



# **Piceance Energy, LLC**

**Mesa County, CO**

**Piceance 28-05**

**Piceance 28-10M**

**Slot B-10**

**Plan: Design #1**

## **Standard Planning Report**

**29 April, 2015**

# **Archer**



Project: Mesa County, CO  
Site: Piceance 28-05  
Well: Piceance 28-10M  
Wellbore: Slot B-10  
Design: Design #1  
Latitude: 39° 15' 3.220 N  
Longitude: 107° 46' 45.770 W  
Ground Level: 7556.0  
Well @ 7578.0usft

# 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 28-10M, True North  
Vertical (TVD) Reference: Well @ 7578.0usft  
Section (VS) Reference: Slot - (0.0N, 0.0E)  
Measured Depth Reference: Well @ 7578.0usft  
Calculation Method: Minimum Curvature

### WELL DETAILS: Piceance 28-10M

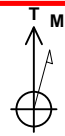
+N/-S	+E/-W	Northing	Ground Level:	7556.0	Latitude	Longitude	Slot
0.0	0.0	1524369.90	Easting	2354585.52	39° 15' 3.220 N	107° 46' 45.770 W	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance Federal 28-10M tgt	7870.0	-769.9	1338.9	1523566.69	2355904.65	39° 14' 55.610 N	107° 46' 28.750 W	Circle (Radius: 50.0)

### SECTION DETAILS

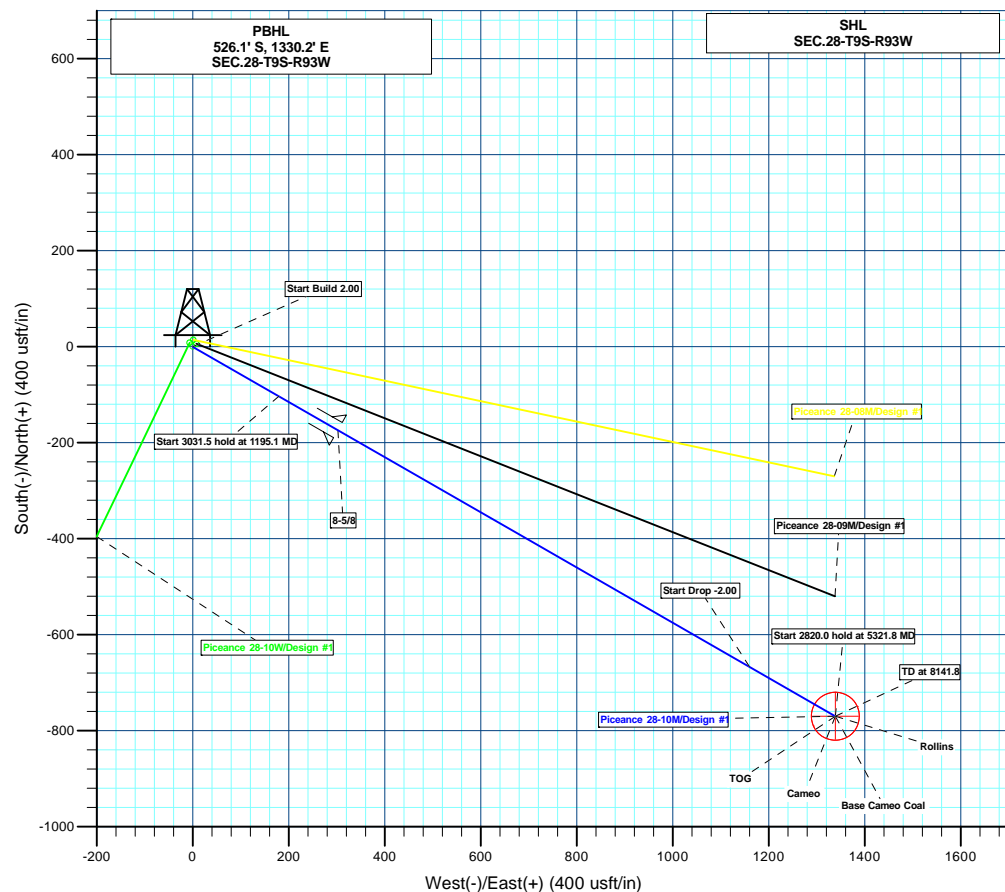
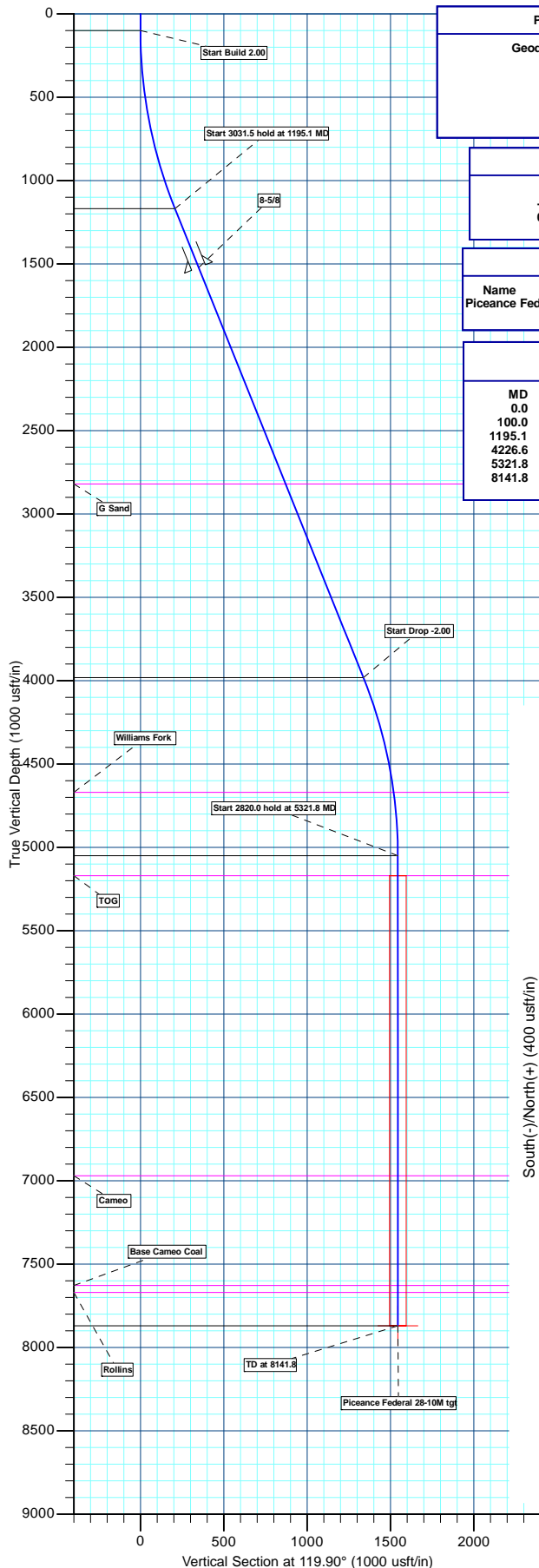
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
100.0	0.00	0.00	100.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
1195.1	21.90	119.90	1168.7	-103.1	179.3	2.00	119.90	206.8	Start 3031.5 hold at 1195.1 MD
4226.6	21.90	119.90	3981.3	-666.8	1159.6	0.00	0.00	1337.6	Start Drop -2.00
5321.8	0.00	0.00	5050.0	-769.9	1338.9	2.00	180.00	1544.4	Start 2820.0 hold at 5321.8 MD
8141.8	0.00	0.00	7870.0	-769.9	1338.9	0.00	0.00	1544.4	TD at 8141.8



Azimuths to True North  
Magnetic North: 9.72°  
Magnetic Field  
Strength: 51741.8snT  
Dip Angle: 65.47°  
Date: 2015/04/27  
Model: IGRF2010

### FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2820.0	2975.0	G Sand
4670.0	4940.7	Williams Fork
5170.0	5441.8	TOG
6970.0	7241.8	Cameo
7628.0	7899.8	Base Cameo Coal
7670.0	7941.8	Rollins



Plan: Design #1 (Piceance 28-10M/Slot B-10)

Created By: Ricky Osburn Date: 8:41, April 29 2015



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-10M
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7578.0usft
Project:	Mesa County, CO	MD Reference:	Well @ 7578.0usft
Site:	Piceance 28-05	North Reference:	True
Well:	Piceance 28-10M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-10		
Design:	Design #1		

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 28-05			
Site Position:		Northing:	1,524,375.79 usft	Latitude:	39° 15' 3.280 N
From:	Lat/Long	Easting:	2,354,593.53 usft	Longitude:	107° 46' 45.670 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	-1.44 °

Well	Piceance 28-10M					
Well Position	+N/-S	-6.1 usft	Northing:	1,524,369.90 usft	Latitude:	39° 15' 3.220 N
	+E/-W	-7.9 usft	Easting:	2,354,585.52 usft	Longitude:	107° 46' 45.770 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,556.0 usft

Wellbore	Slot B-10				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2015/04/27	9.73	65.47	51,742

Design	Design #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	119.90

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
100.0	0.00	0.00	100.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,195.1	21.90	119.90	1,168.7	-103.1	179.3	2.00	2.00	0.00	119.90	
4,226.6	21.90	119.90	3,981.3	-666.8	1,159.6	0.00	0.00	0.00	0.00	
5,321.8	0.00	0.00	5,050.0	-769.9	1,338.9	2.00	-2.00	0.00	180.00	
8,141.8	0.00	0.00	7,870.0	-769.9	1,338.9	0.00	0.00	0.00	0.00	Piceance Federal 28-



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-10M
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7578.0usft
Project:	Mesa County, CO	MD Reference:	Well @ 7578.0usft
Site:	Piceance 28-05	North Reference:	True
Well:	Piceance 28-10M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-10		
Design:	Design #1		

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
Start Build 2.00									
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	2.00	119.90	200.0	-0.9	1.5	1.7	2.00	2.00	0.00
300.0	4.00	119.90	299.8	-3.5	6.0	7.0	2.00	2.00	0.00
400.0	6.00	119.90	399.5	-7.8	13.6	15.7	2.00	2.00	0.00
500.0	8.00	119.90	498.7	-13.9	24.2	27.9	2.00	2.00	0.00
600.0	10.00	119.90	597.5	-21.7	37.7	43.5	2.00	2.00	0.00
700.0	12.00	119.90	695.6	-31.2	54.3	62.6	2.00	2.00	0.00
800.0	14.00	119.90	793.1	-42.4	73.8	85.1	2.00	2.00	0.00
900.0	16.00	119.90	889.6	-55.3	96.2	111.0	2.00	2.00	0.00
1,000.0	18.00	119.90	985.3	-69.9	121.6	140.2	2.00	2.00	0.00
1,100.0	20.00	119.90	1,079.8	-86.1	149.8	172.8	2.00	2.00	0.00
Start 3031.5 hold at 1195.1 MD									
1,195.1	21.90	119.90	1,168.7	-103.1	179.3	206.8	2.00	2.00	0.00
1,200.0	21.90	119.90	1,173.2	-104.0	180.8	208.6	0.00	0.00	0.00
1,300.0	21.90	119.90	1,266.0	-122.6	213.2	245.9	0.00	0.00	0.00
1,400.0	21.90	119.90	1,358.7	-141.2	245.5	283.2	0.00	0.00	0.00
1,500.0	21.90	119.90	1,451.5	-159.8	277.9	320.5	0.00	0.00	0.00
8-5/8									
1,576.0	21.90	119.90	1,522.0	-173.9	302.4	348.8	0.00	0.00	0.00
1,600.0	21.90	119.90	1,544.3	-178.4	310.2	357.8	0.00	0.00	0.00
1,700.0	21.90	119.90	1,637.1	-197.0	342.5	395.1	0.00	0.00	0.00
1,800.0	21.90	119.90	1,729.9	-215.6	374.9	432.4	0.00	0.00	0.00
1,900.0	21.90	119.90	1,822.6	-234.1	407.2	469.7	0.00	0.00	0.00
2,000.0	21.90	119.90	1,915.4	-252.7	439.5	507.0	0.00	0.00	0.00
2,100.0	21.90	119.90	2,008.2	-271.3	471.9	544.3	0.00	0.00	0.00
2,200.0	21.90	119.90	2,101.0	-289.9	504.2	581.6	0.00	0.00	0.00
2,300.0	21.90	119.90	2,193.8	-308.5	536.6	618.9	0.00	0.00	0.00
2,400.0	21.90	119.90	2,286.6	-327.1	568.9	656.2	0.00	0.00	0.00
2,500.0	21.90	119.90	2,379.3	-345.7	601.2	693.5	0.00	0.00	0.00
2,600.0	21.90	119.90	2,472.1	-364.3	633.6	730.8	0.00	0.00	0.00
2,700.0	21.90	119.90	2,564.9	-382.9	665.9	768.2	0.00	0.00	0.00
2,800.0	21.90	119.90	2,657.7	-401.5	698.3	805.5	0.00	0.00	0.00
2,900.0	21.90	119.90	2,750.5	-420.1	730.6	842.8	0.00	0.00	0.00
G Sand									
2,975.0	21.90	119.90	2,820.0	-434.0	754.8	870.7	0.00	0.00	0.00
3,000.0	21.90	119.90	2,843.2	-438.7	762.9	880.1	0.00	0.00	0.00
3,100.0	21.90	119.90	2,936.0	-457.3	795.3	917.4	0.00	0.00	0.00
3,200.0	21.90	119.90	3,028.8	-475.9	827.6	954.7	0.00	0.00	0.00
3,300.0	21.90	119.90	3,121.6	-494.5	859.9	992.0	0.00	0.00	0.00
3,400.0	21.90	119.90	3,214.4	-513.1	892.3	1,029.3	0.00	0.00	0.00
3,500.0	21.90	119.90	3,307.1	-531.7	924.6	1,066.6	0.00	0.00	0.00
3,600.0	21.90	119.90	3,399.9	-550.3	957.0	1,103.9	0.00	0.00	0.00
3,700.0	21.90	119.90	3,492.7	-568.9	989.3	1,141.2	0.00	0.00	0.00
3,800.0	21.90	119.90	3,585.5	-587.5	1,021.6	1,178.5	0.00	0.00	0.00
3,900.0	21.90	119.90	3,678.3	-606.1	1,054.0	1,215.8	0.00	0.00	0.00
4,000.0	21.90	119.90	3,771.1	-624.6	1,086.3	1,253.1	0.00	0.00	0.00
4,100.0	21.90	119.90	3,863.8	-643.2	1,118.7	1,290.4	0.00	0.00	0.00
4,200.0	21.90	119.90	3,956.6	-661.8	1,151.0	1,327.7	0.00	0.00	0.00
Start Drop -2.00									
4,226.6	21.90	119.90	3,981.3	-666.8	1,159.6	1,337.6	0.00	0.00	0.00
4,300.0	20.44	119.90	4,049.7	-680.0	1,182.6	1,364.1	2.00	-2.00	0.00
4,400.0	18.44	119.90	4,144.0	-696.6	1,211.4	1,397.4	2.00	-2.00	0.00



<b>Database:</b>	EDMDBBW	<b>Local Co-ordinate Reference:</b>	Well Piceance 28-10M
<b>Company:</b>	Piceance Energy, LLC	<b>TVD Reference:</b>	Well @ 7578.0usft
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	Well @ 7578.0usft
<b>Site:</b>	Piceance 28-05	<b>North Reference:</b>	True
<b>Well:</b>	Piceance 28-10M	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Slot B-10		
<b>Design:</b>	Design #1		

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)
4,500.0	16.44	119.90	4,239.4	-711.5	1,237.4	1,427.4	2.00	-2.00	0.00
4,600.0	14.44	119.90	4,335.8	-724.8	1,260.5	1,454.0	2.00	-2.00	0.00
4,700.0	12.44	119.90	4,433.1	-736.4	1,280.6	1,477.2	2.00	-2.00	0.00
4,800.0	10.44	119.90	4,531.1	-746.2	1,297.8	1,497.0	2.00	-2.00	0.00
4,900.0	8.44	119.90	4,629.7	-754.4	1,312.0	1,513.4	2.00	-2.00	0.00
<b>Williams Fork</b>									
4,940.7	7.62	119.90	4,670.0	-757.3	1,316.9	1,519.1	2.00	-2.00	0.00
5,000.0	6.44	119.90	4,728.9	-760.9	1,323.2	1,526.4	2.00	-2.00	0.00
5,100.0	4.44	119.90	4,828.4	-765.6	1,331.4	1,535.8	2.00	-2.00	0.00
5,200.0	2.44	119.90	4,928.3	-768.6	1,336.6	1,541.8	2.00	-2.00	0.00
5,300.0	0.44	119.90	5,028.2	-769.8	1,338.8	1,544.3	2.00	-2.00	0.00
<b>Start 2820.0 hold at 5321.8 MD</b>									
5,321.8	0.00	0.00	5,050.0	-769.9	1,338.9	1,544.4	2.00	-2.00	0.00
5,400.0	0.00	0.00	5,128.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
<b>TOG</b>									
5,441.8	0.00	0.00	5,170.0	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
5,500.0	0.00	0.00	5,228.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
5,600.0	0.00	0.00	5,328.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
5,700.0	0.00	0.00	5,428.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
5,800.0	0.00	0.00	5,528.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
5,900.0	0.00	0.00	5,628.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
6,000.0	0.00	0.00	5,728.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
6,100.0	0.00	0.00	5,828.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
6,200.0	0.00	0.00	5,928.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
6,300.0	0.00	0.00	6,028.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
6,400.0	0.00	0.00	6,128.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
6,500.0	0.00	0.00	6,228.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
6,600.0	0.00	0.00	6,328.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
6,700.0	0.00	0.00	6,428.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
6,800.0	0.00	0.00	6,528.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
6,900.0	0.00	0.00	6,628.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
7,000.0	0.00	0.00	6,728.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
7,100.0	0.00	0.00	6,828.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
7,200.0	0.00	0.00	6,928.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
<b>Cameo</b>									
7,241.8	0.00	0.00	6,970.0	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
7,300.0	0.00	0.00	7,028.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
7,400.0	0.00	0.00	7,128.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
7,500.0	0.00	0.00	7,228.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
7,600.0	0.00	0.00	7,328.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
7,700.0	0.00	0.00	7,428.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
7,800.0	0.00	0.00	7,528.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
7,899.8	0.00	0.00	7,628.0	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
7,900.0	0.00	0.00	7,628.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
<b>Rollins</b>									
7,941.8	0.00	0.00	7,670.0	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
8,000.0	0.00	0.00	7,728.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
8,100.0	0.00	0.00	7,828.2	-769.9	1,338.9	1,544.4	0.00	0.00	0.00
<b>TD at 8141.8</b>									
8,141.8	0.00	0.00	7,870.0	-769.9	1,338.9	1,544.4	0.00	0.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-10M
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7578.0usft
Project:	Mesa County, CO	MD Reference:	Well @ 7578.0usft
Site:	Piceance 28-05	North Reference:	True
Well:	Piceance 28-10M	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-10		
Design:	Design #1		

Design Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
Piceance Federal 28-10I - plan hits target center - Circle (radius 50.0)	0.00	0.00	7,870.0	-769.9	1,338.9	1,523,566.69	2,355,904.65	39° 14' 55.610 N	107° 46' 28.750 W

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,576.0	1,522.0	8-5/8	8-5/8	12-1/4

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,975.0	2,820.0	G Sand		0.00	
4,940.7	4,670.0	Williams Fork		0.00	
5,441.8	5,170.0	TOG		0.00	
7,241.8	6,970.0	Cameo		0.00	
7,899.8	7,628.0	Base Cameo Coal		0.00	
7,941.8	7,670.0	Rollins		0.00	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
100.0	100.0	0.0	0.0	Start Build 2.00	
1,195.1	1,168.7	-103.1	179.3	Start 3031.5 hold at 1195.1 MD	
4,226.6	3,981.3	-666.8	1,159.6	Start Drop -2.00	
5,321.8	5,050.0	-769.9	1,338.9	Start 2820.0 hold at 5321.8 MD	
8,141.8	7,870.0	-769.9	1,338.9	TD at 8141.8	



# **Piceance Energy, LLC**

**Mesa County, CO**

**Piceance 28-05**

**Piceance 28-10M**

**Slot B-10**

**Design #1**

## **Anticollision Report**

**29 April, 2015**

# **Archer**



# Archer

## Anticollision Report

# Archer

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance 28-10M
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7578.00usft
<b>Reference Site:</b>	Piceance 28-05	<b>MD Reference:</b>	Well @ 7578.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Piceance 28-10M	<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 B-10	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #1	<b>Offset TVD Reference:</b>	Reference Datum

Reference	Design #1		
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	2015/04/28		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	8,141.78	Design #1 (Slot B-10)	MWD	MWD - Standard	

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Piceance 28-05						
Piceance 28-08M - Slot A-9 - Design #1	100.00	100.00	14.25	14.08	81.288	CC, ES
Piceance 28-08M - Slot A-9 - Design #1	8,141.78	8,084.83	499.79	437.09	7.970	SF
Piceance 28-09M - Slot A-10 - Design #1	242.30	242.21	9.26	8.46	11.584	CC, ES
Piceance 28-09M - Slot A-10 - Design #1	8,141.78	8,107.27	249.90	187.04	3.975	SF
Piceance 28-10W - Slot B-9 - Design #1	100.00	100.00	10.25	10.08	58.479	CC, ES
Piceance 28-10W - Slot B-9 - Design #1	300.00	299.84	16.92	15.74	14.314	SF

Offset Design		Piceance 28-05 - Piceance 28-08M - Slot A-9 - Design #1											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	6.34	14.16	1.57	14.25					
100.00	100.00	100.00	100.00	0.09	0.09	6.34	14.16	1.57	14.25	14.08	0.18	81.288	CC, ES	
200.00	199.98	199.98	199.98	0.30	0.31	-119.65	14.16	1.57	15.03	14.41	0.63	23.937		
300.00	299.84	300.08	300.06	0.53	0.53	-128.97	13.80	3.28	17.50	16.40	1.10	15.876		
400.00	399.45	400.27	400.11	0.79	0.75	-134.06	12.71	8.42	21.19	19.58	1.60	13.211		
500.00	498.70	500.54	499.99	1.10	1.00	-136.08	10.88	16.98	25.84	23.69	2.14	12.060		
600.00	597.47	600.86	599.55	1.44	1.29	-136.21	8.33	28.96	31.35	28.62	2.73	11.487		
700.00	695.62	701.23	698.67	1.85	1.62	-135.25	5.06	44.35	37.72	34.33	3.38	11.146		
800.00	793.06	801.62	797.20	2.31	2.01	-133.73	1.06	63.13	44.95	40.82	4.13	10.890		
900.00	889.64	902.01	895.01	2.83	2.46	-131.93	-3.66	85.28	53.07	48.09	4.98	10.657		
1,000.00	985.27	1,002.40	991.95	3.42	2.97	-130.05	-9.09	110.76	62.12	56.16	5.96	10.427		
1,100.00	1,079.82	1,102.76	1,087.89	4.08	3.55	-128.17	-15.22	139.55	72.09	65.02	7.07	10.196		
1,200.00	1,173.17	1,202.77	1,182.48	4.80	4.19	-126.47	-21.98	171.32	83.07	74.75	8.32	9.986		
1,300.00	1,265.95	1,302.08	1,276.13	5.57	4.86	-125.62	-28.86	203.64	94.75	85.14	9.60	9.865		
1,400.00	1,358.73	1,401.39	1,369.78	6.34	5.54	-124.96	-35.74	235.95	106.44	95.52	10.92	9.751		
1,500.00	1,451.52	1,500.69	1,463.43	7.12	6.22	-124.43	-42.62	268.26	118.14	105.90	12.24	9.648		
1,600.00	1,544.30	1,600.00	1,557.08	7.90	6.90	-124.00	-49.50	300.57	129.85	116.26	13.59	9.558		
1,700.00	1,637.08	1,699.31	1,650.73	8.68	7.59	-123.63	-56.38	332.88	141.57	126.63	14.94	9.478		
1,800.00	1,729.86	1,798.62	1,744.39	9.47	8.28	-123.32	-63.26	365.20	153.29	136.99	16.29	9.408		
1,900.00	1,822.64	1,897.92	1,838.04	10.26	8.97	-123.06	-70.14	397.51	165.01	147.36	17.65	9.346		
2,000.00	1,915.42	1,997.23	1,931.69	11.04	9.67	-122.83	-77.02	429.82	176.74	157.72	19.02	9.292		

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 28-10M
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7578.00usft
<b>Reference Site:</b>	Piceance 28-05	<b>MD Reference:</b>	Well @ 7578.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Piceance 28-10M	<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 B-10	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #1	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Piceance 28-05 - Piceance 28-08M - Slot A-9 - Design #1													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		
2,100.00	2,008.21	2,096.54	2,025.34	11.83	10.36	-122.63	-83.90	462.13	188.47	168.08	20.39	9.243		
2,200.00	2,100.99	2,195.85	2,118.99	12.62	11.05	-122.45	-90.78	494.44	200.20	178.44	21.76	9.200		
2,300.00	2,193.77	2,295.15	2,212.64	13.41	11.75	-122.30	-97.67	526.75	211.93	188.80	23.14	9.161		
2,400.00	2,286.55	2,394.46	2,306.29	14.20	12.45	-122.15	-104.55	559.07	223.67	199.16	24.51	9.125		
2,500.00	2,379.33	2,493.77	2,399.95	15.00	13.14	-122.03	-111.43	591.38	235.41	209.52	25.89	9.093		
2,600.00	2,472.11	2,593.08	2,493.60	15.79	13.84	-121.91	-118.31	623.69	247.14	219.88	27.27	9.064		
2,700.00	2,564.90	2,692.39	2,587.25	16.58	14.54	-121.81	-125.19	656.00	258.88	230.24	28.64	9.038		
2,800.00	2,657.68	2,791.69	2,680.90	17.37	15.24	-121.71	-132.07	688.31	270.62	240.60	30.02	9.013		
2,900.00	2,750.46	2,891.00	2,774.55	18.16	15.94	-121.63	-138.95	720.63	282.36	250.95	31.41	8.991		
3,000.00	2,843.24	2,990.31	2,868.20	18.96	16.64	-121.54	-145.83	752.94	294.10	261.31	32.79	8.970		
3,100.00	2,936.02	3,089.62	2,961.86	19.75	17.33	-121.47	-152.71	785.25	305.84	271.67	34.17	8.951		
3,200.00	3,028.80	3,188.92	3,055.51	20.54	18.03	-121.40	-159.59	817.56	317.58	282.03	35.55	8.933		
3,300.00	3,121.59	3,288.23	3,149.16	21.34	18.73	-121.34	-166.47	849.87	329.32	292.39	36.94	8.916		
3,400.00	3,214.37	3,387.54	3,242.81	22.13	19.43	-121.28	-173.35	882.19	341.07	302.75	38.32	8.901		
3,500.00	3,307.15	3,486.85	3,336.46	22.92	20.13	-121.22	-180.23	914.50	352.81	313.11	39.70	8.886		
3,600.00	3,399.93	3,586.15	3,430.11	23.72	20.83	-121.17	-187.11	946.81	364.55	323.46	41.09	8.873		
3,700.00	3,492.71	3,685.46	3,523.76	24.51	21.53	-121.12	-193.99	979.12	376.29	333.82	42.47	8.860		
3,800.00	3,585.49	3,784.77	3,617.42	25.31	22.23	-121.08	-200.87	1,011.43	388.04	344.18	43.86	8.848		
3,900.00	3,678.28	3,884.08	3,711.07	26.10	22.93	-121.03	-207.75	1,043.75	399.78	354.54	45.24	8.837		
4,000.00	3,771.06	3,983.38	3,804.72	26.89	23.63	-120.99	-214.63	1,076.06	411.52	364.90	46.63	8.826		
4,100.00	3,863.84	4,082.69	3,898.37	27.69	24.33	-120.95	-221.51	1,108.37	423.27	375.26	48.01	8.816		
4,200.00	3,956.62	4,182.00	3,992.02	28.48	25.03	-120.92	-228.39	1,140.68	435.01	385.61	49.40	8.806		
4,300.00	4,049.75	4,281.35	4,085.72	29.20	25.73	-120.92	-235.27	1,173.01	446.28	395.53	50.75	8.794		
4,400.00	4,144.04	4,377.65	4,176.93	29.76	26.27	-120.76	-241.70	1,203.19	456.14	404.27	51.87	8.793		
4,500.00	4,239.44	4,473.61	4,268.80	30.27	26.74	-120.63	-247.47	1,230.29	465.03	412.15	52.88	8.795		
4,600.00	4,335.83	4,569.67	4,361.64	30.72	27.16	-120.51	-252.60	1,254.39	472.92	419.15	53.77	8.795		
4,700.00	4,433.09	4,665.82	4,455.34	31.11	27.53	-120.42	-257.09	1,275.45	479.82	425.27	54.56	8.795		
4,800.00	4,531.10	4,762.03	4,549.78	31.46	27.85	-120.34	-260.92	1,293.44	485.71	430.47	55.24	8.793		
4,900.00	4,629.74	4,858.31	4,644.84	31.75	28.13	-120.28	-264.09	1,308.32	490.58	434.77	55.81	8.790		
5,000.00	4,728.90	4,954.65	4,740.42	31.99	28.36	-120.24	-266.59	1,320.07	494.43	438.14	56.28	8.785		
5,100.00	4,828.44	5,051.02	4,836.38	32.18	28.54	-120.20	-268.42	1,328.68	497.24	440.59	56.65	8.777		
5,200.00	4,928.26	5,147.42	4,932.62	32.32	28.68	-120.18	-269.58	1,334.13	499.02	442.10	56.93	8.766		
5,300.00	5,028.22	5,243.83	5,029.00	32.41	28.78	-120.17	-270.07	1,336.41	499.77	442.66	57.11	8.751		
5,400.00	5,128.22	5,343.05	5,128.22	32.48	28.86	-0.27	-270.08	1,336.48	499.79	442.53	57.26	8.729		
5,500.00	5,228.22	5,443.05	5,228.22	32.55	28.94	-0.27	-270.08	1,336.48	499.79	442.37	57.42	8.704		
5,600.00	5,328.22	5,543.05	5,328.22	32.62	29.02	-0.27	-270.08	1,336.48	499.79	442.21	57.58	8.679		
5,700.00	5,428.22	5,643.05	5,428.22	32.69	29.11	-0.27	-270.08	1,336.48	499.79	442.04	57.75	8.654		
5,800.00	5,528.22	5,743.05	5,528.22	32.76	29.19	-0.27	-270.08	1,336.48	499.79	441.87	57.92	8.629		
5,900.00	5,628.22	5,843.05	5,628.22	32.84	29.28	-0.27	-270.08	1,336.48	499.79	441.70	58.10	8.603		
6,000.00	5,728.22	5,943.05	5,728.22	32.91	29.37	-0.27	-270.08	1,336.48	499.79	441.52	58.27	8.577		
6,100.00	5,828.22	6,043.05	5,828.22	32.99	29.46	-0.27	-270.08	1,336.48	499.79	441.34	58.45	8.551		
6,200.00	5,928.22	6,143.05	5,928.22	33.07	29.55	-0.27	-270.08	1,336.48	499.79	441.16	58.63	8.524		
6,300.00	6,028.22	6,243.05	6,028.22	33.15	29.65	-0.27	-270.08	1,336.48	499.79	440.97	58.82	8.497		
6,400.00	6,128.22	6,343.05	6,128.22	33.23	29.74	-0.27	-270.08	1,336.48	499.79	440.79	59.01	8.470		
6,500.00	6,228.22	6,443.05	6,228.22	33.31	29.84	-0.27	-270.08	1,336.48	499.79	440.60	59.20	8.443		
6,600.00	6,328.22	6,543.05	6,328.22	33.40	29.94	-0.27	-270.08	1,336.48	499.79	440.40	59.39	8.415		
6,700.00	6,428.22	6,643.05	6,428.22	33.48	30.03	-0.27	-270.08	1,336.48	499.79	440.21	59.59	8.388		
6,800.00	6,528.22	6,743.05	6,528.22	33.57	30.13	-0.27	-270.08	1,336.48	499.79	440.01	59.79	8.360		
6,900.00	6,628.22	6,843.05	6,628.22	33.66	30.24	-0.27	-270.08	1,336.48	499.79	439.80	59.99	8.332		
7,000.00	6,728.22	6,943.05	6,728.22	33.75	30.34	-0.27	-270.08	1,336.48	499.79	439.60	60.19	8.303		
7,100.00	6,828.22	7,043.05	6,828.22	33.84	30.44	-0.27	-270.08	1,336.48	499.79	439.39	60.40	8.275		
7,200.00	6,928.22	7,143.05	6,928.22	33.93	30.55	-0.27	-270.08	1,336.48	499.79	439.18	60.61	8.246		

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



<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance 28-10M
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7578.00usft
<b>Reference Site:</b>	Piceance 28-05	<b>MD Reference:</b>	Well @ 7578.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Piceance 28-10M	<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 B-10	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #1	<b>Offset TVD Reference:</b>	Reference Datum

<b>Offset Design</b> Piceance 28-05 - Piceance 28-08M - Slot A-9 - Design #1												<b>Offset Site Error:</b>	0.00 usft
Survey Program: 0-MWD												<b>Offset Well Error:</b>	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance			Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)		
7,300.00	7,028.22	7,243.05	7,028.22	34.02	30.66	-0.27	-270.08	1,336.48	499.79	438.97	60.82	8.218	
7,400.00	7,128.22	7,343.05	7,128.22	34.12	30.76	-0.27	-270.08	1,336.48	499.79	438.76	61.04	8.189	
7,500.00	7,228.22	7,443.05	7,228.22	34.21	30.87	-0.27	-270.08	1,336.48	499.79	438.54	61.25	8.160	
7,600.00	7,328.22	7,543.05	7,328.22	34.31	30.98	-0.27	-270.08	1,336.48	499.79	438.32	61.47	8.130	
7,700.00	7,428.22	7,643.05	7,428.22	34.41	31.10	-0.27	-270.08	1,336.48	499.79	438.10	61.69	8.101	
7,800.00	7,528.22	7,743.05	7,528.22	34.51	31.21	-0.27	-270.08	1,336.48	499.79	437.87	61.92	8.072	
7,900.00	7,628.22	7,843.05	7,628.22	34.61	31.32	-0.27	-270.08	1,336.48	499.79	437.64	62.15	8.042	
8,000.00	7,728.22	7,943.05	7,728.22	34.71	31.44	-0.27	-270.08	1,336.48	499.79	437.42	62.38	8.012	
8,100.00	7,828.22	8,043.05	7,828.22	34.81	31.55	-0.27	-270.08	1,336.48	499.79	437.18	62.61	7.983	
8,141.78	7,870.00	8,084.83	7,870.00	34.86	31.60	-0.27	-270.08	1,336.48	499.79	437.09	62.71	7.970 SF	



# Archer

## Anticollision Report

# Archer

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance 28-10M
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7578.00usft
<b>Reference Site:</b>	Piceance 28-05	<b>MD Reference:</b>	Well @ 7578.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Piceance 28-10M	<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 B-10	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #1	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Piceance 28-05 - Piceance 28-09M - Slot A-10 - Design #1													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	52.28	6.08	7.87	9.94					
100.00	100.00	100.00	100.00	0.09	0.09	52.28	6.08	7.87	9.94	9.77	0.18	56.722		
200.00	199.98	199.98	199.98	0.30	0.31	-77.49	6.08	7.87	9.42	8.80	0.62	15.302		
242.30	242.24	242.21	242.21	0.40	0.40	-86.52	5.97	8.16	9.26	8.46	0.80	11.584 CC, ES		
300.00	299.84	299.86	299.84	0.53	0.52	-98.82	5.44	9.48	9.56	8.51	1.06	9.059		
400.00	399.45	399.86	399.70	0.79	0.74	-116.15	3.52	14.35	11.37	9.81	1.56	7.294		
500.00	498.70	499.97	499.42	1.10	0.99	-126.82	0.31	22.46	14.33	12.22	2.12	6.773		
600.00	597.47	600.18	598.88	1.44	1.28	-132.64	-4.18	33.82	18.00	15.29	2.71	6.645		
700.00	695.62	700.51	697.96	1.85	1.62	-135.55	-9.95	48.42	22.17	18.82	3.35	6.620		
800.00	793.06	800.93	796.53	2.31	2.01	-136.76	-17.01	66.26	26.72	22.67	4.05	6.600		
900.00	889.64	901.45	894.46	2.83	2.46	-136.96	-25.34	87.33	31.64	26.81	4.83	6.552		
1,000.00	985.27	1,002.06	991.63	3.42	2.97	-136.54	-34.94	111.60	36.90	31.19	5.71	6.466		
1,100.00	1,079.82	1,102.77	1,087.90	4.08	3.56	-135.74	-45.80	139.05	42.50	35.80	6.70	6.345		
1,200.00	1,173.17	1,203.56	1,183.16	4.80	4.21	-134.71	-57.90	169.66	48.46	40.64	7.82	6.198		
1,300.00	1,265.95	1,303.65	1,276.90	5.57	4.92	-133.00	-70.80	202.28	54.03	44.97	9.06	5.964		
1,400.00	1,358.73	1,403.49	1,370.37	6.34	5.63	-131.53	-83.71	234.91	59.58	49.23	10.35	5.755		
1,500.00	1,451.52	1,503.32	1,463.83	7.12	6.36	-130.31	-96.61	267.55	65.17	53.49	11.68	5.581		
1,600.00	1,544.30	1,603.16	1,557.30	7.90	7.09	-129.28	-109.52	300.18	70.77	57.75	13.02	5.434		
1,700.00	1,637.08	1,702.99	1,650.76	8.68	7.82	-128.41	-122.42	332.81	76.40	62.02	14.39	5.311		
1,800.00	1,729.86	1,802.83	1,744.23	9.47	8.55	-127.65	-135.33	365.45	82.04	66.28	15.76	5.206		
1,900.00	1,822.64	1,902.66	1,837.69	10.26	9.29	-127.00	-148.23	398.08	87.70	70.56	17.14	5.116		
2,000.00	1,915.42	2,002.50	1,931.16	11.04	10.03	-126.42	-161.14	430.71	93.36	74.83	18.53	5.038		
2,100.00	2,008.21	2,102.33	2,024.62	11.83	10.77	-125.91	-174.04	463.34	99.04	79.11	19.93	4.970		
2,200.00	2,100.99	2,202.17	2,118.08	12.62	11.51	-125.45	-186.95	495.98	104.72	83.39	21.33	4.910		
2,300.00	2,193.77	2,302.00	2,211.55	13.41	12.25	-125.04	-199.86	528.61	110.41	87.67	22.73	4.857		
2,400.00	2,286.55	2,401.84	2,305.01	14.20	12.99	-124.67	-212.76	561.24	116.10	91.96	24.14	4.810		
2,500.00	2,379.33	2,501.68	2,398.48	15.00	13.73	-124.34	-225.67	593.88	121.79	96.25	25.55	4.767		
2,600.00	2,472.11	2,601.51	2,491.94	15.79	14.48	-124.03	-238.57	626.51	127.49	100.53	26.96	4.729		
2,700.00	2,564.90	2,701.35	2,585.41	16.58	15.22	-123.75	-251.48	659.14	133.20	104.83	28.37	4.695		
2,800.00	2,657.68	2,801.18	2,678.87	17.37	15.97	-123.50	-264.38	691.78	138.90	109.12	29.78	4.664		
2,900.00	2,750.46	2,901.02	2,772.34	18.16	16.71	-123.26	-277.29	724.41	144.61	113.41	31.20	4.635		
3,000.00	2,843.24	3,000.85	2,865.80	18.96	17.45	-123.04	-290.19	757.04	150.32	117.70	32.62	4.609		
3,100.00	2,936.02	3,100.69	2,959.27	19.75	18.20	-122.84	-303.10	789.68	156.03	122.00	34.03	4.585		
3,200.00	3,028.80	3,200.52	3,052.73	20.54	18.94	-122.65	-316.00	822.31	161.75	126.30	35.45	4.562		
3,300.00	3,121.59	3,300.36	3,146.19	21.34	19.69	-122.48	-328.91	854.94	167.46	130.59	36.87	4.542		
3,400.00	3,214.37	3,400.19	3,239.66	22.13	20.44	-122.32	-341.82	887.57	173.18	134.89	38.29	4.523		
3,500.00	3,307.15	3,500.03	3,333.12	22.92	21.18	-122.16	-354.72	920.21	178.90	139.19	39.71	4.505		
3,600.00	3,399.93	3,599.86	3,426.59	23.72	21.93	-122.02	-367.63	952.84	184.62	143.49	41.13	4.488		
3,700.00	3,492.71	3,699.70	3,520.05	24.51	22.67	-121.88	-380.53	985.47	190.34	147.79	42.55	4.473		
3,800.00	3,585.49	3,799.53	3,613.52	25.31	23.42	-121.76	-393.44	1,018.11	196.06	152.09	43.98	4.459		
3,900.00	3,678.28	3,899.37	3,706.98	26.10	24.16	-121.64	-406.34	1,050.74	201.79	156.39	45.40	4.445		
4,000.00	3,771.06	3,999.20	3,800.45	26.89	24.91	-121.52	-419.25	1,083.37	207.51	160.69	46.82	4.432		
4,100.00	3,863.84	4,099.04	3,893.91	27.69	25.66	-121.42	-432.15	1,116.01	213.24	164.99	48.24	4.420		
4,200.00	3,956.62	4,198.87	3,987.37	28.48	26.40	-121.32	-445.06	1,148.64	218.96	169.30	49.67	4.409		
4,300.00	4,049.40	4,297.51	4,079.81	29.20	27.10	-121.15	-457.72	1,180.65	224.31	173.28	51.03	4.395		
4,400.00	4,144.04	4,394.38	4,171.49	29.76	27.63	-120.93	-469.21	1,209.71	229.03	176.89	52.14	4.392		
4,500.00	4,239.44	4,491.25	4,264.18	30.27	28.11	-120.74	-479.56	1,235.88	233.28	180.14	53.14	4.390		
4,600.00	4,335.83	4,588.11	4,357.76	30.72	28.53	-120.58	-488.75	1,259.12	237.05	183.02	54.03	4.387		
4,700.00	4,433.09	4,684.98	4,452.13	31.11	28.91	-120.45	-496.77	1,279.41	240.35	185.54	54.81	4.385		
4,800.00	4,531.10	4,781.84	4,547.19	31.46	29.23	-120.34	-503.62	1,296.71	243.17	187.68	55.49	4.382		
4,900.00	4,629.74	4,878.71	4,642.82	31.75	29.51	-120.25	-509.28	1,311.02	245.49	189.44	56.05	4.380		
5,000.00	4,728.90	4,975.58	4,738.92	31.99	29.74	-120.18	-513.74	1,322.31	247.33	190.81	56.52	4.376		

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 28-10M
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7578.00usft
<b>Reference Site:</b>	Piceance 28-05	<b>MD Reference:</b>	Well @ 7578.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Piceance 28-10M	<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 B-10	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #1	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Piceance 28-05 - Piceance 28-09M - Slot A-10 - Design #1													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,100.00	4,828.44	5,072.44	4,835.37	32.18	29.92	-120.13	-517.01	1,330.58	248.68	191.80	56.88	4.372		
5,200.00	4,928.26	5,169.31	4,932.07	32.32	30.06	-120.10	-519.08	1,335.81	249.53	192.38	57.15	4.366		
5,300.00	5,028.22	5,266.18	5,028.90	32.41	30.16	-120.08	-519.94	1,338.00	249.89	192.57	57.32	4.359		
5,400.00	5,128.22	5,365.49	5,128.22	32.48	30.23	-0.18	-519.97	1,338.07	249.90	192.43	57.47	4.348		
5,500.00	5,228.22	5,465.49	5,228.22	32.55	30.31	-0.18	-519.97	1,338.07	249.90	192.27	57.63	4.336		
5,600.00	5,328.22	5,565.49	5,328.22	32.62	30.39	-0.18	-519.97	1,338.07	249.90	192.11	57.79	4.324		
5,700.00	5,428.22	5,665.49	5,428.22	32.69	30.47	-0.18	-519.97	1,338.07	249.90	191.94	57.96	4.312		
5,800.00	5,528.22	5,765.49	5,528.22	32.76	30.55	-0.18	-519.97	1,338.07	249.90	191.77	58.13	4.299		
5,900.00	5,628.22	5,865.49	5,628.22	32.84	30.63	-0.18	-519.97	1,338.07	249.90	191.60	58.30	4.287		
6,000.00	5,728.22	5,965.49	5,728.22	32.91	30.71	-0.18	-519.97	1,338.07	249.90	191.43	58.47	4.274		
6,100.00	5,828.22	6,065.49	5,828.22	32.99	30.80	-0.18	-519.97	1,338.07	249.90	191.25	58.65	4.261		
6,200.00	5,928.22	6,165.49	5,928.22	33.07	30.88	-0.18	-519.97	1,338.07	249.90	191.07	58.83	4.248		
6,300.00	6,028.22	6,265.49	6,028.22	33.15	30.97	-0.18	-519.97	1,338.07	249.90	190.89	59.01	4.235		
6,400.00	6,128.22	6,365.49	6,128.22	33.23	31.06	-0.18	-519.97	1,338.07	249.90	190.70	59.20	4.221		
6,500.00	6,228.22	6,465.49	6,228.22	33.31	31.15	-0.18	-519.97	1,338.07	249.90	190.51	59.39	4.208		
6,600.00	6,328.22	6,565.49	6,328.22	33.40	31.24	-0.18	-519.97	1,338.07	249.90	190.32	59.58	4.194		
6,700.00	6,428.22	6,665.49	6,428.22	33.48	31.34	-0.18	-519.97	1,338.07	249.90	190.13	59.77	4.181		
6,800.00	6,528.22	6,765.49	6,528.22	33.57	31.43	-0.18	-519.97	1,338.07	249.90	189.93	59.97	4.167		
6,900.00	6,628.22	6,865.49	6,628.22	33.66	31.53	-0.18	-519.97	1,338.07	249.90	189.73	60.17	4.153		
7,000.00	6,728.22	6,965.49	6,728.22	33.75	31.62	-0.18	-519.97	1,338.07	249.90	189.53	60.37	4.139		
7,100.00	6,828.22	7,065.49	6,828.22	33.84	31.72	-0.18	-519.97	1,338.07	249.90	189.32	60.58	4.125		
7,200.00	6,928.22	7,165.49	6,928.22	33.93	31.82	-0.18	-519.97	1,338.07	249.90	189.12	60.78	4.111		
7,300.00	7,028.22	7,265.49	7,028.22	34.02	31.92	-0.18	-519.97	1,338.07	249.90	188.90	60.99	4.097		
7,400.00	7,128.22	7,365.49	7,128.22	34.12	32.03	-0.18	-519.97	1,338.07	249.90	188.69	61.21	4.083		
7,500.00	7,228.22	7,465.49	7,228.22	34.21	32.13	-0.18	-519.97	1,338.07	249.90	188.48	61.42	4.069		
7,600.00	7,328.22	7,565.49	7,328.22	34.31	32.24	-0.18	-519.97	1,338.07	249.90	188.26	61.64	4.054		
7,700.00	7,428.22	7,665.49	7,428.22	34.41	32.34	-0.18	-519.97	1,338.07	249.90	188.04	61.86	4.040		
7,800.00	7,528.22	7,765.49	7,528.22	34.51	32.45	-0.18	-519.97	1,338.07	249.90	187.82	62.08	4.025		
7,900.00	7,628.22	7,865.49	7,628.22	34.61	32.56	-0.18	-519.97	1,338.07	249.90	187.59	62.31	4.011		
8,000.00	7,728.22	7,965.49	7,728.22	34.71	32.67	-0.18	-519.97	1,338.07	249.90	187.36	62.54	3.996		
8,100.00	7,828.22	8,065.49	7,828.22	34.81	32.78	-0.18	-519.97	1,338.07	249.90	187.13	62.77	3.981		
8,141.78	7,870.00	8,107.27	7,870.00	34.86	32.82	-0.18	-519.97	1,338.07	249.90	187.04	62.86	3.975 SF		



# Archer

## Anticollision Report

# Archer

<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Piceance 28-10M
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7578.00usft
<b>Reference Site:</b>	Piceance 28-05	<b>MD Reference:</b>	Well @ 7578.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Piceance 28-10M	<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 B-10	<b>Database:</b>	EDMDBBW
<b>Reference Design:</b>	Design #1	<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	-37.86	8.09	-6.29	10.25					
100.00	100.00	100.00	100.00	0.09	0.09	-37.86	8.09	-6.29	10.25	10.08	0.18	58.479 CC, ES		
200.00	199.98	199.98	199.98	0.30	0.31	-160.94	8.09	-6.29	11.89	11.22	0.67	17.820		
300.00	299.84	299.84	299.84	0.53	0.54	-166.71	8.09	-6.29	16.92	15.74	1.18	14.314 SF		
400.00	399.45	399.61	399.59	0.79	0.74	-175.06	6.53	-7.04	25.15	23.46	1.68	14.934		
500.00	498.70	498.84	498.68	1.10	0.94	175.30	1.88	-9.28	36.98	34.79	2.19	16.916		
600.00	597.47	597.21	596.67	1.44	1.16	167.30	-5.79	-12.96	53.13	50.41	2.72	19.548		
700.00	695.62	694.39	693.15	1.85	1.43	161.21	-16.34	-18.02	73.85	70.55	3.29	22.437		
800.00	793.06	790.10	787.71	2.31	1.73	156.62	-29.61	-24.39	99.14	95.22	3.92	25.311		
900.00	889.64	884.31	880.27	2.83	2.07	153.10	-45.41	-31.97	128.90	124.30	4.60	28.022		
1,000.00	985.27	978.48	972.59	3.42	2.44	150.95	-62.17	-40.02	162.25	156.93	5.32	30.474		
1,100.00	1,079.82	1,071.64	1,063.92	4.08	2.82	149.91	-78.75	-47.98	198.53	192.45	6.07	32.683		
1,200.00	1,173.17	1,163.68	1,154.15	4.80	3.20	149.51	-95.14	-55.84	237.61	230.76	6.85	34.707		
1,300.00	1,265.95	1,255.19	1,243.85	5.57	3.59	149.70	-111.42	-63.66	277.94	270.34	7.60	36.564		
1,400.00	1,358.73	1,346.69	1,333.55	6.34	3.97	149.83	-127.71	-71.48	318.28	309.90	8.38	38.003		
1,500.00	1,451.52	1,438.19	1,423.25	7.12	4.36	149.94	-144.00	-79.30	358.61	349.45	9.16	39.148		
1,600.00	1,544.30	1,529.69	1,512.95	7.90	4.76	150.03	-160.29	-87.12	398.95	388.99	9.96	40.071		
1,700.00	1,637.08	1,621.19	1,602.65	8.68	5.15	150.10	-176.58	-94.94	439.29	428.53	10.76	40.827		
1,800.00	1,729.86	1,712.70	1,692.35	9.47	5.54	150.15	-192.86	-102.75	479.63	468.06	11.57	41.455		
1,900.00	1,822.64	1,804.20	1,782.05	10.26	5.94	150.20	-209.15	-110.57	519.97	507.58	12.38	41.984		
2,000.00	1,915.42	1,895.70	1,871.75	11.04	6.33	150.24	-225.44	-118.39	560.30	547.10	13.20	42.434		
2,100.00	2,008.21	1,987.20	1,961.45	11.83	6.73	150.28	-241.73	-126.21	600.64	586.62	14.03	42.821		
2,200.00	2,100.99	2,078.70	2,051.15	12.62	7.13	150.31	-258.01	-134.03	640.98	626.13	14.85	43.157		
2,300.00	2,193.77	2,170.21	2,140.85	13.41	7.52	150.34	-274.30	-141.84	681.32	665.64	15.68	43.451		
2,400.00	2,286.55	2,261.71	2,230.56	14.20	7.92	150.37	-290.59	-149.66	721.66	705.15	16.51	43.711		
2,500.00	2,379.33	2,353.21	2,320.26	15.00	8.32	150.39	-306.88	-157.48	762.00	744.66	17.34	43.941		
2,600.00	2,472.11	2,444.71	2,409.96	15.79	8.72	150.41	-323.17	-165.30	802.34	784.17	18.17	44.146		
2,700.00	2,564.90	2,536.21	2,499.66	16.58	9.12	150.43	-339.45	-173.12	842.68	823.67	19.01	44.330		
2,800.00	2,657.68	2,627.72	2,589.36	17.37	9.51	150.44	-355.74	-180.94	883.02	863.18	19.84	44.497		
2,900.00	2,750.46	2,719.22	2,679.06	18.16	9.91	150.46	-372.03	-188.75	923.36	902.68	20.68	44.647		
3,000.00	2,843.24	2,810.72	2,768.76	18.96	10.31	150.47	-388.32	-196.57	963.70	942.19	21.52	44.785		

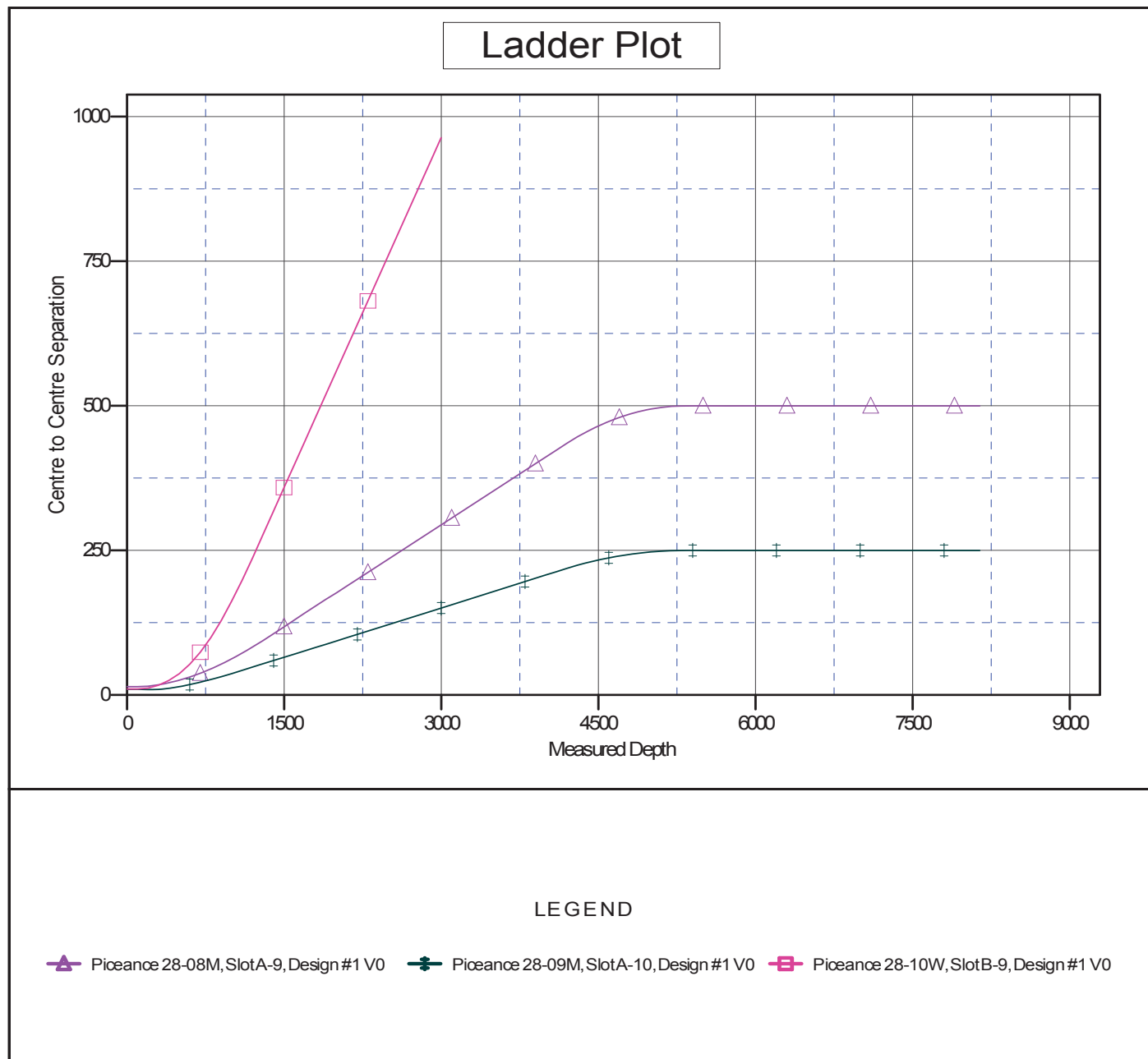
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-10M
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Piceance 28-10M	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-10	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Reference Depths are relative to Well @ 7578.00usft  
Offset Depths are relative to Offset Datum  
Central Meridian is 105° 30' 0.000 W

Coordinates are relative to: Piceance 28-10M  
Coordinate System is US State Plane 1983, Colorado Central Zone  
Grid Convergence at Surface is: -1.44°





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Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Reference Depths are relative to Well @ 7578.00usft

Offset Depths are relative to Offset Datum

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Coordinates are relative to: Piceance 28-10M

Coordinate System is US State Plane 1983, Colorado Central Zone

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