



Piceance Energy, LLC

Mesa County, CO

Piceance 28-10 Pad

Piceance Federal 28-10E

Slot B-4

Plan: Design #2

Standard Planning Report

15 April, 2015

Archer



Project: Mesa County, CO
Site: Piceance 28-10 Pad
Well: Piceance Federal 28-10E
Wellbore: Slot B-4
Design: Design #2
Latitude: 39° 14' 47.880 N
Longitude: 107° 46' 29.760 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 28-10E, 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 28-10E

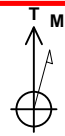
+N/-S	+E/-W	Northing	Ground Level: Easting	Latitude	Longitude	Slot
0.00	0.00	1522786.837	2355805.642	39° 14' 47.880 N	107° 46' 29.760 W	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance 28-10E tgt	8049.00	762.93	1889.52	1523502.219	2357713.671	39° 14' 55.420 N	107° 46' 5.740 W	Circle (Radius: 50.00)

SECTION DETAILS

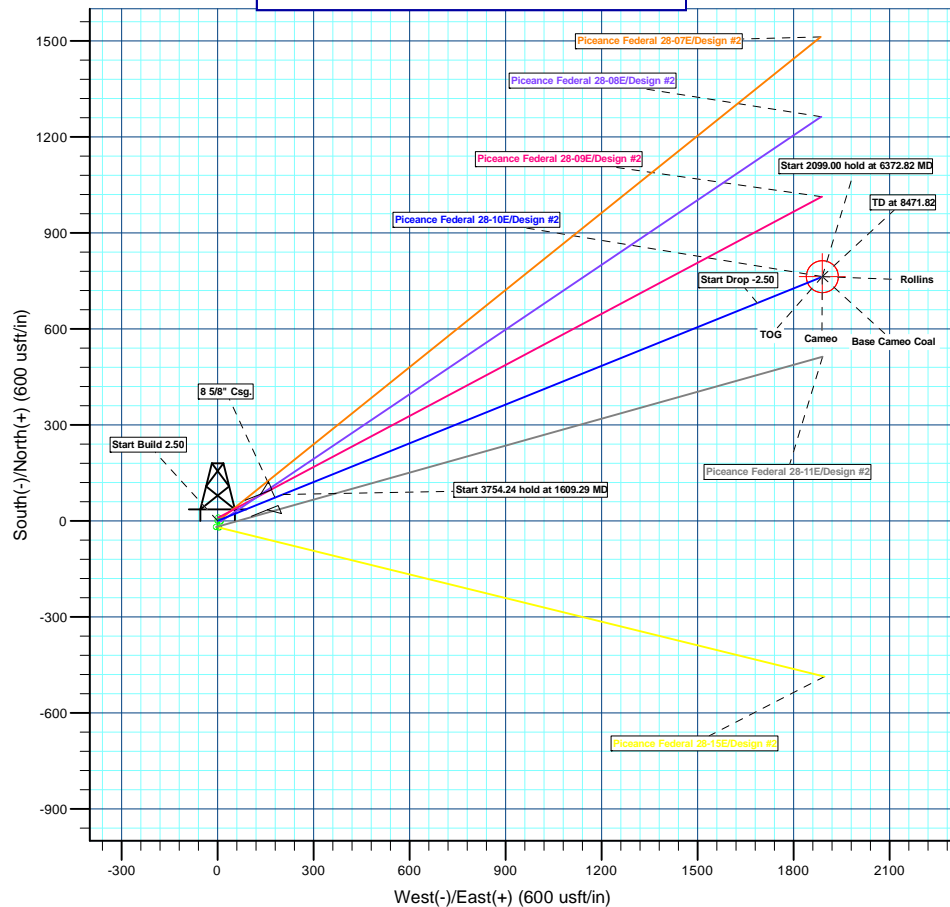
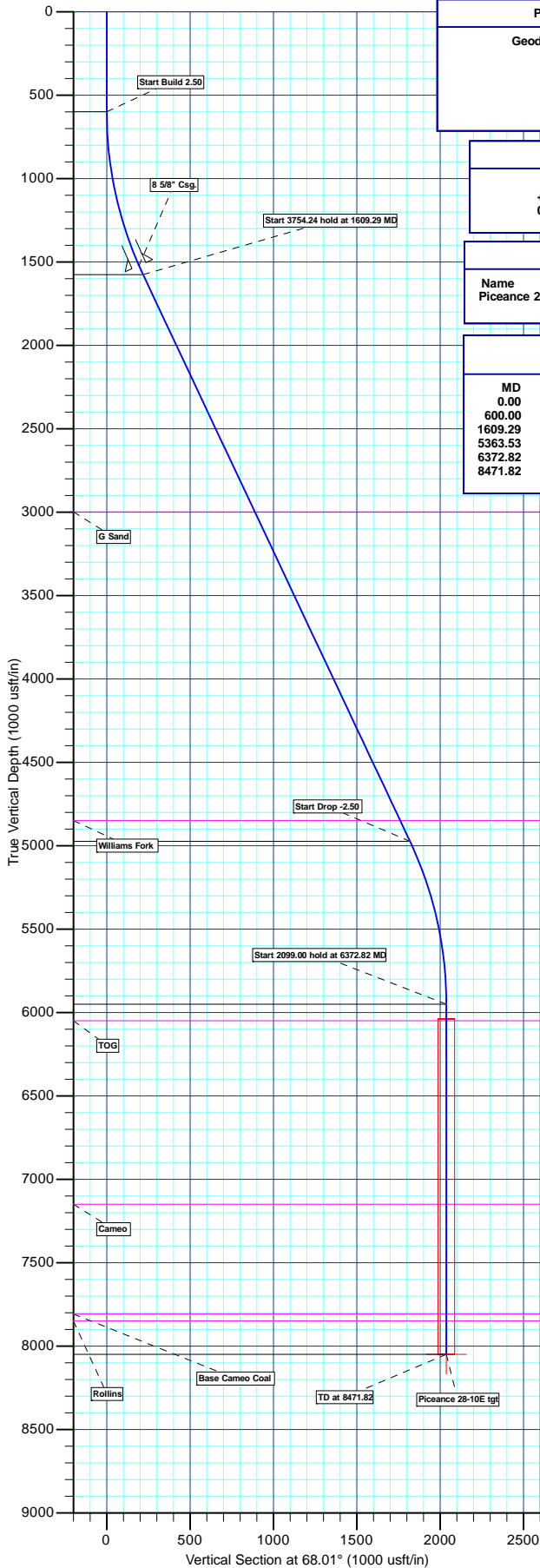
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.50
1609.29	25.23	68.01	1576.98	81.87	202.76	2.50	68.01	218.67	Start 3754.24 hold at 1609.29 MD
5363.53	25.23	68.01	4973.02	681.04	1686.75	0.00	0.00	1819.05	Start Drop -2.50
6372.82	0.00	0.00	5950.00	762.91	1889.52	2.50	180.00	2037.72	Start 2099.00 hold at 6372.82 MD
8471.82	0.00	0.00	8049.00	762.91	1889.52	0.00	0.00	2037.72	TD at 8471.82



Azimuths to True North
Magnetic North: 9.73°
Magnetic Field
Strength: 51746.5snT
Dip Angle: 65.47°
Date: 03/31/2015
Model: IGRF2010

FORMATION TOP DETAILS

TVDPATH	MDPATH	Formation
2999.00	3181.30	G Sand
4849.00	5226.43	Williams Fork
6049.00	6471.82	TOG
7149.00	7571.82	Cameo
7807.00	8229.82	Base Cameo Coal
7849.00	8271.82	Rollins



Plan: Design #2 (Piceance Federal 28-10E/Slot B-4)

Created By: Ricky Osburn Date: 8:51, April 15 2015



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Planning Report

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Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-10E
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 28-10E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-4		
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 28-10E					
Well Position	+N/-S	-36.45 usft	Northing:	1,522,786.837 usft	Latitude:	39° 14' 47.880 N
	+E/-W	-19.67 usft	Easting:	2,355,805.642 usft	Longitude:	107° 46' 29.760 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,679.00 usft

Wellbore	Slot B-4				
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	68.01

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	
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,609.29	25.23	68.01	1,576.98	81.87	202.76	2.50	2.50	0.00	68.01	
5,363.53	25.23	68.01	4,973.02	681.04	1,686.75	0.00	0.00	0.00	0.00	
6,372.82	0.00	0.00	5,950.00	762.91	1,889.52	2.50	-2.50	0.00	180.00	
8,471.82	0.00	0.00	8,049.00	762.91	1,889.52	0.00	0.00	0.00	0.00	Piceance 28-10E tgt



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-10E
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 28-10E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-4		
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
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.50									
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	2.50	68.01	699.97	0.82	2.02	2.18	2.50	2.50	0.00
800.00	5.00	68.01	799.75	3.27	8.09	8.72	2.50	2.50	0.00
900.00	7.50	68.01	899.14	7.34	18.18	19.61	2.50	2.50	0.00
1,000.00	10.00	68.01	997.97	13.04	32.29	34.82	2.50	2.50	0.00
1,100.00	12.50	68.01	1,096.04	20.34	50.37	54.33	2.50	2.50	0.00
1,200.00	15.00	68.01	1,193.17	29.24	72.41	78.09	2.50	2.50	0.00
1,300.00	17.50	68.01	1,289.17	39.71	98.36	106.07	2.50	2.50	0.00
1,400.00	20.00	68.01	1,383.85	51.75	128.16	138.21	2.50	2.50	0.00
1,500.00	22.50	68.01	1,477.05	65.31	161.77	174.46	2.50	2.50	0.00
8 5/8" Csg.									
1,548.88	23.72	68.01	1,522.00	72.50	179.56	193.64	2.50	2.50	0.00
Start 3754.24 hold at 1609.29 MD									
1,609.29	25.23	68.01	1,576.98	81.87	202.76	218.67	2.50	2.50	0.00
1,700.00	25.23	68.01	1,659.04	96.35	238.62	257.34	0.00	0.00	0.00
1,800.00	25.23	68.01	1,749.50	112.31	278.15	299.97	0.00	0.00	0.00
1,900.00	25.23	68.01	1,839.95	128.27	317.68	342.60	0.00	0.00	0.00
2,000.00	25.23	68.01	1,930.41	144.23	357.21	385.22	0.00	0.00	0.00
2,100.00	25.23	68.01	2,020.87	160.19	396.74	427.85	0.00	0.00	0.00
2,200.00	25.23	68.01	2,111.33	176.15	436.26	470.48	0.00	0.00	0.00
2,300.00	25.23	68.01	2,201.79	192.11	475.79	513.11	0.00	0.00	0.00
2,400.00	25.23	68.01	2,292.25	208.07	515.32	555.74	0.00	0.00	0.00
2,500.00	25.23	68.01	2,382.71	224.03	554.85	598.37	0.00	0.00	0.00
2,600.00	25.23	68.01	2,473.17	239.99	594.38	641.00	0.00	0.00	0.00
2,700.00	25.23	68.01	2,563.62	255.94	633.91	683.63	0.00	0.00	0.00
2,800.00	25.23	68.01	2,654.08	271.90	673.43	726.25	0.00	0.00	0.00
2,900.00	25.23	68.01	2,744.54	287.86	712.96	768.88	0.00	0.00	0.00
3,000.00	25.23	68.01	2,835.00	303.82	752.49	811.51	0.00	0.00	0.00
3,100.00	25.23	68.01	2,925.46	319.78	792.02	854.14	0.00	0.00	0.00
G Sand									
3,181.30	25.23	68.01	2,999.00	332.76	824.15	888.80	0.00	0.00	0.00
3,200.00	25.23	68.01	3,015.92	335.74	831.55	896.77	0.00	0.00	0.00
3,300.00	25.23	68.01	3,106.38	351.70	871.08	939.40	0.00	0.00	0.00
3,400.00	25.23	68.01	3,196.84	367.66	910.60	982.03	0.00	0.00	0.00
3,500.00	25.23	68.01	3,287.29	383.62	950.13	1,024.66	0.00	0.00	0.00
3,600.00	25.23	68.01	3,377.75	399.58	989.66	1,067.28	0.00	0.00	0.00
3,700.00	25.23	68.01	3,468.21	415.54	1,029.19	1,109.91	0.00	0.00	0.00
3,800.00	25.23	68.01	3,558.67	431.50	1,068.72	1,152.54	0.00	0.00	0.00
3,900.00	25.23	68.01	3,649.13	447.46	1,108.25	1,195.17	0.00	0.00	0.00
4,000.00	25.23	68.01	3,739.59	463.42	1,147.77	1,237.80	0.00	0.00	0.00
4,100.00	25.23	68.01	3,830.05	479.38	1,187.30	1,280.43	0.00	0.00	0.00
4,200.00	25.23	68.01	3,920.51	495.34	1,226.83	1,323.06	0.00	0.00	0.00
4,300.00	25.23	68.01	4,010.97	511.30	1,266.36	1,365.68	0.00	0.00	0.00
4,400.00	25.23	68.01	4,101.42	527.26	1,305.89	1,408.31	0.00	0.00	0.00
4,500.00	25.23	68.01	4,191.88	543.22	1,345.42	1,450.94	0.00	0.00	0.00
4,600.00	25.23	68.01	4,282.34	559.18	1,384.94	1,493.57	0.00	0.00	0.00
4,700.00	25.23	68.01	4,372.80	575.14	1,424.47	1,536.20	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 28-10E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-4		
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)
4,800.00	25.23	68.01	4,463.26	591.10	1,464.00	1,578.83	0.00	0.00	0.00
4,900.00	25.23	68.01	4,553.72	607.06	1,503.53	1,621.46	0.00	0.00	0.00
5,000.00	25.23	68.01	4,644.18	623.02	1,543.06	1,664.09	0.00	0.00	0.00
5,100.00	25.23	68.01	4,734.64	638.98	1,582.59	1,706.71	0.00	0.00	0.00
5,200.00	25.23	68.01	4,825.09	654.94	1,622.11	1,749.34	0.00	0.00	0.00
Williams Fork									
5,226.43	25.23	68.01	4,849.00	659.16	1,632.56	1,760.61	0.00	0.00	0.00
5,300.00	25.23	68.01	4,915.55	670.90	1,661.64	1,791.97	0.00	0.00	0.00
Start Drop -2.50									
5,363.53	25.23	68.01	4,973.02	681.04	1,686.75	1,819.05	0.00	0.00	0.00
5,400.00	24.32	68.01	5,006.13	686.76	1,700.93	1,834.34	2.50	-2.50	0.00
5,500.00	21.82	68.01	5,098.13	701.43	1,737.26	1,873.52	2.50	-2.50	0.00
5,600.00	19.32	68.01	5,191.75	714.59	1,769.84	1,908.65	2.50	-2.50	0.00
5,700.00	16.82	68.01	5,286.81	726.20	1,798.60	1,939.67	2.50	-2.50	0.00
5,800.00	14.32	68.01	5,383.13	736.25	1,823.49	1,966.51	2.50	-2.50	0.00
5,900.00	11.82	68.01	5,480.53	744.71	1,844.45	1,989.12	2.50	-2.50	0.00
6,000.00	9.32	68.01	5,578.83	751.58	1,861.46	2,007.47	2.50	-2.50	0.00
6,100.00	6.82	68.01	5,677.83	756.84	1,874.48	2,021.50	2.50	-2.50	0.00
6,200.00	4.32	68.01	5,777.35	760.47	1,883.48	2,031.21	2.50	-2.50	0.00
6,300.00	1.82	68.01	5,877.20	762.48	1,888.45	2,036.57	2.50	-2.50	0.00
Start 2099.00 hold at 6372.82 MD									
6,372.82	0.00	0.00	5,950.00	762.91	1,889.52	2,037.72	2.50	-2.50	0.00
6,400.00	0.00	0.00	5,977.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
TOG									
6,471.82	0.00	0.00	6,049.00	762.91	1,889.52	2,037.72	0.00	0.00	0.00
6,500.00	0.00	0.00	6,077.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
6,600.00	0.00	0.00	6,177.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
6,700.00	0.00	0.00	6,277.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
6,800.00	0.00	0.00	6,377.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
6,900.00	0.00	0.00	6,477.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
7,000.00	0.00	0.00	6,577.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
7,100.00	0.00	0.00	6,677.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
7,200.00	0.00	0.00	6,777.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
7,300.00	0.00	0.00	6,877.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
7,400.00	0.00	0.00	6,977.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
7,500.00	0.00	0.00	7,077.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
Cameo									
7,571.82	0.00	0.00	7,149.00	762.91	1,889.52	2,037.72	0.00	0.00	0.00
7,600.00	0.00	0.00	7,177.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
7,700.00	0.00	0.00	7,277.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
7,800.00	0.00	0.00	7,377.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
7,900.00	0.00	0.00	7,477.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
8,000.00	0.00	0.00	7,577.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
8,100.00	0.00	0.00	7,677.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
8,200.00	0.00	0.00	7,777.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
Base Cameo Coal									
8,229.82	0.00	0.00	7,807.00	762.91	1,889.52	2,037.72	0.00	0.00	0.00
Rollins									
8,271.82	0.00	0.00	7,849.00	762.91	1,889.52	2,037.72	0.00	0.00	0.00
8,300.00	0.00	0.00	7,877.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
8,400.00	0.00	0.00	7,977.18	762.91	1,889.52	2,037.72	0.00	0.00	0.00
TD at 8471.82									
8,471.82	0.00	0.00	8,049.00	762.91	1,889.52	2,037.72	0.00	0.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-10E
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 28-10E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-4		
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)

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 28-10E tgt	0.00	0.00	8,049.00	762.93	1,889.52	1,523,502.219	2,357,713.671	39° 14' 55.420 N	107° 46' 5.740 W
- plan misses target center by 0.02usft at 8471.82usft MD (8049.00 TVD, 762.91 N, 1889.52 E)									
- Circle (radius 50.00)									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
1,548.88	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 (°)	
3,181.30	2,999.00	G Sand		0.00		
5,226.43	4,849.00	Williams Fork		0.00		
6,471.82	6,049.00	TOG		0.00		
7,571.82	7,149.00	Cameo		0.00		
8,229.82	7,807.00	Base Cameo Coal		0.00		
8,271.82	7,849.00	Rollins		0.00		

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
600.00	600.00	0.00	0.00	Start Build 2.50	
1,609.29	1,576.98	81.87	202.76	Start 3754.24 hold at 1609.29 MD	
5,363.53	4,973.02	681.04	1,686.75	Start Drop -2.50	
6,372.82	5,950.00	762.91	1,889.52	Start 2099.00 hold at 6372.82 MD	
8,471.82	8,049.00	762.91	1,889.52	TD at 8471.82	



Piceance Energy, LLC

Mesa County, CO

Piceance 28-10 Pad

Piceance Federal 28-10E

Slot B-4

Design #2

Anticollision Report

15 April, 2015

Archer



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-10E
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 28-10E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-4	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	8,471.82	Design #2 (Slot B-4)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Piceance 28-10 Pad						
Piceance Federal 28-07E - Slot A-3 - Design #2	300.00	300.00	14.30	13.23	13.314	CC, ES
Piceance Federal 28-07E - Slot A-3 - Design #2	5,400.00	5,318.89	654.25	581.41	8.982	SF
Piceance Federal 28-08E - Slot A-4 - Design #2	400.00	400.00	9.66	8.13	6.336	CC, ES
Piceance Federal 28-08E - Slot A-4 - Design #2	500.00	499.65	11.27	9.30	5.724	SF
Piceance Federal 28-09E - Slot B-3 - Design #2	500.00	500.00	10.38	8.41	5.262	CC, ES
Piceance Federal 28-09E - Slot B-3 - Design #2	5,400.00	5,382.80	216.41	141.62	2.894	SF
Piceance Federal 28-11E - Slot B-5 - Design #2	600.00	600.00	19.79	17.37	8.169	CC, ES
Piceance Federal 28-11E - Slot B-5 - Design #2	8,444.88	8,424.91	249.89	166.35	2.991	SF
Piceance Federal 28-15E - Slot A-5 - Design #2	200.00	200.00	21.76	21.14	34.830	CC, ES
Piceance Federal 28-15E - Slot A-5 - Design #2	4,800.00	4,648.88	981.53	918.53	15.580	SF

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										
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	Warning				
0.00	0.00	0.00	0.00	0.00	0.00	55.58	8.09	11.80	14.30								
100.00	100.00	100.00	100.00	0.09	0.09	55.58	8.09	11.80	14.30	14.13	0.18	81.589					
200.00	200.00	200.00	200.00	0.31	0.31	55.58	8.09	11.80	14.30	13.68	0.62	22.892					
300.00	300.00	300.00	300.00	0.54	0.54	55.58	8.09	11.80	14.30	13.23	1.07	13.314	CC, ES				
400.00	400.00	399.32	399.29	0.76	0.76	55.01	9.43	13.48	16.47	14.95	1.52	10.836					
500.00	500.00	498.27	498.02	0.99	0.99	53.95	13.45	18.48	22.94	20.97	1.97	11.627					
600.00	600.00	596.48	595.65	1.21	1.24	53.09	20.08	26.73	33.71	31.26	2.45	13.754					
700.00	699.97	693.93	691.99	1.43	1.53	-16.11	29.23	38.13	46.64	43.74	2.90	16.093					
800.00	799.75	790.82	787.07	1.65	1.88	-17.93	40.87	52.62	59.65	56.27	3.38	17.649					
900.00	899.14	887.13	880.73	1.89	2.29	-20.00	54.93	70.11	72.80	68.92	3.89	18.726					
1,000.00	997.97	982.88	972.82	2.17	2.77	-22.19	71.33	90.53	86.16	81.73	4.43	19.470					
1,100.00	1,096.04	1,078.04	1,063.18	2.51	3.32	-24.42	90.00	113.78	99.76	94.76	5.00	19.949					
1,200.00	1,193.17	1,172.62	1,151.69	2.91	3.94	-26.65	110.87	139.76	113.67	108.04	5.63	20.191					
1,300.00	1,289.17	1,266.62	1,238.22	3.38	4.63	-28.86	133.86	168.38	127.92	121.59	6.33	20.213					
1,400.00	1,383.85	1,360.04	1,322.65	3.94	5.40	-31.01	158.89	199.54	142.55	135.44	7.11	20.041					
1,500.00	1,477.05	1,455.72	1,407.57	4.60	6.23	-33.23	186.48	233.89	157.19	149.17	8.03	19.580					
1,600.00	1,568.57	1,554.67	1,495.15	5.34	7.13	-35.91	215.33	269.79	169.10	159.98	9.12	18.548					

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 28-10E
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 28-10E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-4	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		
1,700.00	1,659.04	1,653.72	1,582.82	6.15	8.04	-38.88	244.20	305.74	179.37	169.02	10.36	17.322		
1,800.00	1,749.50	1,752.78	1,670.50	6.98	8.96	-41.54	273.08	341.69	190.06	178.36	11.70	16.245		
1,900.00	1,839.95	1,851.84	1,758.17	7.83	9.88	-43.91	301.95	377.63	201.12	187.99	13.13	15.319		
2,000.00	1,930.41	1,950.90	1,845.85	8.68	10.80	-46.04	330.82	413.58	212.48	197.86	14.62	14.531		
2,100.00	2,020.87	2,049.96	1,933.52	9.54	11.72	-47.94	359.70	449.52	224.10	207.94	16.17	13.860		
2,200.00	2,111.33	2,149.02	2,021.20	10.41	12.65	-49.66	388.57	485.47	235.95	218.19	17.75	13.290		
2,300.00	2,201.79	2,248.08	2,108.87	11.28	13.58	-51.21	417.45	521.42	247.98	228.61	19.37	12.802		
2,400.00	2,292.25	2,347.14	2,196.54	12.15	14.51	-52.62	446.32	557.36	260.18	239.17	21.01	12.382		
2,500.00	2,382.71	2,446.19	2,284.22	13.03	15.44	-53.90	475.20	593.31	272.52	249.85	22.67	12.019		
2,600.00	2,473.17	2,545.25	2,371.89	13.91	16.38	-55.08	504.07	629.25	284.98	260.63	24.35	11.704		
2,700.00	2,563.62	2,644.31	2,459.57	14.79	17.31	-56.15	532.95	665.20	297.55	271.51	26.04	11.428		
2,800.00	2,654.08	2,743.37	2,547.24	15.67	18.24	-57.14	561.82	701.14	310.22	282.48	27.74	11.184		
2,900.00	2,744.54	2,842.43	2,634.92	16.55	19.18	-58.04	590.70	737.09	322.97	293.52	29.44	10.969		
3,000.00	2,835.00	2,941.49	2,722.59	17.44	20.11	-58.88	619.57	773.04	335.79	304.63	31.16	10.778		
3,100.00	2,925.46	3,040.55	2,810.26	18.32	21.05	-59.66	648.44	808.98	348.68	315.80	32.87	10.606		
3,200.00	3,015.92	3,139.60	2,897.94	19.20	21.98	-60.38	677.32	844.93	361.62	327.03	34.60	10.452		
3,300.00	3,106.38	3,238.66	2,985.61	20.09	22.92	-61.06	706.19	880.87	374.62	338.30	36.32	10.314		
3,400.00	3,196.84	3,337.72	3,073.29	20.98	23.85	-61.68	735.07	916.82	387.67	349.62	38.05	10.188		
3,500.00	3,287.29	3,436.78	3,160.96	21.86	24.79	-62.27	763.94	952.77	400.76	360.98	39.78	10.073		
3,600.00	3,377.75	3,535.84	3,248.64	22.75	25.72	-62.82	792.82	988.71	413.89	372.37	41.52	9.969		
3,700.00	3,468.21	3,634.90	3,336.31	23.64	26.66	-63.33	821.69	1,024.66	427.05	383.80	43.25	9.873		
3,800.00	3,558.67	3,733.96	3,423.98	24.53	27.60	-63.82	850.57	1,060.60	440.25	395.26	44.99	9.786		
3,900.00	3,649.13	3,833.02	3,511.66	25.42	28.53	-64.28	879.44	1,096.55	453.47	406.75	46.73	9.705		
4,000.00	3,739.59	3,932.07	3,599.33	26.30	29.47	-64.71	908.32	1,132.50	466.73	418.26	48.47	9.630		
4,100.00	3,830.05	4,031.13	3,687.01	27.19	30.41	-65.11	937.19	1,168.44	480.00	429.80	50.21	9.561		
4,200.00	3,920.51	4,130.19	3,774.68	28.08	31.35	-65.50	966.06	1,204.39	493.30	441.36	51.95	9.496		
4,300.00	4,010.97	4,229.25	3,862.36	28.97	32.28	-65.86	994.94	1,240.33	506.62	452.94	53.69	9.437		
4,400.00	4,101.42	4,328.31	3,950.03	29.86	33.22	-66.21	1,023.81	1,276.28	519.96	464.53	55.43	9.381		
4,500.00	4,191.88	4,427.37	4,037.70	30.75	34.16	-66.54	1,052.69	1,312.22	533.32	476.15	57.17	9.329		
4,600.00	4,282.34	4,526.43	4,125.38	31.64	35.10	-66.85	1,081.56	1,348.17	546.69	487.78	58.91	9.280		
4,700.00	4,372.80	4,625.49	4,213.05	32.53	36.03	-67.15	1,110.44	1,384.12	560.08	499.43	60.65	9.234		
4,800.00	4,463.26	4,724.54	4,300.73	33.42	36.97	-67.43	1,139.31	1,420.06	573.48	511.09	62.39	9.191		
4,900.00	4,553.72	4,823.60	4,388.40	34.31	37.91	-67.70	1,168.19	1,456.01	586.90	522.76	64.14	9.151		
5,000.00	4,644.18	4,922.66	4,476.08	35.20	38.85	-67.96	1,197.06	1,491.95	600.32	534.44	65.88	9.112		
5,100.00	4,734.64	5,021.72	4,563.75	36.09	39.78	-68.21	1,225.94	1,527.90	613.76	546.14	67.62	9.076		
5,200.00	4,825.09	5,120.78	4,651.42	36.98	40.72	-68.45	1,254.81	1,563.85	627.21	557.85	69.36	9.042		
5,300.00	4,915.55	5,219.84	4,739.10	37.87	41.66	-68.67	1,283.68	1,599.79	640.67	569.57	71.11	9.010		
5,400.00	5,006.13	5,318.89	4,826.76	38.73	42.60	-68.99	1,312.56	1,635.73	654.25	581.41	72.84	8.982 SF		
5,500.00	5,098.13	5,417.77	4,914.28	39.39	43.54	-69.24	1,341.38	1,671.62	669.06	594.75	74.31	9.004		
5,600.00	5,191.75	5,532.96	5,017.11	39.99	44.47	-69.22	1,373.89	1,712.08	684.48	608.90	75.57	9.057		
5,700.00	5,286.81	5,653.66	5,127.45	40.52	45.28	-69.17	1,404.49	1,750.18	698.44	621.80	76.64	9.113		
5,800.00	5,383.13	5,775.32	5,241.13	40.97	45.99	-69.10	1,431.62	1,783.95	710.82	633.25	77.57	9.164		
5,900.00	5,480.53	5,897.87	5,357.79	41.36	46.62	-69.02	1,455.08	1,813.16	721.57	643.23	78.34	9.210		
6,000.00	5,578.83	6,021.19	5,477.05	41.68	47.14	-68.93	1,474.72	1,837.61	730.65	651.69	78.96	9.253		
6,100.00	5,677.83	6,145.20	5,598.49	41.94	47.56	-68.82	1,490.38	1,857.11	738.03	658.60	79.43	9.291		
6,200.00	5,777.35	6,269.78	5,721.67	42.13	47.89	-68.69	1,501.96	1,871.52	743.67	663.92	79.75	9.325		
6,300.00	5,877.20	6,394.80	5,846.13	42.26	48.12	-68.55	1,509.34	1,880.71	747.55	667.62	79.93	9.352		
6,400.00	5,977.18	6,520.16	5,971.37	42.33	48.26	-0.38	1,512.47	1,884.60	749.60	669.61	79.99	9.372		
6,500.00	6,077.18	6,625.98	6,077.18	42.40	48.32	-0.36	1,512.58	1,884.74	749.69	669.56	80.12	9.357		
6,600.00	6,177.18	6,725.98	6,177.18	42.47	48.38	-0.36	1,512.58	1,884.74	749.69	669.42	80.27	9.340		
6,700.00	6,277.18	6,825.98	6,277.18	42.54	48.44	-0.36	1,512.58	1,884.74	749.69	669.27	80.41	9.323		
6,800.00	6,377.18	6,925.98	6,377.18	42.61	48.50	-0.36	1,512.58	1,884.74	749.69	669.12	80.56	9.306		

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 28-10E
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 28-10E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-4	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	
6,900.00	6,477.18	7,025.98	6,477.18	42.68	48.56	-0.36	1,512.58	1,884.74	749.69	668.97	80.71	9.288	
7,000.00	6,577.18	7,125.98	6,577.18	42.75	48.62	-0.36	1,512.58	1,884.74	749.69	668.82	80.87	9.271	
7,100.00	6,677.18	7,225.98	6,677.18	42.83	48.69	-0.36	1,512.58	1,884.74	749.69	668.66	81.02	9.253	
7,200.00	6,777.18	7,325.98	6,777.18	42.90	48.75	-0.36	1,512.58	1,884.74	749.69	668.51	81.18	9.235	
7,300.00	6,877.18	7,425.98	6,877.18	42.98	48.82	-0.36	1,512.58	1,884.74	749.69	668.35	81.34	9.217	
7,400.00	6,977.18	7,525.98	6,977.18	43.05	48.88	-0.36	1,512.58	1,884.74	749.69	668.18	81.50	9.198	
7,500.00	7,077.18	7,625.98	7,077.18	43.13	48.95	-0.36	1,512.58	1,884.74	749.69	668.02	81.67	9.180	
7,600.00	7,177.18	7,725.98	7,177.18	43.21	49.02	-0.36	1,512.58	1,884.74	749.69	667.85	81.83	9.161	
7,700.00	7,277.18	7,825.98	7,277.18	43.29	49.09	-0.36	1,512.58	1,884.74	749.69	667.68	82.00	9.142	
7,800.00	7,377.18	7,925.98	7,377.18	43.37	49.16	-0.36	1,512.58	1,884.74	749.69	667.51	82.17	9.123	
7,900.00	7,477.18	8,025.98	7,477.18	43.46	49.23	-0.36	1,512.58	1,884.74	749.69	667.34	82.34	9.104	
8,000.00	7,577.18	8,125.98	7,577.18	43.54	49.30	-0.36	1,512.58	1,884.74	749.69	667.17	82.52	9.085	
8,100.00	7,677.18	8,225.98	7,677.18	43.62	49.37	-0.36	1,512.58	1,884.74	749.69	666.99	82.70	9.066	
8,200.00	7,777.18	8,325.98	7,777.18	43.71	49.45	-0.36	1,512.58	1,884.74	749.69	666.81	82.87	9.046	
8,300.00	7,877.18	8,425.98	7,877.18	43.79	49.52	-0.36	1,512.58	1,884.74	749.69	666.63	83.06	9.026	
8,400.00	7,977.18	8,525.98	7,977.18	43.88	49.60	-0.36	1,512.58	1,884.74	749.69	666.45	83.24	9.006	
8,471.82	8,049.00	8,597.79	8,049.00	43.94	49.65	-0.36	1,512.58	1,884.74	749.69	666.31	83.37	8.992	



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-10E
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 28-10E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-4	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-10 Pad - Piceance Federal 28-08E - Slot A-4 - 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		
0.00	0.00	0.00	0.00	0.00	0.00	102.15	-2.03	9.44	9.66					
100.00	100.00	100.00	100.00	0.09	0.09	102.15	-2.03	9.44	9.66	9.48	0.18	55.078		
200.00	200.00	200.00	200.00	0.31	0.31	102.15	-2.03	9.44	9.66	9.03	0.62	15.454		
300.00	300.00	300.00	300.00	0.54	0.54	102.15	-2.03	9.44	9.66	8.58	1.07	8.988		
400.00	400.00	400.00	400.00	0.76	0.76	102.15	-2.03	9.44	9.66	8.13	1.52	6.336 CC, ES		
500.00	500.00	499.65	499.61	0.99	0.98	94.18	-0.82	11.24	11.27	9.30	1.97	5.724 SF		
600.00	600.00	598.92	598.67	1.21	1.21	80.46	2.79	16.59	16.88	14.46	2.42	6.970		
700.00	699.97	697.69	696.85	1.43	1.46	3.25	8.76	25.45	24.93	22.06	2.87	8.676		
800.00	799.75	796.08	794.11	1.65	1.74	-2.90	17.05	37.75	33.19	29.84	3.35	9.911		
900.00	899.14	894.08	890.26	1.89	2.09	-7.76	27.61	53.44	41.63	37.78	3.84	10.826		
1,000.00	997.97	991.69	985.14	2.17	2.50	-11.94	40.41	72.43	50.26	45.90	4.36	11.522		
1,100.00	1,096.04	1,088.91	1,078.59	2.51	2.97	-15.69	55.39	94.66	59.12	54.21	4.91	12.047		
1,200.00	1,193.17	1,185.74	1,170.44	2.91	3.53	-19.14	72.50	120.05	68.25	62.75	5.50	12.416		
1,300.00	1,289.17	1,282.18	1,260.55	3.38	4.16	-22.35	91.68	148.51	77.68	71.53	6.15	12.631		
1,400.00	1,383.85	1,378.22	1,348.79	3.94	4.87	-25.37	112.87	179.96	87.45	80.57	6.89	12.699		
1,500.00	1,477.05	1,474.24	1,435.34	4.60	5.65	-28.22	136.09	214.42	97.57	89.83	7.74	12.598		
1,600.00	1,568.57	1,573.71	1,524.27	5.34	6.51	-31.51	160.99	251.38	105.79	97.01	8.78	12.049		
1,700.00	1,659.04	1,673.27	1,613.27	6.15	7.39	-35.13	185.92	288.37	112.22	102.23	9.99	11.232		
1,800.00	1,749.50	1,772.82	1,702.27	6.98	8.27	-38.36	210.85	325.36	119.04	107.71	11.33	10.507		
1,900.00	1,839.95	1,872.37	1,791.27	7.83	9.16	-41.24	235.78	362.36	126.19	113.42	12.77	9.882		
2,000.00	1,930.41	1,971.93	1,880.27	8.68	10.06	-43.80	260.70	399.35	133.63	119.34	14.29	9.353		
2,100.00	2,020.87	2,071.48	1,969.28	9.54	10.95	-46.09	285.63	436.34	141.31	125.44	15.87	8.906		
2,200.00	2,111.33	2,171.04	2,058.28	10.41	11.85	-48.14	310.56	473.34	149.18	131.69	17.49	8.530		
2,300.00	2,201.79	2,270.59	2,147.28	11.28	12.76	-49.98	335.48	510.33	157.23	138.08	19.15	8.212		
2,400.00	2,292.25	2,370.14	2,236.28	12.15	13.66	-51.65	360.41	547.32	165.43	144.60	20.83	7.941		
2,500.00	2,382.71	2,469.70	2,325.28	13.03	14.57	-53.15	385.34	584.31	173.75	151.21	22.53	7.710		
2,600.00	2,473.17	2,569.25	2,414.28	13.91	15.48	-54.52	410.27	621.31	182.18	157.92	24.25	7.511		
2,700.00	2,563.62	2,668.81	2,503.28	14.79	16.39	-55.76	435.19	658.30	190.70	164.72	25.98	7.339		
2,800.00	2,654.08	2,768.36	2,592.28	15.67	17.29	-56.90	460.12	695.29	199.30	171.58	27.72	7.189		
2,900.00	2,744.54	2,867.92	2,681.28	16.55	18.20	-57.95	485.05	732.29	207.98	178.51	29.47	7.058		
3,000.00	2,835.00	2,967.47	2,770.29	17.44	19.12	-58.91	509.97	769.28	216.72	185.50	31.22	6.942		
3,100.00	2,925.46	3,067.02	2,859.29	18.32	20.03	-59.79	534.90	806.27	225.52	192.54	32.97	6.839		
3,200.00	3,015.92	3,166.58	2,948.29	19.20	20.94	-60.61	559.83	843.26	234.36	199.63	34.73	6.747		
3,300.00	3,106.38	3,266.13	3,037.29	20.09	21.85	-61.37	584.76	880.26	243.25	206.76	36.49	6.666		
3,400.00	3,196.84	3,365.69	3,126.29	20.98	22.76	-62.08	609.68	917.25	252.18	213.92	38.26	6.592		
3,500.00	3,287.29	3,465.24	3,215.29	21.86	23.67	-62.74	634.61	954.24	261.14	221.12	40.02	6.525		
3,600.00	3,377.75	3,564.79	3,304.29	22.75	24.59	-63.35	659.54	991.24	270.14	228.35	41.78	6.465		
3,700.00	3,468.21	3,664.35	3,393.29	23.64	25.50	-63.92	684.46	1,028.23	279.16	235.61	43.55	6.410		
3,800.00	3,558.67	3,763.90	3,482.29	24.53	26.41	-64.46	709.39	1,065.22	288.21	242.90	45.31	6.360		
3,900.00	3,649.13	3,863.46	3,571.30	25.42	27.33	-64.97	734.32	1,102.21	297.29	250.21	47.08	6.314		
4,000.00	3,739.59	3,963.01	3,660.30	26.30	28.24	-65.44	759.25	1,139.21	306.38	257.54	48.85	6.272		
4,100.00	3,830.05	4,062.57	3,749.30	27.19	29.15	-65.89	784.17	1,176.20	315.50	264.89	50.61	6.234		
4,200.00	3,920.51	4,162.12	3,838.30	28.08	30.07	-66.31	809.10	1,213.19	324.63	272.25	52.38	6.198		
4,300.00	4,010.97	4,261.67	3,927.30	28.97	30.98	-66.71	834.03	1,250.19	333.78	279.64	54.15	6.165		
4,400.00	4,101.42	4,361.23	4,016.30	29.86	31.90	-67.09	858.95	1,287.18	342.95	287.04	55.91	6.134		
4,500.00	4,191.88	4,460.78	4,105.30	30.75	32.81	-67.45	883.88	1,324.17	352.13	294.45	57.68	6.105		
4,600.00	4,282.34	4,560.34	4,194.30	31.64	33.72	-67.79	908.81	1,361.17	361.32	301.88	59.44	6.078		
4,700.00	4,372.80	4,659.89	4,283.30	32.53	34.64	-68.12	933.74	1,398.16	370.53	309.32	61.21	6.054		
4,800.00	4,463.26	4,759.44	4,372.31	33.42	35.55	-68.42	958.66	1,435.15	379.74	316.77	62.97	6.030		
4,900.00	4,553.72	4,859.00	4,461.31	34.31	36.47	-68.72	983.59	1,472.14	388.97	324.23	64.74	6.008		
5,000.00	4,644.18	4,958.55	4,550.31	35.20	37.38	-69.00	1,008.52	1,509.14	398.21	331.70	66.50	5.988		
5,100.00	4,734.64	5,058.11	4,639.31	36.09	38.30	-69.26	1,033.44	1,546.13	407.45	339.18	68.27	5.968		

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 28-10E
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 28-10E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-4	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	4,825.09	5,157.66	4,728.31	36.98	39.21	-69.52	1,058.37	1,583.12	416.70	346.67	70.03	5.950		
5,300.00	4,915.55	5,257.22	4,817.31	37.87	40.13	-69.76	1,083.30	1,620.12	425.97	354.17	71.79	5.933		
5,400.00	5,006.13	5,356.76	4,906.31	38.73	41.04	-70.04	1,108.22	1,657.11	435.33	361.81	73.53	5.921		
5,500.00	5,098.13	5,458.93	4,997.72	39.39	41.95	-70.06	1,133.72	1,694.95	445.81	370.89	74.92	5.950		
5,600.00	5,191.75	5,569.65	5,098.42	39.99	42.75	-69.91	1,159.43	1,733.09	456.01	379.94	76.07	5.995		
5,700.00	5,286.81	5,680.88	5,201.70	40.52	43.43	-69.75	1,182.48	1,767.31	465.21	388.16	77.05	6.038		
5,800.00	5,383.13	5,792.58	5,307.31	40.97	44.04	-69.59	1,202.79	1,797.45	473.38	395.50	77.88	6.078		
5,900.00	5,480.53	5,904.72	5,414.99	41.36	44.56	-69.42	1,220.26	1,823.37	480.50	401.93	78.57	6.116		
6,000.00	5,578.83	6,017.24	5,524.45	41.68	45.00	-69.23	1,234.81	1,844.97	486.56	407.45	79.11	6.150		
6,100.00	5,677.83	6,130.11	5,635.40	41.94	45.36	-69.04	1,246.38	1,862.13	491.53	412.01	79.51	6.182		
6,200.00	5,777.35	6,243.28	5,747.52	42.13	45.63	-68.83	1,254.89	1,874.77	495.40	415.62	79.78	6.210		
6,300.00	5,877.20	6,356.71	5,860.52	42.26	45.83	-68.61	1,260.31	1,882.81	498.15	418.24	79.91	6.234		
6,400.00	5,977.18	6,470.33	5,974.05	42.33	45.95	-0.38	1,262.61	1,886.21	499.72	419.79	79.93	6.252		
6,500.00	6,077.18	6,573.46	6,077.18	42.40	46.02	-0.36	1,262.69	1,886.34	499.79	419.72	80.07	6.242		
6,600.00	6,177.18	6,673.46	6,177.18	42.47	46.08	-0.36	1,262.69	1,886.34	499.79	419.57	80.21	6.231		
6,700.00	6,277.18	6,773.46	6,277.18	42.54	46.14	-0.36	1,262.69	1,886.34	499.79	419.43	80.36	6.219		
6,800.00	6,377.18	6,873.46	6,377.18	42.61	46.21	-0.36	1,262.69	1,886.34	499.79	419.28	80.51	6.208		
6,900.00	6,477.18	6,973.46	6,477.18	42.68	46.27	-0.36	1,262.69	1,886.34	499.79	419.12	80.66	6.196		
7,000.00	6,577.18	7,073.46	6,577.18	42.75	46.34	-0.36	1,262.69	1,886.34	499.79	418.97	80.82	6.184		
7,100.00	6,677.18	7,173.46	6,677.18	42.83	46.40	-0.36	1,262.69	1,886.34	499.79	418.81	80.97	6.172		
7,200.00	6,777.18	7,273.46	6,777.18	42.90	46.47	-0.36	1,262.69	1,886.34	499.79	418.65	81.13	6.160		
7,300.00	6,877.18	7,373.46	6,877.18	42.98	46.54	-0.36	1,262.69	1,886.34	499.79	418.49	81.29	6.148		
7,400.00	6,977.18	7,473.46	6,977.18	43.05	46.61	-0.36	1,262.69	1,886.34	499.79	418.33	81.46	6.136		
7,500.00	7,077.18	7,573.46	7,077.18	43.13	46.68	-0.36	1,262.69	1,886.34	499.79	418.17	81.62	6.123		
7,600.00	7,177.18	7,673.46	7,177.18	43.21	46.76	-0.36	1,262.69	1,886.34	499.79	418.00	81.79	6.111		
7,700.00	7,277.18	7,773.46	7,277.18	43.29	46.83	-0.36	1,262.69	1,886.34	499.79	417.83	81.96	6.098		
7,800.00	7,377.18	7,873.46	7,377.18	43.37	46.90	-0.36	1,262.69	1,886.34	499.79	417.66	82.13	6.085		
7,900.00	7,477.18	7,973.46	7,477.18	43.46	46.98	-0.36	1,262.69	1,886.34	499.79	417.48	82.30	6.073		
8,000.00	7,577.18	8,073.46	7,577.18	43.54	47.05	-0.36	1,262.69	1,886.34	499.79	417.31	82.48	6.060		
8,100.00	7,677.18	8,173.46	7,677.18	43.62	47.13	-0.36	1,262.69	1,886.34	499.79	417.13	82.66	6.047		
8,200.00	7,777.18	8,273.46	7,777.18	43.71	47.21	-0.36	1,262.69	1,886.34	499.79	416.95	82.84	6.033		
8,300.00	7,877.18	8,373.46	7,877.18	43.79	47.29	-0.36	1,262.69	1,886.34	499.79	416.77	83.02	6.020		
8,400.00	7,977.18	8,473.46	7,977.18	43.88	47.37	-0.36	1,262.69	1,886.34	499.79	416.59	83.20	6.007		
8,471.82	8,049.00	8,545.27	8,049.00	43.94	47.43	-0.36	1,262.69	1,886.34	499.79	416.45	83.34	5.997		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-10E
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 28-10E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-4	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	13.14	10.11	2.36	10.38					
100.00	100.00	100.00	100.00	0.09	0.09	13.14	10.11	2.36	10.38	10.21	0.18	59.232		
200.00	200.00	200.00	200.00	0.31	0.31	13.14	10.11	2.36	10.38	9.76	0.62	16.619		
300.00	300.00	300.00	300.00	0.54	0.54	13.14	10.11	2.36	10.38	9.31	1.07	9.665		
400.00	400.00	400.00	400.00	0.76	0.76	13.14	10.11	2.36	10.38	8.86	1.52	6.814		
500.00	500.00	500.00	500.00	0.99	0.99	13.14	10.11	2.36	10.38	8.41	1.97	5.262 CC, ES		
600.00	600.00	599.64	599.61	1.21	1.21	21.00	11.13	4.27	11.93	9.51	2.42	4.937		
700.00	699.97	699.06	698.81	1.43	1.43	-37.11	14.17	9.99	15.59	12.73	2.86	5.444		
800.00	799.75	798.29	797.45	1.65	1.67	-32.27	19.21	19.48	19.73	16.40	3.33	5.920		
900.00	899.14	897.33	895.35	1.89	1.96	-30.11	26.24	32.69	24.13	20.30	3.83	6.301		
1,000.00	997.97	996.19	992.32	2.17	2.29	-29.45	35.23	49.60	28.71	24.35	4.36	6.588		
1,100.00	1,096.04	1,094.85	1,088.19	2.51	2.69	-29.67	46.15	70.14	33.45	28.52	4.93	6.787		
1,200.00	1,193.17	1,193.32	1,182.79	2.91	3.17	-30.45	58.98	94.25	38.33	32.77	5.55	6.903		
1,300.00	1,289.17	1,291.61	1,275.96	3.38	3.73	-31.58	73.67	121.87	43.36	37.11	6.25	6.937		
1,400.00	1,383.85	1,389.71	1,367.53	3.94	4.37	-32.94	90.18	152.93	48.55	41.51	7.04	6.894		
1,500.00	1,477.05	1,487.62	1,457.34	4.60	5.09	-34.45	108.49	187.36	53.92	45.97	7.95	6.785		
1,600.00	1,568.57	1,586.73	1,546.84	5.34	5.90	-36.49	128.47	224.93	58.74	49.71	9.02	6.512		
1,700.00	1,659.04	1,686.62	1,636.94	6.15	6.73	-39.62	148.73	263.03	61.87	51.57	10.30	6.008		
1,800.00	1,749.50	1,786.52	1,727.03	6.98	7.59	-42.46	168.99	301.13	65.15	53.46	11.69	5.573		
1,900.00	1,839.95	1,886.42	1,817.13	7.83	8.45	-45.01	189.25	339.22	68.58	55.41	13.18	5.205		
2,000.00	1,930.41	1,986.31	1,907.23	8.68	9.31	-47.32	209.51	377.32	72.14	57.41	14.73	4.897		
2,100.00	2,020.87	2,086.21	1,997.32	9.54	10.18	-49.41	229.77	415.42	75.80	59.46	16.34	4.639		
2,200.00	2,111.33	2,186.11	2,087.42	10.41	11.06	-51.31	250.03	453.52	79.55	61.56	17.99	4.421		
2,300.00	2,201.79	2,286.00	2,177.52	11.28	11.94	-53.03	270.29	491.62	83.38	63.70	19.68	4.238		
2,400.00	2,292.25	2,385.90	2,267.61	12.15	12.82	-54.60	290.55	529.72	87.28	65.89	21.38	4.081		
2,500.00	2,382.71	2,485.80	2,357.71	13.03	13.70	-56.04	310.81	567.82	91.24	68.12	23.11	3.948		
2,600.00	2,473.17	2,585.69	2,447.80	13.91	14.58	-57.35	331.07	605.92	95.25	70.39	24.85	3.832		
2,700.00	2,563.62	2,685.59	2,537.90	14.79	15.47	-58.56	351.33	644.02	99.31	72.70	26.61	3.732		
2,800.00	2,654.08	2,785.49	2,628.00	15.67	16.35	-59.68	371.59	682.12	103.40	75.03	28.37	3.645		
2,900.00	2,744.54	2,885.38	2,718.09	16.55	17.24	-60.70	391.85	720.22	107.54	77.40	30.14	3.568		
3,000.00	2,835.00	2,985.28	2,808.19	17.44	18.13	-61.66	412.11	758.31	111.70	79.79	31.92	3.500		
3,100.00	2,925.46	3,085.18	2,898.29	18.32	19.02	-62.54	432.37	796.41	115.90	82.20	33.70	3.439		
3,200.00	3,015.92	3,185.07	2,988.38	19.20	19.91	-63.36	452.63	834.51	120.12	84.64	35.48	3.386		
3,300.00	3,106.38	3,284.97	3,078.48	20.09	20.80	-64.13	472.89	872.61	124.36	87.10	37.26	3.337		
3,400.00	3,196.84	3,384.87	3,168.57	20.98	21.69	-64.84	493.15	910.71	128.62	89.57	39.05	3.294		
3,500.00	3,287.29	3,484.76	3,258.67	21.86	22.58	-65.51	513.41	948.81	132.91	92.07	40.84	3.254		
3,600.00	3,377.75	3,584.66	3,348.77	22.75	23.47	-66.14	533.67	986.91	137.21	94.58	42.63	3.219		
3,700.00	3,468.21	3,684.56	3,438.86	23.64	24.36	-66.72	553.93	1,025.01	141.52	97.10	44.42	3.186		
3,800.00	3,558.67	3,784.45	3,528.96	24.53	25.25	-67.28	574.19	1,063.11	145.85	99.64	46.21	3.156		
3,900.00	3,649.13	3,884.35	3,619.06	25.42	26.14	-67.80	594.44	1,101.21	150.19	102.19	48.00	3.129		
4,000.00	3,739.59	3,984.25	3,709.15	26.30	27.03	-68.29	614.70	1,139.31	154.54	104.75	49.79	3.104		
4,100.00	3,830.05	4,084.14	3,799.25	27.19	27.92	-68.76	634.96	1,177.40	158.91	107.33	51.58	3.081		
4,200.00	3,920.51	4,184.04	3,889.34	28.08	28.81	-69.20	655.22	1,215.50	163.28	109.91	53.37	3.059		
4,300.00	4,010.97	4,283.94	3,979.44	28.97	29.71	-69.62	675.48	1,253.60	167.67	112.50	55.16	3.039		
4,400.00	4,101.42	4,383.83	4,069.54	29.86	30.60	-70.01	695.74	1,291.70	172.06	115.10	56.95	3.021		
4,500.00	4,191.88	4,483.73	4,159.63	30.75	31.49	-70.39	716.00	1,329.80	176.46	117.71	58.74	3.004		
4,600.00	4,282.34	4,583.63	4,249.73	31.64	32.38	-70.75	736.26	1,367.90	180.86	120.33	60.53	2.988		
4,700.00	4,372.80	4,683.52	4,339.82	32.53	33.28	-71.09	756.52	1,406.00	185.28	122.95	62.32	2.973		
4,800.00	4,463.26	4,783.42	4,429.92	33.42	34.17	-71.41	776.78	1,444.10	189.70	125.58	64.11	2.959		
4,900.00	4,553.72	4,883.32	4,520.02	34.31	35.06	-71.72	797.04	1,482.20	194.12	128.22	65.90	2.946		
5,000.00	4,644.18	4,983.21	4,610.11	35.20	35.95	-72.02	817.30	1,520.30	198.55	130.86	67.69	2.933		
5,100.00	4,734.64	5,083.11	4,700.21	36.09	36.85	-72.30	837.56	1,558.40	202.99	133.51	69.48	2.922		

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 28-10E
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 28-10E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-4	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	4,825.09	5,183.01	4,790.31	36.98	37.74	-72.58	857.82	1,596.49	207.43	136.16	71.27	2.911	
5,300.00	4,915.55	5,282.90	4,880.40	37.87	38.63	-72.84	878.08	1,634.59	211.88	138.82	73.05	2.900	
5,400.00	5,006.13	5,382.80	4,970.50	38.73	39.53	-73.05	898.34	1,672.69	216.41	141.62	74.79	2.894 SF	
5,500.00	5,098.13	5,484.80	5,062.80	39.39	40.37	-72.64	918.72	1,711.00	221.70	145.64	76.06	2.915	
5,600.00	5,191.75	5,588.65	5,158.51	39.99	41.06	-72.14	937.64	1,746.59	226.71	149.65	77.06	2.942	
5,700.00	5,286.81	5,692.72	5,256.14	40.52	41.67	-71.65	954.54	1,778.38	231.28	153.36	77.91	2.968	
5,800.00	5,383.13	5,797.00	5,355.51	40.97	42.20	-71.17	969.38	1,806.27	235.39	156.76	78.62	2.994	
5,900.00	5,480.53	5,901.47	5,456.39	41.36	42.66	-70.69	982.09	1,830.18	239.03	159.84	79.19	3.018	
6,000.00	5,578.83	6,006.12	5,558.59	41.68	43.04	-70.23	992.65	1,850.04	242.19	162.57	79.62	3.042	
6,100.00	5,677.83	6,110.93	5,661.87	41.94	43.35	-69.77	1,001.02	1,865.78	244.86	164.95	79.91	3.064	
6,200.00	5,777.35	6,215.91	5,766.01	42.13	43.59	-69.30	1,007.18	1,877.35	247.04	166.98	80.06	3.086	
6,300.00	5,877.20	6,321.02	5,870.79	42.26	43.77	-68.84	1,011.09	1,884.71	248.72	168.63	80.09	3.106	
6,400.00	5,977.18	6,426.27	5,975.97	42.33	43.87	-0.39	1,012.74	1,887.82	249.84	169.82	80.02	3.122	
6,500.00	6,077.18	6,527.48	6,077.18	42.40	43.94	-0.36	1,012.80	1,887.93	249.89	169.75	80.15	3.118	
6,600.00	6,177.18	6,627.48	6,177.18	42.47	44.01	-0.36	1,012.80	1,887.93	249.89	169.60	80.29	3.112	
6,700.00	6,277.18	6,727.48	6,277.18	42.54	44.07	-0.36	1,012.80	1,887.93	249.89	169.45	80.44	3.107	
6,800.00	6,377.18	6,827.48	6,377.18	42.61	44.14	-0.36	1,012.80	1,887.93	249.89	169.30	80.59	3.101	
6,900.00	6,477.18	6,927.48	6,477.18	42.68	44.21	-0.36	1,012.80	1,887.93	249.89	169.15	80.74	3.095	
7,000.00	6,577.18	7,027.48	6,577.18	42.75	44.28	-0.36	1,012.80	1,887.93	249.89	169.00	80.90	3.089	
7,100.00	6,677.18	7,127.48	6,677.18	42.83	44.35	-0.36	1,012.80	1,887.93	249.89	168.84	81.05	3.083	
7,200.00	6,777.18	7,227.48	6,777.18	42.90	44.42	-0.36	1,012.80	1,887.93	249.89	168.68	81.21	3.077	
7,300.00	6,877.18	7,327.48	6,877.18	42.98	44.50	-0.36	1,012.80	1,887.93	249.89	168.52	81.38	3.071	
7,400.00	6,977.18	7,427.48	6,977.18	43.05	44.57	-0.36	1,012.80	1,887.93	249.89	168.36	81.54	3.065	
7,500.00	7,077.18	7,527.48	7,077.18	43.13	44.64	-0.36	1,012.80	1,887.93	249.89	168.19	81.70	3.059	
7,600.00	7,177.18	7,627.48	7,177.18	43.21	44.72	-0.36	1,012.80	1,887.93	249.89	168.02	81.87	3.052	
7,700.00	7,277.18	7,727.48	7,277.18	43.29	44.80	-0.36	1,012.80	1,887.93	249.89	167.85	82.04	3.046	
7,800.00	7,377.18	7,827.48	7,377.18	43.37	44.88	-0.36	1,012.80	1,887.93	249.89	167.68	82.21	3.040	
7,900.00	7,477.18	7,927.48	7,477.18	43.46	44.95	-0.36	1,012.80	1,887.93	249.89	167.51	82.39	3.033	
8,000.00	7,577.18	8,027.48	7,577.18	43.54	45.03	-0.36	1,012.80	1,887.93	249.89	167.33	82.56	3.027	
8,100.00	7,677.18	8,127.48	7,677.18	43.62	45.12	-0.36	1,012.80	1,887.93	249.89	167.15	82.74	3.020	
8,200.00	7,777.18	8,227.48	7,777.18	43.71	45.20	-0.36	1,012.80	1,887.93	249.89	166.97	82.92	3.014	
8,300.00	7,877.18	8,327.48	7,877.18	43.79	45.28	-0.36	1,012.80	1,887.93	249.89	166.79	83.10	3.007	
8,400.00	7,977.18	8,427.48	7,977.18	43.88	45.37	-0.36	1,012.80	1,887.93	249.89	166.61	83.29	3.000	
8,471.82	8,049.00	8,499.30	8,049.00	43.94	45.43	-0.36	1,012.80	1,887.93	249.89	166.47	83.42	2.996	



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-10E
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 28-10E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-4	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	-166.20	-19.22	-4.72	19.79					
100.00	100.00	100.00	100.00	0.09	0.09	-166.20	-19.22	-4.72	19.79	19.62	0.18	112.900		
200.00	200.00	200.00	200.00	0.31	0.31	-166.20	-19.22	-4.72	19.79	19.17	0.62	31.677		
300.00	300.00	300.00	300.00	0.54	0.54	-166.20	-19.22	-4.72	19.79	18.72	1.07	18.423		
400.00	400.00	400.00	400.00	0.76	0.76	-166.20	-19.22	-4.72	19.79	18.27	1.52	12.988		
500.00	500.00	500.00	500.00	0.99	0.99	-166.20	-19.22	-4.72	19.79	17.82	1.97	10.030		
600.00	600.00	600.00	600.00	1.21	1.21	-166.20	-19.22	-4.72	19.79	17.37	2.42	8.169 CC, ES		
700.00	699.97	699.97	699.97	1.43	1.44	130.56	-19.22	-4.72	21.14	18.27	2.87	7.360		
800.00	799.75	800.49	800.46	1.65	1.65	137.99	-18.63	-2.60	24.37	21.04	3.33	7.321		
900.00	899.14	901.20	900.94	1.89	1.87	142.83	-16.84	3.78	28.20	24.40	3.80	7.415		
1,000.00	997.97	1,002.09	1,001.22	2.17	2.11	145.75	-13.85	14.42	32.44	28.13	4.31	7.530		
1,100.00	1,096.04	1,103.16	1,101.09	2.51	2.39	147.34	-9.66	29.33	36.99	32.14	4.85	7.627		
1,200.00	1,193.17	1,204.41	1,200.35	2.91	2.72	147.99	-4.27	48.50	41.79	36.35	5.44	7.683		
1,300.00	1,289.17	1,305.83	1,298.79	3.38	3.12	147.97	2.30	71.92	46.81	40.72	6.09	7.683		
1,400.00	1,383.85	1,407.41	1,396.23	3.94	3.61	147.48	10.06	99.56	52.05	45.21	6.83	7.619		
1,500.00	1,477.05	1,509.15	1,492.44	4.60	4.18	146.64	19.00	131.37	57.50	49.82	7.67	7.491		
1,600.00	1,568.57	1,611.04	1,587.24	5.34	4.84	145.56	29.10	167.33	63.16	54.51	8.65	7.304		
1,700.00	1,659.04	1,712.76	1,680.14	6.15	5.60	143.51	40.29	207.18	67.65	57.84	9.81	6.899		
1,800.00	1,749.50	1,812.65	1,770.73	6.98	6.40	140.89	51.67	247.69	71.10	59.97	11.13	6.386		
1,900.00	1,839.95	1,912.54	1,861.32	7.83	7.23	138.52	63.05	288.21	74.69	62.13	12.56	5.947		
2,000.00	1,930.41	2,012.43	1,951.92	8.68	8.06	136.36	74.43	328.73	78.39	64.33	14.06	5.575		
2,100.00	2,020.87	2,112.32	2,042.51	9.54	8.91	134.41	85.81	369.24	82.20	66.57	15.62	5.261		
2,200.00	2,111.33	2,212.21	2,133.10	10.41	9.76	132.63	97.19	409.76	86.09	68.86	17.23	4.996		
2,300.00	2,201.79	2,312.10	2,223.70	11.28	10.62	131.00	108.57	450.27	90.06	71.18	18.88	4.771		
2,400.00	2,292.25	2,411.99	2,314.29	12.15	11.49	129.52	119.95	490.79	94.09	73.54	20.55	4.579		
2,500.00	2,382.71	2,511.88	2,404.88	13.03	12.35	128.15	131.32	531.30	98.18	75.94	22.25	4.414		
2,600.00	2,473.17	2,611.77	2,495.47	13.91	13.22	126.90	142.70	571.82	102.32	78.37	23.96	4.271		
2,700.00	2,563.62	2,711.66	2,586.07	14.79	14.10	125.74	154.08	612.33	106.51	80.83	25.69	4.146		
2,800.00	2,654.08	2,811.55	2,676.66	15.67	14.97	124.67	165.46	652.85	110.74	83.31	27.43	4.038		
2,900.00	2,744.54	2,911.44	2,767.25	16.55	15.85	123.68	176.84	693.36	115.01	85.83	29.18	3.942		
3,000.00	2,835.00	3,011.33	2,857.85	17.44	16.73	122.76	188.22	733.88	119.30	88.37	30.93	3.857		
3,100.00	2,925.46	3,111.22	2,948.44	18.32	17.60	121.91	199.60	774.39	123.63	90.93	32.69	3.781		
3,200.00	3,015.92	3,211.11	3,039.03	19.20	18.48	121.11	210.98	814.91	127.98	93.52	34.46	3.714		
3,300.00	3,106.38	3,311.00	3,129.62	20.09	19.36	120.37	222.36	855.42	132.35	96.12	36.23	3.653		
3,400.00	3,196.84	3,410.89	3,220.22	20.98	20.24	119.67	233.74	895.94	136.74	98.74	38.00	3.598		
3,500.00	3,287.29	3,510.78	3,310.81	21.86	21.13	119.02	245.11	936.46	141.16	101.38	39.78	3.548		
3,600.00	3,377.75	3,610.67	3,401.40	22.75	22.01	118.40	256.49	976.97	145.59	104.03	41.56	3.503		
3,700.00	3,468.21	3,710.56	3,491.99	23.64	22.89	117.83	267.87	1,017.49	150.03	106.69	43.34	3.462		
3,800.00	3,558.67	3,810.45	3,582.59	24.53	23.78	117.28	279.25	1,058.00	154.49	109.37	45.12	3.424		
3,900.00	3,649.13	3,910.34	3,673.18	25.42	24.66	116.77	290.63	1,098.52	158.96	112.07	46.90	3.390		
4,000.00	3,739.59	4,010.23	3,763.77	26.30	25.54	116.28	302.01	1,139.03	163.45	114.77	48.68	3.358		
4,100.00	3,830.05	4,110.12	3,854.37	27.19	26.43	115.83	313.39	1,179.55	167.95	117.48	50.46	3.328		
4,200.00	3,920.51	4,210.01	3,944.96	28.08	27.31	115.39	324.77	1,220.06	172.45	120.21	52.25	3.301		
4,300.00	4,010.97	4,309.90	4,035.55	28.97	28.20	114.98	336.15	1,260.58	176.97	122.94	54.03	3.275		
4,400.00	4,101.42	4,409.79	4,126.14	29.86	29.08	114.58	347.53	1,301.09	181.49	125.68	55.81	3.252		
4,500.00	4,191.88	4,509.68	4,216.74	30.75	29.97	114.21	358.91	1,341.61	186.02	128.43	57.60	3.230		
4,600.00	4,282.34	4,609.57	4,307.33	31.64	30.85	113.86	370.28	1,382.12	190.56	131.19	59.38	3.209		
4,700.00	4,372.80	4,709.46	4,397.92	32.53	31.74	113.52	381.66	1,422.64	195.11	133.95	61.16	3.190		
4,800.00	4,463.26	4,809.35	4,488.52	33.42	32.62	113.19	393.04	1,463.15	199.67	136.72	62.95	3.172		
4,900.00	4,553.72	4,909.24	4,579.11	34.31	33.51	112.88	404.42	1,503.67	204.23	139.50	64.73	3.155		
5,000.00	4,644.18	5,009.13	4,669.70	35.20	34.40	112.59	415.80	1,544.19	208.79	142.28	66.51	3.139		
5,100.00	4,734.64	5,109.02	4,760.29	36.09	35.28	112.31	427.18	1,584.70	213.36	145.07	68.30	3.124		

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 28-10E
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 28-10E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-4	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	4,825.09	5,208.91	4,850.89	36.98	36.17	112.03	438.56	1,625.22	217.94	147.86	70.08	3.110	
5,300.00	4,915.55	5,308.80	4,941.48	37.87	37.06	111.77	449.94	1,665.73	222.52	150.66	71.86	3.096	
5,400.00	5,006.13	5,407.31	5,031.06	38.73	37.87	111.64	461.02	1,705.19	227.16	153.64	73.52	3.090	
5,500.00	5,098.13	5,504.55	5,120.94	39.39	38.51	111.67	471.05	1,740.90	231.54	156.76	74.78	3.096	
5,600.00	5,191.75	5,601.78	5,212.31	39.99	39.08	111.70	480.04	1,772.90	235.47	159.57	75.90	3.102	
5,700.00	5,286.81	5,700.00	5,305.95	40.52	39.59	111.72	488.04	1,801.41	238.94	162.05	76.89	3.108	
5,800.00	5,383.13	5,796.20	5,398.81	40.97	40.01	111.74	494.83	1,825.56	241.94	164.20	77.73	3.112	
5,900.00	5,480.53	5,893.39	5,493.61	41.36	40.38	111.76	500.61	1,846.13	244.47	166.01	78.45	3.116	
6,000.00	5,578.83	5,990.57	5,589.23	41.68	40.68	111.78	505.29	1,862.82	246.51	167.48	79.04	3.119	
6,100.00	5,677.83	6,087.75	5,685.49	41.94	40.92	111.79	508.88	1,875.58	248.08	168.59	79.49	3.121	
6,200.00	5,777.35	6,184.92	5,782.23	42.13	41.11	111.80	511.35	1,884.40	249.17	169.34	79.83	3.121	
6,300.00	5,877.20	6,282.09	5,879.26	42.26	41.23	111.80	512.72	1,889.27	249.77	169.72	80.05	3.120	
6,400.00	5,977.18	6,380.03	5,977.18	42.33	41.31	179.82	513.02	1,890.32	249.89	169.72	80.17	3.117	
6,500.00	6,077.18	6,480.03	6,077.18	42.40	41.37	179.82	513.02	1,890.32	249.89	169.58	80.31	3.111	
6,600.00	6,177.18	6,580.03	6,177.18	42.47	41.45	179.82	513.02	1,890.32	249.89	169.43	80.46	3.106	
6,700.00	6,277.18	6,680.03	6,277.18	42.54	41.52	179.82	513.02	1,890.32	249.89	169.29	80.61	3.100	
6,800.00	6,377.18	6,780.03	6,377.18	42.61	41.59	179.82	513.02	1,890.32	249.89	169.14	80.76	3.094	
6,900.00	6,477.18	6,880.03	6,477.18	42.68	41.66	179.82	513.02	1,890.32	249.89	168.98	80.91	3.089	
7,000.00	6,577.18	6,980.03	6,577.18	42.75	41.74	179.82	513.02	1,890.32	249.89	168.83	81.07	3.083	
7,100.00	6,677.18	7,080.03	6,677.18	42.83	41.81	179.82	513.02	1,890.32	249.89	168.67	81.22	3.077	
7,200.00	6,777.18	7,180.03	6,777.18	42.90	41.89	179.82	513.02	1,890.32	249.89	168.51	81.38	3.071	
7,300.00	6,877.18	7,280.03	6,877.18	42.98	41.97	179.82	513.02	1,890.32	249.89	168.35	81.54	3.065	
7,400.00	6,977.18	7,380.03	6,977.18	43.05	42.05	179.82	513.02	1,890.32	249.89	168.19	81.71	3.058	
7,500.00	7,077.18	7,480.03	7,077.18	43.13	42.13	179.82	513.02	1,890.32	249.89	168.02	81.87	3.052	
7,600.00	7,177.18	7,580.03	7,177.18	43.21	42.21	179.82	513.02	1,890.32	249.89	167.85	82.04	3.046	
7,700.00	7,277.18	7,680.03	7,277.18	43.29	42.29	179.82	513.02	1,890.32	249.89	167.68	82.21	3.040	
7,800.00	7,377.18	7,780.03	7,377.18	43.37	42.38	179.82	513.02	1,890.32	249.89	167.51	82.38	3.033	
7,900.00	7,477.18	7,880.03	7,477.18	43.46	42.46	179.82	513.02	1,890.32	249.89	167.34	82.56	3.027	
8,000.00	7,577.18	7,980.03	7,577.18	43.54	42.55	179.82	513.02	1,890.32	249.89	167.16	82.73	3.021	
8,100.00	7,677.18	8,080.03	7,677.18	43.62	42.63	179.82	513.02	1,890.32	249.89	166.98	82.91	3.014	
8,200.00	7,777.18	8,180.03	7,777.18	43.71	42.72	179.82	513.02	1,890.32	249.89	166.80	83.09	3.007	
8,300.00	7,877.18	8,280.03	7,877.18	43.79	42.81	179.82	513.02	1,890.32	249.89	166.62	83.27	3.001	
8,400.00	7,977.18	8,380.03	7,977.18	43.88	42.90	179.82	513.02	1,890.32	249.89	166.44	83.46	2.994	
8,444.88	8,022.06	8,424.91	8,022.06	43.92	42.94	179.82	513.02	1,890.32	249.89	166.35	83.54	2.991 SF	
8,471.82	8,049.00	8,443.85	8,041.00	43.94	42.96	179.82	513.02	1,890.32	250.02	166.44	83.58	2.991	



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-10E
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 28-10E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-4	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	167.47	-21.25	4.72	21.76					
100.00	100.00	100.00	100.00	0.09	0.09	167.47	-21.25	4.72	21.76	21.59	0.18	124.139		
200.00	200.00	200.00	200.00	0.31	0.31	167.47	-21.25	4.72	21.76	21.14	0.62	34.830	CC, ES	
300.00	300.00	299.52	299.49	0.54	0.53	162.61	-21.76	6.82	22.81	21.75	1.06	21.450		
400.00	400.00	398.66	398.41	0.76	0.75	150.70	-23.30	13.08	26.77	25.25	1.51	17.670		
500.00	500.00	497.07	496.24	0.99	1.01	137.85	-25.84	23.39	35.05	33.07	1.99	17.649		
600.00	600.00	594.38	592.44	1.21	1.32	127.96	-29.33	37.59	48.27	45.78	2.50	19.344		
700.00	699.97	690.62	686.88	1.43	1.70	54.45	-33.74	55.52	65.02	62.09	2.92	22.234		
800.00	799.75	785.96	779.60	1.65	2.13	52.62	-39.04	77.06	83.39	79.98	3.41	24.443		
900.00	899.14	880.34	870.39	1.89	2.64	52.55	-45.19	102.06	103.06	99.12	3.94	26.170		
1,000.00	997.97	973.70	959.09	2.17	3.21	53.36	-52.14	130.34	123.99	119.47	4.52	27.440		
1,100.00	1,096.04	1,065.99	1,045.53	2.51	3.85	54.62	-59.86	161.71	146.22	141.05	5.17	28.267		
1,200.00	1,193.17	1,161.55	1,133.99	2.91	4.58	56.33	-68.49	196.82	168.91	162.97	5.94	28.437		
1,300.00	1,289.17	1,258.98	1,224.11	3.38	5.34	58.69	-77.33	232.75	189.71	182.89	6.82	27.799		
1,400.00	1,383.85	1,356.47	1,314.30	3.94	6.11	61.57	-86.17	268.70	208.83	200.95	7.88	26.509		
1,500.00	1,477.05	1,453.84	1,404.38	4.60	6.88	64.89	-95.00	304.61	226.69	217.57	9.12	24.865		
1,600.00	1,568.57	1,550.91	1,494.18	5.34	7.65	68.60	-103.81	340.41	243.78	233.22	10.56	23.087		
1,700.00	1,659.04	1,647.73	1,583.74	6.15	8.43	72.64	-112.59	376.12	261.20	249.05	12.15	21.491		
1,800.00	1,749.50	1,744.54	1,673.29	6.98	9.21	76.21	-121.37	411.82	279.78	265.97	13.81	20.262		
1,900.00	1,839.95	1,841.35	1,762.85	7.83	9.99	79.34	-130.15	447.52	299.30	283.81	15.49	19.321		
2,000.00	1,930.41	1,938.16	1,852.41	8.68	10.76	82.09	-138.93	483.23	319.60	302.41	17.19	18.596		
2,100.00	2,020.87	2,034.97	1,941.97	9.54	11.55	84.51	-147.71	518.93	340.53	321.64	18.89	18.030		
2,200.00	2,111.33	2,131.78	2,031.52	10.41	12.33	86.65	-156.49	554.64	361.98	341.39	20.58	17.585		
2,300.00	2,201.79	2,228.59	2,121.08	11.28	13.11	88.55	-165.27	590.34	383.87	361.59	22.28	17.231		
2,400.00	2,292.25	2,325.41	2,210.64	12.15	13.89	90.25	-174.05	626.04	406.12	382.16	23.96	16.947		
2,500.00	2,382.71	2,422.22	2,300.20	13.03	14.67	91.78	-182.83	661.75	428.68	403.04	25.64	16.716		
2,600.00	2,473.17	2,519.03	2,389.75	13.91	15.46	93.15	-191.62	697.45	451.51	424.19	27.32	16.528		
2,700.00	2,563.62	2,615.84	2,479.31	14.79	16.24	94.39	-200.40	733.16	474.56	445.58	28.98	16.374		
2,800.00	2,654.08	2,712.65	2,568.87	15.67	17.03	95.52	-209.18	768.86	497.80	467.16	30.64	16.246		
2,900.00	2,744.54	2,809.46	2,658.43	16.55	17.81	96.55	-217.96	804.56	521.21	488.92	32.29	16.139		
3,000.00	2,835.00	2,906.27	2,747.99	17.44	18.59	97.49	-226.74	840.27	544.77	510.83	33.94	16.050		
3,100.00	2,925.46	3,003.08	2,837.54	18.32	19.38	98.35	-235.52	875.97	568.46	532.87	35.58	15.975		
3,200.00	3,015.92	3,099.90	2,927.10	19.20	20.16	99.14	-244.30	911.68	592.25	555.03	37.22	15.912		
3,300.00	3,106.38	3,196.71	3,016.66	20.09	20.95	99.87	-253.08	947.38	616.15	577.30	38.85	15.858		
3,400.00	3,196.84	3,293.52	3,106.22	20.98	21.73	100.55	-261.86	983.08	640.13	599.65	40.48	15.813		
3,500.00	3,287.29	3,390.33	3,195.77	21.86	22.52	101.18	-270.64	1,018.79	664.20	622.09	42.11	15.774		
3,600.00	3,377.75	3,487.14	3,285.33	22.75	23.30	101.76	-279.43	1,054.49	688.33	644.60	43.73	15.741		
3,700.00	3,468.21	3,583.95	3,374.89	23.64	24.09	102.31	-288.21	1,090.20	712.53	667.18	45.35	15.713		
3,800.00	3,558.67	3,680.76	3,464.45	24.53	24.87	102.82	-296.99	1,125.90	736.78	689.82	46.96	15.689		
3,900.00	3,649.13	3,777.58	3,554.00	25.42	25.66	103.30	-305.77	1,161.60	761.09	712.51	48.57	15.669		
4,000.00	3,739.59	3,874.39	3,643.56	26.30	26.45	103.75	-314.55	1,197.31	785.44	735.26	50.18	15.651		
4,100.00	3,830.05	3,971.20	3,733.12	27.19	27.23	104.17	-323.33	1,233.01	809.84	758.04	51.79	15.636		
4,200.00	3,920.51	4,068.01	3,822.68	28.08	28.02	104.56	-332.11	1,268.72	834.27	780.87	53.40	15.623		
4,300.00	4,010.97	4,164.82	3,912.24	28.97	28.80	104.94	-340.89	1,304.42	858.74	803.74	55.00	15.613		
4,400.00	4,101.42	4,261.63	4,001.79	29.86	29.59	105.29	-349.67	1,340.12	883.24	826.64	56.61	15.603		
4,500.00	4,191.88	4,358.44	4,091.35	30.75	30.37	105.62	-358.45	1,375.83	907.77	849.57	58.21	15.596		
4,600.00	4,282.34	4,455.26	4,180.91	31.64	31.16	105.94	-367.24	1,411.53	932.33	872.53	59.81	15.589		
4,700.00	4,372.80	4,552.07	4,270.47	32.53	31.95	106.24	-376.02	1,447.23	956.92	895.52	61.40	15.584		
4,800.00	4,463.26	4,648.88	4,360.02	33.42	32.73	106.53	-384.80	1,482.94	981.53	918.53	63.00	15.580	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 28-10E
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 28-10E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-4	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Reference Depths are relative to Well @ 7701.00usft

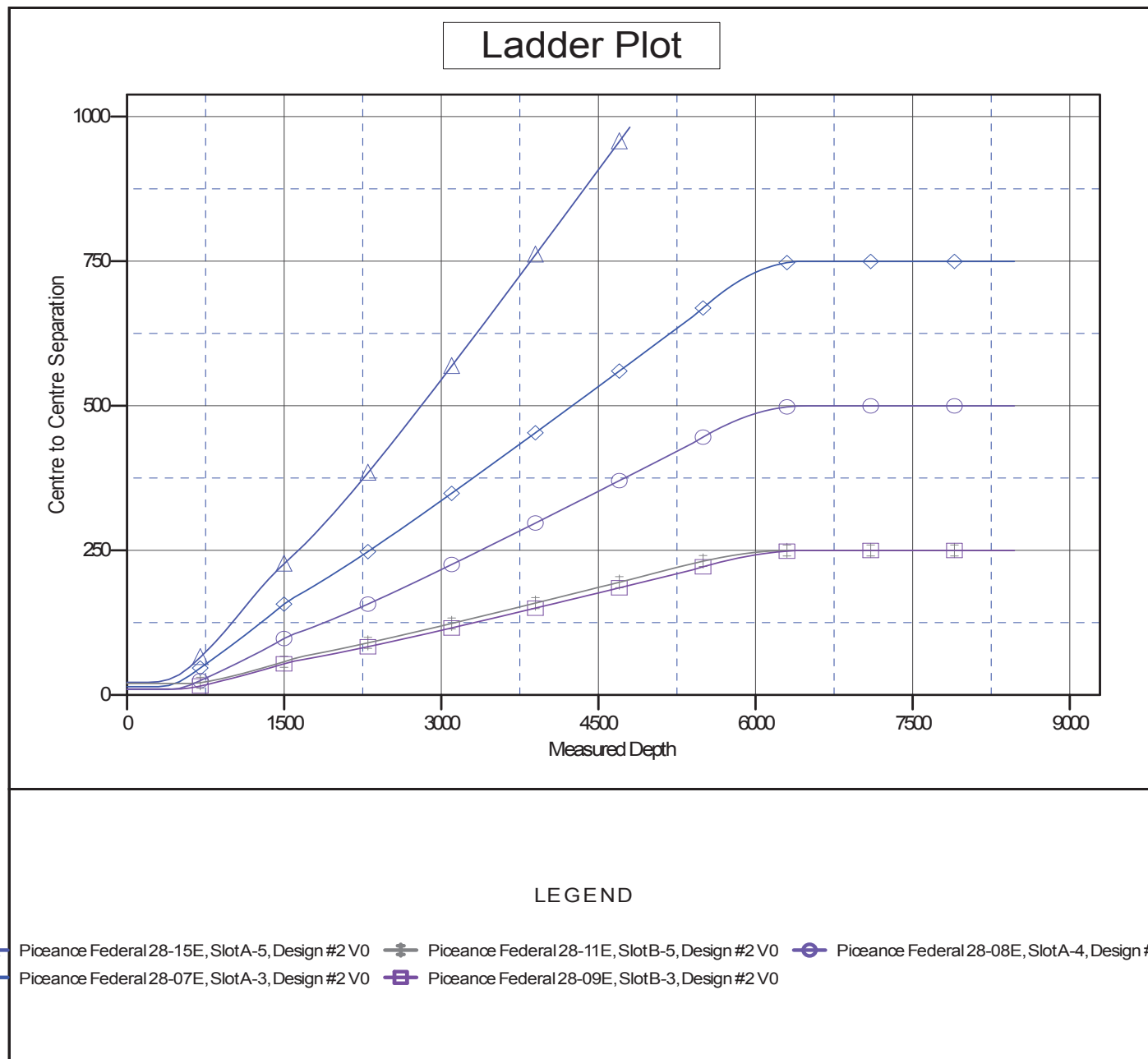
Offset Depths are relative to Offset Datum

Central Meridian is 105° 30' 0.000 W

Coordinates are relative to: Piceance Federal 28-10E

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 28-10E
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 28-10E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-4	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 28-10E

Coordinate System is US State Plane 1983, Colorado Central Zone

Grid Convergence at Surface is: -1.43°

