22.3	23.4	76.39	-406.5	1,013.8	192.2	148.6	43.65	4.404		
3,900.0	3,726.1	3,891.1	3,699.3	23.0	24.1	76.35	-419.4	1,046.5	198.3	153.2	45.02	4.403		
4,000.0	3,820.4	3,990.9	3,792.7	23.7	24.8	76.32	-432.3	1,079.1	204.3	157.9	46.40	4.403		
4,100.0	3,914.7	4,090.8	3,886.2	24.5	25.6	76.29	-445.3	1,111.7	210.3	162.6	47.77	4.403		
4,200.0	4,009.0	4,190.6	3,979.6	25.2	26.3	76.25	-458.2	1,144.4	216.4	167.2	49.15	4.402		
4,300.0	4,103.3	4,291.4	4,074.1	25.9	27.1	76.28	-471.1	1,177.1	222.3	171.8	50.51	4.401		
4,400.0	4,198.2	4,394.4	4,171.5	26.4	27.6	76.56	-483.4	1,208.1	227.7	176.1	51.63	4.410		
4,500.0	4,294.2	4,497.4	4,270.1	26.9	28.1	76.80	-494.3	1,235.9	232.5	179.9	52.62	4.418		
4,600.0	4,391.1	4,600.5	4,369.8	27.3	28.6	77.01	-504.0	1,260.3	236.7	183.2	53.51	4.424		
4,700.0	4,488.8	4,703.7	4,470.5	27.7	29.0	77.18	-512.4	1,281.4	240.4	186.1	54.28	4.428		
4,800.0	4,587.2	4,806.9	4,571.9	28.0	29.3	77.32	-519.4	1,299.1	243.4	188.5	54.94	4.431		
4,900.0	4,686.2	4,910.2	4,674.0	28.2	29.6	77.44	-525.0	1,313.5	245.9	190.4	55.50	4.431		
5,000.0	4,785.5	5,013.5	4,776.7	28.5	29.8	77.52	-529.3	1,324.3	247.8	191.9	55.95	4.429		
5,100.0	4,885.3	5,116.9	4,879.7	28.6	30.0	77.58	-532.3	1,331.8	249.1	192.8	56.29	4.425		

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 28-08M
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 28-08M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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
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		
5,200.0	4,985.2	5,220.3	4,983.0	28.7	30.1	77.61	-533.9	1,335.8	249.8	193.2	56.54	4.418		
5,300.0	5,085.2	5,322.4	5,085.2	28.8	30.2	179.64	-534.1	1,336.5	249.9	193.2	56.71	4.407		
5,400.0	5,185.2	5,422.4	5,185.2	28.9	30.3	179.64	-534.1	1,336.5	249.9	193.0	56.87	4.394		
5,500.0	5,285.2	5,522.4	5,285.2	29.0	30.4	179.64	-534.1	1,336.5	249.9	192.9	57.03	4.382		
5,600.0	5,385.2	5,622.4	5,385.2	29.1	30.4	179.64	-534.1	1,336.5	249.9	192.7	57.20	4.369		
5,700.0	5,485.2	5,722.4	5,485.2	29.2	30.5	179.64	-534.1	1,336.5	249.9	192.5	57.38	4.355		
5,800.0	5,585.2	5,822.4	5,585.2	29.2	30.6	179.64	-534.1	1,336.5	249.9	192.3	57.55	4.342		
5,900.0	5,685.2	5,922.4	5,685.2	29.3	30.7	179.64	-534.1	1,336.5	249.9	192.2	57.73	4.329		
6,000.0	5,785.2	6,022.4	5,785.2	29.4	30.8	179.64	-534.1	1,336.5	249.9	192.0	57.91	4.315		
6,100.0	5,885.2	6,122.4	5,885.2	29.5	30.8	179.64	-534.1	1,336.5	249.9	191.8	58.09	4.302		
6,200.0	5,985.2	6,222.4	5,985.2	29.6	30.9	179.64	-534.1	1,336.5	249.9	191.6	58.28	4.288		
6,300.0	6,085.2	6,322.4	6,085.2	29.7	31.0	179.64	-534.1	1,336.5	249.9	191.4	58.47	4.274		
6,400.0	6,185.2	6,422.4	6,185.2	29.8	31.1	179.64	-534.1	1,336.5	249.9	191.2	58.66	4.260		
6,500.0	6,285.2	6,522.4	6,285.2	29.9	31.2	179.64	-534.1	1,336.5	249.9	191.0	58.86	4.246		
6,600.0	6,385.2	6,622.4	6,385.2	30.0	31.3	179.64	-534.1	1,336.5	249.9	190.8	59.06	4.231		
6,700.0	6,485.2	6,722.4	6,485.2	30.1	31.4	179.64	-534.1	1,336.5	249.9	190.6	59.26	4.217		
6,800.0	6,585.2	6,822.4	6,585.2	30.2	31.5	179.64	-534.1	1,336.5	249.9	190.4	59.46	4.203		
6,900.0	6,685.2	6,922.4	6,685.2	30.3	31.6	179.64	-534.1	1,336.5	249.9	190.2	59.67	4.188		
7,000.0	6,785.2	7,022.4	6,785.2	30.4	31.7	179.64	-534.1	1,336.5	249.9	190.0	59.88	4.173		
7,100.0	6,885.2	7,122.4	6,885.2	30.5	31.8	179.64	-534.1	1,336.5	249.9	189.8	60.09	4.159		
7,200.0	6,985.2	7,222.4	6,985.2	30.6	31.9	179.64	-534.1	1,336.5	249.9	189.6	60.30	4.144		
7,300.0	7,085.2	7,322.4	7,085.2	30.7	32.0	179.64	-534.1	1,336.5	249.9	189.4	60.52	4.129		
7,400.0	7,185.2	7,422.4	7,185.2	30.8	32.1	179.64	-534.1	1,336.5	249.9	189.2	60.74	4.114		
7,500.0	7,285.2	7,522.4	7,285.2	30.9	32.2	179.64	-534.1	1,336.5	249.9	188.9	60.96	4.099		
7,600.0	7,385.2	7,622.4	7,385.2	31.0	32.3	179.64	-534.1	1,336.5	249.9	188.7	61.19	4.084		
7,700.0	7,485.2	7,722.4	7,485.2	31.2	32.4	179.64	-534.1	1,336.5	249.9	188.5	61.41	4.069		
7,800.0	7,585.2	7,822.4	7,585.2	31.3	32.5	179.64	-534.1	1,336.5	249.9	188.3	61.64	4.054		
7,900.0	7,685.2	7,922.4	7,685.2	31.4	32.6	179.64	-534.1	1,336.5	249.9	188.0	61.88	4.039		
8,000.0	7,785.2	8,022.4	7,785.2	31.5	32.7	179.64	-534.1	1,336.5	249.9	187.8	62.11	4.024		
8,064.1	7,849.3	8,086.5	7,849.3	31.6	32.8	179.64	-534.1	1,336.5	249.9	187.6	62.26	4.014		
8,100.0	7,885.2	8,115.3	7,878.0	31.6	32.8	179.64	-534.1	1,336.5	250.0	187.7	62.34	4.010 SF		
8,100.8	7,886.0	8,115.3	7,878.0	31.6	32.8	179.64	-534.1	1,336.5	250.0	187.7	62.34	4.011		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-08M
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 28-08M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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
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	-66.00	9.1	-20.5	22.4					
100.0	100.0	100.0	100.0	0.1	0.1	-66.00	9.1	-20.5	22.4	22.2	0.18	127.696 CC		
200.0	200.0	199.8	199.8	0.3	0.3	-70.32	7.7	-21.4	22.8	22.1	0.61	37.202 ES		
300.0	300.0	299.3	299.2	0.5	0.5	176.11	3.4	-24.3	26.3	25.2	1.09	24.134		
400.0	399.8	398.1	397.5	0.7	0.8	164.23	-3.7	-29.1	36.1	34.5	1.62	22.292 SF		
500.0	499.5	495.6	494.3	1.0	1.1	156.28	-13.5	-35.7	52.3	50.1	2.17	24.160		
600.0	598.7	593.3	591.1	1.3	1.4	152.40	-24.6	-43.2	73.3	70.6	2.71	27.014		
700.0	697.5	690.3	687.2	1.6	1.7	151.15	-35.7	-50.6	97.5	94.2	3.27	29.799		
800.0	795.6	786.5	782.5	2.0	2.1	151.09	-46.7	-58.0	124.6	120.8	3.85	32.390		
900.0	893.1	881.9	877.0	2.4	2.4	151.57	-57.5	-65.4	154.7	150.2	4.44	34.837		
1,000.0	989.6	976.2	970.4	3.0	2.7	152.29	-68.3	-72.6	187.7	182.6	5.05	37.187		
1,100.0	1,085.3	1,069.4	1,062.7	3.5	3.0	153.11	-78.9	-79.8	223.7	218.0	5.67	39.480		
1,200.0	1,179.9	1,161.5	1,153.9	4.2	3.3	154.04	-89.4	-86.8	262.5	256.2	6.29	41.753		
1,300.0	1,274.2	1,253.2	1,244.7	4.8	3.7	155.00	-99.9	-93.9	302.2	295.3	6.88	43.891		
1,400.0	1,368.5	1,344.9	1,335.5	5.5	4.0	155.74	-110.3	-100.9	341.9	334.4	7.49	45.642		
1,500.0	1,462.8	1,436.6	1,426.4	6.2	4.3	156.33	-120.8	-108.0	381.6	373.5	8.10	47.100		
1,600.0	1,557.1	1,528.3	1,517.2	6.9	4.6	156.80	-131.2	-115.0	421.4	412.7	8.72	48.329		
1,700.0	1,651.4	1,620.0	1,608.0	7.6	4.9	157.20	-141.7	-122.1	461.2	451.8	9.34	49.375		
1,800.0	1,745.7	1,711.7	1,698.9	8.3	5.2	157.53	-152.1	-129.1	501.0	491.0	9.96	50.275		
1,900.0	1,840.0	1,803.4	1,789.7	9.0	5.6	157.81	-162.6	-136.1	540.8	530.2	10.59	51.057		
2,000.0	1,934.3	1,895.1	1,880.5	9.7	5.9	158.05	-173.0	-143.2	580.6	569.4	11.22	51.741		
2,100.0	2,028.6	1,986.8	1,971.3	10.4	6.2	158.27	-183.5	-150.2	620.5	608.6	11.85	52.343		
2,200.0	2,122.9	2,078.5	2,062.2	11.1	6.5	158.45	-193.9	-157.3	660.3	647.8	12.49	52.878		
2,300.0	2,217.2	2,170.2	2,153.0	11.8	6.8	158.62	-204.4	-164.3	700.2	687.0	13.12	53.356		
2,400.0	2,311.5	2,261.9	2,243.8	12.5	7.1	158.77	-214.8	-171.4	740.0	726.3	13.76	53.785		
2,500.0	2,405.8	2,353.6	2,334.7	13.2	7.5	158.90	-225.3	-178.4	779.9	765.5	14.40	54.172		
2,600.0	2,500.1	2,445.3	2,425.5	13.9	7.8	159.02	-235.7	-185.5	819.7	804.7	15.03	54.522		
2,700.0	2,594.4	2,537.0	2,516.3	14.6	8.1	159.13	-246.2	-192.5	859.6	843.9	15.67	54.842		
2,800.0	2,688.7	2,628.7	2,607.2	15.3	8.4	159.23	-256.6	-199.5	899.5	883.1	16.31	55.134		
2,900.0	2,783.0	2,720.4	2,698.0	16.0	8.7	159.32	-267.1	-206.6	939.3	922.4	16.95	55.401		
3,000.0	2,877.3	2,812.1	2,788.8	16.7	9.0	159.40	-277.5	-213.6	979.2	961.6	17.60	55.648		

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 28-08M
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 28-08M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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
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	-173.66	-14.2	-1.6	14.3					
100.0	100.0	100.0	100.0	0.1	0.1	-173.66	-14.2	-1.6	14.3	14.1	0.18	81.288 CC, ES		
200.0	200.0	199.8	199.7	0.3	0.3	-179.74	-15.0	-0.1	15.0	14.4	0.61	24.489		
300.0	300.0	299.4	299.2	0.5	0.5	68.91	-17.6	4.4	17.5	16.4	1.06	16.571		
400.0	399.8	398.8	398.3	0.7	0.8	63.78	-21.9	11.9	21.2	19.6	1.53	13.836		
500.0	499.5	498.2	496.9	1.0	1.1	61.68	-27.9	22.4	25.8	23.7	2.05	12.587		
600.0	598.7	597.3	594.8	1.3	1.4	61.45	-35.6	35.8	31.2	28.6	2.62	11.920		
700.0	697.5	696.2	692.0	1.6	1.8	62.27	-45.0	52.0	37.5	34.3	3.27	11.494		
800.0	795.6	795.0	788.2	2.0	2.3	63.65	-56.0	71.2	44.7	40.7	4.00	11.163		
900.0	893.1	893.5	883.4	2.4	2.8	65.27	-68.6	93.1	52.7	47.9	4.85	10.868		
1,000.0	989.6	991.8	977.5	3.0	3.4	66.97	-82.8	117.8	61.6	55.8	5.82	10.587		
1,100.0	1,085.3	1,089.9	1,070.3	3.5	4.0	68.64	-98.6	145.2	71.4	64.5	6.92	10.317		
1,200.0	1,179.9	1,187.7	1,161.7	4.2	4.7	70.20	-115.9	175.3	82.2	74.0	8.16	10.072		
1,300.0	1,274.2	1,286.9	1,253.8	4.8	5.5	71.07	-134.3	207.4	93.9	84.4	9.46	9.926		
1,400.0	1,368.5	1,386.2	1,345.9	5.5	6.2	71.74	-152.8	239.5	105.5	94.8	10.78	9.794		
1,500.0	1,462.8	1,485.5	1,438.0	6.2	7.0	72.28	-171.2	271.6	117.2	105.1	12.11	9.681		
1,600.0	1,557.1	1,584.8	1,530.2	6.9	7.8	72.72	-189.7	303.7	129.0	115.5	13.46	9.582		
1,700.0	1,651.4	1,684.1	1,622.3	7.6	8.6	73.09	-208.2	335.8	140.7	125.9	14.81	9.497		
1,800.0	1,745.7	1,783.4	1,714.5	8.3	9.3	73.40	-226.6	367.9	152.4	136.2	16.17	9.423		
1,900.0	1,840.0	1,882.7	1,806.6	9.0	10.1	73.67	-245.1	400.0	164.1	146.6	17.54	9.359		
2,000.0	1,934.3	1,982.0	1,898.7	9.7	10.9	73.90	-263.6	432.2	175.8	156.9	18.90	9.302		
2,100.0	2,028.6	2,081.3	1,990.9	10.4	11.7	74.10	-282.0	464.3	187.6	167.3	20.27	9.251		
2,200.0	2,122.9	2,180.6	2,083.0	11.1	12.5	74.28	-300.5	496.4	199.3	177.7	21.65	9.207		
2,300.0	2,217.2	2,279.9	2,175.2	11.8	13.3	74.44	-319.0	528.5	211.0	188.0	23.02	9.166		
2,400.0	2,311.5	2,379.3	2,267.3	12.5	14.0	74.58	-337.4	560.6	222.8	198.4	24.40	9.130		
2,500.0	2,405.8	2,478.6	2,359.4	13.2	14.8	74.71	-355.9	592.7	234.5	208.7	25.78	9.097		
2,600.0	2,500.1	2,577.9	2,451.6	13.9	15.6	74.83	-374.4	624.8	246.2	219.1	27.16	9.068		
2,700.0	2,594.4	2,677.2	2,543.7	14.6	16.4	74.93	-392.8	657.0	258.0	229.4	28.54	9.040		
2,800.0	2,688.7	2,776.5	2,635.9	15.3	17.2	75.03	-411.3	689.1	269.7	239.8	29.92	9.016		
2,900.0	2,783.0	2,875.8	2,728.0	16.0	18.0	75.12	-429.8	721.2	281.5	250.2	31.30	8.993		
3,000.0	2,877.3	2,975.1	2,820.1	16.7	18.8	75.20	-448.2	753.3	293.2	260.5	32.68	8.972		
3,100.0	2,971.6	3,074.4	2,912.3	17.4	19.5	75.27	-466.7	785.4	304.9	270.9	34.06	8.952		
3,200.0	3,066.0	3,173.7	3,004.4	18.1	20.3	75.34	-485.2	817.5	316.7	281.2	35.45	8.934		
3,300.0	3,160.3	3,273.0	3,096.6	18.8	21.1	75.41	-503.6	849.6	328.4	291.6	36.83	8.917		
3,400.0	3,254.6	3,372.3	3,188.7	19.5	21.9	75.47	-522.1	881.8	340.2	302.0	38.21	8.902		
3,500.0	3,348.9	3,471.6	3,280.8	20.2	22.7	75.52	-540.6	913.9	351.9	312.3	39.60	8.887		
3,600.0	3,443.2	3,570.9	3,373.0	20.9	23.5	75.57	-559.0	946.0	363.7	322.7	40.98	8.873		
3,700.0	3,537.5	3,670.2	3,465.1	21.6	24.3	75.62	-577.5	978.1	375.4	333.0	42.37	8.860		
3,800.0	3,631.8	3,769.6	3,557.2	22.3	25.1	75.67	-596.0	1,010.2	387.1	343.4	43.75	8.848		
3,900.0	3,726.1	3,868.9	3,649.4	23.0	25.9	75.71	-614.4	1,042.3	398.9	353.7	45.14	8.837		
4,000.0	3,820.4	3,968.2	3,741.5	23.7	26.6	75.75	-632.9	1,074.4	410.6	364.1	46.52	8.826		
4,100.0	3,914.7	4,067.5	3,833.7	24.5	27.4	75.79	-651.4	1,106.6	422.4	374.5	47.91	8.816		
4,200.0	4,009.0	4,166.8	3,925.8	25.2	28.2	75.83	-669.8	1,138.7	434.1	384.8	49.29	8.807		
4,300.0	4,103.3	4,269.5	4,021.2	25.9	29.0	75.91	-688.8	1,171.6	445.7	395.0	50.68	8.795		
4,400.0	4,198.2	4,377.7	4,122.9	26.4	29.6	76.29	-707.2	1,203.6	456.2	404.3	51.86	8.797		
4,500.0	4,294.2	4,486.1	4,226.1	26.9	30.2	76.61	-723.7	1,232.4	465.6	412.7	52.91	8.800		
4,600.0	4,391.1	4,594.8	4,330.8	27.3	30.7	76.89	-738.3	1,257.8	473.9	420.1	53.85	8.801		
4,700.0	4,488.8	4,703.7	4,436.7	27.7	31.1	77.12	-750.9	1,279.7	481.1	426.4	54.66	8.801		
4,800.0	4,587.2	4,812.9	4,543.8	28.0	31.5	77.31	-761.6	1,298.2	487.1	431.7	55.36	8.799		
4,900.0	4,686.2	4,922.2	4,651.7	28.2	31.8	77.46	-770.2	1,313.2	492.0	436.0	55.94	8.795		
5,000.0	4,785.5	5,031.6	4,760.3	28.5	32.0	77.58	-776.7	1,324.6	495.7	439.3	56.41	8.787		
5,100.0	4,885.3	5,141.1	4,869.5	28.6	32.2	77.66	-781.2	1,332.4	498.2	441.4	56.77	8.776		

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 28-08M
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 28-08M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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
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		
5,200.0	4,985.2	5,250.7	4,978.9	28.7	32.4	77.70	-783.6	1,336.5	499.5	442.5	57.02	8.761		
5,300.0	5,085.2	5,356.9	5,085.2	28.8	32.4	179.73	-784.0	1,337.3	499.8	442.6	57.19	8.739		
5,400.0	5,185.2	5,456.9	5,185.2	28.9	32.5	179.73	-784.0	1,337.3	499.8	442.4	57.35	8.715		
5,500.0	5,285.2	5,556.9	5,285.2	29.0	32.6	179.73	-784.0	1,337.3	499.8	442.3	57.51	8.690		
5,600.0	5,385.2	5,656.9	5,385.2	29.1	32.7	179.73	-784.0	1,337.3	499.8	442.1	57.68	8.665		
5,700.0	5,485.2	5,756.9	5,485.2	29.2	32.7	179.73	-784.0	1,337.3	499.8	441.9	57.85	8.640		
5,800.0	5,585.2	5,856.9	5,585.2	29.2	32.8	179.73	-784.0	1,337.3	499.8	441.8	58.02	8.614		
5,900.0	5,685.2	5,956.9	5,685.2	29.3	32.9	179.73	-784.0	1,337.3	499.8	441.6	58.20	8.588		
6,000.0	5,785.2	6,056.9	5,785.2	29.4	33.0	179.73	-784.0	1,337.3	499.8	441.4	58.37	8.562		
6,100.0	5,885.2	6,156.9	5,885.2	29.5	33.0	179.73	-784.0	1,337.3	499.8	441.2	58.55	8.536		
6,200.0	5,985.2	6,256.9	5,985.2	29.6	33.1	179.73	-784.0	1,337.3	499.8	441.1	58.74	8.509		
6,300.0	6,085.2	6,356.9	6,085.2	29.7	33.2	179.73	-784.0	1,337.3	499.8	440.9	58.92	8.482		
6,400.0	6,185.2	6,456.9	6,185.2	29.8	33.3	179.73	-784.0	1,337.3	499.8	440.7	59.11	8.455		
6,500.0	6,285.2	6,556.9	6,285.2	29.9	33.4	179.73	-784.0	1,337.3	499.8	440.5	59.31	8.427		
6,600.0	6,385.2	6,656.9	6,385.2	30.0	33.4	179.73	-784.0	1,337.3	499.8	440.3	59.50	8.400		
6,700.0	6,485.2	6,756.9	6,485.2	30.1	33.5	179.73	-784.0	1,337.3	499.8	440.1	59.70	8.372		
6,800.0	6,585.2	6,856.9	6,585.2	30.2	33.6	179.73	-784.0	1,337.3	499.8	439.9	59.90	8.344		
6,900.0	6,685.2	6,956.9	6,685.2	30.3	33.7	179.73	-784.0	1,337.3	499.8	439.7	60.10	8.316		
7,000.0	6,785.2	7,056.9	6,785.2	30.4	33.8	179.73	-784.0	1,337.3	499.8	439.5	60.31	8.287		
7,100.0	6,885.2	7,156.9	6,885.2	30.5	33.9	179.73	-784.0	1,337.3	499.8	439.3	60.52	8.259		
7,200.0	6,985.2	7,256.9	6,985.2	30.6	34.0	179.73	-784.0	1,337.3	499.8	439.1	60.73	8.230		
7,300.0	7,085.2	7,356.9	7,085.2	30.7	34.1	179.73	-784.0	1,337.3	499.8	438.8	60.94	8.201		
7,400.0	7,185.2	7,456.9	7,185.2	30.8	34.2	179.73	-784.0	1,337.3	499.8	438.6	61.16	8.172		
7,500.0	7,285.2	7,556.9	7,285.2	30.9	34.3	179.73	-784.0	1,337.3	499.8	438.4	61.38	8.143		
7,600.0	7,385.2	7,656.9	7,385.2	31.0	34.4	179.73	-784.0	1,337.3	499.8	438.2	61.60	8.114		
7,700.0	7,485.2	7,756.9	7,485.2	31.2	34.5	179.73	-784.0	1,337.3	499.8	438.0	61.82	8.084		
7,800.0	7,585.2	7,856.9	7,585.2	31.3	34.6	179.73	-784.0	1,337.3	499.8	437.7	62.05	8.055		
7,900.0	7,685.2	7,956.9	7,685.2	31.4	34.7	179.73	-784.0	1,337.3	499.8	437.5	62.28	8.025		
8,000.0	7,785.2	8,056.9	7,785.2	31.5	34.8	179.73	-784.0	1,337.3	499.8	437.3	62.51	7.996		
8,060.7	7,845.9	8,117.7	7,845.9	31.6	34.8	179.73	-784.0	1,337.3	499.8	437.1	62.65	7.978		
8,100.0	7,885.2	8,141.8	7,870.0	31.6	34.9	179.73	-784.0	1,337.3	500.0	437.3	62.72	7.972 SF		
8,100.8	7,886.0	8,141.8	7,870.0	31.6	34.9	179.73	-784.0	1,337.3	500.0	437.3	62.73	7.972		



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-08M
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 28-08M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-9	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

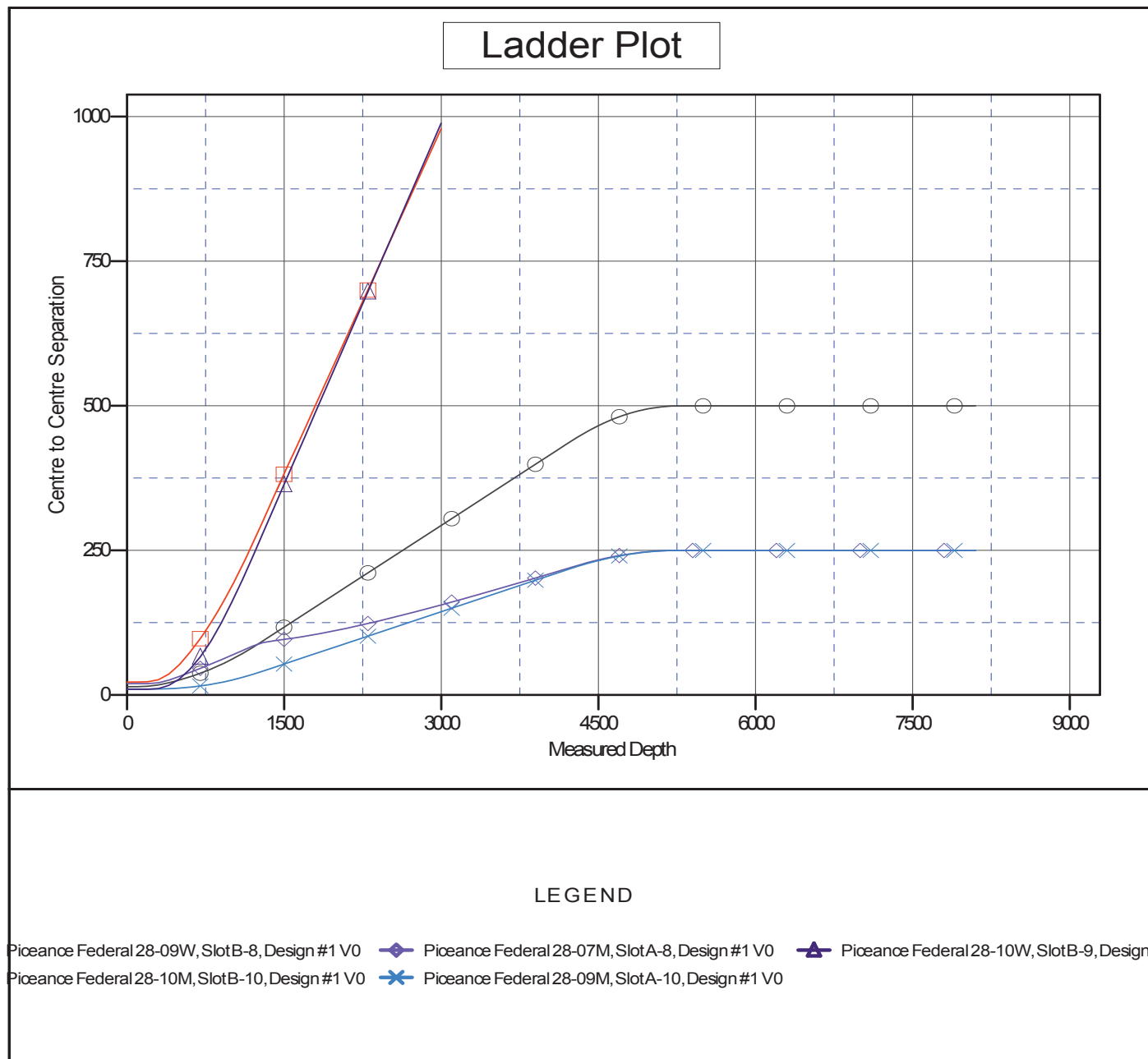
Offset Design Piceance 28-05 - Piceance Federal 28-10W - Slot B-9 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside 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	-127.66	-6.1	-7.9	9.9					
100.0	100.0	100.0	100.0	0.1	0.1	-127.66	-6.1	-7.9	9.9	9.8	0.18	56.674		
200.0	200.0	200.0	200.0	0.3	0.3	-127.66	-6.1	-7.9	9.9	9.3	0.62	15.901 CC, ES		
300.0	300.0	300.0	300.0	0.5	0.5	137.16	-6.1	-7.9	11.1	10.1	1.08	10.314 SF		
400.0	399.8	399.4	399.4	0.7	0.7	146.07	-7.6	-8.6	16.6	15.1	1.55	10.747		
500.0	499.5	498.3	498.1	1.0	0.9	148.75	-12.3	-10.8	27.7	25.7	2.04	13.603		
600.0	598.7	596.0	595.5	1.3	1.2	148.84	-19.8	-14.5	44.2	41.6	2.56	17.261		
700.0	697.5	692.4	691.1	1.6	1.4	148.22	-30.3	-19.5	65.9	62.8	3.11	21.175		
800.0	795.6	786.8	784.5	2.0	1.7	147.46	-43.3	-25.7	92.7	89.0	3.70	25.081		
900.0	893.1	879.4	875.5	2.4	2.1	146.70	-58.7	-33.1	124.6	120.3	4.32	28.825		
1,000.0	989.6	972.9	967.1	3.0	2.4	146.45	-75.3	-41.1	160.1	155.1	4.97	32.190		
1,100.0	1,085.3	1,065.3	1,057.7	3.5	2.8	146.71	-91.8	-49.0	198.3	192.7	5.65	35.125		
1,200.0	1,179.9	1,156.5	1,147.1	4.2	3.2	147.31	-108.0	-56.8	239.1	232.8	6.33	37.777		
1,300.0	1,274.2	1,247.4	1,236.2	4.8	3.6	148.09	-124.2	-64.6	280.7	273.7	7.00	40.081		
1,400.0	1,368.5	1,338.3	1,325.3	5.5	3.9	148.67	-140.4	-72.3	322.3	314.6	7.69	41.886		
1,500.0	1,462.8	1,429.2	1,414.4	6.2	4.3	149.12	-156.6	-80.1	363.9	355.5	8.39	43.359		
1,600.0	1,557.1	1,520.1	1,503.6	6.9	4.7	149.48	-172.7	-87.9	405.5	396.4	9.10	44.563		
1,700.0	1,651.4	1,611.0	1,592.7	7.6	5.1	149.77	-188.9	-95.6	447.1	437.3	9.81	45.562		
1,800.0	1,745.7	1,701.9	1,681.8	8.3	5.5	150.01	-205.1	-103.4	488.8	478.2	10.53	46.402		
1,900.0	1,840.0	1,792.8	1,770.9	9.0	5.9	150.21	-221.3	-111.2	530.4	519.2	11.26	47.115		
2,000.0	1,934.3	1,883.7	1,860.0	9.7	6.3	150.38	-237.5	-118.9	572.1	560.1	11.99	47.728		
2,100.0	2,028.6	1,974.6	1,949.1	10.4	6.7	150.53	-253.7	-126.7	613.7	601.0	12.72	48.259		
2,200.0	2,122.9	2,065.5	2,038.2	11.1	7.1	150.66	-269.8	-134.5	655.4	641.9	13.45	48.724		
2,300.0	2,217.2	2,156.4	2,127.3	11.8	7.5	150.78	-286.0	-142.2	697.0	682.8	14.19	49.133		
2,400.0	2,311.5	2,247.3	2,216.4	12.5	7.9	150.88	-302.2	-150.0	738.7	723.8	14.92	49.495		
2,500.0	2,405.8	2,338.2	2,305.6	13.2	8.3	150.97	-318.4	-157.8	780.4	764.7	15.66	49.819		
2,600.0	2,500.1	2,429.1	2,394.7	13.9	8.6	151.05	-334.6	-165.5	822.0	805.6	16.40	50.109		
2,700.0	2,594.4	2,520.0	2,483.8	14.6	9.0	151.13	-350.7	-173.3	863.7	846.5	17.15	50.370		
2,800.0	2,688.7	2,610.9	2,572.9	15.3	9.4	151.19	-366.9	-181.1	905.4	887.5	17.89	50.607		
2,900.0	2,783.0	2,701.8	2,662.0	16.0	9.8	151.25	-383.1	-188.8	947.0	928.4	18.63	50.823		
3,000.0	2,877.3	2,792.7	2,751.1	16.7	10.2	151.31	-399.3	-196.6	988.7	969.3	19.38	51.019		



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-08M
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 28-08M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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 28-08M
Coordinate System is US State Plane 1983, Colorado Central Zone
Grid Convergence at Surface is: -1.44°





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