



# **Piceance Energy, LLC**

**Mesa County, CO**

**Piceance 28-10 Pad**

**Piceance Federal 28-20E**

**Slot A-10**

**Plan: Design #2**

## **Standard Planning Report**

**15 April, 2015**

# **Archer**



Project: Mesa County, CO  
Site: Piceance 28-10 Pad  
Well: Piceance Federal 28-20E  
Wellbore: Slot A-10  
Design: Design #2  
Latitude: 39° 14' 47.000 N  
Longitude: 107° 46' 29.910 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 28-20E, 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 28-20E

+N/-S	+E/-W	Northing	Ground Level: Easting	Latitude	Longitude	Slot
0.00	0.00	1522698.148	2355791.616	39° 14' 47.000 N	107° 46' 29.910 W	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance 28-20E tgt	7941.00	-1646.98	1915.66	1521003.714	2357665.441	39° 14' 30.720 N	107° 46' 5.560 W	Circle (Radius: 50.00)

### SECTION DETAILS

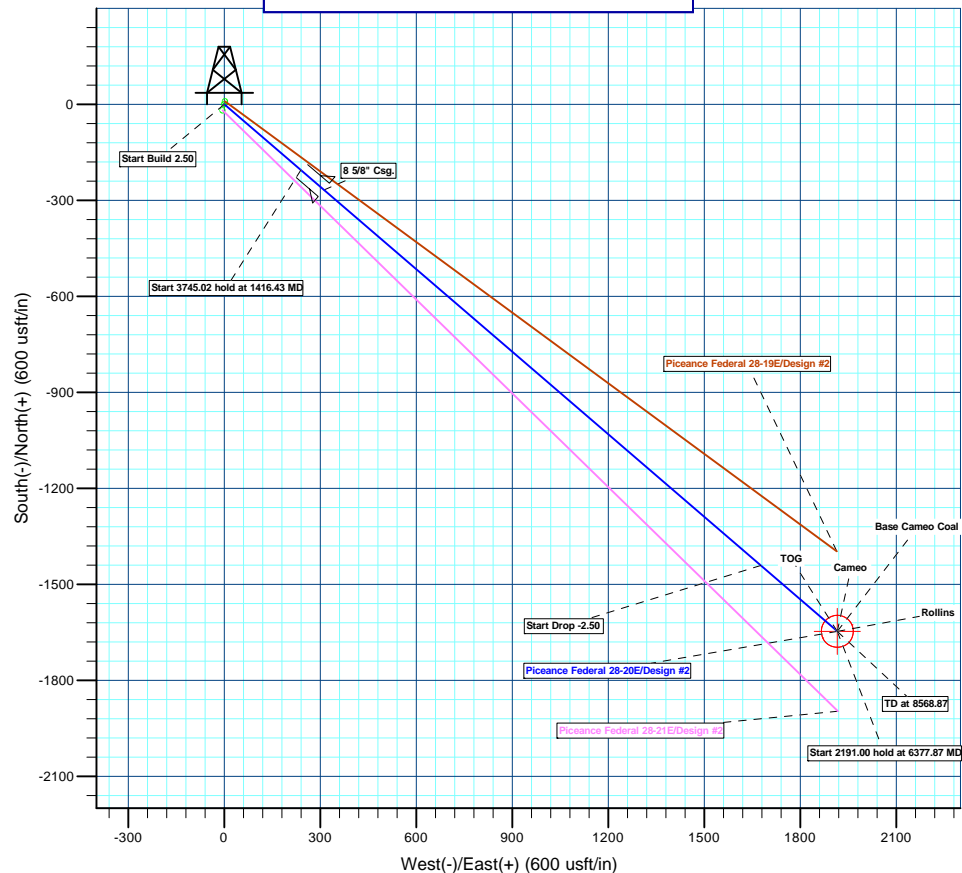
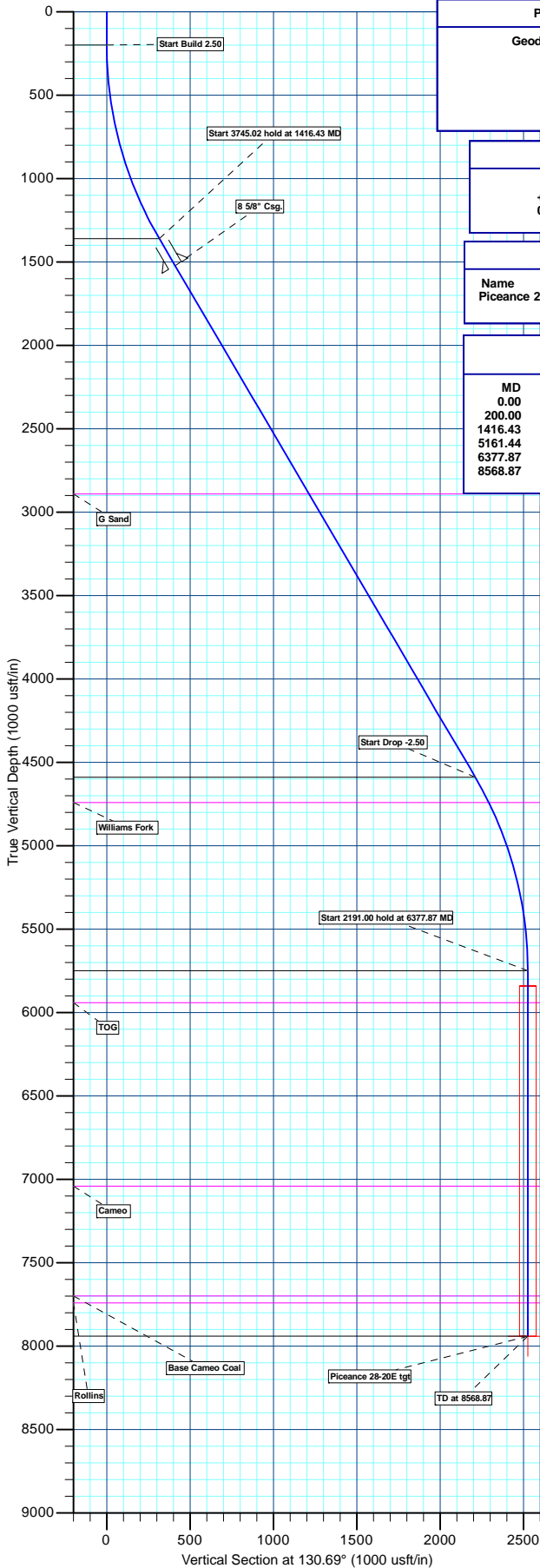
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.50
1416.43	30.41	130.69	1360.11	-205.56	239.09	2.50	130.69	315.31	Start 3745.02 hold at 1416.43 MD
5161.44	30.41	130.69	4589.89	-1441.43	1676.57	0.00	0.00	2211.02	Start Drop -2.50
6377.87	0.00	0.00	5750.00	-1646.99	1915.66	2.50	180.00	2526.33	Start 2191.00 hold at 6377.87 MD
8568.87	0.00	0.00	7941.00	-1646.99	1915.66	0.00	0.00	2526.33	TD at 8568.87



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

TVDPPath	MDPath	Formation
2891.00	3191.53	G Sand
4741.00	5333.05	Williams Fork
5941.00	6568.87	TOG
7041.00	7668.87	Cameo
7699.00	8326.87	Base Cameo Coal
7741.00	8368.87	Rollins



Plan: Design #2 (Piceance Federal 28-20E/Slot A-10)

Created By: Ricky Osburn Date: 9:58, April 15 2015



# Archer

## Planning Report

# Archer

<b>Database:</b>	EDMDBBW	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-20E
<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 28-20E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Slot A-10		
<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 28-20E					
Well Position	+N/-S	-125.47 usft	Northing:	1,522,698.148 usft	Latitude:	39° 14' 47.000 N
	+E/-W	-31.47 usft	Easting:	2,355,791.616 usft	Longitude:	107° 46' 29.910 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,679.00 usft

Wellbore	Slot A-10				
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	130.69

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	
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,416.43	30.41	130.69	1,360.11	-205.56	239.09	2.50	2.50	0.00	130.69	
5,161.44	30.41	130.69	4,589.89	-1,441.43	1,676.57	0.00	0.00	0.00	0.00	
6,377.87	0.00	0.00	5,750.00	-1,646.99	1,915.66	2.50	-2.50	0.00	180.00	
8,568.87	0.00	0.00	7,941.00	-1,646.99	1,915.66	0.00	0.00	0.00	0.00	Piceance 28-20E tgt



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-20E
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 28-20E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-10		
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
Start Build 2.50									
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	2.50	130.69	299.97	-1.42	1.65	2.18	2.50	2.50	0.00
400.00	5.00	130.69	399.75	-5.69	6.61	8.72	2.50	2.50	0.00
500.00	7.50	130.69	499.14	-12.78	14.87	19.61	2.50	2.50	0.00
600.00	10.00	130.69	597.97	-22.70	26.40	34.82	2.50	2.50	0.00
700.00	12.50	130.69	696.04	-35.42	41.19	54.33	2.50	2.50	0.00
800.00	15.00	130.69	793.17	-50.91	59.22	78.09	2.50	2.50	0.00
900.00	17.50	130.69	889.17	-69.15	80.43	106.07	2.50	2.50	0.00
1,000.00	20.00	130.69	983.85	-90.11	104.81	138.21	2.50	2.50	0.00
1,100.00	22.50	130.69	1,077.05	-113.73	132.29	174.46	2.50	2.50	0.00
1,200.00	25.00	130.69	1,168.57	-139.99	162.82	214.73	2.50	2.50	0.00
1,300.00	27.50	130.69	1,258.25	-168.82	196.36	258.95	2.50	2.50	0.00
1,400.00	30.00	130.69	1,345.92	-200.17	232.83	307.05	2.50	2.50	0.00
Start 3745.02 hold at 1416.43 MD									
1,416.43	30.41	130.69	1,360.11	-205.56	239.09	315.31	2.50	2.50	0.00
1,500.00	30.41	130.69	1,432.19	-233.14	271.17	357.62	0.00	0.00	0.00
1,600.00	30.41	130.69	1,518.43	-266.14	309.56	408.24	0.00	0.00	0.00
8 5/8" Csg.									
1,604.14	30.41	130.69	1,522.00	-267.51	311.15	410.33	0.00	0.00	0.00
1,700.00	30.41	130.69	1,604.67	-299.14	347.94	458.85	0.00	0.00	0.00
1,800.00	30.41	130.69	1,690.91	-332.14	386.32	509.47	0.00	0.00	0.00
1,900.00	30.41	130.69	1,777.16	-365.14	424.71	560.09	0.00	0.00	0.00
2,000.00	30.41	130.69	1,863.40	-398.14	463.09	610.71	0.00	0.00	0.00
2,100.00	30.41	130.69	1,949.64	-431.14	501.47	661.33	0.00	0.00	0.00
2,200.00	30.41	130.69	2,035.88	-464.14	539.86	711.95	0.00	0.00	0.00
2,300.00	30.41	130.69	2,122.12	-497.14	578.24	762.57	0.00	0.00	0.00
2,400.00	30.41	130.69	2,208.36	-530.14	616.63	813.19	0.00	0.00	0.00
2,500.00	30.41	130.69	2,294.61	-563.14	655.01	863.81	0.00	0.00	0.00
2,600.00	30.41	130.69	2,380.85	-596.14	693.39	914.43	0.00	0.00	0.00
2,700.00	30.41	130.69	2,467.09	-629.14	731.78	965.05	0.00	0.00	0.00
2,800.00	30.41	130.69	2,553.33	-662.14	770.16	1,015.67	0.00	0.00	0.00
2,900.00	30.41	130.69	2,639.57	-695.14	808.54	1,066.29	0.00	0.00	0.00
3,000.00	30.41	130.69	2,725.82	-728.14	846.93	1,116.91	0.00	0.00	0.00
3,100.00	30.41	130.69	2,812.06	-761.14	885.31	1,167.53	0.00	0.00	0.00
G Sand									
3,191.53	30.41	130.69	2,891.00	-791.35	920.45	1,213.86	0.00	0.00	0.00
3,200.00	30.41	130.69	2,898.30	-794.14	923.70	1,218.15	0.00	0.00	0.00
3,300.00	30.41	130.69	2,984.54	-827.14	962.08	1,268.77	0.00	0.00	0.00
3,400.00	30.41	130.69	3,070.78	-860.15	1,000.46	1,319.38	0.00	0.00	0.00
3,500.00	30.41	130.69	3,157.03	-893.15	1,038.85	1,370.00	0.00	0.00	0.00
3,600.00	30.41	130.69	3,243.27	-926.15	1,077.23	1,420.62	0.00	0.00	0.00
3,700.00	30.41	130.69	3,329.51	-959.15	1,115.61	1,471.24	0.00	0.00	0.00
3,800.00	30.41	130.69	3,415.75	-992.15	1,154.00	1,521.86	0.00	0.00	0.00
3,900.00	30.41	130.69	3,501.99	-1,025.15	1,192.38	1,572.48	0.00	0.00	0.00
4,000.00	30.41	130.69	3,588.24	-1,058.15	1,230.77	1,623.10	0.00	0.00	0.00
4,100.00	30.41	130.69	3,674.48	-1,091.15	1,269.15	1,673.72	0.00	0.00	0.00
4,200.00	30.41	130.69	3,760.72	-1,124.15	1,307.53	1,724.34	0.00	0.00	0.00
4,300.00	30.41	130.69	3,846.96	-1,157.15	1,345.92	1,774.96	0.00	0.00	0.00
4,400.00	30.41	130.69	3,933.20	-1,190.15	1,384.30	1,825.58	0.00	0.00	0.00
4,500.00	30.41	130.69	4,019.45	-1,223.15	1,422.68	1,876.20	0.00	0.00	0.00
4,600.00	30.41	130.69	4,105.69	-1,256.15	1,461.07	1,926.82	0.00	0.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance Federal 28-20E
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 28-20E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot A-10		
Design:	Design #2		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,700.00	30.41	130.69	4,191.93	-1,289.15	1,499.45	1,977.44	0.00	0.00	0.00
4,800.00	30.41	130.69	4,278.17	-1,322.15	1,537.83	2,028.06	0.00	0.00	0.00
4,900.00	30.41	130.69	4,364.41	-1,355.15	1,576.22	2,078.68	0.00	0.00	0.00
5,000.00	30.41	130.69	4,450.66	-1,388.15	1,614.60	2,129.30	0.00	0.00	0.00
5,100.00	30.41	130.69	4,536.90	-1,421.15	1,652.99	2,179.91	0.00	0.00	0.00
<b>Start Drop -2.50</b>									
5,161.44	30.41	130.69	4,589.89	-1,441.43	1,676.57	2,211.02	0.00	0.00	0.00
5,200.00	29.45	130.69	4,623.30	-1,453.97	1,691.16	2,230.25	2.50	-2.50	0.00
5,300.00	26.95	130.69	4,711.43	-1,484.77	1,726.98	2,277.50	2.50	-2.50	0.00
<b>Williams Fork</b>									
5,333.05	26.12	130.69	4,741.00	-1,494.39	1,738.18	2,292.27	2.50	-2.50	0.00
5,400.00	24.45	130.69	4,801.53	-1,513.03	1,759.86	2,320.86	2.50	-2.50	0.00
5,500.00	21.95	130.69	4,893.44	-1,538.71	1,789.72	2,360.24	2.50	-2.50	0.00
5,600.00	19.45	130.69	4,986.98	-1,561.75	1,816.52	2,395.58	2.50	-2.50	0.00
5,700.00	16.95	130.69	5,081.97	-1,582.11	1,840.20	2,426.81	2.50	-2.50	0.00
5,800.00	14.45	130.69	5,178.23	-1,599.74	1,860.71	2,453.86	2.50	-2.50	0.00
5,900.00	11.95	130.69	5,275.58	-1,614.63	1,878.02	2,476.69	2.50	-2.50	0.00
6,000.00	9.45	130.69	5,373.84	-1,626.72	1,892.10	2,495.25	2.50	-2.50	0.00
6,100.00	6.95	130.69	5,472.81	-1,636.02	1,902.91	2,509.50	2.50	-2.50	0.00
6,200.00	4.45	130.69	5,572.31	-1,642.49	1,910.43	2,519.43	2.50	-2.50	0.00
6,300.00	1.95	130.69	5,672.14	-1,646.12	1,914.66	2,525.01	2.50	-2.50	0.00
<b>Start 2191.00 hold at 6377.87 MD</b>									
6,377.87	0.00	0.00	5,750.00	-1,646.99	1,915.66	2,526.33	2.50	-2.50	-167.83
6,400.00	0.00	0.00	5,772.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
6,500.00	0.00	0.00	5,872.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
<b>TOG</b>									
6,568.87	0.00	0.00	5,941.00	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
6,600.00	0.00	0.00	5,972.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
6,700.00	0.00	0.00	6,072.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
6,800.00	0.00	0.00	6,172.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
6,900.00	0.00	0.00	6,272.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
7,000.00	0.00	0.00	6,372.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
7,100.00	0.00	0.00	6,472.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
7,200.00	0.00	0.00	6,572.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
7,300.00	0.00	0.00	6,672.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
7,400.00	0.00	0.00	6,772.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
7,500.00	0.00	0.00	6,872.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
7,600.00	0.00	0.00	6,972.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
<b>Cameo</b>									
7,668.87	0.00	0.00	7,041.00	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
7,700.00	0.00	0.00	7,072.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
7,800.00	0.00	0.00	7,172.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
7,900.00	0.00	0.00	7,272.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
8,000.00	0.00	0.00	7,372.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
8,100.00	0.00	0.00	7,472.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
8,200.00	0.00	0.00	7,572.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
8,300.00	0.00	0.00	7,672.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
8,326.87	0.00	0.00	7,699.00	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
<b>Rollins</b>									
8,368.87	0.00	0.00	7,741.00	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
8,400.00	0.00	0.00	7,772.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00
8,500.00	0.00	0.00	7,872.13	-1,646.99	1,915.66	2,526.33	0.00	0.00	0.00



<b>Database:</b>	EDMDBBW	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-20E
<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 28-20E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Slot A-10		
<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 8568.87									
8,568.87	0.00	0.00	7,941.00	-1,646.99	1,915.66	2,526.33	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 28-20E tgt	0.00	0.00	7,941.00	-1,646.98	1,915.66	1,521,003.714	2,357,665.441	39° 14' 30.720 N	107° 46' 5.560 W
- plan hits target center									
- Circle (radius 50.00)									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
1,604.14	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 (°)	
3,191.53	2,891.00	G Sand		0.00		
5,333.05	4,741.00	Williams Fork		0.00		
6,568.87	5,941.00	TOG		0.00		
7,668.87	7,041.00	Cameo		0.00		
8,326.87	7,699.00	Base Cameo Coal		0.00		
8,368.87	7,741.00	Rollins		0.00		

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
200.00	200.00	0.00	0.00	Start Build 2.50	
1,416.43	1,360.11	-205.56	239.09	Start 3745.02 hold at 1416.43 MD	
5,161.44	4,589.89	-1,441.43	1,676.57	Start Drop -2.50	
6,377.87	5,750.00	-1,646.99	1,915.66	Start 2191.00 hold at 6377.87 MD	
8,568.87	7,941.00	-1,646.99	1,915.66	TD at 8568.87	



# **Piceance Energy, LLC**

**Mesa County, CO**

**Piceance 28-10 Pad**

**Piceance Federal 28-20E**

**Slot A-10**

**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 28-20E
<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 28-20E	<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-10	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #2	<b>Offset TVD Reference:</b>	Reference Datum

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

<b>Survey Tool Program</b>	<b>Date</b>	2015/04/15		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.00	8,568.87	Design #2 (Slot A-10)	MWD	MWD - Standard

<b>Summary</b>						
<b>Site Name</b>	<b>Reference Measured Depth (usft)</b>	<b>Offset Measured Depth (usft)</b>	<b>Distance Between Centres (usft)</b>	<b>Distance Between Ellipses (usft)</b>	<b>Separation Factor</b>	<b>Warning</b>
<b>Offset Well - Wellbore - Design</b>						
Piceance 28-10 Pad						
Piceance Federal 28-19E - Slot A-9 - Design #2	200.00	200.00	9.41	8.78	15.054	CC, ES
Piceance Federal 28-19E - Slot A-9 - Design #2	8,568.87	8,499.79	249.90	162.76	2.868	SF
Piceance Federal 28-21E - Slot A-11 - Design #2	100.00	100.00	20.00	19.82	114.055	CC, ES
Piceance Federal 28-21E - Slot A-11 - Design #2	5,200.00	5,177.66	202.08	120.18	2.467	SF

Offset Design		Piceance 28-10 Pad - Piceance Federal 28-19E - Slot A-9 - Design #2										Offset Site Error:		0.00 usf
Survey Program:		0-MWD										Offset Well Error:		0.00 usf
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	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		
200.00	200.00	200.00	200.00	0.31	0.31	14.53	9.11	2.36	9.41	8.78	0.62	15.054	CC, ES	
300.00	299.97	299.97	299.97	0.52	0.54	-126.83	9.11	2.36	10.55	9.47	1.08	9.792		
400.00	399.75	400.22	400.18	0.75	0.75	-141.13	7.81	4.12	13.73	12.16	1.56	8.782		
500.00	499.14	500.65	500.40	1.01	0.96	-148.79	3.90	9.43	17.59	15.52	2.08	8.468		
600.00	597.97	601.28	600.41	1.33	1.21	-152.84	-2.61	18.29	21.80	19.18	2.62	8.308		
700.00	696.04	702.09	700.03	1.72	1.53	-154.88	-11.74	30.70	26.20	23.00	3.20	8.188		
800.00	793.17	803.08	799.05	2.19	1.91	-155.74	-23.48	46.66	30.73	26.92	3.81	8.059		
900.00	889.17	904.26	897.28	2.74	2.37	-155.86	-37.82	66.16	35.37	30.90	4.48	7.902		
1,000.00	983.85	1,005.61	994.52	3.38	2.91	-155.49	-54.75	89.17	40.10	34.90	5.20	7.706		
1,100.00	1,077.05	1,107.14	1,090.56	4.10	3.55	-154.79	-74.25	115.67	44.92	38.91	6.01	7.470		
1,200.00	1,168.57	1,208.85	1,185.21	4.91	4.28	-153.85	-96.28	145.63	49.83	42.90	6.93	7.195		
1,300.00	1,258.25	1,310.72	1,278.27	5.81	5.11	-152.74	-120.83	179.00	54.82	46.87	7.95	6.894		
1,400.00	1,345.92	1,412.75	1,369.55	6.81	6.04	-151.52	-147.84	215.73	59.91	50.79	9.12	6.568		
1,500.00	1,432.19	1,513.47	1,457.99	7.87	7.03	-150.04	-176.39	254.54	64.52	54.09	10.43	6.186		
1,600.00	1,518.43	1,613.36	1,545.56	8.94	8.04	-148.66	-204.86	293.25	68.97	57.15	11.83	5.832		
1,700.00	1,604.67	1,713.25	1,633.13	10.01	9.06	-147.46	-233.33	331.95	73.46	60.18	13.28	5.530		
1,800.00	1,690.91	1,813.14	1,720.70	11.09	10.08	-146.39	-261.81	370.66	77.97	63.19	14.79	5.273		
1,900.00	1,777.16	1,913.02	1,808.28	12.18	11.10	-145.43	-290.28	409.37	82.51	66.18	16.33	5.052		
2,000.00	1,863.40	2,012.91	1,895.85	13.27	12.13	-144.58	-318.75	448.07	87.07	69.17	17.91	4.863		
2,100.00	1,949.64	2,112.80	1,983.42	14.35	13.16	-143.81	-347.22	486.78	91.65	72.15	19.50	4.699		
2,200.00	2,035.88	2,212.69	2,070.99	15.44	14.20	-143.12	-375.69	525.49	96.24	75.12	21.12	4.556		

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 28-20E
<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 28-20E	<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-10	<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		
2,300.00	2,122.12	2,312.58	2,158.56	16.54	15.23	-142.49	-404.16	564.20	100.85	78.09	22.76	4.431		
2,400.00	2,208.36	2,412.46	2,246.13	17.63	16.27	-141.91	-432.64	602.90	105.46	81.06	24.41	4.321		
2,500.00	2,294.61	2,512.35	2,333.70	18.72	17.30	-141.38	-461.11	641.61	110.09	84.02	26.07	4.223		
2,600.00	2,380.85	2,612.24	2,421.28	19.82	18.34	-140.90	-489.58	680.32	114.72	86.98	27.74	4.136		
2,700.00	2,467.09	2,712.13	2,508.85	20.91	19.38	-140.45	-518.05	719.02	119.36	89.95	29.42	4.058		
2,800.00	2,553.33	2,812.02	2,596.42	22.01	20.42	-140.04	-546.52	757.73	124.01	92.91	31.10	3.987		
2,900.00	2,639.57	2,911.90	2,683.99	23.10	21.46	-139.65	-574.99	796.44	128.67	95.87	32.80	3.923		
3,000.00	2,725.82	3,011.79	2,771.56	24.20	22.50	-139.29	-603.47	835.14	133.33	98.83	34.50	3.865		
3,100.00	2,812.06	3,111.68	2,859.13	25.30	23.54	-138.96	-631.94	873.85	137.99	101.79	36.20	3.812		
3,200.00	2,898.30	3,211.57	2,946.70	26.39	24.58	-138.65	-660.41	912.56	142.66	104.75	37.91	3.763		
3,300.00	2,984.54	3,311.46	3,034.28	27.49	25.62	-138.36	-688.88	951.27	147.33	107.71	39.62	3.718		
3,400.00	3,070.78	3,411.34	3,121.85	28.59	26.66	-138.08	-717.35	989.97	152.01	110.67	41.34	3.677		
3,500.00	3,157.03	3,511.23	3,209.42	29.68	27.70	-137.83	-745.83	1,028.68	156.69	113.63	43.06	3.639		
3,600.00	3,243.27	3,611.12	3,296.99	30.78	28.74	-137.58	-774.30	1,067.39	161.37	116.59	44.78	3.604		
3,700.00	3,329.51	3,711.01	3,384.56	31.88	29.78	-137.36	-802.77	1,106.09	166.06	119.56	46.50	3.571		
3,800.00	3,415.75	3,810.90	3,472.13	32.98	30.83	-137.14	-831.24	1,144.80	170.74	122.52	48.23	3.540		
3,900.00	3,501.99	3,910.78	3,559.70	34.07	31.87	-136.93	-859.71	1,183.51	175.44	125.48	49.96	3.512		
4,000.00	3,588.24	4,010.67	3,647.27	35.17	32.91	-136.74	-888.18	1,222.21	180.13	128.44	51.69	3.485		
4,100.00	3,674.48	4,110.56	3,734.85	36.27	33.95	-136.56	-916.66	1,260.92	184.82	131.40	53.42	3.460		
4,200.00	3,760.72	4,210.45	3,822.42	37.37	34.99	-136.38	-945.13	1,299.63	189.52	134.37	55.15	3.436		
4,300.00	3,846.96	4,310.34	3,909.99	38.47	36.04	-136.22	-973.60	1,338.34	194.22	137.33	56.89	3.414		
4,400.00	3,933.20	4,410.22	3,997.56	39.57	37.08	-136.06	-1,002.07	1,377.04	198.92	140.29	58.62	3.393		
4,500.00	4,019.45	4,510.11	4,085.13	40.66	38.12	-135.91	-1,030.54	1,415.75	203.62	143.26	60.36	3.373		
4,600.00	4,105.69	4,610.00	4,172.70	41.76	39.16	-135.76	-1,059.01	1,454.46	208.32	146.22	62.10	3.355		
4,700.00	4,191.93	4,709.89	4,260.27	42.86	40.21	-135.62	-1,087.49	1,493.16	213.02	149.18	63.84	3.337		
4,800.00	4,278.17	4,809.78	4,347.85	43.96	41.25	-135.49	-1,115.96	1,531.87	217.73	152.15	65.58	3.320		
4,900.00	4,364.41	4,909.67	4,435.42	45.06	42.29	-135.36	-1,144.43	1,570.58	222.43	155.11	67.32	3.304		
5,000.00	4,450.66	5,009.55	4,522.99	46.16	43.34	-135.24	-1,172.90	1,609.29	227.14	158.08	69.06	3.289		
5,100.00	4,536.90	5,109.44	4,610.56	47.26	44.38	-135.13	-1,201.37	1,647.99	231.85	161.04	70.81	3.274		
5,200.00	4,623.30	5,208.64	4,697.52	48.31	45.41	-134.99	-1,229.65	1,686.43	236.33	163.76	72.56	3.257		
5,300.00	4,711.43	5,300.00	4,778.48	49.14	46.25	-134.69	-1,254.74	1,720.54	239.69	165.49	74.20	3.230		
5,400.00	4,801.53	5,396.39	4,865.64	49.90	46.97	-134.38	-1,279.11	1,753.68	242.63	166.93	75.70	3.205		
5,500.00	4,893.44	5,489.92	4,951.80	50.58	47.60	-134.07	-1,300.67	1,782.98	245.19	168.13	77.05	3.182		
5,600.00	4,986.98	5,583.44	5,039.36	51.19	48.16	-133.76	-1,320.12	1,809.43	247.34	169.06	78.29	3.159		
5,700.00	5,081.97	5,676.98	5,128.20	51.72	48.66	-133.45	-1,337.44	1,832.98	249.10	169.70	79.40	3.137		
5,800.00	5,178.23	5,770.52	5,218.17	52.18	49.09	-133.13	-1,352.60	1,853.59	250.45	170.06	80.39	3.115		
5,900.00	5,275.58	5,864.09	5,309.14	52.56	49.46	-132.81	-1,365.58	1,871.23	251.39	170.12	81.27	3.093		
6,000.00	5,373.84	5,957.70	5,400.96	52.88	49.76	-132.48	-1,376.35	1,885.87	251.91	169.89	82.03	3.071		
6,100.00	5,472.81	6,051.35	5,493.48	53.12	50.01	-132.14	-1,384.89	1,897.49	252.03	169.35	82.68	3.048		
6,200.00	5,572.31	6,145.04	5,586.57	53.30	50.20	-131.79	-1,391.19	1,906.05	251.74	168.51	83.23	3.025		
6,300.00	5,672.14	6,238.80	5,680.07	53.41	50.33	-131.43	-1,395.23	1,911.54	251.04	167.36	83.68	3.000		
6,400.00	5,772.13	6,332.62	5,773.84	53.48	50.42	-0.39	-1,397.01	1,913.95	249.99	165.95	84.05	2.974		
6,446.21	5,818.34	6,377.12	5,818.34	53.50	50.45	-0.37	-1,397.09	1,914.07	249.90	165.77	84.13	2.970		
6,500.00	5,872.13	6,430.92	5,872.13	53.52	50.47	-0.37	-1,397.09	1,914.07	249.90	165.70	84.19	2.968		
6,600.00	5,972.13	6,530.92	5,972.13	53.57	50.52	-0.37	-1,397.09	1,914.07	249.90	165.58	84.31	2.964		
6,700.00	6,072.13	6,630.92	6,072.13	53.62	50.58	-0.37	-1,397.09	1,914.07	249.90	165.46	84.44	2.960		
6,800.00	6,172.13	6,730.92	6,172.13	53.67	50.63	-0.37	-1,397.09	1,914.07	249.90	165.34	84.56	2.955		
6,900.00	6,272.13	6,830.92	6,272.13	53.72	50.68	-0.37	-1,397.09	1,914.07	249.90	165.21	84.69	2.951		
7,000.00	6,372.13	6,930.92	6,372.13	53.77	50.74	-0.37	-1,397.09	1,914.07	249.90	165.08	84.82	2.946		
7,100.00	6,472.13	7,030.92	6,472.13	53.82	50.79	-0.37	-1,397.09	1,914.07	249.90	164.95	84.95	2.942		
7,200.00	6,572.13	7,130.92	6,572.13	53.87	50.85	-0.37	-1,397.09	1,914.07	249.90	164.81	85.09	2.937		
7,300.00	6,672.13	7,230.92	6,672.13	53.92	50.91	-0.37	-1,397.09	1,914.07	249.90	164.68	85.22	2.932		

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 28-20E
<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 28-20E	<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-10	<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		Highside Toolface (°)	Distance		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)					
7,400.00	6,772.13	7,330.92	6,772.13	53.98	50.96	-0.37	-1,397.09	1,914.07	249.90	164.54	85.36	2.928	
7,500.00	6,872.13	7,430.92	6,872.13	54.03	51.02	-0.37	-1,397.09	1,914.07	249.90	164.40	85.50	2.923	
7,600.00	6,972.13	7,530.92	6,972.13	54.09	51.08	-0.37	-1,397.09	1,914.07	249.90	164.25	85.64	2.918	
7,700.00	7,072.13	7,630.92	7,072.13	54.14	51.14	-0.37	-1,397.09	1,914.07	249.90	164.11	85.79	2.913	
7,800.00	7,172.13	7,730.92	7,172.13	54.20	51.21	-0.37	-1,397.09	1,914.07	249.90	163.96	85.93	2.908	
7,900.00	7,272.13	7,830.92	7,272.13	54.26	51.27	-0.37	-1,397.09	1,914.07	249.90	163.81	86.08	2.903	
8,000.00	7,372.13	7,930.92	7,372.13	54.32	51.33	-0.37	-1,397.09	1,914.07	249.90	163.66	86.23	2.898	
8,100.00	7,472.13	8,030.92	7,472.13	54.38	51.40	-0.37	-1,397.09	1,914.07	249.90	163.51	86.39	2.893	
8,200.00	7,572.13	8,130.92	7,572.13	54.44	51.46	-0.37	-1,397.09	1,914.07	249.90	163.35	86.54	2.888	
8,300.00	7,672.13	8,230.92	7,672.13	54.50	51.53	-0.37	-1,397.09	1,914.07	249.90	163.20	86.70	2.882	
8,400.00	7,772.13	8,330.92	7,772.13	54.56	51.60	-0.37	-1,397.09	1,914.07	249.90	163.04	86.86	2.877	
8,500.00	7,872.13	8,430.92	7,872.13	54.63	51.66	-0.37	-1,397.09	1,914.07	249.90	162.88	87.02	2.872	
8,568.87	7,941.00	8,499.79	7,941.00	54.67	51.71	-0.37	-1,397.09	1,914.07	249.90	162.76	87.13	2.868 SF	



# Archer

## Anticollision Report

# Archer

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance Federal 28-20E
<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 28-20E	<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-10	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #2	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Piceance 28-10 Pad - Piceance Federal 28-21E - Slot A-11 - Design #2													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.00	0.00	0.00	0.00	0.00	0.00	-164.01	-19.22	-5.51	20.00					
100.00	100.00	100.00	100.00	0.09	0.09	-164.01	-19.22	-5.51	20.00	19.82	0.18	114.055 CC, ES		
200.00	200.00	199.53	199.49	0.31	0.30	-169.18	-20.73	-3.96	21.11	20.50	0.61	34.566		
300.00	299.97	298.83	298.58	0.52	0.54	51.61	-25.24	0.66	23.88	22.82	1.07	22.364		
400.00	399.75	397.95	397.11	0.75	0.82	45.44	-32.74	8.33	27.23	25.65	1.58	17.262		
500.00	499.14	496.89	494.91	1.01	1.15	41.10	-43.17	19.02	30.96	28.82	2.14	14.457		
600.00	597.97	595.65	591.79	1.33	1.56	38.10	-56.52	32.69	34.95	32.20	2.75	12.696		
700.00	696.04	694.22	687.59	1.72	2.03	36.08	-72.74	49.30	39.12	35.71	3.41	11.463		
800.00	793.17	792.62	782.13	2.19	2.58	34.79	-91.79	68.80	43.42	39.29	4.13	10.520		
900.00	889.17	890.85	875.24	2.74	3.20	34.03	-113.61	91.15	47.81	42.90	4.91	9.745		
1,000.00	983.85	988.90	966.78	3.38	3.91	33.67	-138.16	116.29	52.27	46.51	5.76	9.075		
1,100.00	1,077.05	1,086.79	1,056.58	4.10	4.70	33.63	-165.37	144.15	56.80	50.09	6.70	8.473		
1,200.00	1,168.57	1,184.51	1,144.48	4.91	5.58	33.82	-195.18	174.68	61.37	53.64	7.74	7.931		
1,300.00	1,258.25	1,282.07	1,230.35	5.81	6.53	34.20	-227.53	207.80	66.00	57.10	8.90	7.417		
1,400.00	1,345.92	1,380.17	1,314.71	6.81	7.57	34.80	-262.50	243.61	70.53	60.34	10.19	6.922		
1,500.00	1,432.19	1,480.10	1,400.07	7.87	8.67	36.20	-298.81	280.79	73.73	62.06	11.67	6.318		
1,600.00	1,518.43	1,580.03	1,485.43	8.94	9.77	37.51	-335.11	317.97	76.92	63.70	13.23	5.815		
1,700.00	1,604.67	1,679.97	1,570.79	10.01	10.88	38.72	-371.42	355.15	80.15	65.30	14.85	5.399		
1,800.00	1,690.91	1,779.90	1,656.15	11.09	11.99	39.83	-407.73	392.33	83.41	66.90	16.52	5.050		
1,900.00	1,777.16	1,879.84	1,741.51	12.18	13.10	40.86	-444.03	429.51	86.70	68.47	18.23	4.756		
2,000.00	1,863.40	1,979.77	1,826.87	13.27	14.22	41.81	-480.34	466.69	90.02	70.04	19.98	4.505		
2,100.00	1,949.64	2,079.70	1,912.23	14.35	15.33	42.70	-516.65	503.87	93.36	71.60	21.76	4.291		
2,200.00	2,035.88	2,179.64	1,997.59	15.44	16.45	43.52	-552.95	541.05	96.72	73.16	23.57	4.104		
2,300.00	2,122.12	2,279.57	2,082.95	16.54	17.57	44.29	-589.26	578.23	100.10	74.71	25.39	3.942		
2,400.00	2,208.36	2,379.51	2,168.31	17.63	18.69	45.01	-625.57	615.40	103.50	76.26	27.24	3.800		
2,500.00	2,294.61	2,479.44	2,253.67	18.72	19.81	45.68	-661.87	652.58	106.91	77.81	29.10	3.674		
2,600.00	2,380.85	2,579.37	2,339.03	19.82	20.93	46.31	-698.18	689.76	110.34	79.36	30.98	3.561		
2,700.00	2,467.09	2,679.31	2,424.39	20.91	22.05	46.91	-734.49	726.94	113.77	80.90	32.87	3.461		
2,800.00	2,553.33	2,779.24	2,509.75	22.01	23.17	47.47	-770.80	764.12	117.22	82.45	34.77	3.371		
2,900.00	2,639.57	2,879.18	2,595.11	23.10	24.29	47.99	-807.10	801.30	120.68	84.00	36.68	3.290		
3,000.00	2,725.82	2,979.11	2,680.47	24.20	25.41	48.49	-843.41	838.48	124.15	85.55	38.61	3.216		
3,100.00	2,812.06	3,079.05	2,765.83	25.30	26.53	48.96	-879.72	875.66	127.63	87.10	40.53	3.149		
3,200.00	2,898.30	3,178.98	2,851.19	26.39	27.66	49.40	-916.02	912.84	131.12	88.65	42.47	3.087		
3,300.00	2,984.54	3,278.91	2,936.55	27.49	28.78	49.82	-952.33	950.02	134.61	90.20	44.41	3.031		
3,400.00	3,070.78	3,378.85	3,021.91	28.59	29.90	50.22	-988.64	987.20	138.11	91.75	46.36	2.979		
3,500.00	3,157.03	3,478.78	3,107.27	29.68	31.02	50.61	-1,024.94	1,024.37	141.62	93.31	48.31	2.931		
3,600.00	3,243.27	3,578.72	3,192.63	30.78	32.15	50.97	-1,061.25	1,061.55	145.13	94.86	50.27	2.887		
3,700.00	3,329.51	3,678.65	3,277.99	31.88	33.27	51.31	-1,097.56	1,098.73	148.65	96.42	52.23	2.846		
3,800.00	3,415.75	3,778.58	3,363.35	32.98	34.39	51.64	-1,133.87	1,135.91	152.17	97.98	54.20	2.808		
3,900.00	3,501.99	3,878.52	3,448.71	34.07	35.52	51.96	-1,170.17	1,173.09	155.70	99.53	56.17	2.772		
4,000.00	3,588.24	3,978.45	3,534.07	35.17	36.64	52.26	-1,206.48	1,210.27	159.24	101.09	58.14	2.739		
4,100.00	3,674.48	4,078.39	3,619.43	36.27	37.76	52.54	-1,242.79	1,247.45	162.77	102.66	60.12	2.708		
4,200.00	3,760.72	4,178.32	3,704.79	37.37	38.89	52.82	-1,279.09	1,284.63	166.32	104.22	62.10	2.678		
4,300.00	3,846.96	4,278.26	3,790.15	38.47	40.01	53.08	-1,315.40	1,321.81	169.86	105.78	64.08	2.651		
4,400.00	3,933.20	4,378.19	3,875.51	39.57	41.13	53.33	-1,351.71	1,358.99	173.41	107.35	66.06	2.625		
4,500.00	4,019.45	4,478.12	3,960.87	40.66	42.26	53.58	-1,388.01	1,396.17	176.96	108.92	68.04	2.601		
4,600.00	4,105.69	4,578.06	4,046.23	41.76	43.38	53.81	-1,424.32	1,433.35	180.51	110.48	70.03	2.578		
4,700.00	4,191.93	4,677.99	4,131.59	42.86	44.50	54.03	-1,460.63	1,470.52	184.07	112.05	72.02	2.556		
4,800.00	4,278.17	4,777.93	4,216.95	43.96	45.63	54.25	-1,496.93	1,507.70	187.63	113.62	74.01	2.535		
4,900.00	4,364.41	4,877.86	4,302.31	45.06	46.75	54.46	-1,533.24	1,544.88	191.19	115.19	76.00	2.516		
5,000.00	4,450.66	4,977.79	4,387.67	46.16	47.87	54.66	-1,569.55	1,582.06	194.76	116.76	78.00	2.497		
5,100.00	4,536.90	5,077.73	4,473.03	47.26	49.00	54.85	-1,605.86	1,619.24	198.33	118.33	79.99	2.479		

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 28-20E
<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 28-20E	<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-10	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #2	<b>Offset TVD Reference:</b>	Reference Datum

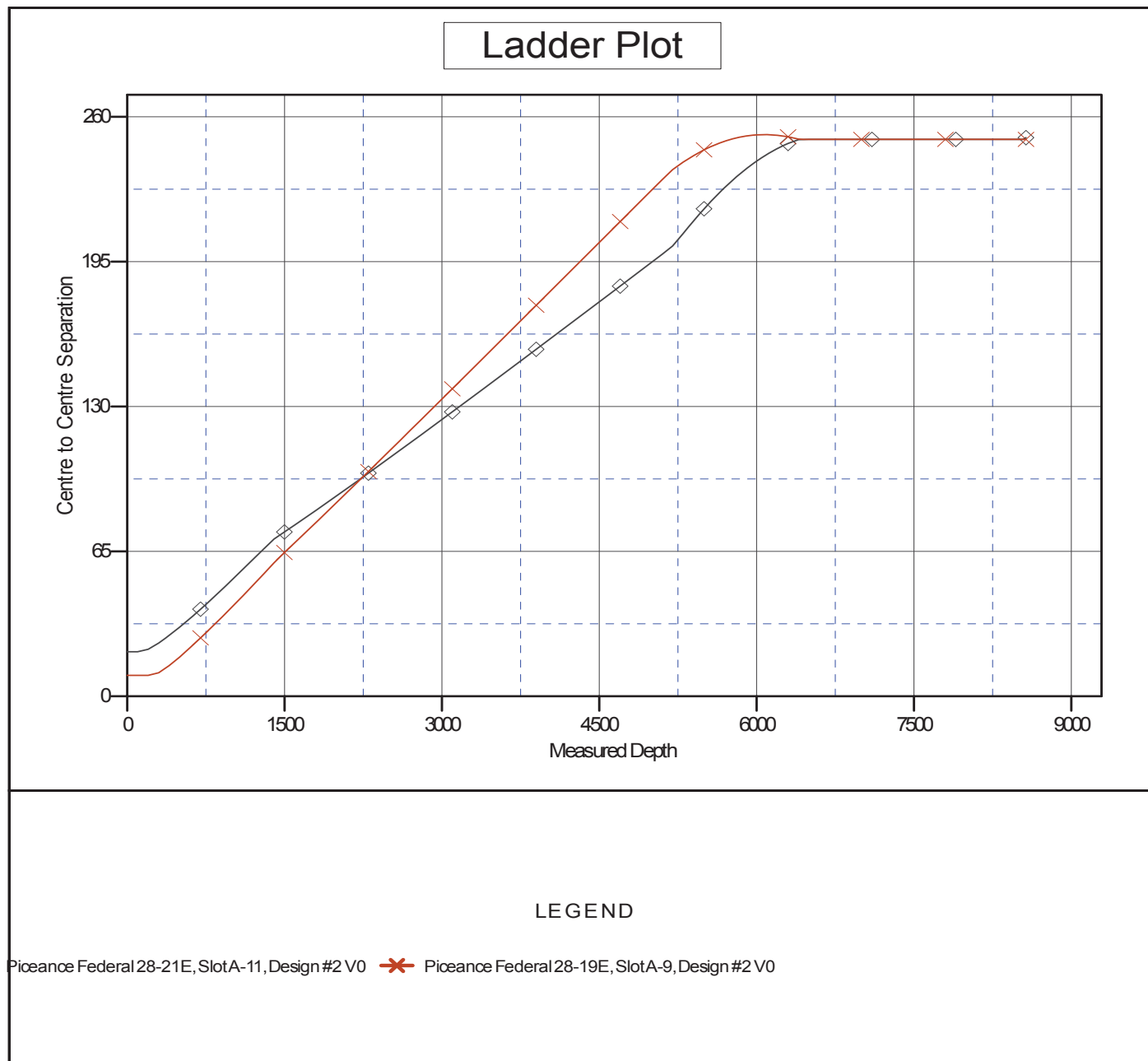
Offset Design Piceance 28-10 Pad - Piceance Federal 28-21E - Slot A-11 - Design #2													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,200.00	4,623.30	5,177.66	4,558.39	48.31	50.12	54.99	-1,642.16	1,656.42	202.08	120.18	81.91	2.467 SF		
5,300.00	4,711.43	5,279.94	4,645.97	49.14	51.22	54.48	-1,679.07	1,694.21	207.63	124.59	83.04	2.500		
5,400.00	4,801.53	5,385.88	4,738.70	49.90	52.13	53.82	-1,714.85	1,730.85	213.35	129.52	83.83	2.545		
5,500.00	4,893.44	5,492.12	4,833.97	50.58	52.95	53.21	-1,747.68	1,764.48	218.73	134.25	84.48	2.589		
5,600.00	4,986.98	5,598.64	4,931.58	51.19	53.69	52.63	-1,777.47	1,794.98	223.76	138.76	85.00	2.632		
5,700.00	5,081.97	5,705.43	5,031.31	51.72	54.33	52.09	-1,804.13	1,822.28	228.43	143.04	85.40	2.675		
5,800.00	5,178.23	5,812.48	5,132.95	52.18	54.90	51.57	-1,827.56	1,846.27	232.72	147.06	85.66	2.717		
5,900.00	5,275.58	5,919.76	5,236.29	52.56	55.38	51.09	-1,847.69	1,866.88	236.61	150.81	85.81	2.758		
6,000.00	5,373.84	6,027.27	5,341.07	52.88	55.78	50.63	-1,864.45	1,884.05	240.11	154.28	85.83	2.798		
6,100.00	5,472.81	6,134.97	5,447.07	53.12	56.09	50.19	-1,877.78	1,897.70	243.18	157.46	85.73	2.837		
6,200.00	5,572.31	6,242.87	5,554.02	53.30	56.34	49.76	-1,887.63	1,907.78	245.84	160.33	85.51	2.875		
6,300.00	5,672.14	6,350.93	5,661.69	53.41	56.50	49.36	-1,893.96	1,914.27	248.06	162.87	85.18	2.912		
6,400.00	5,772.13	6,459.14	5,769.82	53.48	56.60	179.67	-1,896.74	1,917.11	249.77	164.96	84.81	2.945		
6,500.00	5,872.13	6,561.45	5,872.13	53.52	56.65	179.64	-1,896.88	1,917.26	249.90	165.00	84.90	2.944		
6,600.00	5,972.13	6,661.45	5,972.13	53.57	56.70	179.64	-1,896.88	1,917.26	249.90	164.88	85.01	2.939		
6,700.00	6,072.13	6,761.45	6,072.13	53.62	56.74	179.64	-1,896.88	1,917.26	249.90	164.76	85.13	2.935		
6,800.00	6,172.13	6,861.45	6,172.13	53.67	56.79	179.64	-1,896.88	1,917.26	249.90	164.64	85.26	2.931		
6,900.00	6,272.13	6,961.45	6,272.13	53.72	56.83	179.64	-1,896.88	1,917.26	249.90	164.52	85.38	2.927		
7,000.00	6,372.13	7,061.45	6,372.13	53.77	56.88	179.64	-1,896.88	1,917.26	249.90	164.39	85.51	2.923		
7,100.00	6,472.13	7,161.45	6,472.13	53.82	56.93	179.64	-1,896.88	1,917.26	249.90	164.26	85.64	2.918		
7,200.00	6,572.13	7,261.45	6,572.13	53.87	56.97	179.64	-1,896.88	1,917.26	249.90	164.13	85.77	2.914		
7,300.00	6,672.13	7,361.45	6,672.13	53.92	57.02	179.64	-1,896.88	1,917.26	249.90	164.00	85.90	2.909		
7,400.00	6,772.13	7,461.45	6,772.13	53.98	57.07	179.64	-1,896.88	1,917.26	249.90	163.86	86.03	2.905		
7,500.00	6,872.13	7,561.45	6,872.13	54.03	57.12	179.64	-1,896.88	1,917.26	249.90	163.73	86.17	2.900		
7,600.00	6,972.13	7,661.45	6,972.13	54.09	57.18	179.64	-1,896.88	1,917.26	249.90	163.59	86.31	2.895		
7,700.00	7,072.13	7,761.45	7,072.13	54.14	57.23	179.64	-1,896.88	1,917.26	249.90	163.45	86.45	2.891		
7,800.00	7,172.13	7,861.45	7,172.13	54.20	57.28	179.64	-1,896.88	1,917.26	249.90	163.30	86.59	2.886		
7,900.00	7,272.13	7,961.45	7,272.13	54.26	57.34	179.64	-1,896.88	1,917.26	249.90	163.16	86.74	2.881		
8,000.00	7,372.13	8,061.45	7,372.13	54.32	57.39	179.64	-1,896.88	1,917.26	249.90	163.01	86.89	2.876		
8,100.00	7,472.13	8,161.45	7,472.13	54.38	57.45	179.64	-1,896.88	1,917.26	249.90	162.86	87.04	2.871		
8,200.00	7,572.13	8,261.45	7,572.13	54.44	57.50	179.64	-1,896.88	1,917.26	249.90	162.71	87.19	2.866		
8,300.00	7,672.13	8,361.45	7,672.13	54.50	57.56	179.64	-1,896.88	1,917.26	249.90	162.55	87.34	2.861		
8,400.00	7,772.13	8,461.45	7,772.13	54.56	57.62	179.64	-1,896.88	1,917.26	249.90	162.40	87.50	2.856		
8,500.00	7,872.13	8,561.45	7,872.13	54.63	57.68	179.64	-1,896.88	1,917.26	249.90	162.24	87.66	2.851		
8,536.51	7,908.64	8,597.96	7,908.64	54.65	57.70	179.64	-1,896.88	1,917.26	249.90	162.18	87.71	2.849		
8,568.87	7,941.00	8,610.32	7,921.00	54.67	57.71	179.64	-1,896.88	1,917.26	250.70	162.95	87.75	2.857		



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-20E
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 28-20E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-10	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 28-20E  
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 28-20E
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 28-20E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot A-10	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 28-20E

Coordinate System is US State Plane 1983, Colorado Central Zone

Grid Convergence at Surface is: -1.43°

