



Piceance Energy, LLC

Mesa County, CO

Piceance 28-10 Pad

Piceance Federal 28-07E

Slot A-3

Plan: Design #2

Standard Planning Report

15 April, 2015

Archer



Project: Mesa County, CO
Site: Piceance 28-10 Pad
Well: Piceance Federal 28-07E
Wellbore: Slot A-3
Design: Design #2
Latitude: 39° 14' 47.960 N
Longitude: 107° 46' 29.610 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 28-07E, 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 28-07E

+N/-S	+E/-W	Northing	Ground Level: Easting	Latitude	Longitude	Slot
0.00	0.00	1522794.624	2355817.640	39° 14' 47.960 N	107° 46' 29.610 W	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance 28-07E tgt	8073.00	1504.53	1872.94	1524251.782	2357727.669	39° 15' 2.830 N	107° 46' 5.800 W	Circle (Radius: 50.00)

SECTION DETAILS

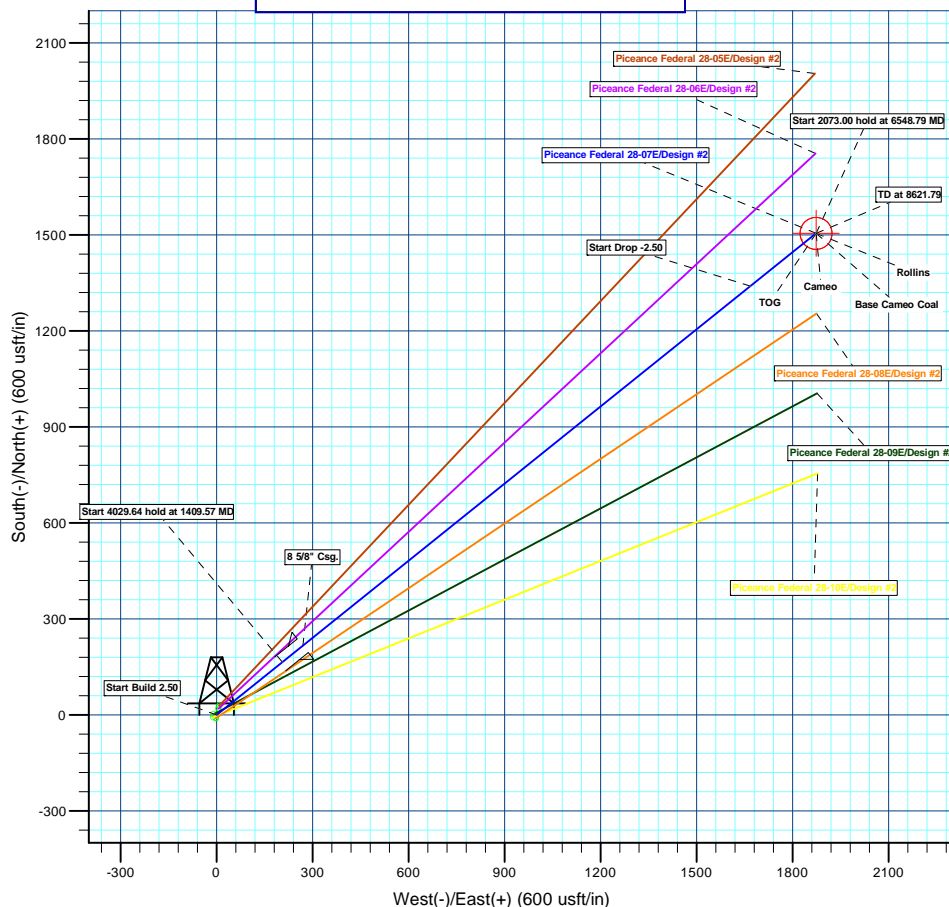
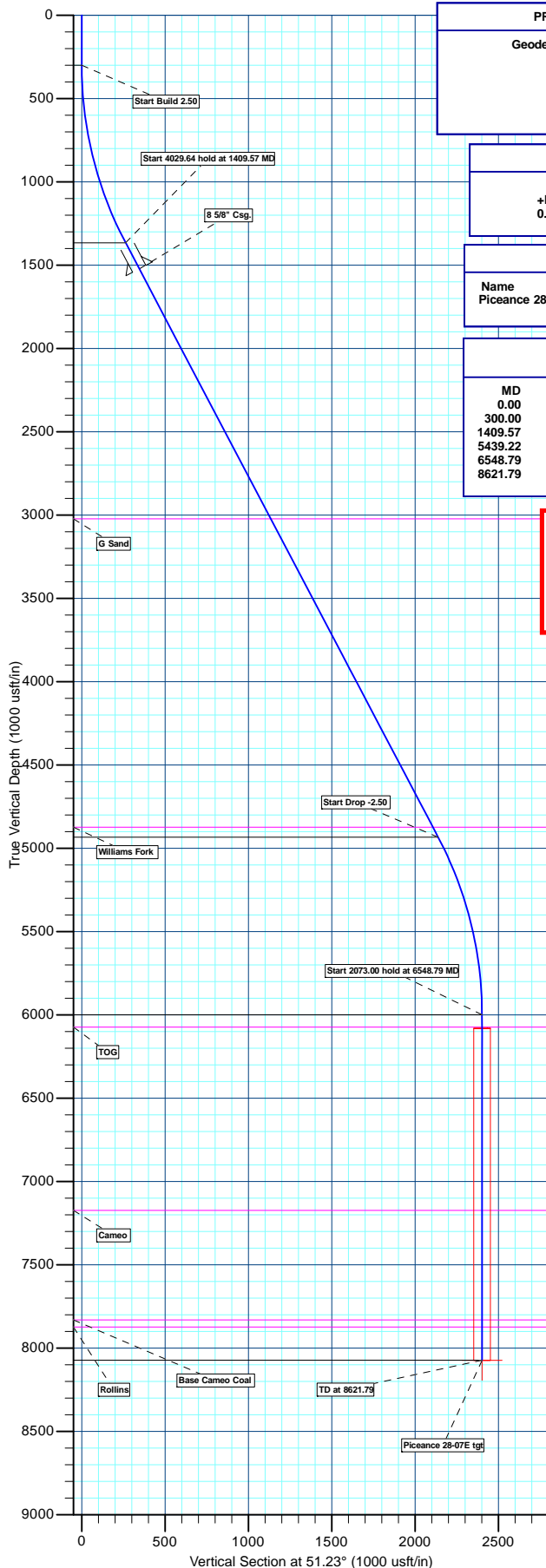
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.50
1409.57	27.74	51.23	1366.73	164.95	205.34	2.50	51.23	263.39	Start 4029.64 hold at 1409.57 MD
5439.22	27.74	51.23	4933.27	1339.55	1667.60	0.00	0.00	2138.99	Start Drop -2.50
6548.79	0.00	0.00	6000.00	1504.49	1872.94	2.50	180.00	2402.38	Start 2073.00 hold at 6548.79 MD
8621.79	0.00	0.00	8073.00	1504.49	1872.94	0.00	0.00	2402.38	TD at 8621.79



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
3023.00	3280.91	G Sand
4873.00	5371.13	Williams Fork
6073.00	6621.79	TOG
7173.00	7721.79	Cameo
7831.00	8379.79	Base Cameo Coal
7873.00	8421.79	Rollins



Plan: Design #2 (Piceance Federal 28-07E/Slot A-3)

Created By: Ricky Osburn Date: 8:39, April 15 2015



Archer
Planning Report

Archer

Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-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 28-07E					
Well Position	+N/-S	-28.37 usft	Northing:	1,522,794.624 usft	Latitude:	39° 14' 47.960 N
	+E/-W	-7.87 usft	Easting:	2,355,817.640 usft	Longitude:	107° 46' 29.610 W
Position Uncertainty	0.00 usft		Wellhead Elevation:	0.00 usft	Ground Level:	7,679.00 usft

Wellbore	Slot A-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	51.23

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	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,409.57	27.74	51.23	1,366.73	164.95	205.34	2.50	2.50	0.00	51.23	
5,439.22	27.74	51.23	4,933.27	1,339.55	1,667.60	0.00	0.00	0.00	0.00	
6,548.79	0.00	0.00	6,000.00	1,504.49	1,872.94	2.50	-2.50	0.00	180.00	
8,621.79	0.00	0.00	8,073.00	1,504.49	1,872.94	0.00	0.00	0.00	0.00	Piceance 28-07E tgt



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-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
Start Build 2.50									
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	2.50	51.23	399.97	1.37	1.70	2.18	2.50	2.50	0.00
500.00	5.00	51.23	499.75	5.46	6.80	8.72	2.50	2.50	0.00
600.00	7.50	51.23	599.14	12.28	15.29	19.61	2.50	2.50	0.00
700.00	10.00	51.23	697.97	21.80	27.14	34.82	2.50	2.50	0.00
800.00	12.50	51.23	796.04	34.02	42.35	54.33	2.50	2.50	0.00
900.00	15.00	51.23	893.17	48.91	60.88	78.09	2.50	2.50	0.00
1,000.00	17.50	51.23	989.17	66.43	82.70	106.07	2.50	2.50	0.00
1,100.00	20.00	51.23	1,083.85	86.56	107.75	138.21	2.50	2.50	0.00
1,200.00	22.50	51.23	1,177.05	109.25	136.01	174.46	2.50	2.50	0.00
1,300.00	25.00	51.23	1,268.57	134.47	167.41	214.73	2.50	2.50	0.00
Start 4029.64 hold at 1409.57 MD									
1,409.57	27.74	51.23	1,366.73	164.95	205.34	263.39	2.50	2.50	0.00
1,500.00	27.74	51.23	1,446.77	191.31	238.16	305.48	0.00	0.00	0.00
8 5/8" Csg.									
1,585.00	27.74	51.23	1,522.00	216.08	269.00	345.04	0.00	0.00	0.00
1,600.00	27.74	51.23	1,535.27	220.46	274.45	352.02	0.00	0.00	0.00
1,700.00	27.74	51.23	1,623.78	249.60	310.73	398.57	0.00	0.00	0.00
1,800.00	27.74	51.23	1,712.29	278.75	347.02	445.11	0.00	0.00	0.00
1,900.00	27.74	51.23	1,800.80	307.90	383.31	491.66	0.00	0.00	0.00
2,000.00	27.74	51.23	1,889.30	337.05	419.60	538.20	0.00	0.00	0.00
2,100.00	27.74	51.23	1,977.81	366.20	455.88	584.75	0.00	0.00	0.00
2,200.00	27.74	51.23	2,066.32	395.35	492.17	631.29	0.00	0.00	0.00
2,300.00	27.74	51.23	2,154.83	424.50	528.46	677.84	0.00	0.00	0.00
2,400.00	27.74	51.23	2,243.33	453.65	564.75	724.38	0.00	0.00	0.00
2,500.00	27.74	51.23	2,331.84	482.80	601.03	770.93	0.00	0.00	0.00
2,600.00	27.74	51.23	2,420.35	511.94	637.32	817.47	0.00	0.00	0.00
2,700.00	27.74	51.23	2,508.86	541.09	673.61	864.02	0.00	0.00	0.00
2,800.00	27.74	51.23	2,597.36	570.24	709.89	910.56	0.00	0.00	0.00
2,900.00	27.74	51.23	2,685.87	599.39	746.18	957.11	0.00	0.00	0.00
3,000.00	27.74	51.23	2,774.38	628.54	782.47	1,003.65	0.00	0.00	0.00
3,100.00	27.74	51.23	2,862.89	657.69	818.76	1,050.20	0.00	0.00	0.00
3,200.00	27.74	51.23	2,951.39	686.84	855.04	1,096.74	0.00	0.00	0.00
G Sand									
3,280.91	27.74	51.23	3,023.00	710.42	884.40	1,134.40	0.00	0.00	0.00
3,300.00	27.74	51.23	3,039.90	715.99	891.33	1,143.29	0.00	0.00	0.00
3,400.00	27.74	51.23	3,128.41	745.14	927.62	1,189.83	0.00	0.00	0.00
3,500.00	27.74	51.23	3,216.91	774.28	963.91	1,236.38	0.00	0.00	0.00
3,600.00	27.74	51.23	3,305.42	803.43	1,000.19	1,282.92	0.00	0.00	0.00
3,700.00	27.74	51.23	3,393.93	832.58	1,036.48	1,329.47	0.00	0.00	0.00
3,800.00	27.74	51.23	3,482.44	861.73	1,072.77	1,376.01	0.00	0.00	0.00
3,900.00	27.74	51.23	3,570.94	890.88	1,109.06	1,422.56	0.00	0.00	0.00
4,000.00	27.74	51.23	3,659.45	920.03	1,145.34	1,469.10	0.00	0.00	0.00
4,100.00	27.74	51.23	3,747.96	949.18	1,181.63	1,515.65	0.00	0.00	0.00
4,200.00	27.74	51.23	3,836.47	978.33	1,217.92	1,562.19	0.00	0.00	0.00
4,300.00	27.74	51.23	3,924.97	1,007.48	1,254.21	1,608.74	0.00	0.00	0.00
4,400.00	27.74	51.23	4,013.48	1,036.62	1,290.49	1,655.28	0.00	0.00	0.00
4,500.00	27.74	51.23	4,101.99	1,065.77	1,326.78	1,701.83	0.00	0.00	0.00
4,600.00	27.74	51.23	4,190.50	1,094.92	1,363.07	1,748.37	0.00	0.00	0.00
4,700.00	27.74	51.23	4,279.00	1,124.07	1,399.36	1,794.92	0.00	0.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-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)
4,800.00	27.74	51.23	4,367.51	1,153.22	1,435.64	1,841.46	0.00	0.00	0.00
4,900.00	27.74	51.23	4,456.02	1,182.37	1,471.93	1,888.01	0.00	0.00	0.00
5,000.00	27.74	51.23	4,544.53	1,211.52	1,508.22	1,934.55	0.00	0.00	0.00
5,100.00	27.74	51.23	4,633.03	1,240.67	1,544.51	1,981.10	0.00	0.00	0.00
5,200.00	27.74	51.23	4,721.54	1,269.82	1,580.79	2,027.64	0.00	0.00	0.00
5,300.00	27.74	51.23	4,810.05	1,298.96	1,617.08	2,074.19	0.00	0.00	0.00
Williams Fork									
5,371.13	27.74	51.23	4,873.00	1,319.70	1,642.89	2,107.29	0.00	0.00	0.00
5,400.00	27.74	51.23	4,898.56	1,328.11	1,653.37	2,120.73	0.00	0.00	0.00
Start Drop -2.50									
5,439.22	27.74	51.23	4,933.27	1,339.55	1,667.60	2,138.99	0.00	0.00	0.00
5,500.00	26.22	51.23	4,987.43	1,356.81	1,689.10	2,166.56	2.50	-2.50	0.00
5,600.00	23.72	51.23	5,078.08	1,383.25	1,722.01	2,208.77	2.50	-2.50	0.00
5,700.00	21.22	51.23	5,170.48	1,407.18	1,751.80	2,246.99	2.50	-2.50	0.00
5,800.00	18.72	51.23	5,264.46	1,428.57	1,778.42	2,281.14	2.50	-2.50	0.00
5,900.00	16.22	51.23	5,359.84	1,447.37	1,801.83	2,311.16	2.50	-2.50	0.00
6,000.00	13.72	51.23	5,456.44	1,463.54	1,821.96	2,336.99	2.50	-2.50	0.00
6,100.00	11.22	51.23	5,554.07	1,477.06	1,838.80	2,358.58	2.50	-2.50	0.00
6,200.00	8.72	51.23	5,652.55	1,487.90	1,852.29	2,375.89	2.50	-2.50	0.00
6,300.00	6.22	51.23	5,751.70	1,496.05	1,862.43	2,388.89	2.50	-2.50	0.00
6,400.00	3.72	51.23	5,851.31	1,501.47	1,869.18	2,397.55	2.50	-2.50	0.00
6,500.00	1.22	51.23	5,951.21	1,504.17	1,872.54	2,401.86	2.50	-2.50	0.00
Start 2073.00 hold at 6548.79 MD									
6,548.79	0.00	0.00	6,000.00	1,504.49	1,872.94	2,402.38	2.50	-2.50	0.00
6,600.00	0.00	0.00	6,051.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
TOG									
6,621.79	0.00	0.00	6,073.00	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
6,700.00	0.00	0.00	6,151.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
6,800.00	0.00	0.00	6,251.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
6,900.00	0.00	0.00	6,351.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
7,000.00	0.00	0.00	6,451.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
7,100.00	0.00	0.00	6,551.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
7,200.00	0.00	0.00	6,651.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
7,300.00	0.00	0.00	6,751.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
7,400.00	0.00	0.00	6,851.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
7,500.00	0.00	0.00	6,951.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
7,600.00	0.00	0.00	7,051.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
7,700.00	0.00	0.00	7,151.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
Cameo									
7,721.79	0.00	0.00	7,173.00	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
7,800.00	0.00	0.00	7,251.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
7,900.00	0.00	0.00	7,351.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
8,000.00	0.00	0.00	7,451.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
8,100.00	0.00	0.00	7,551.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
8,200.00	0.00	0.00	7,651.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
8,300.00	0.00	0.00	7,751.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
Base Cameo Coal									
8,379.79	0.00	0.00	7,831.00	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
8,400.00	0.00	0.00	7,851.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
Rollins									
8,421.79	0.00	0.00	7,873.00	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
8,500.00	0.00	0.00	7,951.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00
8,600.00	0.00	0.00	8,051.21	1,504.49	1,872.94	2,402.38	0.00	0.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-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 8621.79									
8,621.79	0.00	0.00	8,073.00	1,504.49	1,872.94	2,402.38	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 28-07E tgt	0.00	0.00	8,073.00	1,504.53	1,872.94	1,524,251.782	2,357,727.669	39° 15' 2.830 N	107° 46' 5.800 W
- plan misses target center by 0.03usft at 8621.79usft MD (8073.00 TVD, 1504.49 N, 1872.94 E)									
- Circle (radius 50.00)									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
1,585.00	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 (°)	
3,280.91	3,023.00	G Sand		0.00		
5,371.13	4,873.00	Williams Fork		0.00		
6,621.79	6,073.00	TOG		0.00		
7,721.79	7,173.00	Cameo		0.00		
8,379.79	7,831.00	Base Cameo Coal		0.00		
8,421.79	7,873.00	Rollins		0.00		

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
300.00	300.00	0.00	0.00	Start Build 2.50	
1,409.57	1,366.73	164.95	205.34	Start 4029.64 hold at 1409.57 MD	
5,439.22	4,933.27	1,339.55	1,667.60	Start Drop -2.50	
6,548.79	6,000.00	1,504.49	1,872.94	Start 2073.00 hold at 6548.79 MD	
8,621.79	8,073.00	1,504.49	1,872.94	TD at 8621.79	



Piceance Energy, LLC

Mesa County, CO

Piceance 28-10 Pad

Piceance Federal 28-07E

Slot A-3

Design #2

Anticollision Report

15 April, 2015

Archer



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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	8,621.79	Design #2 (Slot A-3)	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 28-05E - Slot A-1 - Design #2	100.00	100.00	29.44	29.26	167.916	CC, ES
Piceance Federal 28-05E - Slot A-1 - Design #2	8,621.79	8,748.23	499.83	416.39	5.990	SF
Piceance Federal 28-06E - Slot A-2 - Design #2	200.00	200.00	19.99	19.37	31.994	CC, ES
Piceance Federal 28-06E - Slot A-2 - Design #2	8,621.79	8,678.88	249.89	166.59	3.000	SF
Piceance Federal 28-08E - Slot A-4 - Design #2	300.00	300.00	10.39	9.31	9.670	CC, ES
Piceance Federal 28-08E - Slot A-4 - Design #2	8,606.09	8,553.57	249.90	166.67	3.003	SF
Piceance Federal 28-09E - Slot B-3 - Design #2	300.00	300.00	9.66	8.58	8.987	CC, ES
Piceance Federal 28-09E - Slot B-3 - Design #2	8,601.48	8,502.98	499.79	416.49	6.000	SF
Piceance Federal 28-10E - Slot B-4 - Design #2	300.00	300.00	14.30	13.23	13.314	CC, ES
Piceance Federal 28-10E - Slot B-4 - Design #2	5,400.00	5,389.53	659.16	585.78	8.982	SF

Offset Design	Piceance 28-10 Pad - Piceance Federal 28-05E - Slot A-1 - Design #2											Offset Site Error:	0.00 usft
Survey Program:	O-MWD											Offset Well Error:	0.00 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	15.50	28.37	7.87	29.44				
100.00	100.00	100.00	100.00	0.09	0.09	15.50	28.37	7.87	29.44	29.26	0.18	167.916	CC, ES
200.00	200.00	198.82	198.78	0.31	0.32	17.32	29.92	9.33	31.36	30.74	0.62	50.410	
300.00	300.00	297.26	297.02	0.54	0.56	21.61	34.54	13.69	37.27	36.19	1.09	34.313	
400.00	399.97	395.23	394.42	0.76	0.82	-25.94	42.19	20.89	45.45	43.87	1.58	28.803	
500.00	499.75	492.84	490.92	1.00	1.14	-23.99	52.81	30.90	53.86	51.76	2.10	25.679	
600.00	599.14	590.10	586.37	1.25	1.52	-23.10	66.36	43.67	62.40	59.75	2.65	23.583	
700.00	697.97	687.00	680.60	1.55	1.96	-22.87	82.78	59.14	71.02	67.79	3.22	22.031	
800.00	796.04	783.56	773.47	1.92	2.47	-23.10	102.01	77.26	79.69	75.85	3.84	20.777	
900.00	893.17	879.78	864.82	2.35	3.04	-23.64	123.99	97.97	88.41	83.92	4.49	19.691	
1,000.00	989.17	975.66	954.51	2.86	3.69	-24.40	148.64	121.20	97.18	91.98	5.20	18.696	
1,100.00	1,083.85	1,071.22	1,042.41	3.45	4.41	-25.32	175.91	146.89	105.99	100.01	5.98	17.734	
1,200.00	1,177.05	1,166.45	1,128.38	4.13	5.19	-26.36	205.72	174.98	114.86	108.05	6.81	16.866	
1,300.00	1,268.57	1,261.36	1,212.30	4.89	6.05	-27.49	237.98	205.38	123.79	116.03	7.76	15.951	
1,400.00	1,358.25	1,358.53	1,296.50	5.74	6.98	-28.81	273.26	238.62	132.30	123.48	8.83	14.991	
1,500.00	1,446.77	1,458.21	1,382.65	6.63	7.96	-30.53	309.77	273.02	139.14	129.13	10.01	13.907	
1,600.00	1,535.27	1,557.89	1,468.79	7.55	8.95	-32.10	346.27	307.42	146.07	134.81	11.26	12.973	

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 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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		
1,700.00	1,623.78	1,657.58	1,554.93	8.47	9.94	-33.53	382.78	341.82	153.10	140.53	12.58	12.173		
1,800.00	1,712.29	1,757.26	1,641.08	9.39	10.93	-34.83	419.28	376.22	160.22	146.28	13.95	11.488		
1,900.00	1,800.80	1,856.94	1,727.22	10.32	11.93	-36.02	455.79	410.62	167.42	152.06	15.36	10.900		
2,000.00	1,889.30	1,956.63	1,813.37	11.26	12.93	-37.11	492.29	445.01	174.68	157.87	16.81	10.392		
2,100.00	1,977.81	2,056.31	1,899.51	12.19	13.93	-38.11	528.80	479.41	182.00	163.71	18.29	9.952		
2,200.00	2,066.32	2,155.99	1,985.66	13.13	14.93	-39.04	565.30	513.81	189.36	169.57	19.79	9.568		
2,300.00	2,154.83	2,255.68	2,071.80	14.07	15.93	-39.90	601.81	548.21	196.78	175.46	21.32	9.231		
2,400.00	2,243.33	2,355.36	2,157.94	15.01	16.93	-40.69	638.31	582.61	204.24	181.37	22.86	8.933		
2,500.00	2,331.84	2,455.04	2,244.09	15.95	17.93	-41.43	674.82	617.01	211.73	187.30	24.42	8.669		
2,600.00	2,420.35	2,554.72	2,330.23	16.89	18.93	-42.12	711.32	651.40	219.25	193.25	26.00	8.433		
2,700.00	2,508.86	2,654.41	2,416.38	17.83	19.93	-42.76	747.83	685.80	226.81	199.22	27.59	8.221		
2,800.00	2,597.36	2,754.09	2,502.52	18.78	20.93	-43.36	784.34	720.20	234.39	205.20	29.19	8.031		
2,900.00	2,685.87	2,853.77	2,588.67	19.72	21.94	-43.92	820.84	754.60	241.99	211.20	30.79	7.859		
3,000.00	2,774.38	2,953.46	2,674.81	20.66	22.94	-44.45	857.35	789.00	249.62	217.21	32.41	7.702		
3,100.00	2,862.89	3,053.14	2,760.95	21.61	23.94	-44.95	893.85	823.40	257.26	223.23	34.03	7.560		
3,200.00	2,951.39	3,152.82	2,847.10	22.55	24.95	-45.42	930.36	857.79	264.93	229.27	35.66	7.429		
3,300.00	3,039.90	3,252.51	2,933.24	23.50	25.95	-45.86	966.86	892.19	272.61	235.31	37.30	7.309		
3,400.00	3,128.41	3,352.19	3,019.39	24.44	26.96	-46.28	1,003.37	926.59	280.30	241.37	38.94	7.199		
3,500.00	3,216.91	3,451.87	3,105.53	25.39	27.96	-46.67	1,039.87	960.99	288.01	247.43	40.58	7.097		
3,600.00	3,305.42	3,551.56	3,191.68	26.33	28.96	-47.05	1,076.38	995.39	295.74	253.51	42.23	7.003		
3,700.00	3,393.93	3,651.24	3,277.82	27.28	29.97	-47.40	1,112.88	1,029.79	303.47	259.59	43.88	6.916		
3,800.00	3,482.44	3,750.92	3,363.97	28.22	30.97	-47.74	1,149.39	1,064.18	311.22	265.68	45.54	6.834		
3,900.00	3,570.94	3,850.61	3,450.11	29.17	31.98	-48.06	1,185.89	1,098.58	318.97	271.78	47.20	6.758		
4,000.00	3,659.45	3,950.29	3,536.25	30.11	32.98	-48.37	1,222.40	1,132.98	326.74	277.88	48.86	6.687		
4,100.00	3,747.96	4,049.97	3,622.40	31.06	33.99	-48.66	1,258.91	1,167.38	334.51	283.99	50.52	6.621		
4,200.00	3,836.47	4,149.66	3,708.54	32.01	34.99	-48.94	1,295.41	1,201.78	342.30	290.11	52.19	6.559		
4,300.00	3,924.97	4,249.34	3,794.69	32.95	36.00	-49.21	1,331.92	1,236.18	350.09	296.23	53.86	6.500		
4,400.00	4,013.48	4,349.02	3,880.83	33.90	37.00	-49.46	1,368.42	1,270.57	357.89	302.35	55.53	6.445		
4,500.00	4,101.99	4,448.70	3,966.98	34.85	38.01	-49.70	1,404.93	1,304.97	365.69	308.49	57.20	6.393		
4,600.00	4,190.50	4,548.39	4,053.12	35.79	39.01	-49.94	1,441.43	1,339.37	373.50	314.62	58.88	6.344		
4,700.00	4,279.00	4,648.07	4,139.26	36.74	40.02	-50.16	1,477.94	1,373.77	381.32	320.76	60.56	6.297		
4,800.00	4,367.51	4,747.75	4,225.41	37.69	41.02	-50.38	1,514.44	1,408.17	389.14	326.91	62.23	6.253		
4,900.00	4,456.02	4,847.44	4,311.55	38.63	42.03	-50.58	1,550.95	1,442.57	396.97	333.06	63.91	6.211		
5,000.00	4,544.53	4,947.12	4,397.70	39.58	43.03	-50.78	1,587.45	1,476.96	404.80	339.21	65.59	6.171		
5,100.00	4,633.03	5,046.80	4,483.84	40.53	44.04	-50.97	1,623.96	1,511.36	412.64	345.36	67.27	6.134		
5,200.00	4,721.54	5,146.49	4,569.99	41.47	45.04	-51.16	1,660.46	1,545.76	420.48	351.52	68.96	6.098		
5,300.00	4,810.05	5,246.17	4,656.13	42.42	46.05	-51.34	1,696.97	1,580.16	428.32	357.69	70.64	6.064		
5,400.00	4,898.56	5,345.85	4,742.27	43.37	47.05	-51.51	1,733.47	1,614.56	436.17	363.85	72.32	6.031		
5,500.00	4,987.43	5,445.50	4,828.39	44.25	48.06	-51.69	1,769.97	1,648.94	444.53	370.60	73.92	6.013		
5,600.00	5,078.08	5,557.75	4,926.28	44.94	49.01	-51.68	1,809.93	1,686.60	454.26	379.12	75.14	6.046		
5,700.00	5,170.48	5,673.96	5,030.28	45.57	49.84	-51.66	1,847.64	1,722.14	463.19	386.99	76.20	6.079		
5,800.00	5,264.46	5,790.67	5,137.25	46.13	50.60	-51.64	1,881.61	1,754.14	471.19	394.06	77.13	6.109		
5,900.00	5,359.84	5,907.85	5,246.88	46.63	51.27	-51.62	1,911.68	1,782.48	478.25	400.31	77.94	6.136		
6,000.00	5,456.44	6,025.43	5,358.87	47.06	51.85	-51.61	1,937.72	1,807.01	484.34	405.71	78.62	6.160		
6,100.00	5,554.07	6,143.35	5,472.88	47.42	52.35	-51.60	1,959.60	1,827.63	489.44	410.26	79.18	6.182		
6,200.00	5,652.55	6,261.56	5,588.58	47.72	52.75	-51.60	1,977.22	1,844.23	493.54	413.94	79.60	6.200		
6,300.00	5,751.70	6,380.00	5,705.59	47.96	53.08	-51.59	1,990.49	1,856.74	496.62	416.72	79.91	6.215		
6,400.00	5,851.31	6,498.60	5,823.55	48.13	53.31	-51.59	1,999.36	1,865.10	498.68	418.60	80.08	6.227		
6,500.00	5,951.21	6,617.30	5,942.07	48.25	53.45	-51.59	2,003.78	1,869.26	499.70	419.57	80.13	6.236		
6,600.00	6,051.21	6,726.43	6,051.21	48.31	53.52	-0.36	2,004.31	1,869.76	499.83	419.65	80.18	6.234		
6,700.00	6,151.21	6,826.43	6,151.21	48.36	53.57	-0.36	2,004.31	1,869.76	499.83	419.51	80.32	6.223		
6,800.00	6,251.21	6,926.43	6,251.21	48.42	53.62	-0.36	2,004.31	1,869.76	499.83	419.37	80.46	6.212		

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 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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	
6,900.00	6,351.21	7,026.43	6,351.21	48.48	53.67	-0.36	2,004.31	1,869.76	499.83	419.22	80.61	6.201	
7,000.00	6,451.21	7,126.43	6,451.21	48.54	53.73	-0.36	2,004.31	1,869.76	499.83	419.07	80.75	6.190	
7,100.00	6,551.21	7,226.43	6,551.21	48.61	53.78	-0.36	2,004.31	1,869.76	499.83	418.93	80.90	6.178	
7,200.00	6,651.21	7,326.43	6,651.21	48.67	53.84	-0.36	2,004.31	1,869.76	499.83	418.77	81.05	6.167	
7,300.00	6,751.21	7,426.43	6,751.21	48.73	53.90	-0.36	2,004.31	1,869.76	499.83	418.62	81.21	6.155	
7,400.00	6,851.21	7,526.43	6,851.21	48.80	53.95	-0.36	2,004.31	1,869.76	499.83	418.47	81.36	6.143	
7,500.00	6,951.21	7,626.43	6,951.21	48.86	54.01	-0.36	2,004.31	1,869.76	499.83	418.31	81.52	6.131	
7,600.00	7,051.21	7,726.43	7,051.21	48.93	54.07	-0.36	2,004.31	1,869.76	499.83	418.15	81.68	6.119	
7,700.00	7,151.21	7,826.43	7,151.21	49.00	54.13	-0.36	2,004.31	1,869.76	499.83	417.98	81.84	6.107	
7,800.00	7,251.21	7,926.43	7,251.21	49.07	54.19	-0.36	2,004.31	1,869.76	499.83	417.82	82.01	6.095	
7,900.00	7,351.21	8,026.43	7,351.21	49.14	54.25	-0.36	2,004.31	1,869.76	499.83	417.65	82.17	6.083	
8,000.00	7,451.21	8,126.43	7,451.21	49.21	54.32	-0.36	2,004.31	1,869.76	499.83	417.49	82.34	6.070	
8,100.00	7,551.21	8,226.43	7,551.21	49.28	54.38	-0.36	2,004.31	1,869.76	499.83	417.31	82.51	6.058	
8,200.00	7,651.21	8,326.43	7,651.21	49.35	54.44	-0.36	2,004.31	1,869.76	499.83	417.14	82.69	6.045	
8,300.00	7,751.21	8,426.43	7,751.21	49.43	54.51	-0.36	2,004.31	1,869.76	499.83	416.97	82.86	6.032	
8,400.00	7,851.21	8,526.43	7,851.21	49.50	54.58	-0.36	2,004.31	1,869.76	499.83	416.79	83.04	6.019	
8,500.00	7,951.21	8,626.43	7,951.21	49.58	54.64	-0.36	2,004.31	1,869.76	499.83	416.61	83.22	6.006	
8,600.00	8,051.21	8,726.43	8,051.21	49.65	54.71	-0.36	2,004.31	1,869.76	499.83	416.43	83.40	5.993	
8,621.79	8,073.00	8,748.23	8,073.00	49.67	54.73	-0.36	2,004.31	1,869.76	499.83	416.39	83.44	5.990 SF	



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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	15.99	19.22	5.51	19.99					
100.00	100.00	100.00	100.00	0.09	0.09	15.99	19.22	5.51	19.99	19.82	0.18	114.028		
200.00	200.00	200.00	200.00	0.31	0.31	15.99	19.22	5.51	19.99	19.37	0.62	31.994 CC, ES		
300.00	300.00	299.20	299.17	0.54	0.54	18.90	20.68	7.08	21.87	20.80	1.07	20.436		
400.00	399.97	398.18	397.93	0.76	0.77	-28.11	25.05	11.78	25.82	24.27	1.55	16.672		
500.00	499.75	496.98	496.15	1.00	1.03	-25.59	32.30	19.58	29.94	27.88	2.06	14.533		
600.00	599.14	595.59	593.63	1.25	1.34	-24.20	42.41	30.45	34.18	31.58	2.60	13.144		
700.00	697.97	694.03	690.21	1.55	1.71	-23.57	55.34	44.35	38.48	35.31	3.17	12.149		
800.00	796.04	792.29	785.72	1.92	2.14	-23.47	71.05	61.24	42.83	39.06	3.77	11.369		
900.00	893.17	890.38	879.99	2.35	2.65	-23.75	89.50	81.08	47.22	42.81	4.41	10.711		
1,000.00	989.17	988.30	972.85	2.86	3.23	-24.32	110.63	103.81	51.64	46.53	5.10	10.122		
1,100.00	1,083.85	1,086.05	1,064.14	3.45	3.89	-25.10	134.41	129.38	56.09	50.23	5.86	9.572		
1,200.00	1,177.05	1,183.63	1,153.71	4.13	4.63	-26.04	160.77	157.72	60.58	53.88	6.70	9.047		
1,300.00	1,268.57	1,281.06	1,241.42	4.89	5.44	-27.10	189.66	188.78	65.11	57.49	7.62	8.543		
1,400.00	1,358.25	1,378.97	1,327.72	5.74	6.33	-28.32	221.14	222.64	69.57	60.90	8.67	8.027		
1,500.00	1,446.77	1,478.90	1,415.21	6.63	7.27	-30.02	254.00	257.97	72.93	63.10	9.83	7.417		
1,600.00	1,535.27	1,578.82	1,502.71	7.55	8.22	-31.59	286.87	293.31	76.33	65.25	11.08	6.891		
1,700.00	1,623.78	1,678.74	1,590.21	8.47	9.17	-33.02	319.73	328.65	79.79	67.40	12.39	6.441		
1,800.00	1,712.29	1,778.66	1,677.70	9.39	10.13	-34.33	352.59	363.99	83.28	69.53	13.75	6.056		
1,900.00	1,800.80	1,878.58	1,765.20	10.32	11.09	-35.54	385.46	399.33	86.82	71.66	15.16	5.727		
2,000.00	1,889.30	1,978.50	1,852.69	11.26	12.06	-36.65	418.32	434.66	90.40	73.79	16.61	5.443		
2,100.00	1,977.81	2,078.42	1,940.19	12.19	13.02	-37.67	451.18	470.00	94.00	75.92	18.09	5.197		
2,200.00	2,066.32	2,178.35	2,027.69	13.13	13.99	-38.62	484.04	505.34	97.64	78.04	19.59	4.983		
2,300.00	2,154.83	2,278.27	2,115.18	14.07	14.96	-39.50	516.91	540.68	101.29	80.17	21.12	4.796		
2,400.00	2,243.33	2,378.19	2,202.68	15.01	15.93	-40.32	549.77	576.02	104.97	82.30	22.67	4.630		
2,500.00	2,331.84	2,478.11	2,290.17	15.95	16.90	-41.09	582.63	611.36	108.67	84.44	24.24	4.484		
2,600.00	2,420.35	2,578.03	2,377.67	16.89	17.87	-41.80	615.50	646.69	112.39	86.57	25.82	4.353		
2,700.00	2,508.86	2,677.95	2,465.16	17.83	18.84	-42.47	648.36	682.03	116.13	88.71	27.41	4.236		
2,800.00	2,597.36	2,777.87	2,552.66	18.78	19.81	-43.09	681.22	717.37	119.88	90.86	29.02	4.131		
2,900.00	2,685.87	2,877.79	2,640.16	19.72	20.78	-43.68	714.09	752.71	123.64	93.01	30.63	4.036		
3,000.00	2,774.38	2,977.72	2,727.65	20.66	21.75	-44.23	746.95	788.05	127.42	95.16	32.26	3.950		
3,100.00	2,862.89	3,077.64	2,815.15	21.61	22.72	-44.76	779.81	823.38	131.20	97.31	33.89	3.871		
3,200.00	2,951.39	3,177.56	2,902.64	22.55	23.69	-45.25	812.67	858.72	135.00	99.47	35.53	3.799		
3,300.00	3,039.90	3,277.48	2,990.14	23.50	24.67	-45.71	845.54	894.06	138.80	101.63	37.18	3.734		
3,400.00	3,128.41	3,377.40	3,077.64	24.44	25.64	-46.15	878.40	929.40	142.62	103.79	38.83	3.673		
3,500.00	3,216.91	3,477.32	3,165.13	25.39	26.61	-46.57	911.26	964.74	146.44	105.96	40.48	3.617		
3,600.00	3,305.42	3,577.24	3,252.63	26.33	27.59	-46.97	944.13	1,000.07	150.27	108.13	42.14	3.566		
3,700.00	3,393.93	3,677.17	3,340.12	27.28	28.56	-47.34	976.99	1,035.41	154.11	110.30	43.81	3.518		
3,800.00	3,482.44	3,777.09	3,427.62	28.22	29.53	-47.70	1,009.85	1,070.75	157.95	112.48	45.48	3.473		
3,900.00	3,570.94	3,877.01	3,515.12	29.17	30.51	-48.04	1,042.72	1,106.09	161.80	114.65	47.15	3.432		
4,000.00	3,659.45	3,976.93	3,602.61	30.11	31.48	-48.37	1,075.58	1,141.43	165.66	116.83	48.82	3.393		
4,100.00	3,747.96	4,076.85	3,690.11	31.06	32.45	-48.68	1,108.44	1,176.76	169.52	119.01	50.50	3.357		
4,200.00	3,836.47	4,176.77	3,777.60	32.01	33.43	-48.97	1,141.30	1,212.10	173.38	121.20	52.18	3.323		
4,300.00	3,924.97	4,276.69	3,865.10	32.95	34.40	-49.26	1,174.17	1,247.44	177.25	123.38	53.86	3.291		
4,400.00	4,013.48	4,376.62	3,952.59	33.90	35.37	-49.53	1,207.03	1,282.78	181.12	125.57	55.55	3.261		
4,500.00	4,101.99	4,476.54	4,040.09	34.85	36.35	-49.79	1,239.89	1,318.12	185.00	127.76	57.23	3.232		
4,600.00	4,190.50	4,576.46	4,127.59	35.79	37.32	-50.04	1,272.76	1,353.45	188.88	129.96	58.92	3.206		
4,700.00	4,279.00	4,676.38	4,215.08	36.74	38.30	-50.28	1,305.62	1,388.79	192.76	132.15	60.61	3.180		
4,800.00	4,367.51	4,776.30	4,302.58	37.69	39.27	-50.51	1,338.48	1,424.13	196.65	134.35	62.30	3.156		
4,900.00	4,456.02	4,876.22	4,390.07	38.63	40.24	-50.73	1,371.35	1,459.47	200.54	136.54	64.00	3.134		
5,000.00	4,544.53	4,976.14	4,477.57	39.58	41.22	-50.94	1,404.21	1,494.81	204.43	138.74	65.69	3.112		
5,100.00	4,633.03	5,076.06	4,565.07	40.53	42.19	-51.15	1,437.07	1,530.14	208.33	140.94	67.39	3.092		

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 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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	4,721.54	5,175.99	4,652.56	41.47	43.17	-51.34	1,469.94	1,565.48	212.23	143.14	69.08	3.072		
5,300.00	4,810.05	5,275.91	4,740.06	42.42	44.14	-51.53	1,502.80	1,600.82	216.13	145.35	70.78	3.053		
5,400.00	4,898.56	5,375.83	4,827.55	43.37	45.11	-51.72	1,535.66	1,636.16	220.03	147.55	72.48	3.036		
5,500.00	4,987.43	5,477.48	4,916.63	44.25	46.08	-51.81	1,569.00	1,672.01	224.34	150.31	74.03	3.030		
5,600.00	5,078.08	5,584.44	5,012.04	44.94	46.88	-51.77	1,601.92	1,707.41	228.89	153.72	75.18	3.045		
5,700.00	5,170.48	5,691.59	5,109.77	45.57	47.60	-51.73	1,631.83	1,739.57	233.03	156.83	76.20	3.058		
5,800.00	5,264.46	5,798.91	5,209.60	46.13	48.24	-51.69	1,658.63	1,768.39	236.72	159.63	77.09	3.071		
5,900.00	5,359.84	5,906.37	5,311.30	46.63	48.81	-51.67	1,682.25	1,793.79	239.98	162.11	77.87	3.082		
6,000.00	5,456.44	6,013.97	5,414.64	47.06	49.30	-51.64	1,702.62	1,815.69	242.78	164.26	78.52	3.092		
6,100.00	5,554.07	6,121.67	5,519.38	47.42	49.72	-51.63	1,719.68	1,834.04	245.13	166.08	79.05	3.101		
6,200.00	5,652.55	6,229.47	5,625.27	47.72	50.06	-51.61	1,733.38	1,848.77	247.01	167.55	79.46	3.109		
6,300.00	5,751.70	6,337.34	5,732.07	47.96	50.33	-51.60	1,743.68	1,859.85	248.43	168.68	79.74	3.115		
6,400.00	5,851.31	6,445.26	5,839.50	48.13	50.53	-51.59	1,750.55	1,867.23	249.37	169.45	79.92	3.120		
6,500.00	5,951.21	6,553.21	5,947.33	48.25	50.65	-51.59	1,753.97	1,870.91	249.84	169.87	79.97	3.124		
6,600.00	6,051.21	6,657.09	6,051.21	48.31	50.72	-0.36	1,754.38	1,871.35	249.89	169.87	80.03	3.123		
6,700.00	6,151.21	6,757.09	6,151.21	48.36	50.77	-0.36	1,754.38	1,871.35	249.89	169.73	80.17	3.117		
6,800.00	6,251.21	6,857.09	6,251.21	48.42	50.83	-0.36	1,754.38	1,871.35	249.89	169.58	80.31	3.112		
6,900.00	6,351.21	6,957.09	6,351.21	48.48	50.88	-0.36	1,754.38	1,871.35	249.89	169.44	80.45	3.106		
7,000.00	6,451.21	7,057.09	6,451.21	48.54	50.94	-0.36	1,754.38	1,871.35	249.89	169.29	80.60	3.100		
7,100.00	6,551.21	7,157.09	6,551.21	48.61	51.00	-0.36	1,754.38	1,871.35	249.89	169.14	80.75	3.095		
7,200.00	6,651.21	7,257.09	6,651.21	48.67	51.06	-0.36	1,754.38	1,871.35	249.89	168.99	80.91	3.089		
7,300.00	6,751.21	7,357.09	6,751.21	48.73	51.12	-0.36	1,754.38	1,871.35	249.89	168.83	81.06	3.083		
7,400.00	6,851.21	7,457.09	6,851.21	48.80	51.18	-0.36	1,754.38	1,871.35	249.89	168.68	81.22	3.077		
7,500.00	6,951.21	7,557.09	6,951.21	48.86	51.24	-0.36	1,754.38	1,871.35	249.89	168.52	81.38	3.071		
7,600.00	7,051.21	7,657.09	7,051.21	48.93	51.31	-0.36	1,754.38	1,871.35	249.89	168.36	81.54	3.065		
7,700.00	7,151.21	7,757.09	7,151.21	49.00	51.37	-0.36	1,754.38	1,871.35	249.89	168.19	81.70	3.059		
7,800.00	7,251.21	7,857.09	7,251.21	49.07	51.44	-0.36	1,754.38	1,871.35	249.89	168.03	81.87	3.052		
7,900.00	7,351.21	7,957.09	7,351.21	49.14	51.50	-0.36	1,754.38	1,871.35	249.89	167.86	82.03	3.046		
8,000.00	7,451.21	8,057.09	7,451.21	49.21	51.57	-0.36	1,754.38	1,871.35	249.89	167.69	82.20	3.040		
8,100.00	7,551.21	8,157.09	7,551.21	49.28	51.64	-0.36	1,754.38	1,871.35	249.89	167.52	82.38	3.034		
8,200.00	7,651.21	8,257.09	7,651.21	49.35	51.70	-0.36	1,754.38	1,871.35	249.89	167.34	82.55	3.027		
8,300.00	7,751.21	8,357.09	7,751.21	49.43	51.77	-0.36	1,754.38	1,871.35	249.89	167.17	82.72	3.021		
8,400.00	7,851.21	8,457.09	7,851.21	49.50	51.84	-0.36	1,754.38	1,871.35	249.89	166.99	82.90	3.014		
8,500.00	7,951.21	8,557.09	7,951.21	49.58	51.92	-0.36	1,754.38	1,871.35	249.89	166.81	83.08	3.008		
8,600.00	8,051.21	8,657.09	8,051.21	49.65	51.99	-0.36	1,754.38	1,871.35	249.89	166.63	83.27	3.001		
8,621.79	8,073.00	8,678.88	8,073.00	49.67	52.00	-0.36	1,754.38	1,871.35	249.89	166.59	83.31	3.000 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 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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	-166.87	-10.12	-2.36	10.39					
100.00	100.00	100.00	100.00	0.09	0.09	-166.87	-10.12	-2.36	10.39	10.21	0.18	59.257		
200.00	200.00	200.00	200.00	0.31	0.31	-166.87	-10.12	-2.36	10.39	9.76	0.62	16.626		
300.00	300.00	300.00	300.00	0.54	0.54	-166.87	-10.12	-2.36	10.39	9.31	1.07	9.670 CC, ES		
400.00	399.97	399.97	399.97	0.76	0.76	148.22	-10.12	-2.36	12.18	10.63	1.55	7.866		
500.00	499.75	500.40	500.36	1.00	0.98	155.85	-8.89	-0.54	16.13	14.08	2.05	7.856		
600.00	599.14	601.01	600.76	1.25	1.22	159.44	-5.19	4.95	20.37	17.80	2.57	7.920		
700.00	697.97	701.82	700.95	1.55	1.47	160.96	0.97	14.10	24.76	21.65	3.11	7.964		
800.00	796.04	802.81	800.74	1.92	1.77	161.31	9.61	26.92	29.26	25.59	3.67	7.975		
900.00	893.17	903.98	899.93	2.35	2.13	160.96	20.72	43.41	33.84	29.58	4.26	7.944		
1,000.00	989.17	1,005.33	998.32	2.86	2.56	160.15	34.30	63.55	38.51	33.61	4.90	7.866		
1,100.00	1,083.85	1,106.86	1,095.70	3.45	3.07	159.03	50.31	87.32	43.26	37.67	5.59	7.738		
1,200.00	1,177.05	1,208.55	1,191.88	4.13	3.67	157.71	68.76	114.70	48.10	41.74	6.36	7.559		
1,300.00	1,268.57	1,310.42	1,286.66	4.89	4.36	156.24	89.61	145.64	53.04	45.81	7.24	7.331		
1,400.00	1,358.25	1,412.44	1,379.83	5.74	5.13	154.67	112.83	180.10	58.09	49.87	8.22	7.068		
1,500.00	1,446.77	1,513.51	1,470.45	6.63	5.99	152.60	137.84	217.21	62.12	52.78	9.34	6.649		
1,600.00	1,535.27	1,613.42	1,559.77	7.55	6.86	150.54	162.85	254.33	65.75	55.17	10.58	6.213		
1,700.00	1,623.78	1,713.33	1,649.08	8.47	7.74	148.70	187.87	291.46	69.45	57.55	11.90	5.836		
1,800.00	1,712.29	1,813.23	1,738.40	9.39	8.63	147.04	212.88	328.58	73.22	59.93	13.28	5.512		
1,900.00	1,800.80	1,913.14	1,827.72	10.32	9.53	145.55	237.90	365.71	77.04	62.32	14.72	5.234		
2,000.00	1,889.30	2,013.05	1,917.04	11.26	10.43	144.19	262.91	402.83	80.91	64.71	16.20	4.996		
2,100.00	1,977.81	2,112.96	2,006.35	12.19	11.33	142.97	287.93	439.95	84.82	67.11	17.71	4.790		
2,200.00	2,066.32	2,212.86	2,095.67	13.13	12.23	141.85	312.95	477.08	88.77	69.52	19.25	4.612		
2,300.00	2,154.83	2,312.77	2,184.99	14.07	13.14	140.83	337.96	514.20	92.74	71.94	20.81	4.457		
2,400.00	2,243.33	2,412.68	2,274.31	15.01	14.05	139.89	362.98	551.33	96.75	74.36	22.39	4.322		
2,500.00	2,331.84	2,512.59	2,363.62	15.95	14.96	139.02	387.99	588.45	100.78	76.79	23.98	4.202		
2,600.00	2,420.35	2,612.50	2,452.94	16.89	15.87	138.23	413.01	625.58	104.83	79.23	25.59	4.096		
2,700.00	2,508.86	2,712.40	2,542.26	17.83	16.78	137.49	438.02	662.70	108.89	81.68	27.21	4.001		
2,800.00	2,597.36	2,812.31	2,631.57	18.78	17.70	136.80	463.04	699.82	112.98	84.13	28.85	3.917		
2,900.00	2,685.87	2,912.22	2,720.89	19.72	18.61	136.17	488.05	736.95	117.08	86.60	30.48	3.841		
3,000.00	2,774.38	3,012.13	2,810.21	20.66	19.52	135.57	513.07	774.07	121.19	89.06	32.13	3.772		
3,100.00	2,862.89	3,112.03	2,899.53	21.61	20.44	135.02	538.09	811.20	125.32	91.54	33.78	3.710		
3,200.00	2,951.39	3,211.94	2,988.84	22.55	21.35	134.50	563.10	848.32	129.45	94.01	35.44	3.653		
3,300.00	3,039.90	3,311.85	3,078.16	23.50	22.27	134.01	588.12	885.45	133.60	96.50	37.10	3.601		
3,400.00	3,128.41	3,411.76	3,167.48	24.44	23.18	133.55	613.13	922.57	137.76	98.99	38.77	3.553		
3,500.00	3,216.91	3,511.67	3,256.79	25.39	24.10	133.12	638.15	959.69	141.92	101.48	40.44	3.510		
3,600.00	3,305.42	3,611.57	3,346.11	26.33	25.02	132.72	663.16	996.82	146.09	103.98	42.11	3.469		
3,700.00	3,393.93	3,711.48	3,435.43	27.28	25.93	132.33	688.18	1,033.94	150.27	106.48	43.79	3.432		
3,800.00	3,482.44	3,811.39	3,524.75	28.22	26.85	131.97	713.20	1,071.07	154.45	108.99	45.47	3.397		
3,900.00	3,570.94	3,911.30	3,614.06	29.17	27.77	131.63	738.21	1,108.19	158.64	111.50	47.15	3.365		
4,000.00	3,659.45	4,011.20	3,703.38	30.11	28.68	131.30	763.23	1,145.32	162.84	114.01	48.83	3.335		
4,100.00	3,747.96	4,111.11	3,792.70	31.06	29.60	130.99	788.24	1,182.44	167.04	116.53	50.51	3.307		
4,200.00	3,836.47	4,211.02	3,882.01	32.01	30.52	130.70	813.26	1,219.56	171.25	119.05	52.20	3.281		
4,300.00	3,924.97	4,310.93	3,971.33	32.95	31.43	130.41	838.27	1,256.69	175.46	121.57	53.89	3.256		
4,400.00	4,013.48	4,410.84	4,060.65	33.90	32.35	130.15	863.29	1,293.81	179.67	124.09	55.58	3.233		
4,500.00	4,101.99	4,510.74	4,149.97	34.85	33.27	129.89	888.31	1,330.94	183.89	126.62	57.27	3.211		
4,600.00	4,190.50	4,610.65	4,239.28	35.79	34.19	129.65	913.32	1,368.06	188.11	129.15	58.96	3.191		
4,700.00	4,279.00	4,710.56	4,328.60	36.74	35.10	129.42	938.34	1,405.19	192.33	131.68	60.65	3.171		
4,800.00	4,367.51	4,810.47	4,417.92	37.69	36.02	129.19	963.35	1,442.31	196.56	134.22	62.34	3.153		
4,900.00	4,456.02	4,910.37	4,507.24	38.63	36.94	128.98	988.37	1,479.43	200.79	136.75	64.04	3.136		
5,000.00	4,544.53	5,010.28	4,596.55	39.58	37.86	128.78	1,013.38	1,516.56	205.02	139.29	65.73	3.119		
5,100.00	4,633.03	5,110.19	4,685.87	40.53	38.78	128.58	1,038.40	1,553.68	209.26	141.83	67.43	3.103		

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 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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	4,721.54	5,210.10	4,775.19	41.47	39.69	128.39	1,063.42	1,590.81	213.49	144.37	69.12	3.089		
5,300.00	4,810.05	5,310.01	4,864.50	42.42	40.61	128.21	1,088.43	1,627.93	217.73	146.92	70.82	3.075		
5,400.00	4,898.56	5,409.91	4,953.82	43.37	41.53	128.03	1,113.45	1,665.06	221.98	149.46	72.52	3.061		
5,500.00	4,987.43	5,505.77	5,040.05	44.25	42.32	128.03	1,136.84	1,699.78	226.43	152.46	73.97	3.061		
5,600.00	5,078.08	5,600.00	5,126.40	44.94	42.95	128.10	1,157.91	1,731.04	230.64	155.55	75.08	3.072		
5,700.00	5,170.48	5,695.05	5,215.00	45.57	43.52	128.16	1,177.13	1,759.57	234.45	158.36	76.09	3.081		
5,800.00	5,264.46	5,789.59	5,304.46	46.13	44.02	128.22	1,194.20	1,784.90	237.85	160.88	76.97	3.090		
5,900.00	5,359.84	5,884.08	5,395.06	46.63	44.47	128.27	1,209.18	1,807.13	240.83	163.10	77.73	3.098		
6,000.00	5,456.44	5,978.52	5,486.64	47.06	44.86	128.31	1,222.06	1,826.24	243.40	165.03	78.37	3.106		
6,100.00	5,554.07	6,072.92	5,579.05	47.42	45.19	128.34	1,232.81	1,842.20	245.55	166.65	78.90	3.112		
6,200.00	5,652.55	6,167.28	5,672.14	47.72	45.46	128.37	1,241.43	1,854.99	247.27	167.96	79.31	3.118		
6,300.00	5,751.70	6,261.62	5,765.76	47.96	45.67	128.39	1,247.89	1,864.58	248.56	168.95	79.61	3.122		
6,400.00	5,851.31	6,355.95	5,859.76	48.13	45.83	128.40	1,252.20	1,870.97	249.42	169.63	79.79	3.126		
6,500.00	5,951.21	6,450.26	5,953.99	48.25	45.93	128.41	1,254.34	1,874.15	249.85	169.98	79.87	3.128		
6,600.00	6,051.21	6,547.48	6,051.21	48.31	46.00	179.64	1,254.60	1,874.54	249.90	169.96	79.94	3.126		
6,700.00	6,151.21	6,647.48	6,151.21	48.36	46.06	179.64	1,254.60	1,874.54	249.90	169.82	80.08	3.121		
6,800.00	6,251.21	6,747.48	6,251.21	48.42	46.12	179.64	1,254.60	1,874.54	249.90	169.67	80.23	3.115		
6,900.00	6,351.21	6,847.48	6,351.21	48.48	46.19	179.64	1,254.60	1,874.54	249.90	169.52	80.37	3.109		
7,000.00	6,451.21	6,947.48	6,451.21	48.54	46.25	179.64	1,254.60	1,874.54	249.90	169.37	80.52	3.103		
7,100.00	6,551.21	7,047.48	6,551.21	48.61	46.32	179.64	1,254.60	1,874.54	249.90	169.22	80.68	3.098		
7,200.00	6,651.21	7,147.48	6,651.21	48.67	46.39	179.64	1,254.60	1,874.54	249.90	169.07	80.83	3.092		
7,300.00	6,751.21	7,247.48	6,751.21	48.73	46.45	179.64	1,254.60	1,874.54	249.90	168.91	80.99	3.086		
7,400.00	6,851.21	7,347.48	6,851.21	48.80	46.52	179.64	1,254.60	1,874.54	249.90	168.75	81.15	3.080		
7,500.00	6,951.21	7,447.48	6,951.21	48.86	46.59	179.64	1,254.60	1,874.54	249.90	168.59	81.31	3.074		
7,600.00	7,051.21	7,547.48	7,051.21	48.93	46.66	179.64	1,254.60	1,874.54	249.90	168.43	81.47	3.067		
7,700.00	7,151.21	7,647.48	7,151.21	49.00	46.74	179.64	1,254.60	1,874.54	249.90	168.26	81.64	3.061		
7,800.00	7,251.21	7,747.48	7,251.21	49.07	46.81	179.64	1,254.60	1,874.54	249.90	168.10	81.80	3.055		
7,900.00	7,351.21	7,847.48	7,351.21	49.14	46.88	179.64	1,254.60	1,874.54	249.90	167.93	81.97	3.049		
8,000.00	7,451.21	7,947.48	7,451.21	49.21	46.96	179.64	1,254.60	1,874.54	249.90	167.75	82.14	3.042		
8,100.00	7,551.21	8,047.48	7,551.21	49.28	47.03	179.64	1,254.60	1,874.54	249.90	167.58	82.32	3.036		
8,200.00	7,651.21	8,147.48	7,651.21	49.35	47.11	179.64	1,254.60	1,874.54	249.90	167.40	82.49	3.029		
8,300.00	7,751.21	8,247.48	7,751.21	49.43	47.19	179.64	1,254.60	1,874.54	249.90	167.23	82.67	3.023		
8,400.00	7,851.21	8,347.48	7,851.21	49.50	47.27	179.64	1,254.60	1,874.54	249.90	167.05	82.85	3.016		
8,500.00	7,951.21	8,447.48	7,951.21	49.58	47.35	179.64	1,254.60	1,874.54	249.90	166.87	83.03	3.010		
8,600.00	8,051.21	8,547.48	8,051.21	49.65	47.43	179.64	1,254.60	1,874.54	249.90	166.68	83.22	3.003		
8,606.09	8,057.30	8,553.57	8,057.30	49.66	47.43	179.64	1,254.60	1,874.54	249.90	166.67	83.23	3.003 SF		
8,621.79	8,073.00	8,562.27	8,066.00	49.67	47.44	179.64	1,254.60	1,874.54	250.00	166.75	83.25	3.003		

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 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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	-77.88	2.03	-9.44	9.66					
100.00	100.00	100.00	100.00	0.09	0.09	-77.88	2.03	-9.44	9.66	9.48	0.18	55.073		
200.00	200.00	200.00	200.00	0.31	0.31	-77.88	2.03	-9.44	9.66	9.03	0.62	15.452		
300.00	300.00	300.00	300.00	0.54	0.54	-77.88	2.03	-9.44	9.66	8.58	1.07	8.987 CC, ES		
400.00	399.97	399.97	399.97	0.76	0.76	-137.80	2.03	-9.44	11.16	9.62	1.54	7.244		
500.00	499.75	499.75	499.75	1.00	0.99	-153.08	2.03	-9.44	16.60	14.54	2.05	8.080		
600.00	599.14	600.25	600.21	1.25	1.21	-163.21	3.06	-7.50	24.61	22.03	2.58	9.542		
700.00	697.97	701.11	700.86	1.55	1.43	-169.73	6.17	-1.65	32.90	29.80	3.10	10.610		
800.00	796.04	802.34	801.46	1.92	1.68	-174.75	11.38	8.14	41.38	37.75	3.63	11.395		
900.00	893.17	903.91	901.82	2.35	1.98	-179.01	18.70	21.90	50.07	45.89	4.18	11.992		
1,000.00	989.17	1,005.83	1,001.73	2.86	2.33	177.17	28.13	39.65	58.97	54.23	4.74	12.439		
1,100.00	1,083.85	1,108.07	1,100.96	3.45	2.76	173.66	39.68	61.37	68.13	62.79	5.34	12.748		
1,200.00	1,177.05	1,210.64	1,199.30	4.13	3.26	170.36	53.34	87.06	77.57	71.57	6.01	12.915		
1,300.00	1,268.57	1,313.51	1,296.54	4.89	3.86	167.23	69.11	116.71	87.32	80.57	6.75	12.928		
1,400.00	1,358.25	1,416.69	1,392.44	5.74	4.56	164.24	86.96	150.28	97.41	89.80	7.61	12.802		
1,500.00	1,446.77	1,520.26	1,486.90	6.63	5.35	161.13	106.90	187.78	106.17	97.58	8.60	12.352		
1,600.00	1,535.27	1,619.98	1,576.83	7.55	6.17	157.99	127.13	225.81	113.15	103.41	9.74	11.613		
1,700.00	1,623.78	1,719.55	1,666.64	8.47	7.01	155.22	147.32	263.78	120.43	109.42	11.01	10.942		
1,800.00	1,712.29	1,819.13	1,756.44	9.39	7.87	152.77	167.51	301.76	127.95	115.59	12.36	10.352		
1,900.00	1,800.80	1,918.70	1,846.25	10.32	8.73	150.59	187.71	339.74	135.69	121.90	13.79	9.842		
2,000.00	1,889.30	2,018.28	1,936.06	11.26	9.59	148.65	207.90	377.71	143.59	128.32	15.27	9.404		
2,100.00	1,977.81	2,117.85	2,025.86	12.19	10.46	146.92	228.10	415.69	151.65	134.85	16.80	9.029		
2,200.00	2,066.32	2,217.43	2,115.67	13.13	11.33	145.36	248.29	453.67	159.82	141.47	18.36	8.706		
2,300.00	2,154.83	2,317.01	2,205.48	14.07	12.21	143.95	268.49	491.64	168.11	148.16	19.95	8.428		
2,400.00	2,243.33	2,416.58	2,295.28	15.01	13.09	142.68	288.68	529.62	176.48	154.92	21.56	8.187		
2,500.00	2,331.84	2,516.16	2,385.09	15.95	13.97	141.52	308.88	567.60	184.93	161.75	23.18	7.977		
2,600.00	2,420.35	2,615.73	2,474.89	16.89	14.85	140.47	329.07	605.57	193.46	168.63	24.82	7.793		
2,700.00	2,508.86	2,715.31	2,564.70	17.83	15.73	139.50	349.27	643.55	202.04	175.56	26.48	7.631		
2,800.00	2,597.36	2,814.88	2,654.51	18.78	16.62	138.61	369.46	681.53	210.67	182.53	28.14	7.487		
2,900.00	2,685.87	2,914.46	2,744.31	19.72	17.50	137.79	389.66	719.50	219.35	189.54	29.81	7.359		
3,000.00	2,774.38	3,014.03	2,834.12	20.66	18.38	137.04	409.85	757.48	228.08	196.59	31.48	7.244		
3,100.00	2,862.89	3,113.61	2,923.93	21.61	19.27	136.34	430.05	795.46	236.83	203.67	33.16	7.141		
3,200.00	2,951.39	3,213.19	3,013.73	22.55	20.16	135.69	450.24	833.43	245.62	210.78	34.85	7.048		
3,300.00	3,039.90	3,312.76	3,103.54	23.50	21.04	135.08	470.44	871.41	254.45	217.91	36.54	6.964		
3,400.00	3,128.41	3,412.34	3,193.35	24.44	21.93	134.52	490.63	909.39	263.29	225.06	38.23	6.887		
3,500.00	3,216.91	3,511.91	3,283.15	25.39	22.82	133.99	510.83	947.36	272.16	232.24	39.92	6.817		
3,600.00	3,305.42	3,611.49	3,372.96	26.33	23.70	133.49	531.02	985.34	281.05	239.43	41.62	6.753		
3,700.00	3,393.93	3,711.06	3,462.77	27.28	24.59	133.03	551.22	1,023.32	289.96	246.65	43.32	6.694		
3,800.00	3,482.44	3,810.64	3,552.57	28.22	25.48	132.59	571.41	1,061.29	298.89	253.88	45.02	6.640		
3,900.00	3,570.94	3,910.21	3,642.38	29.17	26.37	132.18	591.60	1,099.27	307.84	261.12	46.72	6.589		
4,000.00	3,659.45	4,009.79	3,732.19	30.11	27.26	131.80	611.80	1,137.25	316.80	268.38	48.42	6.543		
4,100.00	3,747.96	4,109.36	3,821.99	31.06	28.15	131.43	631.99	1,175.22	325.77	275.65	50.12	6.500		
4,200.00	3,836.47	4,208.94	3,911.80	32.01	29.04	131.08	652.19	1,213.20	334.76	282.93	51.83	6.459		
4,300.00	3,924.97	4,308.52	4,001.61	32.95	29.93	130.75	672.38	1,251.18	343.76	290.23	53.53	6.422		
4,400.00	4,013.48	4,408.09	4,091.41	33.90	30.81	130.44	692.58	1,289.15	352.76	297.53	55.24	6.387		
4,500.00	4,101.99	4,507.67	4,181.22	34.85	31.70	130.14	712.77	1,327.13	361.78	304.84	56.94	6.354		
4,600.00	4,190.50	4,607.24	4,271.03	35.79	32.59	129.86	732.97	1,365.11	370.81	312.16	58.65	6.323		
4,700.00	4,279.00	4,706.82	4,360.83	36.74	33.48	129.59	753.16	1,403.08	379.85	319.49	60.35	6.294		
4,800.00	4,367.51	4,806.39	4,450.64	37.69	34.37	129.34	773.36	1,441.06	388.89	326.83	62.06	6.266		
4,900.00	4,456.02	4,905.97	4,540.45	38.63	35.26	129.09	793.55	1,479.04	397.94	334.17	63.77	6.240		
5,000.00	4,544.53	5,005.54	4,630.25	39.58	36.15	128.86	813.75	1,517.01	407.00	341.52	65.47	6.216		
5,100.00	4,633.03	5,105.12	4,720.06	40.53	37.04	128.64	833.94	1,554.99	416.06	348.88	67.18	6.193		

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 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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	4,721.54	5,204.70	4,809.87	41.47	37.93	128.42	854.14	1,592.97	425.13	356.24	68.89	6.171		
5,300.00	4,810.05	5,304.27	4,899.67	42.42	38.82	128.22	874.33	1,630.94	434.21	363.61	70.60	6.150		
5,400.00	4,898.56	5,403.85	4,989.48	43.37	39.71	128.02	894.53	1,668.92	443.29	370.99	72.31	6.131		
5,500.00	4,987.43	5,500.00	5,076.70	44.25	40.49	128.00	913.53	1,704.65	452.45	378.64	73.82	6.129		
5,600.00	5,078.08	5,587.97	5,157.88	44.94	41.06	128.07	929.44	1,734.57	460.94	386.00	74.94	6.150		
5,700.00	5,170.48	5,678.99	5,243.17	45.57	41.59	128.14	944.35	1,762.61	468.63	392.66	75.98	6.168		
5,800.00	5,264.46	5,769.96	5,329.61	46.13	42.06	128.20	957.65	1,787.62	475.49	398.61	76.89	6.184		
5,900.00	5,359.84	5,860.89	5,417.07	46.63	42.48	128.25	969.32	1,809.58	481.52	403.84	77.68	6.199		
6,000.00	5,456.44	5,951.79	5,505.41	47.06	42.84	128.30	979.36	1,828.45	486.70	408.35	78.35	6.212		
6,100.00	5,554.07	6,042.67	5,594.51	47.42	43.15	128.33	987.74	1,844.20	491.02	412.12	78.90	6.223		
6,200.00	5,652.55	6,133.52	5,684.22	47.72	43.41	128.36	994.45	1,856.83	494.49	415.16	79.33	6.233		
6,300.00	5,751.70	6,224.35	5,774.42	47.96	43.61	128.39	999.49	1,866.30	497.09	417.44	79.65	6.241		
6,400.00	5,851.31	6,315.18	5,864.95	48.13	43.76	128.40	1,002.84	1,872.61	498.83	418.97	79.85	6.247		
6,500.00	5,951.21	6,405.99	5,955.69	48.25	43.86	128.41	1,004.51	1,875.75	499.69	419.74	79.95	6.250		
6,600.00	6,051.21	6,501.51	6,051.21	48.31	43.92	179.64	1,004.71	1,876.13	499.79	419.78	80.02	6.246		
6,700.00	6,151.21	6,601.51	6,151.21	48.36	43.99	179.64	1,004.71	1,876.13	499.79	419.63	80.16	6.235		
6,800.00	6,251.21	6,701.51	6,251.21	48.42	44.05	179.64	1,004.71	1,876.13	499.79	419.49	80.31	6.224		
6,900.00	6,351.21	6,801.51	6,351.21	48.48	44.12	179.64	1,004.71	1,876.13	499.79	419.34	80.45	6.212		
7,000.00	6,451.21	6,901.51	6,451.21	48.54	44.19	179.64	1,004.71	1,876.13	499.79	419.19	80.60	6.201		
7,100.00	6,551.21	7,001.51	6,551.21	48.61	44.26	179.64	1,004.71	1,876.13	499.79	419.04	80.76	6.189		
7,200.00	6,651.21	7,101.51	6,651.21	48.67	44.33	179.64	1,004.71	1,876.13	499.79	418.88	80.91	6.177		
7,300.00	6,751.21	7,201.51	6,751.21	48.73	44.40	179.64	1,004.71	1,876.13	499.79	418.72	81.07	6.165		
7,400.00	6,851.21	7,301.51	6,851.21	48.80	44.48	179.64	1,004.71	1,876.13	499.79	418.56	81.23	6.153		
7,500.00	6,951.21	7,401.51	6,951.21	48.86	44.55	179.64	1,004.71	1,876.13	499.79	418.40	81.39	6.141		
7,600.00	7,051.21	7,501.51	7,051.21	48.93	44.62	179.64	1,004.71	1,876.13	499.79	418.24	81.55	6.128		
7,700.00	7,151.21	7,601.51	7,151.21	49.00	44.70	179.64	1,004.71	1,876.13	499.79	418.07	81.72	6.116		
7,800.00	7,251.21	7,701.51	7,251.21	49.07	44.78	179.64	1,004.71	1,876.13	499.79	417.91	81.89	6.104		
7,900.00	7,351.21	7,801.51	7,351.21	49.14	44.86	179.64	1,004.71	1,876.13	499.79	417.74	82.06	6.091		
8,000.00	7,451.21	7,901.51	7,451.21	49.21	44.93	179.64	1,004.71	1,876.13	499.79	417.56	82.23	6.078		
8,100.00	7,551.21	8,001.51	7,551.21	49.28	45.01	179.64	1,004.71	1,876.13	499.79	417.39	82.40	6.065		
8,200.00	7,651.21	8,101.51	7,651.21	49.35	45.09	179.64	1,004.71	1,876.13	499.79	417.21	82.58	6.052		
8,300.00	7,751.21	8,201.51	7,751.21	49.43	45.18	179.64	1,004.71	1,876.13	499.79	417.04	82.76	6.039		
8,400.00	7,851.21	8,301.51	7,851.21	49.50	45.26	179.64	1,004.71	1,876.13	499.79	416.86	82.94	6.026		
8,500.00	7,951.21	8,401.51	7,951.21	49.58	45.34	179.64	1,004.71	1,876.13	499.79	416.67	83.12	6.013		
8,600.00	8,051.21	8,501.51	8,051.21	49.65	45.43	179.64	1,004.71	1,876.13	499.79	416.49	83.30	6.000		
8,601.48	8,052.68	8,502.98	8,052.68	49.65	45.43	179.64	1,004.71	1,876.13	499.79	416.49	83.31	6.000 SF		
8,621.79	8,073.00	8,509.30	8,059.00	49.67	45.43	179.64	1,004.71	1,876.13	499.99	416.66	83.33	6.000		

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 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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	-124.42	-8.09	-11.80	14.30					
100.00	100.00	100.00	100.00	0.09	0.09	-124.42	-8.09	-11.80	14.30	14.13	0.18	81.589		
200.00	200.00	200.00	200.00	0.31	0.31	-124.42	-8.09	-11.80	14.30	13.68	0.62	22.892		
300.00	300.00	300.00	300.00	0.54	0.54	-124.42	-8.09	-11.80	14.30	13.23	1.07	13.314 CC, ES		
400.00	399.97	399.97	399.97	0.76	0.76	-176.22	-8.09	-11.80	16.48	14.92	1.56	10.576		
500.00	499.75	499.75	499.75	1.00	0.99	-177.28	-8.09	-11.80	23.01	20.93	2.08	11.082		
600.00	599.14	599.14	599.14	1.25	1.21	-178.15	-8.09	-11.80	33.89	31.28	2.61	13.002		
700.00	697.97	699.97	699.94	1.55	1.43	-179.44	-7.27	-9.78	47.04	43.91	3.13	15.040		
800.00	796.04	801.33	801.08	1.92	1.65	178.60	-4.78	-3.60	60.36	56.71	3.64	16.566		
900.00	893.17	903.20	902.31	2.35	1.90	176.32	-0.59	6.77	73.90	69.73	4.17	17.702		
1,000.00	989.17	1,005.54	1,003.43	2.86	2.19	173.89	5.31	21.38	87.74	83.01	4.73	18.554		
1,100.00	1,083.85	1,108.34	1,104.18	3.45	2.54	171.37	12.94	40.26	101.92	96.61	5.32	19.163		
1,200.00	1,177.05	1,211.58	1,204.35	4.13	2.96	168.82	22.28	63.42	116.53	110.56	5.96	19.541		
1,300.00	1,268.57	1,315.24	1,303.68	4.89	3.47	166.26	33.36	90.85	131.59	124.91	6.69	19.684		
1,400.00	1,358.25	1,419.29	1,401.95	5.74	4.07	163.71	46.16	122.55	147.18	139.67	7.51	19.590		
1,500.00	1,446.77	1,523.92	1,499.10	6.63	4.77	161.08	60.70	158.56	161.65	153.20	8.45	19.126		
1,600.00	1,535.27	1,627.97	1,593.88	7.55	5.57	158.01	76.76	198.35	172.84	163.25	9.59	18.027		
1,700.00	1,623.78	1,727.03	1,683.49	8.47	6.38	155.15	92.57	237.51	183.26	172.41	10.85	16.887		
1,800.00	1,712.29	1,826.09	1,773.09	9.39	7.20	152.61	108.38	276.66	194.10	181.88	12.22	15.885		
1,900.00	1,800.80	1,925.14	1,862.70	10.32	8.04	150.33	124.19	315.82	205.27	191.61	13.66	15.023		
2,000.00	1,889.30	2,024.20	1,952.31	11.26	8.89	148.29	140.00	354.97	216.73	201.56	15.17	14.286		
2,100.00	1,977.81	2,123.26	2,041.91	12.19	9.74	146.45	155.81	394.13	228.44	211.71	16.73	13.657		
2,200.00	2,066.32	2,222.32	2,131.52	13.13	10.60	144.80	171.62	433.29	240.36	222.04	18.32	13.120		
2,300.00	2,154.83	2,321.38	2,221.13	14.07	11.47	143.30	187.43	472.44	252.46	232.51	19.94	12.659		
2,400.00	2,243.33	2,420.44	2,310.74	15.01	12.33	141.94	203.24	511.60	264.71	243.12	21.59	12.261		
2,500.00	2,331.84	2,519.50	2,400.34	15.95	13.20	140.70	219.05	550.76	277.09	253.84	23.25	11.916		
2,600.00	2,420.35	2,618.56	2,489.95	16.89	14.07	139.57	234.86	589.91	289.60	264.67	24.93	11.615		
2,700.00	2,508.86	2,717.61	2,579.56	17.83	14.94	138.53	250.67	629.07	302.21	275.58	26.62	11.351		
2,800.00	2,597.36	2,816.67	2,669.17	18.78	15.82	137.57	266.48	668.22	314.90	286.58	28.32	11.118		
2,900.00	2,685.87	2,915.73	2,758.77	19.72	16.69	136.69	282.29	707.38	327.68	297.65	30.03	10.911		
3,000.00	2,774.38	3,014.79	2,848.38	20.66	17.57	135.87	298.10	746.54	340.53	308.78	31.75	10.727		
3,100.00	2,862.89	3,113.85	2,937.99	21.61	18.44	135.12	313.91	785.69	353.44	319.97	33.46	10.562		
3,200.00	2,951.39	3,212.91	3,027.59	22.55	19.32	134.41	329.72	824.85	366.40	331.22	35.19	10.413		
3,300.00	3,039.90	3,311.97	3,117.20	23.50	20.20	133.76	345.53	864.01	379.42	342.51	36.91	10.278		
3,400.00	3,128.41	3,411.03	3,206.81	24.44	21.07	133.15	361.34	903.16	392.49	353.84	38.64	10.156		
3,500.00	3,216.91	3,510.08	3,296.42	25.39	21.95	132.57	377.15	942.32	405.59	365.22	40.38	10.045		
3,600.00	3,305.42	3,609.14	3,386.02	26.33	22.83	132.04	392.96	981.47	418.73	376.62	42.11	9.944		
3,700.00	3,393.93	3,708.20	3,475.63	27.28	23.71	131.53	408.77	1,020.63	431.91	388.06	43.85	9.851		
3,800.00	3,482.44	3,807.26	3,565.24	28.22	24.59	131.06	424.58	1,059.79	445.12	399.53	45.58	9.765		
3,900.00	3,570.94	3,906.32	3,654.85	29.17	25.47	130.61	440.39	1,098.94	458.35	411.03	47.32	9.686		
4,000.00	3,659.45	4,005.38	3,744.45	30.11	26.35	130.19	456.20	1,138.10	471.61	422.55	49.06	9.613		
4,100.00	3,747.96	4,104.44	3,834.06	31.06	27.23	129.79	472.01	1,177.26	484.90	434.10	50.80	9.546		
4,200.00	3,836.47	4,203.49	3,923.67	32.01	28.11	129.41	487.82	1,216.41	498.20	445.67	52.54	9.483		
4,300.00	3,924.97	4,302.55	4,013.28	32.95	28.99	129.06	503.63	1,255.57	511.53	457.25	54.28	9.424		
4,400.00	4,013.48	4,401.61	4,102.88	33.90	29.87	128.72	519.44	1,294.72	524.88	468.86	56.02	9.370		
4,500.00	4,101.99	4,500.67	4,192.49	34.85	30.76	128.39	535.24	1,333.88	538.24	480.48	57.76	9.318		
4,600.00	4,190.50	4,599.73	4,282.10	35.79	31.64	128.09	551.05	1,373.04	551.62	492.12	59.50	9.270		
4,700.00	4,279.00	4,698.79	4,371.70	36.74	32.52	127.80	566.86	1,412.19	565.01	503.77	61.24	9.226		
4,800.00	4,367.51	4,797.85	4,461.31	37.69	33.40	127.52	582.67	1,451.35	578.42	515.43	62.99	9.183		
4,900.00	4,456.02	4,896.91	4,550.92	38.63	34.28	127.25	598.48	1,490.51	591.84	527.11	64.73	9.143		
5,000.00	4,544.53	4,995.96	4,640.53	39.58	35.16	127.00	614.29	1,529.66	605.27	538.80	66.47	9.106		
5,100.00	4,633.03	5,095.02	4,730.13	40.53	36.05	126.75	630.10	1,568.82	618.72	550.50	68.21	9.070		

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 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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	4,721.54	5,194.08	4,819.74	41.47	36.93	126.52	645.91	1,607.97	632.17	562.21	69.96	9.037	
5,300.00	4,810.05	5,293.14	4,909.35	42.42	37.81	126.29	661.72	1,647.13	645.63	573.93	71.70	9.005	
5,400.00	4,898.56	5,389.53	4,996.60	43.37	38.64	126.10	677.06	1,685.11	659.16	585.78	73.39	8.982 SF	
5,500.00	4,987.43	5,479.21	5,078.87	44.25	39.26	126.26	690.42	1,718.21	673.26	598.56	74.70	9.013	
5,600.00	5,078.08	5,568.84	5,162.41	44.94	39.81	126.54	702.57	1,748.29	686.39	610.61	75.78	9.058	
5,700.00	5,170.48	5,658.44	5,247.14	45.57	40.30	126.80	713.48	1,775.31	698.32	621.59	76.73	9.100	
5,800.00	5,264.46	5,748.01	5,332.90	46.13	40.74	127.05	723.13	1,799.23	709.05	631.48	77.57	9.141	
5,900.00	5,359.84	5,837.55	5,419.58	46.63	41.12	127.28	731.53	1,820.02	718.56	640.28	78.28	9.179	
6,000.00	5,456.44	5,927.05	5,507.04	47.06	41.45	127.50	738.64	1,837.65	726.83	647.96	78.87	9.215	
6,100.00	5,554.07	6,016.51	5,595.13	47.42	41.72	127.70	744.48	1,852.09	733.86	654.52	79.34	9.249	
6,200.00	5,652.55	6,105.93	5,683.72	47.72	41.95	127.89	749.01	1,863.33	739.63	659.94	79.69	9.281	
6,300.00	5,751.70	6,200.00	5,777.35	47.96	42.13	128.07	752.39	1,871.68	744.16	664.24	79.92	9.311	
6,400.00	5,851.31	6,284.63	5,861.83	48.13	42.24	128.22	754.19	1,876.15	747.39	667.36	80.03	9.339	
6,500.00	5,951.21	6,374.03	5,951.21	48.25	42.31	128.37	754.82	1,877.72	749.36	669.34	80.03	9.364	
6,600.00	6,051.21	6,474.02	6,051.21	48.31	42.38	179.64	754.82	1,877.72	749.69	669.60	80.09	9.361	
6,700.00	6,151.21	6,574.02	6,151.21	48.36	42.45	179.64	754.82	1,877.72	749.69	669.46	80.23	9.344	
6,800.00	6,251.21	6,674.02	6,251.21	48.42	42.52	179.64	754.82	1,877.72	749.69	669.31	80.37	9.327	
6,900.00	6,351.21	6,774.02	6,351.21	48.48	42.59	179.64	754.82	1,877.72	749.69	669.16	80.52	9.310	
7,000.00	6,451.21	6,874.02	6,451.21	48.54	42.66	179.64	754.82	1,877.72	749.69	669.01	80.67	9.293	
7,100.00	6,551.21	6,974.02	6,551.21	48.61	42.73	179.64	754.82	1,877.72	749.69	668.86	80.83	9.275	
7,200.00	6,651.21	7,074.02	6,651.21	48.67	42.81	179.64	754.82	1,877.72	749.69	668.70	80.98	9.257	
7,300.00	6,751.21	7,174.02	6,751.21	48.73	42.88	179.64	754.82	1,877.72	749.69	668.55	81.14	9.240	
7,400.00	6,851.21	7,274.02	6,851.21	48.80	42.96	179.64	754.82	1,877.72	749.69	668.39	81.30	9.221	
7,500.00	6,951.21	7,374.02	6,951.21	48.86	43.03	179.64	754.82	1,877.72	749.69	668.23	81.46	9.203	
7,600.00	7,051.21	7,474.02	7,051.21	48.93	43.11	179.64	754.82	1,877.72	749.69	668.06	81.62	9.185	
7,700.00	7,151.21	7,574.02	7,151.21	49.00	43.19	179.64	754.82	1,877.72	749.69	667.90	81.79	9.166	
7,800.00	7,251.21	7,674.02	7,251.21	49.07	43.27	179.64	754.82	1,877.72	749.69	667.73	81.96	9.147	
7,900.00	7,351.21	7,774.02	7,351.21	49.14	43.35	179.64	754.82	1,877.72	749.69	667.56	82.13	9.128	
8,000.00	7,451.21	7,874.02	7,451.21	49.21	43.43	179.64	754.82	1,877.72	749.69	667.39	82.30	9.109	
8,100.00	7,551.21	7,974.02	7,551.21	49.28	43.52	179.64	754.82	1,877.72	749.69	667.21	82.47	9.090	
8,200.00	7,651.21	8,074.02	7,651.21	49.35	43.60	179.64	754.82	1,877.72	749.69	667.04	82.65	9.071	
8,300.00	7,751.21	8,174.02	7,751.21	49.43	43.69	179.64	754.82	1,877.72	749.69	666.86	82.83	9.051	
8,400.00	7,851.21	8,274.02	7,851.21	49.50	43.77	179.64	754.82	1,877.72	749.69	666.68	83.01	9.031	
8,500.00	7,951.21	8,374.02	7,951.21	49.58	43.86	179.64	754.82	1,877.72	749.69	666.49	83.19	9.012	
8,565.91	8,017.12	8,439.94	8,017.12	49.63	43.92	179.64	754.82	1,877.72	749.69	666.37	83.31	8.999	
8,600.00	8,051.21	8,471.82	8,049.00	49.65	43.94	179.64	754.82	1,877.72	749.69	666.32	83.37	8.992	
8,621.79	8,073.00	8,471.82	8,049.00	49.67	43.94	179.64	754.82	1,877.72	750.07	666.68	83.39	8.994	

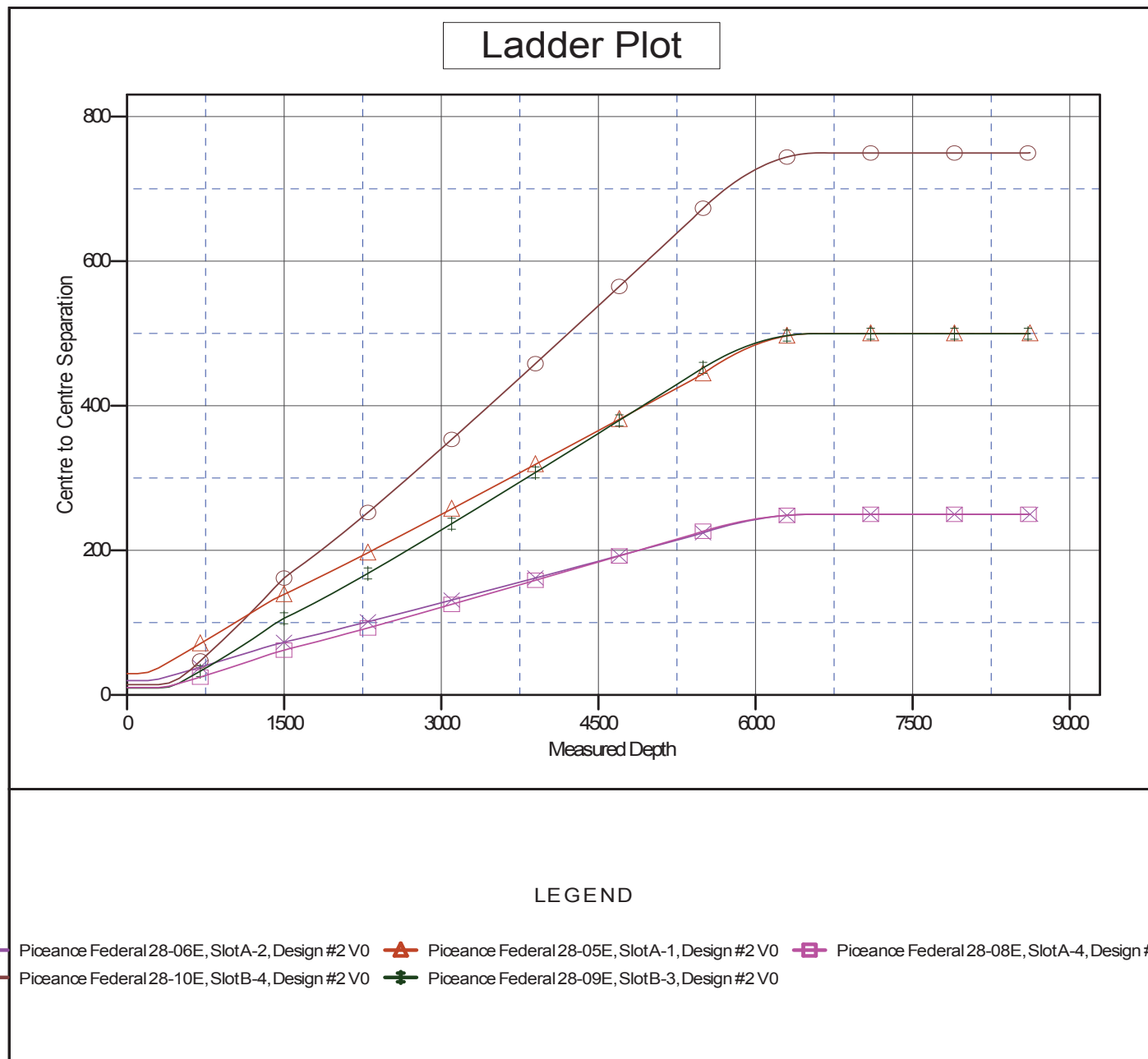
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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 28-07E
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 28-07E
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 28-07E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-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 28-07E

Coordinate System is US State Plane 1983, Colorado Central Zone

Grid Convergence at Surface is: -1.43°

