



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance 28-02W

Slot A-2

Plan: Design #1

Standard Planning Report

29 April, 2015

Archer



Project: Mesa County, CO
Site: Piceance 28-05
Well: Piceance 28-02W
Wellbore: Slot A-2
Design: Design #1
Latitude: 39° 15' 4.200 N
Longitude: 107° 46' 46.630 W
Ground Level: 7556.00
Well @ 7578.00usft

Archer

PROJECT DETAILS: Mesa County, CO

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Colorado Central Zone
System Datum: Mean Sea Level

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Piceance 28-02W, True North
Vertical (TVD) Reference: Well @ 7578.00usft
Section (VS) Reference: Slot - (0.00N, 0.00E)
Measured Depth Reference: Well @ 7578.00usft
Calculation Method: Minimum Curvature

WELL DETAILS: Piceance 28-02W

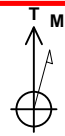
+N/-S	+E/-W	Northing	Ground Level: Easting	Latitude	Longitude	Slot
0.00	0.00	1524470.715	2354520.378	39° 15' 4.200 N	107° 46' 46.630 W	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance Federal 28-02W	7888.00	1150.33	-314.63	1525628.581	2354234.707	39° 15' 15.570 N	107° 46' 50.630 W	Circle (Radius: 50.00)

SECTION DETAILS

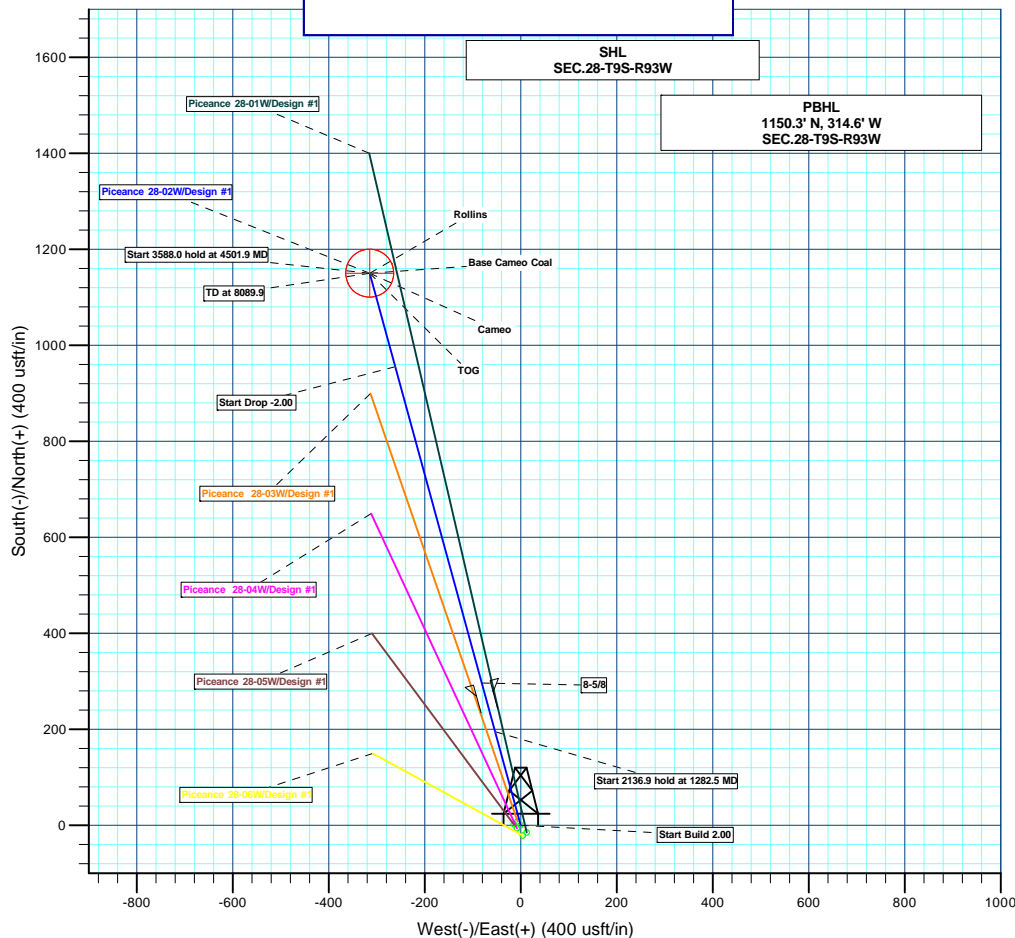
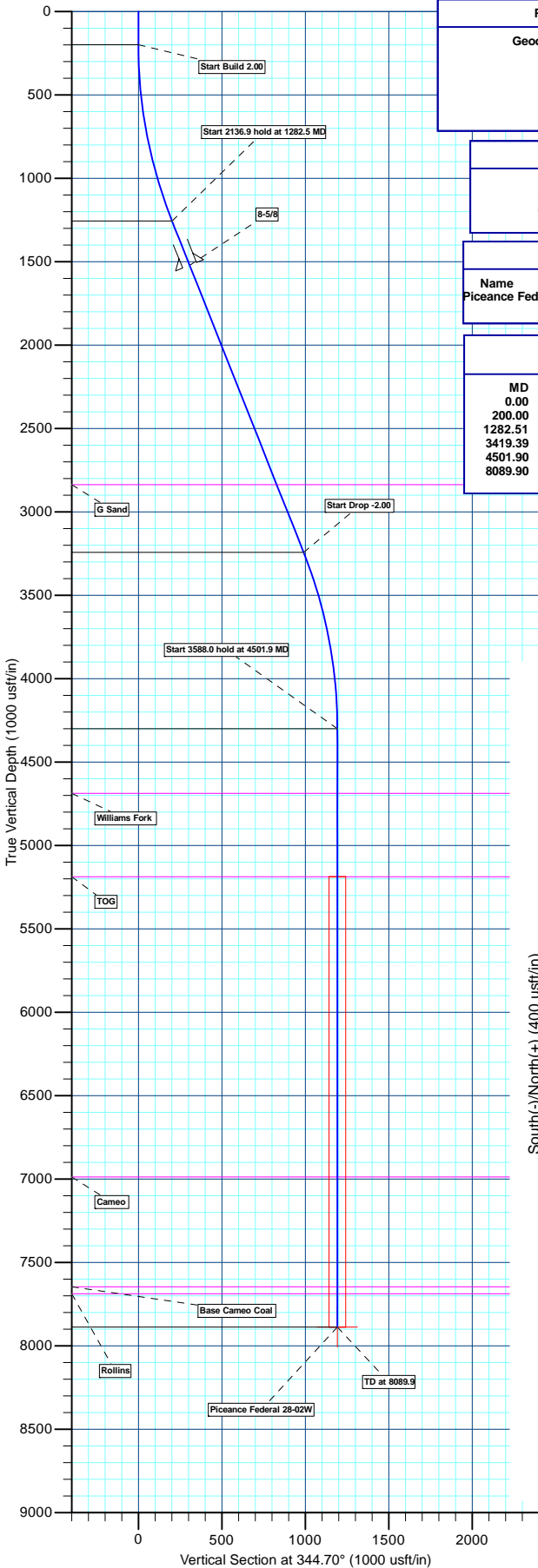
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00
1282.51	21.65	344.70	1256.93	194.94	-53.32	2.00	344.70	202.10	Start 2136.9 hold at 1282.5 MD
3419.39	21.65	344.70	3243.07	955.39	-261.31	0.00	0.00	990.48	Start Drop -2.00
4501.90	0.00	0.00	4300.00	1150.33	-314.63	2.00	180.00	1192.58	Start 3588.0 hold at 4501.9 MD
8089.90	0.00	0.00	7888.00	1150.33	-314.63	0.00	0.00	1192.58	TD at 8089.9



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
2838.00	2983.58	G Sand
4688.00	4889.90	Williams Fork
5188.00	5389.90	TOG
6988.00	7189.90	Cameo
7646.00	7847.90	Base Cameo Coal
7688.00	7889.90	Rollins



Plan: Design #1 (Piceance 28-02W/Slot A-2)

Created By: Ricky Osburn Date: 8:23, April 29 2015



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Planning Report

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Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-02W
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7578.00usft
Project:	Mesa County, CO	MD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	North Reference:	True
Well:	Piceance 28-02W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-2		
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:	1,524,375.785 usft	Latitude:	39° 15' 3.280 N
From:	Lat/Long	Easting:	2,354,593.535 usft	Longitude:	107° 46' 45.670 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"	Grid Convergence:	-1.44 °

Well	Piceance 28-02W					
Well Position	+N/-S	93.06 usft	Northing:	1,524,470.715 usft	Latitude:	39° 15' 4.200 N
	+E/-W	-75.52 usft	Easting:	2,354,520.378 usft	Longitude:	107° 46' 46.630 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,556.00 usft

Wellbore	Slot A-2				
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:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	344.70

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
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,282.51	21.65	344.70	1,256.93	194.94	-53.32	2.00	2.00	0.00	344.70	
3,419.39	21.65	344.70	3,243.07	955.39	-261.31	0.00	0.00	0.00	0.00	
4,501.90	0.00	0.00	4,300.00	1,150.33	-314.63	2.00	-2.00	0.00	180.00	
8,089.90	0.00	0.00	7,888.00	1,150.33	-314.63	0.00	0.00	0.00	0.00	Piceance Federal 28-0



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-02W
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7578.00usft
Project:	Mesa County, CO	MD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	North Reference:	True
Well:	Piceance 28-02W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-2		
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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	2.00	344.70	299.98	1.68	-0.46	1.75	2.00	2.00	0.00
400.00	4.00	344.70	399.84	6.73	-1.84	6.98	2.00	2.00	0.00
500.00	6.00	344.70	499.45	15.14	-4.14	15.69	2.00	2.00	0.00
600.00	8.00	344.70	598.70	26.89	-7.36	27.88	2.00	2.00	0.00
700.00	10.00	344.70	697.47	41.98	-11.48	43.52	2.00	2.00	0.00
800.00	12.00	344.70	795.62	60.38	-16.52	62.60	2.00	2.00	0.00
900.00	14.00	344.70	893.06	82.08	-22.45	85.10	2.00	2.00	0.00
1,000.00	16.00	344.70	989.64	107.05	-29.28	110.98	2.00	2.00	0.00
1,100.00	18.00	344.70	1,085.27	135.25	-36.99	140.21	2.00	2.00	0.00
1,200.00	20.00	344.70	1,179.82	166.65	-45.58	172.77	2.00	2.00	0.00
Start 2136.9 hold at 1282.5 MD									
1,282.51	21.65	344.70	1,256.93	194.94	-53.32	202.10	2.00	2.00	0.00
1,300.00	21.65	344.70	1,273.19	201.16	-55.02	208.55	0.00	0.00	0.00
1,400.00	21.65	344.70	1,366.13	236.75	-64.76	245.45	0.00	0.00	0.00
1,500.00	21.65	344.70	1,459.08	272.34	-74.49	282.34	0.00	0.00	0.00
8-5/8									
1,567.70	21.65	344.70	1,522.00	296.43	-81.08	307.32	0.00	0.00	0.00
1,600.00	21.65	344.70	1,552.02	307.92	-84.22	319.24	0.00	0.00	0.00
1,700.00	21.65	344.70	1,644.97	343.51	-93.96	356.13	0.00	0.00	0.00
1,800.00	21.65	344.70	1,737.92	379.10	-103.69	393.02	0.00	0.00	0.00
1,900.00	21.65	344.70	1,830.86	414.69	-113.42	429.92	0.00	0.00	0.00
2,000.00	21.65	344.70	1,923.81	450.27	-123.16	466.81	0.00	0.00	0.00
2,100.00	21.65	344.70	2,016.75	485.86	-132.89	503.70	0.00	0.00	0.00
2,200.00	21.65	344.70	2,109.70	521.45	-142.62	540.60	0.00	0.00	0.00
2,300.00	21.65	344.70	2,202.64	557.03	-152.36	577.49	0.00	0.00	0.00
2,400.00	21.65	344.70	2,295.59	592.62	-162.09	614.39	0.00	0.00	0.00
2,500.00	21.65	344.70	2,388.53	628.21	-171.82	651.28	0.00	0.00	0.00
2,600.00	21.65	344.70	2,481.48	663.79	-181.56	688.17	0.00	0.00	0.00
2,700.00	21.65	344.70	2,574.42	699.38	-191.29	725.07	0.00	0.00	0.00
2,800.00	21.65	344.70	2,667.37	734.97	-201.02	761.96	0.00	0.00	0.00
2,900.00	21.65	344.70	2,760.31	770.55	-210.76	798.86	0.00	0.00	0.00
G Sand									
2,983.58	21.65	344.70	2,838.00	800.30	-218.89	829.69	0.00	0.00	0.00
3,000.00	21.65	344.70	2,853.26	806.14	-220.49	835.75	0.00	0.00	0.00
3,100.00	21.65	344.70	2,946.20	841.73	-230.23	872.64	0.00	0.00	0.00
3,200.00	21.65	344.70	3,039.15	877.31	-239.96	909.54	0.00	0.00	0.00
3,300.00	21.65	344.70	3,132.10	912.90	-249.69	946.43	0.00	0.00	0.00
3,400.00	21.65	344.70	3,225.04	948.49	-259.43	983.33	0.00	0.00	0.00
Start Drop -2.00									
3,419.39	21.65	344.70	3,243.07	955.39	-261.31	990.48	0.00	0.00	0.00
3,500.00	20.04	344.70	3,318.39	983.05	-268.88	1,019.16	2.00	-2.00	0.00
3,600.00	18.04	344.70	3,412.92	1,014.52	-277.49	1,051.78	2.00	-2.00	0.00
3,700.00	16.04	344.70	3,508.53	1,042.78	-285.22	1,081.08	2.00	-2.00	0.00
3,800.00	14.04	344.70	3,605.10	1,067.80	-292.06	1,107.02	2.00	-2.00	0.00
3,900.00	12.04	344.70	3,702.51	1,089.56	-298.01	1,129.58	2.00	-2.00	0.00
4,000.00	10.04	344.70	3,800.66	1,108.03	-303.06	1,148.73	2.00	-2.00	0.00
4,100.00	8.04	344.70	3,899.41	1,123.18	-307.21	1,164.44	2.00	-2.00	0.00
4,200.00	6.04	344.70	3,998.65	1,135.00	-310.44	1,176.69	2.00	-2.00	0.00
4,300.00	4.04	344.70	4,098.26	1,143.47	-312.76	1,185.47	2.00	-2.00	0.00
4,400.00	2.04	344.70	4,198.12	1,148.58	-314.15	1,190.77	2.00	-2.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-02W
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7578.00usft
Project:	Mesa County, CO	MD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	North Reference:	True
Well:	Piceance 28-02W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-2		
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)
Start 3588.0 hold at 4501.9 MD									
4,501.90	0.00	0.00	4,300.00	1,150.33	-314.63	1,192.58	2.00	-2.00	0.00
4,600.00	0.00	0.00	4,398.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
4,700.00	0.00	0.00	4,498.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
4,800.00	0.00	0.00	4,598.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
Williams Fork									
4,889.90	0.00	0.00	4,688.00	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
4,900.00	0.00	0.00	4,698.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
5,000.00	0.00	0.00	4,798.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
5,100.00	0.00	0.00	4,898.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
5,200.00	0.00	0.00	4,998.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
5,300.00	0.00	0.00	5,098.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
TOG									
5,389.90	0.00	0.00	5,188.00	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
5,400.00	0.00	0.00	5,198.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
5,500.00	0.00	0.00	5,298.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
5,600.00	0.00	0.00	5,398.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
5,700.00	0.00	0.00	5,498.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
5,800.00	0.00	0.00	5,598.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
5,900.00	0.00	0.00	5,698.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
6,000.00	0.00	0.00	5,798.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
6,100.00	0.00	0.00	5,898.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
6,200.00	0.00	0.00	5,998.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
6,300.00	0.00	0.00	6,098.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
6,400.00	0.00	0.00	6,198.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
6,500.00	0.00	0.00	6,298.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
6,600.00	0.00	0.00	6,398.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
6,700.00	0.00	0.00	6,498.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
6,800.00	0.00	0.00	6,598.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
6,900.00	0.00	0.00	6,698.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
7,000.00	0.00	0.00	6,798.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
7,100.00	0.00	0.00	6,898.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
Cameo									
7,189.90	0.00	0.00	6,988.00	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
7,200.00	0.00	0.00	6,998.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
7,300.00	0.00	0.00	7,098.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
7,400.00	0.00	0.00	7,198.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
7,500.00	0.00	0.00	7,298.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
7,600.00	0.00	0.00	7,398.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
7,700.00	0.00	0.00	7,498.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
7,800.00	0.00	0.00	7,598.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
Base Cameo Coal									
7,847.90	0.00	0.00	7,646.00	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
Rollins									
7,889.90	0.00	0.00	7,688.00	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
7,900.00	0.00	0.00	7,698.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
8,000.00	0.00	0.00	7,798.10	1,150.33	-314.63	1,192.58	0.00	0.00	0.00
TD at 8089.9									
8,089.90	0.00	0.00	7,888.00	1,150.33	-314.63	1,192.58	0.00	0.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-02W
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7578.00usft
Project:	Mesa County, CO	MD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	North Reference:	True
Well:	Piceance 28-02W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-2		
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 28-02' - plan hits target center - Circle (radius 50.00)	0.00	0.00	7,888.00	1,150.33	-314.63	1,525,628.581	2,354,234.707	39° 15' 15.570 N	107° 46' 50.630 W

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,567.70	1,522.00	8-5/8	8-5/8	12-1/4

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,983.58	2,838.00	G Sand		0.00	
4,889.90	4,688.00	Williams Fork		0.00	
5,389.90	5,188.00	TOG		0.00	
7,189.90	6,988.00	Cameo		0.00	
7,847.90	7,646.00	Base Cameo Coal		0.00	
7,889.90	7,688.00	Rollins		0.00	

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
200.00	200.00	0.00	0.00	Start Build 2.00
1,282.51	1,256.93	194.94	-53.32	Start 2136.9 hold at 1282.5 MD
3,419.39	3,243.07	955.39	-261.31	Start Drop -2.00
4,501.90	4,300.00	1,150.33	-314.63	Start 3588.0 hold at 4501.9 MD
8,089.90	7,888.00	1,150.33	-314.63	TD at 8089.9



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance Federal 28-02W

Slot A-2

Design #1

Anticollision Report

28 April, 2015

Archer



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-02W
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 28-02W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-2	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	8,089.9	Design #1 (Slot A-2)	MWD	MWD - Standard

Summary							
		Reference	Offset	Distance			
Site Name		Measured	Measured	Between	Between	Separation	Warning
Offset Well - Wellbore - Design		Depth	Depth	Centres	Ellipses	Factor	
		(usft)	(usft)	(usft)	(usft)		
Piceance 28-05							
Piceance Federal 28-01W - Slot A-3 - Design #1		604.7	606.3	10.1	7.3	3.634	CC
Piceance Federal 28-01W - Slot A-3 - Design #1		700.0	701.5	10.7	7.3	3.103	ES
Piceance Federal 28-01W - Slot A-3 - Design #1		800.0	801.3	12.5	8.3	2.987	SF
Piceance federal 28-03W - Slot A-1 - Design #1		433.1	432.9	3.9	2.2	2.332	CC, ES, SF
Piceance Federal 28-04W - Slot B-2 - Design #1		209.0	209.0	9.7	9.0	14.548	CC, ES
Piceance Federal 28-04W - Slot B-2 - Design #1		900.0	898.6	24.1	19.2	4.927	SF
Piceance Federal 28-05W - Slot B-1 - Design #1		100.0	100.0	14.3	14.1	81.583	CC, ES
Piceance Federal 28-05W - Slot B-1 - Design #1		800.0	797.4	34.3	30.4	8.738	SF
Piceance Federal 28-06W - Slot B-3 - Design #1		200.0	200.0	21.8	21.1	34.831	CC, ES
Piceance Federal 28-06W - Slot B-3 - Design #1		500.0	500.3	36.3	34.2	17.097	SF

Offset Design		Piceance 28-05 - Piceance Federal 28-01W - Slot A-3 - 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)	Offset Wellbore Centre +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	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	200.6	200.6	0.3	0.3	137.83	-13.5	12.2	18.2	17.5	0.63	28.792			
300.0	300.0	301.0	300.8	0.5	0.6	146.44	-8.3	11.0	15.2	14.1	1.11	13.753			
400.0	399.8	401.3	400.8	0.8	0.8	136.29	0.2	9.0	12.7	11.1	1.60	7.916			
500.0	499.5	501.5	500.2	1.0	1.1	121.36	12.2	6.2	10.8	8.7	2.13	5.088			
600.0	598.7	601.6	599.0	1.3	1.4	102.03	27.5	2.7	10.1	7.3	2.74	3.679			
604.7	603.4	606.3	603.7	1.3	1.5	101.06	28.3	2.5	10.1	7.3	2.77	3.634	CC		
700.0	697.5	701.5	697.1	1.6	1.8	82.33	46.1	-1.6	10.7	7.3	3.45	3.103	ES		
800.0	795.6	801.3	794.3	2.0	2.3	66.69	68.0	-6.7	12.5	8.3	4.19	2.987	SF		
900.0	893.1	901.0	890.6	2.4	2.8	55.91	93.2	-12.5	15.1	10.2	4.93	3.064			
1,000.0	989.6	1,000.5	985.8	2.9	3.3	48.77	121.6	-19.1	18.2	12.5	5.68	3.196			
1,100.0	1,085.3	1,100.0	1,079.8	3.5	3.9	44.01	153.1	-26.4	21.5	15.0	6.47	3.323			
1,200.0	1,179.8	1,199.3	1,172.5	4.1	4.6	40.81	187.8	-34.4	25.0	17.7	7.29	3.425			
1,300.0	1,273.2	1,298.6	1,263.9	4.7	5.3	38.57	225.5	-43.2	28.6	20.5	8.17	3.504			
1,400.0	1,366.1	1,398.5	1,355.3	5.4	6.1	36.64	264.8	-52.3	32.6	23.5	9.03	3.606			
1,500.0	1,459.1	1,498.4	1,446.7	6.1	6.9	35.13	304.1	-61.4	36.5	26.6	9.89	3.693			

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 28-02W
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 28-02W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-2	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-01W - Slot A-3 - 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	1,552.0	1,598.3	1,538.1	6.8	7.6	33.91	343.4	-70.5	40.5	29.8	10.75	3.769		
1,700.0	1,645.0	1,698.2	1,629.5	7.5	8.4	32.91	382.7	-79.6	44.5	32.9	11.61	3.835		
1,800.0	1,737.9	1,798.1	1,720.9	8.3	9.2	32.08	422.0	-88.7	48.5	36.1	12.47	3.893		
1,900.0	1,830.9	1,898.1	1,812.4	9.0	10.0	31.37	461.3	-97.8	52.6	39.2	13.33	3.944		
2,000.0	1,923.8	1,998.0	1,903.8	9.7	10.7	30.76	500.6	-107.0	56.6	42.4	14.19	3.988		
2,100.0	2,016.8	2,097.9	1,995.2	10.4	11.5	30.24	540.0	-116.1	60.6	45.6	15.05	4.028		
2,200.0	2,109.7	2,197.8	2,086.6	11.1	12.3	29.78	579.3	-125.2	64.7	48.8	15.91	4.064		
2,300.0	2,202.6	2,297.7	2,178.0	11.8	13.1	29.37	618.6	-134.3	68.7	51.9	16.78	4.096		
2,400.0	2,295.6	2,397.6	2,269.4	12.6	13.9	29.01	657.9	-143.4	72.8	55.1	17.64	4.125		
2,500.0	2,388.5	2,497.6	2,360.8	13.3	14.7	28.69	697.2	-152.5	76.8	58.3	18.50	4.151		
2,600.0	2,481.5	2,597.5	2,452.2	14.0	15.5	28.40	736.5	-161.6	80.9	61.5	19.37	4.175		
2,700.0	2,574.4	2,697.4	2,543.6	14.7	16.2	28.14	775.8	-170.7	84.9	64.7	20.23	4.196		
2,800.0	2,667.4	2,797.3	2,635.0	15.5	17.0	27.90	815.1	-179.8	89.0	67.9	21.10	4.216		
2,900.0	2,760.3	2,897.2	2,726.4	16.2	17.8	27.68	854.4	-188.9	93.0	71.1	21.96	4.235		
3,000.0	2,853.3	2,997.1	2,817.9	16.9	18.6	27.48	893.7	-198.0	97.1	74.2	22.83	4.252		
3,100.0	2,946.2	3,097.1	2,909.3	17.6	19.4	27.30	933.0	-207.1	101.1	77.4	23.70	4.268		
3,200.0	3,039.2	3,197.0	3,000.7	18.4	20.2	27.13	972.3	-216.2	105.2	80.6	24.56	4.282		
3,300.0	3,132.1	3,296.9	3,092.1	19.1	21.0	26.97	1,011.6	-225.4	109.2	83.8	25.43	4.296		
3,400.0	3,225.0	3,396.8	3,183.5	19.8	21.8	26.83	1,050.9	-234.5	113.3	87.0	26.30	4.309		
3,500.0	3,318.4	3,496.7	3,274.9	20.5	22.6	26.48	1,090.2	-243.6	118.4	91.3	27.05	4.377		
3,600.0	3,412.9	3,596.3	3,366.0	21.0	23.3	25.52	1,129.4	-252.7	126.5	99.1	27.48	4.604		
3,700.0	3,508.5	3,696.3	3,457.5	21.5	24.1	24.10	1,168.7	-261.8	137.9	110.2	27.69	4.978		
3,800.0	3,605.1	3,800.3	3,553.6	21.9	24.7	22.64	1,207.4	-270.7	150.3	122.5	27.78	5.411		
3,900.0	3,702.5	3,904.9	3,651.6	22.3	25.3	21.38	1,242.9	-278.9	162.6	134.8	27.86	5.838		
4,000.0	3,800.7	4,009.9	3,751.4	22.6	25.8	20.27	1,275.0	-286.4	174.9	146.9	27.93	6.261		
4,100.0	3,899.4	4,115.5	3,852.8	22.9	26.3	19.28	1,303.6	-293.0	186.9	158.9	27.97	6.681		
4,200.0	3,998.7	4,221.6	3,955.7	23.2	26.8	18.40	1,328.7	-298.8	198.8	170.8	27.99	7.102		
4,300.0	4,098.3	4,328.2	4,060.0	23.4	27.1	17.59	1,350.2	-303.8	210.4	182.5	27.96	7.526		
4,400.0	4,198.1	4,435.3	4,165.5	23.5	27.5	16.84	1,367.9	-307.9	221.9	194.0	27.89	7.956		
4,500.0	4,298.1	4,543.0	4,272.2	23.6	27.8	16.15	1,381.9	-311.2	233.0	205.3	27.76	8.393		
4,600.0	4,398.1	4,651.3	4,380.0	23.7	28.0	0.27	1,392.0	-313.5	242.3	214.4	27.89	8.688		
4,700.0	4,498.1	4,760.2	4,488.7	23.8	28.1	-0.07	1,398.1	-314.9	248.0	219.9	28.10	8.823		
4,800.0	4,598.1	4,869.4	4,597.9	23.9	28.2	-0.18	1,400.2	-315.4	249.9	221.5	28.36	8.810		
4,900.0	4,698.1	4,969.6	4,698.1	23.9	28.3	-0.18	1,400.2	-315.4	249.9	221.2	28.65	8.721		
5,000.0	4,798.1	5,069.6	4,798.1	24.0	28.4	-0.18	1,400.2	-315.4	249.9	220.9	28.95	8.632		
5,100.0	4,898.1	5,169.6	4,898.1	24.1	28.5	-0.18	1,400.2	-315.4	249.9	220.6	29.25	8.544		
5,200.0	4,998.1	5,269.6	4,998.1	24.2	28.5	-0.18	1,400.2	-315.4	249.9	220.3	29.55	8.456		
5,300.0	5,098.1	5,369.6	5,098.1	24.3	28.6	-0.18	1,400.2	-315.4	249.9	220.0	29.86	8.369		
5,400.0	5,198.1	5,469.6	5,198.1	24.4	28.7	-0.18	1,400.2	-315.4	249.9	219.7	30.17	8.283		
5,500.0	5,298.1	5,569.6	5,298.1	24.5	28.8	-0.18	1,400.2	-315.4	249.9	219.4	30.48	8.198		
5,600.0	5,398.1	5,669.6	5,398.1	24.6	28.9	-0.18	1,400.2	-315.4	249.9	219.1	30.80	8.113		
5,700.0	5,498.1	5,769.6	5,498.1	24.7	29.0	-0.18	1,400.2	-315.4	249.9	218.8	31.12	8.030		
5,800.0	5,598.1	5,869.6	5,598.1	24.8	29.0	-0.18	1,400.2	-315.4	249.9	218.4	31.45	7.947		
5,900.0	5,698.1	5,969.6	5,698.1	24.9	29.1	-0.18	1,400.2	-315.4	249.9	218.1	31.77	7.865		
6,000.0	5,798.1	6,069.6	5,798.1	25.0	29.2	-0.18	1,400.2	-315.4	249.9	217.8	32.10	7.784		
6,100.0	5,898.1	6,169.6	5,898.1	25.1	29.3	-0.18	1,400.2	-315.4	249.9	217.5	32.43	7.705		
6,200.0	5,998.1	6,269.6	5,998.1	25.2	29.4	-0.18	1,400.2	-315.4	249.9	217.1	32.77	7.626		
6,300.0	6,098.1	6,369.6	6,098.1	25.3	29.5	-0.18	1,400.2	-315.4	249.9	216.8	33.11	7.548		
6,400.0	6,198.1	6,469.6	6,198.1	25.5	29.6	-0.18	1,400.2	-315.4	249.9	216.4	33.45	7.471		
6,500.0	6,298.1	6,569.6	6,298.1	25.6	29.7	-0.18	1,400.2	-315.4	249.9	216.1	33.79	7.395		
6,600.0	6,398.1	6,669.6	6,398.1	25.7	29.8	-0.18	1,400.2	-315.4	249.9	215.8	34.14	7.320		
6,700.0	6,498.1	6,769.6	6,498.1	25.8	29.9	-0.18	1,400.2	-315.4	249.9	215.4	34.49	7.246		

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



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-02W
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 28-02W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-2	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		
6,800.0	6,598.1	6,869.6	6,598.1	25.9	30.0	-0.18	1,400.2	-315.4	249.9	215.1	34.84	7.173		
6,900.0	6,698.1	6,969.6	6,698.1	26.0	30.1	-0.18	1,400.2	-315.4	249.9	214.7	35.19	7.101		
7,000.0	6,798.1	7,069.6	6,798.1	26.2	30.2	-0.18	1,400.2	-315.4	249.9	214.4	35.54	7.031		
7,100.0	6,898.1	7,169.6	6,898.1	26.3	30.3	-0.18	1,400.2	-315.4	249.9	214.0	35.90	6.961		
7,200.0	6,998.1	7,269.6	6,998.1	26.4	30.4	-0.18	1,400.2	-315.4	249.9	213.6	36.26	6.892		
7,300.0	7,098.1	7,369.6	7,098.1	26.5	30.5	-0.18	1,400.2	-315.4	249.9	213.3	36.62	6.824		
7,400.0	7,198.1	7,469.6	7,198.1	26.6	30.6	-0.18	1,400.2	-315.4	249.9	212.9	36.98	6.757		
7,500.0	7,298.1	7,569.6	7,298.1	26.8	30.7	-0.18	1,400.2	-315.4	249.9	212.5	37.35	6.691		
7,600.0	7,398.1	7,669.6	7,398.1	26.9	30.8	-0.18	1,400.2	-315.4	249.9	212.2	37.72	6.626		
7,700.0	7,498.1	7,769.6	7,498.1	27.0	30.9	-0.18	1,400.2	-315.4	249.9	211.8	38.08	6.562		
7,800.0	7,598.1	7,869.6	7,598.1	27.2	31.1	-0.18	1,400.2	-315.4	249.9	211.4	38.45	6.498		
7,900.0	7,698.1	7,969.6	7,698.1	27.3	31.2	-0.18	1,400.2	-315.4	249.9	211.1	38.83	6.436		
8,000.0	7,798.1	8,069.6	7,798.1	27.4	31.3	-0.18	1,400.2	-315.4	249.9	210.7	39.20	6.375		
8,089.9	7,888.0	8,159.5	7,888.0	27.5	31.4	-0.18	1,400.2	-315.4	249.9	210.4	39.54	6.321		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-02W
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 28-02W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-2	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	-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	58.479		
200.0	200.0	200.0	200.0	0.3	0.3	-37.87	8.1	-6.3	10.3	9.6	0.62	16.408		
300.0	300.0	300.0	300.0	0.5	0.5	-27.02	8.1	-6.3	8.7	7.6	1.10	7.863		
400.0	399.8	399.8	399.8	0.8	0.8	-57.75	8.1	-6.3	4.7	3.1	1.55	2.995		
433.1	432.9	432.9	432.9	0.9	0.8	-90.21	8.1	-6.3	3.9	2.2	1.69	2.332 CC, ES, SF		
500.0	499.5	499.5	499.5	1.0	1.0	-147.57	8.1	-6.3	7.4	5.3	2.10	3.510		
600.0	598.7	598.7	598.7	1.3	1.2	-167.82	8.1	-6.3	18.8	16.2	2.64	7.129		
700.0	697.5	697.5	697.5	1.6	1.4	-173.31	8.1	-6.3	34.3	31.1	3.16	10.853		
800.0	795.6	797.4	797.4	2.0	1.7	-175.44	9.7	-6.8	51.7	48.0	3.67	14.087		
900.0	893.1	897.9	897.8	2.4	1.9	-176.31	14.6	-8.5	69.1	64.9	4.17	16.561		
1,000.0	989.6	999.1	998.6	2.9	2.1	-176.68	22.8	-11.4	86.5	81.9	4.69	18.471		
1,100.0	1,085.3	1,101.0	1,099.7	3.5	2.4	-176.79	34.6	-15.4	104.0	98.7	5.21	19.960		
1,200.0	1,179.8	1,203.5	1,200.9	4.1	2.7	-176.75	49.8	-20.7	121.3	115.6	5.74	21.125		
1,300.0	1,273.2	1,306.6	1,302.1	4.7	3.0	-176.62	68.6	-27.1	138.5	132.2	6.28	22.048		
1,400.0	1,366.1	1,410.8	1,403.5	5.4	3.4	-176.38	91.0	-34.8	153.4	146.6	6.81	22.525		
1,500.0	1,459.1	1,510.4	1,500.0	6.1	3.8	-176.11	114.4	-42.9	166.2	158.8	7.36	22.579		
1,600.0	1,552.0	1,609.6	1,596.1	6.8	4.3	-175.87	137.7	-50.9	179.0	171.0	7.92	22.606		
1,700.0	1,645.0	1,708.7	1,692.1	7.5	4.7	-175.67	161.0	-58.9	191.7	183.3	8.49	22.582		
1,800.0	1,737.9	1,807.9	1,788.2	8.3	5.2	-175.49	184.3	-66.9	204.5	195.5	9.07	22.540		
1,900.0	1,830.9	1,907.1	1,884.3	9.0	5.6	-175.34	207.6	-74.9	217.3	207.7	9.67	22.485		
2,000.0	1,923.8	2,006.3	1,980.3	9.7	6.1	-175.20	230.8	-83.0	230.1	219.9	10.26	22.422		
2,100.0	2,016.8	2,105.4	2,076.4	10.4	6.6	-175.07	254.1	-91.0	242.9	232.1	10.87	22.354		
2,200.0	2,109.7	2,204.6	2,172.5	11.1	7.1	-174.96	277.4	-99.0	255.7	244.2	11.48	22.285		
2,300.0	2,202.6	2,303.8	2,268.6	11.8	7.6	-174.86	300.7	-107.0	268.5	256.4	12.09	22.215		
2,400.0	2,295.6	2,403.0	2,364.6	12.6	8.1	-174.76	324.0	-115.0	281.3	268.6	12.70	22.147		
2,500.0	2,388.5	2,502.1	2,460.7	13.3	8.5	-174.68	347.3	-123.0	294.1	280.8	13.32	22.079		
2,600.0	2,481.5	2,601.3	2,556.8	14.0	9.0	-174.60	370.6	-131.0	306.9	293.0	13.94	22.014		
2,700.0	2,574.4	2,700.5	2,652.8	14.7	9.5	-174.53	393.9	-139.1	319.7	305.2	14.57	21.950		
2,800.0	2,667.4	2,799.7	2,748.9	15.5	10.0	-174.46	417.1	-147.1	332.5	317.3	15.19	21.889		
2,900.0	2,760.3	2,898.9	2,845.0	16.2	10.5	-174.40	440.4	-155.1	345.3	329.5	15.82	21.831		
3,000.0	2,853.3	2,998.0	2,941.0	16.9	11.0	-174.35	463.7	-163.1	358.1	341.7	16.45	21.775		
3,100.0	2,946.2	3,097.2	3,037.1	17.6	11.5	-174.29	487.0	-171.1	370.9	353.9	17.08	21.721		
3,200.0	3,039.2	3,196.4	3,133.2	18.4	12.0	-174.25	510.3	-179.1	383.7	366.0	17.71	21.669		
3,300.0	3,132.1	3,295.6	3,229.3	19.1	12.5	-174.20	533.6	-187.1	396.5	378.2	18.34	21.620		
3,400.0	3,225.0	3,394.7	3,325.3	19.8	13.0	-174.16	556.9	-195.2	409.3	390.4	18.98	21.573		
3,500.0	3,318.4	3,494.0	3,421.5	20.5	13.5	-174.12	580.2	-203.2	421.0	401.4	19.62	21.455		
3,600.0	3,412.9	3,593.7	3,518.1	21.0	14.0	-174.04	603.6	-211.2	429.3	409.1	20.23	21.219		
3,700.0	3,508.5	3,693.6	3,614.8	21.5	14.5	-173.90	627.0	-219.3	434.2	413.3	20.82	20.858		
3,800.0	3,605.1	3,793.5	3,711.6	21.9	15.1	-173.71	650.5	-227.4	435.5	414.2	21.37	20.381		
3,900.0	3,702.5	3,893.5	3,808.5	22.3	15.6	-173.46	674.0	-235.5	433.4	411.5	21.89	19.798		
4,000.0	3,800.7	3,993.3	3,905.2	22.6	16.1	-173.15	697.4	-243.5	427.9	405.5	22.39	19.114		
4,100.0	3,899.4	4,092.9	4,001.6	22.9	16.6	-172.76	720.8	-251.6	418.9	396.0	22.85	18.331		
4,200.0	3,998.7	4,192.0	4,097.7	23.2	17.1	-172.27	744.1	-259.6	406.5	383.2	23.29	17.454		
4,300.0	4,098.3	4,290.7	4,193.2	23.4	17.6	-171.68	767.2	-267.6	390.7	367.0	23.70	16.481		
4,400.0	4,198.1	4,388.7	4,288.2	23.5	18.1	-170.94	790.2	-275.5	371.5	347.4	24.11	15.412		
4,500.0	4,298.1	4,486.0	4,382.4	23.6	18.6	-170.00	813.1	-283.3	349.0	324.5	24.51	14.244		
4,600.0	4,398.1	4,573.9	4,467.9	23.7	18.9	-175.58	832.7	-290.1	326.2	301.2	25.01	13.039		
4,700.0	4,498.1	4,662.3	4,554.4	23.8	19.2	-176.45	849.8	-296.0	306.3	280.7	25.53	11.995		
4,800.0	4,598.1	4,751.8	4,642.5	23.9	19.5	-177.29	864.7	-301.1	289.4	263.4	26.05	11.110		
4,900.0	4,698.1	4,842.3	4,732.0	23.9	19.8	-178.05	877.0	-305.3	275.6	249.0	26.55	10.380		
5,000.0	4,798.1	4,933.4	4,822.5	24.0	20.0	-178.71	886.7	-308.7	264.8	237.8	27.03	9.799		

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 28-02W
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 28-02W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-2	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance federal 28-03W - Slot A-1 - 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	4,898.1	5,025.1	4,914.0	24.1	20.2	179.21	893.7	-311.1	257.1	229.7	27.46	9.364		
5,200.0	4,998.1	5,117.2	5,006.0	24.2	20.3	179.53	898.0	-312.6	252.5	224.7	27.84	9.069		
5,300.0	5,098.1	5,209.5	5,098.2	24.3	20.4	179.64	899.4	-313.1	250.9	222.7	28.16	8.909		
5,334.0	5,132.1	5,243.4	5,132.1	24.3	20.5	179.64	899.4	-313.1	250.9	222.6	28.27	8.875		
5,400.0	5,198.1	5,309.4	5,198.1	24.4	20.6	179.64	899.4	-313.1	250.9	222.4	28.49	8.808		
5,500.0	5,298.1	5,409.4	5,298.1	24.5	20.7	179.64	899.4	-313.1	250.9	222.1	28.83	8.704		
5,600.0	5,398.1	5,509.4	5,398.1	24.6	20.8	179.64	899.4	-313.1	250.9	221.7	29.17	8.602		
5,700.0	5,498.1	5,609.4	5,498.1	24.7	20.9	179.64	899.4	-313.1	250.9	221.4	29.52	8.501		
5,800.0	5,598.1	5,709.4	5,598.1	24.8	21.0	179.64	899.4	-313.1	250.9	221.0	29.87	8.401		
5,900.0	5,698.1	5,809.4	5,698.1	24.9	21.2	179.64	899.4	-313.1	250.9	220.7	30.22	8.304		
6,000.0	5,798.1	5,909.4	5,798.1	25.0	21.3	179.64	899.4	-313.1	250.9	220.3	30.57	8.207		
6,100.0	5,898.1	6,009.4	5,898.1	25.1	21.4	179.64	899.4	-313.1	250.9	220.0	30.93	8.113		
6,200.0	5,998.1	6,109.4	5,998.1	25.2	21.5	179.64	899.4	-313.1	250.9	219.6	31.29	8.020		
6,300.0	6,098.1	6,209.4	6,098.1	25.3	21.7	179.64	899.4	-313.1	250.9	219.3	31.65	7.928		
6,400.0	6,198.1	6,309.4	6,198.1	25.5	21.8	179.64	899.4	-313.1	250.9	218.9	32.01	7.838		
6,500.0	6,298.1	6,409.4	6,298.1	25.6	21.9	179.64	899.4	-313.1	250.9	218.5	32.38	7.749		
6,600.0	6,398.1	6,509.4	6,398.1	25.7	22.1	179.64	899.4	-313.1	250.9	218.2	32.75	7.662		
6,700.0	6,498.1	6,609.4	6,498.1	25.8	22.2	179.64	899.4	-313.1	250.9	217.8	33.12	7.577		
6,800.0	6,598.1	6,709.4	6,598.1	25.9	22.4	179.64	899.4	-313.1	250.9	217.4	33.49	7.492		
6,900.0	6,698.1	6,809.4	6,698.1	26.0	22.5	179.64	899.4	-313.1	250.9	217.0	33.86	7.410		
7,000.0	6,798.1	6,909.4	6,798.1	26.2	22.6	179.64	899.4	-313.1	250.9	216.7	34.24	7.328		
7,100.0	6,898.1	7,009.4	6,898.1	26.3	22.8	179.64	899.4	-313.1	250.9	216.3	34.62	7.249		
7,200.0	6,998.1	7,109.4	6,998.1	26.4	22.9	179.64	899.4	-313.1	250.9	215.9	34.99	7.170		
7,300.0	7,098.1	7,209.4	7,098.1	26.5	23.1	179.64	899.4	-313.1	250.9	215.5	35.37	7.093		
7,400.0	7,198.1	7,309.4	7,198.1	26.6	23.2	179.64	899.4	-313.1	250.9	215.2	35.76	7.017		
7,500.0	7,298.1	7,409.4	7,298.1	26.8	23.4	179.64	899.4	-313.1	250.9	214.8	36.14	6.943		
7,600.0	7,398.1	7,509.4	7,398.1	26.9	23.5	179.64	899.4	-313.1	250.9	214.4	36.53	6.869		
7,700.0	7,498.1	7,609.4	7,498.1	27.0	23.7	179.64	899.4	-313.1	250.9	214.0	36.91	6.797		
7,800.0	7,598.1	7,709.4	7,598.1	27.2	23.8	179.64	899.4	-313.1	250.9	213.6	37.30	6.727		
7,900.0	7,698.1	7,809.4	7,698.1	27.3	24.0	179.64	899.4	-313.1	250.9	213.2	37.69	6.657		
8,000.0	7,798.1	7,909.4	7,798.1	27.4	24.1	179.64	899.4	-313.1	250.9	212.8	38.08	6.589		
8,058.2	7,856.3	7,967.6	7,856.3	27.5	24.2	179.64	899.4	-313.1	250.9	212.6	38.31	6.550		
8,089.9	7,888.0	7,994.3	7,883.0	27.5	24.3	179.64	899.4	-313.1	251.0	212.5	38.42	6.531		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-02W
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 28-02W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-2	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-04W - Slot B-2 - 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	-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	-117.55	-4.5	-8.6	9.7	9.1	0.63	15.519		
209.0	209.0	209.0	209.0	0.3	0.3	-100.40	-4.2	-8.7	9.7	9.0	0.67	14.548 CC, ES		
300.0	300.0	299.9	299.8	0.5	0.6	-82.52	0.3	-10.8	10.4	9.4	1.08	9.623		
400.0	399.8	399.7	399.1	0.8	0.8	-68.17	8.1	-14.4	12.7	11.1	1.57	8.067		
500.0	499.5	499.3	498.0	1.0	1.1	-59.80	19.1	-19.5	16.0	13.9	2.10	7.592		
600.0	598.7	599.0	596.6	1.3	1.4	-56.26	32.9	-25.9	19.6	17.0	2.67	7.341		
700.0	697.5	699.0	695.3	1.6	1.8	-60.40	47.1	-32.5	21.8	18.5	3.30	6.597		
800.0	795.6	798.9	794.0	2.0	2.1	-71.74	61.4	-39.1	22.7	18.6	4.04	5.616		
900.0	893.1	898.6	892.4	2.4	2.5	-90.01	75.6	-45.7	24.1	19.2	4.90	4.927 SF		
1,000.0	989.6	998.0	990.6	2.9	2.8	-111.48	89.7	-52.2	28.8	23.1	5.70	5.047		
1,100.0	1,085.3	1,097.0	1,088.3	3.5	3.2	-129.72	103.8	-58.8	38.4	32.1	6.29	6.096		
1,200.0	1,179.8	1,195.4	1,185.5	4.1	3.6	-142.39	117.8	-65.2	52.9	46.2	6.77	7.824		
1,300.0	1,273.2	1,293.1	1,282.1	4.7	3.9	-150.76	131.7	-71.7	72.0	64.7	7.22	9.959		
1,400.0	1,366.1	1,390.6	1,378.4	5.4	4.3	-156.00	145.6	-78.1	92.9	85.2	7.68	12.091		
1,500.0	1,459.1	1,488.1	1,474.7	6.1	4.6	-159.30	159.5	-84.5	114.4	106.2	8.18	13.981		
1,600.0	1,552.0	1,585.6	1,571.0	6.8	5.0	-161.55	173.4	-91.0	136.0	127.3	8.70	15.643		
1,700.0	1,645.0	1,683.1	1,667.3	7.5	5.3	-163.19	187.3	-97.4	157.9	148.6	9.23	17.104		
1,800.0	1,737.9	1,780.7	1,763.6	8.3	5.7	-164.43	201.1	-103.8	179.8	170.0	9.78	18.393		
1,900.0	1,830.9	1,878.2	1,859.9	9.0	6.0	-165.40	215.0	-110.3	201.8	191.4	10.33	19.534		
2,000.0	1,923.8	1,975.7	1,956.1	9.7	6.4	-166.17	228.9	-116.7	223.8	212.9	10.89	20.550		
2,100.0	2,016.8	2,073.2	2,052.4	10.4	6.8	-166.81	242.8	-123.1	245.9	234.4	11.46	21.460		
2,200.0	2,109.7	2,170.7	2,148.7	11.1	7.1	-167.35	256.7	-129.6	268.0	255.9	12.03	22.277		
2,300.0	2,202.6	2,268.2	2,245.0	11.8	7.5	-167.80	270.6	-136.0	290.1	277.5	12.60	23.015		
2,400.0	2,295.6	2,365.7	2,341.3	12.6	7.8	-168.19	284.4	-142.4	312.2	299.0	13.18	23.684		
2,500.0	2,388.5	2,463.2	2,437.6	13.3	8.2	-168.52	298.3	-148.8	334.3	320.5	13.76	24.293		
2,600.0	2,481.5	2,560.7	2,533.9	14.0	8.5	-168.82	312.2	-155.3	356.4	342.1	14.34	24.850		
2,700.0	2,574.4	2,658.2	2,630.2	14.7	8.9	-169.08	326.1	-161.7	378.6	363.7	14.93	25.360		
2,800.0	2,667.4	2,755.7	2,726.5	15.5	9.2	-169.31	340.0	-168.1	400.8	385.2	15.52	25.830		
2,900.0	2,760.3	2,853.2	2,822.8	16.2	9.6	-169.52	353.8	-174.6	422.9	406.8	16.10	26.263		
3,000.0	2,853.3	2,950.7	2,919.1	16.9	10.0	-169.71	367.7	-181.0	445.1	428.4	16.69	26.664		
3,100.0	2,946.2	3,048.2	3,015.4	17.6	10.3	-169.88	381.6	-187.4	467.3	450.0	17.28	27.037		
3,200.0	3,039.2	3,145.7	3,111.7	18.4	10.7	-170.03	395.5	-193.8	489.4	471.6	17.87	27.383		
3,300.0	3,132.1	3,243.2	3,208.0	19.1	11.0	-170.17	409.4	-200.3	511.6	493.1	18.47	27.706		
3,400.0	3,225.0	3,340.7	3,304.3	19.8	11.4	-170.30	423.3	-206.7	533.8	514.7	19.06	28.008		
3,500.0	3,318.4	3,438.4	3,400.8	20.5	11.7	-170.45	437.2	-213.1	554.9	535.2	19.67	28.211		
3,600.0	3,412.9	3,536.8	3,498.0	21.0	12.1	-170.55	451.2	-219.6	572.6	552.4	20.24	28.290		
3,700.0	3,508.5	3,635.8	3,595.7	21.5	12.5	-170.57	465.3	-226.2	587.0	566.2	20.80	28.229		
3,800.0	3,605.1	3,735.2	3,693.9	21.9	12.8	-170.53	479.4	-232.7	598.0	576.7	21.32	28.042		
3,900.0	3,702.5	3,834.9	3,792.3	22.3	13.2	-170.42	493.6	-239.3	605.5	583.7	21.83	27.740		
4,000.0	3,800.7	3,934.8	3,891.0	22.6	13.5	-170.25	507.8	-245.9	609.6	587.3	22.31	27.331		
4,100.0	3,899.4	4,034.7	3,989.7	22.9	13.9	-170.02	522.1	-252.5	610.3	587.6	22.75	26.821		
4,200.0	3,998.7	4,134.6	4,088.4	23.2	14.3	-169.71	536.3	-259.1	607.6	584.4	23.18	26.215		
4,300.0	4,098.3	4,234.4	4,186.9	23.4	14.6	-169.33	550.5	-265.6	601.4	577.8	23.57	25.514		
4,400.0	4,198.1	4,333.8	4,285.1	23.5	15.0	-168.87	564.7	-272.2	591.9	567.9	23.94	24.721		
4,500.0	4,298.1	4,432.8	4,382.9	23.6	15.4	-168.30	578.8	-278.7	578.9	554.7	24.29	23.836		
4,600.0	4,398.1	4,531.6	4,480.4	23.7	15.7	-176.98	592.8	-285.2	564.3	539.5	24.80	22.759		
4,700.0	4,498.1	4,630.4	4,578.0	23.8	16.1	-177.59	606.9	-291.7	549.8	524.4	25.33	21.706		
4,800.0	4,598.1	4,725.4	4,671.8	23.9	16.4	-178.20	620.3	-298.0	535.4	509.5	25.85	20.711		
4,900.0	4,698.1	4,810.1	4,755.8	23.9	16.7	-178.69	630.7	-302.8	523.0	496.7	26.29	19.889		
5,000.0	4,798.1	4,900.0	4,845.2	24.0	16.9	-179.11	639.2	-306.7	513.3	486.6	26.70	19.224		

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 28-02W
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 28-02W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-2	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-04W - Slot B-2 - 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	4,898.1	4,981.2	4,926.1	24.1	17.0	179.39	644.7	-309.3	506.4	479.3	27.06	18.715		
5,200.0	4,998.1	5,067.3	5,012.1	24.2	17.2	179.58	648.3	-310.9	502.2	474.8	27.39	18.334		
5,300.0	5,098.1	5,155.2	5,100.0	24.3	17.3	179.64	649.5	-311.5	500.8	473.1	27.70	18.079		
5,334.0	5,132.1	5,187.2	5,132.1	24.3	17.3	179.64	649.5	-311.5	500.8	473.0	27.81	18.009		
5,400.0	5,198.1	5,253.3	5,198.1	24.4	17.4	179.64	649.5	-311.5	500.8	472.8	28.04	17.863		
5,500.0	5,298.1	5,353.3	5,298.1	24.5	17.6	179.64	649.5	-311.5	500.8	472.4	28.39	17.642		
5,600.0	5,398.1	5,453.3	5,398.1	24.6	17.7	179.64	649.5	-311.5	500.8	472.1	28.74	17.425		
5,700.0	5,498.1	5,553.3	5,498.1	24.7	17.9	179.64	649.5	-311.5	500.8	471.7	29.10	17.212		
5,800.0	5,598.1	5,653.3	5,598.1	24.8	18.0	179.64	649.5	-311.5	500.8	471.4	29.46	17.002		
5,900.0	5,698.1	5,753.3	5,698.1	24.9	18.2	179.64	649.5	-311.5	500.8	471.0	29.82	16.796		
6,000.0	5,798.1	5,853.3	5,798.1	25.0	18.3	179.64	649.5	-311.5	500.8	470.6	30.18	16.594		
6,100.0	5,898.1	5,953.3	5,898.1	25.1	18.5	179.64	649.5	-311.5	500.8	470.3	30.55	16.395		
6,200.0	5,998.1	6,053.3	5,998.1	25.2	18.6	179.64	649.5	-311.5	500.8	469.9	30.91	16.200		
6,300.0	6,098.1	6,153.3	6,098.1	25.3	18.8	179.64	649.5	-311.5	500.8	469.5	31.28	16.008		
6,400.0	6,198.1	6,253.3	6,198.1	25.5	18.9	179.64	649.5	-311.5	500.8	469.2	31.66	15.820		
6,500.0	6,298.1	6,353.3	6,298.1	25.6	19.1	179.64	649.5	-311.5	500.8	468.8	32.03	15.635		
6,600.0	6,398.1	6,453.3	6,398.1	25.7	19.2	179.64	649.5	-311.5	500.8	468.4	32.41	15.454		
6,700.0	6,498.1	6,553.3	6,498.1	25.8	19.4	179.64	649.5	-311.5	500.8	468.0	32.78	15.276		
6,800.0	6,598.1	6,653.3	6,598.1	25.9	19.6	179.64	649.5	-311.5	500.8	467.6	33.16	15.101		
6,900.0	6,698.1	6,753.3	6,698.1	26.0	19.7	179.64	649.5	-311.5	500.8	467.3	33.54	14.930		
7,000.0	6,798.1	6,853.3	6,798.1	26.2	19.9	179.64	649.5	-311.5	500.8	466.9	33.93	14.761		
7,100.0	6,898.1	6,953.3	6,898.1	26.3	20.1	179.64	649.5	-311.5	500.8	466.5	34.31	14.596		
7,200.0	6,998.1	7,053.3	6,998.1	26.4	20.2	179.64	649.5	-311.5	500.8	466.1	34.70	14.433		
7,300.0	7,098.1	7,153.3	7,098.1	26.5	20.4	179.64	649.5	-311.5	500.8	465.7	35.09	14.274		
7,400.0	7,198.1	7,253.3	7,198.1	26.6	20.6	179.64	649.5	-311.5	500.8	465.3	35.47	14.117		
7,500.0	7,298.1	7,353.3	7,298.1	26.8	20.7	179.64	649.5	-311.5	500.8	464.9	35.87	13.964		
7,600.0	7,398.1	7,453.3	7,398.1	26.9	20.9	179.64	649.5	-311.5	500.8	464.6	36.26	13.813		
7,700.0	7,498.1	7,553.3	7,498.1	27.0	21.1	179.64	649.5	-311.5	500.8	464.2	36.65	13.665		
7,800.0	7,598.1	7,653.3	7,598.1	27.2	21.2	179.64	649.5	-311.5	500.8	463.8	37.04	13.519		
7,900.0	7,698.1	7,753.3	7,698.1	27.3	21.4	179.64	649.5	-311.5	500.8	463.4	37.44	13.376		
8,000.0	7,798.1	7,853.3	7,798.1	27.4	21.6	179.64	649.5	-311.5	500.8	463.0	37.84	13.236		
8,055.3	7,853.4	7,908.6	7,853.4	27.5	21.7	179.64	649.5	-311.5	500.8	462.8	38.06	13.159		
8,089.9	7,888.0	7,931.2	7,876.0	27.5	21.7	179.64	649.5	-311.5	501.0	462.8	38.17	13.124		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-02W
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 28-02W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-2	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-05W - Slot B-1 - 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 CC, ES		
200.0	200.0	199.6	199.6	0.3	0.3	-77.34	3.4	-15.2	15.6	15.0	0.63	24.873		
300.0	300.0	299.1	298.9	0.5	0.6	-56.35	7.6	-18.3	18.8	17.7	1.09	17.256		
400.0	399.8	398.4	397.8	0.8	0.8	-54.74	14.5	-23.4	23.0	21.4	1.57	14.622		
500.0	499.5	498.3	497.2	1.0	1.1	-57.39	23.0	-29.7	26.9	24.8	2.08	12.940		
600.0	598.7	598.1	596.5	1.3	1.4	-65.29	31.5	-36.1	29.2	26.5	2.61	11.156		
700.0	697.5	697.9	695.7	1.6	1.7	-78.04	40.0	-42.4	31.0	27.8	3.23	9.618		
800.0	795.6	797.4	794.6	2.0	2.0	-94.62	48.4	-48.7	34.3	30.4	3.93	8.738 SF		
900.0	893.1	896.5	893.1	2.4	2.2	-111.92	56.9	-55.0	41.1	36.5	4.66	8.831		
1,000.0	989.6	995.1	991.2	2.9	2.5	-126.62	65.3	-61.2	52.6	47.3	5.33	9.874		
1,100.0	1,085.3	1,093.1	1,088.6	3.5	2.8	-137.61	73.6	-67.4	68.8	62.9	5.93	11.610		
1,200.0	1,179.8	1,190.3	1,185.3	4.1	3.1	-145.49	81.9	-73.6	89.4	82.9	6.49	13.782		
1,300.0	1,273.2	1,286.7	1,281.1	4.7	3.4	-151.18	90.1	-79.7	114.1	107.0	7.03	16.228		
1,400.0	1,366.1	1,382.7	1,376.7	5.4	3.7	-155.20	98.3	-85.7	140.5	132.9	7.54	18.635		
1,500.0	1,459.1	1,478.8	1,472.2	6.1	4.0	-157.95	106.4	-91.8	167.3	159.3	8.06	20.767		
1,600.0	1,552.0	1,574.9	1,567.7	6.8	4.2	-159.93	114.6	-97.9	194.4	185.8	8.59	22.645		
1,700.0	1,645.0	1,670.9	1,663.2	7.5	4.5	-161.43	122.8	-104.0	221.7	212.6	9.12	24.301		
1,800.0	1,737.9	1,767.0	1,758.7	8.3	4.8	-162.60	131.0	-110.1	249.1	239.4	9.67	25.765		
1,900.0	1,830.9	1,863.1	1,854.3	9.0	5.1	-163.54	139.1	-116.2	276.6	266.3	10.22	27.064		
2,000.0	1,923.8	1,959.1	1,949.8	9.7	5.4	-164.31	147.3	-122.2	304.1	293.3	10.77	28.224		
2,100.0	2,016.8	2,055.2	2,045.3	10.4	5.7	-164.95	155.5	-128.3	331.6	320.3	11.33	29.263		
2,200.0	2,109.7	2,151.3	2,140.8	11.1	6.0	-165.50	163.7	-134.4	359.2	347.3	11.90	30.198		
2,300.0	2,202.6	2,247.3	2,236.4	11.8	6.2	-165.96	171.8	-140.5	386.8	374.4	12.46	31.043		
2,400.0	2,295.6	2,343.4	2,331.9	12.6	6.5	-166.37	180.0	-146.6	414.5	401.5	13.03	31.810		
2,500.0	2,388.5	2,439.5	2,427.4	13.3	6.8	-166.72	188.2	-152.6	442.1	428.5	13.60	32.510		
2,600.0	2,481.5	2,535.5	2,522.9	14.0	7.1	-167.03	196.4	-158.7	469.8	455.6	14.17	33.149		
2,700.0	2,574.4	2,631.6	2,618.5	14.7	7.4	-167.31	204.6	-164.8	497.5	482.7	14.75	33.736		
2,800.0	2,667.4	2,727.7	2,714.0	15.5	7.7	-167.56	212.7	-170.9	525.2	509.9	15.32	34.276		
2,900.0	2,760.3	2,823.7	2,809.5	16.2	8.0	-167.78	220.9	-177.0	552.9	537.0	15.90	34.775		
3,000.0	2,853.3	2,919.8	2,905.0	16.9	8.2	-167.98	229.1	-183.1	580.6	564.1	16.48	35.237		
3,100.0	2,946.2	3,015.9	3,000.6	17.6	8.5	-168.17	237.3	-189.1	608.3	591.2	17.06	35.666		
3,200.0	3,039.2	3,111.9	3,096.1	18.4	8.8	-168.34	245.4	-195.2	636.0	618.4	17.64	36.065		
3,300.0	3,132.1	3,208.0	3,191.6	19.1	9.1	-168.49	253.6	-201.3	663.7	645.5	18.22	36.437		
3,400.0	3,225.0	3,304.1	3,287.1	19.8	9.4	-168.63	261.8	-207.4	691.5	672.7	18.80	36.785		
3,500.0	3,318.4	3,400.4	3,383.0	20.5	9.7	-168.83	270.0	-213.5	718.1	698.7	19.40	37.019		
3,600.0	3,412.9	3,497.6	3,479.6	21.0	9.9	-168.97	278.3	-219.6	741.5	721.6	19.96	37.142		
3,700.0	3,508.5	3,595.6	3,577.0	21.5	10.2	-169.05	286.6	-225.8	761.6	741.1	20.51	37.131		
3,800.0	3,605.1	3,694.2	3,675.1	21.9	10.5	-169.06	295.0	-232.1	778.3	757.3	21.04	37.000		
3,900.0	3,702.5	3,793.3	3,773.6	22.3	10.8	-169.01	303.4	-238.4	791.6	770.1	21.53	36.760		
4,000.0	3,800.7	3,892.8	3,872.5	22.6	11.1	-168.91	311.9	-244.7	801.5	779.5	22.01	36.421		
4,100.0	3,899.4	3,992.5	3,971.7	22.9	11.4	-168.74	320.4	-251.0	808.0	785.6	22.45	35.990		
4,200.0	3,998.7	4,092.4	4,071.0	23.2	11.7	-168.52	328.9	-257.3	811.1	788.2	22.87	35.471		
4,300.0	4,098.3	4,192.3	4,170.4	23.4	12.0	-168.24	337.4	-263.6	810.8	787.5	23.25	34.868		
4,400.0	4,198.1	4,292.1	4,269.6	23.5	12.3	-167.89	345.9	-269.9	807.1	783.5	23.61	34.184		
4,500.0	4,298.1	4,391.7	4,368.7	23.6	12.6	-167.46	354.4	-276.2	800.0	776.1	23.94	33.419		
4,600.0	4,398.1	4,491.2	4,467.5	23.7	12.9	177.67	362.8	-282.5	791.2	766.8	24.40	32.423		
4,700.0	4,498.1	4,590.6	4,566.4	23.8	13.2	178.10	371.3	-288.8	782.5	757.6	24.88	31.444		
4,800.0	4,598.1	4,690.0	4,665.3	23.9	13.5	178.55	379.8	-295.1	773.7	748.4	25.37	30.497		
4,900.0	4,698.1	4,786.2	4,760.9	23.9	13.8	178.99	387.9	-301.2	765.1	739.3	25.85	29.603		
5,000.0	4,798.1	4,868.2	4,842.6	24.0	13.9	179.30	393.6	-305.4	758.1	731.9	26.21	28.922		
5,100.0	4,898.1	4,950.5	4,924.7	24.1	14.1	179.52	397.4	-308.3	753.4	726.8	26.55	28.378		

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 28-02W
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 28-02W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-2	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-05W - Slot B-1 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,200.0	4,998.1	5,032.9	5,007.2	24.2	14.2	179.63	399.4	-309.7	751.0	724.2	26.86	27.960		
5,269.3	5,067.4	5,093.2	5,067.4	24.3	14.3	179.64	399.6	-309.9	750.7	723.6	27.07	27.731		
5,300.0	5,098.1	5,123.9	5,098.1	24.3	14.4	179.64	399.6	-309.9	750.7	723.5	27.18	27.622		
5,400.0	5,198.1	5,223.9	5,198.1	24.4	14.5	179.64	399.6	-309.9	750.7	723.2	27.53	27.265		
5,500.0	5,298.1	5,323.9	5,298.1	24.5	14.7	179.64	399.6	-309.9	750.7	722.8	27.89	26.915		
5,600.0	5,398.1	5,423.9	5,398.1	24.6	14.9	179.64	399.6	-309.9	750.7	722.5	28.25	26.571		
5,700.0	5,498.1	5,523.9	5,498.1	24.7	15.1	179.64	399.6	-309.9	750.7	722.1	28.62	26.233		
5,800.0	5,598.1	5,623.9	5,598.1	24.8	15.2	179.64	399.6	-309.9	750.7	721.7	28.98	25.902		
5,900.0	5,698.1	5,723.9	5,698.1	24.9	15.4	179.64	399.6	-309.9	750.7	721.4	29.35	25.578		
6,000.0	5,798.1	5,823.9	5,798.1	25.0	15.6	179.64	399.6	-309.9	750.7	721.0	29.72	25.259		
6,100.0	5,898.1	5,923.9	5,898.1	25.1	15.8	179.64	399.6	-309.9	750.7	720.6	30.09	24.946		
6,200.0	5,998.1	6,023.9	5,998.1	25.2	16.0	179.64	399.6	-309.9	750.7	720.2	30.47	24.640		
6,300.0	6,098.1	6,123.9	6,098.1	25.3	16.1	179.64	399.6	-309.9	750.7	719.9	30.84	24.339		
6,400.0	6,198.1	6,223.9	6,198.1	25.5	16.3	179.64	399.6	-309.9	750.7	719.5	31.22	24.044		
6,500.0	6,298.1	6,323.9	6,298.1	25.6	16.5	179.64	399.6	-309.9	750.7	719.1	31.60	23.755		
6,600.0	6,398.1	6,423.9	6,398.1	25.7	16.7	179.64	399.6	-309.9	750.7	718.7	31.98	23.472		
6,700.0	6,498.1	6,523.9	6,498.1	25.8	16.9	179.64	399.6	-309.9	750.7	718.3	32.37	23.194		
6,800.0	6,598.1	6,623.9	6,598.1	25.9	17.1	179.64	399.6	-309.9	750.7	718.0	32.75	22.921		
6,900.0	6,698.1	6,723.9	6,698.1	26.0	17.3	179.64	399.6	-309.9	750.7	717.6	33.14	22.653		
7,000.0	6,798.1	6,823.9	6,798.1	26.2	17.4	179.64	399.6	-309.9	750.7	717.2	33.53	22.391		
7,100.0	6,898.1	6,923.9	6,898.1	26.3	17.6	179.64	399.6	-309.9	750.7	716.8	33.92	22.134		
7,200.0	6,998.1	7,023.9	6,998.1	26.4	17.8	179.64	399.6	-309.9	750.7	716.4	34.31	21.881		
7,300.0	7,098.1	7,123.9	7,098.1	26.5	18.0	179.64	399.6	-309.9	750.7	716.0	34.70	21.634		
7,400.0	7,198.1	7,223.9	7,198.1	26.6	18.2	179.64	399.6	-309.9	750.7	715.6	35.09	21.391		
7,500.0	7,298.1	7,323.9	7,298.1	26.8	18.4	179.64	399.6	-309.9	750.7	715.2	35.49	21.153		
7,600.0	7,398.1	7,423.9	7,398.1	26.9	18.6	179.64	399.6	-309.9	750.7	714.8	35.89	20.919		
7,700.0	7,498.1	7,523.9	7,498.1	27.0	18.8	179.64	399.6	-309.9	750.7	714.4	36.28	20.690		
7,800.0	7,598.1	7,623.9	7,598.1	27.2	19.0	179.64	399.6	-309.9	750.7	714.0	36.68	20.465		
7,900.0	7,698.1	7,723.9	7,698.1	27.3	19.2	179.64	399.6	-309.9	750.7	713.6	37.08	20.244		
8,000.0	7,798.1	7,823.9	7,798.1	27.4	19.4	179.64	399.6	-309.9	750.7	713.2	37.48	20.028		
8,050.2	7,848.3	7,874.1	7,848.3	27.5	19.5	179.64	399.6	-309.9	750.7	713.0	37.69	19.920		
8,089.9	7,888.0	7,891.8	7,866.0	27.5	19.5	179.64	399.6	-309.9	751.0	713.2	37.80	19.869		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-02W
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 28-02W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-2	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-06W - Slot B-3 - 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	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	124.141		
200.0	200.0	200.0	200.0	0.3	0.3	167.48	-21.2	4.7	21.8	21.1	0.62	34.831 CC, ES		
300.0	300.0	300.0	300.0	0.5	0.5	-177.43	-21.2	4.7	23.5	22.4	1.11	21.182		
400.0	399.8	399.8	399.8	0.8	0.8	-177.89	-21.2	4.7	28.7	27.1	1.62	17.753		
500.0	499.5	500.3	500.3	1.0	1.0	-176.33	-20.4	3.2	36.3	34.2	2.12	17.097 SF		
600.0	598.7	600.7	600.6	1.3	1.2	-172.19	-17.9	-1.5	45.2	42.6	2.63	17.203		
700.0	697.5	700.3	699.9	1.6	1.4	-167.81	-14.1	-8.3	56.2	53.1	3.15	17.863		
800.0	795.6	799.2	798.4	2.0	1.7	-165.48	-10.3	-15.3	70.7	67.1	3.69	19.184		
900.0	893.1	897.6	896.5	2.4	1.9	-164.52	-6.5	-22.3	88.7	84.4	4.24	20.915		
1,000.0	989.6	995.3	993.9	2.9	2.2	-164.34	-2.7	-29.2	109.9	105.1	4.80	22.901		
1,100.0	1,085.3	1,092.3	1,090.5	3.5	2.4	-164.58	1.0	-36.0	134.3	129.0	5.36	25.059		
1,200.0	1,179.8	1,188.3	1,186.3	4.1	2.7	-165.02	4.7	-42.8	162.1	156.2	5.93	27.342		
1,300.0	1,273.2	1,283.4	1,281.0	4.7	2.9	-165.57	8.4	-49.5	193.0	186.5	6.49	29.751		
1,400.0	1,366.1	1,378.1	1,375.4	5.4	3.2	-166.15	12.0	-56.2	225.1	218.1	7.02	32.076		
1,500.0	1,459.1	1,472.8	1,469.8	6.1	3.4	-166.58	15.7	-62.9	257.1	249.6	7.56	34.032		
1,600.0	1,552.0	1,567.5	1,564.2	6.8	3.7	-166.92	19.3	-69.6	289.2	281.1	8.10	35.693		
1,700.0	1,645.0	1,662.2	1,658.6	7.5	3.9	-167.18	23.0	-76.3	321.3	312.6	8.66	37.116		
1,800.0	1,737.9	1,756.9	1,753.0	8.3	4.2	-167.40	26.6	-83.0	353.4	344.2	9.22	38.345		
1,900.0	1,830.9	1,851.6	1,847.4	9.0	4.4	-167.59	30.3	-89.6	385.5	375.7	9.78	39.415		
2,000.0	1,923.8	1,946.3	1,941.8	9.7	4.7	-167.74	33.9	-96.3	417.6	407.2	10.35	40.354		
2,100.0	2,016.8	2,041.0	2,036.2	10.4	5.0	-167.88	37.6	-103.0	449.7	438.8	10.92	41.183		
2,200.0	2,109.7	2,135.7	2,130.6	11.1	5.2	-167.99	41.3	-109.7	481.8	470.3	11.49	41.920		
2,300.0	2,202.6	2,230.4	2,225.0	11.8	5.5	-168.09	44.9	-116.4	513.9	501.8	12.07	42.578		
2,400.0	2,295.6	2,325.1	2,319.4	12.6	5.7	-168.18	48.6	-123.1	546.0	533.3	12.65	43.169		
2,500.0	2,388.5	2,419.8	2,413.8	13.3	6.0	-168.26	52.2	-129.8	578.1	564.9	13.23	43.703		
2,600.0	2,481.5	2,514.6	2,508.2	14.0	6.2	-168.33	55.9	-136.5	610.2	596.4	13.81	44.187		
2,700.0	2,574.4	2,609.3	2,602.6	14.7	6.5	-168.39	59.5	-143.1	642.3	627.9	14.39	44.628		
2,800.0	2,667.4	2,704.0	2,697.0	15.5	6.7	-168.45	63.2	-149.8	674.4	659.4	14.98	45.031		
2,900.0	2,760.3	2,798.7	2,791.4	16.2	7.0	-168.50	66.8	-156.5	706.5	690.9	15.56	45.401		
3,000.0	2,853.3	2,893.4	2,885.8	16.9	7.2	-168.55	70.5	-163.2	738.6	722.5	16.15	45.741		
3,100.0	2,946.2	2,988.1	2,980.2	17.6	7.5	-168.60	74.1	-169.9	770.7	754.0	16.73	46.055		
3,200.0	3,039.2	3,082.8	3,074.6	18.4	7.7	-168.64	77.8	-176.6	802.8	785.5	17.32	46.346		
3,300.0	3,132.1	3,177.5	3,169.0	19.1	8.0	-168.67	81.4	-183.3	834.9	817.0	17.91	46.616		
3,400.0	3,225.0	3,272.2	3,263.4	19.8	8.3	-168.71	85.1	-190.0	867.0	848.5	18.50	46.867		
3,500.0	3,318.4	3,367.2	3,358.1	20.5	8.5	-168.83	88.7	-196.7	898.1	879.0	19.12	46.981		
3,600.0	3,412.9	3,463.3	3,453.8	21.0	8.8	-168.91	92.5	-203.5	929.9	906.2	19.70	47.009		
3,700.0	3,508.5	3,560.2	3,550.5	21.5	9.0	-168.94	96.2	-210.3	950.5	930.2	20.26	46.919		
3,800.0	3,605.1	3,657.9	3,647.8	21.9	9.3	-168.92	100.0	-217.2	971.7	950.9	20.79	46.727		
3,900.0	3,702.5	3,756.3	3,745.9	22.3	9.6	-168.85	103.8	-224.1	989.5	968.2	21.31	46.442		

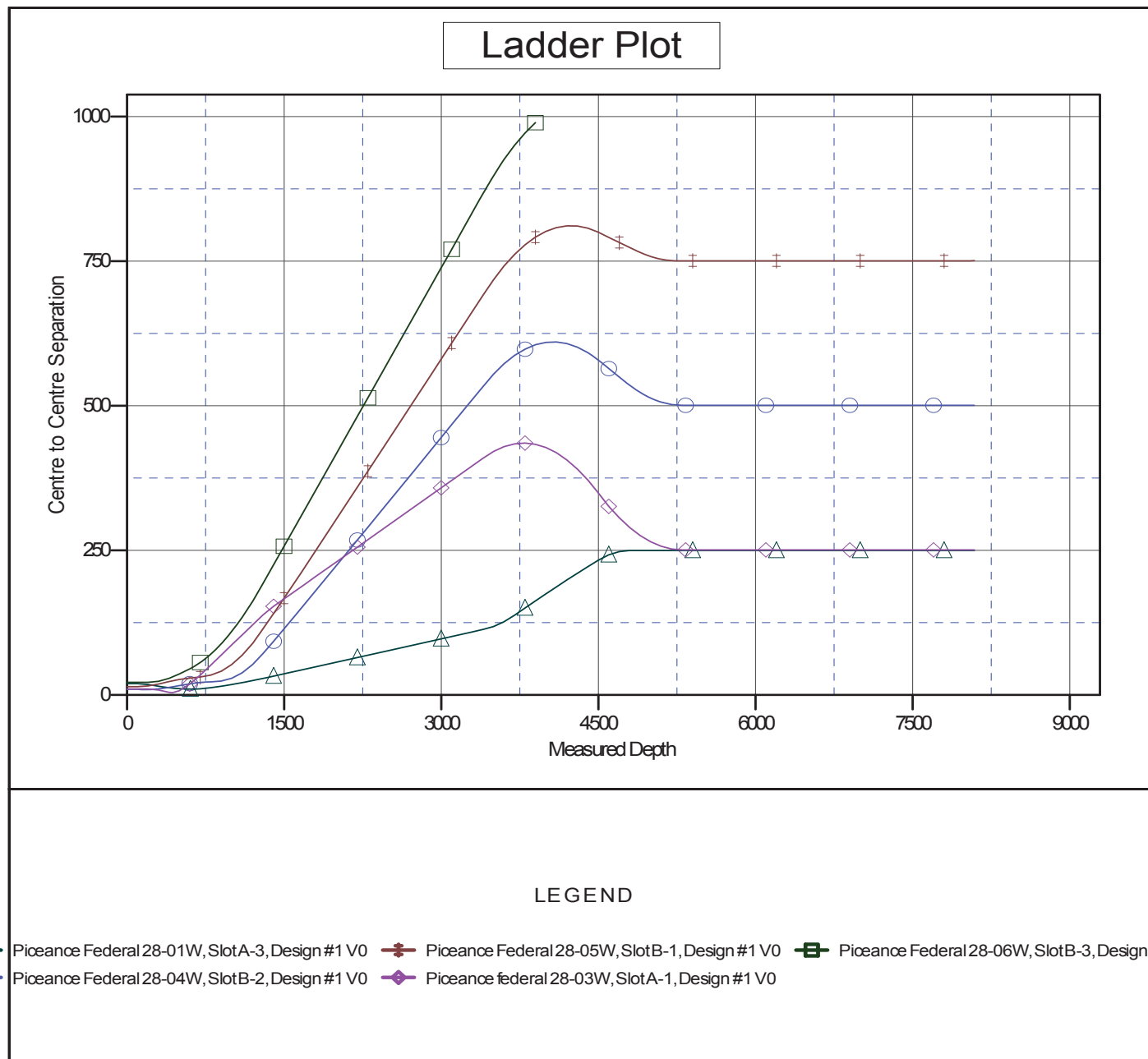
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-02W
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Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-02W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-2	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 28-02W
Coordinate System is US State Plane 1983, Colorado Central Zone
Grid Convergence at Surface is: -1.44°





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