



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance federal 28-05M

Slot B-6

Plan: Design #1

Standard Planning Report

28 April, 2015

Archer



Project: Mesa County, CO
Site: Piceance 28-05
Well: Piceance federal 28-05M
Wellbore: Slot B-6
Design: Design #1
Latitude: 39° 15' 3.680 N
Longitude: 107° 46' 46.250 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 28-05M, 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 28-05M

+N/-S	+E/-W	Northing	Ground Level:	Latitude	Longitude	Slot
0.0	0.0	1524417.38	7556.0	39° 15' 3.680 N	107° 46' 46.250 W	
			Easting 2354548.94			

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance Federal 28-05M tgt	7903.0	433.1	1419.8	1524814.68	2355979.18	39° 15' 7.960 N	107° 46' 28.200 W	Circle (Radius: 50.0)

SECTION DETAILS

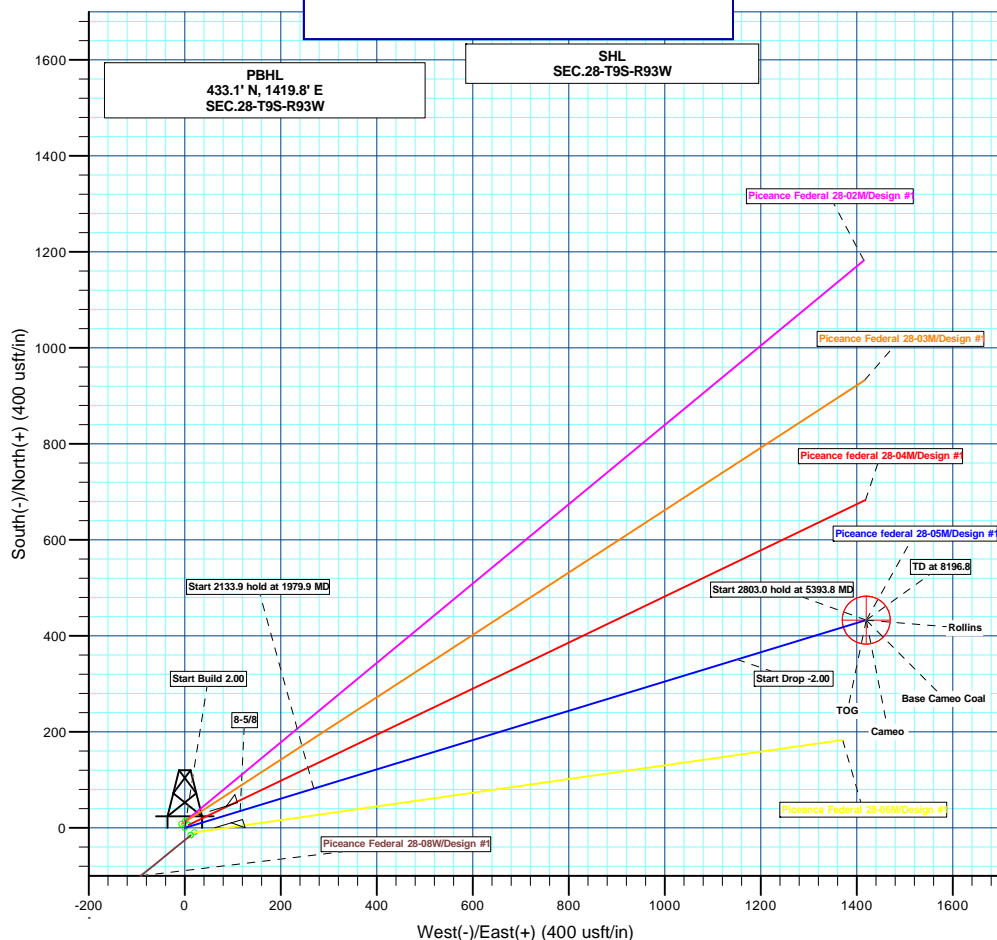
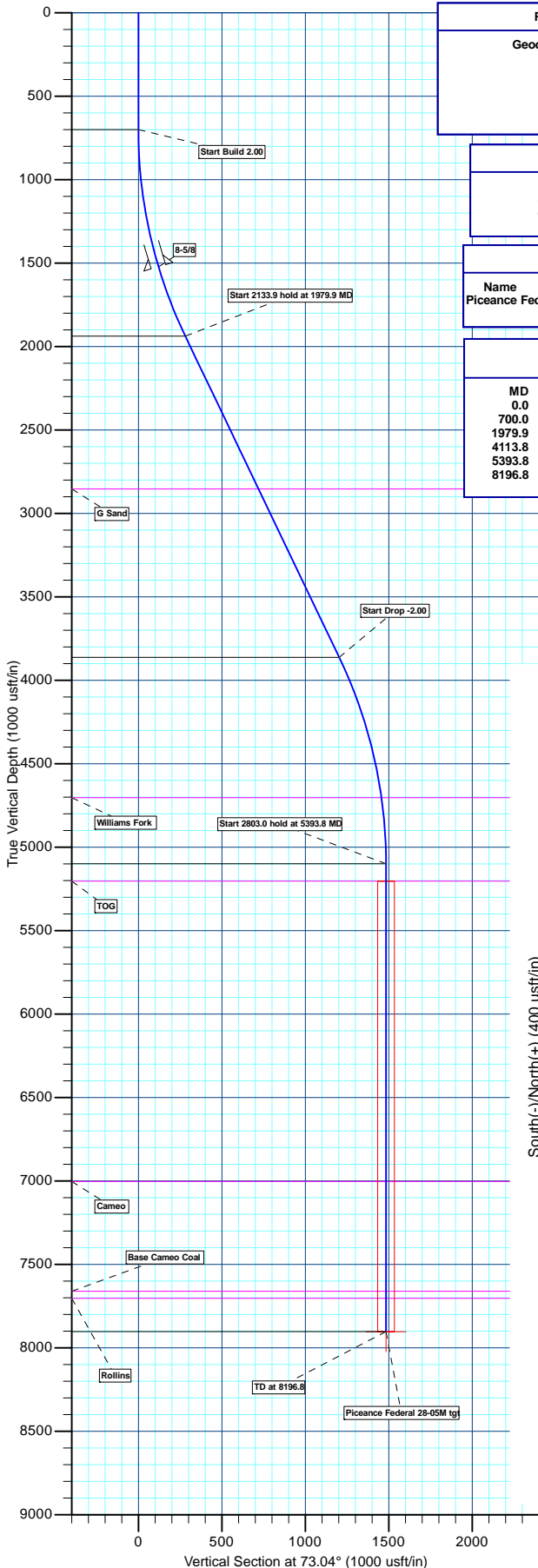
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
700.0	0.00	0.00	700.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
1979.9	25.60	73.04	1937.8	82.0	269.0	2.00	73.04	281.2	Start 2133.9 hold at 1979.9 MD
4113.8	25.60	73.04	3862.2	351.0	1150.9	0.00	0.00	1203.2	Start Drop -2.00
5393.8	0.00	0.00	5100.0	433.1	1419.8	2.00	180.00	1484.4	Start 2803.0 hold at 5393.8 MD
8196.8	0.00	0.00	7903.0	433.1	1419.8	0.00	0.00	1484.4	TD at 8196.8



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
2853.0	2994.8	G Sand
4703.0	4995.5	Williams Fork
5203.0	5496.8	TOG
7003.0	7296.8	Cameo
7661.0	7954.8	Base Cameo Coal
7703.0	7996.8	Rollins



Plan: Design #1 (Piceance federal 28-05M/Slot B-6)

Created By: Ricky Osburn Date: 11:33, April 28 2015



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Planning Report

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Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance federal 28-05M
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 28-05M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-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 28-05M					
Well Position	+N/-S	40.5 usft	Northing:	1,524,417.38 usft	Latitude:	39° 15' 3.680 N
	+E/-W	-45.6 usft	Easting:	2,354,548.94 usft	Longitude:	107° 46' 46.250 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,556.0 usft

Wellbore	Slot B-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	73.04

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	
700.0	0.00	0.00	700.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,979.9	25.60	73.04	1,937.8	82.0	269.0	2.00	2.00	0.00	73.04	
4,113.8	25.60	73.04	3,862.2	351.0	1,150.9	0.00	0.00	0.00	0.00	
5,393.8	0.00	0.00	5,100.0	433.1	1,419.8	2.00	-2.00	0.00	180.00	
8,196.8	0.00	0.00	7,903.0	433.1	1,419.8	0.00	0.00	0.00	0.00	Piceance Federal 28-



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance federal 28-05M
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 28-05M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-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
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
Start Build 2.00									
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	2.00	73.04	800.0	0.5	1.7	1.7	2.00	2.00	0.00
900.0	4.00	73.04	899.8	2.0	6.7	7.0	2.00	2.00	0.00
1,000.0	6.00	73.04	999.5	4.6	15.0	15.7	2.00	2.00	0.00
1,100.0	8.00	73.04	1,098.7	8.1	26.7	27.9	2.00	2.00	0.00
1,200.0	10.00	73.04	1,197.5	12.7	41.6	43.5	2.00	2.00	0.00
1,300.0	12.00	73.04	1,295.6	18.3	59.9	62.6	2.00	2.00	0.00
1,400.0	14.00	73.04	1,393.1	24.8	81.4	85.1	2.00	2.00	0.00
1,500.0	16.00	73.04	1,489.6	32.4	106.1	111.0	2.00	2.00	0.00
8-5/8									
1,533.7	16.67	73.04	1,522.0	35.1	115.2	120.5	2.00	2.00	0.00
1,600.0	18.00	73.04	1,585.3	40.9	134.1	140.2	2.00	2.00	0.00
1,700.0	20.00	73.04	1,679.8	50.4	165.3	172.8	2.00	2.00	0.00
1,800.0	22.00	73.04	1,773.2	60.9	199.5	208.6	2.00	2.00	0.00
1,900.0	24.00	73.04	1,865.2	72.3	236.9	247.7	2.00	2.00	0.00
Start 2133.9 hold at 1979.9 MD									
1,979.9	25.60	73.04	1,937.8	82.0	269.0	281.2	2.00	2.00	0.00
2,000.0	25.60	73.04	1,955.9	84.6	277.3	289.9	0.00	0.00	0.00
2,100.0	25.60	73.04	2,046.1	97.2	318.6	333.1	0.00	0.00	0.00
2,200.0	25.60	73.04	2,136.2	109.8	359.9	376.3	0.00	0.00	0.00
2,300.0	25.60	73.04	2,226.4	122.4	401.2	419.5	0.00	0.00	0.00
2,400.0	25.60	73.04	2,316.6	135.0	442.6	462.7	0.00	0.00	0.00
2,500.0	25.60	73.04	2,406.8	147.6	483.9	505.9	0.00	0.00	0.00
2,600.0	25.60	73.04	2,497.0	160.2	525.2	549.1	0.00	0.00	0.00
2,700.0	25.60	73.04	2,587.2	172.8	566.6	592.3	0.00	0.00	0.00
2,800.0	25.60	73.04	2,677.3	185.4	607.9	635.5	0.00	0.00	0.00
2,900.0	25.60	73.04	2,767.5	198.0	649.2	678.7	0.00	0.00	0.00
G Sand									
2,994.8	25.60	73.04	2,853.0	210.0	688.4	719.7	0.00	0.00	0.00
3,000.0	25.60	73.04	2,857.7	210.6	690.5	721.9	0.00	0.00	0.00
3,100.0	25.60	73.04	2,947.9	223.2	731.9	765.1	0.00	0.00	0.00
3,200.0	25.60	73.04	3,038.1	235.8	773.2	808.4	0.00	0.00	0.00
3,300.0	25.60	73.04	3,128.3	248.4	814.5	851.6	0.00	0.00	0.00
3,400.0	25.60	73.04	3,218.4	261.0	855.8	894.8	0.00	0.00	0.00
3,500.0	25.60	73.04	3,308.6	273.6	897.2	938.0	0.00	0.00	0.00
3,600.0	25.60	73.04	3,398.8	286.3	938.5	981.2	0.00	0.00	0.00
3,700.0	25.60	73.04	3,489.0	298.9	979.8	1,024.4	0.00	0.00	0.00
3,800.0	25.60	73.04	3,579.2	311.5	1,021.2	1,067.6	0.00	0.00	0.00
3,900.0	25.60	73.04	3,669.4	324.1	1,062.5	1,110.8	0.00	0.00	0.00
4,000.0	25.60	73.04	3,759.6	336.7	1,103.8	1,154.0	0.00	0.00	0.00
4,100.0	25.60	73.04	3,849.7	349.3	1,145.1	1,197.2	0.00	0.00	0.00
Start Drop -2.00									
4,113.8	25.60	73.04	3,862.2	351.0	1,150.9	1,203.2	0.00	0.00	0.00
4,200.0	23.88	73.04	3,940.5	361.5	1,185.3	1,239.2	2.00	-2.00	0.00
4,300.0	21.88	73.04	4,032.6	372.9	1,222.5	1,278.1	2.00	-2.00	0.00
4,400.0	19.88	73.04	4,126.0	383.3	1,256.6	1,313.8	2.00	-2.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance federal 28-05M
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 28-05M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-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	17.88	73.04	4,220.6	392.7	1,287.5	1,346.1	2.00	-2.00	0.00
4,600.0	15.88	73.04	4,316.3	401.2	1,315.3	1,375.1	2.00	-2.00	0.00
4,700.0	13.88	73.04	4,413.0	408.7	1,339.9	1,400.8	2.00	-2.00	0.00
4,800.0	11.88	73.04	4,510.5	415.2	1,361.2	1,423.1	2.00	-2.00	0.00
4,900.0	9.88	73.04	4,608.7	420.7	1,379.2	1,441.9	2.00	-2.00	0.00
Williams Fork									
4,995.5	7.97	73.04	4,703.0	425.0	1,393.4	1,456.8	2.00	-2.00	0.00
5,000.0	7.88	73.04	4,707.5	425.2	1,394.0	1,457.4	2.00	-2.00	0.00
5,100.0	5.88	73.04	4,806.7	428.7	1,405.4	1,469.3	2.00	-2.00	0.00
5,200.0	3.88	73.04	4,906.4	431.2	1,413.6	1,477.8	2.00	-2.00	0.00
5,300.0	1.88	73.04	5,006.2	432.6	1,418.4	1,482.9	2.00	-2.00	0.00
Start 2803.0 hold at 5393.8 MD									
5,393.8	0.00	0.00	5,100.0	433.1	1,419.8	1,484.4	2.00	-2.00	-77.88
5,400.0	0.00	0.00	5,106.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
TOG									
5,496.8	0.00	0.00	5,203.0	433.1	1,419.8	1,484.4	0.00	0.00	0.00
5,500.0	0.00	0.00	5,206.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
5,600.0	0.00	0.00	5,306.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
5,700.0	0.00	0.00	5,406.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
5,800.0	0.00	0.00	5,506.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
5,900.0	0.00	0.00	5,606.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
6,000.0	0.00	0.00	5,706.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
6,100.0	0.00	0.00	5,806.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
6,200.0	0.00	0.00	5,906.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
6,300.0	0.00	0.00	6,006.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
6,400.0	0.00	0.00	6,106.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
6,500.0	0.00	0.00	6,206.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
6,600.0	0.00	0.00	6,306.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
6,700.0	0.00	0.00	6,406.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
6,800.0	0.00	0.00	6,506.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
6,900.0	0.00	0.00	6,606.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
7,000.0	0.00	0.00	6,706.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
7,100.0	0.00	0.00	6,806.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
7,200.0	0.00	0.00	6,906.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
Cameo									
7,296.8	0.00	0.00	7,003.0	433.1	1,419.8	1,484.4	0.00	0.00	0.00
7,300.0	0.00	0.00	7,006.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
7,400.0	0.00	0.00	7,106.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
7,500.0	0.00	0.00	7,206.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
7,600.0	0.00	0.00	7,306.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
7,700.0	0.00	0.00	7,406.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
7,800.0	0.00	0.00	7,506.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
7,900.0	0.00	0.00	7,606.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
Base Cameo Coal									
7,954.8	0.00	0.00	7,661.0	433.1	1,419.8	1,484.4	0.00	0.00	0.00
Rollins									
7,996.8	0.00	0.00	7,703.0	433.1	1,419.8	1,484.4	0.00	0.00	0.00
8,000.0	0.00	0.00	7,706.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
8,100.0	0.00	0.00	7,806.2	433.1	1,419.8	1,484.4	0.00	0.00	0.00
TD at 8196.8									
8,196.8	0.00	0.00	7,903.0	433.1	1,419.8	1,484.4	0.00	0.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance federal 28-05M
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 28-05M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-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 28-05I	0.00	0.00	7,903.0	433.1	1,419.8	1,524,814.68	2,355,979.18	39° 15' 7.960 N	107° 46' 28.200 W
- plan hits target center									
- Circle (radius 50.0)									

Casing Points				
Measured Depth	Vertical Depth		Casing Diameter	Hole Diameter
(usft)	(usft)	Name	(")	(")
1,533.7	1,522.0	8-5/8	8-5/8	12-1/4

Formations					
Measured Depth	Vertical Depth			Dip	Dip Direction
(usft)	(usft)	Name	Lithology	(°)	(°)
2,994.8	2,853.0	G Sand		0.00	
4,995.5	4,703.0	Williams Fork		0.00	
5,496.8	5,203.0	TOG		0.00	
7,296.8	7,003.0	Cameo		0.00	
7,954.8	7,661.0	Base Cameo Coal		0.00	
7,996.8	7,703.0	Rollins		0.00	

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(usft)	(usft)	+N/-S (usft)	+E/-W (usft)	Comment	
700.0	700.0	0.0	0.0	Start Build 2.00	
1,979.9	1,937.8	82.0	269.0	Start 2133.9 hold at 1979.9 MD	
4,113.8	3,862.2	351.0	1,150.9	Start Drop -2.00	
5,393.8	5,100.0	433.1	1,419.8	Start 2803.0 hold at 5393.8 MD	
8,196.8	7,903.0	433.1	1,419.8	TD at 8196.8	



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance federal 28-05M

Slot B-6

Design #1

Anticollision Report

28 April, 2015

Archer



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-05M
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 28-05M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-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	8,196.8	Design #1 (Slot B-6)	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 28-02M - Slot A-5 - Design #1	100.0	100.0	14.3	14.1	81.288	CC, ES
Piceance Federal 28-02M - Slot A-5 - Design #1	8,196.8	8,289.5	749.7	684.0	11.417	SF
Piceance Federal 28-03M - Slot B-5 - Design #1	270.4	270.4	10.2	9.3	10.874	CC
Piceance Federal 28-03M - Slot B-5 - Design #1	300.0	300.0	10.3	9.2	9.570	ES
Piceance Federal 28-03M - Slot B-5 - Design #1	8,196.8	8,239.7	499.8	434.1	7.611	SF
Piceance federal 28-04M - Slot A-6 - Design #1	500.0	500.0	9.9	8.0	5.035	CC, ES
Piceance federal 28-04M - Slot A-6 - Design #1	8,196.8	8,211.8	249.9	184.5	3.820	SF
Piceance Federal 28-06M - Slot A-7 - Design #1	300.0	300.0	22.4	21.3	20.837	CC, ES
Piceance Federal 28-06M - Slot A-7 - Design #1	3,400.0	3,358.6	149.7	111.8	3.949	SF
Piceance Federal 28-08W - Slot B-7 - Design #1	635.6	635.6	19.7	17.1	7.655	CC
Piceance Federal 28-08W - Slot B-7 - Design #1	700.0	700.0	19.8	16.9	6.937	ES
Piceance Federal 28-08W - Slot B-7 - Design #1	800.0	799.6	20.8	17.6	6.384	SF

Offset Design		Piceance 28-05 - Piceance Federal 28-02M - Slot A-5 - 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 +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	6.34	14.2	1.6	14.3						
100.0	100.0	100.0	100.0	0.1	0.1	6.34	14.2	1.6	14.3	14.1	0.18	81.288	CC, ES		
200.0	200.0	199.6	199.6	0.3	0.3	10.78	15.3	2.9	15.5	14.9	0.62	24.991			
300.0	300.0	299.0	298.8	0.5	0.6	20.38	18.6	6.9	19.8	18.8	1.08	18.385			
400.0	400.0	397.9	397.3	0.8	0.8	29.33	24.0	13.5	27.7	26.1	1.56	17.746			
500.0	500.0	496.0	494.8	1.0	1.1	35.64	31.6	22.6	39.2	37.1	2.07	18.901			
600.0	600.0	593.3	590.9	1.2	1.4	39.74	41.2	34.2	54.3	51.7	2.63	20.676			
700.0	700.0	689.4	685.3	1.4	1.8	42.43	52.7	48.1	72.9	69.6	3.22	22.632			
800.0	800.0	784.5	778.0	1.7	2.2	-29.10	66.0	64.3	93.3	89.8	3.44	27.100			
900.0	899.8	879.0	869.4	1.9	2.7	-28.74	81.2	82.7	113.9	110.0	3.92	29.038			
1,000.0	999.5	972.7	959.3	2.1	3.2	-28.97	98.2	103.2	134.8	130.3	4.43	30.428			
1,100.0	1,098.7	1,065.8	1,047.6	2.4	3.7	-29.55	116.9	125.9	155.8	150.9	4.96	31.402			
1,200.0	1,197.5	1,158.2	1,134.3	2.6	4.4	-30.34	137.3	150.5	177.1	171.6	5.53	32.036			
1,300.0	1,295.6	1,249.8	1,219.2	3.0	5.0	-31.27	159.2	177.0	198.6	192.5	6.12	32.427			
1,400.0	1,393.1	1,340.8	1,302.3	3.4	5.7	-32.28	182.7	205.4	220.3	213.6	6.77	32.532			
1,500.0	1,489.6	1,431.0	1,383.6	3.8	6.5	-33.34	207.7	235.6	242.3	234.9	7.48	32.416			

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 28-05M
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 28-05M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-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		
1,600.0	1,585.3	1,528.0	1,470.2	4.3	7.4	-34.62	235.5	269.3	263.4	255.1	8.27	31.839		
1,700.0	1,679.8	1,625.9	1,557.7	4.9	8.2	-36.12	263.6	303.3	281.8	272.6	9.16	30.776		
1,800.0	1,773.2	1,724.2	1,645.4	5.5	9.1	-37.84	291.8	337.4	297.7	287.6	10.15	29.334		
1,900.0	1,865.2	1,822.6	1,733.3	6.3	10.0	-39.80	320.0	371.5	311.3	300.0	11.27	27.616		
2,000.0	1,955.9	1,921.1	1,821.2	7.1	10.9	-42.02	348.3	405.7	322.7	310.2	12.55	25.722		
2,100.0	2,046.1	2,019.6	1,909.2	7.9	11.8	-44.34	376.5	439.9	333.9	319.9	13.93	23.965		
2,200.0	2,136.2	2,118.1	1,997.1	8.7	12.7	-46.50	404.8	474.0	345.5	330.1	15.40	22.444		
2,300.0	2,226.4	2,216.5	2,085.1	9.6	13.5	-48.52	433.0	508.2	357.6	340.7	16.92	21.132		
2,400.0	2,316.6	2,315.0	2,173.0	10.5	14.4	-50.41	461.3	542.4	370.2	351.7	18.51	20.002		
2,500.0	2,406.8	2,413.5	2,260.9	11.4	15.3	-52.18	489.5	576.5	383.1	363.0	20.13	19.027		
2,600.0	2,497.0	2,512.0	2,348.9	12.2	16.2	-53.83	517.8	610.7	396.4	374.6	21.80	18.182		
2,700.0	2,587.2	2,610.5	2,436.8	13.1	17.1	-55.37	546.0	644.9	409.9	386.4	23.49	17.448		
2,800.0	2,677.3	2,709.0	2,524.7	14.0	18.0	-56.82	574.3	679.1	423.8	398.5	25.21	16.808		
2,900.0	2,767.5	2,807.4	2,612.7	14.9	18.9	-58.17	602.5	713.2	437.8	410.9	26.95	16.246		
3,000.0	2,857.7	2,905.9	2,700.6	15.8	19.8	-59.44	630.8	747.4	452.2	423.5	28.71	15.752		
3,100.0	2,947.9	3,004.4	2,788.6	16.7	20.7	-60.63	659.0	781.6	466.7	436.2	30.47	15.315		
3,200.0	3,038.1	3,102.9	2,876.5	17.6	21.6	-61.75	687.3	815.8	481.4	449.1	32.25	14.926		
3,300.0	3,128.3	3,201.4	2,964.4	18.5	22.5	-62.81	715.5	849.9	496.3	462.2	34.04	14.580		
3,400.0	3,218.4	3,299.9	3,052.4	19.4	23.4	-63.80	743.8	884.1	511.3	475.5	35.83	14.270		
3,500.0	3,308.6	3,398.3	3,140.3	20.3	24.3	-64.73	772.0	918.3	526.5	488.8	37.63	13.991		
3,600.0	3,398.8	3,496.8	3,228.2	21.2	25.2	-65.62	800.3	952.5	541.8	502.4	39.43	13.739		
3,700.0	3,489.0	3,595.3	3,316.2	22.1	26.1	-66.45	828.5	986.6	557.2	516.0	41.24	13.511		
3,800.0	3,579.2	3,693.8	3,404.1	23.0	27.0	-67.24	856.8	1,020.8	572.8	529.7	43.05	13.305		
3,900.0	3,669.4	3,792.3	3,492.0	23.9	27.9	-67.99	885.1	1,055.0	588.4	543.5	44.86	13.116		
4,000.0	3,759.6	3,890.8	3,580.0	24.9	28.8	-68.70	913.3	1,089.2	604.1	557.5	46.67	12.944		
4,100.0	3,849.7	3,989.2	3,667.9	25.8	29.7	-69.38	941.6	1,123.3	619.9	571.5	48.49	12.786		
4,200.0	3,940.5	4,087.7	3,755.9	26.6	30.6	-70.18	969.8	1,157.5	636.3	586.1	50.22	12.670		
4,300.0	4,032.6	4,192.6	3,849.6	27.2	31.5	-70.75	999.7	1,193.7	653.6	601.9	51.75	12.630		
4,400.0	4,126.0	4,308.3	3,954.8	27.9	32.3	-71.25	1,030.5	1,231.0	670.0	616.9	53.12	12.614		
4,500.0	4,220.6	4,424.8	4,062.4	28.4	33.0	-71.68	1,058.8	1,265.2	685.0	630.6	54.37	12.600		
4,600.0	4,316.3	4,541.9	4,172.4	28.9	33.7	-72.06	1,084.4	1,296.1	698.5	643.0	55.50	12.586		
4,700.0	4,413.0	4,659.6	4,284.5	29.4	34.3	-72.38	1,107.2	1,323.7	710.4	653.9	56.51	12.572		
4,800.0	4,510.5	4,777.8	4,398.5	29.8	34.8	-72.66	1,127.2	1,347.8	720.9	663.5	57.41	12.557		
4,900.0	4,608.7	4,896.4	4,514.1	30.1	35.3	-72.89	1,144.2	1,368.4	729.7	671.5	58.18	12.542		
5,000.0	4,707.5	5,015.5	4,631.1	30.4	35.7	-73.08	1,158.1	1,385.3	737.0	678.1	58.83	12.528		
5,100.0	4,806.7	5,134.8	4,749.2	30.6	36.0	-73.22	1,169.0	1,398.4	742.6	683.2	59.35	12.512		
5,200.0	4,906.4	5,254.4	4,868.1	30.8	36.2	-73.32	1,176.8	1,407.8	746.6	686.8	59.76	12.494		
5,300.0	5,006.2	5,374.1	4,987.7	30.9	36.4	-73.38	1,181.3	1,413.4	749.0	688.9	60.04	12.474		
5,400.0	5,106.2	5,492.7	5,106.2	31.0	36.5	-0.36	1,182.7	1,415.1	749.7	689.5	60.22	12.450		
5,500.0	5,206.2	5,592.7	5,206.2	31.1	36.6	-0.36	1,182.7	1,415.1	749.7	689.3	60.38	12.417		
5,600.0	5,306.2	5,692.7	5,306.2	31.2	36.6	-0.36	1,182.7	1,415.1	749.7	689.2	60.54	12.384		
5,700.0	5,406.2	5,792.7	5,406.2	31.3	36.7	-0.36	1,182.7	1,415.1	749.7	689.0	60.70	12.351		
5,800.0	5,506.2	5,892.7	5,506.2	31.4	36.8	-0.36	1,182.7	1,415.1	749.7	688.8	60.87	12.317		
5,900.0	5,606.2	5,992.7	5,606.2	31.4	36.8	-0.36	1,182.7	1,415.1	749.7	688.7	61.04	12.283		
6,000.0	5,706.2	6,092.7	5,706.2	31.5	36.9	-0.36	1,182.7	1,415.1	749.7	688.5	61.21	12.248		
6,100.0	5,806.2	6,192.7	5,806.2	31.6	37.0	-0.36	1,182.7	1,415.1	749.7	688.3	61.38	12.213		
6,200.0	5,906.2	6,292.7	5,906.2	31.7	37.0	-0.36	1,182.7	1,415.1	749.7	688.1	61.56	12.178		
6,300.0	6,006.2	6,392.7	6,006.2	31.8	37.1	-0.36	1,182.7	1,415.1	749.7	688.0	61.74	12.142		
6,400.0	6,106.2	6,492.7	6,106.2	31.9	37.2	-0.36	1,182.7	1,415.1	749.7	687.8	61.93	12.106		
6,500.0	6,206.2	6,592.7	6,206.2	32.0	37.3	-0.36	1,182.7	1,415.1	749.7	687.6	62.11	12.070		
6,600.0	6,306.2	6,692.7	6,306.2	32.1	37.4	-0.36	1,182.7	1,415.1	749.7	687.4	62.30	12.033		
6,700.0	6,406.2	6,792.7	6,406.2	32.2	37.4	-0.36	1,182.7	1,415.1	749.7	687.2	62.49	11.996		

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 28-05M
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 28-05M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-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		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
6,800.0	6,506.2	6,892.7	6,506.2	32.2	37.5	-0.36	1,182.7	1,415.1	749.7	687.0	62.69	11.959		
6,900.0	6,606.2	6,992.7	6,606.2	32.3	37.6	-0.36	1,182.7	1,415.1	749.7	686.8	62.89	11.922		
7,000.0	6,706.2	7,092.7	6,706.2	32.4	37.7	-0.36	1,182.7	1,415.1	749.7	686.6	63.09	11.884		
7,100.0	6,806.2	7,192.7	6,806.2	32.5	37.8	-0.36	1,182.7	1,415.1	749.7	686.4	63.29	11.846		
7,200.0	6,906.2	7,292.7	6,906.2	32.6	37.8	-0.36	1,182.7	1,415.1	749.7	686.2	63.49	11.808		
7,300.0	7,006.2	7,392.7	7,006.2	32.7	37.9	-0.36	1,182.7	1,415.1	749.7	686.0	63.70	11.769		
7,400.0	7,106.2	7,492.7	7,106.2	32.8	38.0	-0.36	1,182.7	1,415.1	749.7	685.8	63.91	11.731		
7,500.0	7,206.2	7,592.7	7,206.2	32.9	38.1	-0.36	1,182.7	1,415.1	749.7	685.6	64.12	11.692		
7,600.0	7,306.2	7,692.7	7,306.2	33.1	38.2	-0.36	1,182.7	1,415.1	749.7	685.4	64.34	11.653		
7,700.0	7,406.2	7,792.7	7,406.2	33.2	38.3	-0.36	1,182.7	1,415.1	749.7	685.1	64.55	11.614		
7,800.0	7,506.2	7,892.7	7,506.2	33.3	38.4	-0.36	1,182.7	1,415.1	749.7	684.9	64.77	11.574		
7,900.0	7,606.2	7,992.7	7,606.2	33.4	38.5	-0.36	1,182.7	1,415.1	749.7	684.7	64.99	11.535		
8,000.0	7,706.2	8,092.7	7,706.2	33.5	38.6	-0.36	1,182.7	1,415.1	749.7	684.5	65.22	11.495		
8,100.0	7,806.2	8,192.7	7,806.2	33.6	38.7	-0.36	1,182.7	1,415.1	749.7	684.3	65.44	11.456		
8,196.8	7,903.0	8,289.5	7,903.0	33.7	38.7	-0.36	1,182.7	1,415.1	749.7	684.0	65.66	11.417 SF		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-05M
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 28-05M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-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	-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		
200.0	200.0	200.0	200.0	0.3	0.3	-37.87	8.1	-6.3	10.3	9.6	0.62	16.407		
270.4	270.4	270.4	270.4	0.5	0.5	-33.02	8.6	-5.6	10.2	9.3	0.94	10.874 CC		
300.0	300.0	300.0	300.0	0.5	0.5	-28.10	9.0	-4.8	10.3	9.2	1.07	9.570 ES		
400.0	400.0	399.7	399.6	0.8	0.8	-2.20	11.9	-0.5	11.9	10.4	1.52	7.816		
500.0	500.0	499.0	498.5	1.0	1.0	22.23	16.6	6.8	18.0	16.0	1.99	9.024		
600.0	600.0	597.5	596.3	1.2	1.3	36.02	23.1	16.8	28.8	26.3	2.50	11.522		
700.0	700.0	695.2	692.7	1.4	1.6	43.25	31.4	29.5	43.7	40.6	3.05	14.338		
800.0	800.0	791.9	787.7	1.7	2.0	-26.27	41.3	44.8	60.6	57.2	3.39	17.863		
900.0	899.8	888.1	881.5	1.9	2.4	-24.94	52.9	62.7	77.8	74.0	3.87	20.123		
1,000.0	999.5	983.8	974.0	2.1	2.9	-24.61	66.2	83.0	95.2	90.9	4.37	21.807		
1,100.0	1,098.7	1,078.8	1,065.1	2.4	3.4	-24.81	81.0	105.8	112.7	107.8	4.89	23.053		
1,200.0	1,197.5	1,173.3	1,154.7	2.6	3.9	-25.33	97.3	131.0	130.3	124.9	5.44	23.953		
1,300.0	1,295.6	1,267.2	1,242.7	3.0	4.6	-26.03	115.2	158.5	148.0	142.0	6.02	24.581		
1,400.0	1,393.1	1,360.5	1,329.1	3.4	5.3	-26.86	134.4	188.1	165.8	159.2	6.65	24.955		
1,500.0	1,489.6	1,454.2	1,414.5	3.8	6.0	-27.77	155.3	220.3	183.8	176.5	7.32	25.100		
1,600.0	1,585.3	1,551.8	1,502.9	4.3	6.8	-28.91	177.9	254.9	200.4	192.3	8.07	24.826		
1,700.0	1,679.8	1,650.7	1,592.5	4.9	7.6	-30.36	200.7	290.1	214.0	205.1	8.90	24.050		
1,800.0	1,773.2	1,749.8	1,682.3	5.5	8.5	-32.10	223.6	325.3	224.9	215.1	9.83	22.882		
1,900.0	1,865.2	1,849.1	1,772.2	6.3	9.3	-34.17	246.6	360.6	233.1	222.2	10.89	21.414		
2,000.0	1,955.9	1,948.4	1,862.1	7.1	10.2	-36.60	269.5	395.9	238.9	226.8	12.10	19.742		
2,100.0	2,046.1	2,047.7	1,952.0	7.9	11.0	-39.13	292.4	431.2	244.2	230.8	13.44	18.171		
2,200.0	2,136.2	2,147.0	2,042.0	8.7	11.9	-41.55	315.4	466.5	250.0	235.2	14.88	16.808		
2,300.0	2,226.4	2,246.3	2,131.9	9.6	12.7	-43.85	338.3	501.8	256.3	239.9	16.39	15.633		
2,400.0	2,316.6	2,345.5	2,221.8	10.5	13.6	-46.05	361.2	537.1	262.9	244.9	17.98	14.622		
2,500.0	2,406.8	2,444.8	2,311.7	11.4	14.4	-48.13	384.2	572.4	269.9	250.3	19.63	13.752		
2,600.0	2,497.0	2,544.1	2,401.6	12.2	15.3	-50.11	407.1	607.7	277.2	255.9	21.32	13.003		
2,700.0	2,587.2	2,643.4	2,491.5	13.1	16.1	-51.98	430.1	643.0	284.9	261.8	23.06	12.356		
2,800.0	2,677.3	2,742.7	2,581.5	14.0	17.0	-53.76	453.0	678.3	292.8	268.0	24.83	11.795		
2,900.0	2,767.5	2,841.9	2,671.4	14.9	17.9	-55.44	475.9	713.6	301.0	274.4	26.62	11.307		
3,000.0	2,857.7	2,941.2	2,761.3	15.8	18.7	-57.03	498.9	748.9	309.5	281.0	28.44	10.882		
3,100.0	2,947.9	3,040.5	2,851.2	16.7	19.6	-58.53	521.8	784.2	318.2	287.9	30.28	10.509		
3,200.0	3,038.1	3,139.8	2,941.1	17.6	20.4	-59.96	544.7	819.4	327.0	294.9	32.12	10.181		
3,300.0	3,128.3	3,239.1	3,031.0	18.5	21.3	-61.31	567.7	854.7	336.1	302.1	33.98	9.891		
3,400.0	3,218.4	3,338.4	3,121.0	19.4	22.2	-62.59	590.6	890.0	345.4	309.5	35.85	9.634		
3,500.0	3,308.6	3,437.6	3,210.9	20.3	23.0	-63.80	613.5	925.3	354.8	317.1	37.72	9.406		
3,600.0	3,398.8	3,536.9	3,300.8	21.2	23.9	-64.95	636.5	960.6	364.4	324.8	39.60	9.202		
3,700.0	3,489.0	3,636.2	3,390.7	22.1	24.7	-66.04	659.4	995.9	374.1	332.6	41.47	9.019		
3,800.0	3,579.2	3,735.5	3,480.6	23.0	25.6	-67.07	682.3	1,031.2	383.9	340.5	43.35	8.855		
3,900.0	3,669.4	3,834.8	3,570.6	23.9	26.5	-68.05	705.3	1,066.5	393.8	348.6	45.23	8.707		
4,000.0	3,759.6	3,934.0	3,660.5	24.9	27.3	-68.99	728.2	1,101.8	403.9	356.8	47.11	8.573		
4,100.0	3,849.7	4,033.3	3,750.4	25.8	28.2	-69.88	751.2	1,137.1	414.1	365.1	48.99	8.452		
4,200.0	3,940.5	4,132.6	3,840.3	26.6	29.0	-70.73	774.1	1,172.4	424.7	374.0	50.75	8.370		
4,300.0	4,032.6	4,236.4	3,934.6	27.2	29.9	-71.23	797.8	1,208.9	436.3	384.1	52.21	8.357		
4,400.0	4,126.0	4,345.1	4,034.6	27.9	30.6	-71.64	820.9	1,244.4	447.2	393.7	53.51	8.358		
4,500.0	4,220.6	4,454.0	4,136.5	28.4	31.2	-71.99	841.9	1,276.7	457.1	402.4	54.69	8.359		
4,600.0	4,316.3	4,563.2	4,240.0	28.9	31.8	-72.30	860.8	1,305.9	466.1	410.3	55.76	8.358		
4,700.0	4,413.0	4,672.7	4,345.0	29.4	32.3	-72.57	877.7	1,331.7	474.0	417.2	56.72	8.357		
4,800.0	4,510.5	4,782.4	4,451.4	29.8	32.8	-72.80	892.3	1,354.3	480.8	423.3	57.55	8.354		
4,900.0	4,608.7	4,892.3	4,558.9	30.1	33.2	-72.99	904.7	1,373.4	486.7	428.4	58.28	8.351		
5,000.0	4,707.5	5,002.3	4,667.3	30.4	33.5	-73.14	914.9	1,389.1	491.4	432.5	58.89	8.345		

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 28-05M
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 28-05M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-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	4,806.7	5,112.5	4,776.5	30.6	33.8	-73.26	922.9	1,401.3	495.1	435.8	59.38	8.339		
5,200.0	4,906.4	5,222.8	4,886.3	30.8	34.0	-73.34	928.5	1,410.0	497.8	438.0	59.76	8.330		
5,300.0	5,006.2	5,333.2	4,996.5	30.9	34.2	-73.39	931.8	1,415.1	499.3	439.3	60.03	8.318		
5,400.0	5,106.2	5,442.9	5,106.2	31.0	34.3	-0.36	932.8	1,416.6	499.8	439.6	60.20	8.302		
5,500.0	5,206.2	5,542.9	5,206.2	31.1	34.3	-0.36	932.8	1,416.6	499.8	439.4	60.35	8.281		
5,600.0	5,306.2	5,642.9	5,306.2	31.2	34.4	-0.36	932.8	1,416.6	499.8	439.3	60.52	8.259		
5,700.0	5,406.2	5,742.9	5,406.2	31.3	34.5	-0.36	932.8	1,416.6	499.8	439.1	60.68	8.236		
5,800.0	5,506.2	5,842.9	5,506.2	31.4	34.5	-0.36	932.8	1,416.6	499.8	438.9	60.85	8.214		
5,900.0	5,606.2	5,942.9	5,606.2	31.4	34.6	-0.36	932.8	1,416.6	499.8	438.8	61.02	8.191		
6,000.0	5,706.2	6,042.9	5,706.2	31.5	34.7	-0.36	932.8	1,416.6	499.8	438.6	61.19	8.168		
6,100.0	5,806.2	6,142.9	5,806.2	31.6	34.8	-0.36	932.8	1,416.6	499.8	438.4	61.37	8.144		
6,200.0	5,906.2	6,242.9	5,906.2	31.7	34.8	-0.36	932.8	1,416.6	499.8	438.2	61.55	8.120		
6,300.0	6,006.2	6,342.9	6,006.2	31.8	34.9	-0.36	932.8	1,416.6	499.8	438.1	61.73	8.096		
6,400.0	6,106.2	6,442.9	6,106.2	31.9	35.0	-0.36	932.8	1,416.6	499.8	437.9	61.91	8.072		
6,500.0	6,206.2	6,542.9	6,206.2	32.0	35.1	-0.36	932.8	1,416.6	499.8	437.7	62.10	8.048		
6,600.0	6,306.2	6,642.9	6,306.2	32.1	35.2	-0.36	932.8	1,416.6	499.8	437.5	62.29	8.023		
6,700.0	6,406.2	6,742.9	6,406.2	32.2	35.3	-0.36	932.8	1,416.6	499.8	437.3	62.48	7.999		
6,800.0	6,506.2	6,842.9	6,506.2	32.2	35.3	-0.36	932.8	1,416.6	499.8	437.1	62.68	7.974		
6,900.0	6,606.2	6,942.9	6,606.2	32.3	35.4	-0.36	932.8	1,416.6	499.8	436.9	62.88	7.949		
7,000.0	6,706.2	7,042.9	6,706.2	32.4	35.5	-0.36	932.8	1,416.6	499.8	436.7	63.08	7.923		
7,100.0	6,806.2	7,142.9	6,806.2	32.5	35.6	-0.36	932.8	1,416.6	499.8	436.5	63.28	7.898		
7,200.0	6,906.2	7,242.9	6,906.2	32.6	35.7	-0.36	932.8	1,416.6	499.8	436.3	63.49	7.872		
7,300.0	7,006.2	7,342.9	7,006.2	32.7	35.8	-0.36	932.8	1,416.6	499.8	436.1	63.69	7.847		
7,400.0	7,106.2	7,442.9	7,106.2	32.8	35.9	-0.36	932.8	1,416.6	499.8	435.9	63.91	7.821		
7,500.0	7,206.2	7,542.9	7,206.2	32.9	36.0	-0.36	932.8	1,416.6	499.8	435.7	64.12	7.795		
7,600.0	7,306.2	7,642.9	7,306.2	33.1	36.1	-0.36	932.8	1,416.6	499.8	435.5	64.33	7.769		
7,700.0	7,406.2	7,742.9	7,406.2	33.2	36.2	-0.36	932.8	1,416.6	499.8	435.2	64.55	7.743		
7,800.0	7,506.2	7,842.9	7,506.2	33.3	36.3	-0.36	932.8	1,416.6	499.8	435.0	64.77	7.716		
7,900.0	7,606.2	7,942.9	7,606.2	33.4	36.4	-0.36	932.8	1,416.6	499.8	434.8	64.99	7.690		
8,000.0	7,706.2	8,042.9	7,706.2	33.5	36.5	-0.36	932.8	1,416.6	499.8	434.6	65.22	7.663		
8,100.0	7,806.2	8,142.9	7,806.2	33.6	36.6	-0.36	932.8	1,416.6	499.8	434.4	65.45	7.637		
8,196.8	7,903.0	8,239.7	7,903.0	33.7	36.7	-0.36	932.8	1,416.6	499.8	434.1	65.67	7.611 SF		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-05M
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 28-05M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-6	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance federal 28-04M - Slot A-6 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
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		
200.0	200.0	200.0	200.0	0.3	0.3	52.34	6.1	7.9	9.9	9.3	0.62	15.902		
300.0	300.0	300.0	300.0	0.5	0.5	52.34	6.1	7.9	9.9	8.9	1.07	9.248		
400.0	400.0	400.0	400.0	0.8	0.8	52.34	6.1	7.9	9.9	8.4	1.52	6.520		
500.0	500.0	500.0	500.0	1.0	1.0	52.34	6.1	7.9	9.9	8.0	1.97	5.035 CC, ES		
600.0	600.0	599.6	599.6	1.2	1.2	54.12	6.8	9.4	11.6	9.2	2.42	4.820		
700.0	700.0	699.0	698.8	1.4	1.4	57.27	9.1	14.1	16.8	13.9	2.86	5.876		
800.0	800.0	798.1	797.5	1.7	1.7	-14.30	12.8	21.8	23.7	20.4	3.30	7.190		
900.0	899.8	896.9	895.6	1.9	1.9	-14.46	17.9	32.6	30.7	27.0	3.75	8.192		
1,000.0	999.5	995.5	993.0	2.1	2.2	-15.33	24.6	46.4	37.8	33.5	4.22	8.958		
1,100.0	1,098.7	1,093.8	1,089.6	2.4	2.5	-16.57	32.6	63.1	44.9	40.2	4.70	9.550		
1,200.0	1,197.5	1,191.9	1,185.2	2.6	2.9	-18.01	42.0	82.8	52.1	46.8	5.20	10.006		
1,300.0	1,295.6	1,289.7	1,279.8	3.0	3.4	-19.58	52.9	105.4	59.3	53.6	5.73	10.348		
1,400.0	1,393.1	1,387.4	1,373.2	3.4	3.9	-21.22	65.1	130.8	66.7	60.4	6.30	10.589		
1,500.0	1,489.6	1,484.7	1,465.4	3.8	4.5	-22.89	78.6	158.9	74.2	67.3	6.91	10.734		
1,600.0	1,585.3	1,581.9	1,556.3	4.3	5.1	-24.59	93.4	189.9	81.9	74.3	7.58	10.795		
1,700.0	1,679.8	1,678.7	1,645.8	4.9	5.8	-26.28	109.5	223.4	89.7	81.3	8.33	10.758		
1,800.0	1,773.2	1,775.8	1,734.1	5.5	6.6	-27.98	127.0	259.8	97.6	88.4	9.17	10.640		
1,900.0	1,865.2	1,875.5	1,824.3	6.3	7.4	-30.16	145.4	298.1	103.8	93.6	10.15	10.222		
2,000.0	1,955.9	1,975.3	1,914.5	7.1	8.2	-33.08	163.8	336.5	107.2	95.9	11.32	9.470		
2,100.0	2,046.1	2,075.1	2,004.8	7.9	9.1	-36.18	182.2	374.9	110.0	97.4	12.66	8.691		
2,200.0	2,136.2	2,174.9	2,095.0	8.7	9.9	-39.12	200.6	413.2	113.1	99.0	14.11	8.016		
2,300.0	2,226.4	2,274.7	2,185.3	9.6	10.8	-41.89	219.0	451.6	116.5	100.9	15.67	7.438		
2,400.0	2,316.6	2,374.5	2,275.5	10.5	11.6	-44.51	237.5	490.0	120.2	102.9	17.30	6.945		
2,500.0	2,406.8	2,474.3	2,365.8	11.4	12.5	-46.96	255.9	528.4	124.1	105.1	19.01	6.527		
2,600.0	2,497.0	2,574.0	2,456.0	12.2	13.4	-49.27	274.3	566.8	128.2	107.4	20.76	6.172		
2,700.0	2,587.2	2,673.8	2,546.3	13.1	14.3	-51.42	292.7	605.1	132.5	109.9	22.56	5.870		
2,800.0	2,677.3	2,773.6	2,636.5	14.0	15.1	-53.44	311.1	643.5	136.9	112.5	24.40	5.612		
2,900.0	2,767.5	2,873.4	2,726.8	14.9	16.0	-55.33	329.6	681.9	141.6	115.3	26.26	5.391		
3,000.0	2,857.7	2,973.2	2,817.0	15.8	16.9	-57.10	348.0	720.3	146.3	118.2	28.13	5.201		
3,100.0	2,947.9	3,073.0	2,907.3	16.7	17.8	-58.75	366.4	758.7	151.2	121.2	30.03	5.037		
3,200.0	3,038.1	3,172.8	2,997.5	17.6	18.6	-60.30	384.8	797.0	156.2	124.3	31.93	4.894		
3,300.0	3,128.3	3,272.6	3,087.8	18.5	19.5	-61.76	403.2	835.4	161.4	127.5	33.83	4.770		
3,400.0	3,218.4	3,372.3	3,178.0	19.4	20.4	-63.12	421.7	873.8	166.6	130.9	35.75	4.661		
3,500.0	3,308.6	3,472.1	3,268.3	20.3	21.3	-64.40	440.1	912.2	171.9	134.3	37.66	4.565		
3,600.0	3,398.8	3,571.9	3,358.5	21.2	22.1	-65.60	458.5	950.6	177.3	137.7	39.57	4.481		
3,700.0	3,489.0	3,671.7	3,448.8	22.1	23.0	-66.73	476.9	988.9	182.8	141.3	41.49	4.406		
3,800.0	3,579.2	3,771.5	3,539.0	23.0	23.9	-67.79	495.3	1,027.3	188.3	144.9	43.40	4.339		
3,900.0	3,669.4	3,871.3	3,629.3	23.9	24.8	-68.80	513.8	1,065.7	193.9	148.6	45.31	4.280		
4,000.0	3,759.6	3,971.1	3,719.5	24.9	25.7	-69.75	532.2	1,104.1	199.6	152.4	47.21	4.227		
4,100.0	3,849.7	4,070.9	3,809.8	25.8	26.6	-70.64	550.6	1,142.5	205.3	156.2	49.12	4.179		
4,200.0	3,940.5	4,171.5	3,900.8	26.6	27.4	-71.28	569.1	1,181.1	211.4	160.5	50.84	4.158		
4,300.0	4,032.6	4,274.7	3,995.4	27.2	28.1	-71.66	587.1	1,218.5	217.5	165.2	52.23	4.164		
4,400.0	4,126.0	4,378.1	4,091.4	27.9	28.8	-71.99	603.6	1,252.9	223.1	169.6	53.48	4.171		
4,500.0	4,220.6	4,481.5	4,188.9	28.4	29.4	-72.28	618.6	1,284.1	228.1	173.5	54.62	4.176		
4,600.0	4,316.3	4,585.1	4,287.6	28.9	29.9	-72.53	632.1	1,312.2	232.7	177.0	55.65	4.181		
4,700.0	4,413.0	4,688.7	4,387.5	29.4	30.4	-72.74	644.0	1,337.1	236.7	180.2	56.57	4.185		
4,800.0	4,510.5	4,792.3	4,488.3	29.8	30.8	-72.92	654.4	1,358.7	240.2	182.9	57.37	4.187		
4,900.0	4,608.7	4,896.1	4,590.0	30.1	31.2	-73.07	663.2	1,377.0	243.2	185.1	58.07	4.188		
5,000.0	4,707.5	4,999.8	4,692.5	30.4	31.5	-73.19	670.3	1,392.0	245.6	187.0	58.65	4.188		
5,100.0	4,806.7	5,103.6	4,795.5	30.6	31.7	-73.29	675.9	1,403.6	247.5	188.4	59.12	4.187		

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 28-05M
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 28-05M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-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	4,906.4	5,207.5	4,898.9	30.8	31.9	-73.35	679.9	1,411.9	248.9	189.4	59.49	4.183		
5,300.0	5,006.2	5,311.3	5,002.6	30.9	32.1	-73.39	682.2	1,416.7	249.7	189.9	59.75	4.178		
5,400.0	5,106.2	5,415.0	5,106.2	31.0	32.2	-0.36	683.0	1,418.2	249.9	190.0	59.92	4.171		
5,500.0	5,206.2	5,515.0	5,206.2	31.1	32.2	-0.36	683.0	1,418.2	249.9	189.8	60.07	4.160		
5,600.0	5,306.2	5,615.0	5,306.2	31.2	32.3	-0.36	683.0	1,418.2	249.9	189.7	60.24	4.149		
5,700.0	5,406.2	5,715.0	5,406.2	31.3	32.4	-0.36	683.0	1,418.2	249.9	189.5	60.40	4.137		
5,800.0	5,506.2	5,815.0	5,506.2	31.4	32.5	-0.36	683.0	1,418.2	249.9	189.3	60.57	4.126		
5,900.0	5,606.2	5,915.0	5,606.2	31.4	32.5	-0.36	683.0	1,418.2	249.9	189.2	60.74	4.114		
6,000.0	5,706.2	6,015.0	5,706.2	31.5	32.6	-0.36	683.0	1,418.2	249.9	189.0	60.92	4.102		
6,100.0	5,806.2	6,115.0	5,806.2	31.6	32.7	-0.36	683.0	1,418.2	249.9	188.8	61.10	4.090		
6,200.0	5,906.2	6,215.0	5,906.2	31.7	32.8	-0.36	683.0	1,418.2	249.9	188.6	61.28	4.078		
6,300.0	6,006.2	6,315.0	6,006.2	31.8	32.9	-0.36	683.0	1,418.2	249.9	188.4	61.46	4.066		
6,400.0	6,106.2	6,415.0	6,106.2	31.9	33.0	-0.36	683.0	1,418.2	249.9	188.3	61.64	4.054		
6,500.0	6,206.2	6,515.0	6,206.2	32.0	33.0	-0.36	683.0	1,418.2	249.9	188.1	61.83	4.041		
6,600.0	6,306.2	6,615.0	6,306.2	32.1	33.1	-0.36	683.0	1,418.2	249.9	187.9	62.02	4.029		
6,700.0	6,406.2	6,715.0	6,406.2	32.2	33.2	-0.36	683.0	1,418.2	249.9	187.7	62.22	4.016		
6,800.0	6,506.2	6,815.0	6,506.2	32.2	33.3	-0.36	683.0	1,418.2	249.9	187.5	62.41	4.004		
6,900.0	6,606.2	6,915.0	6,606.2	32.3	33.4	-0.36	683.0	1,418.2	249.9	187.3	62.61	3.991		
7,000.0	6,706.2	7,015.0	6,706.2	32.4	33.5	-0.36	683.0	1,418.2	249.9	187.1	62.82	3.978		
7,100.0	6,806.2	7,115.0	6,806.2	32.5	33.6	-0.36	683.0	1,418.2	249.9	186.9	63.02	3.965		
7,200.0	6,906.2	7,215.0	6,906.2	32.6	33.7	-0.36	683.0	1,418.2	249.9	186.7	63.23	3.952		
7,300.0	7,006.2	7,315.0	7,006.2	32.7	33.8	-0.36	683.0	1,418.2	249.9	186.5	63.44	3.939		
7,400.0	7,106.2	7,415.0	7,106.2	32.8	33.9	-0.36	683.0	1,418.2	249.9	186.2	63.65	3.926		
7,500.0	7,206.2	7,515.0	7,206.2	32.9	34.0	-0.36	683.0	1,418.2	249.9	186.0	63.86	3.913		
7,600.0	7,306.2	7,615.0	7,306.2	33.1	34.1	-0.36	683.0	1,418.2	249.9	185.8	64.08	3.900		
7,700.0	7,406.2	7,715.0	7,406.2	33.2	34.2	-0.36	683.0	1,418.2	249.9	185.6	64.30	3.887		
7,800.0	7,506.2	7,815.0	7,506.2	33.3	34.3	-0.36	683.0	1,418.2	249.9	185.4	64.52	3.873		
7,900.0	7,606.2	7,915.0	7,606.2	33.4	34.4	-0.36	683.0	1,418.2	249.9	185.2	64.74	3.860		
8,000.0	7,706.2	8,015.0	7,706.2	33.5	34.5	-0.36	683.0	1,418.2	249.9	184.9	64.97	3.846		
8,100.0	7,806.2	8,115.0	7,806.2	33.6	34.6	-0.36	683.0	1,418.2	249.9	184.7	65.20	3.833		
8,196.8	7,903.0	8,211.8	7,903.0	33.7	34.7	-0.36	683.0	1,418.2	249.9	184.5	65.42	3.820 SF		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-05M
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 28-05M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-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			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	114.00	-9.1	20.5	22.4					
100.0	100.0	100.0	100.0	0.1	0.1	114.00	-9.1	20.5	22.4	22.2	0.18	127.696		
200.0	200.0	200.0	200.0	0.3	0.3	114.00	-9.1	20.5	22.4	21.8	0.62	35.828		
300.0	300.0	300.0	300.0	0.5	0.5	114.00	-9.1	20.5	22.4	21.3	1.07	20.837 CC, ES		
400.0	400.0	399.3	399.3	0.8	0.8	111.80	-8.9	22.2	23.9	22.4	1.51	15.773		
500.0	500.0	498.4	498.2	1.0	1.0	106.63	-8.1	27.2	28.5	26.5	1.96	14.559		
600.0	600.0	597.0	596.4	1.2	1.2	101.01	-6.9	35.7	36.5	34.1	2.42	15.099		
700.0	700.0	694.9	693.6	1.4	1.5	96.36	-5.3	47.3	48.1	45.2	2.91	16.539		
800.0	800.0	792.1	789.7	1.7	1.8	20.33	-3.2	62.2	61.5	58.2	3.31	18.563		
900.0	899.8	888.9	884.7	1.9	2.1	18.80	-0.6	80.2	75.1	71.3	3.77	19.894		
1,000.0	999.5	985.2	978.7	2.1	2.5	18.06	2.4	101.2	88.7	84.4	4.25	20.853		
1,100.0	1,098.7	1,081.1	1,071.5	2.4	3.0	17.80	5.8	125.2	102.3	97.5	4.75	21.534		
1,200.0	1,197.5	1,176.6	1,163.0	2.6	3.5	17.84	9.7	152.2	115.9	110.6	5.27	21.999		
1,300.0	1,295.6	1,271.7	1,253.2	3.0	4.1	18.09	13.9	182.0	129.4	123.6	5.81	22.290		
1,400.0	1,393.1	1,370.2	1,345.9	3.4	4.8	18.59	18.6	214.9	141.8	135.4	6.37	22.247		
1,500.0	1,489.6	1,469.8	1,439.7	3.8	5.4	19.45	23.3	248.2	150.9	143.9	6.98	21.627		
1,600.0	1,585.3	1,569.6	1,533.6	4.3	6.1	20.67	28.1	281.6	156.8	149.2	7.62	20.578		
1,700.0	1,679.8	1,669.4	1,627.6	4.9	6.8	22.29	32.8	314.9	159.5	151.2	8.32	19.182		
1,800.0	1,773.2	1,769.2	1,721.5	5.5	7.5	24.37	37.6	348.3	159.2	150.1	9.09	17.505		
1,900.0	1,865.2	1,868.9	1,815.3	6.3	8.2	27.05	42.3	381.6	156.0	146.0	10.00	15.604		
2,000.0	1,955.9	1,968.3	1,908.9	7.1	8.9	30.50	47.0	414.8	150.1	139.1	11.08	13.547		
2,100.0	2,046.1	2,067.6	2,002.4	7.9	9.5	34.40	51.8	448.0	144.0	131.6	12.38	11.633		
2,200.0	2,136.2	2,166.9	2,095.9	8.7	10.2	38.63	56.5	481.2	138.5	124.6	13.87	9.984		
2,300.0	2,226.4	2,266.2	2,189.3	9.6	10.9	43.17	61.2	514.4	133.9	118.3	15.58	8.593		
2,400.0	2,316.6	2,365.5	2,282.8	10.5	11.6	48.00	65.9	547.6	130.2	112.7	17.49	7.443		
2,500.0	2,406.8	2,464.8	2,376.3	11.4	12.3	53.08	70.7	580.8	127.4	107.9	19.57	6.513		
2,600.0	2,497.0	2,564.1	2,469.7	12.2	13.0	58.33	75.4	614.0	125.8	104.0	21.77	5.776		
2,700.0	2,587.2	2,663.4	2,563.2	13.1	13.7	63.67	80.1	647.2	125.2	101.1	24.05	5.205		
2,703.2	2,590.0	2,666.6	2,566.2	13.2	13.7	63.84	80.3	648.2	125.2	101.0	24.12	5.189		
2,800.0	2,677.3	2,762.7	2,656.7	14.0	14.4	69.02	84.8	680.4	125.7	99.4	26.33	4.773		
2,900.0	2,767.5	2,862.0	2,750.2	14.9	15.1	74.28	89.6	713.6	127.3	98.7	28.57	4.456		
3,000.0	2,857.7	2,961.3	2,843.6	15.8	15.8	79.36	94.3	746.8	130.0	99.3	30.71	4.232		
3,100.0	2,947.9	3,060.6	2,937.1	16.7	16.5	84.21	99.0	780.0	133.6	100.9	32.72	4.084		
3,200.0	3,038.1	3,160.0	3,030.6	17.6	17.2	88.77	103.7	813.1	138.2	103.6	34.60	3.995		
3,300.0	3,128.3	3,259.3	3,124.0	18.5	17.9	93.02	108.5	846.3	143.6	107.3	36.32	3.953		
3,400.0	3,218.4	3,358.6	3,217.5	19.4	18.6	96.94	113.2	879.5	149.7	111.8	37.91	3.949 SF		
3,500.0	3,308.6	3,457.9	3,311.0	20.3	19.3	100.55	117.9	912.7	156.5	117.1	39.38	3.974		
3,600.0	3,398.8	3,557.2	3,404.5	21.2	20.0	103.84	122.6	945.9	163.9	123.1	40.74	4.022		
3,700.0	3,489.0	3,656.5	3,497.9	22.1	20.7	106.85	127.4	979.1	171.7	129.7	42.01	4.087		
3,800.0	3,579.2	3,755.8	3,591.4	23.0	21.4	109.58	132.1	1,012.3	180.0	136.8	43.21	4.166		
3,900.0	3,669.4	3,855.1	3,684.9	23.9	22.1	112.08	136.8	1,045.5	188.7	144.3	44.35	4.254		
4,000.0	3,759.6	3,954.4	3,778.3	24.9	22.8	114.35	141.5	1,078.7	197.6	152.2	45.44	4.350		
4,100.0	3,849.7	4,053.7	3,871.8	25.8	23.5	116.42	146.3	1,111.9	206.9	160.4	46.49	4.451		
4,200.0	3,940.5	4,153.1	3,965.4	26.6	24.2	118.15	151.0	1,145.1	215.8	168.3	47.50	4.544		
4,300.0	4,032.6	4,252.8	4,059.2	27.2	24.9	118.97	155.7	1,178.4	223.2	174.6	48.57	4.594		
4,400.0	4,126.0	4,352.0	4,152.7	27.9	25.6	118.98	160.5	1,211.5	228.9	179.1	49.80	4.597		
4,500.0	4,220.6	4,449.2	4,244.9	28.4	26.2	118.77	164.8	1,241.8	233.8	182.9	50.90	4.593		
4,600.0	4,316.3	4,546.3	4,338.1	28.9	26.6	118.60	168.6	1,268.9	238.1	186.3	51.86	4.592		
4,700.0	4,413.0	4,643.4	4,432.1	29.4	27.0	118.45	172.0	1,292.9	242.0	189.3	52.71	4.591		
4,800.0	4,510.5	4,740.6	4,527.0	29.8	27.4	118.32	175.0	1,313.7	245.4	191.9	53.46	4.589		
4,900.0	4,608.7	4,837.7	4,622.5	30.1	27.7	118.22	177.5	1,331.4	248.2	194.1	54.11	4.587		
5,000.0	4,707.5	4,934.9	4,718.5	30.4	28.0	118.14	179.6	1,345.8	250.5	195.9	54.65	4.585		

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 28-05M
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 28-05M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-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			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	4,806.7	5,032.1	4,815.0	30.6	28.2	118.08	181.2	1,357.0	252.3	197.3	55.09	4.581		
5,200.0	4,906.4	5,129.2	4,911.8	30.8	28.4	118.04	182.3	1,364.9	253.6	198.2	55.43	4.576		
5,300.0	5,006.2	5,226.4	5,008.9	30.9	28.5	118.01	183.0	1,369.6	254.4	198.7	55.67	4.569		
5,400.0	5,106.2	5,323.7	5,106.2	31.0	28.6	-168.96	183.2	1,371.1	254.6	198.8	55.82	4.561		
5,500.0	5,206.2	5,423.7	5,206.2	31.1	28.7	-168.96	183.2	1,371.1	254.6	198.6	55.99	4.547		
5,600.0	5,306.2	5,523.7	5,306.2	31.2	28.8	-168.96	183.2	1,371.1	254.6	198.4	56.17	4.533		
5,700.0	5,406.2	5,623.7	5,406.2	31.3	28.9	-168.96	183.2	1,371.1	254.6	198.3	56.34	4.519		
5,800.0	5,506.2	5,723.7	5,506.2	31.4	29.0	-168.96	183.2	1,371.1	254.6	198.1	56.53	4.504		
5,900.0	5,606.2	5,823.7	5,606.2	31.4	29.1	-168.96	183.2	1,371.1	254.6	197.9	56.71	4.490		
6,000.0	5,706.2	5,923.7	5,706.2	31.5	29.1	-168.96	183.2	1,371.1	254.6	197.7	56.90	4.475		
6,100.0	5,806.2	6,023.7	5,806.2	31.6	29.2	-168.96	183.2	1,371.1	254.6	197.5	57.09	4.460		
6,200.0	5,906.2	6,123.7	5,906.2	31.7	29.3	-168.96	183.2	1,371.1	254.6	197.3	57.28	4.445		
6,300.0	6,006.2	6,223.7	6,006.2	31.8	29.4	-168.96	183.2	1,371.1	254.6	197.1	57.47	4.430		
6,400.0	6,106.2	6,323.7	6,106.2	31.9	29.5	-168.96	183.2	1,371.1	254.6	196.9	57.67	4.415		
6,500.0	6,206.2	6,423.7	6,206.2	32.0	29.6	-168.96	183.2	1,371.1	254.6	196.7	57.87	4.399		
6,600.0	6,306.2	6,523.7	6,306.2	32.1	29.7	-168.96	183.2	1,371.1	254.6	196.5	58.08	4.384		
6,700.0	6,406.2	6,623.7	6,406.2	32.2	29.8	-168.96	183.2	1,371.1	254.6	196.3	58.28	4.368		
6,800.0	6,506.2	6,723.7	6,506.2	32.2	29.9	-168.96	183.2	1,371.1	254.6	196.1	58.49	4.353		
6,900.0	6,606.2	6,823.7	6,606.2	32.3	30.0	-168.96	183.2	1,371.1	254.6	195.9	58.70	4.337		
7,000.0	6,706.2	6,923.7	6,706.2	32.4	30.1	-168.96	183.2	1,371.1	254.6	195.7	58.92	4.321		
7,100.0	6,806.2	7,023.7	6,806.2	32.5	30.2	-168.96	183.2	1,371.1	254.6	195.5	59.14	4.305		
7,200.0	6,906.2	7,123.7	6,906.2	32.6	30.4	-168.96	183.2	1,371.1	254.6	195.3	59.36	4.289		
7,300.0	7,006.2	7,223.7	7,006.2	32.7	30.5	-168.96	183.2	1,371.1	254.6	195.0	59.58	4.273		
7,400.0	7,106.2	7,323.7	7,106.2	32.8	30.6	-168.96	183.2	1,371.1	254.6	194.8	59.80	4.257		
7,500.0	7,206.2	7,423.7	7,206.2	32.9	30.7	-168.96	183.2	1,371.1	254.6	194.6	60.03	4.241		
7,600.0	7,306.2	7,523.7	7,306.2	33.1	30.8	-168.96	183.2	1,371.1	254.6	194.3	60.26	4.225		
7,700.0	7,406.2	7,623.7	7,406.2	33.2	30.9	-168.96	183.2	1,371.1	254.6	194.1	60.49	4.209		
7,800.0	7,506.2	7,723.7	7,506.2	33.3	31.0	-168.96	183.2	1,371.1	254.6	193.9	60.73	4.192		
7,900.0	7,606.2	7,823.7	7,606.2	33.4	31.1	-168.96	183.2	1,371.1	254.6	193.6	60.97	4.176		
8,000.0	7,706.2	7,923.7	7,706.2	33.5	31.3	-168.96	183.2	1,371.1	254.6	193.4	61.21	4.160		
8,100.0	7,806.2	8,023.7	7,806.2	33.6	31.4	-168.96	183.2	1,371.1	254.6	193.2	61.45	4.143		
8,162.0	7,868.2	8,085.7	7,868.2	33.7	31.5	-168.96	183.2	1,371.1	254.6	193.0	61.60	4.133		
8,196.8	7,903.0	8,113.5	7,896.0	33.7	31.5	-168.96	183.2	1,371.1	254.7	193.0	61.68	4.130		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-05M
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 28-05M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-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)	Semi Major Axis 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	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	112.456		
200.0	200.0	200.0	200.0	0.3	0.3	140.33	-15.2	12.6	19.7	19.1	0.62	31.552		
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		
400.0	400.0	400.0	400.0	0.8	0.8	140.33	-15.2	12.6	19.7	18.2	1.52	12.937		
500.0	500.0	500.0	500.0	1.0	1.0	140.33	-15.2	12.6	19.7	17.7	1.97	9.990		
600.0	600.0	600.0	600.0	1.2	1.2	140.33	-15.2	12.6	19.7	17.3	2.42	8.137		
635.6	635.6	635.6	635.6	1.3	1.3	140.97	-15.3	12.4	19.7	17.1	2.58	7.655 CC		
700.0	700.0	700.0	699.9	1.4	1.4	145.39	-16.3	11.2	19.8	16.9	2.85	6.937 ES		
800.0	800.0	799.6	799.4	1.7	1.6	91.51	-19.6	7.2	20.8	17.6	3.26	6.384 SF		
900.0	899.8	898.1	897.6	1.9	1.8	119.40	-24.9	0.6	27.8	24.1	3.70	7.506		
1,000.0	999.5	996.2	995.1	2.1	2.1	138.44	-31.6	-7.6	42.9	38.7	4.16	10.310		
1,100.0	1,098.7	1,093.7	1,092.0	2.4	2.3	148.76	-38.2	-15.8	63.2	58.5	4.62	13.676		
1,200.0	1,197.5	1,190.3	1,188.1	2.6	2.6	154.90	-44.7	-23.8	87.6	82.5	5.08	17.235		
1,300.0	1,295.6	1,286.0	1,283.2	3.0	2.8	158.92	-51.2	-31.8	115.7	110.2	5.55	20.861		
1,400.0	1,393.1	1,380.6	1,377.3	3.4	3.1	161.74	-57.6	-39.7	147.4	141.3	6.01	24.506		
1,500.0	1,489.6	1,474.0	1,470.2	3.8	3.4	163.81	-64.0	-47.5	182.4	175.9	6.48	28.146		
1,600.0	1,585.3	1,566.2	1,561.8	4.3	3.6	165.39	-70.2	-55.2	220.8	213.8	6.95	31.775		
1,700.0	1,679.8	1,657.0	1,652.0	4.9	3.9	166.63	-76.4	-62.8	262.4	255.0	7.41	35.394		
1,800.0	1,773.2	1,746.2	1,740.8	5.5	4.1	167.62	-82.4	-70.2	307.1	299.3	7.88	38.992		
1,900.0	1,865.2	1,833.8	1,827.9	6.3	4.4	168.43	-88.3	-77.5	355.0	346.7	8.34	42.568		
2,000.0	1,955.9	1,919.8	1,913.3	7.1	4.7	169.15	-94.2	-84.7	405.9	397.1	8.81	46.097		
2,100.0	2,046.1	2,005.1	1,998.2	7.9	4.9	169.87	-99.9	-91.8	457.8	448.5	9.29	49.273		
2,200.0	2,136.2	2,090.5	2,083.0	8.7	5.2	170.45	-105.7	-99.0	509.7	500.0	9.79	52.090		
2,300.0	2,226.4	2,175.8	2,167.9	9.6	5.4	170.92	-111.5	-106.1	561.7	551.4	10.29	54.599		
2,400.0	2,316.6	2,261.2	2,252.7	10.5	5.7	171.31	-117.3	-113.2	613.7	602.9	10.80	56.842		
2,500.0	2,406.8	2,346.5	2,337.6	11.4	5.9	171.64	-123.1	-120.3	665.7	654.4	11.31	58.856		
2,600.0	2,497.0	2,431.9	2,422.5	12.2	6.2	171.93	-128.9	-127.5	717.7	705.9	11.83	60.671		
2,700.0	2,587.2	2,517.3	2,507.3	13.1	6.4	172.17	-134.7	-134.6	769.7	757.4	12.35	62.313		
2,800.0	2,677.3	2,602.6	2,592.2	14.0	6.7	172.39	-140.4	-141.7	821.8	808.9	12.88	63.805		
2,900.0	2,767.5	2,688.0	2,677.1	14.9	7.0	172.57	-146.2	-148.8	873.8	860.4	13.41	65.164		
3,000.0	2,857.7	2,773.3	2,761.9	15.8	7.2	172.74	-152.0	-156.0	925.9	911.9	13.94	66.407		
3,100.0	2,947.9	2,858.7	2,846.8	16.7	7.5	172.89	-157.8	-163.1	977.9	963.4	14.48	67.547		

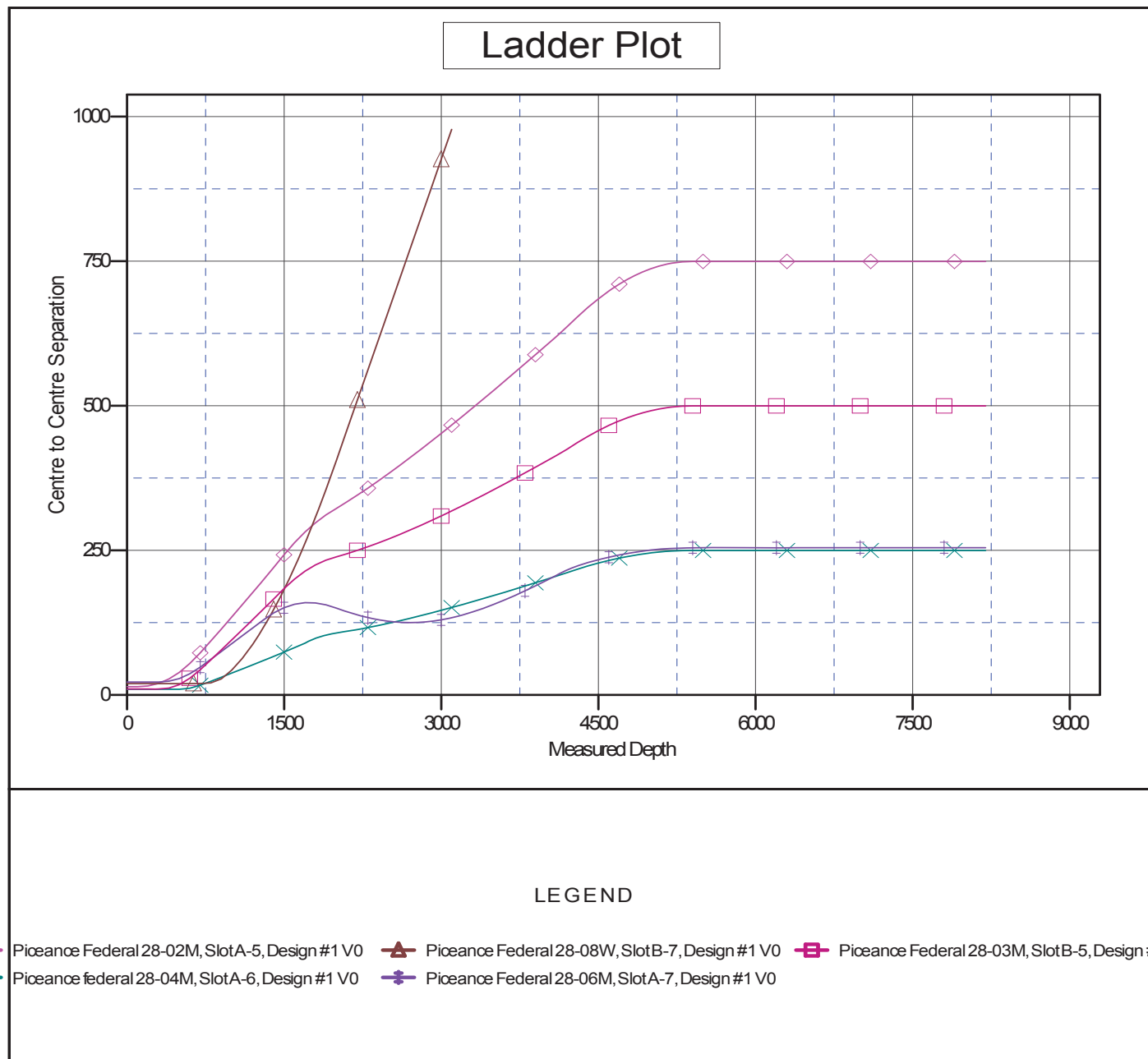
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance federal 28-05M
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 28-05M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-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 28-05M
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 28-05M
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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 28-05M

Coordinate System is US State Plane 1983, Colorado Central Zone

Grid Convergence at Surface is: -1.44°

