

# **PICEANCE VLY NAD 83**

**PA 20-06S-095W**

**DOE 1-W-20 Pad**

**PA 543-20 - Slot B4**

**Wellbore #1**

**Plan: Plan #2 01Oct10 kjs**

## **Standard Planning Report - Geographic**

**22 October, 2010**

**Williams**  
Planning Report - Geographic

|                  |                        |                                     |  |
|------------------|------------------------|-------------------------------------|--|
| <b>Database:</b> | Compass R5000 WIN AUTH | <b>Local Co-ordinate Reference:</b> | Well PA 543-20 - Slot B4                           |
| <b>Company:</b>  | PICEANCE VLY NAD 83    | <b>TVD Reference:</b>               | KELLY BUSHING @ 6256.0usft (SSD 577 (26' RKB) kjs) |
| <b>Project:</b>  | PA 20-06S-095W         | <b>MD Reference:</b>                | KELLY BUSHING @ 6256.0usft (SSD 577 (26' RKB) kjs) |
| <b>Site:</b>     | DOE 1-W-20 Pad         | <b>North Reference:</b>             | True   |
| <b>Well:</b>     | PA 543-20              | <b>Survey Calculation Method:</b>   | Minimum Curvature                                  |
| <b>Wellbore:</b> | Wellbore #1            |                                     |  |
| <b>Design:</b>   | Plan #2 01Oct10 kjs    |                                     |  |

|                    |                                     |                      |                |
|--------------------|-------------------------------------|----------------------|----------------|
| <b>Project</b>     | PA 20-06S-095W, Garfield County, CO |                      |                |
| <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               |                      |                |

|                              |                |                     |                   |                          |                  |
|------------------------------|----------------|---------------------|-------------------|--------------------------|------------------|
| <b>Site</b>                  | DOE 1-W-20 Pad |                     |                   |                          |                  |
| <b>Site Position:</b>        |                | <b>Northing:</b>    | 1,618,275.70 usft | <b>Latitude:</b>         | 39° 30' 14.005 N |
| <b>From:</b>                 | Map            | <b>Easting:</b>     | 2,289,265.87 usft | <b>Longitude:</b>        | 108° 1' 8.935 W  |
| <b>Position Uncertainty:</b> | 0.0 usft       | <b>Slot Radius:</b> | 13.200 in         | <b>Grid Convergence:</b> | -1.589 °         |

|                             |                     |          |                            |                   |                      |                  |
|-----------------------------|---------------------|----------|----------------------------|-------------------|----------------------|------------------|
| <b>Well</b>                 | PA 543-20 - Slot B4 |          |                            |                   |                      |                  |
| <b>Well Position</b>        | <b>+N/-S</b>        | 0.0 usft | <b>Northing:</b>           | 1,618,313.30 usft | <b>Latitude:</b>     | 39° 30' 14.384 N |
|                             | <b>+E/-W</b>        | 0.0 usft | <b>Easting:</b>            | 2,289,292.50 usft | <b>Longitude:</b>    | 108° 1' 8.609 W  |
| <b>Position Uncertainty</b> |                     | 0.0 usft | <b>Wellhead Elevation:</b> |                   | <b>Ground Level:</b> | 6,230.0 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          | 4/22/2010          | 10.511                 | 65.773               | 52,365                     |

|                          |                                |                     |                      |                      |
|--------------------------|--------------------------------|---------------------|----------------------|----------------------|
| <b>Design</b>            | Plan #2 01Oct10 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                  | 39.78                |

| <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   |                      |
| 150.0                 | 0.00            | 0.00        | 150.0                 | 0.0          | 0.0          | 0.00                    | 0.00                   | 0.00                  | 0.000   |                      |
| 626.5                 | 14.29           | 39.78       | 621.5                 | 45.4         | 37.8         | 3.00                    | 3.00                   | 0.00                  | 39.776  |                      |
| 5,573.0               | 14.29           | 39.78       | 5,414.9               | 984.0        | 819.2        | 0.00                    | 0.00                   | 0.00                  | 0.000   |                      |
| 6,525.9               | 0.00            | 0.00        | 6,358.0               | 1,074.9      | 894.8        | 1.50                    | -1.50                  | 0.00                  | 180.000 |                      |
| 6,625.9               | 0.00            | 0.00        | 6,458.0               | 1,074.9      | 894.8        | 0.00                    | 0.00                   | 0.00                  | 0.000   | Top Gas (25' Radius) |
| 8,775.9               | 0.00            | 0.00        | 8,608.0               | 1,074.9      | 894.8        | 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 543-20 - Slot B4                           |
| <b>Company:</b>  | PICEANCE VLY NAD 83    | <b>TVD Reference:</b>               | KELLY BUSHING @ 6256.0usft (SSD 577 (26' RKB) kjs) |
| <b>Project:</b>  | PA 20-06S-095W         | <b>MD Reference:</b>                | KELLY BUSHING @ 6256.0usft (SSD 577 (26' RKB) kjs) |
| <b>Site:</b>     | DOE 1-W-20 Pad         | <b>North Reference:</b>             | True   |
| <b>Well:</b>     | PA 543-20              | <b>Survey Calculation Method:</b>   | Minimum Curvature                                  |
| <b>Wellbore:</b> | Wellbore #1            |                                     |  |
| <b>Design:</b>   | Plan #2 01Oct10 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          | 1,618,313.30        | 2,289,292.50       | 39° 30' 14.384 N | 108° 1' 8.609 W  |  |
| 150.0                            | 0.00            | 0.00        | 150.0                 | 0.0          | 0.0          | 1,618,313.30        | 2,289,292.50       | 39° 30' 14.384 N | 108° 1' 8.609 W  |  |
| <b>Start Build 3.00</b>          |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 626.5                            | 14.29           | 39.78       | 621.5                 | 45.4         | 37.8         | 1,618,357.67        | 2,289,331.57       | 39° 30' 14.833 N | 108° 1' 8.126 W  |  |
| <b>Hold 14.29 Inclination</b>    |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 878.0                            | 14.29           | 39.78       | 865.3                 | 93.2         | 77.6         | 1,618,404.28        | 2,289,372.62       | 39° 30' 15.305 N | 108° 1' 7.619 W  |  |
| <b>9 5/8"</b>                    |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 2,882.8                          | 14.29           | 39.78       | 2,808.0               | 473.6        | 394.2        | 1,618,775.76        | 2,289,699.72       | 39° 30' 19.064 N | 108° 1' 3.579 W  |  |
| <b>Top of "G" Sand</b>           |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 2,986.0                          | 14.29           | 39.78       | 2,908.0               | 493.2        | 410.5        | 1,618,794.88        | 2,289,716.55       | 39° 30' 19.258 N | 108° 1' 3.371 W  |  |
| <b>Base of "G" Sand</b>          |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 5,142.7                          | 14.29           | 39.78       | 4,998.0               | 902.4        | 751.2        | 1,619,194.52        | 2,290,068.46       | 39° 30' 23.303 N | 108° 0' 59.024 W |  |
| <b>Mesaverde</b>                 |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 5,573.0                          | 14.29           | 39.78       | 5,414.9               | 984.0        | 819.2        | 1,619,274.25        | 2,290,138.66       | 39° 30' 24.110 N | 108° 0' 58.157 W |  |
| <b>Start Drop -1.50</b>          |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 6,525.9                          | 0.00            | 0.00        | 6,358.0               | 1,074.9      | 894.8        | 1,619,363.00        | 2,290,216.80       | 39° 30' 25.008 N | 108° 0' 57.191 W |  |
| <b>Vertical</b>                  |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 6,625.9                          | 0.00            | 0.00        | 6,458.0               | 1,074.9      | 894.8        | 1,619,363.00        | 2,290,216.80       | 39° 30' 25.008 N | 108° 0' 57.191 W |  |
| <b>Top Gas - Approx. Top Gas</b> |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 7,890.9                          | 0.00            | 0.00        | 7,723.0               | 1,074.9      | 894.8        | 1,619,363.00        | 2,290,216.80       | 39° 30' 25.008 N | 108° 0' 57.191 W |  |
| <b>Cameo Coals</b>               |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 8,625.9                          | 0.00            | 0.00        | 8,458.0               | 1,074.9      | 894.8        | 1,619,363.00        | 2,290,216.80       | 39° 30' 25.008 N | 108° 0' 57.191 W |  |
| <b>Rollins SS</b>                |                 |             |                       |              |              |                     |                    |                  |                  |  |
| 8,775.9                          | 0.00            | 0.00        | 8,608.0               | 1,074.9      | 894.8        | 1,619,363.00        | 2,290,216.80       | 39° 30' 25.008 N | 108° 0' 57.191 W |  |
| <b>TD at 8775.9</b>              |                 |             |                       |              |              |                     |                    |                  |                  |  |

| Design Targets   |               |              |            |              |              |                 |                |                  |                  |  |
|--|---------------|--------------|------------|--------------|--------------|-----------------|----------------|------------------|------------------|--|
| Target Name<br>- hit/miss target<br>- Shape                                    | Dip Angle (°) | Dip Dir. (°) | TVD (usft) | +N/-S (usft) | +E/-W (usft) | Northing (usft) | Easting (usft) | Latitude         | Longitude        |  |
| Top Gas (25' Radius) P/<br>- plan hits target center<br>- Circle (radius 25.0) | 0.00          | 0.00         | 6,458.0    | 1,074.9      | 894.8        | 1,619,363.00    | 2,290,216.80   | 39° 30' 25.008 N | 108° 0' 57.191 W |  |

| Casing Points         |                       |        |      |                      |                    |  |
|-----------------------|-----------------------|--------|------|----------------------|--------------------|--|
| Measured Depth (usft) | Vertical Depth (usft) |        | Name | Casing Diameter (in) | Hole Diameter (in) |  |
| 878.0                 | 865.3                 | 9 5/8" |      | 9.625                | 12.250             |  |

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|                  |                        |                                     |  |
|------------------|------------------------|-------------------------------------|--|
| <b>Database:</b> | Compass R5000 WIN AUTH | <b>Local Co-ordinate Reference:</b> | Well PA 543-20 - Slot B4                           |
| <b>Company:</b>  | PICEANCE VLY NAD 83    | <b>TVD Reference:</b>               | KELLY BUSHING @ 6256.0usft (SSD 577 (26' RKB) kjs) |
| <b>Project:</b>  | PA 20-06S-095W         | <b>MD Reference:</b>                | KELLY BUSHING @ 6256.0usft (SSD 577 (26' RKB) kjs) |
| <b>Site:</b>     | DOE 1-W-20 Pad         | <b>North Reference:</b>             | True   |
| <b>Well:</b>     | PA 543-20              | <b>Survey Calculation Method:</b>   | Minimum Curvature                                  |
| <b>Wellbore:</b> | Wellbore #1            |                                     |  |
| <b>Design:</b>   | Plan #2 01Oct10 kjs    |                                     |  |

| Formations            |                       |                  |           |         |                   |  |
|-----------------------|-----------------------|------------------|-----------|---------|-------------------|--|
| Measured Depth (usft) | Vertical Depth (usft) | Name             | Lithology | Dip (°) | Dip Direction (°) |  |
| 2,882.8               | 2,808.0               | Top of "G" Sand  |           |         |                   |  |
| 2,986.0               | 2,908.0               | Base of "G" Sand |           |         |                   |  |
| 5,142.7               | 4,998.0               | Mesaverde        |           |         |                   |  |
| 6,625.9               | 6,458.0               | Approx. Top Gas  |           |         |                   |  |
| 7,890.9               | 7,723.0               | Cameo Coals      |           |         |                   |  |
| 8,625.9               | 8,458.0               | Rollins SS       |           |         |                   |  |

| Plan Annotations      |                       |                   |              |                        |  |
|-----------------------|-----------------------|-------------------|--------------|------------------------|--|
| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              | Comment                |  |
|                       |                       | +N/-S (usft)      | +E/-W (usft) |                        |  |
| 150.0                 | 150.0                 | 0.0               | 0.0          | Start Build 3.00       |  |
| 626.5                 | 621.5                 | 45.4              | 37.8         | Hold 14.29 Inclination |  |
| 5,573.0               | 5,414.9               | 984.0             | 819.2        | Start Drop -1.50       |  |
| 6,525.9               | 6,358.0               | 1,074.9           | 894.8        | Vertical               |  |
| 6,625.9               | 6,458.0               | 1,074.9           | 894.8        | Top Gas                |  |
| 8,775.9               | 8,608.0               | 1,074.9           | 894.8        | TD at 8775.9           |  |