

PICEANCE HL NAD 83

RG 14-02S-098W

Federal RG 24-14-298 Pad

Federal RG 521-23-298 - Slot B2

Wellbore #1

Plan: Plan #2 13Apr11 kjs

Standard Planning Report - Geographic

09 August, 2011

Williams
Planning Report - Geographic

Database:	Compass R5000 WIN AUTH	Local Co-ordinate Reference:	Well Federal RG 521-23-298 - Slot B2
Company:	PICEANCE HL NAD 83	TVD Reference:	KELLY BUSHING @ 6708.0usft (Frontier 10 (22' RKB) kjs)
Project:	RG 14-02S-098W	MD Reference:	KELLY BUSHING @ 6708.0usft (Frontier 10 (22' RKB) kjs)
Site:	Federal RG 24-14-298 Pad	North Reference:	True
Well:	Federal RG 521-23-298	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 13Apr11 kjs		

Project	RG 14-02S-098W, Rio Blanco County, CO, RG 14-02S-098W		
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	Federal RG 24-14-298 Pad		
Site Position:		Northing:	1,754,584.50 usft
From:	Map	Easting:	2,196,448.10 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13.200 in
		Latitude:	39° 52' 13.383 N
		Longitude:	108° 21' 47.349 W
		Grid Convergence:	-1.806 °

Well	Federal RG 521-23-298 - Slot B2					
Well Position	+N/-S	0.0 usft	Northing:	1,754,517.50 usft	Latitude:	39° 52' 12.718 N
	+E/-W	0.0 usft	Easting:	2,196,435.20 usft	Longitude:	108° 21' 47.487 W
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	6,686.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/19/2010	10.715	66.010	52,516

Design	Plan #2 13Apr11 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	189.67	

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	
697.8	13.00	200.00	692.8	-61.3	-22.3	2.25	2.25	0.00	200.000	
4,188.9	13.00	200.00	4,094.5	-799.3	-290.9	0.00	0.00	0.00	0.000	
4,910.7	17.22	160.67	4,792.9	-976.9	-283.3	1.50	0.59	-5.45	-87.464	
5,134.8	17.22	160.67	5,007.0	-1,039.6	-261.3	0.00	0.00	0.00	0.000	
6,283.0	0.00	0.00	6,138.0	-1,201.2	-204.6	1.50	-1.50	0.00	180.000	
10,973.0	0.00	0.00	10,828.0	-1,201.2	-204.6	0.00	0.00	0.00	0.000	TD / PBHL Fed RG 5;

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Well:	Federal RG 521-23-298	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 13Apr11 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	1,754,517.50	2,196,435.20	39° 52' 12.718 N	108° 21' 47.487 W	
120.0	0.00	0.00	120.0	0.0	0.0	1,754,517.50	2,196,435.20	39° 52' 12.718 N	108° 21' 47.487 W	
Start Build 2.25										
697.8	13.00	200.00	692.8	-61.3	-22.3	1,754,456.90	2,196,410.95	39° 52' 12.111 N	108° 21' 47.773 W	
Hold 13.00 Inclination										
826.2	13.00	200.00	818.0	-88.5	-32.2	1,754,430.07	2,196,400.22	39° 52' 11.843 N	108° 21' 47.900 W	
Green River Fm										
964.8	13.00	200.00	953.0	-117.8	-42.9	1,754,401.13	2,196,388.64	39° 52' 11.554 N	108° 21' 48.037 W	
A Groove										
1,159.8	13.00	200.00	1,143.0	-159.0	-57.9	1,754,360.41	2,196,372.35	39° 52' 11.146 N	108° 21' 48.229 W	
B Groove										
1,483.1	13.00	200.00	1,458.0	-227.3	-82.7	1,754,292.88	2,196,345.33	39° 52' 10.471 N	108° 21' 48.548 W	
Dissolution Surface										
2,160.4	13.00	200.00	2,118.0	-370.5	-134.9	1,754,151.41	2,196,288.73	39° 52' 9.056 N	108° 21' 49.217 W	
Garden Gulch										
2,355.4	13.00	200.00	2,308.0	-411.7	-149.9	1,754,110.68	2,196,272.44	39° 52' 8.649 N	108° 21' 49.409 W	
Orange Marker										
2,571.0	13.00	200.00	2,518.0	-457.3	-166.4	1,754,065.67	2,196,254.43	39° 52' 8.198 N	108° 21' 49.622 W	
Wasatch										
3,340.7	13.00	200.00	3,268.0	-620.0	-225.7	1,753,904.90	2,196,190.11	39° 52' 6.590 N	108° 21' 50.381 W	
9 5/8"										
4,188.9	13.00	200.00	4,094.5	-799.3	-290.9	1,753,727.74	2,196,119.23	39° 52' 4.818 N	108° 21' 51.218 W	
Begin 1.5°/100 Build & Turn										
4,454.5	13.75	183.02	4,353.0	-858.9	-302.8	1,753,668.51	2,196,105.46	39° 52' 4.229 N	108° 21' 51.371 W	
G' Sand										
4,738.8	15.66	167.94	4,628.0	-930.2	-296.6	1,753,597.05	2,196,109.45	39° 52' 3.524 N	108° 21' 51.291 W	
Ft. Union										
4,910.7	17.22	160.67	4,792.9	-976.9	-283.3	1,753,549.94	2,196,121.25	39° 52' 3.063 N	108° 21' 51.120 W	
Hold 17.22 Inclination										
5,134.8	17.22	160.67	5,007.0	-1,039.6	-261.3	1,753,486.64	2,196,141.23	39° 52' 2.444 N	108° 21' 50.839 W	
Start Drop -1.50										
6,123.0	2.40	160.67	5,978.0	-1,198.1	-205.8	1,753,326.50	2,196,191.79	39° 52' 0.878 N	108° 21' 50.126 W	
Ohio Creek										
6,283.0	0.00	0.00	6,138.0	-1,201.2	-204.6	1,753,323.30	2,196,192.80	39° 52' 0.846 N	108° 21' 50.112 W	
Vertical										
6,383.0	0.00	0.00	6,238.0	-1,201.2	-204.6	1,753,323.30	2,196,192.80	39° 52' 0.846 N	108° 21' 50.112 W	
Mesaverde - Mesaverde - Mesaverde (25' Radius) Federal RG 521-23-298										
7,223.0	0.00	0.00	7,078.0	-1,201.2	-204.6	1,753,323.30	2,196,192.80	39° 52' 0.846 N	108° 21' 50.112 W	
Top Gas										
9,173.0	0.00	0.00	9,028.0	-1,201.2	-204.6	1,753,323.30	2,196,192.80	39° 52' 0.846 N	108° 21' 50.112 W	
Cameo Coals										
9,773.0	0.00	0.00	9,628.0	-1,201.2	-204.6	1,753,323.30	2,196,192.80	39° 52' 0.846 N	108° 21' 50.112 W	
Rollins SS										
9,903.0	0.00	0.00	9,758.0	-1,201.2	-204.6	1,753,323.30	2,196,192.80	39° 52' 0.846 N	108° 21' 50.112 W	
Cozzette										
10,128.0	0.00	0.00	9,983.0	-1,201.2	-204.6	1,753,323.30	2,196,192.80	39° 52' 0.846 N	108° 21' 50.112 W	
Corcoran										
10,488.0	0.00	0.00	10,343.0	-1,201.2	-204.6	1,753,323.30	2,196,192.80	39° 52' 0.846 N	108° 21' 50.112 W	
Upper Sego										

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Site:	Federal RG 24-14-298 Pad	North Reference:	True
Well:	Federal RG 521-23-298	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 13Apr11 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
10,723.0	0.00	0.00	10,578.0	-1,201.2	-204.6	1,753,323.30	2,196,192.80	39° 52' 0.846 N	108° 21' 50.112 W
Lower Sego									
10,973.0	0.00	0.00	10,828.0	-1,201.2	-204.6	1,753,323.30	2,196,192.80	39° 52' 0.846 N	108° 21' 50.112 W
TD at 10973.0 - TD - TD / PBHL Fed RG 521-23-298									

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
Mesaverde (25' Radius) - plan hits target center - Circle (radius 25.0)	0.00	0.00	6,238.0	-1,201.2	-204.6	1,753,323.30	2,196,192.80	39° 52' 0.846 N	108° 21' 50.112 W
TD / PBHL Fed RG 521- - plan hits target center - Point	0.00	0.00	10,828.0	-1,201.2	-204.6	1,753,323.30	2,196,192.80	39° 52' 0.846 N	108° 21' 50.112 W

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (in)	Hole Diameter (in)	
3,340.7	3,268.0	9 5/8"	9.625	12.250	

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Project:	RG 14-02S-098W	MD Reference:	KELLY BUSHING @ 6708.0usft (Frontier 10 (22' RKB) kjs)
Site:	Federal RG 24-14-298 Pad	North Reference:	True
Well:	Federal RG 521-23-298	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 13Apr11 kjs		

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
826.2	818.0	Green River Fm				
964.8	953.0	A Groove				
1,159.8	1,143.0	B Groove				
1,483.1	1,458.0	Dissolution Surface				
2,160.4	2,118.0	Garden Gulch				
2,355.4	2,308.0	Orange Marker				
2,571.0	2,518.0	Wasatch				
4,454.5	4,353.0	G' Sand				
4,738.8	4,628.0	Ft. Union				
6,123.0	5,978.0	Ohio Creek				
6,383.0	6,238.0	Mesaverde				
7,223.0	7,078.0	Top Gas				
9,173.0	9,028.0	Cameo Coals				
9,773.0	9,628.0	Rollins SS				
9,903.0	9,758.0	Cozzette				
10,128.0	9,983.0	Corcoran				
10,488.0	10,343.0	Upper Sego				
10,723.0	10,578.0	Lower Sego				
10,973.0	10,828.0	TD				

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
120.0	120.0	0.0	0.0	Start Build 2.25	
697.8	692.8	-61.3	-22.3	Hold 13.00 Inclination	
4,188.9	4,094.5	-799.3	-290.9	Begin 1.5°/100 Build & Turn	
4,910.7	4,792.9	-976.9	-283.3	Hold 17.22 Inclination	
5,134.8	5,007.0	-1,039.6	-261.3	Start Drop -1.50	
6,283.0	6,138.0	-1,201.2	-204.6	Vertical	
6,383.0	6,238.0	-1,201.2	-204.6	Mesaverde	
10,973.0	10,828.0	-1,201.2	-204.6	TD at 10973.0	