



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance Federal 28-03M

Slot B-5

Plan: Design #1

Standard Planning Report

28 April, 2015

Archer



Project: Mesa County, CO
Site: Piceance 28-05
Well: Piceance Federal 28-03M
Wellbore: Slot B-5
Design: Design #1
Latitude: 39° 15' 3.760 N
Longitude: 107° 46' 46.330 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 Federal 28-03M, 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 Federal 28-03M

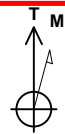
+N/-S	+E/-W	Northing	Ground Level:	Latitude	Longitude	Slot
0.0	0.0	1524425.63	7556.0 Easting 2354542.85	39° 15' 3.760 N	107° 46' 46.330 W	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance Federal 28-03M tgt	7913.0	924.8	1422.9	1525314.39	2355988.55	39° 15' 12.900 N	107° 46' 28.240 W	Circle (Radius: 50.0)

SECTION DETAILS

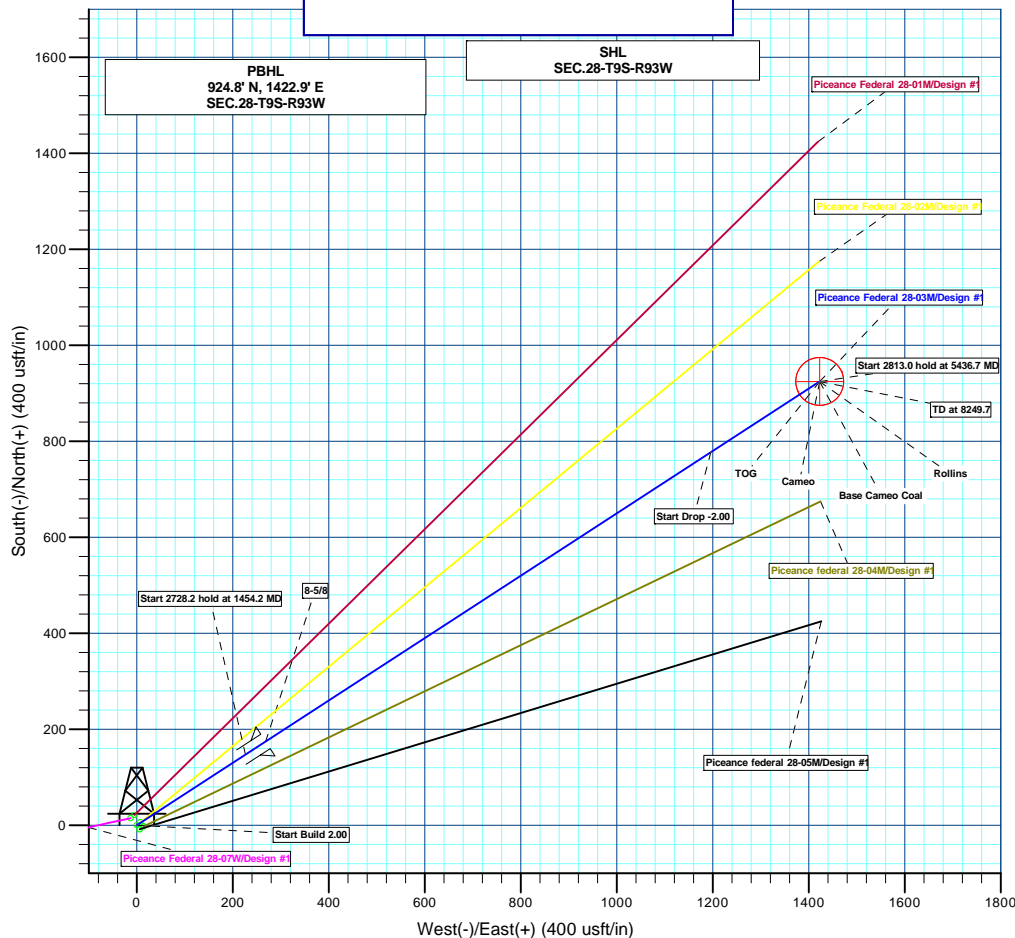
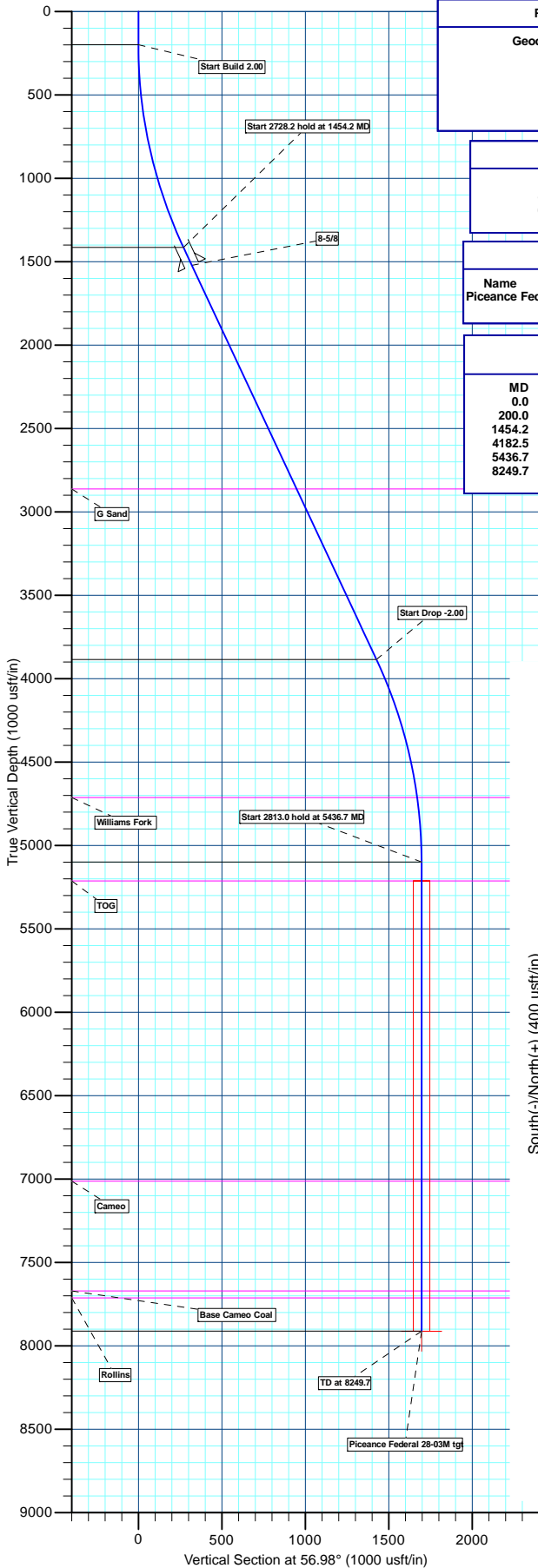
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
1454.2	25.08	56.98	1414.5	147.2	226.6	2.00	56.98	270.2	Start 2728.2 hold at 1454.2 MD
4182.5	25.08	56.98	3885.5	777.5	1196.4	0.00	0.00	1426.8	Start Drop -2.00
5436.7	0.00	0.00	5100.0	924.8	1422.9	2.00	180.00	1697.0	Start 2813.0 hold at 5436.7 MD
8249.7	0.00	0.00	7913.0	924.8	1422.9	0.00	0.00	1697.0	TD at 8249.7



Azimuths to True North
Magnetic North: 9.72°
Magnetic Field
Strength: 51741.9snT
Dip Angle: 65.47°
Date: 04/27/2015
Model: IGRF2010

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2863.0	3053.5	G Sand
4713.0	5048.5	Williams Fork
5213.0	5549.7	TOG
7013.0	7349.7	Cameo
7671.0	8007.7	Base Cameo Coal
7713.0	8049.7	Rollins



Plan: Design #1 (Piceance Federal 28-03M/Slot B-5)

Created By: Ricky Osburn Date: 11:14, April 28 2015



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-03M
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 Federal 28-03M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-5		
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 Federal 28-03M					
Well Position	+N/-S	48.6 usft	Northing:	1,524,425.63 usft	Latitude:	39° 15' 3.760 N
	+E/-W	-51.9 usft	Easting:	2,354,542.85 usft	Longitude:	107° 46' 46.330 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,556.0 usft

Wellbore	Slot B-5				
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	56.98

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	
1,454.2	25.08	56.98	1,414.5	147.2	226.6	2.00	2.00	0.00	56.98	
4,182.5	25.08	56.98	3,885.5	777.5	1,196.4	0.00	0.00	0.00	0.00	
5,436.7	0.00	0.00	5,100.0	924.8	1,422.9	2.00	-2.00	0.00	180.00	
8,249.7	0.00	0.00	7,913.0	924.8	1,422.9	0.00	0.00	0.00	0.00	Piceance Federal 28-



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-03M
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 Federal 28-03M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-5		
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	56.98	300.0	1.0	1.5	1.7	2.00	2.00	0.00
400.0	4.00	56.98	399.8	3.8	5.9	7.0	2.00	2.00	0.00
500.0	6.00	56.98	499.5	8.6	13.2	15.7	2.00	2.00	0.00
600.0	8.00	56.98	598.7	15.2	23.4	27.9	2.00	2.00	0.00
700.0	10.00	56.98	697.5	23.7	36.5	43.5	2.00	2.00	0.00
800.0	12.00	56.98	795.6	34.1	52.5	62.6	2.00	2.00	0.00
900.0	14.00	56.98	893.1	46.4	71.4	85.1	2.00	2.00	0.00
1,000.0	16.00	56.98	989.6	60.5	93.1	111.0	2.00	2.00	0.00
1,100.0	18.00	56.98	1,085.3	76.4	117.6	140.2	2.00	2.00	0.00
1,200.0	20.00	56.98	1,179.8	94.1	144.9	172.8	2.00	2.00	0.00
1,300.0	22.00	56.98	1,273.2	113.7	174.9	208.6	2.00	2.00	0.00
1,400.0	24.00	56.98	1,365.2	135.0	207.7	247.7	2.00	2.00	0.00
Start 2728.2 hold at 1454.2 MD									
1,454.2	25.08	56.98	1,414.5	147.2	226.6	270.2	2.00	2.00	0.00
1,500.0	25.08	56.98	1,456.0	157.8	242.8	289.6	0.00	0.00	0.00
8-5/8									
1,572.9	25.08	56.98	1,522.0	174.6	268.7	320.5	0.00	0.00	0.00
1,600.0	25.08	56.98	1,546.6	180.9	278.4	332.0	0.00	0.00	0.00
1,700.0	25.08	56.98	1,637.1	204.0	313.9	374.4	0.00	0.00	0.00
1,800.0	25.08	56.98	1,727.7	227.1	349.5	416.8	0.00	0.00	0.00
1,900.0	25.08	56.98	1,818.3	250.2	385.0	459.2	0.00	0.00	0.00
2,000.0	25.08	56.98	1,908.8	273.3	420.6	501.6	0.00	0.00	0.00
2,100.0	25.08	56.98	1,999.4	296.4	456.1	544.0	0.00	0.00	0.00
2,200.0	25.08	56.98	2,090.0	319.5	491.7	586.4	0.00	0.00	0.00
2,300.0	25.08	56.98	2,180.5	342.6	527.2	628.8	0.00	0.00	0.00
2,400.0	25.08	56.98	2,271.1	365.7	562.8	671.2	0.00	0.00	0.00
2,500.0	25.08	56.98	2,361.7	388.8	598.3	713.6	0.00	0.00	0.00
2,600.0	25.08	56.98	2,452.3	411.9	633.9	756.0	0.00	0.00	0.00
2,700.0	25.08	56.98	2,542.8	435.0	669.4	798.3	0.00	0.00	0.00
2,800.0	25.08	56.98	2,633.4	458.1	705.0	840.7	0.00	0.00	0.00
2,900.0	25.08	56.98	2,724.0	481.2	740.5	883.1	0.00	0.00	0.00
3,000.0	25.08	56.98	2,814.5	504.3	776.0	925.5	0.00	0.00	0.00
G Sand									
3,053.5	25.08	56.98	2,863.0	516.7	795.1	948.2	0.00	0.00	0.00
3,100.0	25.08	56.98	2,905.1	527.4	811.6	967.9	0.00	0.00	0.00
3,200.0	25.08	56.98	2,995.7	550.5	847.1	1,010.3	0.00	0.00	0.00
3,300.0	25.08	56.98	3,086.2	573.7	882.7	1,052.7	0.00	0.00	0.00
3,400.0	25.08	56.98	3,176.8	596.8	918.2	1,095.1	0.00	0.00	0.00
3,500.0	25.08	56.98	3,267.4	619.9	953.8	1,137.5	0.00	0.00	0.00
3,600.0	25.08	56.98	3,357.9	643.0	989.3	1,179.9	0.00	0.00	0.00
3,700.0	25.08	56.98	3,448.5	666.1	1,024.9	1,222.3	0.00	0.00	0.00
3,800.0	25.08	56.98	3,539.1	689.2	1,060.4	1,264.7	0.00	0.00	0.00
3,900.0	25.08	56.98	3,629.6	712.3	1,096.0	1,307.1	0.00	0.00	0.00
4,000.0	25.08	56.98	3,720.2	735.4	1,131.5	1,349.5	0.00	0.00	0.00
4,100.0	25.08	56.98	3,810.8	758.5	1,167.1	1,391.9	0.00	0.00	0.00
Start Drop -2.00									
4,182.5	25.08	56.98	3,885.5	777.5	1,196.4	1,426.8	0.00	0.00	0.00
4,200.0	24.73	56.98	3,901.4	781.5	1,202.6	1,434.2	2.00	-2.00	0.00
4,300.0	22.73	56.98	3,992.9	803.5	1,236.3	1,474.5	2.00	-2.00	0.00
4,400.0	20.73	56.98	4,085.8	823.7	1,267.4	1,511.5	2.00	-2.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-03M
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 Federal 28-03M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-5		
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	18.73	56.98	4,179.9	842.1	1,295.7	1,545.3	2.00	-2.00	0.00
4,600.0	16.73	56.98	4,275.2	858.6	1,321.2	1,575.7	2.00	-2.00	0.00
4,700.0	14.73	56.98	4,371.4	873.4	1,344.0	1,602.8	2.00	-2.00	0.00
4,800.0	12.73	56.98	4,468.5	886.4	1,363.9	1,626.6	2.00	-2.00	0.00
4,900.0	10.73	56.98	4,566.4	897.4	1,380.9	1,646.9	2.00	-2.00	0.00
5,000.0	8.73	56.98	4,665.0	906.7	1,395.1	1,663.8	2.00	-2.00	0.00
Williams Fork									
5,048.5	7.76	56.98	4,713.0	910.4	1,400.9	1,670.8	2.00	-2.00	0.00
5,100.0	6.73	56.98	4,764.1	914.0	1,406.4	1,677.3	2.00	-2.00	0.00
5,200.0	4.73	56.98	4,863.6	919.4	1,414.7	1,687.3	2.00	-2.00	0.00
5,300.0	2.73	56.98	4,963.4	923.0	1,420.2	1,693.8	2.00	-2.00	0.00
5,400.0	0.73	56.98	5,063.3	924.6	1,422.7	1,696.8	2.00	-2.00	0.00
Start 2813.0 hold at 5436.7 MD									
5,436.7	0.00	0.00	5,100.0	924.8	1,422.9	1,697.0	2.00	-2.00	-155.32
5,500.0	0.00	0.00	5,163.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
TOG									
5,549.7	0.00	0.00	5,213.0	924.8	1,422.9	1,697.0	0.00	0.00	0.00
5,600.0	0.00	0.00	5,263.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
5,700.0	0.00	0.00	5,363.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
5,800.0	0.00	0.00	5,463.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
5,900.0	0.00	0.00	5,563.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
6,000.0	0.00	0.00	5,663.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
6,100.0	0.00	0.00	5,763.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
6,200.0	0.00	0.00	5,863.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
6,300.0	0.00	0.00	5,963.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
6,400.0	0.00	0.00	6,063.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
6,500.0	0.00	0.00	6,163.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
6,600.0	0.00	0.00	6,263.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
6,700.0	0.00	0.00	6,363.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
6,800.0	0.00	0.00	6,463.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
6,900.0	0.00	0.00	6,563.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
7,000.0	0.00	0.00	6,663.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
7,100.0	0.00	0.00	6,763.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
7,200.0	0.00	0.00	6,863.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
7,300.0	0.00	0.00	6,963.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
Cameo									
7,349.7	0.00	0.00	7,013.0	924.8	1,422.9	1,697.0	0.00	0.00	0.00
7,400.0	0.00	0.00	7,063.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
7,500.0	0.00	0.00	7,163.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
7,600.0	0.00	0.00	7,263.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
7,700.0	0.00	0.00	7,363.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
7,800.0	0.00	0.00	7,463.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
7,900.0	0.00	0.00	7,563.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
8,000.0	0.00	0.00	7,663.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
Base Cameo Coal									
8,007.7	0.00	0.00	7,671.0	924.8	1,422.9	1,697.0	0.00	0.00	0.00
Rollins									
8,049.7	0.00	0.00	7,713.0	924.8	1,422.9	1,697.0	0.00	0.00	0.00
8,100.0	0.00	0.00	7,763.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
8,200.0	0.00	0.00	7,863.3	924.8	1,422.9	1,697.0	0.00	0.00	0.00
TD at 8249.7									
8,249.7	0.00	0.00	7,913.0	924.8	1,422.9	1,697.0	0.00	0.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-03M
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 Federal 28-03M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-5		
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 28-03M - plan hits target center - Circle (radius 50.0)	0.00	0.00	7,913.0	924.8	1,422.9	1,525,314.39	2,355,988.55	39° 15' 12.900 N	107° 46' 28.240 W

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,572.9	1,522.0	8-5/8	8-5/8	12-1/4

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,053.5	2,863.0	G Sand		0.00	
5,048.5	4,713.0	Williams Fork		0.00	
5,549.7	5,213.0	TOG		0.00	
7,349.7	7,013.0	Cameo		0.00	
8,007.7	7,671.0	Base Cameo Coal		0.00	
8,049.7	7,713.0	Rollins		0.00	

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
200.0	200.0	0.0	0.0	Start Build 2.00
1,454.2	1,414.5	147.2	226.6	Start 2728.2 hold at 1454.2 MD
4,182.5	3,885.5	777.5	1,196.4	Start Drop -2.00
5,436.7	5,100.0	924.8	1,422.9	Start 2813.0 hold at 5436.7 MD
8,249.7	7,913.0	924.8	1,422.9	TD at 8249.7



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance Federal 28-03M

Slot B-5

Design #1

Anticollision Report

28 April, 2015

Archer



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-03M
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 28-03M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-5	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	8,249.7	Design #1 (Slot B-5)	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 28-01M - Slot A-4 - Design #1	100.0	100.0	21.8	21.6	124.141	CC, ES
Piceance Federal 28-01M - Slot A-4 - Design #1	8,249.7	8,371.6	499.8	433.8	7.569	SF
Piceance Federal 28-02M - Slot A-5 - Design #1	100.0	100.0	9.9	9.8	56.675	CC, ES
Piceance Federal 28-02M - Slot A-5 - Design #1	8,249.7	8,299.5	249.9	184.2	3.804	SF
Piceance federal 28-04M - Slot A-6 - Design #1	448.5	448.2	9.4	7.7	5.367	CC, ES
Piceance federal 28-04M - Slot A-6 - Design #1	8,249.7	8,216.8	249.9	184.5	3.819	SF
Piceance federal 28-05M - Slot B-6 - Design #1	270.4	270.4	10.2	9.3	10.884	CC
Piceance federal 28-05M - Slot B-6 - Design #1	300.0	300.0	10.3	9.2	9.579	ES
Piceance federal 28-05M - Slot B-6 - Design #1	8,249.7	8,196.8	499.9	434.2	7.611	SF
Piceance Federal 28-07W - Slot B-4 - Design #1	200.0	200.0	19.7	19.1	31.553	CC
Piceance Federal 28-07W - Slot B-4 - Design #1	300.0	300.0	20.0	18.9	18.664	ES
Piceance Federal 28-07W - Slot B-4 - Design #1	500.0	499.5	26.6	24.5	12.969	SF

Offset Design		Piceance 28-05 - Piceance Federal 28-01M - Slot A-4 - 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	-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	124.141	CC, ES		
200.0	200.0	199.6	199.5	0.3	0.3	-8.83	22.5	-3.5	22.7	22.1	0.62	36.522			
300.0	300.0	299.0	298.8	0.5	0.6	-59.79	26.1	0.2	25.2	24.1	1.09	23.218			
400.0	399.8	398.3	397.7	0.8	0.8	-55.83	32.1	6.3	28.4	26.8	1.58	18.033			
500.0	499.5	497.4	496.1	1.0	1.1	-53.54	40.6	14.9	32.2	30.1	2.10	15.325			
600.0	598.7	596.4	594.0	1.3	1.4	-52.51	51.4	25.8	36.6	33.9	2.67	13.669			
700.0	697.5	695.3	691.0	1.6	1.8	-52.38	64.5	39.2	41.4	38.1	3.30	12.528			
800.0	795.6	794.0	787.3	2.0	2.2	-52.86	80.0	54.9	46.7	42.7	4.00	11.663			
900.0	893.1	892.6	882.5	2.4	2.7	-53.75	97.7	72.9	52.4	47.6	4.78	10.956			
1,000.0	989.6	991.0	976.7	2.9	3.3	-54.91	117.7	93.2	58.7	53.0	5.67	10.350			
1,100.0	1,085.3	1,089.2	1,069.7	3.5	3.9	-56.23	139.9	115.7	65.4	58.8	6.67	9.814			
1,200.0	1,179.8	1,187.3	1,161.4	4.1	4.6	-57.62	164.3	140.5	72.7	64.9	7.79	9.336			
1,300.0	1,273.2	1,285.2	1,251.7	4.8	5.3	-59.05	190.9	167.5	80.5	71.4	9.04	8.906			
1,400.0	1,365.2	1,383.0	1,340.5	5.6	6.1	-60.46	219.5	196.5	88.8	78.4	10.42	8.519			
1,500.0	1,456.0	1,480.5	1,427.7	6.4	6.9	-61.73	250.2	227.7	97.8	85.9	11.93	8.199			

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 28-03M
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 28-03M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-5	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-01M - Slot A-4 - 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	1,546.6	1,577.9	1,513.2	7.2	7.8	-61.70	282.9	260.9	108.7	95.3	13.41	8.106		
1,700.0	1,637.1	1,677.2	1,599.7	8.0	8.8	-61.13	317.1	295.6	120.5	105.6	14.89	8.096		
1,800.0	1,727.7	1,776.5	1,686.2	8.9	9.7	-60.66	351.4	330.4	132.4	116.0	16.37	8.085		
1,900.0	1,818.3	1,875.8	1,772.7	9.7	10.7	-60.27	385.6	365.1	144.2	126.3	17.86	8.074		
2,000.0	1,908.8	1,975.1	1,859.2	10.6	11.7	-59.94	419.8	399.9	156.1	136.7	19.35	8.064		
2,100.0	1,999.4	2,074.4	1,945.7	11.5	12.6	-59.65	454.0	434.6	167.9	147.1	20.85	8.055		
2,200.0	2,090.0	2,173.7	2,032.2	12.3	13.6	-59.40	488.3	469.4	179.8	157.4	22.34	8.045		
2,300.0	2,180.5	2,273.0	2,118.6	13.2	14.6	-59.19	522.5	504.1	191.6	167.8	23.84	8.037		
2,400.0	2,271.1	2,372.3	2,205.1	14.0	15.5	-59.00	556.7	538.8	203.5	178.1	25.34	8.029		
2,500.0	2,361.7	2,471.5	2,291.6	14.9	16.5	-58.82	591.0	573.6	215.3	188.5	26.84	8.022		
2,600.0	2,452.3	2,570.8	2,378.1	15.8	17.5	-58.67	625.2	608.3	227.2	198.9	28.35	8.015		
2,700.0	2,542.8	2,670.1	2,464.6	16.6	18.5	-58.53	659.4	643.1	239.1	209.2	29.85	8.009		
2,800.0	2,633.4	2,769.4	2,551.1	17.5	19.4	-58.41	693.6	677.8	250.9	219.6	31.36	8.003		
2,900.0	2,724.0	2,868.7	2,637.6	18.4	20.4	-58.30	727.9	712.6	262.8	229.9	32.86	7.998		
3,000.0	2,814.5	2,968.0	2,724.1	19.2	21.4	-58.19	762.1	747.3	274.7	240.3	34.37	7.993		
3,100.0	2,905.1	3,067.3	2,810.5	20.1	22.4	-58.10	796.3	782.1	286.5	250.7	35.87	7.988		
3,200.0	2,995.7	3,166.6	2,897.0	21.0	23.4	-58.01	830.6	816.8	298.4	261.0	37.38	7.983		
3,300.0	3,086.2	3,265.9	2,983.5	21.8	24.3	-57.93	864.8	851.6	310.3	271.4	38.89	7.979		
3,400.0	3,176.8	3,365.2	3,070.0	22.7	25.3	-57.86	899.0	886.3	322.2	281.8	40.39	7.975		
3,500.0	3,267.4	3,464.5	3,156.5	23.6	26.3	-57.79	933.2	921.0	334.0	292.1	41.90	7.972		
3,600.0	3,357.9	3,563.8	3,243.0	24.4	27.3	-57.72	967.5	955.8	345.9	302.5	43.41	7.968		
3,700.0	3,448.5	3,663.1	3,329.5	25.3	28.3	-57.66	1,001.7	990.5	357.8	312.9	44.92	7.965		
3,800.0	3,539.1	3,762.3	3,416.0	26.2	29.2	-57.60	1,035.9	1,025.3	369.6	323.2	46.43	7.962		
3,900.0	3,629.6	3,861.6	3,502.4	27.0	30.2	-57.55	1,070.2	1,060.0	381.5	333.6	47.93	7.959		
4,000.0	3,720.2	3,960.9	3,588.9	27.9	31.2	-57.50	1,104.4	1,094.8	393.4	343.9	49.44	7.956		
4,100.0	3,810.8	4,060.2	3,675.4	28.8	32.2	-57.45	1,138.6	1,129.5	405.3	354.3	50.95	7.954		
4,200.0	3,901.4	4,161.9	3,764.1	29.6	33.2	-57.45	1,173.6	1,165.0	417.1	364.7	52.46	7.952		
4,300.0	3,992.9	4,272.4	3,861.7	30.3	34.0	-57.60	1,209.8	1,201.8	428.4	374.6	53.95	7.969		
4,400.0	4,085.8	4,383.3	3,961.7	30.9	34.8	-57.72	1,243.4	1,235.9	438.9	383.9	54.93	7.990		
4,500.0	4,179.9	4,494.5	4,063.8	31.5	35.5	-57.81	1,274.4	1,267.4	448.6	392.6	56.00	8.011		
4,600.0	4,275.2	4,606.2	4,168.0	32.0	36.2	-57.87	1,302.7	1,296.1	457.5	400.6	56.96	8.032		
4,700.0	4,371.4	4,718.2	4,273.9	32.4	36.8	-57.91	1,328.2	1,322.0	465.7	407.8	57.82	8.054		
4,800.0	4,468.5	4,830.6	4,381.5	32.8	37.3	-57.92	1,350.9	1,345.0	473.0	414.4	58.56	8.076		
4,900.0	4,566.4	4,943.2	4,490.6	33.2	37.8	-57.90	1,370.6	1,365.0	479.4	420.2	59.19	8.099		
5,000.0	4,665.0	5,056.1	4,601.0	33.5	38.2	-57.86	1,387.3	1,381.9	485.0	425.3	59.72	8.122		
5,100.0	4,764.1	5,169.3	4,712.4	33.8	38.6	-57.79	1,401.0	1,395.8	489.8	429.7	60.13	8.146		
5,200.0	4,863.6	5,282.7	4,824.8	34.0	38.9	-57.70	1,411.5	1,406.6	493.7	433.3	60.43	8.170		
5,300.0	4,963.4	5,396.2	4,937.8	34.1	39.1	-57.59	1,419.0	1,414.2	496.7	436.1	60.61	8.195		
5,400.0	5,063.3	5,509.9	5,051.4	34.2	39.2	-57.45	1,423.3	1,418.6	498.9	438.2	60.69	8.220		
5,500.0	5,163.3	5,621.9	5,163.3	34.3	39.3	-0.36	1,424.5	1,419.8	499.8	439.0	60.76	8.225		
5,600.0	5,263.3	5,721.9	5,263.3	34.4	39.4	-0.36	1,424.5	1,419.8	499.8	438.9	60.91	8.205		
5,700.0	5,363.3	5,821.9	5,363.3	34.4	39.4	-0.36	1,424.5	1,419.8	499.8	438.7	61.07	8.184		
5,800.0	5,463.3	5,921.9	5,463.3	34.5	39.5	-0.36	1,424.5	1,419.8	499.8	438.6	61.23	8.162		
5,900.0	5,563.3	6,021.9	5,563.3	34.6	39.6	-0.36	1,424.5	1,419.8	499.8	438.4	61.40	8.140		
6,000.0	5,663.3	6,121.9	5,663.3	34.7	39.6	-0.36	1,424.5	1,419.8	499.8	438.2	61.57	8.118		
6,100.0	5,763.3	6,221.9	5,763.3	34.7	39.7	-0.36	1,424.5	1,419.8	499.8	438.1	61.74	8.096		
6,200.0	5,863.3	6,321.9	5,863.3	34.8	39.8	-0.36	1,424.5	1,419.8	499.8	437.9	61.91	8.073		
6,300.0	5,963.3	6,421.9	5,963.3	34.9	39.8	-0.36	1,424.5	1,419.8	499.8	437.7	62.09	8.050		
6,400.0	6,063.3	6,521.9	6,063.3	35.0	39.9	-0.36	1,424.5	1,419.8	499.8	437.5	62.27	8.027		
6,500.0	6,163.3	6,621.9	6,163.3	35.0	40.0	-0.36	1,424.5	1,419.8	499.8	437.4	62.45	8.004		
6,600.0	6,263.3	6,721.9	6,263.3	35.1	40.0	-0.36	1,424.5	1,419.8	499.8	437.2	62.63	7.980		
6,700.0	6,363.3	6,821.9	6,363.3	35.2	40.1	-0.36	1,424.5	1,419.8	499.8	437.0	62.82	7.956		

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 28-03M
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 28-03M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-5	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.0 usft
Piceance 28-05 - Piceance Federal 28-01M - Slot A-4 - 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)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
6,800.0	6,463.3	6,921.9	6,463.3	35.3	40.2	-0.36	1,424.5	1,419.8	499.8	436.8	63.01	7.932		
6,900.0	6,563.3	7,021.9	6,563.3	35.4	40.3	-0.36	1,424.5	1,419.8	499.8	436.6	63.20	7.908		
7,000.0	6,663.3	7,121.9	6,663.3	35.5	40.3	-0.36	1,424.5	1,419.8	499.8	436.4	63.39	7.884		
7,100.0	6,763.3	7,221.9	6,763.3	35.6	40.4	-0.36	1,424.5	1,419.8	499.8	436.2	63.59	7.860		
7,200.0	6,863.3	7,321.9	6,863.3	35.7	40.5	-0.36	1,424.5	1,419.8	499.8	436.0	63.79	7.835		
7,300.0	6,963.3	7,421.9	6,963.3	35.7	40.6	-0.36	1,424.5	1,419.8	499.8	435.8	63.99	7.810		
7,400.0	7,063.3	7,521.9	7,063.3	35.8	40.7	-0.36	1,424.5	1,419.8	499.8	435.6	64.20	7.785		
7,500.0	7,163.3	7,621.9	7,163.3	35.9	40.7	-0.36	1,424.5	1,419.8	499.8	435.4	64.41	7.760		
7,600.0	7,263.3	7,721.9	7,263.3	36.0	40.8	-0.36	1,424.5	1,419.8	499.8	435.2	64.61	7.735		
7,700.0	7,363.3	7,821.9	7,363.3	36.1	40.9	-0.36	1,424.5	1,419.8	499.8	435.0	64.83	7.710		
7,800.0	7,463.3	7,921.9	7,463.3	36.2	41.0	-0.36	1,424.5	1,419.8	499.8	434.8	65.04	7.684		
7,900.0	7,563.3	8,021.9	7,563.3	36.3	41.1	-0.36	1,424.5	1,419.8	499.8	434.5	65.26	7.659		
8,000.0	7,663.3	8,121.9	7,663.3	36.4	41.2	-0.36	1,424.5	1,419.8	499.8	434.3	65.48	7.633		
8,100.0	7,763.3	8,221.9	7,763.3	36.5	41.2	-0.36	1,424.5	1,419.8	499.8	434.1	65.70	7.607		
8,200.0	7,863.3	8,321.9	7,863.3	36.6	41.3	-0.36	1,424.5	1,419.8	499.8	433.9	65.92	7.581		
8,249.7	7,913.0	8,371.6	7,913.0	36.7	41.4	-0.36	1,424.5	1,419.8	499.8	433.8	66.04	7.569 SF		



Archer
Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-03M
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 28-03M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-5	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	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	56.675 CC, ES		
200.0	200.0	199.6	199.6	0.3	0.3	52.06	7.2	9.2	11.7	11.1	0.62	18.719		
300.0	300.0	299.1	298.9	0.5	0.6	-6.04	10.5	13.2	15.1	14.0	1.10	13.737		
400.0	399.8	398.4	397.9	0.8	0.8	-7.96	16.0	19.8	18.6	17.0	1.60	11.625		
500.0	499.5	497.7	496.4	1.0	1.1	-10.28	23.6	29.1	22.2	20.0	2.12	10.472		
600.0	598.7	596.8	594.3	1.3	1.4	-12.83	33.4	41.0	25.7	23.1	2.64	9.742		
700.0	697.5	695.8	691.5	1.6	1.8	-15.51	45.4	55.4	29.4	26.2	3.19	9.225		
800.0	795.6	794.6	787.8	2.0	2.2	-18.24	59.5	72.5	33.2	29.4	3.76	8.819		
900.0	893.1	893.3	883.2	2.4	2.7	-20.98	75.6	92.0	37.1	32.7	4.38	8.466		
1,000.0	989.6	991.9	977.6	2.9	3.3	-23.70	93.8	114.0	41.2	36.1	5.07	8.133		
1,100.0	1,085.3	1,090.4	1,070.8	3.5	3.9	-26.37	114.1	138.5	45.5	39.6	5.83	7.802		
1,200.0	1,179.8	1,188.8	1,162.8	4.1	4.6	-28.98	136.3	165.4	49.9	43.2	6.68	7.468		
1,300.0	1,273.2	1,287.0	1,253.3	4.8	5.3	-31.52	160.5	194.7	54.6	46.9	7.66	7.128		
1,400.0	1,365.2	1,385.1	1,342.4	5.6	6.1	-33.96	186.7	226.3	59.5	50.7	8.77	6.787		
1,500.0	1,456.0	1,484.0	1,430.9	6.4	7.0	-36.33	214.8	260.3	64.6	54.6	10.01	6.457		
1,600.0	1,546.6	1,583.8	1,520.1	7.2	7.9	-38.44	243.4	294.9	69.9	58.5	11.33	6.165		
1,700.0	1,637.1	1,683.6	1,609.2	8.0	8.7	-40.25	272.0	329.6	75.2	62.5	12.71	5.914		
1,800.0	1,727.7	1,783.5	1,698.3	8.9	9.6	-41.83	300.7	364.2	80.6	66.4	14.13	5.700		
1,900.0	1,818.3	1,883.3	1,787.5	9.7	10.5	-43.20	329.3	398.9	86.0	70.4	15.58	5.518		
2,000.0	1,908.8	1,983.1	1,876.6	10.6	11.4	-44.41	358.0	433.5	91.5	74.4	17.06	5.362		
2,100.0	1,999.4	2,083.0	1,965.8	11.5	12.3	-45.49	386.6	468.1	97.0	78.4	18.56	5.227		
2,200.0	2,090.0	2,182.8	2,054.9	12.3	13.2	-46.44	415.2	502.8	102.5	82.5	20.07	5.110		
2,300.0	2,180.5	2,282.6	2,144.1	13.2	14.1	-47.30	443.9	537.4	108.1	86.5	21.59	5.007		
2,400.0	2,271.1	2,382.4	2,232.2	14.0	15.1	-48.08	472.5	572.1	113.7	90.6	23.12	4.918		
2,500.0	2,361.7	2,482.3	2,322.3	14.9	16.0	-48.78	501.1	606.7	119.3	94.6	24.66	4.838		
2,600.0	2,452.3	2,582.1	2,411.5	15.8	16.9	-49.42	529.8	641.3	124.9	98.7	26.21	4.767		
2,700.0	2,542.8	2,681.9	2,500.6	16.6	17.8	-50.00	558.4	676.0	130.6	102.8	27.76	4.704		
2,800.0	2,633.4	2,781.8	2,589.8	17.5	18.7	-50.54	587.1	710.6	136.2	106.9	29.31	4.647		
2,900.0	2,724.0	2,881.6	2,678.9	18.4	19.6	-51.03	615.7	745.3	141.9	111.0	30.87	4.596		
3,000.0	2,814.5	2,981.4	2,768.0	19.2	20.5	-51.49	644.3	779.9	147.6	115.1	32.44	4.550		
3,100.0	2,905.1	3,081.3	2,857.2	20.1	21.4	-51.91	673.0	814.6	153.3	119.3	34.00	4.507		
3,200.0	2,995.7	3,181.1	2,946.3	21.0	22.3	-52.30	701.6	849.2	158.9	123.4	35.57	4.469		
3,300.0	3,086.2	3,280.9	3,035.5	21.8	23.2	-52.66	730.3	883.8	164.6	127.5	37.14	4.433		
3,400.0	3,176.8	3,380.8	3,124.6	22.7	24.1	-53.00	758.9	918.5	170.3	131.6	38.71	4.400		
3,500.0	3,267.4	3,480.6	3,213.7	23.6	25.0	-53.32	787.5	953.1	176.1	135.8	40.29	4.370		
3,600.0	3,357.9	3,580.4	3,302.9	24.4	26.0	-53.62	816.2	987.8	181.8	139.9	41.86	4.342		
3,700.0	3,448.5	3,680.3	3,392.0	25.3	26.9	-53.90	844.8	1,022.4	187.5	144.1	43.44	4.316		
3,800.0	3,539.1	3,780.1	3,481.2	26.2	27.8	-54.16	873.5	1,057.0	193.2	148.2	45.01	4.292		
3,900.0	3,629.6	3,879.9	3,570.3	27.0	28.7	-54.41	902.1	1,091.7	198.9	152.4	46.59	4.270		
4,000.0	3,720.2	3,979.8	3,659.5	27.9	29.6	-54.64	930.7	1,126.3	204.7	156.5	48.17	4.249		
4,100.0	3,810.8	4,079.6	3,748.6	28.8	30.5	-54.87	959.4	1,161.0	210.4	160.7	49.75	4.229		
4,200.0	3,901.4	4,181.0	3,839.2	29.6	31.4	-55.12	988.4	1,196.0	216.1	164.7	51.32	4.210		
4,300.0	3,992.9	4,286.1	3,934.4	30.3	32.1	-55.50	1,016.7	1,230.3	221.2	168.6	52.66	4.201		
4,400.0	4,085.8	4,391.3	4,031.3	30.9	32.8	-55.83	1,042.9	1,262.0	226.0	172.1	53.88	4.194		
4,500.0	4,179.9	4,496.6	4,129.7	31.5	33.4	-56.13	1,066.8	1,290.9	230.3	175.3	55.00	4.187		
4,600.0	4,275.2	4,602.0	4,229.5	32.0	34.0	-56.38	1,088.3	1,317.0	234.2	178.2	56.01	4.182		
4,700.0	4,371.4	4,707.5	4,330.6	32.4	34.5	-56.61	1,107.6	1,340.2	237.7	180.8	56.91	4.177		
4,800.0	4,468.5	4,813.1	4,432.8	32.8	35.0	-56.80	1,124.5	1,360.6	240.8	183.1	57.71	4.172		
4,900.0	4,566.4	4,918.8	4,536.0	33.2	35.4	-56.96	1,138.9	1,378.1	243.4	185.0	58.40	4.168		
5,000.0	4,665.0	5,024.5	4,640.0	33.5	35.7	-57.09	1,151.0	1,392.7	245.6	186.6	58.97	4.165		
5,100.0	4,764.1	5,130.2	4,744.6	33.8	36.0	-57.19	1,160.6	1,404.3	247.3	187.9	59.44	4.161		

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 28-03M
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 28-03M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-5	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-02M - Slot A-5 - 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	
5,200.0	4,863.6	5,236.0	4,849.8	34.0	36.2	-57.27	1,167.7	1,412.9	248.6	188.8	59.80	4.157		
5,300.0	4,963.4	5,341.8	4,955.4	34.1	36.4	-57.32	1,172.3	1,418.5	249.5	189.4	60.06	4.154		
5,400.0	5,063.3	5,447.7	5,061.2	34.2	36.5	-57.34	1,174.5	1,421.2	249.9	189.7	60.21	4.150		
5,500.0	5,163.3	5,549.8	5,163.3	34.3	36.5	-0.36	1,174.6	1,421.4	249.9	189.6	60.34	4.141		
5,600.0	5,263.3	5,649.8	5,263.3	34.4	36.6	-0.36	1,174.6	1,421.4	249.9	189.4	60.50	4.131		
5,700.0	5,363.3	5,749.8	5,363.3	34.4	36.7	-0.36	1,174.6	1,421.4	249.9	189.2	60.66	4.120		
5,800.0	5,463.3	5,849.8	5,463.3	34.5	36.7	-0.36	1,174.6	1,421.4	249.9	189.1	60.83	4.108		
5,900.0	5,563.3	5,949.8	5,563.3	34.6	36.8	-0.36	1,174.6	1,421.4	249.9	188.9	60.99	4.097		
6,000.0	5,663.3	6,049.8	5,663.3	34.7	36.9	-0.36	1,174.6	1,421.4	249.9	188.7	61.16	4.086		
6,100.0	5,763.3	6,149.8	5,763.3	34.7	36.9	-0.36	1,174.6	1,421.4	249.9	188.6	61.34	4.074		
6,200.0	5,863.3	6,249.8	5,863.3	34.8	37.0	-0.36	1,174.6	1,421.4	249.9	188.4	61.51	4.063		
6,300.0	5,963.3	6,349.8	5,963.3	34.9	37.1	-0.36	1,174.6	1,421.4	249.9	188.2	61.69	4.051		
6,400.0	6,063.3	6,449.8	6,063.3	35.0	37.2	-0.36	1,174.6	1,421.4	249.9	188.0	61.87	4.039		
6,500.0	6,163.3	6,549.8	6,163.3	35.0	37.2	-0.36	1,174.6	1,421.4	249.9	187.8	62.06	4.027		
6,600.0	6,263.3	6,649.8	6,263.3	35.1	37.3	-0.36	1,174.6	1,421.4	249.9	187.7	62.24	4.015		
6,700.0	6,363.3	6,749.8	6,363.3	35.2	37.4	-0.36	1,174.6	1,421.4	249.9	187.5	62.43	4.003		
6,800.0	6,463.3	6,849.8	6,463.3	35.3	37.5	-0.36	1,174.6	1,421.4	249.9	187.3	62.62	3.990		
6,900.0	6,563.3	6,949.8	6,563.3	35.4	37.6	-0.36	1,174.6	1,421.4	249.9	187.1	62.82	3.978		
7,000.0	6,663.3	7,049.8	6,663.3	35.5	37.6	-0.36	1,174.6	1,421.4	249.9	186.9	63.02	3.966		
7,100.0	6,763.3	7,149.8	6,763.3	35.6	37.7	-0.36	1,174.6	1,421.4	249.9	186.7	63.22	3.953		
7,200.0	6,863.3	7,249.8	6,863.3	35.7	37.8	-0.36	1,174.6	1,421.4	249.9	186.5	63.42	3.940		
7,300.0	6,963.3	7,349.8	6,963.3	35.7	37.9	-0.36	1,174.6	1,421.4	249.9	186.3	63.62	3.928		
7,400.0	7,063.3	7,449.8	7,063.3	35.8	38.0	-0.36	1,174.6	1,421.4	249.9	186.1	63.83	3.915		
7,500.0	7,163.3	7,549.8	7,163.3	35.9	38.1	-0.36	1,174.6	1,421.4	249.9	185.9	64.04	3.902		
7,600.0	7,263.3	7,649.8	7,263.3	36.0	38.2	-0.36	1,174.6	1,421.4	249.9	185.6	64.25	3.889		
7,700.0	7,363.3	7,749.8	7,363.3	36.1	38.2	-0.36	1,174.6	1,421.4	249.9	185.4	64.47	3.876		
7,800.0	7,463.3	7,849.8	7,463.3	36.2	38.3	-0.36	1,174.6	1,421.4	249.9	185.2	64.69	3.863		
7,900.0	7,563.3	7,949.8	7,563.3	36.3	38.4	-0.36	1,174.6	1,421.4	249.9	185.0	64.91	3.850		
8,000.0	7,663.3	8,049.8	7,663.3	36.4	38.5	-0.36	1,174.6	1,421.4	249.9	184.8	65.13	3.837		
8,100.0	7,763.3	8,149.8	7,763.3	36.5	38.6	-0.36	1,174.6	1,421.4	249.9	184.5	65.35	3.824		
8,200.0	7,863.3	8,249.8	7,863.3	36.6	38.7	-0.36	1,174.6	1,421.4	249.9	184.3	65.58	3.811		
8,249.7	7,913.0	8,299.5	7,913.0	36.7	38.8	-0.36	1,174.6	1,421.4	249.9	184.2	65.69	3.804 SF		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-03M
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 28-03M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-5	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	98.13	-2.0	14.2	14.3					
100.0	100.0	100.0	100.0	0.1	0.1	98.13	-2.0	14.2	14.3	14.1	0.18	81.583		
200.0	200.0	200.0	200.0	0.3	0.3	98.13	-2.0	14.2	14.3	13.7	0.62	22.890		
300.0	300.0	300.0	300.0	0.5	0.5	46.22	-2.0	14.2	13.0	12.0	1.09	12.003		
400.0	399.8	399.8	399.8	0.8	0.8	68.11	-2.0	14.2	10.1	8.6	1.53	6.617		
448.5	448.2	448.2	448.2	0.9	0.9	90.00	-2.0	14.2	9.4	7.7	1.75	5.367	CC, ES	
500.0	499.5	499.5	499.5	1.0	1.0	117.49	-2.0	14.2	10.6	8.6	2.03	5.239		
600.0	598.7	599.2	599.2	1.3	1.2	147.85	-1.3	15.7	18.2	15.6	2.59	7.011		
700.0	697.5	699.3	699.2	1.6	1.4	158.22	1.0	20.4	27.9	24.8	3.11	8.966		
800.0	795.6	799.8	799.2	2.0	1.7	162.51	4.8	28.3	38.2	34.6	3.63	10.523		
900.0	893.1	900.6	899.3	2.4	1.9	164.45	10.1	39.4	48.8	44.6	4.16	11.714		
1,000.0	989.6	1,001.8	999.3	2.9	2.2	165.26	16.9	53.7	59.5	54.8	4.71	12.614		
1,100.0	1,085.3	1,103.4	1,098.9	3.5	2.6	165.45	25.4	71.2	70.3	65.0	5.29	13.280		
1,200.0	1,179.8	1,205.3	1,198.2	4.1	3.0	165.27	35.4	92.0	81.1	75.2	5.90	13.751		
1,300.0	1,273.2	1,307.5	1,296.9	4.8	3.5	164.84	46.9	116.1	92.1	85.5	6.55	14.057		
1,400.0	1,365.2	1,410.2	1,394.9	5.6	4.0	164.24	60.0	143.4	103.1	95.8	7.25	14.217		
1,500.0	1,456.0	1,513.2	1,492.2	6.4	4.6	163.49	74.7	174.0	113.8	105.8	8.00	14.232		
1,600.0	1,546.6	1,616.7	1,588.7	7.2	5.3	162.26	91.0	207.9	121.8	112.9	8.83	13.786		
1,700.0	1,637.1	1,720.6	1,684.0	8.0	6.1	160.45	108.8	245.1	126.5	116.7	9.80	12.913		
1,800.0	1,727.7	1,822.1	1,776.0	8.9	6.9	158.18	127.4	283.9	128.7	117.8	10.90	11.809		
1,900.0	1,818.3	1,922.0	1,866.3	9.7	7.8	155.96	145.8	322.3	130.9	118.8	12.10	10.818		
2,000.0	1,908.8	2,021.8	1,956.6	10.6	8.6	153.81	164.3	360.7	133.3	119.9	13.39	9.955		
2,100.0	1,999.4	2,121.7	2,046.9	11.5	9.5	151.74	182.7	399.1	135.8	121.0	14.75	9.204		
2,200.0	2,090.0	2,221.5	2,137.2	12.3	10.3	149.75	201.1	437.5	138.5	122.3	16.19	8.553		
2,300.0	2,180.5	2,321.4	2,227.5	13.2	11.2	147.84	219.6	475.9	141.4	123.7	17.69	7.989		
2,400.0	2,271.1	2,421.2	2,317.8	14.0	12.1	146.01	238.0	514.3	144.4	125.1	19.25	7.499		
2,500.0	2,361.7	2,521.1	2,408.1	14.9	12.9	144.25	256.4	552.7	147.5	126.7	20.86	7.072		
2,600.0	2,452.3	2,620.9	2,498.4	15.8	13.8	142.57	274.9	591.1	150.8	128.3	22.51	6.699		
2,700.0	2,542.8	2,720.8	2,588.7	16.6	14.7	140.96	293.3	629.5	154.2	130.0	24.20	6.373		
2,800.0	2,633.4	2,820.6	2,679.0	17.5	15.5	139.42	311.7	667.9	157.8	131.9	25.92	6.087		
2,900.0	2,724.0	2,920.5	2,769.3	18.4	16.4	137.95	330.2	706.3	161.4	133.7	27.67	5.834		
3,000.0	2,814.5	3,020.3	2,859.6	19.2	17.3	136.54	348.6	744.7	165.2	135.7	29.44	5.611		
3,100.0	2,905.1	3,120.2	2,949.9	20.1	18.2	135.20	367.0	783.1	169.0	137.8	31.22	5.412		
3,200.0	2,995.7	3,220.0	3,040.3	21.0	19.0	133.92	385.5	821.5	172.9	139.9	33.03	5.236		
3,300.0	3,086.2	3,319.9	3,130.6	21.8	19.9	132.69	403.9	859.9	176.9	142.1	34.85	5.078		
3,400.0	3,176.8	3,419.7	3,220.9	22.7	20.8	131.52	422.3	898.3	181.0	144.3	36.67	4.936		
3,500.0	3,267.4	3,519.6	3,311.2	23.6	21.7	130.41	440.7	936.7	185.2	146.7	38.51	4.808		
3,600.0	3,357.9	3,619.4	3,401.5	24.4	22.6	129.34	459.2	975.1	189.4	149.0	40.35	4.693		
3,700.0	3,448.5	3,719.3	3,491.8	25.3	23.4	128.32	477.6	1,013.5	193.7	151.5	42.20	4.589		
3,800.0	3,539.1	3,819.1	3,582.1	26.2	24.3	127.34	496.0	1,051.9	198.0	154.0	44.06	4.495		
3,900.0	3,629.6	3,919.0	3,672.4	27.0	25.2	126.40	514.5	1,090.3	202.4	156.5	45.92	4.409		
4,000.0	3,720.2	4,018.8	3,762.7	27.9	26.1	125.51	532.9	1,128.7	206.9	159.1	47.78	4.331		
4,100.0	3,810.8	4,118.7	3,853.0	28.8	27.0	124.65	551.3	1,167.1	211.4	161.8	49.64	4.259		
4,200.0	3,901.4	4,216.1	3,941.5	29.6	27.7	124.06	569.0	1,203.9	216.3	165.0	51.30	4.216		
4,300.0	3,992.9	4,312.6	4,030.4	30.3	28.4	123.81	585.2	1,237.8	221.5	168.9	52.58	4.211		
4,400.0	4,085.8	4,409.1	4,120.5	30.9	29.0	123.59	600.2	1,268.9	226.2	172.4	53.77	4.207		
4,500.0	4,179.9	4,505.5	4,211.7	31.5	29.5	123.40	613.8	1,297.2	230.5	175.6	54.84	4.203		
4,600.0	4,275.2	4,602.0	4,303.9	32.0	30.0	123.24	626.0	1,322.8	234.4	178.6	55.82	4.199		
4,700.0	4,371.4	4,700.0	4,398.5	32.4	30.4	123.10	637.1	1,345.9	237.9	181.2	56.70	4.195		
4,800.0	4,468.5	4,794.9	4,490.8	32.8	30.8	122.98	646.5	1,365.5	240.9	183.4	57.46	4.192		
4,900.0	4,566.4	4,891.3	4,585.4	33.2	31.2	122.89	654.7	1,382.5	243.5	185.4	58.12	4.189		
5,000.0	4,665.0	4,987.7	4,680.5	33.5	31.4	122.81	661.5	1,396.7	245.6	187.0	58.68	4.186		

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 28-03M
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 28-03M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-5	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance federal 28-04M - Slot A-6 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
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	
5,100.0	4,764.1	5,084.2	4,776.1	33.8	31.7	122.74	666.9	1,408.0	247.4	188.2	59.13	4.183		
5,200.0	4,863.6	5,180.6	4,872.1	34.0	31.9	122.70	670.9	1,416.3	248.6	189.2	59.49	4.180		
5,300.0	4,963.4	5,277.0	4,968.3	34.1	32.0	122.67	673.6	1,421.8	249.5	189.7	59.75	4.176		
5,400.0	5,063.3	5,373.4	5,064.6	34.2	32.1	122.66	674.8	1,424.3	249.9	190.0	59.91	4.171		
5,500.0	5,163.3	5,472.1	5,163.3	34.3	32.2	179.64	674.9	1,424.5	249.9	189.9	60.04	4.162		
5,600.0	5,263.3	5,572.1	5,263.3	34.4	32.3	179.64	674.9	1,424.5	249.9	189.7	60.20	4.151		
5,700.0	5,363.3	5,672.1	5,363.3	34.4	32.3	179.64	674.9	1,424.5	249.9	189.5	60.36	4.140		
5,800.0	5,463.3	5,772.1	5,463.3	34.5	32.4	179.64	674.9	1,424.5	249.9	189.4	60.53	4.129		
5,900.0	5,563.3	5,872.1	5,563.3	34.6	32.5	179.64	674.9	1,424.5	249.9	189.2	60.70	4.117		
6,000.0	5,663.3	5,972.1	5,663.3	34.7	32.6	179.64	674.9	1,424.5	249.9	189.0	60.87	4.105		
6,100.0	5,763.3	6,072.1	5,763.3	34.7	32.7	179.64	674.9	1,424.5	249.9	188.9	61.05	4.094		
6,200.0	5,863.3	6,172.1	5,863.3	34.8	32.7	179.64	674.9	1,424.5	249.9	188.7	61.22	4.082		
6,300.0	5,963.3	6,272.1	5,963.3	34.9	32.8	179.64	674.9	1,424.5	249.9	188.5	61.41	4.070		
6,400.0	6,063.3	6,372.1	6,063.3	35.0	32.9	179.64	674.9	1,424.5	249.9	188.3	61.59	4.058		
6,500.0	6,163.3	6,472.1	6,163.3	35.0	33.0	179.64	674.9	1,424.5	249.9	188.1	61.77	4.045		
6,600.0	6,263.3	6,572.1	6,263.3	35.1	33.1	179.64	674.9	1,424.5	249.9	187.9	61.96	4.033		
6,700.0	6,363.3	6,672.1	6,363.3	35.2	33.2	179.64	674.9	1,424.5	249.9	187.7	62.16	4.021		
6,800.0	6,463.3	6,772.1	6,463.3	35.3	33.3	179.64	674.9	1,424.5	249.9	187.5	62.35	4.008		
6,900.0	6,563.3	6,872.1	6,563.3	35.4	33.4	179.64	674.9	1,424.5	249.9	187.4	62.55	3.995		
7,000.0	6,663.3	6,972.1	6,663.3	35.5	33.5	179.64	674.9	1,424.5	249.9	187.2	62.75	3.983		
7,100.0	6,763.3	7,072.1	6,763.3	35.6	33.6	179.64	674.9	1,424.5	249.9	186.9	62.95	3.970		
7,200.0	6,863.3	7,172.1	6,863.3	35.7	33.7	179.64	674.9	1,424.5	249.9	186.7	63.15	3.957		
7,300.0	6,963.3	7,272.1	6,963.3	35.7	33.7	179.64	674.9	1,424.5	249.9	186.5	63.36	3.944		
7,400.0	7,063.3	7,372.1	7,063.3	35.8	33.8	179.64	674.9	1,424.5	249.9	186.3	63.57	3.931		
7,500.0	7,163.3	7,472.1	7,163.3	35.9	33.9	179.64	674.9	1,424.5	249.9	186.1	63.78	3.918		
7,600.0	7,263.3	7,572.1	7,263.3	36.0	34.0	179.64	674.9	1,424.5	249.9	185.9	64.00	3.905		
7,700.0	7,363.3	7,672.1	7,363.3	36.1	34.1	179.64	674.9	1,424.5	249.9	185.7	64.21	3.892		
7,800.0	7,463.3	7,772.1	7,463.3	36.2	34.3	179.64	674.9	1,424.5	249.9	185.5	64.43	3.878		
7,900.0	7,563.3	7,872.1	7,563.3	36.3	34.4	179.64	674.9	1,424.5	249.9	185.2	64.66	3.865		
8,000.0	7,663.3	7,972.1	7,663.3	36.4	34.5	179.64	674.9	1,424.5	249.9	185.0	64.88	3.852		
8,100.0	7,763.3	8,072.1	7,763.3	36.5	34.6	179.64	674.9	1,424.5	249.9	184.8	65.11	3.838		
8,200.0	7,863.3	8,172.1	7,863.3	36.6	34.7	179.64	674.9	1,424.5	249.9	184.6	65.34	3.825		
8,231.3	7,894.6	8,203.3	7,894.6	36.6	34.7	179.64	674.9	1,424.5	249.9	184.5	65.41	3.821		
8,249.7	7,913.0	8,216.8	7,908.0	36.7	34.7	179.64	674.9	1,424.5	249.9	184.5	65.44	3.819 SF		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-03M
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 28-03M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-5	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance federal 28-05M - Slot B-6 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	142.13	-8.1	6.3	10.3					
100.0	100.0	100.0	100.0	0.1	0.1	142.13	-8.1	6.3	10.3	10.1	0.18	58.478		
200.0	200.0	200.0	200.0	0.3	0.3	142.13	-8.1	6.3	10.3	9.6	0.62	16.407		
270.4	270.4	270.4	270.4	0.5	0.5	90.00	-8.1	6.3	10.2	9.3	0.94	10.884 CC		
300.0	300.0	300.0	300.0	0.5	0.5	94.92	-8.1	6.3	10.3	9.2	1.07	9.579 ES		
400.0	399.8	399.8	399.8	0.8	0.8	120.83	-8.1	6.3	11.9	10.4	1.55	7.693		
500.0	499.5	499.5	499.5	1.0	1.0	145.29	-8.1	6.3	18.0	15.9	2.08	8.638		
600.0	598.7	598.7	598.7	1.3	1.2	159.10	-8.1	6.3	28.9	26.3	2.62	11.021		
700.0	697.5	697.5	697.5	1.6	1.4	166.33	-8.1	6.3	43.9	40.7	3.14	13.950		
800.0	795.6	797.5	797.5	2.0	1.6	169.78	-7.6	7.9	61.1	57.5	3.65	16.740		
900.0	893.1	898.2	898.0	2.4	1.9	171.01	-6.1	12.8	78.7	74.6	4.15	18.978		
1,000.0	989.6	999.3	998.8	2.9	2.1	171.20	-3.5	21.2	96.6	92.0	4.66	20.730		
1,100.0	1,085.3	1,101.1	1,099.8	3.5	2.4	170.84	0.1	33.1	114.8	109.6	5.19	22.097		
1,200.0	1,179.8	1,203.4	1,200.8	4.1	2.6	170.13	4.8	48.5	133.1	127.3	5.75	23.144		
1,300.0	1,273.2	1,306.2	1,301.7	4.8	3.0	169.21	10.6	67.4	151.7	145.3	6.34	23.915		
1,400.0	1,365.2	1,409.6	1,402.4	5.6	3.4	168.14	17.4	89.9	170.5	163.5	6.98	24.434		
1,500.0	1,456.0	1,513.6	1,502.7	6.4	3.9	166.98	25.4	116.0	189.2	181.5	7.66	24.708		
1,600.0	1,546.6	1,618.5	1,602.8	7.2	4.4	165.58	34.5	145.9	205.3	196.9	8.41	24.420		
1,700.0	1,637.1	1,724.2	1,702.5	8.0	5.0	163.86	44.8	179.5	218.4	209.1	9.26	23.590		
1,800.0	1,727.7	1,830.4	1,801.3	8.9	5.7	161.80	56.1	216.9	228.6	218.3	10.25	22.309		
1,900.0	1,818.3	1,936.8	1,898.8	9.7	6.5	159.38	68.6	257.7	235.9	224.6	11.39	20.710		
2,000.0	1,908.8	2,039.0	1,991.1	10.6	7.4	156.76	81.4	299.7	241.3	228.6	12.68	19.022		
2,100.0	1,999.4	2,138.3	2,080.6	11.5	8.2	154.28	93.9	340.7	246.8	232.8	14.06	17.551		
2,200.0	2,090.0	2,237.6	2,170.1	12.3	9.1	151.92	106.4	381.7	252.8	237.3	15.53	16.276		
2,300.0	2,180.5	2,336.9	2,259.7	13.2	9.9	149.66	118.9	422.8	259.2	242.2	17.08	15.178		
2,400.0	2,271.1	2,436.1	2,349.2	14.0	10.8	147.52	131.5	463.8	266.0	247.3	18.69	14.233		
2,500.0	2,361.7	2,535.4	2,438.7	14.9	11.7	145.49	144.0	504.8	273.2	252.8	20.36	13.419		
2,600.0	2,452.3	2,634.7	2,528.3	15.8	12.6	143.56	156.5	545.9	280.7	258.6	22.07	12.716		
2,700.0	2,542.8	2,734.0	2,617.8	16.6	13.4	141.73	169.0	586.9	288.5	264.6	23.82	12.109		
2,800.0	2,633.4	2,833.3	2,707.4	17.5	14.3	140.00	181.5	627.9	296.5	270.9	25.60	11.581		
2,900.0	2,724.0	2,932.6	2,796.9	18.4	15.2	138.36	194.0	669.0	304.8	277.4	27.41	11.122		
3,000.0	2,814.5	3,031.8	2,886.4	19.2	16.1	136.81	206.5	710.0	313.4	284.2	29.24	10.720		
3,100.0	2,905.1	3,131.1	2,976.0	20.1	17.0	135.34	219.1	751.0	322.2	291.1	31.08	10.367		
3,200.0	2,995.7	3,230.4	3,065.5	21.0	17.9	133.95	231.6	792.0	331.2	298.2	32.93	10.056		
3,300.0	3,086.2	3,329.7	3,155.0	21.8	18.8	132.63	244.1	833.1	340.3	305.5	34.79	9.781		
3,400.0	3,176.8	3,429.0	3,244.6	22.7	19.7	131.38	256.6	874.1	349.6	313.0	36.66	9.537		
3,500.0	3,267.4	3,528.2	3,334.1	23.6	20.6	130.20	269.1	915.1	359.1	320.6	38.53	9.320		
3,600.0	3,357.9	3,627.5	3,423.6	24.4	21.5	129.08	281.6	956.2	368.7	328.3	40.41	9.125		
3,700.0	3,448.5	3,726.8	3,513.2	25.3	22.4	128.02	294.1	997.2	378.5	336.2	42.29	8.951		
3,800.0	3,539.1	3,826.1	3,602.7	26.2	23.3	127.01	306.7	1,038.2	388.4	344.2	44.17	8.794		
3,900.0	3,629.6	3,925.4	3,692.2	27.0	24.2	126.05	319.2	1,079.3	398.4	352.4	46.05	8.652		
4,000.0	3,720.2	4,024.6	3,781.8	27.9	25.1	125.13	331.7	1,120.3	408.5	360.6	47.92	8.524		
4,100.0	3,810.8	4,123.5	3,870.9	28.8	26.0	124.27	344.1	1,161.1	418.7	368.9	49.79	8.410		
4,200.0	3,901.4	4,218.2	3,957.1	29.6	26.7	123.75	356.6	1,198.6	429.6	378.2	51.40	8.358		
4,300.0	3,992.9	4,312.9	4,044.6	30.3	27.3	123.54	368.2	1,233.4	440.3	387.6	52.70	8.356		
4,400.0	4,085.8	4,407.7	4,133.3	30.9	27.9	123.37	375.9	1,265.4	450.2	396.3	53.90	8.354		
4,500.0	4,179.9	4,502.6	4,223.1	31.5	28.4	123.22	384.9	1,294.6	459.2	404.2	54.99	8.351		
4,600.0	4,275.2	4,597.6	4,314.0	32.0	28.9	123.10	392.9	1,321.0	467.4	411.4	55.98	8.349		
4,700.0	4,371.4	4,692.6	4,405.8	32.4	29.3	122.99	400.1	1,344.4	474.6	417.7	56.86	8.347		
4,800.0	4,468.5	4,787.7	4,498.4	32.8	29.7	122.90	406.3	1,365.0	481.0	423.3	57.64	8.344		
4,900.0	4,566.4	4,882.8	4,591.7	33.2	30.0	122.83	411.7	1,382.6	486.4	428.1	58.31	8.341		
5,000.0	4,665.0	4,977.9	4,685.6	33.5	30.3	122.77	416.2	1,397.3	490.9	432.0	58.88	8.337		

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 28-03M
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 28-03M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-5	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance federal 28-05M - Slot B-6 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Semi Major Axis Reference (usft)	Highside Toolface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,100.0	4,764.1	5,073.1	4,780.0	33.8	30.6	122.72		419.7	1,409.0	494.5	435.2	59.35	8.332	
5,200.0	4,863.6	5,168.3	4,874.8	34.0	30.8	122.69		422.4	1,417.6	497.2	437.5	59.71	8.326	
5,300.0	4,963.4	5,263.6	4,969.9	34.1	30.9	122.67		424.1	1,423.3	498.9	438.9	59.98	8.318	
5,400.0	5,063.3	5,358.8	5,065.1	34.2	31.0	122.66		424.9	1,425.9	499.7	439.6	60.15	8.309	
5,500.0	5,163.3	5,457.1	5,163.3	34.3	31.1	179.64		425.0	1,426.1	499.8	439.5	60.29	8.290	
5,600.0	5,263.3	5,557.1	5,263.3	34.4	31.2	179.64		425.0	1,426.1	499.8	439.4	60.45	8.268	
5,700.0	5,363.3	5,657.1	5,363.3	34.4	31.2	179.64		425.0	1,426.1	499.8	439.2	60.61	8.246	
5,800.0	5,463.3	5,757.1	5,463.3	34.5	31.3	179.64		425.0	1,426.1	499.8	439.0	60.78	8.224	
5,900.0	5,563.3	5,857.1	5,563.3	34.6	31.4	179.64		425.0	1,426.1	499.8	438.9	60.95	8.201	
6,000.0	5,663.3	5,957.1	5,663.3	34.7	31.5	179.64		425.0	1,426.1	499.8	438.7	61.12	8.178	
6,100.0	5,763.3	6,057.1	5,763.3	34.7	31.6	179.64		425.0	1,426.1	499.8	438.5	61.29	8.154	
6,200.0	5,863.3	6,157.1	5,863.3	34.8	31.7	179.64		425.0	1,426.1	499.8	438.3	61.47	8.131	
6,300.0	5,963.3	6,257.1	5,963.3	34.9	31.7	179.64		425.0	1,426.1	499.8	438.1	61.65	8.107	
6,400.0	6,063.3	6,357.1	6,063.3	35.0	31.8	179.64		425.0	1,426.1	499.8	438.0	61.84	8.083	
6,500.0	6,163.3	6,457.1	6,163.3	35.0	31.9	179.64		425.0	1,426.1	499.8	437.8	62.02	8.058	
6,600.0	6,263.3	6,557.1	6,263.3	35.1	32.0	179.64		425.0	1,426.1	499.8	437.6	62.21	8.034	
6,700.0	6,363.3	6,657.1	6,363.3	35.2	32.1	179.64		425.0	1,426.1	499.8	437.4	62.40	8.009	
6,800.0	6,463.3	6,757.1	6,463.3	35.3	32.2	179.64		425.0	1,426.1	499.8	437.2	62.60	7.985	
6,900.0	6,563.3	6,857.1	6,563.3	35.4	32.3	179.64		425.0	1,426.1	499.8	437.0	62.79	7.959	
7,000.0	6,663.3	6,957.1	6,663.3	35.5	32.4	179.64		425.0	1,426.1	499.8	436.8	62.99	7.934	
7,100.0	6,763.3	7,057.1	6,763.3	35.6	32.5	179.64		425.0	1,426.1	499.8	436.6	63.19	7.909	
7,200.0	6,863.3	7,157.1	6,863.3	35.7	32.6	179.64		425.0	1,426.1	499.8	436.4	63.40	7.883	
7,300.0	6,963.3	7,257.1	6,963.3	35.7	32.7	179.64		425.0	1,426.1	499.8	436.2	63.61	7.858	
7,400.0	7,063.3	7,357.1	7,063.3	35.8	32.8	179.64		425.0	1,426.1	499.8	436.0	63.81	7.832	
7,500.0	7,163.3	7,457.1	7,163.3	35.9	32.9	179.64		425.0	1,426.1	499.8	435.8	64.03	7.806	
7,600.0	7,263.3	7,557.1	7,263.3	36.0	33.0	179.64		425.0	1,426.1	499.8	435.6	64.24	7.780	
7,700.0	7,363.3	7,657.1	7,363.3	36.1	33.1	179.64		425.0	1,426.1	499.8	435.3	64.46	7.754	
7,800.0	7,463.3	7,757.1	7,463.3	36.2	33.2	179.64		425.0	1,426.1	499.8	435.1	64.68	7.728	
7,900.0	7,563.3	7,857.1	7,563.3	36.3	33.3	179.64		425.0	1,426.1	499.8	434.9	64.90	7.701	
8,000.0	7,663.3	7,957.1	7,663.3	36.4	33.4	179.64		425.0	1,426.1	499.8	434.7	65.12	7.675	
8,100.0	7,763.3	8,057.1	7,763.3	36.5	33.6	179.64		425.0	1,426.1	499.8	434.4	65.35	7.648	
8,200.0	7,863.3	8,157.1	7,863.3	36.6	33.7	179.64		425.0	1,426.1	499.8	434.2	65.58	7.622	
8,229.0	7,892.3	8,186.0	7,892.3	36.6	33.7	179.64		425.0	1,426.1	499.8	434.2	65.64	7.614	
8,249.7	7,913.0	8,196.8	7,903.0	36.7	33.7	179.64		425.0	1,426.1	499.9	434.2	65.68	7.611 SF	



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-03M
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 28-03M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-5	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-07W - Slot B-4 - 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	-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	112.458		
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		
300.0	300.0	300.0	300.0	0.5	0.5	-101.62	15.2	-12.6	20.0	18.9	1.07	18.664 ES		
400.0	399.8	399.8	399.8	0.8	0.8	-115.26	15.2	-12.6	21.7	20.1	1.54	14.094		
500.0	499.5	499.5	499.5	1.0	1.0	-132.39	15.2	-12.6	26.6	24.5	2.05	12.969 SF		
600.0	598.7	598.7	598.7	1.3	1.2	-146.75	15.2	-12.6	36.0	33.4	2.59	13.895		
700.0	697.5	697.5	697.5	1.6	1.4	-156.53	15.2	-12.6	49.8	46.7	3.12	15.951		
800.0	795.6	793.4	793.4	2.0	1.6	-162.65	14.8	-14.1	69.3	65.7	3.64	19.049		
900.0	893.1	887.0	886.9	2.4	1.8	-166.26	13.8	-18.5	95.8	91.6	4.15	23.073		
1,000.0	989.6	979.8	979.4	2.9	2.0	-168.40	12.3	-25.5	128.4	123.7	4.67	27.510		
1,100.0	1,085.3	1,072.9	1,072.2	3.5	2.2	-169.85	10.7	-32.9	164.7	159.5	5.16	31.885		
1,200.0	1,179.8	1,164.7	1,163.7	4.1	2.5	-170.90	9.0	-40.1	204.2	198.6	5.66	36.059		
1,300.0	1,273.2	1,255.0	1,253.7	4.8	2.7	-171.69	7.5	-47.2	247.0	240.8	6.16	40.063		
1,400.0	1,365.2	1,343.8	1,342.2	5.6	2.9	-172.31	5.9	-54.2	292.9	286.2	6.67	43.928		
1,500.0	1,456.0	1,431.1	1,429.3	6.4	3.1	-172.86	4.4	-61.1	341.5	334.4	7.15	47.761		
1,600.0	1,546.6	1,518.2	1,516.0	7.2	3.3	-173.35	2.8	-68.0	390.6	383.0	7.62	51.237		
1,700.0	1,637.1	1,605.3	1,602.8	8.0	3.6	-173.72	1.3	-74.8	439.8	431.7	8.10	54.260		
1,800.0	1,727.7	1,692.3	1,689.6	8.9	3.8	-174.02	-0.2	-81.7	488.9	480.3	8.60	56.882		
1,900.0	1,818.3	1,779.4	1,776.4	9.7	4.0	-174.27	-1.7	-88.6	538.1	529.0	9.09	59.174		
2,000.0	1,908.8	1,866.5	1,863.2	10.6	4.2	-174.47	-3.3	-95.4	587.2	577.6	9.60	61.191		
2,100.0	1,999.4	1,953.5	1,949.9	11.5	4.5	-174.65	-4.8	-102.3	636.4	626.3	10.11	62.975		
2,200.0	2,090.0	2,040.6	2,036.7	12.3	4.7	-174.79	-6.3	-109.1	685.6	674.9	10.62	64.561		
2,300.0	2,180.5	2,127.7	2,123.5	13.2	4.9	-174.92	-7.9	-116.0	734.7	723.6	11.14	65.979		
2,400.0	2,271.1	2,214.7	2,210.3	14.0	5.2	-175.04	-9.4	-122.9	783.9	772.2	11.66	67.252		
2,500.0	2,361.7	2,301.8	2,297.1	14.9	5.4	-175.13	-10.9	-129.7	833.1	820.9	12.18	68.400		
2,600.0	2,452.3	2,388.9	2,383.8	15.8	5.6	-175.22	-12.5	-136.6	882.3	869.6	12.71	69.439		
2,700.0	2,542.8	2,475.9	2,470.6	16.6	5.9	-175.30	-14.0	-143.5	931.4	918.2	13.23	70.384		
2,800.0	2,633.4	2,563.0	2,557.4	17.5	6.1	-175.37	-15.5	-150.3	980.6	966.9	13.76	71.246		

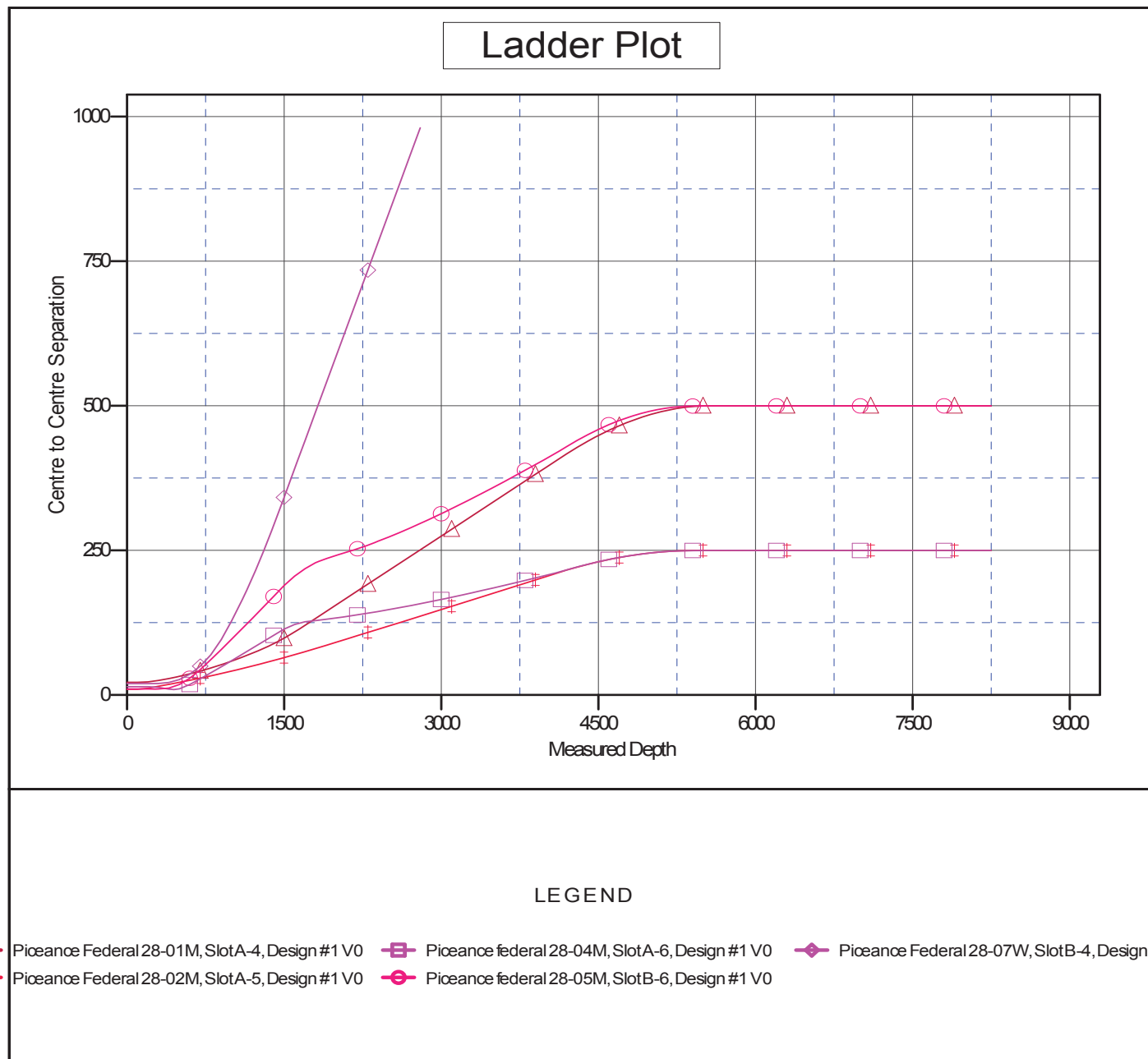
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-03M
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 28-03M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-5	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 28-03M
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 28-03M
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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 28-03M

Coordinate System is US State Plane 1983, Colorado Central Zone

Grid Convergence at Surface is: -1.44°

