



Piceance Energy, LLC

Mesa County, CO

Piceance 28-10 Pad

Piceance Federal 28-09E

Slot B-3

Plan: Design #2

Standard Planning Report

15 April, 2015

Archer



Project: Mesa County, CO
Site: Piceance 28-10 Pad
Well: Piceance Federal 28-09E
Wellbore: Slot B-3
Design: Design #2
Latitude: 39° 14' 47.980 N
Longitude: 107° 46' 29.730 W
Ground Level: 7679.00
Well @ 7701.00usft

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 Federal 28-09E, True North
Vertical (TVD) Reference: Well @ 7701.00usft
Section (VS) Reference: Slot - (0.00N, 0.00E)
Measured Depth Reference: Well @ 7701.00usft
Calculation Method: Minimum Curvature

WELL DETAILS: Piceance Federal 28-09E

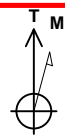
+N/-S	+E/-W	Northing	Ground Level: Easting	Latitude	Longitude	Slot
0.00	0.00	1522796.887	2355808.254	39° 14' 47.980 N	107° 46' 29.730 W	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance 28-09E tgt	8059.00	1002.71	1885.57	1523752.073	2357718.337	39° 14' 57.890 N	107° 46' 5.760 W	Circle (Radius: 50.00)

SECTION DETAILS

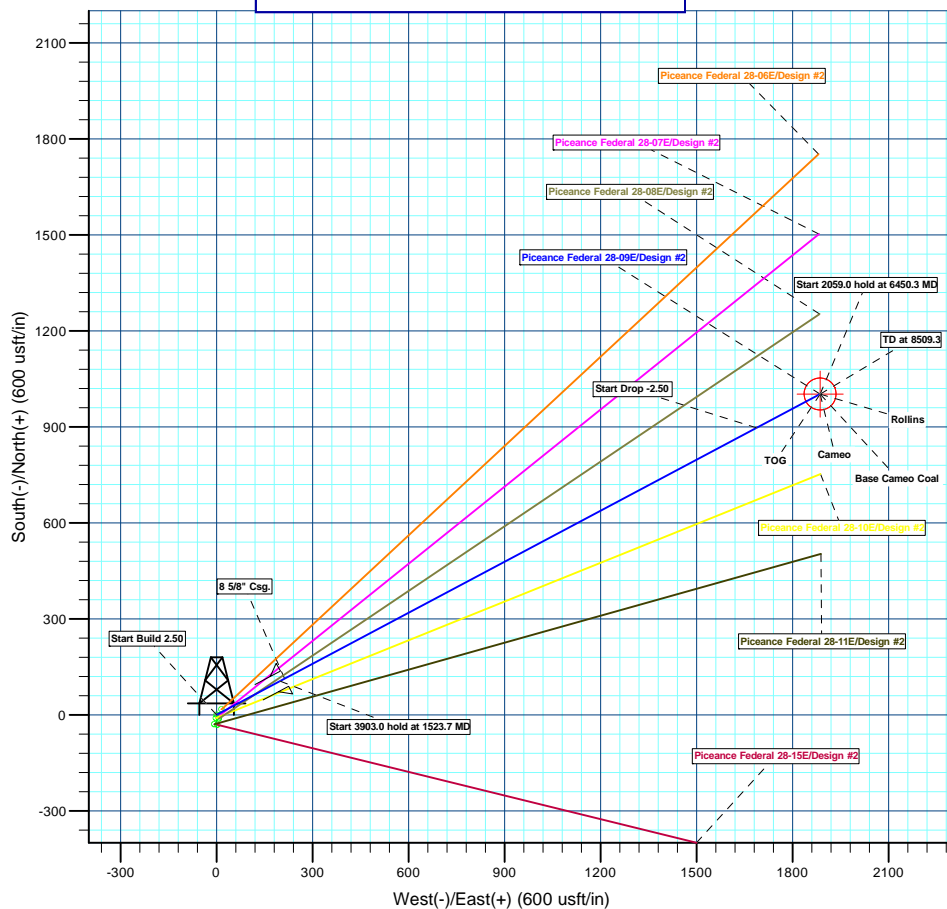
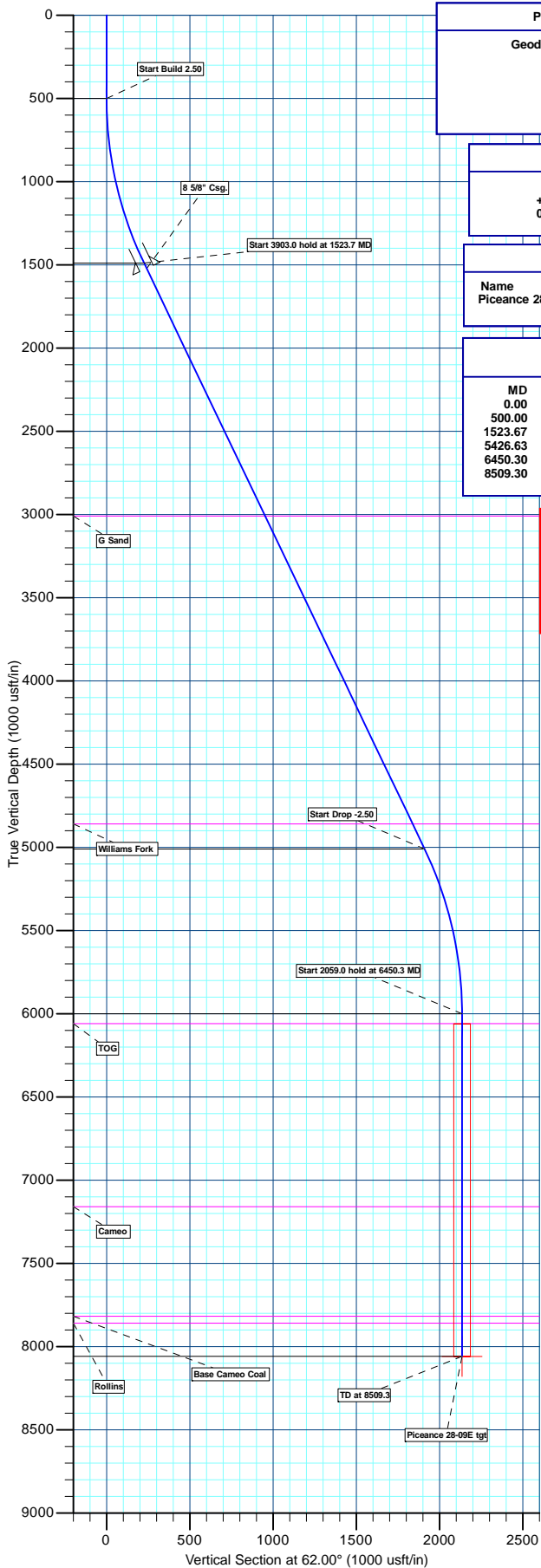
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.50
1523.67	25.59	62.00	1489.97	105.57	198.52	2.50	62.00	224.84	Start 3903.0 hold at 1523.7 MD
5426.63	25.59	62.00	5010.03	897.12	1687.05	0.00	0.00	1910.75	Start Drop -2.50
6450.30	0.00	0.00	6000.00	1002.69	1885.57	2.50	180.00	2135.59	Start 2059.0 hold at 6450.3 MD
8509.30	0.00	0.00	8059.00	1002.69	1885.57	0.00	0.00	2135.59	TD at 8509.3



Azimuths to True North
Magnetic North: 9.73°
Magnetic Field
Strength: 51746.6snT
Dip Angle: 65.47°
Date: 03/31/2015
Model: IGRF2010

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
3009.00	3207.94	G Sand
4859.00	5259.17	Williams Fork
6059.00	6509.30	TOG
7159.00	7609.30	Cameo
7817.00	8267.30	Base Cameo Coal
7859.00	8309.30	Rollins



Plan: Design #2 (Piceance Federal 28-09E/Slot B-3)

Created By: Ricky Osburn Date: 8:47, April 15 2015



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Planning Report

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Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-09E
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7701.00usft
Project:	Mesa County, CO	MD Reference:	Well @ 7701.00usft
Site:	Piceance 28-10 Pad	North Reference:	True
Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-3		
Design:	Design #2		

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 28-10 Pad			
Site Position:		Northing:	1,522,822.786 usft	Latitude:	39° 14' 48.240 N
From:	Lat/Long	Easting:	2,355,826.215 usft	Longitude:	107° 46' 29.510 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"	Grid Convergence:	-1.43 °

Well	Piceance Federal 28-09E					
Well Position	+N/-S	-26.34 usft	Northing:	1,522,796.887 usft	Latitude:	39° 14' 47.980 N
	+E/-W	-17.31 usft	Easting:	2,355,808.254 usft	Longitude:	107° 46' 29.730 W
Position Uncertainty	0.00 usft		Wellhead Elevation:	0.00 usft	Ground Level:	7,679.00 usft

Wellbore	Slot B-3				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2015/03/31	9.73	65.47	51,747

Design	Design #2			
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	62.00

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	
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,523.67	25.59	62.00	1,489.97	105.57	198.52	2.50	2.50	0.00	62.00	
5,426.63	25.59	62.00	5,010.03	897.12	1,687.05	0.00	0.00	0.00	0.00	
6,450.30	0.00	0.00	6,000.00	1,002.69	1,885.57	2.50	-2.50	0.00	180.00	
8,509.30	0.00	0.00	8,059.00	1,002.69	1,885.57	0.00	0.00	0.00	0.00	Piceance 28-09E tgt



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-09E
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7701.00usft
Project:	Mesa County, CO	MD Reference:	Well @ 7701.00usft
Site:	Piceance 28-10 Pad	North Reference:	True
Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-3		
Design:	Design #2		

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
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.50									
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	2.50	62.00	599.97	1.02	1.93	2.18	2.50	2.50	0.00
700.00	5.00	62.00	699.75	4.09	7.70	8.72	2.50	2.50	0.00
800.00	7.50	62.00	799.14	9.21	17.31	19.61	2.50	2.50	0.00
900.00	10.00	62.00	897.97	16.35	30.74	34.82	2.50	2.50	0.00
1,000.00	12.50	62.00	996.04	25.51	47.97	54.33	2.50	2.50	0.00
1,100.00	15.00	62.00	1,093.17	36.67	68.95	78.09	2.50	2.50	0.00
1,200.00	17.50	62.00	1,189.17	49.80	93.65	106.07	2.50	2.50	0.00
1,300.00	20.00	62.00	1,283.85	64.89	122.03	138.21	2.50	2.50	0.00
1,400.00	22.50	62.00	1,377.05	81.91	154.03	174.46	2.50	2.50	0.00
1,500.00	25.00	62.00	1,468.57	100.82	189.59	214.73	2.50	2.50	0.00
Start 3903.0 hold at 1523.7 MD									
1,523.67	25.59	62.00	1,489.97	105.57	198.52	224.84	2.50	2.50	0.00
8 5/8" Csg.									
1,559.18	25.59	62.00	1,522.00	112.77	212.06	240.18	0.00	0.00	0.00
1,600.00	25.59	62.00	1,558.81	121.05	227.63	257.81	0.00	0.00	0.00
1,700.00	25.59	62.00	1,649.00	141.33	265.77	301.01	0.00	0.00	0.00
1,800.00	25.59	62.00	1,739.19	161.61	303.91	344.20	0.00	0.00	0.00
1,900.00	25.59	62.00	1,829.38	181.89	342.04	387.40	0.00	0.00	0.00
2,000.00	25.59	62.00	1,919.57	202.17	380.18	430.59	0.00	0.00	0.00
2,100.00	25.59	62.00	2,009.76	222.45	418.32	473.79	0.00	0.00	0.00
2,200.00	25.59	62.00	2,099.95	242.73	456.46	516.99	0.00	0.00	0.00
2,300.00	25.59	62.00	2,190.14	263.01	494.60	560.18	0.00	0.00	0.00
2,400.00	25.59	62.00	2,280.33	283.29	532.74	603.38	0.00	0.00	0.00
2,500.00	25.59	62.00	2,370.52	303.57	570.88	646.57	0.00	0.00	0.00
2,600.00	25.59	62.00	2,460.71	323.85	609.01	689.77	0.00	0.00	0.00
2,700.00	25.59	62.00	2,550.90	344.14	647.15	732.96	0.00	0.00	0.00
2,800.00	25.59	62.00	2,641.09	364.42	685.29	776.16	0.00	0.00	0.00
2,900.00	25.59	62.00	2,731.27	384.70	723.43	819.35	0.00	0.00	0.00
3,000.00	25.59	62.00	2,821.46	404.98	761.57	862.55	0.00	0.00	0.00
3,100.00	25.59	62.00	2,911.65	425.26	799.71	905.75	0.00	0.00	0.00
3,200.00	25.59	62.00	3,001.84	445.54	837.85	948.94	0.00	0.00	0.00
G Sand									
3,207.94	25.59	62.00	3,009.00	447.15	840.87	952.37	0.00	0.00	0.00
3,300.00	25.59	62.00	3,092.03	465.82	875.98	992.14	0.00	0.00	0.00
3,400.00	25.59	62.00	3,182.22	486.10	914.12	1,035.33	0.00	0.00	0.00
3,500.00	25.59	62.00	3,272.41	506.38	952.26	1,078.53	0.00	0.00	0.00
3,600.00	25.59	62.00	3,362.60	526.66	990.40	1,121.72	0.00	0.00	0.00
3,700.00	25.59	62.00	3,452.79	546.94	1,028.54	1,164.92	0.00	0.00	0.00
3,800.00	25.59	62.00	3,542.98	567.23	1,066.68	1,208.12	0.00	0.00	0.00
3,900.00	25.59	62.00	3,633.17	587.51	1,104.81	1,251.31	0.00	0.00	0.00
4,000.00	25.59	62.00	3,723.36	607.79	1,142.95	1,294.51	0.00	0.00	0.00
4,100.00	25.59	62.00	3,813.55	628.07	1,181.09	1,337.70	0.00	0.00	0.00
4,200.00	25.59	62.00	3,903.74	648.35	1,219.23	1,380.90	0.00	0.00	0.00
4,300.00	25.59	62.00	3,993.93	668.63	1,257.37	1,424.09	0.00	0.00	0.00
4,400.00	25.59	62.00	4,084.12	688.91	1,295.51	1,467.29	0.00	0.00	0.00
4,500.00	25.59	62.00	4,174.31	709.19	1,333.65	1,510.48	0.00	0.00	0.00
4,600.00	25.59	62.00	4,264.50	729.47	1,371.78	1,553.68	0.00	0.00	0.00



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Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7701.00usft
Project:	Mesa County, CO	MD Reference:	Well @ 7701.00usft
Site:	Piceance 28-10 Pad	North Reference:	True
Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-3		
Design:	Design #2		

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)
4,700.00	25.59	62.00	4,354.68	749.75	1,409.92	1,596.88	0.00	0.00	0.00
4,800.00	25.59	62.00	4,444.87	770.03	1,448.06	1,640.07	0.00	0.00	0.00
4,900.00	25.59	62.00	4,535.06	790.31	1,486.20	1,683.27	0.00	0.00	0.00
5,000.00	25.59	62.00	4,625.25	810.60	1,524.34	1,726.46	0.00	0.00	0.00
5,100.00	25.59	62.00	4,715.44	830.88	1,562.48	1,769.66	0.00	0.00	0.00
5,200.00	25.59	62.00	4,805.63	851.16	1,600.62	1,812.85	0.00	0.00	0.00
Williams Fork									
5,259.17	25.59	62.00	4,859.00	863.16	1,623.18	1,838.41	0.00	0.00	0.00
5,300.00	25.59	62.00	4,895.82	871.44	1,638.75	1,856.05	0.00	0.00	0.00
5,400.00	25.59	62.00	4,986.01	891.72	1,676.89	1,899.25	0.00	0.00	0.00
Start Drop -2.50									
5,426.63	25.59	62.00	5,010.03	897.12	1,687.05	1,910.75	0.00	0.00	0.00
5,500.00	23.76	62.00	5,076.70	911.50	1,714.09	1,941.38	2.50	-2.50	0.00
5,600.00	21.26	62.00	5,169.07	929.47	1,747.89	1,979.65	2.50	-2.50	0.00
5,700.00	18.76	62.00	5,263.03	945.53	1,778.09	2,013.87	2.50	-2.50	0.00
5,800.00	16.26	62.00	5,358.39	959.66	1,804.65	2,043.95	2.50	-2.50	0.00
5,900.00	13.76	62.00	5,454.97	971.81	1,827.51	2,069.84	2.50	-2.50	0.00
6,000.00	11.26	62.00	5,552.59	981.98	1,846.63	2,091.49	2.50	-2.50	0.00
6,100.00	8.76	62.00	5,651.06	990.14	1,861.98	2,108.87	2.50	-2.50	0.00
6,200.00	6.26	62.00	5,750.20	996.27	1,873.51	2,121.93	2.50	-2.50	0.00
6,300.00	3.76	62.00	5,849.81	1,000.37	1,881.22	2,130.66	2.50	-2.50	0.00
6,400.00	1.26	62.00	5,949.70	1,002.43	1,885.08	2,135.04	2.50	-2.50	0.00
Start 2059.0 hold at 6450.3 MD									
6,450.30	0.00	0.00	6,000.00	1,002.69	1,885.57	2,135.59	2.50	-2.50	0.00
6,500.00	0.00	0.00	6,049.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
TOG									
6,509.30	0.00	0.00	6,059.00	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
6,600.00	0.00	0.00	6,149.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
6,700.00	0.00	0.00	6,249.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
6,800.00	0.00	0.00	6,349.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
6,900.00	0.00	0.00	6,449.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
7,000.00	0.00	0.00	6,549.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
7,100.00	0.00	0.00	6,649.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
7,200.00	0.00	0.00	6,749.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
7,300.00	0.00	0.00	6,849.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
7,400.00	0.00	0.00	6,949.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
7,500.00	0.00	0.00	7,049.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
7,600.00	0.00	0.00	7,149.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
Cameo									
7,609.30	0.00	0.00	7,159.00	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
7,700.00	0.00	0.00	7,249.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
7,800.00	0.00	0.00	7,349.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
7,900.00	0.00	0.00	7,449.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
8,000.00	0.00	0.00	7,549.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
8,100.00	0.00	0.00	7,649.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
8,200.00	0.00	0.00	7,749.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
Base Cameo Coal									
8,267.30	0.00	0.00	7,817.00	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
8,300.00	0.00	0.00	7,849.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
Rollins									
8,309.30	0.00	0.00	7,859.00	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00
8,400.00	0.00	0.00	7,949.70	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-09E
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7701.00usft
Project:	Mesa County, CO	MD Reference:	Well @ 7701.00usft
Site:	Piceance 28-10 Pad	North Reference:	True
Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-3		
Design:	Design #2		

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)
TD at 8509.3									
8,509.30	0.00	0.00	8,059.00	1,002.69	1,885.57	2,135.59	0.00	0.00	0.00

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Piceance 28-09E tgt	0.00	0.00	8,059.00	1,002.71	1,885.57	1,523,752.073	2,357,718.337	39° 14' 57.890 N	107° 46' 5.760 W
- plan misses target center by 0.03usft at 8509.30usft MD (8059.00 TVD, 1002.69 N, 1885.57 E)									
- Circle (radius 50.00)									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
1,559.18	1,522.00	8 5/8" Csg.	8-5/8	12-1/4	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
3,207.94	3,009.00	G Sand		0.00		
5,259.17	4,859.00	Williams Fork		0.00		
6,509.30	6,059.00	TOG		0.00		
7,609.30	7,159.00	Cameo		0.00		
8,267.30	7,817.00	Base Cameo Coal		0.00		
8,309.30	7,859.00	Rollins		0.00		

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
500.00	500.00	0.00	0.00	Start Build 2.50	
1,523.67	1,489.97	105.57	198.52	Start 3903.0 hold at 1523.7 MD	
5,426.63	5,010.03	897.12	1,687.05	Start Drop -2.50	
6,450.30	6,000.00	1,002.69	1,885.57	Start 2059.0 hold at 6450.3 MD	
8,509.30	8,059.00	1,002.69	1,885.57	TD at 8509.3	



Piceance Energy, LLC

Mesa County, CO

Piceance 28-10 Pad

Piceance Federal 28-09E

Slot B-3

Design #2

Anticollision Report

15 April, 2015

Archer



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Reference Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-3	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Reference	Design #2		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.00usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,000.00 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date	2015/04/15		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	8,509.30	Design #2 (Slot B-3)	MWD	MWD - Standard	

Summary						
Site Name	Reference	Offset	Distance		Separation	Warning
	Measured	Measured	Between	Between		
	Depth	Depth	Centres	Ellipses		
Offset Well - Wellbore - Design						
Piceance 28-10 Pad						
Piceance Federal 28-06E - Slot A-2 - Design #2	200.00	200.00	22.78	22.15	36.456	CC, ES
Piceance Federal 28-06E - Slot A-2 - Design #2	8,509.30	8,664.88	749.69	666.36	8.997	SF
Piceance Federal 28-07E - Slot A-3 - Design #2	300.00	300.00	9.66	8.58	8.987	CC, ES
Piceance Federal 28-07E - Slot A-3 - Design #2	8,509.30	8,607.79	499.79	416.47	5.999	SF
Piceance Federal 28-08E - Slot A-4 - Design #2	461.09	461.10	14.03	12.23	7.811	CC
Piceance Federal 28-08E - Slot A-4 - Design #2	500.00	500.00	14.09	12.12	7.152	ES
Piceance Federal 28-08E - Slot A-4 - Design #2	8,509.30	8,555.27	249.89	166.61	3.001	SF
Piceance Federal 28-10E - Slot B-4 - Design #2	500.00	500.00	10.38	8.41	5.262	CC, ES
Piceance Federal 28-10E - Slot B-4 - Design #2	5,400.00	5,406.37	217.00	142.04	2.895	SF
Piceance Federal 28-11E - Slot B-5 - Design #2	500.00	500.00	30.18	28.20	15.292	CC, ES
Piceance Federal 28-11E - Slot B-5 - Design #2	8,500.00	8,443.85	499.86	416.33	5.984	SF
Piceance Federal 28-15E - Slot A-5 - Design #2	200.00	200.00	31.45	30.82	50.328	CC, ES
Piceance Federal 28-15E - Slot A-5 - Design #2	4,200.00	4,035.77	994.48	941.43	18.745	SF

Offset Design		Piceance 28-10 Pad - Piceance Federal 28-06E - Slot A-2 - Design #2										Offset Site Error:		0.00 usft		
Survey Program:		0-MWD												Offset Well Error:		0.00 usft
Reference		Offset		Semi Major Axis			Distance									
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning			
0.00	0.00	0.00	0.00	0.00	0.00	41.01	17.19	14.95	22.78							
100.00	100.00	100.00	100.00	0.09	0.09	41.01	17.19	14.95	22.78	22.60	0.18	129.932				
200.00	200.00	200.00	200.00	0.31	0.31	41.01	17.19	14.95	22.78	22.15	0.62	36.456	CC, ES			
300.00	300.00	298.96	298.93	0.54	0.54	41.53	18.64	16.51	24.93	23.86	1.07	23.288				
400.00	400.00	397.55	397.31	0.76	0.77	42.66	22.98	21.18	31.37	29.84	1.53	20.527				
500.00	500.00	495.42	494.60	0.99	1.03	43.77	30.14	28.87	42.08	40.07	2.01	20.912				
600.00	599.97	592.53	590.61	1.21	1.33	-17.95	40.03	39.50	54.96	52.49	2.47	22.278				
700.00	699.75	689.10	685.40	1.43	1.69	-18.66	52.60	53.02	67.91	64.95	2.96	22.936				
800.00	799.14	785.12	778.79	1.68	2.11	-19.88	67.78	69.35	80.95	77.47	3.48	23.241				
900.00	897.97	880.60	870.64	1.96	2.60	-21.37	85.51	88.41	94.10	90.07	4.03	23.324				
1,000.00	996.04	975.52	960.81	2.31	3.16	-23.02	105.70	110.12	107.40	102.78	4.62	23.234				
1,100.00	1,093.17	1,069.90	1,049.16	2.72	3.78	-24.76	128.27	134.40	120.88	115.62	5.26	22.987				
1,200.00	1,189.17	1,163.74	1,135.59	3.20	4.48	-26.54	153.16	161.16	134.57	128.61	5.96	22.579				
1,300.00	1,283.85	1,257.04	1,219.96	3.78	5.24	-28.35	180.27	190.31	148.51	141.79	6.73	22.082				
1,400.00	1,377.05	1,349.80	1,302.17	4.43	6.05	-30.15	209.52	221.76	162.72	155.12	7.61	21.393				

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 28-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Reference Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-3	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
1,500.00	1,468.57	1,448.38	1,388.49	5.18	6.98	-32.26	241.94	256.62	175.56	166.92	8.64	20.328		
1,600.00	1,558.81	1,547.50	1,475.29	6.01	7.92	-34.74	274.54	291.68	186.11	176.31	9.80	18.991		
1,700.00	1,649.00	1,646.64	1,562.10	6.85	8.87	-37.00	307.14	326.74	196.89	185.83	11.06	17.803		
1,800.00	1,739.19	1,745.77	1,648.90	7.70	9.82	-39.02	339.75	361.80	207.94	195.54	12.40	16.773		
1,900.00	1,829.38	1,844.90	1,735.71	8.56	10.77	-40.84	372.35	396.86	219.21	205.42	13.80	15.887		
2,000.00	1,919.57	1,944.03	1,822.51	9.43	11.72	-42.48	404.95	431.91	230.69	215.44	15.25	15.127		
2,100.00	2,009.76	2,043.17	1,909.32	10.30	12.68	-43.97	437.56	466.97	242.34	225.59	16.74	14.474		
2,200.00	2,099.95	2,142.30	1,996.12	11.18	13.64	-45.32	470.16	502.03	254.13	235.86	18.27	13.910		
2,300.00	2,190.14	2,241.43	2,082.93	12.06	14.60	-46.54	502.76	537.09	266.05	246.23	19.82	13.422		
2,400.00	2,280.33	2,340.56	2,169.73	12.94	15.56	-47.67	535.37	572.15	278.08	256.68	21.40	12.996		
2,500.00	2,370.52	2,439.69	2,256.54	13.83	16.52	-48.70	567.97	607.21	290.20	267.21	22.99	12.623		
2,600.00	2,460.71	2,538.83	2,343.34	14.71	17.48	-49.64	600.58	642.27	302.41	277.82	24.60	12.294		
2,700.00	2,550.90	2,637.96	2,430.15	15.60	18.45	-50.52	633.18	677.33	314.70	288.48	26.22	12.002		
2,800.00	2,641.09	2,737.09	2,516.95	16.48	19.41	-51.32	665.78	712.39	327.06	299.20	27.85	11.743		
2,900.00	2,731.27	2,836.22	2,603.76	17.37	20.37	-52.07	698.39	747.45	339.47	309.98	29.49	11.510		
3,000.00	2,821.46	2,935.36	2,690.56	18.26	21.34	-52.77	730.99	782.50	351.93	320.79	31.14	11.301		
3,100.00	2,911.65	3,034.49	2,777.37	19.15	22.30	-53.42	763.59	817.56	364.45	331.65	32.79	11.113		
3,200.00	3,001.84	3,133.62	2,864.17	20.04	23.27	-54.02	796.20	852.62	377.00	342.55	34.45	10.942		
3,300.00	3,092.03	3,232.75	2,950.97	20.93	24.23	-54.59	828.80	887.68	389.60	353.48	36.12	10.786		
3,400.00	3,182.22	3,331.89	3,037.78	21.82	25.20	-55.12	861.40	922.74	402.23	364.44	37.79	10.644		
3,500.00	3,272.41	3,431.02	3,124.58	22.71	26.16	-55.62	894.01	957.80	414.89	375.43	39.46	10.514		
3,600.00	3,362.60	3,530.15	3,211.39	23.60	27.13	-56.09	926.61	992.86	427.58	386.45	41.14	10.394		
3,700.00	3,452.79	3,629.28	3,298.19	24.49	28.09	-56.53	959.21	1,027.92	440.30	397.49	42.81	10.284		
3,800.00	3,542.98	3,728.41	3,385.00	25.39	29.06	-56.95	991.82	1,062.98	453.05	408.55	44.49	10.182		
3,900.00	3,633.17	3,827.55	3,471.80	26.28	30.02	-57.34	1,024.42	1,098.04	465.81	419.63	46.18	10.087		
4,000.00	3,723.36	3,926.68	3,558.61	27.17	30.99	-57.71	1,057.02	1,133.09	478.60	430.73	47.86	10.000		
4,100.00	3,813.55	4,025.81	3,645.41	28.06	31.95	-58.07	1,089.63	1,168.15	491.40	441.85	49.55	9.918		
4,200.00	3,903.74	4,124.94	3,732.22	28.96	32.92	-58.40	1,122.23	1,203.21	504.22	452.99	51.24	9.841		
4,300.00	3,993.93	4,224.08	3,819.02	29.85	33.89	-58.72	1,154.84	1,238.27	517.06	464.14	52.92	9.770		
4,400.00	4,084.12	4,323.21	3,905.83	30.74	34.85	-59.03	1,187.44	1,273.33	529.91	475.30	54.61	9.703		
4,500.00	4,174.31	4,422.34	3,992.63	31.64	35.82	-59.32	1,220.04	1,308.39	542.78	486.48	56.31	9.640		
4,600.00	4,264.50	4,521.47	4,079.44	32.53	36.79	-59.59	1,252.65	1,343.45	555.66	497.66	58.00	9.581		
4,700.00	4,354.69	4,620.61	4,166.24	33.42	37.75	-59.85	1,285.25	1,378.51	568.55	508.86	59.69	9.525		
4,800.00	4,444.87	4,719.74	4,253.05	34.32	38.72	-60.11	1,317.85	1,413.57	581.46	520.07	61.38	9.473		
4,900.00	4,535.06	4,818.87	4,339.85	35.21	39.68	-60.35	1,350.46	1,448.62	594.37	531.29	63.08	9.423		
5,000.00	4,625.25	4,918.00	4,426.66	36.10	40.65	-60.58	1,383.06	1,483.68	607.30	542.52	64.77	9.376		
5,100.00	4,715.44	5,017.13	4,513.46	37.00	41.62	-60.80	1,415.66	1,518.74	620.23	553.76	66.47	9.331		
5,200.00	4,805.63	5,116.27	4,600.27	37.89	42.58	-61.01	1,448.27	1,553.80	633.17	565.01	68.16	9.289		
5,300.00	4,895.82	5,215.40	4,687.07	38.79	43.55	-61.21	1,480.87	1,588.86	646.12	576.26	69.86	9.249		
5,400.00	4,986.01	5,314.53	4,773.88	39.68	44.52	-61.41	1,513.47	1,623.92	659.08	587.52	71.56	9.211		
5,500.00	5,076.70	5,413.60	4,860.63	40.49	45.48	-61.73	1,546.06	1,658.96	672.60	599.41	73.19	9.189		
5,600.00	5,169.07	5,527.78	4,961.22	41.14	46.47	-61.88	1,582.83	1,698.50	687.40	612.84	74.56	9.220		
5,700.00	5,263.03	5,651.98	5,073.40	41.71	47.34	-61.99	1,619.11	1,737.51	700.93	625.19	75.74	9.255		
5,800.00	5,358.39	5,777.11	5,189.18	42.22	48.11	-62.08	1,651.42	1,772.25	712.89	636.11	76.78	9.285		
5,900.00	5,454.97	5,903.08	5,308.16	42.65	48.79	-62.16	1,679.55	1,802.50	723.23	645.55	77.68	9.310		
6,000.00	5,552.59	6,029.77	5,429.94	43.02	49.36	-62.23	1,703.30	1,828.05	731.91	653.49	78.42	9.333		
6,100.00	5,651.06	6,157.07	5,554.05	43.33	49.84	-62.28	1,722.52	1,848.71	738.90	659.88	79.02	9.350		
6,200.00	5,750.20	6,284.84	5,680.01	43.56	50.21	-62.32	1,737.07	1,864.35	744.17	664.69	79.48	9.363		
6,300.00	5,849.81	6,412.96	5,807.31	43.74	50.48	-62.35	1,746.83	1,874.85	747.69	667.90	79.79	9.371		
6,400.00	5,949.70	6,541.30	5,935.42	43.86	50.64	-62.36	1,751.74	1,880.13	749.46	669.51	79.95	9.374		
6,500.00	6,049.70	6,655.58	6,049.70	43.92	50.72	-0.36	1,752.36	1,880.79	749.69	669.64	80.05	9.365		
6,600.00	6,149.70	6,755.58	6,149.70	43.99	50.77	-0.36	1,752.36	1,880.79	749.69	669.50	80.19	9.349		

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 28-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Reference Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-3	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design												Offset Site Error:	0.00 usft
Survey Program: 0-MWD												Offset Well Error:	0.00 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	
6,700.00	6,249.70	6,855.58	6,249.70	44.05	50.83	-0.36	1,752.36	1,880.79	749.69	669.35	80.33	9.332	
6,800.00	6,349.70	6,955.58	6,349.70	44.12	50.88	-0.36	1,752.36	1,880.79	749.69	669.20	80.48	9.315	
6,900.00	6,449.70	7,055.58	6,449.70	44.19	50.94	-0.36	1,752.36	1,880.79	749.69	669.06	80.63	9.298	
7,000.00	6,549.70	7,155.58	6,549.70	44.26	51.00	-0.36	1,752.36	1,880.79	749.69	668.90	80.78	9.280	
7,100.00	6,649.70	7,255.58	6,649.70	44.33	51.06	-0.36	1,752.36	1,880.79	749.69	668.75	80.94	9.263	
7,200.00	6,749.70	7,355.58	6,749.70	44.40	51.12	-0.36	1,752.36	1,880.79	749.69	668.59	81.09	9.245	
7,300.00	6,849.70	7,455.58	6,849.70	44.47	51.18	-0.36	1,752.36	1,880.79	749.69	668.44	81.25	9.227	
7,400.00	6,949.70	7,555.58	6,949.70	44.55	51.24	-0.36	1,752.36	1,880.79	749.69	668.28	81.41	9.209	
7,500.00	7,049.70	7,655.58	7,049.70	44.62	51.31	-0.36	1,752.36	1,880.79	749.69	668.11	81.57	9.190	
7,600.00	7,149.70	7,755.58	7,149.70	44.70	51.37	-0.36	1,752.36	1,880.79	749.69	667.95	81.74	9.172	
7,700.00	7,249.70	7,855.58	7,249.70	44.78	51.44	-0.36	1,752.36	1,880.79	749.69	667.78	81.90	9.153	
7,800.00	7,349.70	7,955.58	7,349.70	44.85	51.50	-0.36	1,752.36	1,880.79	749.69	667.61	82.07	9.134	
7,900.00	7,449.70	8,055.58	7,449.70	44.93	51.57	-0.36	1,752.36	1,880.79	749.69	667.44	82.24	9.115	
8,000.00	7,549.70	8,155.58	7,549.70	45.01	51.64	-0.36	1,752.36	1,880.79	749.69	667.27	82.42	9.096	
8,100.00	7,649.70	8,255.58	7,649.70	45.09	51.70	-0.36	1,752.36	1,880.79	749.69	667.09	82.59	9.077	
8,200.00	7,749.70	8,355.58	7,749.70	45.18	51.77	-0.36	1,752.36	1,880.79	749.69	666.92	82.77	9.058	
8,300.00	7,849.70	8,455.58	7,849.70	45.26	51.84	-0.36	1,752.36	1,880.79	749.69	666.74	82.95	9.038	
8,400.00	7,949.70	8,555.58	7,949.70	45.34	51.91	-0.36	1,752.36	1,880.79	749.69	666.56	83.13	9.018	
8,500.00	8,049.70	8,655.58	8,049.70	45.43	51.99	-0.36	1,752.36	1,880.79	749.69	666.37	83.31	8.998	
8,509.30	8,059.00	8,664.88	8,059.00	45.43	51.99	-0.36	1,752.36	1,880.79	749.69	666.36	83.33	8.997 SF	



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Reference Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-3	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 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		
0.00	0.00	0.00	0.00	0.00	0.00	102.12	-2.03	9.44	9.66					
100.00	100.00	100.00	100.00	0.09	0.09	102.12	-2.03	9.44	9.66	9.48	0.18	55.073		
200.00	200.00	200.00	200.00	0.31	0.31	102.12	-2.03	9.44	9.66	9.03	0.62	15.452		
300.00	300.00	300.00	300.00	0.54	0.54	102.12	-2.03	9.44	9.66	8.58	1.07	8.987 CC, ES		
400.00	400.00	399.67	399.64	0.76	0.76	93.45	-0.67	11.13	11.16	9.63	1.52	7.330		
500.00	500.00	498.97	498.72	0.99	0.99	78.20	3.38	16.17	16.57	14.59	1.98	8.372		
600.00	599.97	597.77	596.93	1.21	1.24	6.14	10.07	24.50	24.51	22.07	2.44	10.048		
700.00	699.75	696.18	694.21	1.43	1.54	-0.28	19.36	36.07	32.69	29.76	2.93	11.163		
800.00	799.14	794.22	790.40	1.68	1.90	-5.19	31.22	50.82	41.04	37.60	3.44	11.932		
900.00	897.97	891.88	885.32	1.96	2.32	-9.31	45.57	68.69	49.54	45.57	3.97	12.481		
1,000.00	996.04	989.15	978.81	2.31	2.81	-12.95	62.37	89.61	58.23	53.70	4.53	12.865		
1,100.00	1,093.17	1,086.05	1,070.72	2.72	3.37	-16.27	81.57	113.50	67.12	62.00	5.12	13.106		
1,200.00	1,189.17	1,182.56	1,160.90	3.20	4.01	-19.34	103.08	140.29	76.24	70.47	5.77	13.206		
1,300.00	1,283.85	1,278.69	1,249.21	3.78	4.73	-22.23	126.86	169.89	85.62	79.12	6.50	13.171		
1,400.00	1,377.05	1,374.45	1,335.52	4.43	5.52	-24.95	152.83	202.22	95.27	87.95	7.33	13.001		
1,500.00	1,468.57	1,472.46	1,422.39	5.18	6.39	-27.74	181.25	237.60	104.44	96.14	8.30	12.581		
1,600.00	1,558.81	1,572.03	1,510.52	6.01	7.29	-30.93	210.28	273.74	111.44	102.01	9.43	11.813		
1,700.00	1,649.00	1,671.61	1,598.65	6.85	8.21	-33.78	239.30	309.87	118.66	107.97	10.68	11.109		
1,800.00	1,739.19	1,771.18	1,686.78	7.70	9.13	-36.30	268.33	346.00	126.13	114.10	12.02	10.490		
1,900.00	1,829.38	1,870.76	1,774.92	8.56	10.05	-38.54	297.35	382.14	133.81	120.37	13.44	9.955		
2,000.00	1,919.57	1,970.33	1,863.05	9.43	10.98	-40.53	326.38	418.27	141.68	126.76	14.92	9.498		
2,100.00	2,009.76	2,069.91	1,951.18	10.30	11.91	-42.31	355.40	454.40	149.70	133.26	16.44	9.107		
2,200.00	2,099.95	2,169.49	2,039.31	11.18	12.84	-43.91	384.43	490.54	157.85	139.85	18.00	8.771		
2,300.00	2,190.14	2,269.06	2,127.44	12.06	13.78	-45.35	413.45	526.67	166.11	146.53	19.58	8.483		
2,400.00	2,280.33	2,368.64	2,215.57	12.94	14.71	-46.66	442.48	562.80	174.46	153.27	21.19	8.234		
2,500.00	2,370.52	2,468.21	2,303.71	13.83	15.65	-47.84	471.50	598.94	182.90	160.08	22.81	8.017		
2,600.00	2,460.71	2,567.79	2,391.84	14.71	16.59	-48.92	500.53	635.07	191.40	166.95	24.45	7.827		
2,700.00	2,550.90	2,667.36	2,479.97	15.60	17.53	-49.91	529.55	671.20	199.97	173.87	26.11	7.660		
2,800.00	2,641.09	2,766.94	2,568.10	16.48	18.46	-50.82	558.58	707.34	208.59	180.83	27.77	7.512		
2,900.00	2,731.27	2,866.51	2,656.23	17.37	19.40	-51.65	587.60	743.47	217.26	187.83	29.44	7.381		
3,000.00	2,821.46	2,966.09	2,744.36	18.26	20.34	-52.42	616.63	779.60	225.98	194.87	31.11	7.264		
3,100.00	2,911.65	3,065.67	2,832.50	19.15	21.28	-53.13	645.65	815.74	234.73	201.94	32.79	7.158		
3,200.00	3,001.84	3,165.24	2,920.63	20.04	22.22	-53.79	674.68	851.87	243.51	209.03	34.48	7.063		
3,300.00	3,092.03	3,264.82	3,008.76	20.93	23.16	-54.41	703.70	888.00	252.32	216.16	36.16	6.977		
3,400.00	3,182.22	3,364.39	3,096.89	21.82	24.10	-54.98	732.73	924.14	261.16	223.31	37.86	6.899		
3,500.00	3,272.41	3,463.97	3,185.02	22.71	25.05	-55.52	761.75	960.27	270.03	230.48	39.55	6.828		
3,600.00	3,362.60	3,563.54	3,273.16	23.60	25.99	-56.02	790.78	996.40	278.92	237.67	41.24	6.762		
3,700.00	3,452.79	3,663.12	3,361.29	24.49	26.93	-56.49	819.80	1,032.54	287.82	244.88	42.94	6.702		
3,800.00	3,542.98	3,762.69	3,449.42	25.39	27.87	-56.94	848.83	1,068.67	296.75	252.11	44.64	6.647		
3,900.00	3,633.17	3,862.27	3,537.55	26.28	28.81	-57.35	877.86	1,104.81	305.69	259.35	46.34	6.596		
4,000.00	3,723.36	3,961.84	3,625.68	27.17	29.75	-57.75	906.88	1,140.94	314.65	266.60	48.04	6.549		
4,100.00	3,813.55	4,061.42	3,713.81	28.06	30.70	-58.12	935.91	1,177.07	323.62	273.87	49.75	6.505		
4,200.00	3,903.74	4,161.00	3,801.95	28.96	31.64	-58.47	964.93	1,213.21	332.60	281.15	51.45	6.464		
4,300.00	3,993.93	4,260.57	3,890.08	29.85	32.58	-58.80	993.96	1,249.34	341.59	288.44	53.16	6.426		
4,400.00	4,084.12	4,360.15	3,978.21	30.74	33.52	-59.12	1,022.98	1,285.47	350.60	295.74	54.86	6.391		
4,500.00	4,174.31	4,459.72	4,066.34	31.64	34.46	-59.42	1,052.01	1,321.61	359.62	303.05	56.57	6.357		
4,600.00	4,264.50	4,559.30	4,154.47	32.53	35.41	-59.70	1,081.03	1,357.74	368.64	310.37	58.27	6.326		
4,700.00	4,354.69	4,658.87	4,242.60	33.42	36.35	-59.98	1,110.06	1,393.87	377.67	317.70	59.98	6.297		
4,800.00	4,444.87	4,758.45	4,330.74	34.32	37.29	-60.23	1,139.08	1,430.01	386.72	325.03	61.69	6.269		
4,900.00	4,535.06	4,858.02	4,418.87	35.21	38.23	-60.48	1,168.11	1,466.14	395.77	332.37	63.39	6.243		
5,000.00	4,625.25	4,957.60	4,507.00	36.10	39.18	-60.72	1,197.13	1,502.27	404.82	339.72	65.10	6.219		
5,100.00	4,715.44	5,057.18	4,595.13	37.00	40.12	-60.94	1,226.16	1,538.41	413.89	347.08	66.81	6.195		

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 28-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Reference Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-3	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-10 Pad - Piceance Federal 28-07E - Slot A-3 - Design #2													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 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		
5,200.00	4,805.63	5,156.75	4,683.26	37.89	41.06	-61.16	1,255.18	1,574.54	422.95	354.44	68.52	6.173		
5,300.00	4,895.82	5,256.33	4,771.39	38.79	42.01	-61.37	1,284.21	1,610.67	432.03	361.81	70.22	6.152		
5,400.00	4,986.01	5,355.90	4,859.53	39.68	42.95	-61.57	1,313.23	1,646.81	441.11	369.18	71.93	6.132		
5,500.00	5,076.70	5,457.66	4,949.62	40.49	43.89	-61.79	1,342.85	1,683.68	450.71	377.17	73.54	6.129		
5,600.00	5,169.07	5,571.08	5,051.67	41.14	44.74	-61.90	1,373.83	1,722.25	460.32	385.50	74.82	6.152		
5,700.00	5,263.03	5,684.95	5,156.47	41.71	45.47	-62.00	1,401.71	1,756.96	468.94	392.99	75.94	6.175		
5,800.00	5,358.39	5,799.22	5,263.72	42.22	46.13	-62.09	1,426.39	1,787.67	476.53	399.60	76.93	6.194		
5,900.00	5,454.97	5,913.86	5,373.16	42.65	46.69	-62.17	1,447.74	1,814.25	483.09	405.31	77.77	6.212		
6,000.00	5,552.59	6,028.81	5,484.47	43.02	47.16	-62.23	1,465.68	1,836.59	488.58	410.11	78.47	6.226		
6,100.00	5,651.06	6,144.01	5,597.32	43.33	47.56	-62.28	1,480.14	1,854.59	492.99	413.96	79.04	6.238		
6,200.00	5,750.20	6,259.42	5,711.39	43.56	47.86	-62.32	1,491.04	1,868.16	496.32	416.85	79.46	6.246		
6,300.00	5,849.81	6,374.97	5,826.34	43.74	48.09	-62.35	1,498.34	1,877.25	498.54	418.78	79.76	6.251		
6,400.00	5,949.70	6,490.61	5,941.82	43.86	48.23	-62.36	1,502.00	1,881.81	499.65	419.73	79.92	6.252		
6,500.00	6,049.70	6,598.49	6,049.70	43.92	48.30	-0.36	1,502.47	1,882.38	499.79	419.78	80.01	6.246		
6,600.00	6,149.70	6,698.49	6,149.70	43.99	48.36	-0.36	1,502.47	1,882.38	499.79	419.63	80.16	6.235		
6,700.00	6,249.70	6,798.49	6,249.70	44.05	48.42	-0.36	1,502.47	1,882.38	499.79	419.49	80.30	6.224		
6,800.00	6,349.70	6,898.49	6,349.70	44.12	48.48	-0.36	1,502.47	1,882.38	499.79	419.34	80.45	6.212		
6,900.00	6,449.70	6,998.49	6,449.70	44.19	48.54	-0.36	1,502.47	1,882.38	499.79	419.19	80.60	6.201		
7,000.00	6,549.70	7,098.49	6,549.70	44.26	48.61	-0.36	1,502.47	1,882.38	499.79	419.04	80.75	6.189		
7,100.00	6,649.70	7,198.49	6,649.70	44.33	48.67	-0.36	1,502.47	1,882.38	499.79	418.88	80.91	6.177		
7,200.00	6,749.70	7,298.49	6,749.70	44.40	48.73	-0.36	1,502.47	1,882.38	499.79	418.73	81.07	6.165		
7,300.00	6,849.70	7,398.49	6,849.70	44.47	48.80	-0.36	1,502.47	1,882.38	499.79	418.57	81.23	6.153		
7,400.00	6,949.70	7,498.49	6,949.70	44.55	48.86	-0.36	1,502.47	1,882.38	499.79	418.41	81.39	6.141		
7,500.00	7,049.70	7,598.49	7,049.70	44.62	48.93	-0.36	1,502.47	1,882.38	499.79	418.24	81.55	6.129		
7,600.00	7,149.70	7,698.49	7,149.70	44.70	49.00	-0.36	1,502.47	1,882.38	499.79	418.08	81.72	6.116		
7,700.00	7,249.70	7,798.49	7,249.70	44.78	49.07	-0.36	1,502.47	1,882.38	499.79	417.91	81.88	6.104		
7,800.00	7,349.70	7,898.49	7,349.70	44.85	49.14	-0.36	1,502.47	1,882.38	499.79	417.74	82.05	6.091		
7,900.00	7,449.70	7,998.49	7,449.70	44.93	49.21	-0.36	1,502.47	1,882.38	499.79	417.57	82.22	6.078		
8,000.00	7,549.70	8,098.49	7,549.70	45.01	49.28	-0.36	1,502.47	1,882.38	499.79	417.39	82.40	6.066		
8,100.00	7,649.70	8,198.49	7,649.70	45.09	49.35	-0.36	1,502.47	1,882.38	499.79	417.22	82.58	6.053		
8,200.00	7,749.70	8,298.49	7,749.70	45.18	49.43	-0.36	1,502.47	1,882.38	499.79	417.04	82.75	6.040		
8,300.00	7,849.70	8,398.49	7,849.70	45.26	49.50	-0.36	1,502.47	1,882.38	499.79	416.86	82.93	6.026		
8,400.00	7,949.70	8,498.49	7,949.70	45.34	49.57	-0.36	1,502.47	1,882.38	499.79	416.68	83.12	6.013		
8,500.00	8,049.70	8,598.49	8,049.70	45.43	49.65	-0.36	1,502.47	1,882.38	499.79	416.49	83.30	6.000		
8,509.30	8,059.00	8,607.79	8,059.00	45.43	49.66	-0.36	1,502.47	1,882.38	499.79	416.47	83.32	5.999 SF		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Reference Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-3	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 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		
0.00	0.00	0.00	0.00	0.00	0.00	149.76	-12.14	7.08	14.06					
100.00	100.00	100.00	100.00	0.09	0.09	149.76	-12.14	7.08	14.06	13.88	0.18	80.185		
200.00	200.00	200.00	200.00	0.31	0.31	149.76	-12.14	7.08	14.06	13.43	0.62	22.498		
300.00	300.00	300.00	300.00	0.54	0.54	149.76	-12.14	7.08	14.06	12.98	1.07	13.085		
400.00	400.00	400.00	400.00	0.76	0.76	149.76	-12.14	7.08	14.06	12.53	1.52	9.225		
461.09	461.09	461.10	461.09	0.90	0.90	146.44	-11.69	7.76	14.03	12.23	1.80	7.811 CC		
500.00	500.00	500.00	499.97	0.99	0.98	140.87	-10.93	8.89	14.09	12.12	1.97	7.152 ES		
600.00	599.97	599.73	599.48	1.21	1.21	61.85	-7.28	14.29	14.91	12.49	2.41	6.176		
700.00	699.75	699.29	698.44	1.43	1.46	46.74	-1.24	23.26	16.50	13.61	2.89	5.707		
800.00	799.14	798.66	796.65	1.68	1.75	33.93	7.18	35.76	18.73	15.32	3.41	5.493		
900.00	897.97	897.84	893.93	1.96	2.10	23.20	17.95	51.74	21.45	17.50	3.95	5.437		
1,000.00	996.04	996.82	990.09	2.31	2.52	14.16	31.03	71.16	24.58	20.09	4.48	5.481		
1,100.00	1,093.17	1,095.60	1,084.97	2.72	3.01	6.45	46.39	93.95	28.05	23.03	5.03	5.583		
1,200.00	1,189.17	1,194.20	1,178.40	3.20	3.58	-0.22	63.99	120.06	31.85	26.27	5.58	5.704		
1,300.00	1,283.85	1,292.60	1,270.20	3.78	4.23	-6.08	83.77	149.42	35.95	29.76	6.19	5.809		
1,400.00	1,377.05	1,390.81	1,360.23	4.43	4.96	-11.29	105.69	181.95	40.34	33.46	6.87	5.869		
1,500.00	1,468.57	1,489.30	1,448.80	5.18	5.78	-16.00	129.75	217.65	44.89	37.20	7.69	5.838		
1,600.00	1,558.81	1,589.17	1,538.09	6.01	6.65	-20.79	154.75	254.76	47.98	39.30	8.67	5.532		
1,700.00	1,649.00	1,689.05	1,627.38	6.85	7.53	-25.04	179.76	291.88	51.25	41.43	9.82	5.218		
1,800.00	1,739.19	1,788.93	1,716.68	7.70	8.41	-28.76	204.77	328.99	54.76	43.65	11.11	4.929		
1,900.00	1,829.38	1,888.81	1,805.97	8.56	9.31	-32.02	229.78	366.10	58.49	45.97	12.51	4.673		
2,000.00	1,919.57	1,988.69	1,895.26	9.43	10.21	-34.88	254.79	403.22	62.37	48.37	14.00	4.454		
2,100.00	2,009.76	2,088.57	1,984.55	10.30	11.11	-37.40	279.80	440.33	66.40	50.84	15.56	4.268		
2,200.00	2,099.95	2,188.45	2,073.84	11.18	12.01	-39.63	304.80	477.45	70.53	53.38	17.15	4.112		
2,300.00	2,190.14	2,288.33	2,163.13	12.06	12.92	-41.61	329.81	514.56	74.77	55.98	18.79	3.979		
2,400.00	2,280.33	2,388.20	2,252.42	12.94	13.83	-43.38	354.82	551.67	79.08	58.63	20.45	3.867		
2,500.00	2,370.52	2,488.08	2,341.72	13.83	14.74	-44.96	379.83	588.79	83.46	61.33	22.12	3.772		
2,600.00	2,460.71	2,587.96	2,431.01	14.71	15.65	-46.39	404.84	625.90	87.89	64.08	23.82	3.690		
2,700.00	2,550.90	2,687.84	2,520.30	15.60	16.56	-47.67	429.85	663.01	92.38	66.86	25.52	3.620		
2,800.00	2,641.09	2,787.72	2,609.59	16.48	17.47	-48.84	454.85	700.13	96.91	69.68	27.23	3.559		
2,900.00	2,731.27	2,887.60	2,698.88	17.37	18.38	-49.90	479.86	737.24	101.47	72.53	28.94	3.506		
3,000.00	2,821.46	2,987.48	2,788.17	18.26	19.30	-50.87	504.87	774.35	106.07	75.41	30.66	3.459		
3,100.00	2,911.65	3,087.36	2,877.46	19.15	20.21	-51.76	529.88	811.47	110.69	78.31	32.39	3.418		
3,200.00	3,001.84	3,187.24	2,966.75	20.04	21.13	-52.58	554.89	848.58	115.34	81.23	34.11	3.381		
3,300.00	3,092.03	3,287.11	3,056.05	20.93	22.04	-53.34	579.90	885.69	120.01	84.17	35.84	3.349		
3,400.00	3,182.22	3,386.99	3,145.34	21.82	22.96	-54.03	604.91	922.81	124.70	87.14	37.56	3.320		
3,500.00	3,272.41	3,486.87	3,234.63	22.71	23.87	-54.68	629.91	959.92	129.41	90.11	39.29	3.293		
3,600.00	3,362.60	3,586.75	3,323.92	23.60	24.79	-55.28	654.92	997.03	134.13	93.11	41.02	3.270		
3,700.00	3,452.79	3,686.63	3,413.21	24.49	25.70	-55.84	679.93	1,034.15	138.86	96.11	42.75	3.248		
3,800.00	3,542.98	3,786.51	3,502.50	25.39	26.62	-56.37	704.94	1,071.26	143.61	99.13	44.48	3.229		
3,900.00	3,633.17	3,886.39	3,591.79	26.28	27.54	-56.86	729.95	1,108.38	148.37	102.16	46.21	3.211		
4,000.00	3,723.36	3,986.27	3,681.09	27.17	28.45	-57.32	754.96	1,145.49	153.14	105.20	47.94	3.195		
4,100.00	3,813.55	4,086.15	3,770.38	28.06	29.37	-57.75	779.96	1,182.60	157.92	108.25	49.67	3.180		
4,200.00	3,903.74	4,186.02	3,859.67	28.96	30.29	-58.16	804.97	1,219.72	162.71	111.31	51.40	3.166		
4,300.00	3,993.93	4,285.90	3,948.96	29.85	31.20	-58.54	829.98	1,256.83	167.50	114.38	53.12	3.153		
4,400.00	4,084.12	4,385.78	4,038.25	30.74	32.12	-58.90	854.99	1,293.94	172.30	117.45	54.85	3.141		
4,500.00	4,174.31	4,485.66	4,127.54	31.64	33.04	-59.24	880.00	1,331.06	177.11	120.53	56.58	3.130		
4,600.00	4,264.50	4,585.54	4,216.83	32.53	33.96	-59.57	905.01	1,368.17	181.93	123.62	58.31	3.120		
4,700.00	4,354.69	4,685.42	4,306.13	33.42	34.87	-59.88	930.01	1,405.28	186.75	126.71	60.04	3.111		
4,800.00	4,444.87	4,785.30	4,395.42	34.32	35.79	-60.17	955.02	1,442.40	191.57	129.81	61.76	3.102		
4,900.00	4,535.06	4,885.18	4,484.71	35.21	36.71	-60.45	980.03	1,479.51	196.40	132.91	63.49	3.093		
5,000.00	4,625.25	4,985.06	4,574.00	36.10	37.63	-60.71	1,005.04	1,516.62	201.23	136.02	65.22	3.086		

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 28-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Reference Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-3	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 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		
5,100.00	4,715.44	5,084.93	4,663.29	37.00	38.54	-60.96	1,030.05	1,553.74	206.07	139.13	66.94	3.078		
5,200.00	4,805.63	5,184.81	4,752.58	37.89	39.46	-61.20	1,055.06	1,590.85	210.91	142.25	68.67	3.071		
5,300.00	4,895.82	5,284.69	4,841.87	38.79	40.38	-61.43	1,080.07	1,627.97	215.76	145.37	70.39	3.065		
5,400.00	4,986.01	5,384.57	4,931.17	39.68	41.30	-61.65	1,105.07	1,665.08	220.61	148.49	72.12	3.059		
5,500.00	5,076.70	5,487.48	5,023.47	40.49	42.18	-61.82	1,130.50	1,702.81	225.66	151.96	73.69	3.062		
5,600.00	5,169.07	5,593.19	5,120.10	41.14	42.90	-61.93	1,154.43	1,738.32	230.42	155.50	74.92	3.075		
5,700.00	5,263.03	5,699.04	5,218.75	41.71	43.54	-62.03	1,175.87	1,770.14	234.68	158.67	76.01	3.087		
5,800.00	5,358.39	5,805.03	5,319.19	42.22	44.10	-62.11	1,194.76	1,798.18	238.44	161.47	76.96	3.098		
5,900.00	5,454.97	5,911.13	5,421.19	42.65	44.59	-62.18	1,211.06	1,822.36	241.67	163.89	77.78	3.107		
6,000.00	5,552.59	6,017.32	5,524.53	43.02	45.00	-62.24	1,224.71	1,842.62	244.38	165.92	78.46	3.115		
6,100.00	5,651.06	6,123.60	5,628.97	43.33	45.34	-62.29	1,235.68	1,858.90	246.55	167.55	79.00	3.121		
6,200.00	5,750.20	6,229.94	5,734.27	43.56	45.60	-62.33	1,243.94	1,871.16	248.18	168.77	79.41	3.125		
6,300.00	5,849.81	6,336.33	5,840.18	43.74	45.80	-62.35	1,249.46	1,879.35	249.28	169.58	79.70	3.128		
6,400.00	5,949.70	6,442.74	5,946.47	43.86	45.92	-62.36	1,252.22	1,883.46	249.82	169.97	79.85	3.128		
6,500.00	6,049.70	6,545.97	6,049.70	43.92	46.00	-0.36	1,252.57	1,883.98	249.89	169.93	79.96	3.125		
6,600.00	6,149.70	6,645.97	6,149.70	43.99	46.06	-0.36	1,252.57	1,883.98	249.89	169.79	80.11	3.120		
6,700.00	6,249.70	6,745.97	6,249.70	44.05	46.12	-0.36	1,252.57	1,883.98	249.89	169.64	80.25	3.114		
6,800.00	6,349.70	6,845.97	6,349.70	44.12	46.19	-0.36	1,252.57	1,883.98	249.89	169.49	80.40	3.108		
6,900.00	6,449.70	6,945.97	6,449.70	44.19	46.25	-0.36	1,252.57	1,883.98	249.89	169.34	80.55	3.102		
7,000.00	6,549.70	7,045.97	6,549.70	44.26	46.32	-0.36	1,252.57	1,883.98	249.89	169.19	80.71	3.096		
7,100.00	6,649.70	7,145.97	6,649.70	44.33	46.39	-0.36	1,252.57	1,883.98	249.89	169.03	80.86	3.090		
7,200.00	6,749.70	7,245.97	6,749.70	44.40	46.45	-0.36	1,252.57	1,883.98	249.89	168.87	81.02	3.084		
7,300.00	6,849.70	7,345.97	6,849.70	44.47	46.52	-0.36	1,252.57	1,883.98	249.89	168.71	81.18	3.078		
7,400.00	6,949.70	7,445.97	6,949.70	44.55	46.59	-0.36	1,252.57	1,883.98	249.89	168.55	81.34	3.072		
7,500.00	7,049.70	7,545.97	7,049.70	44.62	46.66	-0.36	1,252.57	1,883.98	249.89	168.39	81.51	3.066		
7,600.00	7,149.70	7,645.97	7,149.70	44.70	46.74	-0.36	1,252.57	1,883.98	249.89	168.22	81.67	3.060		
7,700.00	7,249.70	7,745.97	7,249.70	44.78	46.81	-0.36	1,252.57	1,883.98	249.89	168.05	81.84	3.053		
7,800.00	7,349.70	7,845.97	7,349.70	44.85	46.88	-0.36	1,252.57	1,883.98	249.89	167.88	82.01	3.047		
7,900.00	7,449.70	7,945.97	7,449.70	44.93	46.96	-0.36	1,252.57	1,883.98	249.89	167.71	82.18	3.041		
8,000.00	7,549.70	8,045.97	7,549.70	45.01	47.03	-0.36	1,252.57	1,883.98	249.89	167.53	82.36	3.034		
8,100.00	7,649.70	8,145.97	7,649.70	45.09	47.11	-0.36	1,252.57	1,883.98	249.89	167.36	82.54	3.028		
8,200.00	7,749.70	8,245.97	7,749.70	45.18	47.19	-0.36	1,252.57	1,883.98	249.89	167.18	82.72	3.021		
8,300.00	7,849.70	8,345.97	7,849.70	45.26	47.27	-0.36	1,252.57	1,883.98	249.89	167.00	82.90	3.015		
8,400.00	7,949.70	8,445.97	7,949.70	45.34	47.35	-0.36	1,252.57	1,883.98	249.89	166.81	83.08	3.008		
8,500.00	8,049.70	8,545.97	8,049.70	45.43	47.43	-0.36	1,252.57	1,883.98	249.89	166.63	83.26	3.001		
8,509.30	8,059.00	8,555.27	8,059.00	45.43	47.43	-0.36	1,252.57	1,883.98	249.89	166.61	83.28	3.001 SF		

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 28-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Reference Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-3	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 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		
0.00	0.00	0.00	0.00	0.00	0.00	-166.86	-10.11	-2.36	10.38					
100.00	100.00	100.00	100.00	0.09	0.09	-166.86	-10.11	-2.36	10.38	10.21	0.18	59.232		
200.00	200.00	200.00	200.00	0.31	0.31	-166.86	-10.11	-2.36	10.38	9.76	0.62	16.619		
300.00	300.00	300.00	300.00	0.54	0.54	-166.86	-10.11	-2.36	10.38	9.31	1.07	9.665		
400.00	400.00	400.00	400.00	0.76	0.76	-166.86	-10.11	-2.36	10.38	8.86	1.52	6.814		
500.00	500.00	500.00	500.00	0.99	0.99	-166.86	-10.11	-2.36	10.38	8.41	1.97	5.262 CC, ES		
600.00	599.97	599.97	599.97	1.21	1.21	139.02	-10.11	-2.36	11.93	9.50	2.43	4.911		
700.00	699.75	700.32	700.29	1.43	1.43	148.94	-9.29	-0.32	15.62	12.71	2.90	5.380		
800.00	799.14	800.87	800.61	1.68	1.65	153.75	-6.82	5.80	19.79	16.40	3.39	5.837		
900.00	897.97	901.59	900.72	1.96	1.90	155.86	-2.69	16.01	24.23	20.33	3.90	6.212		
1,000.00	996.04	1,002.50	1,000.43	2.31	2.18	156.46	3.09	30.33	28.86	24.42	4.44	6.502		
1,100.00	1,093.17	1,103.58	1,099.54	2.72	2.52	156.15	10.52	48.74	33.66	28.64	5.02	6.710		
1,200.00	1,189.17	1,204.84	1,197.84	3.20	2.93	155.26	19.60	71.22	38.61	32.97	5.65	6.837		
1,300.00	1,283.85	1,306.27	1,295.14	3.78	3.42	154.02	30.31	97.75	43.74	37.38	6.35	6.883		
1,400.00	1,377.05	1,407.85	1,391.23	4.43	4.00	152.53	42.64	128.30	49.04	41.88	7.16	6.849		
1,500.00	1,468.57	1,509.60	1,485.91	5.18	4.67	150.88	56.58	162.83	54.53	46.44	8.09	6.744		
1,600.00	1,558.81	1,611.48	1,578.96	6.01	5.43	148.55	72.11	201.27	59.13	49.95	9.18	6.442		
1,700.00	1,649.00	1,711.38	1,669.33	6.85	6.25	145.45	88.05	240.76	62.27	51.80	10.47	5.949		
1,800.00	1,739.19	1,811.27	1,759.69	7.70	7.08	142.65	103.99	280.25	65.57	53.70	11.87	5.524		
1,900.00	1,829.38	1,911.17	1,850.06	8.56	7.92	140.12	119.94	319.73	69.02	55.66	13.36	5.165		
2,000.00	1,919.57	2,011.07	1,940.42	9.43	8.78	137.84	135.88	359.22	72.59	57.66	14.92	4.864		
2,100.00	2,009.76	2,110.96	2,030.79	10.30	9.64	135.78	151.82	398.71	76.26	59.72	16.54	4.611		
2,200.00	2,099.95	2,210.86	2,121.16	11.18	10.50	133.90	167.77	438.20	80.02	61.83	18.19	4.399		
2,300.00	2,190.14	2,310.76	2,211.52	12.06	11.37	132.20	183.71	477.68	83.86	63.98	19.88	4.219		
2,400.00	2,280.33	2,410.65	2,301.89	12.94	12.25	130.65	199.65	517.17	87.76	66.18	21.59	4.066		
2,500.00	2,370.52	2,510.55	2,392.25	13.83	13.12	129.23	215.60	556.66	91.73	68.41	23.32	3.934		
2,600.00	2,460.71	2,610.45	2,482.62	14.71	14.00	127.92	231.54	596.15	95.75	70.69	25.06	3.821		
2,700.00	2,550.90	2,710.34	2,572.98	15.60	14.88	126.73	247.48	635.63	99.81	73.00	26.82	3.722		
2,800.00	2,641.09	2,810.24	2,663.35	16.48	15.76	125.63	263.43	675.12	103.91	75.33	28.58	3.636		
2,900.00	2,731.27	2,910.14	2,753.71	17.37	16.64	124.61	279.37	714.61	108.05	77.70	30.35	3.560		
3,000.00	2,821.46	3,010.03	2,844.08	18.26	17.52	123.67	295.31	754.10	112.22	80.10	32.13	3.493		
3,100.00	2,911.65	3,109.93	2,934.44	19.15	18.41	122.79	311.26	793.58	116.42	82.51	33.91	3.434		
3,200.00	3,001.84	3,209.83	3,024.81	20.04	19.29	121.98	327.20	833.07	120.64	84.95	35.69	3.380		
3,300.00	3,092.03	3,309.72	3,115.17	20.93	20.18	121.22	343.14	872.56	124.89	87.41	37.47	3.333		
3,400.00	3,182.22	3,409.62	3,205.54	21.82	21.06	120.51	359.09	912.05	129.15	89.89	39.26	3.290		
3,500.00	3,272.41	3,509.52	3,295.90	22.71	21.95	119.85	375.03	951.53	133.44	92.39	41.05	3.251		
3,600.00	3,362.60	3,609.41	3,386.27	23.60	22.83	119.22	390.97	991.02	137.74	94.90	42.84	3.215		
3,700.00	3,452.79	3,709.31	3,476.63	24.49	23.72	118.64	406.92	1,030.51	142.06	97.43	44.63	3.183		
3,800.00	3,542.98	3,809.21	3,567.00	25.39	24.61	118.09	422.86	1,070.00	146.39	99.97	46.42	3.154		
3,900.00	3,633.17	3,909.10	3,657.36	26.28	25.50	117.57	438.80	1,109.48	150.73	102.52	48.21	3.126		
4,000.00	3,723.36	4,009.00	3,747.73	27.17	26.38	117.08	454.75	1,148.97	155.08	105.08	50.00	3.102		
4,100.00	3,813.55	4,108.90	3,838.10	28.06	27.27	116.62	470.69	1,188.46	159.45	107.66	51.79	3.079		
4,200.00	3,903.74	4,208.79	3,928.46	28.96	28.16	116.18	486.63	1,227.95	163.83	110.24	53.58	3.057		
4,300.00	3,993.93	4,308.69	4,018.83	29.85	29.05	115.77	502.58	1,267.43	168.21	112.84	55.37	3.038		
4,400.00	4,084.12	4,408.59	4,109.19	30.74	29.94	115.37	518.52	1,306.92	172.60	115.44	57.16	3.019		
4,500.00	4,174.31	4,508.48	4,199.56	31.64	30.83	115.00	534.46	1,346.41	177.00	118.05	58.96	3.002		
4,600.00	4,264.50	4,608.38	4,289.92	32.53	31.71	114.64	550.41	1,385.90	181.41	120.67	60.75	2.986		
4,700.00	4,354.69	4,708.28	4,380.29	33.42	32.60	114.30	566.35	1,425.38	185.82	123.29	62.53	2.972		
4,800.00	4,444.87	4,808.17	4,470.65	34.32	33.49	113.98	582.29	1,464.87	190.24	125.92	64.32	2.958		
4,900.00	4,535.06	4,908.07	4,561.02	35.21	34.38	113.67	598.24	1,504.36	194.67	128.56	66.11	2.945		
5,000.00	4,625.25	5,007.97	4,651.38	36.10	35.27	113.38	614.18	1,543.85	199.10	131.20	67.90	2.932		
5,100.00	4,715.44	5,107.86	4,741.75	37.00	36.16	113.10	630.12	1,583.33	203.54	133.85	69.69	2.921		

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 28-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Reference Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-3	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 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		
5,200.00	4,805.63	5,207.76	4,832.11	37.89	37.05	112.83	646.07	1,622.82	207.98	136.50	71.48	2.910		
5,300.00	4,895.82	5,307.66	4,922.48	38.79	37.94	112.57	662.01	1,662.31	212.43	139.16	73.27	2.899		
5,400.00	4,986.01	5,406.37	5,011.94	39.68	38.77	112.42	677.63	1,700.99	217.00	142.04	74.96	2.895 SF		
5,500.00	5,076.70	5,503.47	5,101.35	40.49	39.42	112.96	691.80	1,736.09	222.17	146.00	76.17	2.917		
5,600.00	5,169.07	5,600.00	5,191.75	41.14	39.99	113.54	704.47	1,767.48	226.98	149.85	77.13	2.943		
5,700.00	5,263.03	5,697.32	5,284.24	41.71	40.50	114.10	715.80	1,795.52	231.37	153.41	77.96	2.968		
5,800.00	5,358.39	5,794.07	5,377.39	42.22	40.95	114.63	725.58	1,819.76	235.33	156.68	78.65	2.992		
5,900.00	5,454.97	5,890.73	5,471.46	42.65	41.33	115.15	733.88	1,840.32	238.84	159.64	79.21	3.016		
6,000.00	5,552.59	5,987.28	5,566.28	43.02	41.64	115.65	740.68	1,857.16	241.91	162.29	79.63	3.038		
6,100.00	5,651.06	6,083.73	5,661.68	43.33	41.89	116.13	745.98	1,870.27	244.53	164.61	79.92	3.060		
6,200.00	5,750.20	6,180.09	5,757.50	43.56	42.09	116.61	749.76	1,879.65	246.69	166.61	80.09	3.080		
6,300.00	5,849.81	6,276.35	5,853.56	43.74	42.23	117.07	752.04	1,885.28	248.40	168.27	80.13	3.100		
6,400.00	5,949.70	6,372.82	5,950.00	43.86	42.31	117.52	752.80	1,887.16	249.64	169.58	80.06	3.118		
6,500.00	6,049.70	6,472.52	6,049.70	43.92	42.38	117.64	752.80	1,887.16	249.89	169.79	80.11	3.119		
6,600.00	6,149.70	6,572.52	6,149.70	43.99	42.45	117.64	752.80	1,887.16	249.89	169.64	80.25	3.114		
6,700.00	6,249.70	6,672.52	6,249.70	44.05	42.52	117.64	752.80	1,887.16	249.89	169.49	80.40	3.108		
6,800.00	6,349.70	6,772.52	6,349.70	44.12	42.59	117.64	752.80	1,887.16	249.89	169.34	80.55	3.102		
6,900.00	6,449.70	6,872.52	6,449.70	44.19	42.66	117.64	752.80	1,887.16	249.89	169.19	80.70	3.097		
7,000.00	6,549.70	6,972.52	6,549.70	44.26	42.73	117.64	752.80	1,887.16	249.89	169.04	80.86	3.091		
7,100.00	6,649.70	7,072.52	6,649.70	44.33	42.80	117.64	752.80	1,887.16	249.89	168.88	81.01	3.085		
7,200.00	6,749.70	7,172.52	6,749.70	44.40	42.88	117.64	752.80	1,887.16	249.89	168.72	81.17	3.079		
7,300.00	6,849.70	7,272.52	6,849.70	44.47	42.96	117.64	752.80	1,887.16	249.89	168.56	81.33	3.073		
7,400.00	6,949.70	7,372.52	6,949.70	44.55	43.03	117.64	752.80	1,887.16	249.89	168.40	81.49	3.066		
7,500.00	7,049.70	7,472.52	7,049.70	44.62	43.11	117.64	752.80	1,887.16	249.89	168.24	81.66	3.060		
7,600.00	7,149.70	7,572.52	7,149.70	44.70	43.19	117.64	752.80	1,887.16	249.89	168.07	81.83	3.054		
7,700.00	7,249.70	7,672.52	7,249.70	44.78	43.27	117.64	752.80	1,887.16	249.89	167.90	81.99	3.048		
7,800.00	7,349.70	7,772.52	7,349.70	44.85	43.35	117.64	752.80	1,887.16	249.89	167.73	82.17	3.041		
7,900.00	7,449.70	7,872.52	7,449.70	44.93	43.43	117.64	752.80	1,887.16	249.89	167.55	82.34	3.035		
8,000.00	7,549.70	7,972.52	7,549.70	45.01	43.52	117.64	752.80	1,887.16	249.89	167.38	82.51	3.028		
8,100.00	7,649.70	8,072.52	7,649.70	45.09	43.60	117.64	752.80	1,887.16	249.89	167.20	82.69	3.022		
8,200.00	7,749.70	8,172.52	7,749.70	45.18	43.68	117.64	752.80	1,887.16	249.89	167.02	82.87	3.015		
8,300.00	7,849.70	8,272.52	7,849.70	45.26	43.77	117.64	752.80	1,887.16	249.89	166.84	83.05	3.009		
8,400.00	7,949.70	8,372.52	7,949.70	45.34	43.86	117.64	752.80	1,887.16	249.89	166.66	83.24	3.002		
8,466.43	8,016.13	8,438.95	8,016.13	45.40	43.92	117.64	752.80	1,887.16	249.89	166.53	83.36	2.998		
8,500.00	8,049.70	8,471.82	8,049.00	45.43	43.94	117.64	752.80	1,887.16	249.89	166.47	83.42	2.996		
8,509.30	8,059.00	8,471.82	8,049.00	45.43	43.94	117.64	752.80	1,887.16	250.09	166.66	83.43	2.998		

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 28-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Reference Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-3	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 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		
0.00	0.00	0.00	0.00	0.00	0.00	-166.43	-29.33	-7.08	30.18					
100.00	100.00	100.00	100.00	0.09	0.09	-166.43	-29.33	-7.08	30.18	30.00	0.18	172.129		
200.00	200.00	200.00	200.00	0.31	0.31	-166.43	-29.33	-7.08	30.18	29.55	0.62	48.295		
300.00	300.00	300.00	300.00	0.54	0.54	-166.43	-29.33	-7.08	30.18	29.10	1.07	28.088		
400.00	400.00	400.00	400.00	0.76	0.76	-166.43	-29.33	-7.08	30.18	28.65	1.52	19.802		
500.00	500.00	500.00	500.00	0.99	0.99	-166.43	-29.33	-7.08	30.18	28.20	1.97	15.292 CC, ES		
600.00	599.97	599.97	599.97	1.21	1.21	134.50	-29.33	-7.08	31.67	29.24	2.43	13.041		
700.00	699.75	699.75	699.75	1.43	1.44	141.75	-29.33	-7.08	36.55	33.65	2.90	12.583		
800.00	799.14	800.57	800.54	1.68	1.65	148.31	-28.74	-4.96	44.02	40.62	3.40	12.959		
900.00	897.97	901.75	901.49	1.96	1.87	152.03	-26.94	1.46	52.37	48.48	3.90	13.438		
1,000.00	996.04	1,003.29	1,002.40	2.31	2.12	153.92	-23.92	12.21	61.33	56.91	4.42	13.865		
1,100.00	1,093.17	1,105.16	1,103.05	2.72	2.40	154.61	-19.68	27.31	70.75	65.77	4.98	14.197		
1,200.00	1,189.17	1,207.36	1,203.22	3.20	2.74	154.51	-14.21	46.77	80.59	74.99	5.59	14.409		
1,300.00	1,283.85	1,309.86	1,302.69	3.78	3.14	153.87	-7.52	70.58	90.81	84.54	6.27	14.487		
1,400.00	1,377.05	1,412.67	1,401.24	4.43	3.63	152.85	0.39	98.74	101.43	94.40	7.03	14.422		
1,500.00	1,468.57	1,515.76	1,498.64	5.18	4.22	151.56	9.51	131.22	112.46	104.55	7.91	14.217		
1,600.00	1,558.81	1,619.20	1,594.75	6.01	4.90	149.90	19.84	168.02	122.83	113.90	8.92	13.765		
1,700.00	1,649.00	1,721.90	1,688.43	6.85	5.67	147.22	31.22	208.53	130.21	120.07	10.14	12.837		
1,800.00	1,739.19	1,821.47	1,778.74	7.70	6.48	144.53	42.56	248.91	136.97	125.47	11.50	11.911		
1,900.00	1,829.38	1,921.05	1,869.04	8.56	7.30	142.10	53.91	289.30	143.99	131.05	12.95	11.122		
2,000.00	1,919.57	2,020.62	1,959.35	9.43	8.13	139.89	65.25	329.69	151.26	136.79	14.47	10.455		
2,100.00	2,009.76	2,120.19	2,049.66	10.30	8.98	137.89	76.59	370.08	158.73	142.68	16.05	9.892		
2,200.00	2,099.95	2,219.77	2,139.96	11.18	9.83	136.07	87.94	410.46	166.37	148.70	17.67	9.417		
2,300.00	2,190.14	2,319.34	2,230.27	12.06	10.68	134.41	99.28	450.85	174.16	154.84	19.32	9.014		
2,400.00	2,280.33	2,418.92	2,320.58	12.94	11.55	132.90	110.62	491.24	182.09	161.09	21.00	8.670		
2,500.00	2,370.52	2,518.49	2,410.88	13.83	12.41	131.51	121.97	531.63	190.14	167.43	22.71	8.374		
2,600.00	2,460.71	2,618.07	2,501.19	14.71	13.28	130.23	133.31	572.01	198.28	173.86	24.42	8.118		
2,700.00	2,550.90	2,717.64	2,591.49	15.60	14.15	129.06	144.65	612.40	206.52	180.36	26.16	7.896		
2,800.00	2,641.09	2,817.22	2,681.80	16.48	15.02	127.97	155.99	652.79	214.83	186.94	27.90	7.701		
2,900.00	2,731.27	2,916.79	2,772.11	17.37	15.89	126.97	167.34	693.17	223.22	193.57	29.65	7.529		
3,000.00	2,821.46	3,016.36	2,862.41	18.26	16.77	126.04	178.68	733.56	231.67	200.27	31.40	7.377		
3,100.00	2,911.65	3,115.94	2,952.72	19.15	17.65	125.18	190.02	773.95	240.18	207.01	33.16	7.242		
3,200.00	3,001.84	3,215.51	3,043.03	20.04	18.52	124.37	201.37	814.34	248.74	213.81	34.93	7.121		
3,300.00	3,092.03	3,315.09	3,133.33	20.93	19.40	123.62	212.71	854.72	257.34	220.64	36.70	7.013		
3,400.00	3,182.22	3,414.66	3,223.64	21.82	20.28	122.92	224.05	895.11	265.98	227.52	38.47	6.915		
3,500.00	3,272.41	3,514.24	3,313.95	22.71	21.16	122.26	235.40	935.50	274.66	234.42	40.24	6.826		
3,600.00	3,362.60	3,613.81	3,404.25	23.60	22.04	121.64	246.74	975.89	283.38	241.37	42.01	6.745		
3,700.00	3,452.79	3,713.38	3,494.56	24.49	22.92	121.06	258.08	1,016.27	292.12	248.34	43.79	6.672		
3,800.00	3,542.98	3,812.96	3,584.87	25.39	23.80	120.51	269.43	1,056.66	300.90	255.34	45.56	6.604		
3,900.00	3,633.17	3,912.53	3,675.17	26.28	24.68	119.99	280.77	1,097.05	309.70	262.36	47.34	6.542		
4,000.00	3,723.36	4,012.11	3,765.48	27.17	25.56	119.51	292.11	1,137.43	318.52	269.41	49.11	6.485		
4,100.00	3,813.55	4,111.68	3,855.78	28.06	26.44	119.04	303.45	1,177.82	327.37	276.47	50.89	6.433		
4,200.00	3,903.74	4,211.26	3,946.09	28.96	27.32	118.61	314.80	1,218.21	336.23	283.56	52.67	6.384		
4,300.00	3,993.93	4,310.83	4,036.40	29.85	28.21	118.19	326.14	1,258.60	345.11	290.67	54.44	6.339		
4,400.00	4,084.12	4,410.40	4,126.70	30.74	29.09	117.80	337.48	1,298.98	354.01	297.79	56.22	6.297		
4,500.00	4,174.31	4,509.98	4,217.01	31.64	29.97	117.42	348.83	1,339.37	362.93	304.93	58.00	6.258		
4,600.00	4,264.50	4,609.55	4,307.32	32.53	30.85	117.07	360.17	1,379.76	371.86	312.09	59.77	6.221		
4,700.00	4,354.69	4,709.13	4,397.62	33.42	31.74	116.73	371.51	1,420.15	380.81	319.25	61.55	6.187		
4,800.00	4,444.87	4,808.70	4,487.93	34.32	32.62	116.40	382.86	1,460.53	389.76	326.44	63.33	6.155		
4,900.00	4,535.06	4,908.28	4,578.24	35.21	33.50	116.09	394.20	1,500.92	398.73	333.63	65.10	6.125		
5,000.00	4,625.25	5,007.85	4,668.54	36.10	34.39	115.80	405.54	1,541.31	407.71	340.83	66.88	6.096		
5,100.00	4,715.44	5,107.42	4,758.85	37.00	35.27	115.51	416.89	1,581.69	416.70	348.05	68.65	6.070		

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 28-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Reference Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-3	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-10 Pad - Piceance Federal 28-11E - Slot B-5 - Design #2													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 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		
5,200.00	4,805.63	5,207.00	4,849.15	37.89	36.15	115.24	428.23	1,622.08	425.70	355.27	70.43	6.044		
5,300.00	4,895.82	5,306.57	4,939.46	38.79	37.04	114.98	439.57	1,662.47	434.71	362.51	72.20	6.021		
5,400.00	4,986.01	5,403.98	5,028.00	39.68	37.85	114.80	450.55	1,701.54	443.85	369.97	73.89	6.007		
5,500.00	5,076.70	5,500.00	5,116.70	40.49	38.48	115.09	460.49	1,736.95	453.36	378.15	75.20	6.028		
5,600.00	5,169.07	5,594.19	5,205.13	41.14	39.04	115.43	469.26	1,768.17	462.07	385.80	76.27	6.058		
5,700.00	5,263.03	5,689.21	5,295.60	41.71	39.53	115.76	477.10	1,796.11	469.91	392.70	77.21	6.086		
5,800.00	5,358.39	5,784.17	5,387.14	42.22	39.96	116.07	483.92	1,820.39	476.86	398.85	78.01	6.113		
5,900.00	5,454.97	5,879.07	5,479.59	42.65	40.33	116.37	489.71	1,840.99	482.92	404.24	78.68	6.138		
6,000.00	5,552.59	5,973.91	5,572.78	43.02	40.63	116.65	494.45	1,857.87	488.08	408.85	79.22	6.161		
6,100.00	5,651.06	6,068.68	5,666.56	43.33	40.88	116.92	498.15	1,871.02	492.32	412.68	79.64	6.182		
6,200.00	5,750.20	6,163.38	5,760.75	43.56	41.07	117.18	500.79	1,880.43	495.65	415.72	79.93	6.201		
6,300.00	5,849.81	6,258.01	5,855.19	43.74	41.20	117.43	502.37	1,886.08	498.05	417.96	80.09	6.218		
6,400.00	5,949.70	6,352.85	5,950.00	43.86	41.29	117.67	502.90	1,887.96	499.53	419.38	80.15	6.233		
6,500.00	6,049.70	6,452.55	6,049.70	43.92	41.36	117.73	502.90	1,887.96	499.79	419.55	80.23	6.229		
6,600.00	6,149.70	6,552.55	6,149.70	43.99	41.43	117.73	502.90	1,887.96	499.79	419.41	80.38	6.218		
6,700.00	6,249.70	6,652.55	6,249.70	44.05	41.50	117.73	502.90	1,887.96	499.79	419.26	80.52	6.207		
6,800.00	6,349.70	6,752.55	6,349.70	44.12	41.57	117.73	502.90	1,887.96	499.79	419.11	80.67	6.195		
6,900.00	6,449.70	6,852.55	6,449.70	44.19	41.64	117.73	502.90	1,887.96	499.79	418.96	80.83	6.183		
7,000.00	6,549.70	6,952.55	6,549.70	44.26	41.72	117.73	502.90	1,887.96	499.79	418.81	80.98	6.172		
7,100.00	6,649.70	7,052.55	6,649.70	44.33	41.79	117.73	502.90	1,887.96	499.79	418.65	81.14	6.160		
7,200.00	6,749.70	7,152.55	6,749.70	44.40	41.87	117.73	502.90	1,887.96	499.79	418.49	81.29	6.148		
7,300.00	6,849.70	7,252.55	6,849.70	44.47	41.95	117.73	502.90	1,887.96	499.79	418.33	81.45	6.136		
7,400.00	6,949.70	7,352.55	6,949.70	44.55	42.03	117.73	502.90	1,887.96	499.79	418.17	81.62	6.124		
7,500.00	7,049.70	7,452.55	7,049.70	44.62	42.11	117.73	502.90	1,887.96	499.79	418.00	81.78	6.111		
7,600.00	7,149.70	7,552.55	7,149.70	44.70	42.19	117.73	502.90	1,887.96	499.79	417.84	81.95	6.099		
7,700.00	7,249.70	7,652.55	7,249.70	44.78	42.27	117.73	502.90	1,887.96	499.79	417.67	82.12	6.086		
7,800.00	7,349.70	7,752.55	7,349.70	44.85	42.35	117.73	502.90	1,887.96	499.79	417.50	82.29	6.074		
7,900.00	7,449.70	7,852.55	7,449.70	44.93	42.44	117.73	502.90	1,887.96	499.79	417.32	82.46	6.061		
8,000.00	7,549.70	7,952.55	7,549.70	45.01	42.52	117.73	502.90	1,887.96	499.79	417.15	82.64	6.048		
8,100.00	7,649.70	8,052.55	7,649.70	45.09	42.61	117.73	502.90	1,887.96	499.79	416.97	82.82	6.035		
8,200.00	7,749.70	8,152.55	7,749.70	45.18	42.70	117.73	502.90	1,887.96	499.79	416.79	83.00	6.022		
8,300.00	7,849.70	8,252.55	7,849.70	45.26	42.79	117.73	502.90	1,887.96	499.79	416.61	83.18	6.009		
8,400.00	7,949.70	8,352.55	7,949.70	45.34	42.87	117.73	502.90	1,887.96	499.79	416.43	83.36	5.995		
8,463.49	8,013.19	8,416.04	8,013.19	45.40	42.93	117.73	502.90	1,887.96	499.79	416.31	83.48	5.987		
8,500.00	8,049.70	8,443.85	8,041.00	45.43	42.96	117.73	502.90	1,887.96	499.86	416.33	83.54	5.984 SF		
8,509.30	8,059.00	8,443.85	8,041.00	45.43	42.96	117.73	502.90	1,887.96	500.11	416.56	83.55	5.986		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Reference Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-3	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 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		
0.00	0.00	0.00	0.00	0.00	0.00	175.70	-31.36	2.36	31.45					
100.00	100.00	100.00	100.00	0.09	0.09	175.70	-31.36	2.36	31.45	31.27	0.18	179.373		
200.00	200.00	200.00	200.00	0.31	0.31	175.70	-31.36	2.36	31.45	30.82	0.62	50.328 CC, ES		
300.00	300.00	299.51	299.48	0.54	0.53	172.04	-31.87	4.46	32.19	31.13	1.06	30.268		
400.00	400.00	398.65	398.40	0.76	0.75	162.22	-33.41	10.71	35.13	33.61	1.51	23.187		
500.00	500.00	497.05	496.22	0.99	1.01	149.68	-35.95	21.03	41.82	39.84	1.98	21.119		
600.00	599.97	594.60	592.66	1.21	1.33	78.19	-39.45	35.27	52.95	50.48	2.46	21.482		
700.00	699.75	691.36	687.61	1.43	1.70	73.63	-43.89	53.31	67.31	64.35	2.96	22.727		
800.00	799.14	787.21	780.81	1.68	2.14	71.91	-49.23	75.01	84.14	80.64	3.51	24.003		
900.00	897.97	882.06	872.03	1.96	2.65	71.72	-55.42	100.19	103.18	99.06	4.12	25.051		
1,000.00	996.04	975.80	961.07	2.31	3.22	72.32	-62.42	128.65	124.36	119.53	4.83	25.773		
1,100.00	1,093.17	1,068.36	1,047.73	2.72	3.87	73.31	-70.18	160.21	147.68	142.03	5.64	26.163		
1,200.00	1,189.17	1,163.77	1,136.04	3.20	4.60	74.75	-78.80	195.28	172.30	165.69	6.61	26.063		
1,300.00	1,283.85	1,260.46	1,225.49	3.78	5.35	76.95	-87.57	230.93	196.25	188.52	7.73	25.399		
1,400.00	1,377.05	1,356.93	1,314.73	4.43	6.11	79.68	-96.32	266.51	219.78	210.77	9.01	24.400		
1,500.00	1,468.57	1,452.99	1,403.59	5.18	6.87	82.77	-105.04	301.94	243.35	232.90	10.45	23.291		
1,600.00	1,558.81	1,548.67	1,492.10	6.01	7.64	86.31	-113.71	337.23	267.53	255.51	12.03	22.245		
1,700.00	1,649.00	1,644.33	1,580.59	6.85	8.40	89.42	-122.39	372.50	292.61	278.97	13.63	21.460		
1,800.00	1,739.19	1,739.98	1,669.08	7.70	9.17	92.04	-131.07	407.78	318.38	303.13	15.25	20.878		
1,900.00	1,829.38	1,835.64	1,757.57	8.56	9.94	94.27	-139.74	443.06	344.69	327.82	16.86	20.439		
2,000.00	1,919.57	1,931.30	1,846.06	9.43	10.71	96.19	-148.42	478.34	371.42	352.94	18.48	20.103		
2,100.00	2,009.76	2,026.96	1,934.55	10.30	11.48	97.85	-157.10	513.62	398.49	378.41	20.08	19.843		
2,200.00	2,099.95	2,122.61	2,023.04	11.18	12.25	99.30	-165.77	548.90	425.83	404.15	21.68	19.638		
2,300.00	2,190.14	2,218.27	2,111.53	12.06	13.03	100.57	-174.45	584.17	453.40	430.12	23.28	19.476		
2,400.00	2,280.33	2,313.93	2,200.02	12.94	13.80	101.71	-183.13	619.45	481.16	456.29	24.87	19.346		
2,500.00	2,370.52	2,409.59	2,288.52	13.83	14.57	102.71	-191.80	654.73	509.07	482.61	26.46	19.240		
2,600.00	2,460.71	2,505.25	2,377.01	14.71	15.35	103.62	-200.48	690.01	537.11	509.07	28.04	19.154		
2,700.00	2,550.90	2,600.90	2,465.50	15.60	16.12	104.43	-209.15	725.29	565.27	535.65	29.62	19.083		
2,800.00	2,641.09	2,696.56	2,553.99	16.48	16.90	105.17	-217.83	760.57	593.52	562.32	31.20	19.025		
2,900.00	2,731.27	2,792.22	2,642.48	17.37	17.67	105.84	-226.51	795.85	621.85	589.08	32.77	18.976		
3,000.00	2,821.46	2,887.88	2,730.97	18.26	18.45	106.46	-235.18	831.12	650.26	615.92	34.34	18.936		
3,100.00	2,911.65	2,983.53	2,819.46	19.15	19.22	107.02	-243.86	866.40	678.73	642.82	35.91	18.902		
3,200.00	3,001.84	3,079.19	2,907.95	20.04	20.00	107.53	-252.54	901.68	707.25	669.77	37.47	18.873		
3,300.00	3,092.03	3,174.85	2,996.44	20.93	20.77	108.01	-261.21	936.96	735.82	696.78	39.04	18.849		
3,400.00	3,182.22	3,270.51	3,084.93	21.82	21.55	108.45	-269.89	972.24	764.44	723.84	40.60	18.828		
3,500.00	3,272.41	3,366.17	3,173.42	22.71	22.32	108.86	-278.57	1,007.52	793.09	750.93	42.16	18.811		
3,600.00	3,362.60	3,461.82	3,261.91	23.60	23.10	109.24	-287.24	1,042.79	821.78	778.06	43.72	18.796		
3,700.00	3,452.79	3,557.48	3,350.40	24.49	23.87	109.60	-295.92	1,078.07	850.50	805.22	45.28	18.784		
3,800.00	3,542.98	3,653.14	3,438.89	25.39	24.65	109.93	-304.59	1,113.35	879.25	832.42	46.84	18.773		
3,900.00	3,633.17	3,748.80	3,527.38	26.28	25.43	110.24	-313.27	1,148.63	908.03	859.63	48.39	18.764		
4,000.00	3,723.36	3,844.46	3,615.87	27.17	26.20	110.53	-321.95	1,183.91	936.82	886.88	49.95	18.757		
4,100.00	3,813.55	3,940.11	3,704.36	28.06	26.98	110.81	-330.62	1,219.19	965.64	914.14	51.50	18.750		
4,200.00	3,903.74	4,035.77	3,792.85	28.96	27.76	111.07	-339.30	1,254.47	994.48	941.43	53.05	18.745 SF		

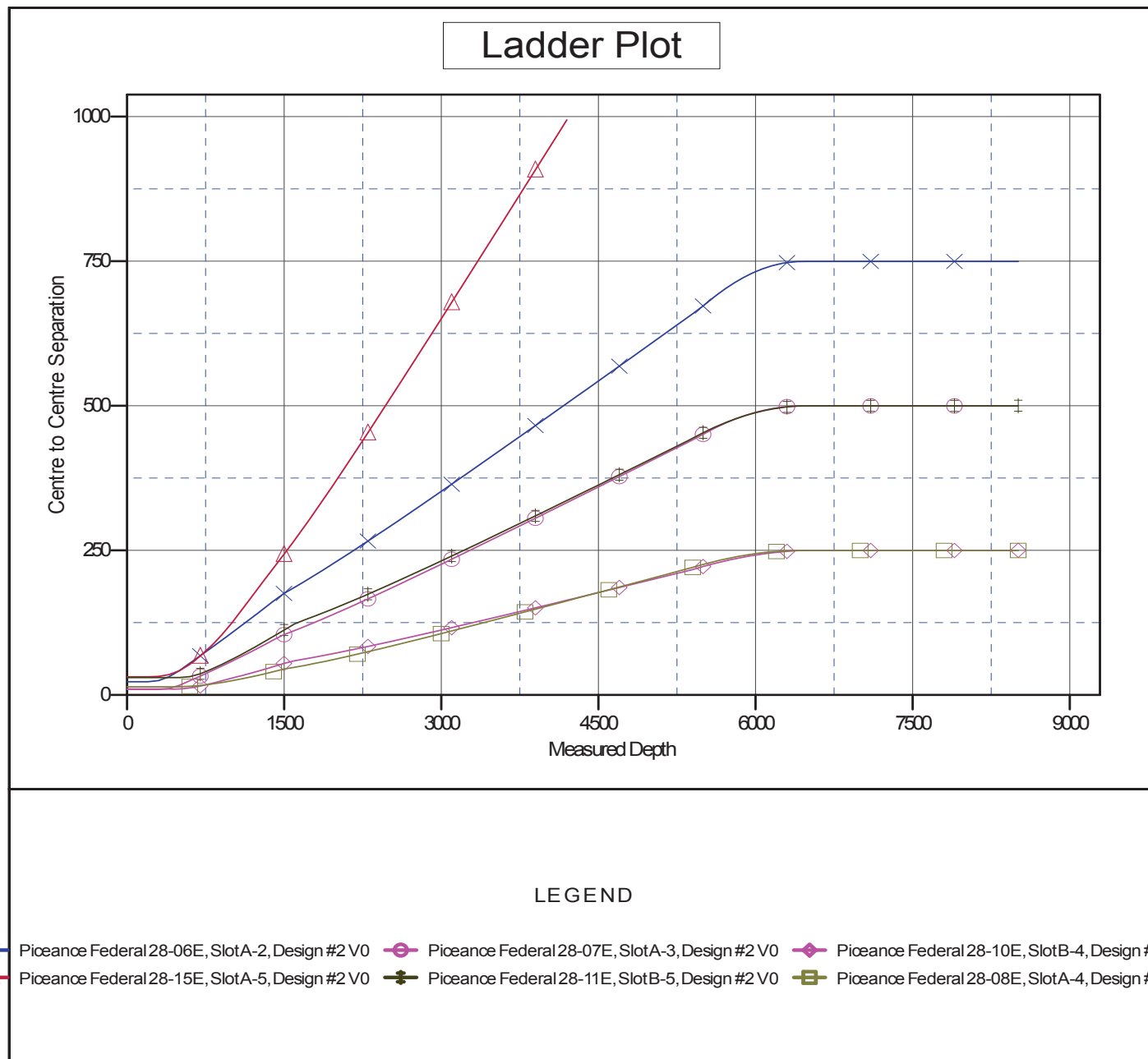
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Reference Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Piceance Federal 28-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-3	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Reference Depths are relative to Well @ 7701.00usft
Offset Depths are relative to Offset Datum
Central Meridian is 105° 30' 0.000 W

Coordinates are relative to: Piceance Federal 28-09E
Coordinate System is US State Plane 1983, Colorado Central Zone
Grid Convergence at Surface is: -1.43°





Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-09E
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Reference Depths are relative to Well @ 7701.00usft

Offset Depths are relative to Offset Datum

Central Meridian is 105° 30' 0.000 W

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