



PICEANCE HL NAD 83

RG 25-01S-098W

RGU 31-25-198 Pad

Federal RGU 321-25-198 - Slot B2

Wellbore #1

Design: Wellbore #1

Standard Survey Report

15 November, 2010

Williams
Survey Report

Company:	PICEANCE HL NAD 83	Local Co-ordinate Reference:	Well Federal RGU 321-25-198 (B2) - Slot B2
Project:	RG 25-01S-098W	TVD Reference:	KELLY BUSHING @ 6661.0usft (Cyclone 29 (21' RKB) jib)
Site:	RGU 31-25-198 Pad	MD Reference:	KELLY BUSHING @ 6661.0usft (Cyclone 29 (21' RKB) jib)
Well:	Federal RGU 321-25-198	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass R5000 WIN AUTH

Project	RG 25-01S-098W, Rio Blanco County, CO, RG 25-01S-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		RGU 31-25-198 Pad			
Site Position:		Northing:	1,780,066.10 usft	Latitude:	39° 56' 27.323 N
From:	Map	Easting:	2,203,704.00 usft	Longitude:	108° 20' 24.552 W
Position Uncertainty:	0.0 usft	Slot Radius:	0.000 in	Grid Convergence:	-1.791 °

Well		Federal RGU 321-25-198 - Slot B2				
Well Position	+N/-S	0.0 usft	Northing:	1,780,033.30 usft	Latitude:	39° 56' 26.993 N
	+E/-W	0.0 usft	Easting:	2,203,685.60 usft	Longitude:	108° 20' 24.775 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	6,640.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/27/2010	10.647	66.058	52,505

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	255.33	

Survey Program	Date	11/15/2010			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
211.0	12,903.0	Survey #1 MWD 29oct10 jib (Wellbore #1)	MWD	MWD - Standard	

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
211.0	1.20	286.60	211.0	0.6	-2.1	1.9	0.57	0.57		0.00
303.0	2.10	280.60	302.9	1.2	-4.7	4.2	0.99	0.98		-6.52
395.0	3.00	272.80	394.9	1.6	-8.8	8.1	1.05	0.98		-8.48
488.0	4.60	261.50	487.6	1.2	-14.9	14.1	1.89	1.72		-12.15
580.0	6.20	255.70	579.2	-0.6	-23.3	22.7	1.84	1.74		-6.30
674.0	7.70	257.50	672.5	-3.2	-34.4	34.1	1.61	1.60		1.91
764.0	9.60	253.80	761.5	-6.6	-47.5	47.6	2.20	2.11		-4.11
857.0	10.70	251.40	853.1	-11.5	-63.1	64.0	1.27	1.18		-2.58

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass R5000 WIN AUTH

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)	
949.0	11.00	250.90	943.4	-17.1	-79.5	81.3	0.34	0.33	-0.54	
1,043.0	11.90	247.40	1,035.5	-23.7	-96.9	99.8	1.21	0.96	-3.72	
1,138.0	10.90	253.20	1,128.7	-30.1	-114.6	118.5	1.60	-1.05	6.11	
1,232.0	11.10	257.90	1,220.9	-34.6	-131.9	136.4	0.98	0.21	5.00	
1,327.0	11.70	256.30	1,314.1	-38.8	-150.2	155.2	0.71	0.63	-1.68	
1,421.0	12.50	256.80	1,406.0	-43.4	-169.4	174.9	0.86	0.85	0.53	
1,515.0	12.70	255.90	1,497.7	-48.2	-189.3	195.4	0.30	0.21	-0.96	
1,610.0	11.30	250.30	1,590.6	-53.9	-208.2	215.1	1.92	-1.47	-5.89	
1,704.0	9.80	257.80	1,683.1	-58.7	-224.7	232.2	2.16	-1.60	7.98	
1,799.0	9.80	257.50	1,776.7	-62.1	-240.5	248.4	0.05	0.00	-0.32	
1,893.0	10.20	254.50	1,869.2	-66.1	-256.3	264.7	0.70	0.43	-3.19	
1,988.0	10.10	254.90	1,962.8	-70.5	-272.5	281.5	0.13	-0.11	0.42	
2,082.0	10.30	256.00	2,055.3	-74.7	-288.6	298.1	0.30	0.21	1.17	
2,175.0	10.70	255.40	2,146.7	-78.9	-305.0	315.1	0.45	0.43	-0.65	
2,269.0	11.10	255.50	2,239.0	-83.3	-322.2	332.8	0.43	0.43	0.11	
2,364.0	11.10	257.00	2,332.2	-87.7	-340.0	351.1	0.30	0.00	1.58	
2,458.0	11.30	256.80	2,424.5	-91.8	-357.8	369.4	0.22	0.21	-0.21	
2,550.0	11.80	256.90	2,514.6	-96.0	-375.7	387.8	0.54	0.54	0.11	
2,645.0	11.60	257.30	2,607.6	-100.3	-394.5	407.0	0.23	-0.21	0.42	
2,739.0	11.70	257.60	2,699.7	-104.4	-413.0	426.0	0.12	0.11	0.32	
2,834.0	12.00	258.80	2,792.7	-108.4	-432.1	445.5	0.41	0.32	1.26	
2,928.0	11.70	257.40	2,884.6	-112.4	-451.0	464.8	0.44	-0.32	-1.49	
3,023.0	11.80	258.60	2,977.7	-116.4	-469.9	484.1	0.28	0.11	1.26	
3,117.0	11.50	256.00	3,069.7	-120.6	-488.4	503.1	0.64	-0.32	-2.77	
3,211.0	11.70	252.20	3,161.8	-125.8	-506.6	521.9	0.84	0.21	-4.04	
3,305.0	11.40	253.50	3,253.9	-131.3	-524.6	540.7	0.42	-0.32	1.38	
3,400.0	12.00	250.90	3,346.9	-137.2	-542.9	560.0	0.84	0.63	-2.74	
3,494.0	12.10	250.00	3,438.9	-143.8	-561.4	579.5	0.23	0.11	-0.96	
3,588.0	11.90	249.70	3,530.8	-150.5	-579.8	599.0	0.22	-0.21	-0.32	
3,682.0	12.10	256.00	3,622.8	-156.3	-598.4	618.5	1.41	0.21	6.70	
3,777.0	12.40	254.00	3,715.6	-161.5	-617.9	638.6	0.55	0.32	-2.11	
3,871.0	12.50	255.00	3,807.4	-166.9	-637.4	658.9	0.25	0.11	1.06	
4,054.0	10.10	251.30	3,986.8	-177.2	-671.7	694.7	1.37	-1.31	-2.02	
4,149.0	8.70	250.20	4,080.5	-182.3	-686.4	710.2	1.49	-1.47	-1.16	
4,243.0	7.70	251.10	4,173.6	-186.7	-699.0	723.5	1.07	-1.06	0.96	
4,338.0	8.50	257.80	4,267.6	-190.3	-711.9	736.9	1.30	0.84	7.05	
4,432.0	9.10	260.50	4,360.5	-193.0	-726.0	751.2	0.77	0.64	2.87	
4,527.0	10.40	260.00	4,454.2	-195.7	-741.9	767.3	1.37	1.37	-0.53	
4,622.0	9.70	252.60	4,547.7	-199.6	-758.0	783.8	1.54	-0.74	-7.79	
4,717.0	10.70	255.80	4,641.2	-204.1	-774.2	800.6	1.21	1.05	3.37	
4,811.0	11.00	255.10	4,733.5	-208.6	-791.3	818.3	0.35	0.32	-0.74	
4,905.0	10.10	255.50	4,825.9	-213.0	-807.9	835.5	0.96	-0.96	0.43	

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Survey										
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5,000.0	10.30	256.30	4,919.4	-217.0	-824.3	852.4	0.26	0.21	0.84	
5,094.0	10.50	254.70	5,011.9	-221.3	-840.7	869.3	0.37	0.21	-1.70	
5,188.0	10.20	252.20	5,104.4	-226.1	-856.9	886.2	0.57	-0.32	-2.66	
5,282.0	9.80	253.00	5,196.9	-231.0	-872.4	902.5	0.45	-0.43	0.85	
5,377.0	10.30	249.90	5,290.5	-236.3	-888.2	919.0	0.78	0.53	-3.26	
5,471.0	10.80	258.10	5,382.9	-241.0	-904.7	936.2	1.68	0.53	8.72	
5,566.0	9.90	253.90	5,476.3	-245.1	-921.2	953.3	1.24	-0.95	-4.42	
5,661.0	10.80	256.90	5,569.8	-249.4	-937.7	970.3	1.10	0.95	3.16	
5,755.0	11.90	258.60	5,662.0	-253.3	-955.8	988.8	1.22	1.17	1.81	
5,850.0	11.60	259.90	5,755.0	-256.9	-974.8	1,008.1	0.42	-0.32	1.37	
5,949.0	11.30	258.40	5,852.0	-260.6	-994.1	1,027.7	0.43	-0.30	-1.52	
6,039.0	11.70	255.90	5,940.2	-264.6	-1,011.6	1,045.6	0.71	0.44	-2.78	
6,133.0	11.00	254.70	6,032.3	-269.3	-1,029.5	1,064.1	0.79	-0.74	-1.28	
6,227.0	11.20	250.60	6,124.6	-274.7	-1,046.8	1,082.2	0.87	0.21	-4.36	
6,322.0	10.10	249.30	6,218.0	-280.7	-1,063.3	1,099.7	1.19	-1.16	-1.37	
6,416.0	9.40	247.90	6,310.6	-286.5	-1,078.1	1,115.5	0.79	-0.74	-1.49	
6,510.0	8.10	250.00	6,403.5	-291.6	-1,091.4	1,129.7	1.42	-1.38	2.23	
6,605.0	7.80	250.20	6,497.6	-296.1	-1,103.8	1,142.8	0.32	-0.32	0.21	
6,700.0	8.80	249.90	6,591.6	-300.8	-1,116.7	1,156.4	1.05	1.05	-0.32	
6,794.0	7.70	256.00	6,684.6	-304.8	-1,129.5	1,169.9	1.49	-1.17	6.49	
6,889.0	8.10	257.90	6,778.7	-307.7	-1,142.2	1,182.9	0.50	0.42	2.00	
6,984.0	8.20	260.40	6,872.8	-310.2	-1,155.5	1,196.4	0.39	0.11	2.63	
7,078.0	7.80	260.80	6,965.8	-312.4	-1,168.4	1,209.4	0.43	-0.43	0.43	
7,173.0	7.70	264.70	7,060.0	-314.0	-1,181.1	1,222.1	0.56	-0.11	4.11	
7,267.0	6.70	263.90	7,153.2	-315.2	-1,192.8	1,233.7	1.07	-1.06	-0.85	
7,361.0	6.20	265.40	7,246.6	-316.2	-1,203.3	1,244.1	0.56	-0.53	1.60	
7,456.0	6.00	265.40	7,341.1	-317.0	-1,213.4	1,254.1	0.21	-0.21	0.00	
7,549.0	5.40	269.80	7,433.6	-317.4	-1,222.6	1,263.1	0.80	-0.65	4.73	
7,643.0	5.10	268.00	7,527.2	-317.5	-1,231.2	1,271.5	0.36	-0.32	-1.91	
7,736.0	3.40	268.40	7,620.0	-317.8	-1,238.1	1,278.2	1.83	-1.83	0.43	
7,829.0	1.90	259.70	7,712.9	-318.1	-1,242.4	1,282.4	1.67	-1.61	-9.35	
7,923.0	1.20	249.60	7,806.8	-318.7	-1,244.8	1,284.9	0.80	-0.74	-10.74	
8,016.0	1.10	224.30	7,899.8	-319.7	-1,246.3	1,286.7	0.55	-0.11	-27.20	
8,109.0	1.00	233.40	7,992.8	-320.8	-1,247.6	1,288.2	0.21	-0.11	9.78	
8,202.0	1.10	228.00	8,085.8	-321.9	-1,248.9	1,289.7	0.15	0.11	-5.81	
8,295.0	1.40	232.80	8,178.8	-323.2	-1,250.5	1,291.6	0.34	0.32	5.16	
8,389.0	1.70	230.90	8,272.7	-324.8	-1,252.5	1,293.9	0.32	0.32	-2.02	
8,483.0	0.70	257.90	8,366.7	-325.8	-1,254.1	1,295.8	1.19	-1.06	28.72	
8,577.0	1.00	237.20	8,460.7	-326.3	-1,255.4	1,297.1	0.45	0.32	-22.02	
8,670.0	1.10	249.30	8,553.7	-327.1	-1,256.9	1,298.8	0.26	0.11	13.01	
8,763.0	0.60	232.70	8,646.7	-327.7	-1,258.1	1,300.1	0.59	-0.54	-17.85	
8,856.0	0.30	262.60	8,739.7	-328.0	-1,258.8	1,300.8	0.40	-0.32	32.15	

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8,950.0	0.30	266.20	8,833.7	-328.1	-1,259.3	1,301.3	0.02	0.00	3.83	
9,043.0	0.00	187.80	8,926.7	-328.1	-1,259.5	1,301.5	0.32	-0.32	0.00	
9,137.0	0.30	241.30	9,020.7	-328.2	-1,259.7	1,301.8	0.32	0.32	0.00	
9,230.0	0.40	209.40	9,113.7	-328.6	-1,260.1	1,302.2	0.23	0.11	-34.30	
9,324.0	0.10	280.70	9,207.7	-328.9	-1,260.3	1,302.5	0.40	-0.32	75.85	
9,417.0	0.40	303.60	9,300.7	-328.7	-1,260.7	1,302.8	0.33	0.32	24.62	
9,510.0	0.30	228.10	9,393.7	-328.7	-1,261.1	1,303.3	0.47	-0.11	-81.18	
9,604.0	0.10	124.40	9,487.7	-328.9	-1,261.2	1,303.4	0.36	-0.21	-110.32	
9,698.0	0.30	204.40	9,581.7	-329.1	-1,261.3	1,303.5	0.32	0.21	85.11	
9,791.0	0.50	183.50	9,674.7	-329.8	-1,261.4	1,303.8	0.26	0.22	-22.47	
9,885.0	0.10	100.70	9,768.7	-330.2	-1,261.3	1,303.9	0.53	-0.43	-88.09	
9,979.0	0.60	22.30	9,862.7	-329.8	-1,261.1	1,303.5	0.63	0.53	-83.40	
10,073.0	1.10	45.10	9,956.7	-328.7	-1,260.3	1,302.4	0.63	0.53	24.26	
10,167.0	0.70	38.20	10,050.6	-327.6	-1,259.3	1,301.2	0.44	-0.43	-7.34	
10,261.0	0.20	85.80	10,144.6	-327.1	-1,258.7	1,300.5	0.62	-0.53	50.64	
10,356.0	0.40	207.70	10,239.6	-327.4	-1,258.7	1,300.6	0.56	0.21	128.32	
10,450.0	0.50	219.30	10,333.6	-328.0	-1,259.1	1,301.2	0.14	0.11	12.34	
10,543.0	0.30	280.60	10,426.6	-328.3	-1,259.6	1,301.7	0.48	-0.22	65.91	
10,637.0	0.70	287.60	10,520.6	-328.1	-1,260.4	1,302.4	0.43	0.43	7.45	
10,731.0	0.70	75.40	10,614.6	-327.7	-1,260.4	1,302.3	1.43	0.00	157.23	
10,824.0	1.10	65.80	10,707.6	-327.2	-1,259.1	1,300.9	0.46	0.43	-10.32	
10,918.0	0.90	82.00	10,801.6	-326.8	-1,257.5	1,299.3	0.37	-0.21	17.23	
11,012.0	0.70	83.50	10,895.6	-326.6	-1,256.2	1,298.0	0.21	-0.21	1.60	
11,105.0	0.40	81.10	10,988.6	-326.5	-1,255.3	1,297.1	0.32	-0.32	-2.58	
11,199.0	0.30	155.40	11,082.6	-326.6	-1,254.9	1,296.7	0.46	-0.11	79.04	
11,293.0	0.70	195.00	11,176.6	-327.4	-1,254.9	1,296.9	0.54	0.43	42.13	
11,480.0	1.00	230.80	11,363.6	-329.6	-1,256.5	1,299.0	0.32	0.16	19.14	
11,762.0	2.00	242.60	11,645.5	-333.4	-1,262.8	1,306.0	0.37	0.35	4.18	
11,857.0	2.30	246.80	11,740.4	-334.9	-1,266.0	1,309.5	0.36	0.32	4.42	
11,951.0	2.40	257.50	11,834.3	-336.1	-1,269.6	1,313.4	0.48	0.11	11.38	
12,045.0	2.40	272.00	11,928.2	-336.4	-1,273.5	1,317.2	0.64	0.00	15.43	
12,139.0	0.50	255.70	12,022.2	-336.5	-1,275.9	1,319.5	2.05	-2.02	-17.34	
12,233.0	0.60	162.30	12,116.2	-337.0	-1,276.2	1,319.9	0.85	0.11	-99.36	
12,327.0	1.20	104.90	12,210.2	-337.7	-1,275.0	1,319.0	1.08	0.64	-61.06	
12,422.0	1.50	109.50	12,305.2	-338.4	-1,272.9	1,317.1	0.34	0.32	4.84	
12,610.0	1.00	126.50	12,493.1	-340.2	-1,269.3	1,314.1	0.33	-0.27	9.04	
12,704.0	0.70	178.30	12,587.1	-341.3	-1,268.6	1,313.7	0.84	-0.32	55.11	
12,795.0	0.70	196.00	12,678.1	-342.4	-1,268.7	1,314.1	0.24	0.00	19.45	
12,853.0	0.80	194.50	12,736.1	-343.1	-1,268.9	1,314.5	0.18	0.17	-2.59	
12,903.0	0.80	194.50	12,786.1	-343.8	-1,269.1	1,314.8	0.00	0.00	0.00	

Williams
Survey Report

Company:	PICEANCE HL NAD 83	Local Co-ordinate Reference:	Well Federal RGU 321-25-198 (B2) - Slot B2
Project:	RG 25-01S-098W	TVD Reference:	KELLY BUSHING @ 6661.0usft (Cyclone 29 (21' RKB) jjb)
Site:	RGU 31-25-198 Pad	MD Reference:	KELLY BUSHING @ 6661.0usft (Cyclone 29 (21' RKB) jjb)
Well:	Federal RGU 321-25-198	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass R5000 WIN AUTH

Checked By: _____	Approved By: _____	Date: _____
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