

PICEANCE VLY NAD 83

PA 29-06S-095W

DOE 2-W-29 Pad

PA 21-29 - Slot A4

Wellbore #1

Plan: Plan #2 08Jan10 kjs

Standard Planning Report - Geographic

23 February, 2010

Williams
Planning Report - Geographic

Database:	Compass R5000 WIN AUTH	Local Co-ordinate Reference:	Well PA 21-29 - Slot A4
Company:	PICEANCE VLY NAD 83	TVD Reference:	Corrected Elev. @ 5916.0usft (Cyclone 17 (21' KB) kjs)
Project:	PA 29-06S-095W	MD Reference:	Corrected Elev. @ 5916.0usft (Cyclone 17 (21' KB) kjs)
Site:	DOE 2-W-29 Pad	North Reference:	True
Well:	PA 21-29	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 08Jan10 kjs		

Project	PA 29-06S-095W, Garfield County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		Using geodetic scale factor

Site	DOE 2-W-29 Pad		
Site Position:		Northing:	1,616,110.00 usft
From:	Map	Easting:	2,290,002.20 usft
Position Uncertainty:	0.0 usft	Slot Radius:	0.000 in
		Latitude:	39° 29' 52.810 N
		Longitude:	108° 0' 58.779 W
		Grid Convergence:	-1.587 °

Well	PA 21-29 - Slot A4		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft		Wellhead Elevation:
			Latitude:
			Longitude:
			Ground Level:

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2005-10	8/20/2009	10.575	65.797	52,460

Design	Plan #2 08Jan10 kjs			
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	278.76

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	0.000	
120.0	0.00	0.00	120.0	0.0	0.0	0.00	0.00	0.00	0.000	
320.0	6.00	257.00	319.6	-2.4	-10.2	3.00	3.00	0.00	257.000	
1,067.4	27.87	279.24	1,030.7	17.2	-223.4	3.00	2.93	2.98	27.643	
4,421.1	27.87	279.24	3,995.5	269.0	-1,770.7	0.00	0.00	0.00	0.000	
6,279.0	0.00	0.00	5,781.0	340.2	-2,208.0	1.50	-1.50	4.35	180.000	Top Gas (25' Radius)
8,429.0	0.00	0.00	7,931.0	340.2	-2,208.0	0.00	0.00	0.00	0.000	TD / PBHL PA 21-29

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Site:	DOE 2-W-29 Pad	North Reference:	True
Well:	PA 21-29	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 08Jan10 kjs		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.0	0.00	0.00	0.0	0.0	0.0	1,616,103.00	2,290,025.10	39° 29' 52.747 N	108° 0' 58.484 W	
120.0	0.00	0.00	120.0	0.0	0.0	1,616,103.00	2,290,025.10	39° 29' 52.747 N	108° 0' 58.484 W	
Start Build 3.00										
320.0	6.00	257.00	319.6	-2.4	-10.2	1,616,100.93	2,290,014.85	39° 29' 52.724 N	108° 0' 58.614 W	
Begin 3°/100 Build & Turn										
500.0	11.07	270.14	497.6	-4.4	-36.7	1,616,099.59	2,289,988.33	39° 29' 52.703 N	108° 0' 58.952 W	
1,000.0	25.86	278.76	970.6	12.4	-193.3	1,616,120.75	2,289,832.20	39° 29' 52.870 N	108° 1' 0.951 W	
1,067.4	27.87	279.24	1,030.7	17.2	-223.4	1,616,126.35	2,289,802.28	39° 29' 52.917 N	108° 1' 1.334 W	
Hold 27.87 Inclination										
1,500.0	27.87	279.24	1,413.2	49.7	-423.0	1,616,164.35	2,289,603.66	39° 29' 53.238 N	108° 1' 3.880 W	
2,000.0	27.87	279.24	1,855.2	87.2	-653.7	1,616,208.27	2,289,374.12	39° 29' 53.609 N	108° 1' 6.823 W	
2,500.0	27.87	279.24	2,297.2	124.8	-884.4	1,616,252.19	2,289,144.57	39° 29' 53.980 N	108° 1' 9.766 W	
2,521.3	27.87	279.24	2,316.0	126.4	-894.2	1,616,254.06	2,289,134.80	39° 29' 53.996 N	108° 1' 9.891 W	
Top of "G" Sand										
2,634.4	27.87	279.24	2,416.0	134.9	-946.4	1,616,264.00	2,289,082.87	39° 29' 54.080 N	108° 1' 10.557 W	
Base of "G" Sand										
2,747.5	27.87	279.24	2,516.0	143.3	-998.6	1,616,273.93	2,289,030.93	39° 29' 54.164 N	108° 1' 11.223 W	
9 5/8"										
3,000.0	27.87	279.24	2,739.2	162.3	-1,115.1	1,616,296.11	2,288,915.02	39° 29' 54.351 N	108° 1' 12.709 W	
3,500.0	27.87	279.24	3,181.2	199.9	-1,345.7	1,616,340.04	2,288,685.47	39° 29' 54.722 N	108° 1' 15.652 W	
4,000.0	27.87	279.24	3,623.2	237.4	-1,576.4	1,616,383.96	2,288,455.92	39° 29' 55.093 N	108° 1' 18.595 W	
4,421.1	27.87	279.24	3,995.5	269.0	-1,770.7	1,616,420.95	2,288,262.59	39° 29' 55.405 N	108° 1' 21.073 W	
Begin 1.5°/100 Drop										
4,500.0	26.69	279.24	4,065.6	274.8	-1,806.4	1,616,427.74	2,288,227.08	39° 29' 55.463 N	108° 1' 21.528 W	
4,909.9	20.54	279.24	4,441.0	301.2	-1,968.4	1,616,458.58	2,288,065.92	39° 29' 55.723 N	108° 1' 23.594 W	
Mesaverde										
5,000.0	19.19	279.24	4,525.8	306.1	-1,998.6	1,616,464.33	2,288,035.85	39° 29' 55.772 N	108° 1' 23.980 W	
5,500.0	11.69	279.24	5,007.4	327.5	-2,129.8	1,616,489.32	2,287,905.25	39° 29' 55.983 N	108° 1' 25.654 W	
6,000.0	4.19	279.24	5,502.2	338.6	-2,197.9	1,616,502.28	2,287,837.50	39° 29' 56.092 N	108° 1' 26.523 W	
6,279.0	0.00	0.00	5,781.0	340.2	-2,208.0	1,616,504.20	2,287,827.50	39° 29' 56.109 N	108° 1' 26.651 W	
Top Gas - Approx. Top Gas										
6,500.0	0.00	0.00	6,002.0	340.2	-2,208.0	1,616,504.20	2,287,827.50	39° 29' 56.109 N	108° 1' 26.651 W	
7,000.0	0.00	0.00	6,502.0	340.2	-2,208.0	1,616,504.20	2,287,827.50	39° 29' 56.109 N	108° 1' 26.651 W	
7,500.0	0.00	0.00	7,002.0	340.2	-2,208.0	1,616,504.20	2,287,827.50	39° 29' 56.109 N	108° 1' 26.651 W	
7,704.0	0.00	0.00	7,206.0	340.2	-2,208.0	1,616,504.20	2,287,827.50	39° 29' 56.109 N	108° 1' 26.651 W	
Cameo Coals										
8,000.0	0.00	0.00	7,502.0	340.2	-2,208.0	1,616,504.20	2,287,827.50	39° 29' 56.109 N	108° 1' 26.651 W	
8,279.0	0.00	0.00	7,781.0	340.2	-2,208.0	1,616,504.20	2,287,827.50	39° 29' 56.109 N	108° 1' 26.651 W	
Rollins SS										
8,429.0	0.00	0.00	7,931.0	340.2	-2,208.0	1,616,504.20	2,287,827.50	39° 29' 56.109 N	108° 1' 26.651 W	
TD at 8429.0 - TD										

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Project:	PA 29-06S-095W	MD Reference:	Corrected Elev. @ 5916.0usft (Cyclone 17 (21' KB) kjs)
Site:	DOE 2-W-29 Pad	North Reference:	True
Well:	PA 21-29	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 08Jan10 kjs		

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
Top Gas (25' Radius) P/ - plan hits target center - Circle (radius 25.0)	0.00	0.00	5,781.0	340.2	-2,208.0	1,616,504.20	2,287,827.50	39° 29' 56.109 N	108° 1' 26.651 W
TD / PBHL PA 21-29 - plan hits target center - Point	0.00	0.00	7,931.0	340.2	-2,208.0	1,616,504.20	2,287,827.50	39° 29' 56.109 N	108° 1' 26.651 W

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (in)	Hole Diameter (in)	
2,747.5	2,516.0	9 5/8"	9.625	12.250	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
2,521.3	2,316.0	Top of "G" Sand				
2,634.4	2,416.0	Base of "G" Sand				
4,909.9	4,441.0	Mesaverde				
6,279.0	5,781.0	Approx. Top Gas				
7,704.0	7,206.0	Cameo Coals				
8,279.0	7,781.0	Rollins SS				
8,429.0	7,931.0	TD				

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
120.0	120.0	0.0	0.0	Start Build 3.00	
320.0	319.6	-2.4	-10.2	Begin 3°/100 Build & Turn	
1,067.4	1,030.7	17.2	-223.4	Hold 27.87 Inclination	
4,421.1	3,995.5	269.0	-1,770.7	Begin 1.5°/100 Drop	
6,279.0	5,781.0	340.2	-2,208.0	Top Gas	
8,429.0	7,931.0	340.2	-2,208.0	TD at 8429.0	