

# **PICEANCE VLY NAD 83**

**PA 21-06S-095W**

**PA 22-21 Pad**

**PA 22-21 - Slot B2**

**Wellbore #1**

**Plan: Design #1 18Mar10 kjs**

## **Standard Planning Report - Geographic**

**23 April, 2010**

**Williams**  
Planning Report - Geographic

|                  |                        |                                     |  |
|------------------|------------------------|-------------------------------------|--|
| <b>Database:</b> | Compass R5000 WIN AUTH | <b>Local Co-ordinate Reference:</b> | Well PA 22-21 - Slot B2                              |
| <b>Company:</b>  | PICEANCE VLY NAD 83    | <b>TVD Reference:</b>               | KELLY BUSHING @ 6049.0usft (Nabors 577 (26' KB) JMS) |
| <b>Project:</b>  | PA 21-06S-095W         | <b>MD Reference:</b>                | KELLY BUSHING @ 6049.0usft (Nabors 577 (26' KB) JMS) |
| <b>Site:</b>     | PA 22-21 Pad           | <b>North Reference:</b>             | True   |
| <b>Well:</b>     | PA 22-21               | <b>Survey Calculation Method:</b>   | Minimum Curvature                                    |
| <b>Wellbore:</b> | Wellbore #1            |                                     |  |
| <b>Design:</b>   | Design #1 18Mar10 kjs  |                                     |  |

|                    |  |                      |                             |
|--------------------|--|----------------------|-----------------------------|
| <b>Project</b>     | PA 21-06S-095W, Garfield County, CO, 21-06S-095W |                      |                             |
| <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>                  | PA 22-21 Pad |                          |                   |
| <b>Site Position:</b>        |              | <b>Northing:</b>         | 1,620,681.59 usft |
| <b>From:</b>                 | Map          | <b>Easting:</b>          | 2,292,411.75 usft |
| <b>Position Uncertainty:</b> | 0.0 usft     | <b>Slot Radius:</b>      | 13.200 in         |
|                              |              | <b>Latitude:</b>         | 39° 30' 38.635 N  |
|                              |              | <b>Longitude:</b>        | 108° 0' 29.662 W  |
|                              |              | <b>Grid Convergence:</b> | -1.582 °          |

|                      |                    |          |                     |                   |               |                  |
|----------------------|--------------------|----------|---------------------|-------------------|---------------|------------------|
| Well                 | PA 22-21 - Slot B2 |          |                     |                   |               |                  |
| Well Position        | +N/-S              | 0.0 usft | Northing:           | 1,620,689.04 usft | Latitude:     | 39° 30' 38.734 N |
|                      | +E/-W              | 0.0 usft | Easting:            | 2,292,504.38 usft | Longitude:    | 108° 0' 28.483 W |
| Position Uncertainty |                    | 0.0 usft | Wellhead Elevation: |                   | Ground Level: | 6,023.0 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          | 3/18/2010          | 10.520                 | 65.783               | 52,382                     |

|                          |                                |                     |                      |                      |  |
|--------------------------|--------------------------------|---------------------|----------------------|----------------------|--|
| <b>Design</b>            | Design #1 18Mar10 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                  | 90.65                |  |

| <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   |                      |
| 120.0                 | 0.00            | 0.00        | 120.0                 | 0.0          | 0.0          | 0.00                    | 0.00                   | 0.00                  | 0.000   |                      |
| 305.0                 | 5.55            | 90.65       | 304.7                 | -0.1         | 9.0          | 3.00                    | 3.00                   | 0.00                  | 90.649  |                      |
| 6,173.3               | 5.55            | 90.65       | 6,145.5               | -6.5         | 576.5        | 0.00                    | 0.00                   | 0.00                  | 0.000   |                      |
| 6,543.4               | 0.00            | 0.00        | 6,515.0               | -6.7         | 594.5        | 1.50                    | -1.50                  | 0.00                  | 180.000 | Top Gas (25' Radius) |
| 8,693.4               | 0.00            | 0.00        | 8,665.0               | -6.7         | 594.5        | 0.00                    | 0.00                   | 0.00                  | 0.000   |                      |

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| <b>Database:</b> | Compass R5000 WIN AUTH | <b>Local Co-ordinate Reference:</b> | Well PA 22-21 - Slot B2                              |
| <b>Company:</b>  | PICEANCE VLY NAD 83    | <b>TVD Reference:</b>               | KELLY BUSHING @ 6049.0usft (Nabors 577 (26' KB) JMS) |
| <b>Project:</b>  | PA 21-06S-095W         | <b>MD Reference:</b>                | KELLY BUSHING @ 6049.0usft (Nabors 577 (26' KB) JMS) |
| <b>Site:</b>     | PA 22-21 Pad           | <b>North Reference:</b>             | True   |
| <b>Well:</b>     | PA 22-21               | <b>Survey Calculation Method:</b>   | Minimum Curvature                                    |
| <b>Wellbore:</b> | Wellbore #1            |                                     |  |
| <b>Design:</b>   | Design #1 18Mar10 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          | 1,620,689.04        | 2,292,504.38       | 39° 30' 38.734 N | 108° 0' 28.483 W |  |
| 120.0                            | 0.00            | 0.00        | 120.0                 | 0.0          | 0.0          | 1,620,689.04        | 2,292,504.38       | 39° 30' 38.734 N | 108° 0' 28.483 W |  |
| <b>Start Build 3.00</b>          |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 305.0                            | 5.55            | 90.65       | 304.7                 | -0.1         | 9.0          | 1,620,688.69        | 2,292,513.33       | 39° 30' 38.733 N | 108° 0' 28.368 W |  |
| <b>Hold 5.55 Inclination</b>     |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 869.0                            | 5.55            | 90.65       | 866.1                 | -0.7         | 63.5         | 1,620,686.57        | 2,292,567.84       | 39° 30' 38.727 N | 108° 0' 27.672 W |  |
| <b>9 5/8"</b>                    |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 2,812.0                          | 5.55            | 90.65       | 2,800.0               | -2.8         | 251.4        | 1,620,679.25        | 2,292,755.63       | 39° 30' 38.706 N | 108° 0' 25.274 W |  |
| <b>Top of "G" Sand</b>           |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 2,912.5                          | 5.55            | 90.65       | 2,900.0               | -3.0         | 261.2        | 1,620,678.87        | 2,292,765.35       | 39° 30' 38.705 N | 108° 0' 25.151 W |  |
| <b>Base of "G" Sand</b>          |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 5,067.6                          | 5.55            | 90.65       | 5,045.0               | -5.3         | 469.6        | 1,620,670.76        | 2,292,973.64       | 39° 30' 38.681 N | 108° 0' 22.491 W |  |
| <b>Mesaverde</b>                 |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 6,173.3                          | 5.55            | 90.65       | 6,145.5               | -6.5         | 576.5        | 1,620,666.59        | 2,293,080.50       | 39° 30' 38.669 N | 108° 0' 21.126 W |  |
| <b>Start Drop -1.50</b>          |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 6,543.4                          | 0.00            | 0.00        | 6,515.0               | -6.7         | 594.5        | 1,620,665.90        | 2,293,098.40       | 39° 30' 38.667 N | 108° 0' 20.898 W |  |
| <b>Top Gas - Approx. Top Gas</b> |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 7,778.4                          | 0.00            | 0.00        | 7,750.0               | -6.7         | 594.5        | 1,620,665.90        | 2,293,098.40       | 39° 30' 38.667 N | 108° 0' 20.898 W |  |
| <b>Cameo Coals</b>               |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 8,543.4                          | 0.00            | 0.00        | 8,515.0               | -6.7         | 594.5        | 1,620,665.90        | 2,293,098.40       | 39° 30' 38.667 N | 108° 0' 20.898 W |  |
| <b>Rollins SS</b>                |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 8,693.4                          | 0.00            | 0.00        | 8,665.0               | -6.7         | 594.5        | 1,620,665.90        | 2,293,098.40       | 39° 30' 38.667 N | 108° 0' 20.898 W |  |
| <b>TD at 8693.4 - TD</b>         |                 |             |                       |              |              |                     |                    |                  |                  |  |

| Design Targets            |               |              |            |              |              |                 |                |                  |                  |  |
|---------------------------|---------------|--------------|------------|--------------|--------------|-----------------|----------------|------------------|------------------|--|
| Target Name               | Dip Angle (°) | Dip Dir. (°) | TVD (usft) | +N/-S (usft) | +E/-W (usft) | Northing (usft) | Easting (usft) | Latitude         | Longitude        |  |
| - hit/miss target         |               |              |            |              |              |                 |                |                  |                  |  |
| - Shape                   |               |              |            |              |              |                 |                |                  |                  |  |
| Top Gas (25' Radius) P/   | 0.00          | 0.00         | 6,515.0    | -6.7         | 594.5        | 1,620,665.90    | 2,293,098.40   | 39° 30' 38.667 N | 108° 0' 20.898 W |  |
| - plan hits target center |               |              |            |              |              |                 |                |                  |                  |  |
| - Circle (radius 25.0)    |               |              |            |              |              |                 |                |                  |                  |  |

| Casing Points         |                       |        |  |  |  |  | Casing Diameter (in) | Hole Diameter (in) |
|-----------------------|-----------------------|--------|--|--|--|--|----------------------|--------------------|
| Measured Depth (usft) | Vertical Depth (usft) | Name   |  |  |  |  |                      |                    |
| 869.0                 | 866.1                 | 9 5/8" |  |  |  |  | 9.625                | 12.250             |

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Planning Report - Geographic

|                  |                        |                                     |  |
|------------------|------------------------|-------------------------------------|--|
| <b>Database:</b> | Compass R5000 WIN AUTH | <b>Local Co-ordinate Reference:</b> | Well PA 22-21 - Slot B2                              |
| <b>Company:</b>  | PICEANCE VLY NAD 83    | <b>TVD Reference:</b>               | KELLY BUSHING @ 6049.0usft (Nabors 577 (26' KB) JMS) |
| <b>Project:</b>  | PA 21-06S-095W         | <b>MD Reference:</b>                | KELLY BUSHING @ 6049.0usft (Nabors 577 (26' KB) JMS) |
| <b>Site:</b>     | PA 22-21 Pad           | <b>North Reference:</b>             | True   |
| <b>Well:</b>     | PA 22-21               | <b>Survey Calculation Method:</b>   | Minimum Curvature                                    |
| <b>Wellbore:</b> | Wellbore #1            |                                     |  |
| <b>Design:</b>   | Design #1 18Mar10 kjs  |                                     |  |

| Formations            |                       |                  |           |         |                   |  |
|-----------------------|-----------------------|------------------|-----------|---------|-------------------|--|
| Measured Depth (usft) | Vertical Depth (usft) | Name             | Lithology | Dip (°) | Dip Direction (°) |  |
| 2,812.0               | 2,800.0               | Top of "G" Sand  |           | 0.000   |                   |  |
| 2,912.5               | 2,900.0               | Base of "G" Sand |           | 0.000   |                   |  |
| 5,067.6               | 5,045.0               | Mesaverde        |           | 0.000   |                   |  |
| 6,543.4               | 6,515.0               | Approx. Top Gas  |           | 0.000   |                   |  |
| 7,778.4               | 7,750.0               | Cameo Coals      |           | 0.000   |                   |  |
| 8,543.4               | 8,515.0               | Rollins SS       |           | 0.000   |                   |  |
| 8,693.4               | 8,665.0               | TD               |           | 0.000   |                   |  |

| 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 3.00      |  |
| 305.0                 | 304.7                 | -0.1              | 9.0          | Hold 5.55 Inclination |  |
| 6,173.3               | 6,145.5               | -6.5              | 576.5        | Start Drop -1.50      |  |
| 6,543.4               | 6,515.0               | -6.7              | 594.5        | Top Gas               |  |
| 8,693.4               | 8,665.0               | -6.7              | 594.5        | TD at 8693.4          |  |