



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance federal 28-04M

Slot A-6

Plan: Design #1

Standard Planning Report

28 April, 2015

Archer



Project: Mesa County, CO
Site: Piceance 28-05
Well: Piceance federal 28-04M
Wellbore: Slot A-6
Design: Design #1
Latitude: 39° 15' 3.740 N
Longitude: 107° 46' 46.150 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 28-04M, 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 28-04M

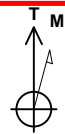
+N-S	+E-W	Northing	Ground Level:	Latitude	Longitude	Slot
0.0	0.0	1524423.25	7556.0	39° 15' 3.740 N	107° 46' 46.150 W	
			Easting			
			2354556.96			

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

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude	Shape
Piceance Federal 28-04M tgt	7908.0	676.9	1410.4	1525064.53	2355983.86	39° 15' 10.430 N	107° 46' 28.220 W	Circle (Radius: 50.0)

SECTION DETAILS

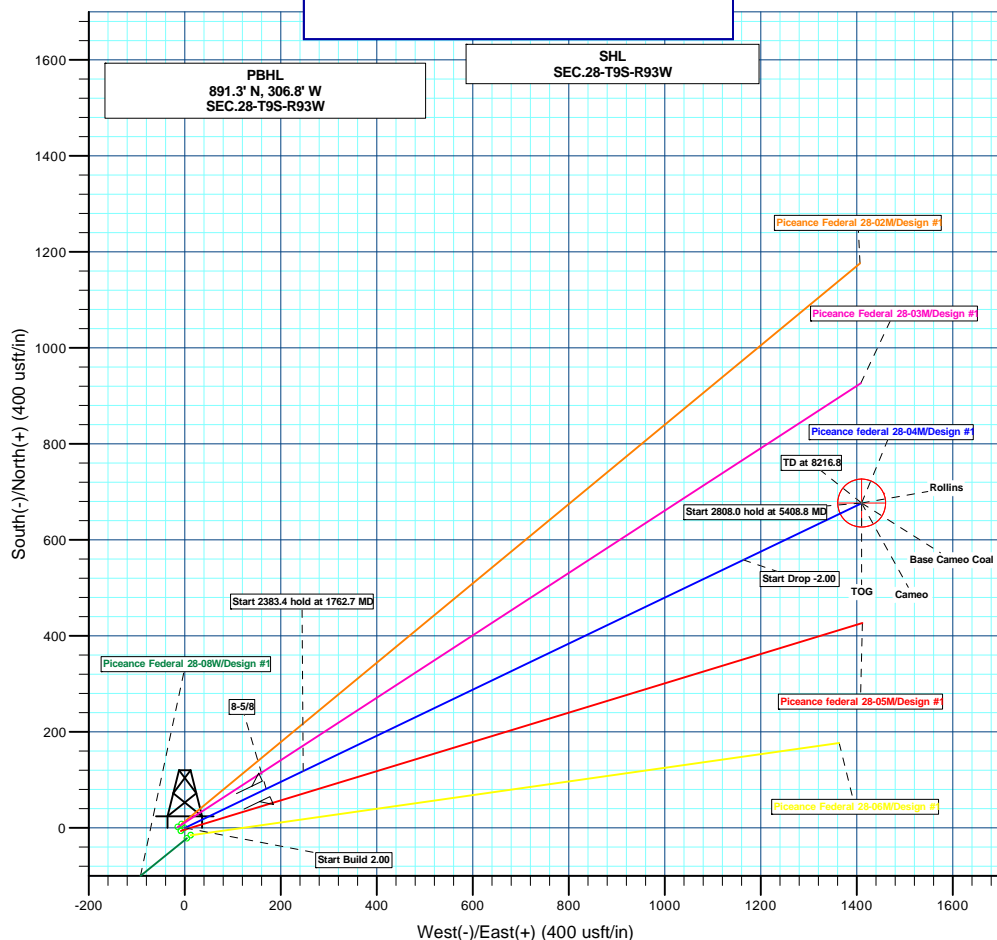
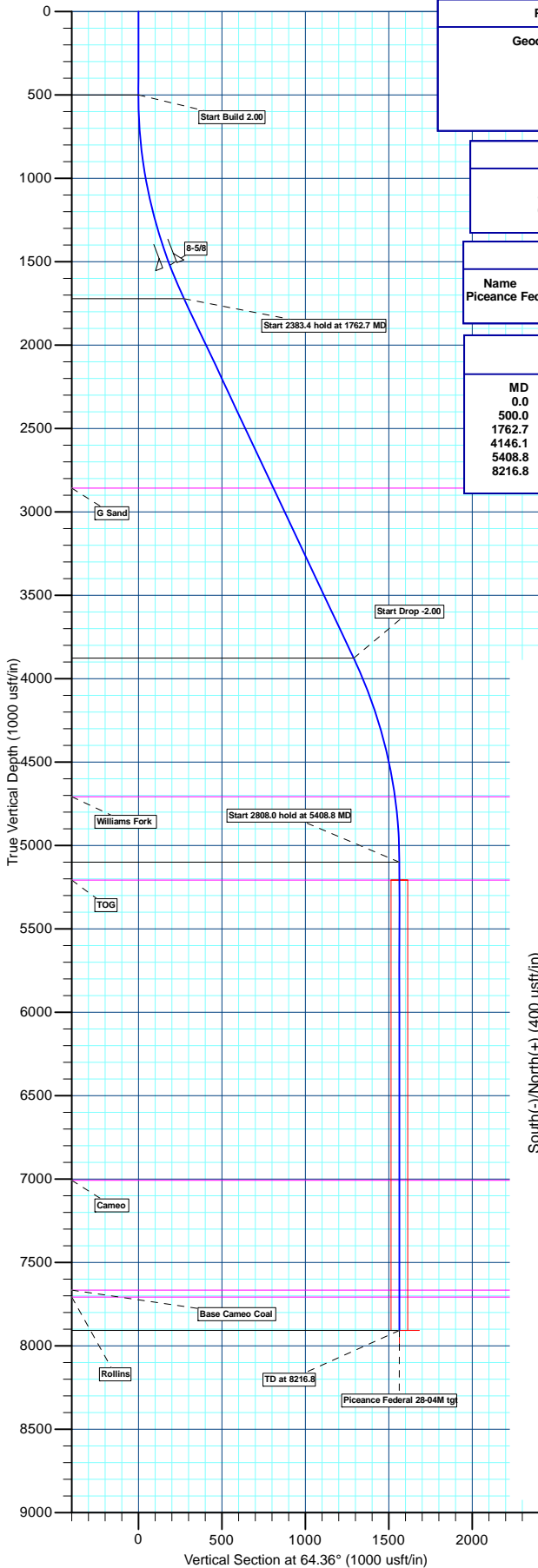
MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	VSec	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
1762.7	25.25	64.36	1722.2	118.5	246.8	2.00	64.36	273.8	Start 2383.4 hold at 1762.7 MD
4146.1	25.25	64.36	3877.8	558.4	1163.5	0.00	0.00	1290.6	Start Drop -2.00
5408.8	0.00	0.00	5100.0	676.9	1410.4	2.00	180.00	1564.4	Start 2808.0 hold at 5408.8 MD
8216.8	0.00	0.00	7908.0	676.9	1410.4	0.00	0.00	1564.4	TD at 8216.8



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
2858.0	3018.5	G Sand
4708.0	5015.5	Williams Fork
5208.0	5516.8	TOG
7008.0	7316.8	Cameo
7666.0	7974.8	Base Cameo Coal
7708.0	8016.8	Rollins



Plan: Design #1 (Piceance federal 28-04M/Slot A-6)

Created By: Ricky Osburn Date: 11:24, April 28 2015



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance federal 28-04M
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 28-04M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-6		
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 28-04M					
Well Position	+N/-S	46.5 usft	Northing:	1,524,423.25 usft	Latitude:	39° 15' 3.740 N
	+E/-W	-37.8 usft	Easting:	2,354,556.96 usft	Longitude:	107° 46' 46.150 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,556.0 usft

Wellbore	Slot A-6				
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	64.36

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	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,762.7	25.25	64.36	1,722.2	118.5	246.8	2.00	2.00	0.00	64.36	
4,146.1	25.25	64.36	3,877.8	558.4	1,163.5	0.00	0.00	0.00	0.00	
5,408.8	0.00	0.00	5,100.0	676.9	1,410.4	2.00	-2.00	0.00	180.00	
8,216.8	0.00	0.00	7,908.0	676.9	1,410.4	0.00	0.00	0.00	0.00	Piceance Federal 28-



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance federal 28-04M
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 28-04M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-6		
Design:	Design #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
Start Build 2.00									
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	2.00	64.36	600.0	0.8	1.6	1.7	2.00	2.00	0.00
700.0	4.00	64.36	699.8	3.0	6.3	7.0	2.00	2.00	0.00
800.0	6.00	64.36	799.5	6.8	14.1	15.7	2.00	2.00	0.00
900.0	8.00	64.36	898.7	12.1	25.1	27.9	2.00	2.00	0.00
1,000.0	10.00	64.36	997.5	18.8	39.2	43.5	2.00	2.00	0.00
1,100.0	12.00	64.36	1,095.6	27.1	56.4	62.6	2.00	2.00	0.00
1,200.0	14.00	64.36	1,193.1	36.8	76.7	85.1	2.00	2.00	0.00
1,300.0	16.00	64.36	1,289.6	48.0	100.1	111.0	2.00	2.00	0.00
1,400.0	18.00	64.36	1,385.3	60.7	126.4	140.2	2.00	2.00	0.00
1,500.0	20.00	64.36	1,479.8	74.8	155.8	172.8	2.00	2.00	0.00
8-5/8									
1,545.0	20.90	64.36	1,522.0	81.6	169.9	188.5	2.00	2.00	0.00
1,600.0	22.00	64.36	1,573.2	90.3	188.1	208.6	2.00	2.00	0.00
1,700.0	24.00	64.36	1,665.2	107.2	223.3	247.7	2.00	2.00	0.00
Start 2383.4 hold at 1762.7 MD									
1,762.7	25.25	64.36	1,722.2	118.5	246.8	273.8	2.00	2.00	0.00
1,800.0	25.25	64.36	1,755.9	125.4	261.2	289.7	0.00	0.00	0.00
1,900.0	25.25	64.36	1,846.4	143.8	299.7	332.4	0.00	0.00	0.00
2,000.0	25.25	64.36	1,936.8	162.3	338.1	375.0	0.00	0.00	0.00
2,100.0	25.25	64.36	2,027.3	180.7	376.6	417.7	0.00	0.00	0.00
2,200.0	25.25	64.36	2,117.7	199.2	415.0	460.4	0.00	0.00	0.00
2,300.0	25.25	64.36	2,208.2	217.6	453.5	503.0	0.00	0.00	0.00
2,400.0	25.25	64.36	2,298.6	236.1	492.0	545.7	0.00	0.00	0.00
2,500.0	25.25	64.36	2,389.0	254.6	530.4	588.3	0.00	0.00	0.00
2,600.0	25.25	64.36	2,479.5	273.0	568.9	631.0	0.00	0.00	0.00
2,700.0	25.25	64.36	2,569.9	291.5	607.3	673.7	0.00	0.00	0.00
2,800.0	25.25	64.36	2,660.4	309.9	645.8	716.3	0.00	0.00	0.00
2,900.0	25.25	64.36	2,750.8	328.4	684.3	759.0	0.00	0.00	0.00
3,000.0	25.25	64.36	2,841.3	346.9	722.7	801.7	0.00	0.00	0.00
G Sand									
3,018.5	25.25	64.36	2,858.0	350.3	729.8	809.6	0.00	0.00	0.00
3,100.0	25.25	64.36	2,931.7	365.3	761.2	844.3	0.00	0.00	0.00
3,200.0	25.25	64.36	3,022.1	383.8	799.7	887.0	0.00	0.00	0.00
3,300.0	25.25	64.36	3,112.6	402.2	838.1	929.6	0.00	0.00	0.00
3,400.0	25.25	64.36	3,203.0	420.7	876.6	972.3	0.00	0.00	0.00
3,500.0	25.25	64.36	3,293.5	439.2	915.0	1,015.0	0.00	0.00	0.00
3,600.0	25.25	64.36	3,383.9	457.6	953.5	1,057.6	0.00	0.00	0.00
3,700.0	25.25	64.36	3,474.4	476.1	992.0	1,100.3	0.00	0.00	0.00
3,800.0	25.25	64.36	3,564.8	494.5	1,030.4	1,143.0	0.00	0.00	0.00
3,900.0	25.25	64.36	3,655.3	513.0	1,068.9	1,185.6	0.00	0.00	0.00
4,000.0	25.25	64.36	3,745.7	531.5	1,107.3	1,228.3	0.00	0.00	0.00
4,100.0	25.25	64.36	3,836.1	549.9	1,145.8	1,270.9	0.00	0.00	0.00
Start Drop -2.00									
4,146.1	25.25	64.36	3,877.8	558.4	1,163.5	1,290.6	0.00	0.00	0.00
4,200.0	24.18	64.36	3,926.8	568.2	1,183.9	1,313.1	2.00	-2.00	0.00
4,300.0	22.18	64.36	4,018.7	585.2	1,219.3	1,352.5	2.00	-2.00	0.00
4,400.0	20.18	64.36	4,112.0	600.8	1,251.9	1,388.6	2.00	-2.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance federal 28-04M
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 28-04M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-6		
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	18.18	64.36	4,206.4	615.0	1,281.5	1,421.5	2.00	-2.00	0.00
4,600.0	16.18	64.36	4,301.9	627.8	1,308.1	1,451.0	2.00	-2.00	0.00
4,700.0	14.18	64.36	4,398.5	639.1	1,331.7	1,477.2	2.00	-2.00	0.00
4,800.0	12.18	64.36	4,495.8	649.0	1,352.3	1,500.0	2.00	-2.00	0.00
4,900.0	10.18	64.36	4,593.9	657.4	1,369.7	1,519.3	2.00	-2.00	0.00
5,000.0	8.18	64.36	4,692.6	664.3	1,384.1	1,535.3	2.00	-2.00	0.00
Williams Fork									
5,015.5	7.86	64.36	4,708.0	665.2	1,386.1	1,537.4	2.00	-2.00	0.00
5,100.0	6.18	64.36	4,791.8	669.7	1,395.4	1,547.8	2.00	-2.00	0.00
5,200.0	4.18	64.36	4,891.4	673.6	1,403.5	1,556.8	2.00	-2.00	0.00
5,300.0	2.18	64.36	4,991.3	676.0	1,408.5	1,562.3	2.00	-2.00	0.00
Start 2808.0 hold at 5408.8 MD									
5,408.8	0.00	0.00	5,100.0	676.9	1,410.4	1,564.4	2.00	-2.00	-59.18
5,500.0	0.00	0.00	5,191.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
TOG									
5,516.8	0.00	0.00	5,208.0	676.9	1,410.4	1,564.4	0.00	0.00	0.00
5,600.0	0.00	0.00	5,291.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
5,700.0	0.00	0.00	5,391.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
5,800.0	0.00	0.00	5,491.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
5,900.0	0.00	0.00	5,591.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
6,000.0	0.00	0.00	5,691.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
6,100.0	0.00	0.00	5,791.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
6,200.0	0.00	0.00	5,891.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
6,300.0	0.00	0.00	5,991.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
6,400.0	0.00	0.00	6,091.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
6,500.0	0.00	0.00	6,191.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
6,600.0	0.00	0.00	6,291.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
6,700.0	0.00	0.00	6,391.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
6,800.0	0.00	0.00	6,491.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
6,900.0	0.00	0.00	6,591.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
7,000.0	0.00	0.00	6,691.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
7,100.0	0.00	0.00	6,791.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
7,200.0	0.00	0.00	6,891.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
7,300.0	0.00	0.00	6,991.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
Cameo									
7,316.8	0.00	0.00	7,008.0	676.9	1,410.4	1,564.4	0.00	0.00	0.00
7,400.0	0.00	0.00	7,091.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
7,500.0	0.00	0.00	7,191.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
7,600.0	0.00	0.00	7,291.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
7,700.0	0.00	0.00	7,391.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
7,800.0	0.00	0.00	7,491.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
7,900.0	0.00	0.00	7,591.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
Base Cameo Coal									
7,974.8	0.00	0.00	7,666.0	676.9	1,410.4	1,564.4	0.00	0.00	0.00
8,000.0	0.00	0.00	7,691.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
Rollins									
8,016.8	0.00	0.00	7,708.0	676.9	1,410.4	1,564.4	0.00	0.00	0.00
8,100.0	0.00	0.00	7,791.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
8,200.0	0.00	0.00	7,891.2	676.9	1,410.4	1,564.4	0.00	0.00	0.00
TD at 8216.8									
8,216.8	0.00	0.00	7,908.0	676.9	1,410.4	1,564.4	0.00	0.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance federal 28-04M
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 28-04M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-6		
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 28-04M	0.00	0.00	7,908.0	676.9	1,410.4	1,525,064.53	2,355,983.86	39° 15' 10.430 N	107° 46' 28.220 W
- plan hits target center									
- Circle (radius 50.0)									

Casing Points				
Measured Depth	Vertical Depth		Casing Diameter	Hole Diameter
(usft)	(usft)	Name	(")	(")
1,545.0	1,522.0	8-5/8	8-5/8	12-1/4

Formations					
Measured Depth	Vertical Depth			Dip	Dip Direction
(usft)	(usft)	Name	Lithology	(°)	(°)
3,018.5	2,858.0	G Sand		0.00	
5,015.5	4,708.0	Williams Fork		0.00	
5,516.8	5,208.0	TOG		0.00	
7,316.8	7,008.0	Cameo		0.00	
7,974.8	7,666.0	Base Cameo Coal		0.00	
8,016.8	7,708.0	Rollins		0.00	

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(usft)	(usft)	+N/-S	+E/-W	Comment	
(usft)	(usft)	(usft)	(usft)		
500.0	500.0	0.0	0.0	Start Build 2.00	
1,762.7	1,722.2	118.5	246.8	Start 2383.4 hold at 1762.7 MD	
4,146.1	3,877.8	558.4	1,163.5	Start Drop -2.00	
5,408.8	5,100.0	676.9	1,410.4	Start 2808.0 hold at 5408.8 MD	
8,216.8	7,908.0	676.9	1,410.4	TD at 8216.8	



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance federal 28-04M

Slot A-6

Design #1

Anticollision Report

28 April, 2015

Archer



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-04M
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 28-04M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-6	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	8,216.8	Design #1 (Slot A-6)	MWD	MWD - Standard	

Summary						
Site Name	Reference	Offset	Distance		Separation	Warning
	Measured	Measured	Between	Between		
	Depth	Depth	Centres	Ellipses		
Offset Well - Wellbore - Design		(usft)	(usft)	(usft)	(usft)	Factor
Piceance 28-05						
Piceance Federal 28-02M - Slot A-5 - Design #1		100.0	100.0	10.3	10.1	58.478 CC
Piceance Federal 28-02M - Slot A-5 - Design #1		200.0	199.9	10.5	9.8	16.730 ES
Piceance Federal 28-02M - Slot A-5 - Design #1		8,216.8	8,294.5	499.8	434.4	7.638 SF
Piceance Federal 28-03M - Slot B-5 - Design #1		448.2	448.5	9.4	7.7	5.380 CC, ES
Piceance Federal 28-03M - Slot B-5 - Design #1		8,216.8	8,244.7	249.9	184.5	3.819 SF
Piceance federal 28-05M - Slot B-6 - Design #1		500.0	500.0	9.9	8.0	5.035 CC, ES
Piceance federal 28-05M - Slot B-6 - Design #1		8,216.8	8,196.8	249.9	184.5	3.820 SF
Piceance Federal 28-06M - Slot A-7 - Design #1		300.0	300.0	19.7	18.6	18.351 CC, ES
Piceance Federal 28-06M - Slot A-7 - Design #1		2,500.0	2,471.7	195.0	170.1	7.849 SF
Piceance Federal 28-08W - Slot B-7 - Design #1		500.0	500.0	21.8	19.8	11.028 CC, ES
Piceance Federal 28-08W - Slot B-7 - Design #1		700.0	699.2	25.5	22.7	8.950 SF

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
Reference		Offset		Semi Major Axis			Distance								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
0.0	0.0	0.0	0.0	0.0	0.0	-37.87	8.1	-6.3	10.3						
100.0	100.0	100.0	100.0	0.1	0.1	-37.87	8.1	-6.3	10.3	10.1	0.18	58.478	CC		
115.0	115.0	115.0	115.0	0.1	0.1	-37.65	8.1	-6.3	10.3	10.0	0.24	42.252			
200.0	200.0	199.9	199.9	0.3	0.3	-28.27	9.2	-4.9	10.5	9.8	0.62	16.730	ES		
300.0	300.0	299.7	299.5	0.5	0.6	-4.26	12.5	-0.9	12.6	11.5	1.08	11.620			
400.0	400.0	398.9	398.3	0.8	0.8	17.59	18.0	5.7	19.0	17.4	1.56	12.146			
500.0	500.0	497.4	496.1	1.0	1.1	30.20	25.6	14.9	29.9	27.8	2.08	14.388			
600.0	600.0	595.2	592.8	1.2	1.4	-28.28	35.3	26.6	43.3	40.8	2.50	17.315			
700.0	699.8	692.6	688.4	1.4	1.8	-25.96	47.0	40.8	57.1	54.1	2.98	19.126			
800.0	799.5	789.5	782.8	1.7	2.2	-25.17	60.7	57.3	71.1	67.6	3.49	20.345			
900.0	898.7	885.9	876.1	1.9	2.7	-25.14	76.4	76.3	85.2	81.2	4.03	21.157			
1,000.0	997.5	981.8	968.0	2.2	3.2	-25.55	93.9	97.5	99.5	94.9	4.59	21.669			
1,100.0	1,095.6	1,077.3	1,058.5	2.6	3.8	-26.23	113.3	120.9	113.9	108.7	5.19	21.944			
1,200.0	1,193.1	1,172.3	1,147.5	3.0	4.5	-27.07	134.5	146.6	128.4	122.6	5.83	22.025			
1,300.0	1,289.6	1,266.9	1,234.9	3.4	5.2	-28.01	157.4	174.3	143.1	136.6	6.52	21.951			
1,400.0	1,385.3	1,360.9	1,320.6	4.0	5.9	-29.03	182.1	204.2	158.0	150.7	7.28	21.715			

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 28-04M
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 28-04M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-6	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
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		
1,500.0	1,479.8	1,455.5	1,405.5	4.6	6.7	-30.11	208.6	236.3	173.0	164.9	8.10	21.344		
1,600.0	1,573.2	1,554.5	1,493.9	5.2	7.6	-31.51	237.0	270.6	186.1	177.1	9.04	20.583		
1,700.0	1,665.2	1,653.8	1,582.6	6.0	8.5	-33.28	265.5	305.1	196.4	186.3	10.10	19.453		
1,800.0	1,755.9	1,753.2	1,671.3	6.8	9.4	-35.44	294.0	339.5	204.3	193.0	11.30	18.087		
1,900.0	1,846.4	1,852.6	1,760.1	7.6	10.3	-37.60	322.5	374.0	211.9	199.4	12.59	16.832		
2,000.0	1,936.8	1,952.0	1,848.8	8.4	11.2	-39.61	351.0	408.5	219.9	205.9	13.96	15.747		
2,100.0	2,027.3	2,051.4	1,937.6	9.3	12.1	-41.48	379.6	443.0	228.0	212.6	15.39	14.812		
2,200.0	2,117.7	2,150.8	2,026.3	10.1	13.0	-43.21	408.1	477.5	236.4	219.5	16.88	14.005		
2,300.0	2,208.2	2,250.2	2,115.1	11.0	13.9	-44.83	436.6	512.0	245.0	226.6	18.41	13.308		
2,400.0	2,298.6	2,349.6	2,203.8	11.9	14.8	-46.34	465.1	546.5	253.8	233.8	19.98	12.703		
2,500.0	2,389.0	2,449.0	2,292.6	12.7	15.7	-47.74	493.6	581.0	262.7	241.1	21.57	12.176		
2,600.0	2,479.5	2,548.4	2,381.3	13.6	16.6	-49.06	522.1	615.5	271.8	248.6	23.20	11.716		
2,700.0	2,569.9	2,647.8	2,470.1	14.5	17.5	-50.28	550.6	650.0	281.0	256.1	24.84	11.311		
2,800.0	2,660.4	2,747.2	2,558.9	15.4	18.4	-51.43	579.2	684.5	290.3	263.8	26.51	10.953		
2,900.0	2,750.8	2,846.6	2,647.6	16.2	19.3	-52.51	607.7	719.0	299.7	271.6	28.18	10.636		
3,000.0	2,841.3	2,946.0	2,736.4	17.1	20.2	-53.52	636.2	753.4	309.3	279.4	29.87	10.353		
3,100.0	2,931.7	3,045.4	2,825.1	18.0	21.1	-54.48	664.7	787.9	318.9	287.3	31.58	10.100		
3,200.0	3,022.1	3,144.8	2,913.9	18.9	22.0	-55.37	693.2	822.4	328.6	295.3	33.29	9.872		
3,300.0	3,112.6	3,244.2	3,002.6	19.8	22.9	-56.22	721.7	856.9	338.4	303.4	35.01	9.667		
3,400.0	3,203.0	3,343.6	3,091.4	20.6	23.8	-57.01	750.3	891.4	348.3	311.5	36.73	9.481		
3,500.0	3,293.5	3,443.0	3,180.1	21.5	24.7	-57.76	778.8	925.9	358.2	319.7	38.46	9.313		
3,600.0	3,383.9	3,542.4	3,268.9	22.4	25.6	-58.48	807.3	960.4	368.2	328.0	40.20	9.159		
3,700.0	3,474.4	3,641.8	3,357.7	23.3	26.5	-59.15	835.8	994.9	378.2	336.3	41.94	9.018		
3,800.0	3,564.8	3,741.2	3,446.4	24.2	27.4	-59.79	864.3	1,029.4	388.3	344.6	43.68	8.889		
3,900.0	3,655.3	3,840.6	3,535.2	25.0	28.3	-60.40	892.8	1,063.9	398.4	353.0	45.43	8.770		
4,000.0	3,745.7	3,940.0	3,623.9	25.9	29.2	-60.97	921.4	1,098.4	408.6	361.4	47.17	8.661		
4,100.0	3,836.1	4,039.4	3,712.7	26.8	30.1	-61.52	949.9	1,132.9	418.8	369.9	48.92	8.560		
4,200.0	3,926.8	4,138.8	3,801.4	27.6	31.0	-62.09	978.4	1,167.3	429.3	378.6	50.62	8.480		
4,300.0	4,018.7	4,247.9	3,899.6	28.3	31.9	-62.54	1,008.7	1,204.0	440.2	388.1	52.05	8.458		
4,400.0	4,112.0	4,358.5	4,000.9	28.9	32.6	-62.94	1,037.0	1,238.2	450.3	397.0	53.33	8.444		
4,500.0	4,206.4	4,469.3	4,104.1	29.5	33.3	-63.30	1,062.8	1,269.5	459.5	405.0	54.50	8.431		
4,600.0	4,301.9	4,580.5	4,209.0	30.0	33.9	-63.61	1,086.1	1,297.7	467.8	412.2	55.56	8.419		
4,700.0	4,398.5	4,691.9	4,315.6	30.4	34.4	-63.87	1,106.9	1,322.8	475.1	418.6	56.51	8.407		
4,800.0	4,495.8	4,803.6	4,423.5	30.8	34.9	-64.10	1,125.0	1,344.8	481.6	424.2	57.35	8.397		
4,900.0	4,593.9	4,915.4	4,532.7	31.2	35.3	-64.29	1,140.5	1,363.5	487.0	429.0	58.07	8.388		
5,000.0	4,692.6	5,027.5	4,642.9	31.5	35.7	-64.45	1,153.3	1,378.9	491.5	432.9	58.67	8.378		
5,100.0	4,791.8	5,139.6	4,754.0	31.7	36.0	-64.57	1,163.3	1,391.0	495.1	435.9	59.16	8.369		
5,200.0	4,891.4	5,251.9	4,865.7	31.9	36.2	-64.65	1,170.6	1,399.8	497.6	438.1	59.53	8.359		
5,300.0	4,991.3	5,364.3	4,977.8	32.1	36.4	-64.71	1,175.0	1,405.2	499.2	439.4	59.80	8.348		
5,400.0	5,091.2	5,476.7	5,090.2	32.1	36.5	-64.73	1,176.7	1,407.2	499.8	439.8	59.95	8.336		
5,500.0	5,191.2	5,577.7	5,191.2	32.2	36.6	-0.36	1,176.7	1,407.2	499.8	439.7	60.10	8.316		
5,600.0	5,291.2	5,677.7	5,291.2	32.3	36.6	-0.36	1,176.7	1,407.2	499.8	439.5	60.26	8.293		
5,700.0	5,391.2	5,777.7	5,391.2	32.4	36.7	-0.36	1,176.7	1,407.2	499.8	439.4	60.43	8.271		
5,800.0	5,491.2	5,877.7	5,491.2	32.4	36.8	-0.36	1,176.7	1,407.2	499.8	439.2	60.59	8.248		
5,900.0	5,591.2	5,977.7	5,591.2	32.5	36.8	-0.36	1,176.7	1,407.2	499.8	439.0	60.76	8.225		
6,000.0	5,691.2	6,077.7	5,691.2	32.6	36.9	-0.36	1,176.7	1,407.2	499.8	438.9	60.94	8.202		
6,100.0	5,791.2	6,177.7	5,791.2	32.7	37.0	-0.36	1,176.7	1,407.2	499.8	438.7	61.11	8.179		
6,200.0	5,891.2	6,277.7	5,891.2	32.8	37.0	-0.36	1,176.7	1,407.2	499.8	438.5	61.29	8.155		
6,300.0	5,991.2	6,377.7	5,991.2	32.9	37.1	-0.36	1,176.7	1,407.2	499.8	438.3	61.47	8.131		
6,400.0	6,091.2	6,477.7	6,091.2	32.9	37.2	-0.36	1,176.7	1,407.2	499.8	438.1	61.65	8.107		
6,500.0	6,191.2	6,577.7	6,191.2	33.0	37.3	-0.36	1,176.7	1,407.2	499.8	438.0	61.84	8.082		
6,600.0	6,291.2	6,677.7	6,291.2	33.1	37.3	-0.36	1,176.7	1,407.2	499.8	437.8	62.03	8.058		

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 28-04M
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 28-04M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-6	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.0 usft
Piceance 28-05 - Piceance Federal 28-02M - Slot A-5 - 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		
6,700.0	6,391.2	6,777.7	6,391.2	33.2	37.4	-0.36	1,176.7	1,407.2	499.8	437.6	62.22	8.033		
6,800.0	6,491.2	6,877.7	6,491.2	33.3	37.5	-0.36	1,176.7	1,407.2	499.8	437.4	62.41	8.008		
6,900.0	6,591.2	6,977.7	6,591.2	33.4	37.6	-0.36	1,176.7	1,407.2	499.8	437.2	62.61	7.983		
7,000.0	6,691.2	7,077.7	6,691.2	33.5	37.7	-0.36	1,176.7	1,407.2	499.8	437.0	62.81	7.957		
7,100.0	6,791.2	7,177.7	6,791.2	33.6	37.7	-0.36	1,176.7	1,407.2	499.8	436.8	63.01	7.932		
7,200.0	6,891.2	7,277.7	6,891.2	33.7	37.8	-0.36	1,176.7	1,407.2	499.8	436.6	63.22	7.906		
7,300.0	6,991.2	7,377.7	6,991.2	33.8	37.9	-0.36	1,176.7	1,407.2	499.8	436.4	63.42	7.880		
7,400.0	7,091.2	7,477.7	7,091.2	33.9	38.0	-0.36	1,176.7	1,407.2	499.8	436.2	63.63	7.854		
7,500.0	7,191.2	7,577.7	7,191.2	34.0	38.1	-0.36	1,176.7	1,407.2	499.8	436.0	63.84	7.828		
7,600.0	7,291.2	7,677.7	7,291.2	34.1	38.2	-0.36	1,176.7	1,407.2	499.8	435.7	64.06	7.802		
7,700.0	7,391.2	7,777.7	7,391.2	34.2	38.3	-0.36	1,176.7	1,407.2	499.8	435.5	64.28	7.776		
7,800.0	7,491.2	7,877.7	7,491.2	34.3	38.4	-0.36	1,176.7	1,407.2	499.8	435.3	64.50	7.749		
7,900.0	7,591.2	7,977.7	7,591.2	34.4	38.5	-0.36	1,176.7	1,407.2	499.8	435.1	64.72	7.723		
8,000.0	7,691.2	8,077.7	7,691.2	34.5	38.5	-0.36	1,176.7	1,407.2	499.8	434.9	64.94	7.696		
8,100.0	7,791.2	8,177.7	7,791.2	34.6	38.6	-0.36	1,176.7	1,407.2	499.8	434.6	65.17	7.669		
8,200.0	7,891.2	8,277.7	7,891.2	34.7	38.7	-0.36	1,176.7	1,407.2	499.8	434.4	65.40	7.643		
8,216.8	7,908.0	8,294.5	7,908.0	34.7	38.8	-0.36	1,176.7	1,407.2	499.8	434.4	65.43	7.638 SF		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-04M
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 28-04M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-6	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-03M - Slot B-5 - 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	-81.87	2.0	-14.2	14.3					
100.0	100.0	100.0	100.0	0.1	0.1	-81.87	2.0	-14.2	14.3	14.1	0.18	81.583		
200.0	200.0	200.0	200.0	0.3	0.3	-81.87	2.0	-14.2	14.3	13.7	0.62	22.890		
300.0	300.0	300.3	300.3	0.5	0.5	-76.78	3.0	-12.7	13.0	12.0	1.07	12.149		
400.0	400.0	400.4	400.3	0.8	0.8	-54.80	5.8	-8.3	10.1	8.6	1.53	6.631		
448.2	448.2	448.5	448.2	0.9	0.9	-33.02	7.9	-5.1	9.4	7.7	1.75	5.380 CC, ES		
500.0	500.0	500.0	499.5	1.0	1.0	-5.40	10.6	-1.0	10.6	8.6	1.99	5.339		
600.0	600.0	599.1	597.8	1.2	1.3	-39.52	17.1	9.1	18.2	15.7	2.47	7.360		
700.0	699.8	697.9	695.4	1.4	1.6	-29.16	25.5	22.0	27.8	24.9	2.95	9.442		
800.0	799.5	796.3	792.0	1.7	2.0	-24.84	35.7	37.7	38.0	34.6	3.45	11.028		
900.0	898.7	894.3	887.5	1.9	2.4	-22.85	47.6	56.0	48.4	44.5	3.97	12.194		
1,000.0	997.5	992.0	981.9	2.2	2.9	-21.96	61.3	77.0	58.9	54.4	4.52	13.040		
1,100.0	1,095.6	1,089.3	1,075.1	2.6	3.4	-21.69	76.6	100.6	69.5	64.4	5.10	13.639		
1,200.0	1,193.1	1,186.3	1,166.9	3.0	4.0	-21.77	93.6	126.8	80.1	74.4	5.71	14.040		
1,300.0	1,289.6	1,282.9	1,257.3	3.4	4.7	-22.09	112.2	155.4	90.7	84.4	6.35	14.289		
1,400.0	1,385.3	1,379.2	1,346.2	4.0	5.4	-22.57	132.4	186.5	101.4	94.4	7.05	14.393		
1,500.0	1,479.8	1,476.0	1,434.3	4.6	6.2	-23.17	154.3	220.1	112.0	104.2	7.80	14.368		
1,600.0	1,573.2	1,575.6	1,524.5	5.2	7.0	-24.21	177.3	255.5	120.4	111.8	8.63	13.958		
1,700.0	1,665.2	1,675.4	1,614.9	6.0	7.8	-25.81	200.4	291.0	125.7	116.2	9.56	13.148		
1,800.0	1,755.9	1,775.3	1,705.3	6.8	8.7	-27.97	223.4	326.5	128.3	117.6	10.63	12.061		
1,900.0	1,846.4	1,875.1	1,795.7	7.6	9.5	-30.21	246.5	362.0	130.4	118.6	11.81	11.037		
2,000.0	1,936.8	1,975.0	1,886.2	8.4	10.4	-32.37	269.6	397.5	132.7	119.6	13.08	10.143		
2,100.0	2,027.3	2,074.8	1,976.6	9.3	11.2	-34.46	292.6	433.0	135.2	120.7	14.43	9.367		
2,200.0	2,117.7	2,174.7	2,067.0	10.1	12.1	-36.47	315.7	468.5	137.8	122.0	15.86	8.693		
2,300.0	2,208.2	2,274.5	2,157.5	11.0	13.0	-38.40	338.8	504.0	140.7	123.3	17.35	8.110		
2,400.0	2,298.6	2,374.4	2,247.9	11.9	13.8	-40.25	361.8	539.5	143.7	124.8	18.89	7.603		
2,500.0	2,389.0	2,474.2	2,338.3	12.7	14.7	-42.03	384.9	575.0	146.8	126.3	20.49	7.163		
2,600.0	2,479.5	2,574.1	2,428.7	13.6	15.5	-43.73	408.0	610.5	150.0	127.9	22.13	6.778		
2,700.0	2,569.9	2,673.9	2,519.2	14.5	16.4	-45.36	431.0	646.0	153.4	129.6	23.82	6.442		
2,800.0	2,660.4	2,773.7	2,609.6	15.4	17.3	-46.91	454.1	681.5	156.9	131.4	25.53	6.147		
2,900.0	2,750.8	2,873.6	2,700.0	16.2	18.1	-48.40	477.2	717.0	160.5	133.3	27.27	5.888		
3,000.0	2,841.3	2,973.4	2,790.5	17.1	19.0	-49.82	500.2	752.4	164.3	135.2	29.03	5.658		
3,100.0	2,931.7	3,073.3	2,880.9	18.0	19.9	-51.17	523.3	787.9	168.1	137.3	30.82	5.454		
3,200.0	3,022.1	3,173.1	2,971.3	18.9	20.7	-52.47	546.4	823.4	172.0	139.4	32.62	5.273		
3,300.0	3,112.6	3,273.0	3,061.8	19.8	21.6	-53.71	569.4	858.9	176.0	141.5	34.43	5.111		
3,400.0	3,203.0	3,372.8	3,152.2	20.6	22.5	-54.89	592.5	894.4	180.1	143.8	36.26	4.966		
3,500.0	3,293.5	3,472.7	3,242.6	21.5	23.3	-56.02	615.6	929.9	184.2	146.1	38.10	4.835		
3,600.0	3,383.9	3,572.5	3,333.1	22.4	24.2	-57.10	638.6	965.4	188.4	148.5	39.94	4.717		
3,700.0	3,474.4	3,672.4	3,423.5	23.3	25.0	-58.13	661.7	1,000.9	192.7	150.9	41.79	4.611		
3,800.0	3,564.8	3,772.2	3,513.9	24.2	25.9	-59.12	684.8	1,036.4	197.0	153.4	43.64	4.515		
3,900.0	3,655.3	3,872.1	3,604.4	25.0	26.8	-60.06	707.8	1,071.9	201.4	155.9	45.50	4.427		
4,000.0	3,745.7	3,971.9	3,694.8	25.9	27.6	-60.97	730.9	1,107.4	205.8	158.5	47.36	4.347		
4,100.0	3,836.1	4,071.8	3,785.2	26.8	28.5	-61.83	754.0	1,142.9	210.3	161.1	49.22	4.274		
4,200.0	3,926.8	4,171.6	3,875.7	27.6	29.4	-62.59	777.0	1,178.4	215.1	164.1	50.99	4.219		
4,300.0	4,018.7	4,275.4	3,970.3	28.3	30.1	-62.96	800.3	1,214.1	220.5	168.2	52.35	4.212		
4,400.0	4,112.0	4,379.8	4,067.0	28.9	30.8	-63.29	821.7	1,247.2	225.5	171.9	53.58	4.208		
4,500.0	4,206.4	4,484.3	4,165.1	29.5	31.4	-63.58	841.3	1,277.3	230.0	175.3	54.71	4.205		
4,600.0	4,301.9	4,588.9	4,264.5	30.0	31.9	-63.83	858.9	1,304.4	234.1	178.4	55.73	4.202		
4,700.0	4,398.5	4,693.5	4,364.1	30.4	32.4	-64.04	874.5	1,328.4	237.8	181.1	56.63	4.198		
4,800.0	4,495.8	4,798.2	4,466.8	30.8	32.8	-64.23	888.2	1,349.4	240.9	183.5	57.43	4.195		
4,900.0	4,593.9	4,903.0	4,569.4	31.2	33.2	-64.38	899.8	1,367.2	243.6	185.5	58.12	4.192		
5,000.0	4,692.6	5,007.9	4,672.8	31.5	33.5	-64.50	909.3	1,381.9	245.8	187.2	58.69	4.189		

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 28-04M
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 28-04M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-6	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-03M - Slot B-5 - 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		
5,100.0	4,791.8	5,112.7	4,776.7	31.7	33.8	-64.60	916.8	1,393.4	247.6	188.4	59.16	4.185		
5,200.0	4,891.4	5,217.6	4,881.2	31.9	34.0	-64.67	922.2	1,401.8	248.8	189.3	59.52	4.181		
5,300.0	4,991.3	5,322.6	4,985.9	32.1	34.1	-64.71	925.5	1,406.9	249.6	189.8	59.78	4.176		
5,400.0	5,091.2	5,427.5	5,090.8	32.1	34.2	-64.73	926.8	1,408.8	249.9	190.0	59.94	4.169		
5,500.0	5,191.2	5,527.9	5,191.2	32.2	34.3	-0.36	926.8	1,408.8	249.9	189.8	60.08	4.159		
5,600.0	5,291.2	5,627.9	5,291.2	32.3	34.4	-0.36	926.8	1,408.8	249.9	189.7	60.24	4.148		
5,700.0	5,391.2	5,727.9	5,391.2	32.4	34.5	-0.36	926.8	1,408.8	249.9	189.5	60.41	4.137		
5,800.0	5,491.2	5,827.9	5,491.2	32.4	34.5	-0.36	926.8	1,408.8	249.9	189.3	60.58	4.125		
5,900.0	5,591.2	5,927.9	5,591.2	32.5	34.6	-0.36	926.8	1,408.8	249.9	189.2	60.75	4.114		
6,000.0	5,691.2	6,027.9	5,691.2	32.6	34.7	-0.36	926.8	1,408.8	249.9	189.0	60.92	4.102		
6,100.0	5,791.2	6,127.9	5,791.2	32.7	34.8	-0.36	926.8	1,408.8	249.9	188.8	61.10	4.090		
6,200.0	5,891.2	6,227.9	5,891.2	32.8	34.8	-0.36	926.8	1,408.8	249.9	188.6	61.27	4.078		
6,300.0	5,991.2	6,327.9	5,991.2	32.9	34.9	-0.36	926.8	1,408.8	249.9	188.4	61.46	4.066		
6,400.0	6,091.2	6,427.9	6,091.2	32.9	35.0	-0.36	926.8	1,408.8	249.9	188.3	61.64	4.054		
6,500.0	6,191.2	6,527.9	6,191.2	33.0	35.1	-0.36	926.8	1,408.8	249.9	188.1	61.83	4.042		
6,600.0	6,291.2	6,627.9	6,291.2	33.1	35.2	-0.36	926.8	1,408.8	249.9	187.9	62.02	4.029		
6,700.0	6,391.2	6,727.9	6,391.2	33.2	35.2	-0.36	926.8	1,408.8	249.9	187.7	62.21	4.017		
6,800.0	6,491.2	6,827.9	6,491.2	33.3	35.3	-0.36	926.8	1,408.8	249.9	187.5	62.40	4.004		
6,900.0	6,591.2	6,927.9	6,591.2	33.4	35.4	-0.36	926.8	1,408.8	249.9	187.3	62.60	3.992		
7,000.0	6,691.2	7,027.9	6,691.2	33.5	35.5	-0.36	926.8	1,408.8	249.9	187.1	62.80	3.979		
7,100.0	6,791.2	7,127.9	6,791.2	33.6	35.6	-0.36	926.8	1,408.8	249.9	186.9	63.01	3.966		
7,200.0	6,891.2	7,227.9	6,891.2	33.7	35.7	-0.36	926.8	1,408.8	249.9	186.7	63.21	3.953		
7,300.0	6,991.2	7,327.9	6,991.2	33.8	35.8	-0.36	926.8	1,408.8	249.9	186.5	63.42	3.940		
7,400.0	7,091.2	7,427.9	7,091.2	33.9	35.9	-0.36	926.8	1,408.8	249.9	186.3	63.63	3.927		
7,500.0	7,191.2	7,527.9	7,191.2	34.0	36.0	-0.36	926.8	1,408.8	249.9	186.1	63.84	3.914		
7,600.0	7,291.2	7,627.9	7,291.2	34.1	36.1	-0.36	926.8	1,408.8	249.9	185.8	64.06	3.901		
7,700.0	7,391.2	7,727.9	7,391.2	34.2	36.1	-0.36	926.8	1,408.8	249.9	185.6	64.28	3.888		
7,800.0	7,491.2	7,827.9	7,491.2	34.3	36.2	-0.36	926.8	1,408.8	249.9	185.4	64.50	3.875		
7,900.0	7,591.2	7,927.9	7,591.2	34.4	36.3	-0.36	926.8	1,408.8	249.9	185.2	64.72	3.861		
8,000.0	7,691.2	8,027.9	7,691.2	34.5	36.4	-0.36	926.8	1,408.8	249.9	185.0	64.94	3.848		
8,100.0	7,791.2	8,127.9	7,791.2	34.6	36.5	-0.36	926.8	1,408.8	249.9	184.7	65.17	3.835		
8,200.0	7,891.2	8,227.9	7,891.2	34.7	36.6	-0.36	926.8	1,408.8	249.9	184.5	65.40	3.821		
8,216.8	7,908.0	8,244.7	7,908.0	34.7	36.7	-0.36	926.8	1,408.8	249.9	184.5	65.44	3.819 SF		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-04M
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 28-04M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-6	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	-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	56.675		
200.0	200.0	200.0	200.0	0.3	0.3	-127.66	-6.1	-7.9	9.9	9.3	0.62	15.902		
300.0	300.0	300.0	300.0	0.5	0.5	-127.66	-6.1	-7.9	9.9	8.9	1.07	9.248		
400.0	400.0	400.0	400.0	0.8	0.8	-127.66	-6.1	-7.9	9.9	8.4	1.52	6.520		
500.0	500.0	500.0	500.0	1.0	1.0	-127.66	-6.1	-7.9	9.9	8.0	1.97	5.035 CC, ES		
600.0	600.0	600.0	600.0	1.2	1.2	169.76	-6.1	-7.9	11.6	9.2	2.43	4.795		
700.0	699.8	699.8	699.8	1.4	1.4	172.92	-6.1	-7.9	16.8	13.9	2.90	5.806		
800.0	799.5	800.3	800.3	1.7	1.7	174.36	-5.6	-6.2	23.8	20.4	3.36	7.075		
900.0	898.7	901.0	900.8	1.9	1.9	174.16	-4.0	-1.1	30.9	27.0	3.83	8.060		
1,000.0	997.5	1,001.9	1,001.3	2.2	2.1	173.23	-1.4	7.3	38.0	33.7	4.31	8.824		
1,100.0	1,095.6	1,103.0	1,101.7	2.6	2.4	171.92	2.2	19.2	45.2	40.4	4.80	9.426		
1,200.0	1,193.1	1,204.4	1,201.8	3.0	2.7	170.38	6.9	34.5	52.5	47.2	5.30	9.898		
1,300.0	1,289.6	1,306.0	1,301.5	3.4	3.0	168.71	12.6	53.2	59.9	54.1	5.84	10.261		
1,400.0	1,385.3	1,407.8	1,400.6	4.0	3.4	166.95	19.3	75.3	67.5	61.1	6.41	10.523		
1,500.0	1,479.8	1,509.8	1,499.1	4.6	3.8	165.14	27.1	100.9	75.2	68.1	7.04	10.687		
1,600.0	1,573.2	1,612.1	1,596.7	5.2	4.4	163.30	35.9	129.8	83.1	75.3	7.72	10.755		
1,700.0	1,665.2	1,714.5	1,693.4	6.0	5.0	161.45	45.8	162.2	91.1	82.6	8.48	10.737		
1,800.0	1,755.9	1,817.2	1,789.1	6.8	5.7	159.57	56.7	197.9	99.1	89.8	9.35	10.597		
1,900.0	1,846.4	1,920.1	1,883.6	7.6	6.4	157.13	68.6	236.9	104.8	94.4	10.38	10.091		
2,000.0	1,936.8	2,021.8	1,975.5	8.4	7.2	154.02	81.2	278.4	107.8	96.2	11.61	9.289		
2,100.0	2,027.3	2,121.6	2,065.5	9.3	8.1	150.96	93.8	319.6	110.7	97.7	12.97	8.535		
2,200.0	2,117.7	2,221.4	2,155.5	10.1	8.9	148.06	106.4	360.9	113.9	99.4	14.45	7.883		
2,300.0	2,208.2	2,321.2	2,245.5	11.0	9.8	145.32	119.0	402.1	117.3	101.3	16.02	7.325		
2,400.0	2,298.6	2,420.9	2,335.5	11.9	10.7	142.75	131.6	443.4	121.1	103.4	17.67	6.850		
2,500.0	2,389.0	2,520.7	2,425.5	12.7	11.5	140.33	144.1	484.6	125.0	105.6	19.39	6.446		
2,600.0	2,479.5	2,620.5	2,515.5	13.6	12.4	138.06	156.7	525.8	129.1	108.0	21.16	6.104		
2,700.0	2,569.9	2,720.3	2,605.5	14.5	13.3	135.94	169.3	567.1	133.5	110.5	22.97	5.812		
2,800.0	2,660.4	2,820.1	2,695.5	15.4	14.2	133.95	181.9	608.3	138.0	113.2	24.81	5.563		
2,900.0	2,750.8	2,919.9	2,785.5	16.2	15.1	132.09	194.4	649.6	142.6	116.0	26.67	5.349		
3,000.0	2,841.3	3,019.7	2,875.4	17.1	16.0	130.35	207.0	690.8	147.5	118.9	28.55	5.165		
3,100.0	2,931.7	3,119.4	2,965.4	18.0	16.9	128.72	219.6	732.0	152.4	121.9	30.44	5.005		
3,200.0	3,022.1	3,219.2	3,055.4	18.9	17.8	127.19	232.2	773.3	157.4	125.1	32.35	4.867		
3,300.0	3,112.6	3,319.0	3,145.4	19.8	18.7	125.76	244.8	814.5	162.6	128.3	34.26	4.746		
3,400.0	3,203.0	3,418.8	3,235.4	20.6	19.6	124.42	257.3	855.7	167.8	131.7	36.17	4.640		
3,500.0	3,293.5	3,518.6	3,325.4	21.5	20.5	123.15	269.9	897.0	173.2	135.1	38.08	4.547		
3,600.0	3,383.9	3,618.4	3,415.4	22.4	21.4	121.97	282.5	938.2	178.6	138.6	40.00	4.465		
3,700.0	3,474.4	3,718.2	3,505.4	23.3	22.3	120.86	295.1	979.5	184.1	142.2	41.91	4.392		
3,800.0	3,564.8	3,818.0	3,595.4	24.2	23.2	119.81	307.7	1,020.7	189.6	145.8	43.82	4.327		
3,900.0	3,655.3	3,917.7	3,685.4	25.0	24.1	118.82	320.2	1,061.9	195.2	149.5	45.73	4.269		
4,000.0	3,745.7	4,017.5	3,775.4	25.9	25.0	117.88	332.8	1,103.2	200.9	153.3	47.64	4.217		
4,100.0	3,836.1	4,117.2	3,865.3	26.8	25.9	117.00	345.4	1,144.4	206.6	157.1	49.54	4.171		
4,200.0	3,926.8	4,214.7	3,954.0	27.6	26.7	116.58	357.2	1,183.1	212.7	161.6	51.15	4.159		
4,300.0	4,018.7	4,312.2	4,044.0	28.3	27.3	116.34	368.1	1,219.0	218.5	166.1	52.47	4.165		
4,400.0	4,112.0	4,409.7	4,135.2	28.9	27.9	116.13	378.2	1,251.9	223.9	170.2	53.67	4.171		
4,500.0	4,206.4	4,507.3	4,227.6	29.5	28.5	115.95	387.3	1,281.8	228.7	174.0	54.78	4.176		
4,600.0	4,301.9	4,604.8	4,320.9	30.0	28.9	115.80	395.5	1,308.7	233.1	177.3	55.77	4.180		
4,700.0	4,398.5	4,702.3	4,415.2	30.4	29.4	115.67	402.8	1,332.5	237.0	180.3	56.66	4.183		
4,800.0	4,495.8	4,800.0	4,510.5	30.8	29.8	115.56	409.1	1,353.3	240.4	182.9	57.43	4.185		
4,900.0	4,593.9	4,897.4	4,606.1	31.2	30.1	115.47	414.5	1,370.9	243.2	185.1	58.10	4.186		
5,000.0	4,692.6	4,995.0	4,702.5	31.5	30.4	115.40	418.9	1,385.4	245.6	186.9	58.66	4.186		
5,100.0	4,791.8	5,092.5	4,799.3	31.7	30.6	115.34	422.4	1,396.8	247.4	188.3	59.12	4.185		

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 28-04M
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 28-04M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-6	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		
5,200.0	4,891.4	5,190.1	4,896.5	31.9	30.8	115.31	424.9	1,405.0	248.8	189.3	59.48	4.183		
5,300.0	4,991.3	5,287.7	4,993.9	32.1	30.9	115.28	426.4	1,410.1	249.6	189.9	59.74	4.178		
5,400.0	5,091.2	5,385.2	5,091.5	32.1	31.0	115.27	427.0	1,411.9	249.9	190.0	59.89	4.172		
5,500.0	5,191.2	5,485.0	5,191.2	32.2	31.1	179.64	427.0	1,412.0	249.9	189.9	60.05	4.162		
5,600.0	5,291.2	5,585.0	5,291.2	32.3	31.2	179.64	427.0	1,412.0	249.9	189.7	60.21	4.150		
5,700.0	5,391.2	5,685.0	5,391.2	32.4	31.3	179.64	427.0	1,412.0	249.9	189.5	60.38	4.139		
5,800.0	5,491.2	5,785.0	5,491.2	32.4	31.3	179.64	427.0	1,412.0	249.9	189.4	60.55	4.127		
5,900.0	5,591.2	5,885.0	5,591.2	32.5	31.4	179.64	427.0	1,412.0	249.9	189.2	60.72	4.116		
6,000.0	5,691.2	5,985.0	5,691.2	32.6	31.5	179.64	427.0	1,412.0	249.9	189.0	60.89	4.104		
6,100.0	5,791.2	6,085.0	5,791.2	32.7	31.6	179.64	427.0	1,412.0	249.9	188.8	61.07	4.092		
6,200.0	5,891.2	6,185.0	5,891.2	32.8	31.7	179.64	427.0	1,412.0	249.9	188.6	61.25	4.080		
6,300.0	5,991.2	6,285.0	5,991.2	32.9	31.8	179.64	427.0	1,412.0	249.9	188.5	61.43	4.068		
6,400.0	6,091.2	6,385.0	6,091.2	32.9	31.9	179.64	427.0	1,412.0	249.9	188.3	61.62	4.056		
6,500.0	6,191.2	6,485.0	6,191.2	33.0	32.0	179.64	427.0	1,412.0	249.9	188.1	61.80	4.043		
6,600.0	6,291.2	6,585.0	6,291.2	33.1	32.0	179.64	427.0	1,412.0	249.9	187.9	62.00	4.031		
6,700.0	6,391.2	6,685.0	6,391.2	33.2	32.1	179.64	427.0	1,412.0	249.9	187.7	62.19	4.018		
6,800.0	6,491.2	6,785.0	6,491.2	33.3	32.2	179.64	427.0	1,412.0	249.9	187.5	62.39	4.006		
6,900.0	6,591.2	6,885.0	6,591.2	33.4	32.3	179.64	427.0	1,412.0	249.9	187.3	62.58	3.993		
7,000.0	6,691.2	6,985.0	6,691.2	33.5	32.4	179.64	427.0	1,412.0	249.9	187.1	62.79	3.980		
7,100.0	6,791.2	7,085.0	6,791.2	33.6	32.5	179.64	427.0	1,412.0	249.9	186.9	62.99	3.967		
7,200.0	6,891.2	7,185.0	6,891.2	33.7	32.6	179.64	427.0	1,412.0	249.9	186.7	63.20	3.954		
7,300.0	6,991.2	7,285.0	6,991.2	33.8	32.7	179.64	427.0	1,412.0	249.9	186.5	63.40	3.941		
7,400.0	7,091.2	7,385.0	7,091.2	33.9	32.8	179.64	427.0	1,412.0	249.9	186.3	63.62	3.928		
7,500.0	7,191.2	7,485.0	7,191.2	34.0	32.9	179.64	427.0	1,412.0	249.9	186.1	63.83	3.915		
7,600.0	7,291.2	7,585.0	7,291.2	34.1	33.0	179.64	427.0	1,412.0	249.9	185.9	64.05	3.902		
7,700.0	7,391.2	7,685.0	7,391.2	34.2	33.1	179.64	427.0	1,412.0	249.9	185.6	64.27	3.889		
7,800.0	7,491.2	7,785.0	7,491.2	34.3	33.3	179.64	427.0	1,412.0	249.9	185.4	64.49	3.875		
7,900.0	7,591.2	7,885.0	7,591.2	34.4	33.4	179.64	427.0	1,412.0	249.9	185.2	64.71	3.862		
8,000.0	7,691.2	7,985.0	7,691.2	34.5	33.5	179.64	427.0	1,412.0	249.9	185.0	64.94	3.848		
8,100.0	7,791.2	8,085.0	7,791.2	34.6	33.6	179.64	427.0	1,412.0	249.9	184.7	65.16	3.835		
8,200.0	7,891.2	8,185.0	7,891.2	34.7	33.7	179.64	427.0	1,412.0	249.9	184.5	65.40	3.821		
8,203.8	7,895.0	8,188.8	7,895.0	34.7	33.7	179.64	427.0	1,412.0	249.9	184.5	65.40	3.821		
8,216.8	7,908.0	8,196.8	7,903.0	34.7	33.7	179.64	427.0	1,412.0	249.9	184.5	65.43	3.820 SF		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-04M
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 28-04M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-6	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-06M - Slot A-7 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
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	140.33	-15.2	12.6	19.7					
100.0	100.0	100.0	100.0	0.1	0.1	140.33	-15.2	12.6	19.7	19.5	0.18	112.457		
200.0	200.0	200.0	200.0	0.3	0.3	140.33	-15.2	12.6	19.7	19.1	0.62	31.553		
300.0	300.0	300.0	300.0	0.5	0.5	140.33	-15.2	12.6	19.7	18.6	1.07	18.351 CC, ES		
400.0	400.0	399.6	399.6	0.8	0.8	136.24	-14.9	14.3	20.7	19.2	1.51	13.655		
500.0	500.0	499.0	498.8	1.0	1.0	126.17	-14.2	19.4	24.1	22.1	1.96	12.300		
600.0	600.0	598.0	597.5	1.2	1.2	53.08	-13.0	27.9	29.8	27.4	2.40	12.411		
700.0	699.8	696.8	695.5	1.4	1.5	48.54	-11.3	39.7	36.6	33.8	2.86	12.793		
800.0	799.5	795.3	792.8	1.7	1.8	46.52	-9.2	54.9	44.2	40.9	3.35	13.191		
900.0	898.7	893.5	889.2	1.9	2.2	46.01	-6.5	73.2	52.4	48.6	3.87	13.531		
1,000.0	997.5	991.4	984.7	2.2	2.6	46.41	-3.5	94.8	61.2	56.8	4.44	13.780		
1,100.0	1,095.6	1,089.0	1,079.1	2.6	3.0	47.35	0.0	119.5	70.6	65.5	5.07	13.922		
1,200.0	1,193.1	1,186.3	1,172.2	3.0	3.6	48.62	4.0	147.2	80.5	74.8	5.77	13.948		
1,300.0	1,289.6	1,283.3	1,264.1	3.4	4.2	50.08	8.4	178.0	91.1	84.5	6.57	13.866		
1,400.0	1,385.3	1,382.6	1,357.6	4.0	4.8	52.21	13.1	211.2	101.1	93.6	7.50	13.481		
1,500.0	1,479.8	1,482.1	1,451.2	4.6	5.5	55.44	17.8	244.5	109.2	100.6	8.59	12.707		
1,600.0	1,573.2	1,581.5	1,544.8	5.2	6.2	59.67	22.6	277.7	115.8	106.0	9.89	11.718		
1,700.0	1,665.2	1,680.7	1,638.2	6.0	6.9	64.88	27.3	310.8	121.6	110.2	11.40	10.665		
1,800.0	1,755.9	1,779.6	1,731.3	6.8	7.5	70.95	32.0	343.9	127.2	114.0	13.12	9.692		
1,900.0	1,846.4	1,878.5	1,824.4	7.6	8.2	76.79	36.7	377.0	133.9	119.0	14.90	8.987		
2,000.0	1,936.8	1,977.4	1,917.4	8.4	8.9	82.04	41.4	410.0	142.0	125.3	16.67	8.516		
2,100.0	2,027.3	2,076.2	2,010.5	9.3	9.6	86.69	46.1	443.0	151.1	132.7	18.40	8.209		
2,200.0	2,117.7	2,175.1	2,103.5	10.1	10.3	90.80	50.8	476.1	161.1	141.0	20.09	8.019		
2,300.0	2,208.2	2,274.0	2,196.6	11.0	11.0	94.42	55.5	509.1	171.8	150.1	21.72	7.911		
2,400.0	2,298.6	2,372.8	2,289.7	11.9	11.7	97.60	60.2	542.2	183.1	159.8	23.30	7.860		
2,500.0	2,389.0	2,471.7	2,382.7	12.7	12.4	100.41	64.9	575.2	195.0	170.1	24.84	7.849 SF		
2,600.0	2,479.5	2,570.6	2,475.8	13.6	13.1	102.90	69.6	608.3	207.2	180.9	26.34	7.865		
2,700.0	2,569.9	2,669.4	2,568.8	14.5	13.8	105.11	74.3	641.3	219.8	192.0	27.82	7.902		
2,800.0	2,660.4	2,768.3	2,661.9	15.4	14.5	107.07	79.0	674.4	232.7	203.4	29.26	7.952		
2,900.0	2,750.8	2,867.2	2,755.0	16.2	15.2	108.83	83.7	707.4	245.8	215.1	30.68	8.011		
3,000.0	2,841.3	2,966.0	2,848.0	17.1	15.9	110.41	88.4	740.5	259.1	227.0	32.09	8.075		
3,100.0	2,931.7	3,064.9	2,941.1	18.0	16.6	111.84	93.1	773.5	272.6	239.1	33.47	8.144		
3,200.0	3,022.1	3,163.8	3,034.2	18.9	17.2	113.13	97.9	806.5	286.3	251.4	34.85	8.214		
3,300.0	3,112.6	3,262.6	3,127.2	19.8	17.9	114.31	102.6	839.6	300.0	263.8	36.21	8.286		
3,400.0	3,203.0	3,361.5	3,220.3	20.6	18.6	115.38	107.3	872.6	313.9	276.4	37.57	8.357		
3,500.0	3,293.5	3,460.4	3,313.3	21.5	19.3	116.36	112.0	905.7	327.9	289.0	38.91	8.428		
3,600.0	3,383.9	3,559.2	3,406.4	22.4	20.0	117.26	116.7	938.7	342.0	301.8	40.25	8.497		
3,700.0	3,474.4	3,658.1	3,499.5	23.3	20.7	118.08	121.4	971.8	356.2	314.6	41.58	8.565		
3,800.0	3,564.8	3,757.0	3,592.5	24.2	21.4	118.85	126.1	1,004.8	370.4	327.5	42.91	8.632		
3,900.0	3,655.3	3,855.8	3,685.6	25.0	22.1	119.56	130.8	1,037.9	384.7	340.4	44.23	8.696		
4,000.0	3,745.7	3,954.7	3,778.6	25.9	22.8	120.22	135.5	1,070.9	399.0	353.5	45.55	8.759		
4,100.0	3,836.1	4,053.6	3,871.7	26.8	23.5	120.83	140.2	1,104.0	413.4	366.5	46.87	8.820		
4,200.0	3,926.8	4,152.5	3,964.8	27.6	24.2	121.47	144.9	1,137.0	427.6	379.4	48.15	8.880		
4,300.0	4,018.7	4,251.7	4,058.2	28.3	24.9	121.82	149.6	1,170.2	440.1	390.7	49.38	8.914		
4,400.0	4,112.0	4,350.3	4,151.0	28.9	25.6	121.76	154.3	1,203.1	450.9	400.2	50.64	8.904		
4,500.0	4,206.4	4,445.9	4,241.7	29.5	26.2	121.60	158.5	1,232.9	460.4	408.7	51.74	8.898		
4,600.0	4,301.9	4,541.5	4,333.5	30.0	26.6	121.47	162.4	1,259.8	469.0	416.3	52.71	8.898		
4,700.0	4,398.5	4,637.3	4,426.1	30.4	27.0	121.36	165.8	1,283.6	476.6	423.0	53.57	8.897		
4,800.0	4,495.8	4,733.1	4,519.6	30.8	27.4	121.27	168.7	1,304.4	483.2	428.9	54.33	8.895		
4,900.0	4,593.9	4,829.0	4,613.8	31.2	27.7	121.19	171.2	1,322.1	488.9	433.9	54.99	8.891		
5,000.0	4,692.6	4,925.0	4,708.7	31.5	28.0	121.13	173.3	1,336.6	493.5	438.0	55.54	8.886		
5,100.0	4,791.8	5,021.0	4,804.0	31.7	28.2	121.09	174.9	1,348.0	497.2	441.2	55.99	8.880		

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 28-04M
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 28-04M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-6	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-06M - Slot A-7 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
5,200.0	4,891.4	5,117.0	4,899.6	31.9	28.4	121.06	176.1	1,356.3	499.8	443.5	56.34	8.871		
5,300.0	4,991.3	5,213.0	4,995.5	32.1	28.5	121.04	176.8	1,361.3	501.4	444.8	56.59	8.860		
5,400.0	5,091.2	5,309.1	5,091.6	32.1	28.6	121.03	177.1	1,363.2	502.0	445.3	56.75	8.846		
5,500.0	5,191.2	5,408.8	5,191.2	32.2	28.7	-174.61	177.1	1,363.2	502.0	445.1	56.90	8.822		
5,600.0	5,291.2	5,508.8	5,291.2	32.3	28.8	-174.61	177.1	1,363.2	502.0	444.9	57.07	8.796		
5,700.0	5,391.2	5,608.8	5,391.2	32.4	28.9	-174.61	177.1	1,363.2	502.0	444.8	57.25	8.769		
5,800.0	5,491.2	5,708.8	5,491.2	32.4	29.0	-174.61	177.1	1,363.2	502.0	444.6	57.43	8.742		
5,900.0	5,591.2	5,808.8	5,591.2	32.5	29.0	-174.61	177.1	1,363.2	502.0	444.4	57.61	8.715		
6,000.0	5,691.2	5,908.8	5,691.2	32.6	29.1	-174.61	177.1	1,363.2	502.0	444.2	57.79	8.687		
6,100.0	5,791.2	6,008.8	5,791.2	32.7	29.2	-174.61	177.1	1,363.2	502.0	444.0	57.98	8.659		
6,200.0	5,891.2	6,108.8	5,891.2	32.8	29.3	-174.61	177.1	1,363.2	502.0	443.8	58.16	8.631		
6,300.0	5,991.2	6,208.8	5,991.2	32.9	29.4	-174.61	177.1	1,363.2	502.0	443.7	58.36	8.602		
6,400.0	6,091.2	6,308.8	6,091.2	32.9	29.5	-174.61	177.1	1,363.2	502.0	443.5	58.55	8.574		
6,500.0	6,191.2	6,408.8	6,191.2	33.0	29.6	-174.61	177.1	1,363.2	502.0	443.3	58.75	8.545		
6,600.0	6,291.2	6,508.8	6,291.2	33.1	29.7	-174.61	177.1	1,363.2	502.0	443.1	58.95	8.516		
6,700.0	6,391.2	6,608.8	6,391.2	33.2	29.8	-174.61	177.1	1,363.2	502.0	442.9	59.15	8.487		
6,800.0	6,491.2	6,708.8	6,491.2	33.3	29.9	-174.61	177.1	1,363.2	502.0	442.7	59.36	8.457		
6,900.0	6,591.2	6,808.8	6,591.2	33.4	30.0	-174.61	177.1	1,363.2	502.0	442.4	59.57	8.428		
7,000.0	6,691.2	6,908.8	6,691.2	33.5	30.1	-174.61	177.1	1,363.2	502.0	442.2	59.78	8.398		
7,100.0	6,791.2	7,008.8	6,791.2	33.6	30.2	-174.61	177.1	1,363.2	502.0	442.0	59.99	8.368		
7,200.0	6,891.2	7,108.8	6,891.2	33.7	30.3	-174.61	177.1	1,363.2	502.0	441.8	60.21	8.338		
7,300.0	6,991.2	7,208.8	6,991.2	33.8	30.4	-174.61	177.1	1,363.2	502.0	441.6	60.43	8.308		
7,400.0	7,091.2	7,308.8	7,091.2	33.9	30.6	-174.61	177.1	1,363.2	502.0	441.4	60.65	8.278		
7,500.0	7,191.2	7,408.8	7,191.2	34.0	30.7	-174.61	177.1	1,363.2	502.0	441.1	60.87	8.247		
7,600.0	7,291.2	7,508.8	7,291.2	34.1	30.8	-174.61	177.1	1,363.2	502.0	440.9	61.10	8.216		
7,700.0	7,391.2	7,608.8	7,391.2	34.2	30.9	-174.61	177.1	1,363.2	502.0	440.7	61.33	8.186		
7,800.0	7,491.2	7,708.8	7,491.2	34.3	31.0	-174.61	177.1	1,363.2	502.0	440.5	61.56	8.155		
7,900.0	7,591.2	7,808.8	7,591.2	34.4	31.1	-174.61	177.1	1,363.2	502.0	440.2	61.79	8.124		
8,000.0	7,691.2	7,908.8	7,691.2	34.5	31.2	-174.61	177.1	1,363.2	502.0	440.0	62.03	8.093		
8,100.0	7,791.2	8,008.8	7,791.2	34.6	31.4	-174.61	177.1	1,363.2	502.0	439.7	62.27	8.062		
8,200.0	7,891.2	8,108.8	7,891.2	34.7	31.5	-174.61	177.1	1,363.2	502.0	439.5	62.51	8.031		
8,216.8	7,908.0	8,113.5	7,896.0	34.7	31.5	-174.61	177.1	1,363.2	502.2	439.6	62.53	8.030		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-04M
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 28-04M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-6	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-08W - Slot B-7 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	167.48	-21.2	4.7	21.8					
100.0	100.0	100.0	100.0	0.1	0.1	167.48	-21.2	4.7	21.8	21.6	0.18	124.139		
200.0	200.0	200.0	200.0	0.3	0.3	167.48	-21.2	4.7	21.8	21.1	0.62	34.830		
300.0	300.0	300.0	300.0	0.5	0.5	167.48	-21.2	4.7	21.8	20.7	1.07	20.257		
400.0	400.0	400.0	400.0	0.8	0.8	167.48	-21.2	4.7	21.8	20.2	1.52	14.282		
500.0	500.0	500.0	500.0	1.0	1.0	167.48	-21.2	4.7	21.8	19.8	1.97	11.028 CC, ES		
600.0	600.0	600.0	600.0	1.2	1.2	107.49	-21.2	4.7	22.2	19.8	2.42	9.193		
700.0	699.8	699.2	699.2	1.4	1.4	122.03	-22.3	3.4	25.5	22.7	2.85	8.950 SF		
800.0	799.5	797.4	797.3	1.7	1.6	139.71	-25.5	-0.6	35.6	32.3	3.31	10.736		
900.0	898.7	893.9	893.4	1.9	1.8	151.91	-30.7	-7.0	53.8	50.0	3.80	14.141		
1,000.0	997.5	990.2	989.1	2.2	2.0	159.00	-37.2	-15.0	78.4	74.2	4.29	18.288		
1,100.0	1,095.6	1,085.8	1,084.1	2.6	2.3	163.19	-43.7	-23.0	107.0	102.2	4.77	22.454		
1,200.0	1,193.1	1,180.3	1,178.1	3.0	2.5	165.92	-50.1	-30.8	139.1	133.9	5.24	26.548		
1,300.0	1,289.6	1,273.6	1,270.9	3.4	2.8	167.83	-56.4	-38.6	174.6	168.9	5.72	30.556		
1,400.0	1,385.3	1,365.6	1,362.4	4.0	3.1	169.23	-62.7	-46.3	213.5	207.3	6.19	34.487		
1,500.0	1,479.8	1,456.2	1,452.4	4.6	3.3	170.30	-68.8	-53.9	255.6	248.9	6.67	38.343		
1,600.0	1,573.2	1,545.3	1,541.0	5.2	3.6	171.14	-74.9	-61.3	300.8	293.7	7.14	42.124		
1,700.0	1,665.2	1,632.7	1,627.9	6.0	3.8	171.80	-80.8	-68.6	349.2	341.6	7.61	45.862		
1,800.0	1,755.9	1,718.5	1,713.2	6.8	4.1	172.40	-86.6	-75.8	400.4	392.3	8.08	49.528		
1,900.0	1,846.4	1,804.0	1,798.2	7.6	4.3	172.96	-92.4	-82.9	452.2	443.6	8.56	52.838		
2,000.0	1,936.8	1,889.4	1,883.1	8.4	4.6	173.40	-98.2	-90.0	504.0	495.0	9.04	55.743		
2,100.0	2,027.3	1,974.9	1,968.1	9.3	4.8	173.76	-104.0	-97.2	555.9	546.3	9.53	58.307		
2,200.0	2,117.7	2,060.3	2,053.1	10.1	5.1	174.05	-109.8	-104.3	607.7	597.7	10.03	60.579		
2,300.0	2,208.2	2,145.8	2,138.0	11.0	5.3	174.31	-115.5	-111.4	659.6	649.1	10.54	62.604		
2,400.0	2,298.6	2,231.2	2,223.0	11.9	5.6	174.52	-121.3	-118.6	711.5	700.5	11.05	64.416		
2,500.0	2,389.0	2,316.7	2,307.9	12.7	5.8	174.70	-127.1	-125.7	763.4	751.8	11.56	66.044		
2,600.0	2,479.5	2,402.2	2,392.9	13.6	6.1	174.87	-132.9	-132.8	815.3	803.2	12.08	67.513		
2,700.0	2,569.9	2,487.6	2,477.9	14.5	6.4	175.01	-138.7	-140.0	867.2	854.6	12.60	68.845		
2,800.0	2,660.4	2,573.1	2,562.8	15.4	6.6	175.14	-144.5	-147.1	919.1	906.0	13.12	70.055		
2,900.0	2,750.8	2,658.5	2,647.8	16.2	6.9	175.25	-150.3	-154.2	971.0	957.4	13.65	71.160		

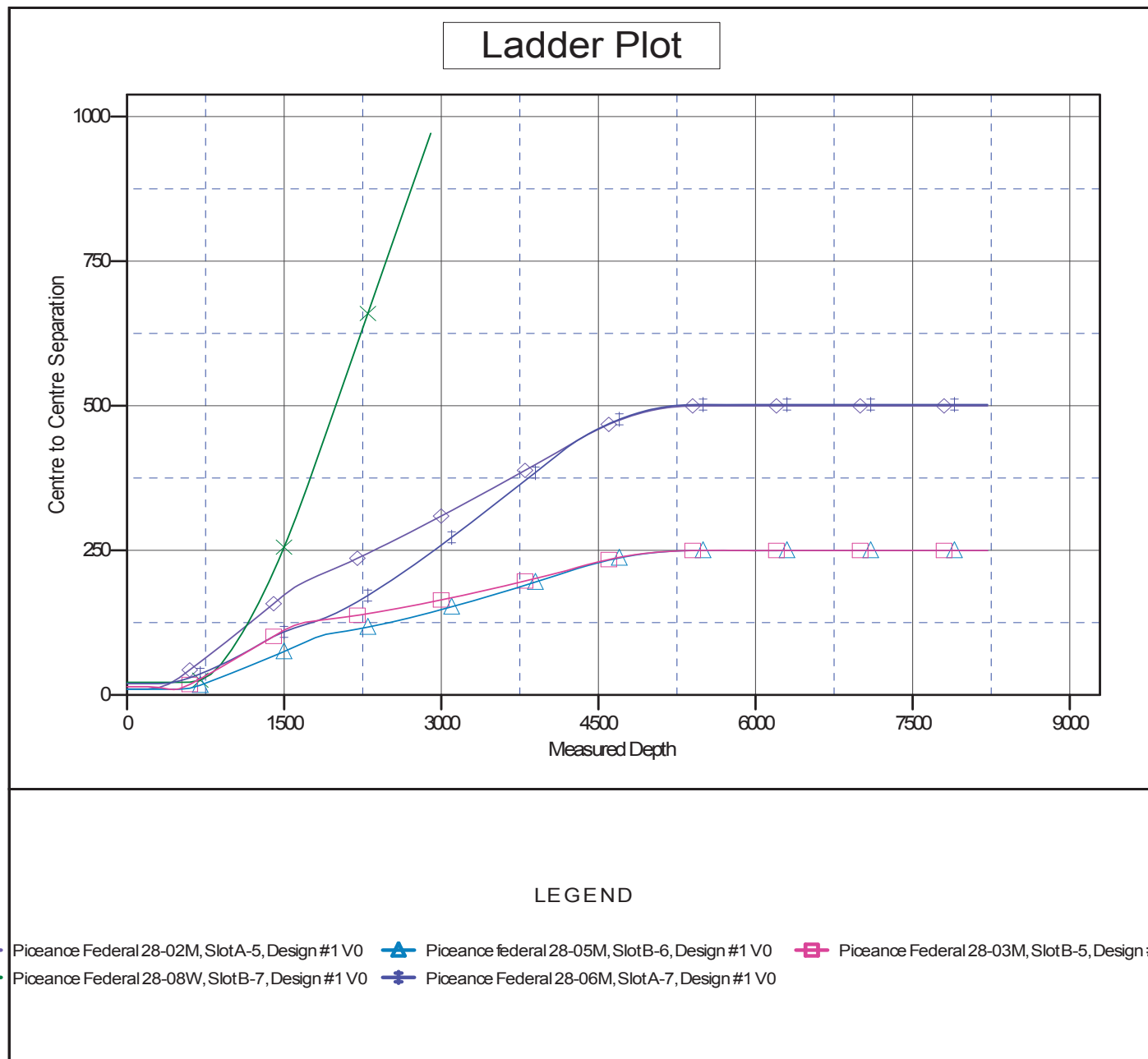
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-04M
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 28-04M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-6	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 28-04M
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 28-04M
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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 28-04M

Coordinate System is US State Plane 1983, Colorado Central Zone

Grid Convergence at Surface is: -1.44°

