

# **PICEANCE HL NAD 83**

**RG 14-02S-098W**

**Federal RG 24-14-298 Pad**

**Federal RG 411-23-298 - Slot B7**

**Wellbore #1**

**Plan: Plan #2 13Apr11 kjs**

## **Standard Planning Report - Geographic**

**09 August, 2011**

**Williams**  
Planning Report - Geographic

<b>Database:</b>	Compass R5000 WIN AUTH	<b>Local Co-ordinate Reference:</b>	Well Federal RG 411-23-298 - Slot B7
<b>Company:</b>	PICEANCE HL NAD 83	<b>TVD Reference:</b>	KELLY BUSHING @ 6708.0usft (Frontier 10 (22' RKB) kjs)
<b>Project:</b>	RG 14-02S-098W	<b>MD Reference:</b>	KELLY BUSHING @ 6708.0usft (Frontier 10 (22' RKB) kjs)
<b>Site:</b>	Federal RG 24-14-298 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Federal RG 411-23-298	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #2 13Apr11 kjs		

<b>Project</b>	RG 14-02S-098W, Rio Blanco County, CO, RG 14-02S-098W		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Central Zone		Using geodetic scale factor

<b>Site</b>	Federal RG 24-14-298 Pad		
<b>Site Position:</b>		<b>Northing:</b>	1,754,584.50 usft
<b>From:</b>	Map	<b>Easting:</b>	2,196,448.10 usft
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13.200 in
		<b>Latitude:</b>	39° 52' 13.383 N
		<b>Longitude:</b>	108° 21' 47.349 W
		<b>Grid Convergence:</b>	-1.806 °

Well	Federal RG 411-23-298 - Slot B7					
Well Position	+N/-S	0.0 usft	Northing:	1,754,555.00 usft	Latitude:	39° 52' 13.088 N
	+E/-W	0.0 usft	Easting:	2,196,436.80 usft	Longitude:	108° 21' 47.482 W
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	6,686.0 usft

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

<b>Design</b>	Plan #2 13Apr11 kjs			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	231.77

<b>Plan Sections</b>										
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	
130.0	0.00	0.00	130.0	0.0	0.0	0.00	0.00	0.00	0.000	
338.3	5.00	240.00	338.1	-4.5	-7.9	2.40	2.40	0.00	240.000	
1,028.7	21.50	231.59	1,007.8	-98.8	-133.9	2.40	2.39	-1.22	-10.835	
4,962.8	21.50	231.59	4,668.1	-994.6	-1,263.7	0.00	0.00	0.00	0.000	
6,396.0	0.00	0.00	6,068.0	-1,159.7	-1,471.9	1.50	-1.50	0.00	180.000	
11,086.0	0.00	0.00	10,758.0	-1,159.7	-1,471.9	0.00	0.00	0.00	0.000	TD / PBHL Fed RG 4

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Planning Report - Geographic

<b>Database:</b>	Compass R5000 WIN AUTH	<b>Local Co-ordinate Reference:</b>	Well Federal RG 411-23-298 - Slot B7
<b>Company:</b>	PICEANCE HL NAD 83	<b>TVD Reference:</b>	KELLY BUSHING @ 6708.0usft (Frontier 10 (22' RKB) kjs)
<b>Project:</b>	RG 14-02S-098W	<b>MD Reference:</b>	KELLY BUSHING @ 6708.0usft (Frontier 10 (22' RKB) kjs)
<b>Site:</b>	Federal RG 24-14-298 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Federal RG 411-23-298	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	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	1,754,555.00	2,196,436.80	39° 52' 13.088 N	108° 21' 47.482 W	
130.0	0.00	0.00	130.0	0.0	0.0	1,754,555.00	2,196,436.80	39° 52' 13.088 N	108° 21' 47.482 W	
Start Build 2.40										
338.3	5.00	240.00	338.1	-4.5	-7.9	1,754,550.71	2,196,428.79	39° 52' 13.044 N	108° 21' 47.583 W	
Begin 2.4° Build & Turn										
817.4	16.43	232.39	808.0	-56.5	-79.9	1,754,501.03	2,196,355.18	39° 52' 12.530 N	108° 21' 48.506 W	
Green River Fm										
970.1	20.09	231.77	953.0	-85.9	-117.6	1,754,472.81	2,196,316.54	39° 52' 12.239 N	108° 21' 48.990 W	
A Groove										
1,028.7	21.50	231.59	1,007.8	-98.8	-133.9	1,754,460.43	2,196,299.82	39° 52' 12.112 N	108° 21' 49.199 W	
Hold 21.50 Inclination										
1,179.4	21.50	231.59	1,148.0	-133.2	-177.2	1,754,427.49	2,196,255.48	39° 52' 11.772 N	108° 21' 49.755 W	
B Groove										
1,512.6	21.50	231.59	1,458.0	-209.0	-272.9	1,754,354.68	2,196,157.45	39° 52' 11.023 N	108° 21' 50.982 W	
Dissolution Surface										
2,205.8	21.50	231.59	2,103.0	-366.9	-472.0	1,754,203.18	2,195,953.49	39° 52' 9.463 N	108° 21' 53.535 W	
Garden Gulch										
2,415.4	21.50	231.59	2,298.0	-414.6	-532.2	1,754,157.38	2,195,891.83	39° 52' 8.991 N	108° 21' 54.307 W	
Orange Marker										
2,641.1	21.50	231.59	2,508.0	-466.0	-597.0	1,754,108.05	2,195,825.42	39° 52' 8.483 N	108° 21' 55.138 W	
Wasatch										
3,447.2	21.50	231.59	3,258.0	-649.5	-828.5	1,753,931.89	2,195,588.26	39° 52' 6.669 N	108° 21' 58.107 W	
9 5/8"										
4,602.6	21.50	231.59	4,333.0	-912.6	-1,160.3	1,753,679.39	2,195,248.32	39° 52' 4.069 N	108° 22' 2.362 W	
G' Sand										
4,887.4	21.50	231.59	4,598.0	-977.5	-1,242.1	1,753,617.15	2,195,164.53	39° 52' 3.428 N	108° 22' 3.411 W	
Ft. Union										
4,962.8	21.50	231.59	4,668.1	-994.6	-1,263.7	1,753,600.68	2,195,142.36	39° 52' 3.259 N	108° 22' 3.689 W	
Start Drop -1.50										
6,236.0	2.40	231.59	5,908.0	-1,157.6	-1,469.3	1,753,444.20	2,194,931.69	39° 52' 1.647 N	108° 22' 6.326 W	
Ohio Creek										
6,396.0	0.00	0.00	6,068.0	-1,159.7	-1,471.9	1,753,442.20	2,194,929.00	39° 52' 1.627 N	108° 22' 6.359 W	
Vertical										
6,496.0	0.00	0.00	6,168.0	-1,159.7	-1,471.9	1,753,442.20	2,194,929.00	39° 52' 1.627 N	108° 22' 6.359 W	
Mesaverde - Mesaverde - Mesaverde (25' Radius) Federal RG 411-23-298										
7,346.0	0.00	0.00	7,018.0	-1,159.7	-1,471.9	1,753,442.20	2,194,929.00	39° 52' 1.627 N	108° 22' 6.359 W	
Top Gas										
9,296.0	0.00	0.00	8,968.0	-1,159.7	-1,471.9	1,753,442.20	2,194,929.00	39° 52' 1.627 N	108° 22' 6.359 W	
Cameo Coals										
9,886.0	0.00	0.00	9,558.0	-1,159.7	-1,471.9	1,753,442.20	2,194,929.00	39° 52' 1.627 N	108° 22' 6.359 W	
Rollins SS										
10,011.0	0.00	0.00	9,683.0	-1,159.7	-1,471.9	1,753,442.20	2,194,929.00	39° 52' 1.627 N	108° 22' 6.359 W	
Cozzette										
10,231.0	0.00	0.00	9,903.0	-1,159.7	-1,471.9	1,753,442.20	2,194,929.00	39° 52' 1.627 N	108° 22' 6.359 W	
Corcoran										
10,596.0	0.00	0.00	10,268.0	-1,159.7	-1,471.9	1,753,442.20	2,194,929.00	39° 52' 1.627 N	108° 22' 6.359 W	
Upper Sego										
10,836.0	0.00	0.00	10,508.0	-1,159.7	-1,471.9	1,753,442.20	2,194,929.00	39° 52' 1.627 N	108° 22' 6.359 W	
Lower Sego										

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<b>Site:</b>	Federal RG 24-14-298 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Federal RG 411-23-298	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	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
11,086.0	0.00	0.00	10,758.0	-1,159.7	-1,471.9	1,753,442.20	2,194,929.00	39° 52' 1.627 N	108° 22' 6.359 W
TD at 11086.0 - TD - TD / PBHL Fed RG 411-23-298									

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	6,168.0	-1,159.7	-1,471.9	1,753,442.20	2,194,929.00	39° 52' 1.627 N	108° 22' 6.359 W
TD / PBHL Fed RG 411- - plan hits target center - Point	0.00	0.00	10,758.0	-1,159.7	-1,471.9	1,753,442.20	2,194,929.00	39° 52' 1.627 N	108° 22' 6.359 W

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (in)	Hole Diameter (in)	
3,447.2	3,258.0	9 5/8"	9.625	12.250	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
817.4	808.0	Green River Fm				
970.1	953.0	A Groove				
1,179.4	1,148.0	B Groove				
1,512.6	1,458.0	Dissolution Surface				
2,205.8	2,103.0	Garden Gulch				
2,415.4	2,298.0	Orange Marker				
2,641.1	2,508.0	Wasatch				
4,602.6	4,333.0	G' Sand				
4,887.4	4,598.0	Ft. Union				
6,236.0	5,908.0	Ohio Creek				
6,496.0	6,168.0	Mesaverde				
7,346.0	7,018.0	Top Gas				
9,296.0	8,968.0	Cameo Coals				
9,886.0	9,558.0	Rollins SS				
10,011.0	9,683.0	Cozzette				
10,231.0	9,903.0	Corcoran				
10,596.0	10,268.0	Upper Sego				
10,836.0	10,508.0	Lower Sego				
11,086.0	10,758.0	TD				

**Williams**  
Planning Report - Geographic

<b>Database:</b>	Compass R5000 WIN AUTH	<b>Local Co-ordinate Reference:</b>	Well Federal RG 411-23-298 - Slot B7
<b>Company:</b>	PICEANCE HL NAD 83	<b>TVD Reference:</b>	KELLY BUSHING @ 6708.0usft (Frontier 10 (22' RKB) kjs)
<b>Project:</b>	RG 14-02S-098W	<b>MD Reference:</b>	KELLY BUSHING @ 6708.0usft (Frontier 10 (22' RKB) kjs)
<b>Site:</b>	Federal RG 24-14-298 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Federal RG 411-23-298	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #2 13Apr11 kjs		

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
130.0	130.0	0.0	0.0	Start Build 2.40
338.3	338.1	-4.5	-7.9	Begin 2.4° Build & Turn
1,028.7	1,007.8	-98.8	-133.9	Hold 21.50 Inclination
4,962.8	4,668.1	-994.6	-1,263.7	Start Drop -1.50
6,396.0	6,068.0	-1,159.7	-1,471.9	Vertical
6,496.0	6,168.0	-1,159.7	-1,471.9	Mesaverde
11,086.0	10,758.0	-1,159.7	-1,471.9	TD at 11086.0