



# **Piceance Energy, LLC**

**Mesa County, CO**

**Piceance 28-10 Pad**

**Piceance Federal 28-18E**

**Slot A-8**

**Plan: Design #2**

## **Standard Planning Report**

**15 April, 2015**

# **Archer**



Project: Mesa County, CO  
Site: Piceance 28-10 Pad  
Well: Piceance Federal 28-18E  
Wellbore: Slot A-8  
Design: Design #2  
Latitude: 39° 14' 47.290 N  
Longitude: 107° 46' 29.820 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 28-18E, 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 28-18E

+N/-S	+E/-W	Northing	Ground Level: Easting	Latitude	Longitude	Slot
0.00	0.00	1522727.301	2355799.429	39° 14' 47.290 N	107° 46' 29.820 W	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance 28-18E tgt	7974.00	-1176.54	1905.40	1521503.423	2357674.772	39° 14' 35.660 N	107° 46' 5.600 W	Circle (Radius: 50.00)

### SECTION DETAILS

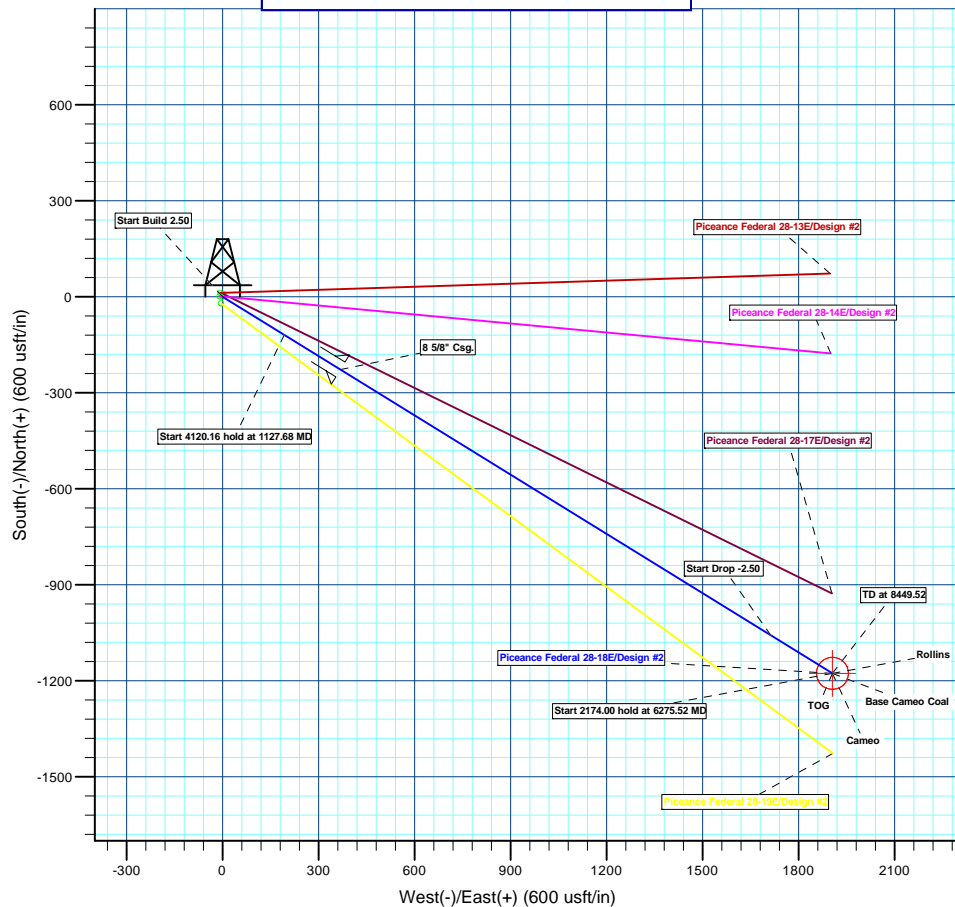
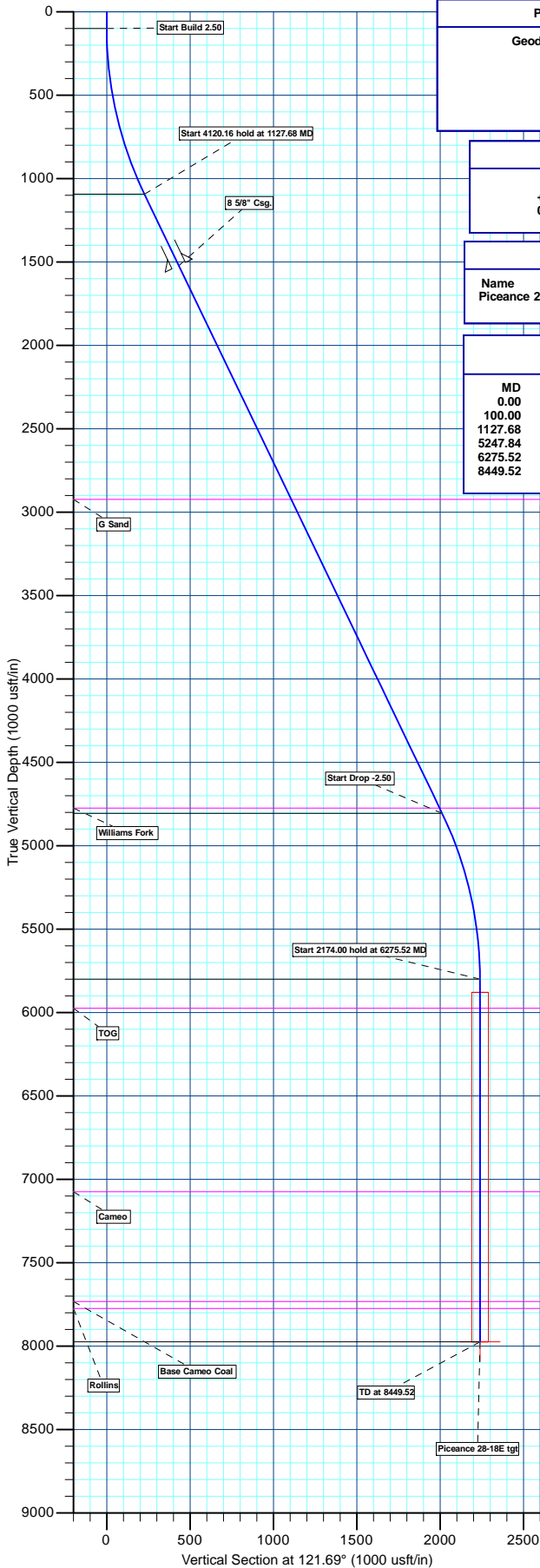
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.50
1127.68	25.69	121.69	1093.58	-119.04	192.78	2.50	121.69	226.58	Start 4120.16 hold at 1127.68 MD
5247.84	25.69	121.69	4806.42	-1057.50	1712.62	0.00	0.00	2012.80	Start Drop -2.50
6275.52	0.00	0.00	5800.00	-1176.54	1905.40	2.50	180.00	2239.37	Start 2174.00 hold at 6275.52 MD
8449.52	0.00	0.00	7974.00	-1176.54	1905.40	0.00	0.00	2239.37	TD at 8449.52



Azimuths to True North  
Magnetic North: 9.73°  
Magnetic Field  
Strength: 51746.4snT  
Dip Angle: 65.47°  
Date: 03/31/2015  
Model: IGRF2010

### FORMATION TOP DETAILS

TVDPATH	MDPATH	Formation
2924.00	3158.91	G Sand
4774.00	5211.87	Williams Fork
5974.00	6449.52	TOG
7074.00	7549.52	Cameo
7732.00	8207.52	Base Cameo Coal
7774.00	8249.52	Rollins



Plan: Design #2 (Piceance Federal 28-18E/Slot A-8)

Created By: Ricky Osburn Date: 9:52, April 15 2015



<b>Database:</b>	EDMDBBW	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-18E
<b>Company:</b>	Piceance Energy, LLC	<b>TVD Reference:</b>	Well @ 7701.00usft
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	Well @ 7701.00usft
<b>Site:</b>	Piceance 28-10 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Piceance Federal 28-18E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Slot A-8		
<b>Design:</b>	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 28-18E					
Well Position	+N/-S	-96.13 usft	Northing:	1,522,727.301 usft	Latitude:	39° 14' 47.290 N
	+E/-W	-24.39 usft	Easting:	2,355,799.429 usft	Longitude:	107° 46' 29.820 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,679.00 usft

Wellbore	Slot A-8				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2015/03/31	9.73	65.47	51,746

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	121.69

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	
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,127.68	25.69	121.69	1,093.58	-119.04	192.78	2.50	2.50	0.00	121.69	
5,247.84	25.69	121.69	4,806.42	-1,057.50	1,712.62	0.00	0.00	0.00	0.00	
6,275.52	0.00	0.00	5,800.00	-1,176.54	1,905.40	2.50	-2.50	0.00	180.00	
8,449.52	0.00	0.00	7,974.00	-1,176.54	1,905.40	0.00	0.00	0.00	0.00	Piceance 28-18E tgt



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-18E
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 28-18E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-8		
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
Start Build 2.50									
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	2.50	121.69	199.97	-1.15	1.86	2.18	2.50	2.50	0.00
300.00	5.00	121.69	299.75	-4.58	7.42	8.72	2.50	2.50	0.00
400.00	7.50	121.69	399.14	-10.30	16.68	19.61	2.50	2.50	0.00
500.00	10.00	121.69	497.97	-18.29	29.63	34.82	2.50	2.50	0.00
600.00	12.50	121.69	596.04	-28.54	46.22	54.33	2.50	2.50	0.00
700.00	15.00	121.69	693.17	-41.03	66.45	78.09	2.50	2.50	0.00
800.00	17.50	121.69	789.17	-55.73	90.25	106.07	2.50	2.50	0.00
900.00	20.00	121.69	883.85	-72.62	117.60	138.21	2.50	2.50	0.00
1,000.00	22.50	121.69	977.05	-91.66	148.44	174.46	2.50	2.50	0.00
1,100.00	25.00	121.69	1,068.57	-112.81	182.70	214.73	2.50	2.50	0.00
Start 4120.16 hold at 1127.68 MD									
1,127.68	25.69	121.69	1,093.58	-119.04	192.78	226.58	2.50	2.50	0.00
1,200.00	25.69	121.69	1,158.76	-135.51	219.46	257.93	0.00	0.00	0.00
1,300.00	25.69	121.69	1,248.87	-158.29	256.35	301.28	0.00	0.00	0.00
1,400.00	25.69	121.69	1,338.98	-181.07	293.24	344.64	0.00	0.00	0.00
1,500.00	25.69	121.69	1,429.10	-203.84	330.13	387.99	0.00	0.00	0.00
1,600.00	25.69	121.69	1,519.21	-226.62	367.01	431.34	0.00	0.00	0.00
8 5/8" Csg.									
1,603.10	25.69	121.69	1,522.00	-227.33	368.15	432.68	0.00	0.00	0.00
1,700.00	25.69	121.69	1,609.32	-249.40	403.90	474.70	0.00	0.00	0.00
1,800.00	25.69	121.69	1,699.44	-272.18	440.79	518.05	0.00	0.00	0.00
1,900.00	25.69	121.69	1,789.55	-294.95	477.68	561.40	0.00	0.00	0.00
2,000.00	25.69	121.69	1,879.67	-317.73	514.56	604.76	0.00	0.00	0.00
2,100.00	25.69	121.69	1,969.78	-340.51	551.45	648.11	0.00	0.00	0.00
2,200.00	25.69	121.69	2,059.89	-363.29	588.34	691.46	0.00	0.00	0.00
2,300.00	25.69	121.69	2,150.01	-386.06	625.23	734.82	0.00	0.00	0.00
2,400.00	25.69	121.69	2,240.12	-408.84	662.11	778.17	0.00	0.00	0.00
2,500.00	25.69	121.69	2,330.23	-431.62	699.00	821.52	0.00	0.00	0.00
2,600.00	25.69	121.69	2,420.35	-454.40	735.89	864.87	0.00	0.00	0.00
2,700.00	25.69	121.69	2,510.46	-477.17	772.78	908.23	0.00	0.00	0.00
2,800.00	25.69	121.69	2,600.58	-499.95	809.66	951.58	0.00	0.00	0.00
2,900.00	25.69	121.69	2,690.69	-522.73	846.55	994.93	0.00	0.00	0.00
3,000.00	25.69	121.69	2,780.80	-545.50	883.44	1,038.29	0.00	0.00	0.00
3,100.00	25.69	121.69	2,870.92	-568.28	920.33	1,081.64	0.00	0.00	0.00
G Sand									
3,158.91	25.69	121.69	2,924.00	-581.70	942.06	1,107.18	0.00	0.00	0.00
3,200.00	25.69	121.69	2,961.03	-591.06	957.22	1,124.99	0.00	0.00	0.00
3,300.00	25.69	121.69	3,051.14	-613.84	994.10	1,168.35	0.00	0.00	0.00
3,400.00	25.69	121.69	3,141.26	-636.61	1,030.99	1,211.70	0.00	0.00	0.00
3,500.00	25.69	121.69	3,231.37	-659.39	1,067.88	1,255.05	0.00	0.00	0.00
3,600.00	25.69	121.69	3,321.49	-682.17	1,104.77	1,298.41	0.00	0.00	0.00
3,700.00	25.69	121.69	3,411.60	-704.95	1,141.65	1,341.76	0.00	0.00	0.00
3,800.00	25.69	121.69	3,501.71	-727.72	1,178.54	1,385.11	0.00	0.00	0.00
3,900.00	25.69	121.69	3,591.83	-750.50	1,215.43	1,428.47	0.00	0.00	0.00
4,000.00	25.69	121.69	3,681.94	-773.28	1,252.32	1,471.82	0.00	0.00	0.00
4,100.00	25.69	121.69	3,772.06	-796.05	1,289.20	1,515.17	0.00	0.00	0.00
4,200.00	25.69	121.69	3,862.17	-818.83	1,326.09	1,558.53	0.00	0.00	0.00
4,300.00	25.69	121.69	3,952.28	-841.61	1,362.98	1,601.88	0.00	0.00	0.00
4,400.00	25.69	121.69	4,042.40	-864.39	1,399.87	1,645.23	0.00	0.00	0.00
4,500.00	25.69	121.69	4,132.51	-887.16	1,436.76	1,688.59	0.00	0.00	0.00
4,600.00	25.69	121.69	4,222.62	-909.94	1,473.64	1,731.94	0.00	0.00	0.00



<b>Database:</b>	EDMDBBW	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-18E
<b>Company:</b>	Piceance Energy, LLC	<b>TVD Reference:</b>	Well @ 7701.00usft
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	Well @ 7701.00usft
<b>Site:</b>	Piceance 28-10 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Piceance Federal 28-18E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Slot A-8		
<b>Design:</b>	Design #2		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,700.00	25.69	121.69	4,312.74	-932.72	1,510.53	1,775.29	0.00	0.00	0.00
4,800.00	25.69	121.69	4,402.85	-955.50	1,547.42	1,818.65	0.00	0.00	0.00
4,900.00	25.69	121.69	4,492.97	-978.27	1,584.31	1,862.00	0.00	0.00	0.00
5,000.00	25.69	121.69	4,583.08	-1,001.05	1,621.19	1,905.35	0.00	0.00	0.00
5,100.00	25.69	121.69	4,673.19	-1,023.83	1,658.08	1,948.71	0.00	0.00	0.00
5,200.00	25.69	121.69	4,763.31	-1,046.61	1,694.97	1,992.06	0.00	0.00	0.00
<b>Williams Fork</b>									
5,211.87	25.69	121.69	4,774.00	-1,049.31	1,699.35	1,997.20	0.00	0.00	0.00
<b>Start Drop -2.50</b>									
5,247.84	25.69	121.69	4,806.42	-1,057.50	1,712.62	2,012.80	0.00	0.00	0.00
5,300.00	24.39	121.69	4,853.67	-1,069.10	1,731.40	2,034.88	2.50	-2.50	0.00
5,400.00	21.89	121.69	4,945.62	-1,089.74	1,764.83	2,074.17	2.50	-2.50	0.00
5,500.00	19.39	121.69	5,039.20	-1,108.26	1,794.82	2,109.41	2.50	-2.50	0.00
5,600.00	16.89	121.69	5,134.22	-1,124.61	1,821.30	2,140.54	2.50	-2.50	0.00
5,700.00	14.39	121.69	5,230.51	-1,138.78	1,844.24	2,167.49	2.50	-2.50	0.00
5,800.00	11.89	121.69	5,327.89	-1,150.72	1,863.58	2,190.22	2.50	-2.50	0.00
5,900.00	9.39	121.69	5,426.16	-1,160.41	1,879.28	2,208.68	2.50	-2.50	0.00
6,000.00	6.89	121.69	5,525.15	-1,167.85	1,891.33	2,222.83	2.50	-2.50	0.00
6,100.00	4.39	121.69	5,624.65	-1,173.01	1,899.68	2,232.66	2.50	-2.50	0.00
6,200.00	1.89	121.69	5,724.50	-1,175.89	1,904.34	2,238.13	2.50	-2.50	0.00
<b>Start 2174.00 hold at 6275.52 MD</b>									
6,275.52	0.00	0.00	5,800.00	-1,176.54	1,905.40	2,239.37	2.50	-2.50	0.00
6,300.00	0.00	0.00	5,824.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
6,400.00	0.00	0.00	5,924.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
<b>TOG</b>									
6,449.52	0.00	0.00	5,974.00	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
6,500.00	0.00	0.00	6,024.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
6,600.00	0.00	0.00	6,124.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
6,700.00	0.00	0.00	6,224.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
6,800.00	0.00	0.00	6,324.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
6,900.00	0.00	0.00	6,424.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
7,000.00	0.00	0.00	6,524.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
7,100.00	0.00	0.00	6,624.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
7,200.00	0.00	0.00	6,724.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
7,300.00	0.00	0.00	6,824.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
7,400.00	0.00	0.00	6,924.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
7,500.00	0.00	0.00	7,024.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
<b>Cameo</b>									
7,549.52	0.00	0.00	7,074.00	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
7,600.00	0.00	0.00	7,124.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
7,700.00	0.00	0.00	7,224.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
7,800.00	0.00	0.00	7,324.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
7,900.00	0.00	0.00	7,424.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
8,000.00	0.00	0.00	7,524.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
8,100.00	0.00	0.00	7,624.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
8,200.00	0.00	0.00	7,724.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
8,207.52	0.00	0.00	7,732.00	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
<b>Rollins</b>									
8,249.52	0.00	0.00	7,774.00	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
8,300.00	0.00	0.00	7,824.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00
8,400.00	0.00	0.00	7,924.48	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00



<b>Database:</b>	EDMDBBW	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-18E
<b>Company:</b>	Piceance Energy, LLC	<b>TVD Reference:</b>	Well @ 7701.00usft
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	Well @ 7701.00usft
<b>Site:</b>	Piceance 28-10 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Piceance Federal 28-18E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Slot A-8		
<b>Design:</b>	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 8449.52									
8,449.52	0.00	0.00	7,974.00	-1,176.54	1,905.40	2,239.37	0.00	0.00	0.00

Design Targets									
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Piceance 28-18E tgt - plan hits target center - Circle (radius 50.00)	0.00	0.00	7,974.00	-1,176.54	1,905.40	1,521,503.423	2,357,674.772	39° 14' 35.660 N	107° 46' 5.600 W

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
1,603.10	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 (°)
3,158.91	2,924.00	G Sand		0.00	
5,211.87	4,774.00	Williams Fork		0.00	
6,449.52	5,974.00	TOG		0.00	
7,549.52	7,074.00	Cameo		0.00	
8,207.52	7,732.00	Base Cameo Coal		0.00	
8,249.52	7,774.00	Rollins		0.00	

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
100.00	100.00	0.00	0.00	Start Build 2.50
1,127.68	1,093.58	-119.04	192.78	Start 4120.16 hold at 1127.68 MD
5,247.84	4,806.42	-1,057.50	1,712.62	Start Drop -2.50
6,275.52	5,800.00	-1,176.54	1,905.40	Start 2174.00 hold at 6275.52 MD
8,449.52	7,974.00	-1,176.54	1,905.40	TD at 8449.52



# **Piceance Energy, LLC**

**Mesa County, CO**

**Piceance 28-10 Pad**

**Piceance Federal 28-18E**

**Slot A-8**

**Design #2**

## **Anticollision Report**

**15 April, 2015**

# **Archer**



# Archer

## Anticollision Report

# Archer

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-18E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7701.00usft
<b>Reference Site:</b>	Piceance 28-10 Pad	<b>MD Reference:</b>	Well @ 7701.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Piceance Federal 28-18E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Slot A-8	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #2	<b>Offset TVD Reference:</b>	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	8,449.52	Design #2 (Slot A-8)	MWD	MWD - Standard	

Summary						
Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance		Separation Factor	Warning
			Between Centres (usft)	Between Ellipses (usft)		
Piceance 28-10 Pad						
Piceance Federal 28-13E - Slot B-7 - Design #2	100.00	100.00	14.04	13.86	80.055	CC, ES
Piceance Federal 28-13E - Slot B-7 - Design #2	4,700.00	4,624.03	994.61	931.96	15.877	SF
Piceance Federal 28-14E - Slot B-8 - Design #2	100.00	100.00	9.65	9.48	55.047	CC, ES
Piceance Federal 28-14E - Slot B-8 - Design #2	8,449.52	8,347.20	999.57	914.49	11.748	SF
Piceance Federal 28-17E - Slot A-7 - Design #2	100.00	100.00	9.41	9.23	53.653	CC, ES
Piceance Federal 28-17E - Slot A-7 - Design #2	8,449.52	8,407.84	249.90	164.49	2.926	SF
Piceance Federal 28-19E - Slot A-9 - Design #2	274.17	274.00	19.70	18.74	20.595	CC
Piceance Federal 28-19E - Slot A-9 - Design #2	300.00	299.75	19.81	18.73	18.372	ES
Piceance Federal 28-19E - Slot A-9 - Design #2	3,000.00	3,016.47	103.69	58.87	2.314	SF

Offset Design		Piceance 28-10 Pad - Piceance Federal 28-13E - Slot B-7 - Design #2											Offset Site Error:	0.00 usft	
Survey Program:		0-MWD												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
0.00	0.00	0.00	0.00	0.00	0.00	-30.30	12.12	-7.08	14.04						
100.00	100.00	100.00	100.00	0.09	0.09	-30.30	12.12	-7.08	14.04	13.86	0.18	80.055	CC, ES		
200.00	199.97	199.97	199.97	0.31	0.31	-155.64	12.12	-7.08	15.99	15.30	0.69	23.080			
300.00	299.75	299.75	299.75	0.55	0.54	-162.60	12.12	-7.08	22.12	20.87	1.25	17.716			
400.00	399.14	399.14	399.14	0.82	0.76	-168.26	12.12	-7.08	32.67	30.86	1.81	18.019			
500.00	497.97	497.97	497.97	1.17	0.98	-171.93	12.12	-7.08	47.67	45.29	2.38	20.062			
600.00	596.04	596.04	596.04	1.57	1.20	-174.22	12.12	-7.08	67.04	64.11	2.94	22.832			
700.00	693.17	696.13	696.10	2.06	1.42	-174.91	12.18	-5.07	89.18	85.70	3.48	25.629			
800.00	789.17	796.87	796.63	2.62	1.63	-174.08	12.39	1.37	112.23	108.22	4.01	27.965			
900.00	883.85	898.11	897.27	3.27	1.87	-172.48	12.74	12.27	136.23	131.66	4.57	29.816			
1,000.00	977.05	999.75	997.73	4.00	2.16	-170.48	13.23	27.68	161.28	156.12	5.16	31.243			
1,100.00	1,068.57	1,101.71	1,097.72	4.83	2.50	-168.24	13.86	47.59	187.49	181.68	5.81	32.249			
1,200.00	1,158.76	1,204.20	1,197.23	5.73	2.92	-165.93	14.64	72.06	213.90	207.41	6.49	32.953			
1,300.00	1,248.87	1,307.74	1,296.55	6.64	3.43	-163.33	15.58	101.28	237.80	230.51	7.29	32.619			
1,400.00	1,338.98	1,411.96	1,395.08	7.55	4.03	-160.39	16.66	135.18	259.27	251.00	8.27	31.341			
1,500.00	1,429.10	1,516.45	1,492.22	8.47	4.74	-157.13	17.88	173.63	278.64	269.17	9.47	29.421			
1,600.00	1,519.21	1,615.79	1,583.26	9.40	5.50	-153.89	19.15	213.37	296.84	286.00	10.83	27.398			
1,700.00	1,609.32	1,712.83	1,672.10	10.32	6.27	-151.05	20.40	252.40	315.73	303.44	12.29	25.693			

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





# Archer

## Anticollision Report

# Archer

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-18E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7701.00usft
<b>Reference Site:</b>	Piceance 28-10 Pad	<b>MD Reference:</b>	Well @ 7701.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Piceance Federal 28-18E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Slot A-8	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #2	<b>Offset TVD Reference:</b>	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		
1,800.00	1,699.44	1,809.87	1,760.94	11.25	7.05	-148.54	21.64	291.43	335.29	321.48	13.81	24.275		
1,900.00	1,789.55	1,906.91	1,849.77	12.18	7.84	-146.30	22.89	330.45	355.42	340.03	15.39	23.099		
2,000.00	1,879.67	2,003.95	1,938.61	13.10	8.65	-144.29	24.13	369.48	376.02	359.03	17.00	22.122		
2,100.00	1,969.78	2,100.99	2,027.45	14.03	9.45	-142.50	25.38	408.51	397.03	378.39	18.63	21.305		
2,200.00	2,059.89	2,198.03	2,116.29	14.96	10.26	-140.88	26.62	447.53	418.37	398.08	20.29	20.618		
2,300.00	2,150.01	2,295.07	2,205.12	15.90	11.08	-139.42	27.87	486.56	440.00	418.04	21.96	20.035		
2,400.00	2,240.12	2,392.11	2,293.96	16.83	11.89	-138.10	29.11	525.58	461.89	438.25	23.64	19.537		
2,500.00	2,330.23	2,489.15	2,382.80	17.76	12.71	-136.90	30.36	564.61	483.99	458.66	25.33	19.109		
2,600.00	2,420.35	2,586.19	2,471.64	18.69	13.53	-135.80	31.60	603.64	506.27	479.25	27.02	18.737		
2,700.00	2,510.46	2,683.23	2,560.47	19.62	14.36	-134.79	32.85	642.66	528.72	500.01	28.71	18.413		
2,800.00	2,600.58	2,780.27	2,649.31	20.56	15.18	-133.86	34.09	681.69	551.32	520.91	30.41	18.128		
2,900.00	2,690.69	2,877.31	2,738.15	21.49	16.00	-133.01	35.34	720.72	574.04	541.93	32.11	17.877		
3,000.00	2,780.80	2,974.35	2,826.99	22.42	16.83	-132.22	36.58	759.74	596.87	563.06	33.81	17.653		
3,100.00	2,870.92	3,071.39	2,915.82	23.35	17.66	-131.49	37.83	798.77	619.81	584.30	35.51	17.454		
3,200.00	2,961.03	3,168.43	3,004.66	24.29	18.48	-130.81	39.07	837.80	642.83	605.62	37.21	17.275		
3,300.00	3,051.14	3,265.47	3,093.50	25.22	19.31	-130.18	40.32	876.82	665.93	627.02	38.91	17.114		
3,400.00	3,141.26	3,362.51	3,182.34	26.15	20.14	-129.59	41.56	915.85	689.11	648.50	40.61	16.969		
3,500.00	3,231.37	3,459.55	3,271.17	27.09	20.97	-129.04	42.81	954.88	712.34	670.04	42.31	16.837		
3,600.00	3,321.49	3,556.59	3,360.01	28.02	21.80	-128.52	44.05	993.90	735.64	691.63	44.01	16.716		
3,700.00	3,411.60	3,653.63	3,448.85	28.95	22.62	-128.04	45.30	1,032.93	758.99	713.29	45.71	16.606		
3,800.00	3,501.71	3,750.67	3,537.69	29.89	23.45	-127.58	46.54	1,071.95	782.39	734.99	47.40	16.505		
3,900.00	3,591.83	3,847.71	3,626.52	30.82	24.28	-127.15	47.79	1,110.98	805.84	756.74	49.10	16.413		
4,000.00	3,681.94	3,944.75	3,715.36	31.76	25.11	-126.75	49.03	1,150.01	829.32	778.53	50.79	16.327		
4,100.00	3,772.06	4,041.79	3,804.20	32.69	25.94	-126.36	50.28	1,189.03	852.84	800.35	52.49	16.248		
4,200.00	3,862.17	4,138.83	3,893.04	33.62	26.77	-126.00	51.52	1,228.06	876.40	822.22	54.18	16.174		
4,300.00	3,952.28	4,235.87	3,981.87	34.56	27.61	-125.66	52.77	1,267.09	899.99	844.11	55.88	16.106		
4,400.00	4,042.40	4,332.91	4,070.71	35.49	28.44	-125.33	54.01	1,306.11	923.60	866.03	57.57	16.043		
4,500.00	4,132.51	4,429.95	4,159.55	36.43	29.27	-125.02	55.26	1,345.14	947.25	887.99	59.26	15.984		
4,600.00	4,222.62	4,526.99	4,248.39	37.36	30.10	-124.72	56.50	1,384.17	970.92	909.96	60.96	15.928		
4,700.00	4,312.74	4,624.03	4,337.22	38.29	30.93	-124.44	57.75	1,423.19	994.61	931.96	62.65	15.877 SF		



# Archer

## Anticollision Report

# Archer

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-18E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7701.00usft
<b>Reference Site:</b>	Piceance 28-10 Pad	<b>MD Reference:</b>	Well @ 7701.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Piceance Federal 28-18E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Slot A-8	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #2	<b>Offset TVD Reference:</b>	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	-78.00	2.01	-9.44	9.65					
100.00	100.00	100.00	100.00	0.09	0.09	-78.00	2.01	-9.44	9.65	9.48	0.18	55.047	CC, ES	
200.00	199.97	199.97	199.97	0.31	0.31	163.88	2.01	-9.44	11.73	11.03	0.70	16.726		
300.00	299.75	299.75	299.75	0.55	0.54	169.61	2.01	-9.44	18.10	16.84	1.26	14.376		
400.00	399.14	399.14	399.14	0.82	0.76	173.48	2.01	-9.44	28.88	27.06	1.82	15.857		
500.00	497.97	497.97	497.97	1.17	0.98	175.70	2.01	-9.44	44.02	41.64	2.38	18.486		
600.00	596.04	598.49	598.46	1.57	1.20	177.81	1.81	-7.33	61.61	58.69	2.92	21.092		
700.00	693.17	699.61	699.36	2.06	1.41	-179.56	1.19	-0.79	79.64	76.19	3.45	23.099		
800.00	789.17	801.26	800.39	2.62	1.66	-176.72	0.16	10.24	98.24	94.25	3.99	24.605		
900.00	883.85	903.37	901.29	3.27	1.95	-173.80	-1.30	25.81	117.54	112.97	4.57	25.734		
1,000.00	977.05	1,005.90	1,001.80	4.00	2.31	-170.85	-3.19	45.93	137.65	132.46	5.19	26.515		
1,100.00	1,068.57	1,108.80	1,101.66	4.83	2.75	-167.93	-5.50	70.59	158.68	152.79	5.89	26.936		
1,200.00	1,158.76	1,212.22	1,200.82	5.73	3.28	-165.05	-8.24	99.86	179.64	173.00	6.64	27.037		
1,300.00	1,248.87	1,316.52	1,299.36	6.64	3.91	-161.89	-11.43	133.85	197.80	190.24	7.55	26.182		
1,400.00	1,338.98	1,421.31	1,396.69	7.55	4.64	-158.37	-15.05	172.46	213.26	204.58	8.68	24.559		
1,500.00	1,429.10	1,520.85	1,487.97	8.47	5.42	-154.90	-18.76	212.02	227.32	217.33	9.99	22.752		
1,600.00	1,519.21	1,618.98	1,577.90	9.40	6.20	-151.86	-22.42	251.10	242.03	230.62	11.41	21.217		
1,700.00	1,609.32	1,717.12	1,667.84	10.32	7.00	-149.17	-26.08	290.19	257.34	244.43	12.91	19.940		
1,800.00	1,699.44	1,815.25	1,757.78	11.25	7.81	-146.79	-29.75	329.27	273.15	258.68	14.47	18.883		
1,900.00	1,789.55	1,913.38	1,847.72	12.18	8.62	-144.66	-33.41	368.36	289.37	273.30	16.07	18.009		
2,000.00	1,879.67	2,011.51	1,937.65	13.10	9.44	-142.76	-37.08	407.45	305.95	288.24	17.70	17.282		
2,100.00	1,969.78	2,109.64	2,027.59	14.03	10.27	-141.06	-40.74	446.53	322.82	303.45	19.36	16.673		
2,200.00	2,059.89	2,207.77	2,117.53	14.96	11.09	-139.53	-44.41	485.62	339.94	318.90	21.04	16.158		
2,300.00	2,150.01	2,305.91	2,207.46	15.90	11.92	-138.14	-48.07	524.70	357.27	334.55	22.73	15.721		
2,400.00	2,240.12	2,404.04	2,297.40	16.83	12.75	-136.88	-51.74	563.79	374.80	350.37	24.42	15.346		
2,500.00	2,330.23	2,502.17	2,387.34	17.76	13.58	-135.73	-55.40	602.88	392.48	366.35	26.13	15.022		
2,600.00	2,420.35	2,600.30	2,477.28	18.69	14.41	-134.68	-59.06	641.96	410.30	382.47	27.84	14.740		
2,700.00	2,510.46	2,698.43	2,567.21	19.62	15.25	-133.72	-62.73	681.05	428.25	398.70	29.55	14.493		
2,800.00	2,600.58	2,796.56	2,657.15	20.56	16.08	-132.84	-66.39	720.14	446.31	415.04	31.26	14.276		
2,900.00	2,690.69	2,894.70	2,747.09	21.49	16.92	-132.02	-70.06	759.22	464.45	431.48	32.98	14.083		
3,000.00	2,780.80	2,992.83	2,837.02	22.42	17.75	-131.27	-73.72	798.31	482.69	447.99	34.70	13.912		
3,100.00	2,870.92	3,090.96	2,926.96	23.35	18.59	-130.57	-77.39	837.39	501.00	464.58	36.41	13.758		
3,200.00	2,961.03	3,189.09	3,016.90	24.29	19.43	-129.92	-81.05	876.48	519.37	481.24	38.13	13.620		
3,300.00	3,051.14	3,287.22	3,106.84	25.22	20.26	-129.31	-84.71	915.57	537.81	497.96	39.85	13.496		
3,400.00	3,141.26	3,385.35	3,196.77	26.15	21.10	-128.75	-88.38	954.65	556.30	514.73	41.57	13.383		
3,500.00	3,231.37	3,483.49	3,286.71	27.09	21.94	-128.22	-92.04	993.74	574.84	531.56	43.29	13.280		
3,600.00	3,321.49	3,581.62	3,376.65	28.02	22.78	-127.72	-95.71	1,032.82	593.43	548.42	45.00	13.186		
3,700.00	3,411.60	3,679.75	3,466.58	28.95	23.61	-127.26	-99.37	1,071.91	612.05	565.33	46.72	13.100		
3,800.00	3,501.71	3,777.88	3,556.52	29.89	24.45	-126.82	-103.04	1,111.00	630.71	582.28	48.44	13.021		
3,900.00	3,591.83	3,876.01	3,646.46	30.82	25.29	-126.40	-106.70	1,150.08	649.41	599.26	50.15	12.948		
4,000.00	3,681.94	3,974.15	3,736.39	31.76	26.13	-126.01	-110.36	1,189.17	668.14	616.27	51.87	12.881		
4,100.00	3,772.06	4,072.28	3,826.33	32.69	26.97	-125.64	-114.03	1,228.25	686.89	633.31	53.58	12.819		
4,200.00	3,862.17	4,170.41	3,916.27	33.62	27.81	-125.29	-117.69	1,267.34	705.67	650.37	55.30	12.761		
4,300.00	3,952.28	4,268.54	4,006.21	34.56	28.65	-124.96	-121.36	1,306.43	724.48	667.46	57.01	12.707		
4,400.00	4,042.40	4,366.67	4,096.14	35.49	29.49	-124.65	-125.02	1,345.51	743.31	684.58	58.73	12.657		
4,500.00	4,132.51	4,464.80	4,186.08	36.43	30.33	-124.35	-128.69	1,384.60	762.15	701.71	60.44	12.610		
4,600.00	4,222.62	4,562.94	4,276.02	37.36	31.17	-124.06	-132.35	1,423.68	781.02	718.87	62.15	12.566		
4,700.00	4,312.74	4,661.07	4,365.95	38.29	32.01	-123.79	-136.01	1,462.77	799.91	736.04	63.86	12.525		
4,800.00	4,402.85	4,759.20	4,455.89	39.23	32.85	-123.53	-139.68	1,501.86	818.81	753.23	65.58	12.486		
4,900.00	4,492.97	4,857.33	4,545.83	40.16	33.69	-123.29	-143.34	1,540.94	837.72	770.44	67.29	12.450		
5,000.00	4,583.08	4,955.46	4,635.77	41.10	34.53	-123.05	-147.01	1,580.03	856.66	787.66	69.00	12.416		
5,100.00	4,673.19	5,053.59	4,725.70	42.03	35.37	-122.82	-150.67	1,619.11	875.60	804.89	70.71	12.383		

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



# Archer

## Anticollision Report

# Archer

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-18E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7701.00usft
<b>Reference Site:</b>	Piceance 28-10 Pad	<b>MD Reference:</b>	Well @ 7701.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Piceance Federal 28-18E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Slot A-8	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #2	<b>Offset TVD Reference:</b>	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	4,763.31	5,151.73	4,815.64	42.97	36.21	-122.61	-154.34	1,658.20	894.56	822.14	72.42	12.353		
5,300.00	4,853.67	5,249.90	4,905.61	43.84	37.05	-122.57	-158.00	1,697.30	913.21	839.12	74.10	12.325		
5,400.00	4,945.62	5,344.70	4,992.85	44.52	37.75	-122.57	-161.46	1,734.22	929.98	854.45	75.54	12.312		
5,500.00	5,039.20	5,438.31	5,080.37	45.13	38.33	-122.56	-164.57	1,767.31	944.99	868.21	76.78	12.308		
5,600.00	5,134.22	5,532.33	5,169.55	45.65	38.84	-122.53	-167.34	1,796.93	958.23	880.35	77.88	12.303		
5,700.00	5,230.51	5,626.72	5,260.24	46.11	39.29	-122.50	-169.78	1,822.97	969.68	890.83	78.85	12.298		
5,800.00	5,327.89	5,721.45	5,352.25	46.49	39.68	-122.45	-171.88	1,845.35	979.31	899.64	79.67	12.292		
5,900.00	5,426.16	5,816.48	5,445.41	46.81	40.00	-122.39	-173.63	1,863.98	987.09	906.74	80.36	12.284		
6,000.00	5,525.15	5,911.76	5,539.52	47.05	40.27	-122.31	-175.02	1,878.78	993.02	912.11	80.91	12.274		
6,100.00	5,624.65	6,007.27	5,634.39	47.23	40.47	-122.23	-176.04	1,889.70	997.07	915.75	81.32	12.260		
6,200.00	5,724.50	6,102.94	5,729.80	47.35	40.62	-122.13	-176.69	1,896.68	999.24	917.62	81.62	12.243		
6,300.00	5,824.48	6,200.00	5,826.80	47.42	40.72	-0.33	-176.98	1,899.70	999.58	917.78	81.80	12.220		
6,338.02	5,862.50	6,235.70	5,862.50	47.44	40.74	-0.32	-176.99	1,899.82	999.57	917.72	81.85	12.212		
6,400.00	5,924.48	6,297.68	5,924.48	47.47	40.78	-0.32	-176.99	1,899.82	999.57	917.64	81.93	12.200		
6,500.00	6,024.48	6,397.68	6,024.48	47.53	40.85	-0.32	-176.99	1,899.82	999.57	917.51	82.06	12.181		
6,600.00	6,124.48	6,497.68	6,124.48	47.58	40.92	-0.32	-176.99	1,899.82	999.57	917.37	82.20	12.161		
6,700.00	6,224.48	6,597.68	6,224.48	47.64	40.99	-0.32	-176.99	1,899.82	999.57	917.24	82.33	12.140		
6,800.00	6,324.48	6,697.68	6,324.48	47.70	41.06	-0.32	-176.99	1,899.82	999.57	917.10	82.47	12.120		
6,900.00	6,424.48	6,797.68	6,424.48	47.76	41.13	-0.32	-176.99	1,899.82	999.57	916.95	82.61	12.099		
7,000.00	6,524.48	6,897.68	6,524.48	47.82	41.21	-0.32	-176.99	1,899.82	999.57	916.81	82.76	12.078		
7,100.00	6,624.48	6,997.68	6,624.48	47.88	41.28	-0.32	-176.99	1,899.82	999.57	916.66	82.90	12.057		
7,200.00	6,724.48	7,097.68	6,724.48	47.94	41.36	-0.32	-176.99	1,899.82	999.57	916.52	83.05	12.035		
7,300.00	6,824.48	7,197.68	6,824.48	48.00	41.44	-0.32	-176.99	1,899.82	999.57	916.37	83.20	12.014		
7,400.00	6,924.48	7,297.68	6,924.48	48.07	41.52	-0.32	-176.99	1,899.82	999.57	916.21	83.35	11.992		
7,500.00	7,024.48	7,397.68	7,024.48	48.13	41.60	-0.32	-176.99	1,899.82	999.57	916.06	83.51	11.970		
7,600.00	7,124.48	7,497.68	7,124.48	48.20	41.68	-0.32	-176.99	1,899.82	999.57	915.90	83.67	11.947		
7,700.00	7,224.48	7,597.68	7,224.48	48.26	41.76	-0.32	-176.99	1,899.82	999.57	915.74	83.82	11.924		
7,800.00	7,324.48	7,697.68	7,324.48	48.33	41.84	-0.32	-176.99	1,899.82	999.57	915.58	83.99	11.902		
7,900.00	7,424.48	7,797.68	7,424.48	48.40	41.93	-0.32	-176.99	1,899.82	999.57	915.42	84.15	11.879		
8,000.00	7,524.48	7,897.68	7,524.48	48.47	42.01	-0.32	-176.99	1,899.82	999.57	915.25	84.31	11.855		
8,100.00	7,624.48	7,997.68	7,624.48	48.54	42.10	-0.32	-176.99	1,899.82	999.57	915.09	84.48	11.832		
8,200.00	7,724.48	8,097.68	7,724.48	48.61	42.18	-0.32	-176.99	1,899.82	999.57	914.92	84.65	11.808		
8,300.00	7,824.48	8,197.68	7,824.48	48.68	42.27	-0.32	-176.99	1,899.82	999.57	914.75	84.82	11.784		
8,400.00	7,924.48	8,297.68	7,924.48	48.76	42.36	-0.32	-176.99	1,899.82	999.57	914.57	84.99	11.760		
8,449.52	7,974.00	8,347.20	7,974.00	48.79	42.41	-0.32	-176.99	1,899.82	999.57	914.49	85.08	11.748 SF		



# Archer

## Anticollision Report

# Archer

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-18E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7701.00usft
<b>Reference Site:</b>	Piceance 28-10 Pad	<b>MD Reference:</b>	Well @ 7701.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Piceance Federal 28-18E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Slot A-8	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #2	<b>Offset TVD Reference:</b>	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	14.53	9.11	2.36	9.41					
100.00	100.00	100.00	100.00	0.09	0.09	14.53	9.11	2.36	9.41	9.23	0.18	53.653 CC, ES		
200.00	199.97	199.97	199.97	0.31	0.31	-118.86	9.11	2.36	10.26	9.63	0.64	16.117		
300.00	299.75	300.15	300.11	0.55	0.53	-135.37	8.14	4.32	13.10	11.94	1.16	11.333		
400.00	399.14	400.51	400.25	0.82	0.75	-144.32	5.23	10.22	16.86	15.16	1.71	9.889		
500.00	497.97	501.06	500.19	1.17	1.02	-148.93	0.39	20.08	21.10	18.82	2.28	9.247		
600.00	596.04	601.79	599.74	1.57	1.35	-151.14	-6.41	33.88	25.61	22.73	2.89	8.870		
700.00	693.17	702.70	698.68	2.06	1.74	-151.96	-15.14	51.63	30.33	26.80	3.54	8.577		
800.00	789.17	803.79	796.83	2.62	2.22	-151.93	-25.81	73.31	35.23	30.98	4.25	8.296		
900.00	883.85	905.05	893.98	3.27	2.78	-151.36	-38.40	98.90	40.28	35.25	5.04	7.999		
1,000.00	977.05	1,006.48	989.94	4.00	3.43	-150.43	-52.91	128.37	45.50	39.58	5.93	7.675		
1,100.00	1,068.57	1,108.08	1,084.50	4.83	4.17	-149.25	-69.30	161.67	50.89	43.94	6.95	7.326		
1,200.00	1,158.76	1,209.49	1,177.19	5.73	5.01	-147.39	-87.46	198.57	55.55	47.45	8.10	6.855		
1,300.00	1,248.87	1,309.39	1,267.91	6.64	5.87	-145.06	-105.93	236.12	59.27	49.86	9.41	6.296		
1,400.00	1,338.98	1,409.29	1,358.62	7.55	6.75	-143.01	-124.41	273.67	63.07	52.26	10.81	5.834		
1,500.00	1,429.10	1,509.20	1,449.34	8.47	7.63	-141.19	-142.89	311.22	66.95	54.68	12.27	5.455		
1,600.00	1,519.21	1,609.10	1,540.05	9.40	8.52	-139.57	-161.37	348.77	70.89	57.10	13.79	5.142		
1,700.00	1,609.32	1,709.01	1,630.77	10.32	9.41	-138.12	-179.85	386.32	74.87	59.54	15.34	4.882		
1,800.00	1,699.44	1,808.91	1,721.48	11.25	10.30	-136.82	-198.33	423.87	78.90	61.98	16.92	4.664		
1,900.00	1,789.55	1,908.81	1,812.20	12.18	11.19	-135.65	-216.81	461.42	82.97	64.44	18.52	4.479		
2,000.00	1,879.67	2,008.72	1,902.91	13.10	12.09	-134.59	-235.29	498.97	87.07	66.92	20.15	4.322		
2,100.00	1,969.78	2,108.62	1,993.63	14.03	12.98	-133.62	-253.77	536.52	91.19	69.40	21.79	4.186		
2,200.00	2,059.89	2,208.52	2,084.35	14.96	13.88	-132.74	-272.25	574.07	95.34	71.90	23.44	4.068		
2,300.00	2,150.01	2,308.43	2,175.06	15.90	14.77	-131.93	-290.73	611.62	99.51	74.41	25.10	3.965		
2,400.00	2,240.12	2,408.33	2,265.78	16.83	15.67	-131.18	-309.21	649.17	103.70	76.93	26.77	3.874		
2,500.00	2,330.23	2,508.23	2,356.49	17.76	16.57	-130.50	-327.69	686.72	107.90	79.45	28.45	3.793		
2,600.00	2,420.35	2,608.14	2,447.21	18.69	17.47	-129.86	-346.16	724.27	112.12	81.99	30.13	3.721		
2,700.00	2,510.46	2,708.04	2,537.92	19.62	18.37	-129.27	-364.64	761.82	116.35	84.53	31.82	3.657		
2,800.00	2,600.58	2,807.94	2,628.64	20.56	19.27	-128.73	-383.12	799.37	120.59	87.08	33.51	3.599		
2,900.00	2,690.69	2,907.85	2,719.35	21.49	20.17	-128.22	-401.60	836.92	124.84	89.64	35.20	3.546		
3,000.00	2,780.80	3,007.75	2,810.07	22.42	21.07	-127.74	-420.08	874.47	129.10	92.20	36.90	3.499		
3,100.00	2,870.92	3,107.66	2,900.78	23.35	21.97	-127.29	-438.56	912.02	133.37	94.77	38.60	3.455		
3,200.00	2,961.03	3,207.56	2,991.50	24.29	22.87	-126.88	-457.04	949.56	137.65	97.35	40.31	3.415		
3,300.00	3,051.14	3,307.46	3,082.21	25.22	23.77	-126.48	-475.52	987.11	141.94	99.93	42.01	3.379		
3,400.00	3,141.26	3,407.37	3,172.93	26.15	24.67	-126.11	-494.00	1,024.66	146.23	102.51	43.72	3.345		
3,500.00	3,231.37	3,507.27	3,263.64	27.09	25.57	-125.76	-512.48	1,062.21	150.52	105.10	45.43	3.314		
3,600.00	3,321.49	3,607.17	3,354.36	28.02	26.47	-125.43	-530.96	1,099.76	154.82	107.69	47.14	3.285		
3,700.00	3,411.60	3,707.08	3,445.07	28.95	27.37	-125.12	-549.44	1,137.31	159.13	110.28	48.85	3.258		
3,800.00	3,501.71	3,806.98	3,535.79	29.89	28.27	-124.83	-567.92	1,174.86	163.44	112.88	50.56	3.233		
3,900.00	3,591.83	3,906.88	3,626.51	30.82	29.18	-124.55	-586.39	1,212.41	167.76	115.49	52.27	3.209		
4,000.00	3,681.94	4,006.79	3,717.22	31.76	30.08	-124.28	-604.87	1,249.96	172.08	118.09	53.99	3.187		
4,100.00	3,772.06	4,106.69	3,807.94	32.69	30.98	-124.03	-623.35	1,287.51	176.40	120.70	55.70	3.167		
4,200.00	3,862.17	4,206.60	3,898.65	33.62	31.88	-123.79	-641.83	1,325.06	180.72	123.31	57.41	3.148		
4,300.00	3,952.28	4,306.50	3,989.37	34.56	32.78	-123.56	-660.31	1,362.61	185.05	125.92	59.13	3.130		
4,400.00	4,042.40	4,406.40	4,080.08	35.49	33.68	-123.34	-678.79	1,400.16	189.38	128.54	60.85	3.112		
4,500.00	4,132.51	4,506.31	4,170.80	36.43	34.58	-123.13	-697.27	1,437.71	193.72	131.15	62.56	3.096		
4,600.00	4,222.62	4,606.21	4,261.51	37.36	35.49	-122.93	-715.75	1,475.26	198.05	133.77	64.28	3.081		
4,700.00	4,312.74	4,706.11	4,352.23	38.29	36.39	-122.74	-734.23	1,512.81	202.39	136.40	66.00	3.067		
4,800.00	4,402.85	4,806.02	4,442.94	39.23	37.29	-122.55	-752.71	1,550.36	206.73	139.02	67.72	3.053		
4,900.00	4,492.97	4,905.92	4,533.66	40.16	38.19	-122.38	-771.19	1,587.91	211.08	141.64	69.43	3.040		
5,000.00	4,583.08	5,005.82	4,624.37	41.10	39.09	-122.21	-789.67	1,625.46	215.42	144.27	71.15	3.028		
5,100.00	4,673.19	5,105.73	4,715.09	42.03	39.99	-122.05	-808.15	1,663.01	219.77	146.90	72.87	3.016		

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



# Archer

## Anticollision Report

# Archer

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-18E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7701.00usft
<b>Reference Site:</b>	Piceance 28-10 Pad	<b>MD Reference:</b>	Well @ 7701.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Piceance Federal 28-18E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Slot A-8	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #2	<b>Offset TVD Reference:</b>	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	4,763.31	5,205.63	4,805.80	42.97	40.90	-121.89	-826.62	1,700.56	224.12	149.53	74.59	3.005	
5,300.00	4,853.67	5,302.86	4,894.41	43.84	41.71	-121.85	-844.30	1,736.47	228.52	152.38	76.14	3.001	
5,400.00	4,945.62	5,400.00	4,984.43	44.52	42.34	-121.89	-860.41	1,769.20	232.64	155.30	77.34	3.008	
5,500.00	5,039.20	5,493.98	5,072.92	45.13	42.88	-121.92	-874.37	1,797.58	236.32	157.94	78.38	3.015	
5,600.00	5,134.22	5,589.47	5,164.08	45.65	43.36	-121.96	-886.91	1,823.06	239.58	160.27	79.30	3.021	
5,700.00	5,230.51	5,684.92	5,256.31	46.11	43.78	-121.98	-897.76	1,845.11	242.39	162.31	80.09	3.027	
5,800.00	5,327.89	5,780.34	5,349.45	46.49	44.13	-122.01	-906.90	1,863.68	244.77	164.03	80.74	3.032	
5,900.00	5,426.16	5,875.74	5,443.35	46.81	44.41	-122.03	-914.32	1,878.76	246.69	165.43	81.26	3.036	
6,000.00	5,525.15	5,971.12	5,537.85	47.05	44.64	-122.04	-920.01	1,890.31	248.17	166.51	81.66	3.039	
6,100.00	5,624.65	6,066.48	5,632.79	47.23	44.81	-122.05	-923.95	1,898.33	249.20	167.25	81.95	3.041	
6,200.00	5,724.50	6,161.84	5,728.01	47.35	44.92	-122.06	-926.15	1,902.79	249.77	167.65	82.12	3.042	
6,300.00	5,824.48	6,258.33	5,824.48	47.42	44.99	-0.37	-926.65	1,903.81	249.90	167.69	82.21	3.040	
6,400.00	5,924.48	6,358.33	5,924.48	47.47	45.05	-0.37	-926.65	1,903.81	249.90	167.56	82.33	3.035	
6,500.00	6,024.48	6,458.33	6,024.48	47.53	45.11	-0.37	-926.65	1,903.81	249.90	167.43	82.46	3.030	
6,600.00	6,124.48	6,558.33	6,124.48	47.58	45.17	-0.37	-926.65	1,903.81	249.90	167.30	82.59	3.026	
6,700.00	6,224.48	6,658.33	6,224.48	47.64	45.23	-0.37	-926.65	1,903.81	249.90	167.17	82.73	3.021	
6,800.00	6,324.48	6,758.33	6,324.48	47.70	45.29	-0.37	-926.65	1,903.81	249.90	167.04	82.86	3.016	
6,900.00	6,424.48	6,858.33	6,424.48	47.76	45.36	-0.37	-926.65	1,903.81	249.90	166.90	83.00	3.011	
7,000.00	6,524.48	6,958.33	6,524.48	47.82	45.42	-0.37	-926.65	1,903.81	249.90	166.76	83.14	3.006	
7,100.00	6,624.48	7,058.33	6,624.48	47.88	45.49	-0.37	-926.65	1,903.81	249.90	166.62	83.28	3.001	
7,200.00	6,724.48	7,158.33	6,724.48	47.94	45.55	-0.37	-926.65	1,903.81	249.90	166.47	83.43	2.995	
7,300.00	6,824.48	7,258.33	6,824.48	48.00	45.62	-0.37	-926.65	1,903.81	249.90	166.33	83.57	2.990	
7,400.00	6,924.48	7,358.33	6,924.48	48.07	45.69	-0.37	-926.65	1,903.81	249.90	166.18	83.72	2.985	
7,500.00	7,024.48	7,458.33	7,024.48	48.13	45.76	-0.37	-926.65	1,903.81	249.90	166.03	83.87	2.980	
7,600.00	7,124.48	7,558.33	7,124.48	48.20	45.83	-0.37	-926.65	1,903.81	249.90	165.87	84.02	2.974	
7,700.00	7,224.48	7,658.33	7,224.48	48.26	45.90	-0.37	-926.65	1,903.81	249.90	165.72	84.18	2.969	
7,800.00	7,324.48	7,758.33	7,324.48	48.33	45.97	-0.37	-926.65	1,903.81	249.90	165.56	84.34	2.963	
7,900.00	7,424.48	7,858.33	7,424.48	48.40	46.04	-0.37	-926.65	1,903.81	249.90	165.40	84.49	2.958	
8,000.00	7,524.48	7,958.33	7,524.48	48.47	46.12	-0.37	-926.65	1,903.81	249.90	165.24	84.66	2.952	
8,100.00	7,624.48	8,058.33	7,624.48	48.54	46.19	-0.37	-926.65	1,903.81	249.90	165.08	84.82	2.946	
8,200.00	7,724.48	8,158.33	7,724.48	48.61	46.27	-0.37	-926.65	1,903.81	249.90	164.91	84.98	2.941	
8,300.00	7,824.48	8,258.33	7,824.48	48.68	46.35	-0.37	-926.65	1,903.81	249.90	164.75	85.15	2.935	
8,400.00	7,924.48	8,358.33	7,924.48	48.76	46.43	-0.37	-926.65	1,903.81	249.90	164.58	85.32	2.929	
8,449.52	7,974.00	8,407.84	7,974.00	48.79	46.46	-0.37	-926.65	1,903.81	249.90	164.49	85.41	2.926 SF	

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



# Archer

## Anticollision Report

# Archer

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-18E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7701.00usft
<b>Reference Site:</b>	Piceance 28-10 Pad	<b>MD Reference:</b>	Well @ 7701.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Piceance Federal 28-18E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Slot A-8	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #2	<b>Offset TVD Reference:</b>	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	-20.23	-4.72	20.78					
100.00	100.00	100.00	100.00	0.09	0.09	-166.87	-20.23	-4.72	20.78	20.60	0.18	118.512		
200.00	199.97	199.97	199.97	0.31	0.31	77.33	-20.23	-4.72	20.19	19.57	0.62	32.648		
274.17	274.00	274.00	274.00	0.49	0.48	90.00	-20.23	-4.72	19.70	18.74	0.96	20.595 CC		
300.00	299.75	299.75	299.75	0.55	0.54	96.08	-20.23	-4.72	19.81	18.73	1.08	18.372 ES		
400.00	399.14	399.57	399.54	0.82	0.74	118.52	-21.52	-2.98	22.64	21.01	1.62	13.937		
500.00	497.97	499.78	499.53	1.17	0.96	133.71	-25.39	2.29	28.28	26.06	2.23	12.711		
600.00	596.04	600.37	599.51	1.57	1.21	142.96	-31.88	11.11	35.44	32.59	2.85	12.449		
700.00	693.17	701.34	699.29	2.06	1.52	148.58	-41.00	23.52	43.36	39.88	3.49	12.442		
800.00	789.17	802.69	798.67	2.62	1.91	152.06	-52.77	39.51	51.71	47.56	4.15	12.456		
900.00	883.85	904.43	897.44	3.27	2.37	154.23	-67.19	59.11	60.29	55.44	4.86	12.416		
1,000.00	977.05	1,006.54	995.40	4.00	2.92	155.56	-84.26	82.32	69.02	63.41	5.61	12.301		
1,100.00	1,068.57	1,109.04	1,092.34	4.83	3.57	156.32	-103.97	109.12	77.83	71.40	6.43	12.108		
1,200.00	1,158.76	1,211.99	1,188.11	5.73	4.31	156.43	-126.34	139.53	85.64	78.35	7.29	11.747		
1,300.00	1,248.87	1,315.37	1,282.48	6.64	5.15	155.19	-151.34	173.52	89.66	81.36	8.30	10.806		
1,400.00	1,338.98	1,418.80	1,374.89	7.55	6.10	152.58	-178.86	210.93	89.83	80.26	9.57	9.388		
1,500.00	1,429.10	1,519.64	1,463.40	8.47	7.10	148.78	-207.49	249.85	87.37	76.23	11.15	7.839		
1,600.00	1,519.21	1,619.43	1,550.88	9.40	8.10	144.73	-235.93	288.52	85.15	72.21	12.94	6.579		
1,700.00	1,609.32	1,719.21	1,638.36	10.32	9.12	140.49	-264.37	327.19	83.38	68.43	14.95	5.576		
1,800.00	1,699.44	1,819.00	1,725.85	11.25	10.14	136.09	-292.82	365.85	82.09	64.94	17.15	4.787		
1,900.00	1,789.55	1,918.79	1,813.33	12.18	11.16	131.57	-321.26	404.52	81.30	61.79	19.50	4.169		
2,000.00	1,879.67	2,018.58	1,900.82	13.10	12.19	127.00	-349.70	443.19	81.02	59.05	21.97	3.688		
2,003.69	1,882.99	2,022.27	1,904.05	13.14	12.23	126.83	-350.76	444.62	81.02	58.96	22.06	3.673		
2,100.00	1,969.78	2,118.37	1,988.30	14.03	13.22	122.42	-378.15	481.86	81.26	56.76	24.50	3.317		
2,200.00	2,059.89	2,218.16	2,075.79	14.96	14.25	117.90	-406.59	520.53	82.01	54.96	27.05	3.032		
2,300.00	2,150.01	2,317.95	2,163.27	15.90	15.29	113.49	-435.04	559.20	83.27	53.69	29.58	2.815		
2,400.00	2,240.12	2,417.74	2,250.76	16.83	16.32	109.24	-463.48	597.87	85.01	52.96	32.05	2.652		
2,500.00	2,330.23	2,517.53	2,338.24	17.76	17.36	105.17	-491.92	636.53	87.19	52.76	34.44	2.532		
2,600.00	2,420.35	2,617.31	2,425.72	18.69	18.39	101.33	-520.37	675.20	89.80	53.07	36.73	2.445		
2,700.00	2,510.46	2,717.10	2,513.21	19.62	19.43	97.71	-548.81	713.87	92.79	53.88	38.91	2.385		
2,800.00	2,600.58	2,816.89	2,600.69	20.56	20.47	94.33	-577.25	752.54	96.12	55.14	40.98	2.346		
2,900.00	2,690.69	2,916.68	2,688.18	21.49	21.51	91.19	-605.70	791.21	99.77	56.82	42.95	2.323		
3,000.00	2,780.80	3,016.47	2,775.66	22.42	22.54	88.27	-634.14	829.88	103.69	58.87	44.82	2.314 SF		
3,100.00	2,870.92	3,116.26	2,863.15	23.35	23.58	85.58	-662.58	868.55	107.86	61.27	46.60	2.315		
3,200.00	2,961.03	3,216.05	2,950.63	24.29	24.62	83.09	-691.03	907.21	112.26	63.96	48.30	2.324		
3,300.00	3,051.14	3,315.84	3,038.11	25.22	25.66	80.79	-719.47	945.88	116.85	66.91	49.94	2.340		
3,400.00	3,141.26	3,415.62	3,125.60	26.15	26.70	78.66	-747.91	984.55	121.61	70.10	51.51	2.361		
3,500.00	3,231.37	3,515.41	3,213.08	27.09	27.74	76.70	-776.36	1,023.22	126.53	73.49	53.04	2.386		
3,600.00	3,321.49	3,615.20	3,300.57	28.02	28.78	74.89	-804.80	1,061.89	131.59	77.07	54.52	2.414		
3,700.00	3,411.60	3,714.99	3,388.05	28.95	29.82	73.22	-833.24	1,100.56	136.76	80.80	55.96	2.444		
3,800.00	3,501.71	3,814.78	3,475.54	29.89	30.87	71.66	-861.69	1,139.23	142.05	84.67	57.38	2.476		
3,900.00	3,591.83	3,914.57	3,563.02	30.82	31.91	70.22	-890.13	1,177.89	147.43	88.67	58.76	2.509		
4,000.00	3,681.94	4,014.36	3,650.51	31.76	32.95	68.88	-918.57	1,216.56	152.90	92.77	60.13	2.543		
4,100.00	3,772.06	4,114.15	3,737.99	32.69	33.99	67.64	-947.02	1,255.23	158.44	96.97	61.47	2.577		
4,200.00	3,862.17	4,213.94	3,825.47	33.62	35.03	66.47	-975.46	1,293.90	164.06	101.26	62.80	2.612		
4,300.00	3,952.28	4,313.72	3,912.96	34.56	36.07	65.39	-1,003.90	1,332.57	169.74	105.62	64.12	2.647		
4,400.00	4,042.40	4,413.51	4,000.44	35.49	37.11	64.38	-1,032.35	1,371.24	175.47	110.05	65.42	2.682		
4,500.00	4,132.51	4,513.30	4,087.93	36.43	38.15	63.43	-1,060.79	1,409.91	181.26	114.54	66.72	2.717		
4,600.00	4,222.62	4,613.09	4,175.41	37.36	39.20	62.54	-1,089.24	1,448.57	187.09	119.08	68.01	2.751		
4,700.00	4,312.74	4,712.88	4,262.90	38.29	40.24	61.70	-1,117.68	1,487.24	192.97	123.68	69.29	2.785		
4,800.00	4,402.85	4,812.67	4,350.38	39.23	41.28	60.91	-1,146.12	1,525.91	198.88	128.32	70.57	2.818		
4,900.00	4,492.97	4,912.46	4,437.86	40.16	42.32	60.17	-1,174.57	1,564.58	204.83	132.99	71.84	2.851		

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



# Archer

## Anticollision Report

# Archer

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-18E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7701.00usft
<b>Reference Site:</b>	Piceance 28-10 Pad	<b>MD Reference:</b>	Well @ 7701.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Piceance Federal 28-18E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Slot A-8	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #2	<b>Offset TVD Reference:</b>	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	
5,000.00	4,583.08	5,012.25	4,525.35	41.10	43.36	59.47	-1,203.01	1,603.25	210.81	137.71	73.10	2.884	
5,100.00	4,673.19	5,112.03	4,612.83	42.03	44.41	58.81	-1,231.45	1,641.92	216.82	142.46	74.37	2.916	
5,200.00	4,763.31	5,212.02	4,700.49	42.97	45.45	58.19	-1,259.95	1,680.66	222.86	147.23	75.63	2.947	
5,300.00	4,853.67	5,318.04	4,794.66	43.84	46.38	58.00	-1,288.80	1,719.88	227.78	150.74	77.04	2.957	
5,400.00	4,945.62	5,424.25	4,891.15	44.52	47.16	57.99	-1,315.09	1,755.62	232.02	153.76	78.26	2.965	
5,500.00	5,039.20	5,530.61	4,989.73	45.13	47.85	57.97	-1,338.73	1,787.76	235.83	156.49	79.33	2.973	
5,600.00	5,134.22	5,637.11	5,090.19	45.65	48.45	57.96	-1,359.66	1,816.22	239.19	158.92	80.27	2.980	
5,700.00	5,230.51	5,743.73	5,192.30	46.11	48.97	57.96	-1,377.82	1,840.91	242.11	161.04	81.07	2.986	
5,800.00	5,327.89	5,850.45	5,295.82	46.49	49.41	57.95	-1,393.17	1,861.76	244.57	162.84	81.73	2.992	
5,900.00	5,426.16	5,957.25	5,400.52	46.81	49.76	57.95	-1,405.65	1,878.73	246.57	164.31	82.26	2.998	
6,000.00	5,525.15	6,064.13	5,506.15	47.05	50.04	57.94	-1,415.23	1,891.75	248.10	165.45	82.66	3.002	
6,100.00	5,624.65	6,171.05	5,612.47	47.23	50.24	57.94	-1,421.88	1,900.80	249.17	166.24	82.93	3.004	
6,200.00	5,724.50	6,278.01	5,719.24	47.35	50.38	57.94	-1,425.59	1,905.85	249.76	166.67	83.09	3.006	
6,300.00	5,824.48	6,383.27	5,824.48	47.42	50.45	179.64	-1,426.43	1,906.99	249.90	166.73	83.17	3.005	
6,400.00	5,924.48	6,483.27	5,924.48	47.47	50.50	179.64	-1,426.43	1,906.99	249.90	166.61	83.29	3.000	
6,500.00	6,024.48	6,583.27	6,024.48	47.53	50.55	179.64	-1,426.43	1,906.99	249.90	166.48	83.42	2.996	
6,600.00	6,124.48	6,683.27	6,124.48	47.58	50.60	179.64	-1,426.43	1,906.99	249.90	166.35	83.54	2.991	
6,700.00	6,224.48	6,783.27	6,224.48	47.64	50.66	179.64	-1,426.43	1,906.99	249.90	166.22	83.67	2.987	
6,800.00	6,324.48	6,883.27	6,324.48	47.70	50.71	179.64	-1,426.43	1,906.99	249.90	166.09	83.81	2.982	
6,900.00	6,424.48	6,983.27	6,424.48	47.76	50.77	179.64	-1,426.43	1,906.99	249.90	165.96	83.94	2.977	
7,000.00	6,524.48	7,083.27	6,524.48	47.82	50.82	179.64	-1,426.43	1,906.99	249.90	165.82	84.08	2.972	
7,100.00	6,624.48	7,183.27	6,624.48	47.88	50.88	179.64	-1,426.43	1,906.99	249.90	165.68	84.22	2.967	
7,200.00	6,724.48	7,283.27	6,724.48	47.94	50.94	179.64	-1,426.43	1,906.99	249.90	165.54	84.36	2.962	
7,300.00	6,824.48	7,383.27	6,824.48	48.00	50.99	179.64	-1,426.43	1,906.99	249.90	165.40	84.50	2.957	
7,400.00	6,924.48	7,483.27	6,924.48	48.07	51.05	179.64	-1,426.43	1,906.99	249.90	165.25	84.64	2.952	
7,500.00	7,024.48	7,583.27	7,024.48	48.13	51.11	179.64	-1,426.43	1,906.99	249.90	165.11	84.79	2.947	
7,600.00	7,124.48	7,683.27	7,124.48	48.20	51.18	179.64	-1,426.43	1,906.99	249.90	164.96	84.94	2.942	
7,700.00	7,224.48	7,783.27	7,224.48	48.26	51.24	179.64	-1,426.43	1,906.99	249.90	164.81	85.09	2.937	
7,800.00	7,324.48	7,883.27	7,324.48	48.33	51.30	179.64	-1,426.43	1,906.99	249.90	164.65	85.24	2.932	
7,900.00	7,424.48	7,983.27	7,424.48	48.40	51.37	179.64	-1,426.43	1,906.99	249.90	164.50	85.40	2.926	
8,000.00	7,524.48	8,083.27	7,524.48	48.47	51.43	179.64	-1,426.43	1,906.99	249.90	164.34	85.56	2.921	
8,100.00	7,624.48	8,183.27	7,624.48	48.54	51.50	179.64	-1,426.43	1,906.99	249.90	164.18	85.72	2.915	
8,200.00	7,724.48	8,283.27	7,724.48	48.61	51.56	179.64	-1,426.43	1,906.99	249.90	164.02	85.88	2.910	
8,300.00	7,824.48	8,383.27	7,824.48	48.68	51.63	179.64	-1,426.43	1,906.99	249.90	163.85	86.04	2.904	
8,400.00	7,924.48	8,483.27	7,924.48	48.76	51.70	179.64	-1,426.43	1,906.99	249.90	163.69	86.21	2.899	
8,425.84	7,950.32	8,509.10	7,950.32	48.78	51.72	179.64	-1,426.43	1,906.99	249.90	163.65	86.25	2.897	
8,449.52	7,974.00	8,517.79	7,959.00	48.79	51.72	179.64	-1,426.43	1,906.99	250.35	164.07	86.28	2.902	

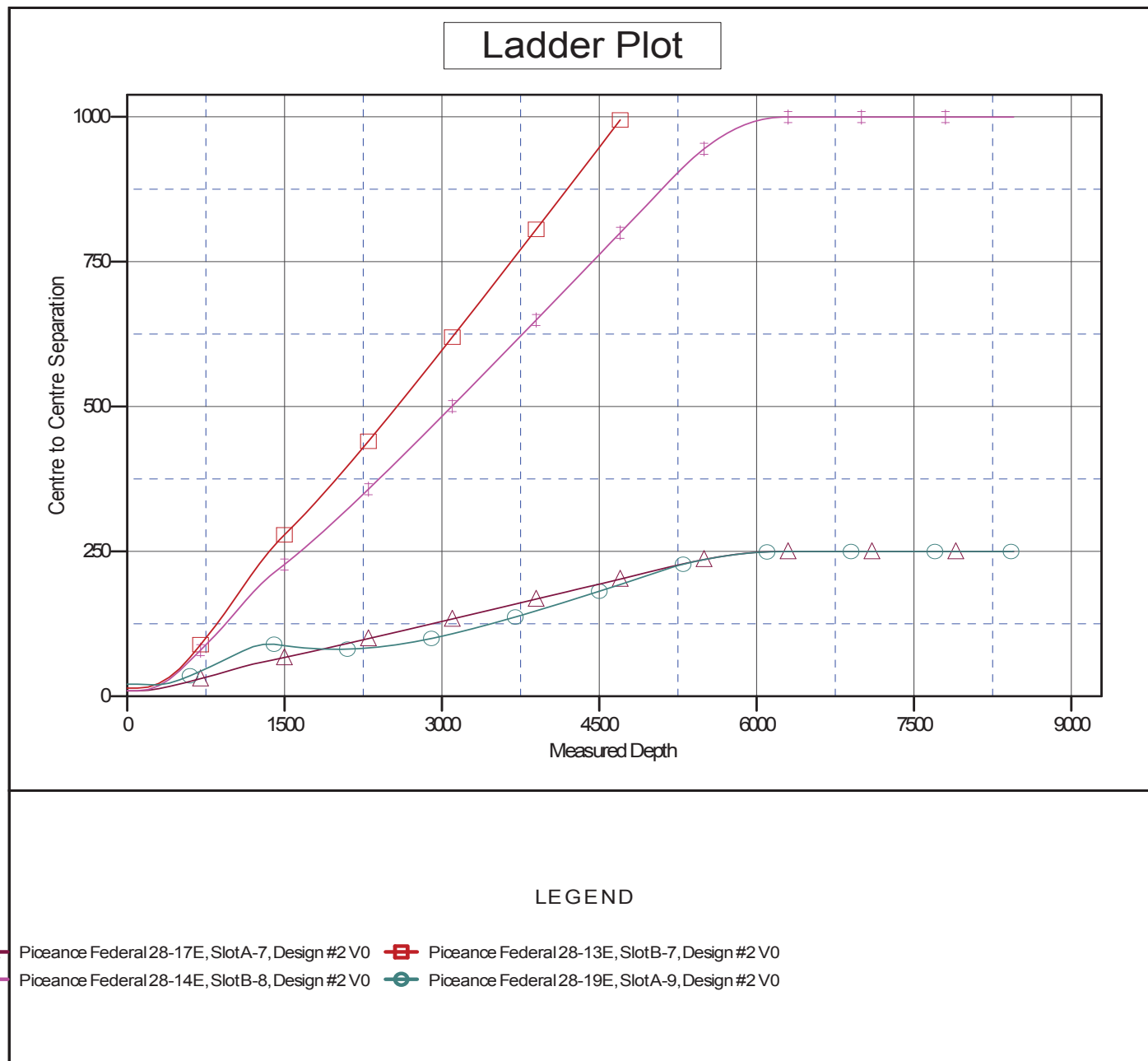




Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-18E
Project:	Mesa County, CO	TVD Reference:	Well @ 7701.00usft
Reference Site:	Piceance 28-10 Pad	MD Reference:	Well @ 7701.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Piceance Federal 28-18E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-8	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 28-18E  
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 28-18E
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 28-18E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-8	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

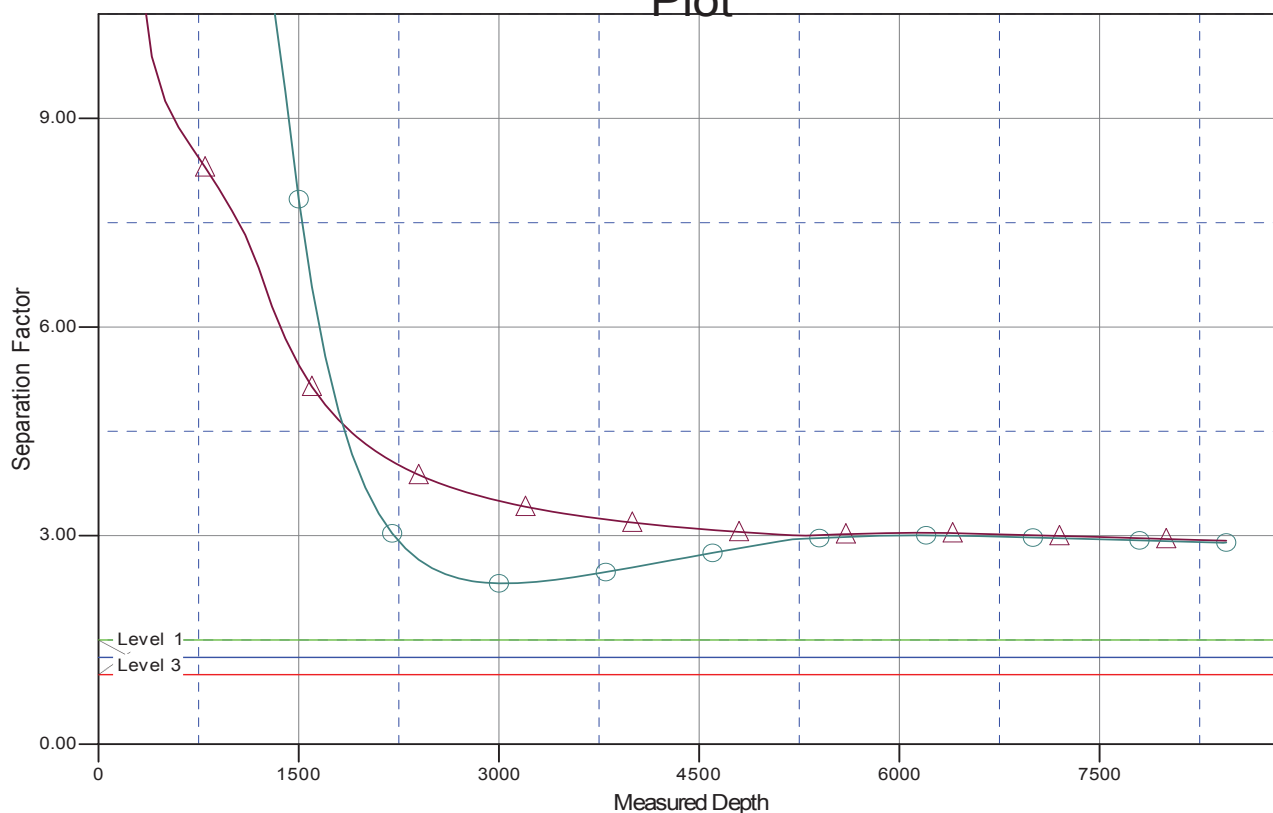
Central Meridian is 105° 30' 0.000 W

Coordinates are relative to: Piceance Federal 28-18E

Coordinate System is US State Plane 1983, Colorado Central Zone

Grid Convergence at Surface is: -1.43°

## Separation Factor Plot



### LEGEND

- Piceance Federal 28-17E, Slot A-7, Design #2 V0
- Piceance Federal 28-13E, Slot B-7, Design #2 V0
- Piceance Federal 28-14E, Slot B-8, Design #2 V0
- Piceance Federal 28-19E, Slot A-9, Design #2 V0