

# Chevron USA

Piceance

SKR-598-36-AV

SKR-598-36-AV-01 - slot 1

598-36-26

Design: Actual Field Surveys

## Sperry Drilling Services

### Standard Report

19 September, 2008

Well Coordinates: 1,645,957.30 N, 2,199,493.80 E (39° 34' 21.31" N, 108° 20' 24.76" W)

Ground Level: 6,342.00 ft

Local Coordinate Origin: Centered on Well SKR-598-36-AV-01 - Slot slot 1

Viewing Datum: RFE @ 6367.0ft (Original Well Elev)

TVDs to System: N

North Reference: Grid

Unit System: API - US Survey Feet

Version: 2003.16 Build: 42B

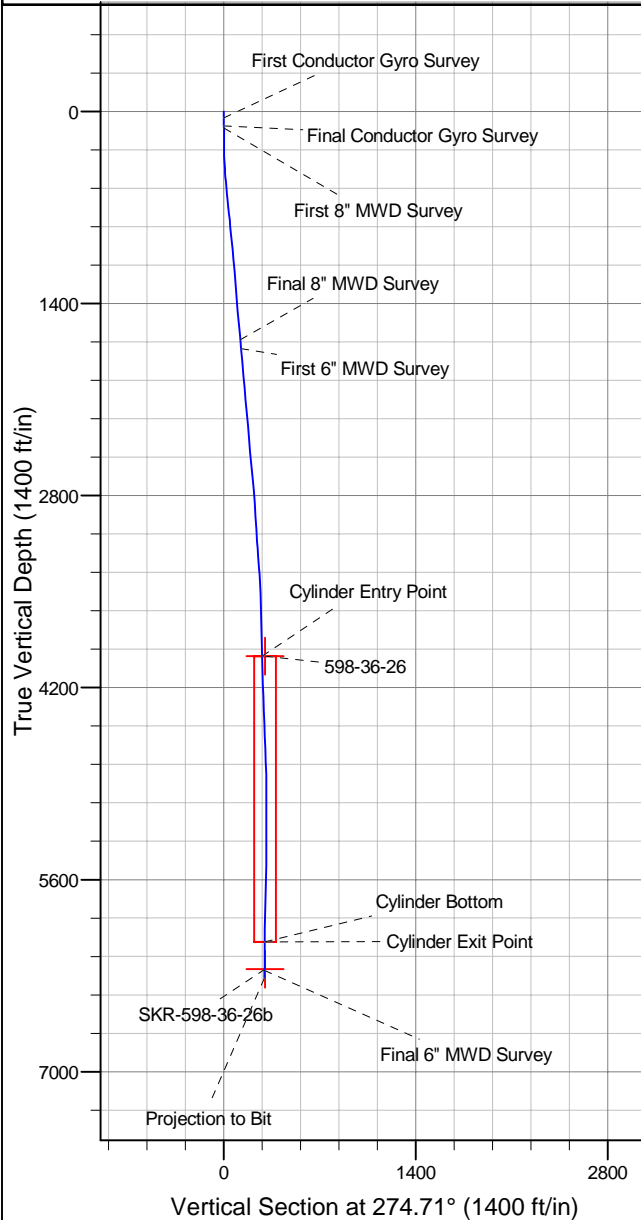
**HALLIBURTON**

Project: Piceance  
 Site: SKR-598-36-AV  
 Well: SKR-598-36-AV-01  
 Wellbore: 598-36-26  
 Plan: Actual Field Surveys

Chevron USA

HALLIBURTON

Drilling and Formation  
 Evaluation

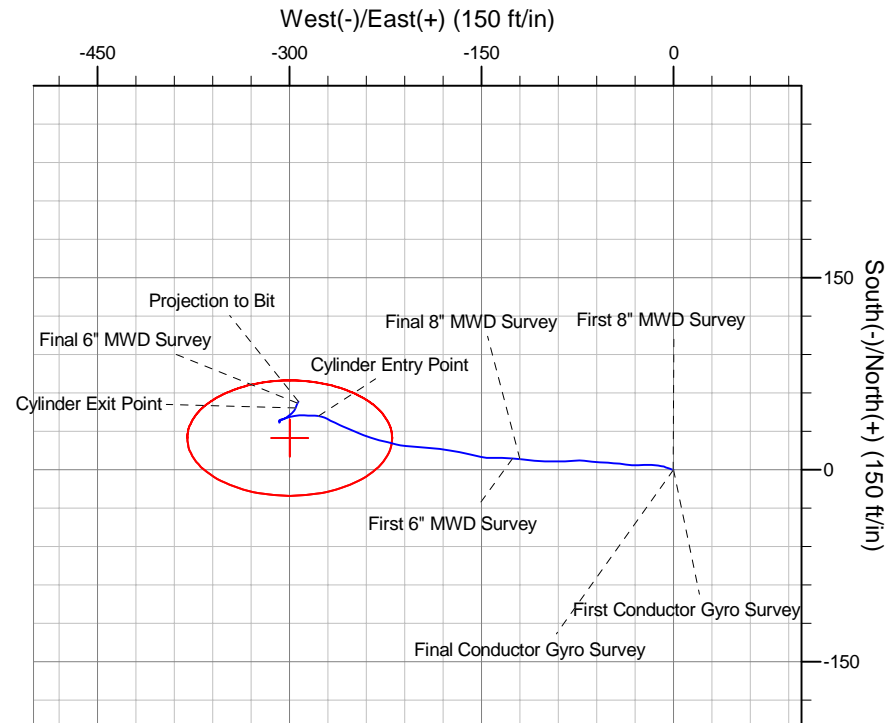


#### WELL DETAILS: SKR-598-36-AV-01

| +N/-S | +E/-W | Northing   | Ground Level: 6342.0<br>Easting | Latitude         | Longitude         | Slot   |
|-------|-------|------------|---------------------------------|------------------|-------------------|--------|
| 0.0   | 0.0   | 1645957.30 | 2199493.80                      | 39° 34' 21.309 N | 108° 20' 24.758 W | slot 1 |

#### WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

| Name           | TVD    | +N/-S | +E/-W  | Northing   | Easting    | Shape                        |
|----------------|--------|-------|--------|------------|------------|------------------------------|
| 598-36-26      | 3971.0 | 24.7  | -299.8 | 1645982.00 | 2199194.00 | Ellipse (Radii: L45.0 W80.0) |
| SKR-598-36-26b | 6253.0 | 24.7  | -299.8 | 1645982.00 | 2199194.00 | Point                        |



## Design Report for SKR-598-36-AV-01 - Actual Field Surveys

| Measured Depth (ft)                | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) |
|------------------------------------|-----------------|-------------|---------------------|------------|------------|-----------------------|-----------------------|
| 0.0                                | 0.00            | 0.00        | 0.0                 | 0.0        | 0.0        | 0.0                   | 0.00                  |
| 45.0                               | 0.03            | 63.65       | 45.0                | 0.0        | 0.0        | 0.0                   | 0.07                  |
| <b>First Conductor Gyro Survey</b> |                 |             |                     |            |            |                       |                       |
| 100.0                              | 0.20            | 271.58      | 100.0               | 0.0        | -0.2       | 0.2                   | 0.42                  |
| 105.0                              | 0.15            | 275.40      | 105.0               | 0.0        | -0.2       | 0.2                   | 1.11                  |
| <b>Final Conductor Gyro Survey</b> |                 |             |                     |            |            |                       |                       |
| 120.0                              | 0.16            | 260.79      | 120.0               | 0.0        | -0.2       | 0.2                   | 0.27                  |
| <b>First 8" MWD Survey</b>         |                 |             |                     |            |            |                       |                       |
| 200.0                              | 0.09            | 197.89      | 200.0               | -0.1       | -0.4       | 0.4                   | 0.18                  |
| 300.0                              | 2.29            | 289.70      | 300.0               | 0.4        | -1.8       | 1.8                   | 2.29                  |
| 400.0                              | 3.31            | 289.48      | 399.9               | 2.0        | -6.5       | 6.7                   | 1.02                  |
| 500.0                              | 4.85            | 276.42      | 499.6               | 3.6        | -13.5      | 13.8                  | 1.79                  |
| 600.0                              | 5.57            | 268.43      | 599.2               | 3.8        | -22.7      | 23.0                  | 1.02                  |
| 700.0                              | 5.96            | 271.93      | 698.7               | 3.5        | -32.8      | 33.0                  | 0.53                  |
| 800.0                              | 5.73            | 277.00      | 798.1               | 4.8        | -42.9      | 43.2                  | 0.57                  |
| 900.0                              | 5.65            | 272.97      | 897.7               | 5.5        | -52.6      | 52.9                  | 0.41                  |
| 1,000.0                            | 5.80            | 275.84      | 997.1               | 6.1        | -62.7      | 63.0                  | 0.32                  |
| 1,100.0                            | 4.81            | 274.32      | 1,096.7             | 7.1        | -71.9      | 72.2                  | 1.00                  |
| 1,200.0                            | 4.51            | 266.23      | 1,196.4             | 7.0        | -79.9      | 80.2                  | 0.73                  |
| 1,300.0                            | 4.61            | 268.54      | 1,296.1             | 6.6        | -87.8      | 88.0                  | 0.21                  |
| 1,400.0                            | 4.88            | 270.96      | 1,395.7             | 6.6        | -96.0      | 96.3                  | 0.34                  |
| 1,500.0                            | 5.13            | 273.23      | 1,495.4             | 6.9        | -104.8     | 105.0                 | 0.32                  |
| 1,600.0                            | 5.28            | 275.56      | 1,594.9             | 7.6        | -113.9     | 114.1                 | 0.26                  |
| 1,669.0                            | 5.30            | 278.07      | 1,663.6             | 8.3        | -120.2     | 120.4                 | 0.34                  |
| <b>Final 8" MWD Survey</b>         |                 |             |                     |            |            |                       |                       |
| 1,700.0                            | 5.16            | 276.47      | 1,694.5             | 8.7        | -123.0     | 123.3                 | 0.66                  |
| 1,733.0                            | 5.01            | 274.66      | 1,727.4             | 8.9        | -125.9     | 126.2                 | 0.66                  |
| <b>First 6" MWD Survey</b>         |                 |             |                     |            |            |                       |                       |
| 1,800.0                            | 4.96            | 271.70      | 1,794.1             | 9.3        | -131.7     | 132.0                 | 0.39                  |
| 1,900.0                            | 4.73            | 268.06      | 1,893.8             | 9.2        | -140.2     | 140.5                 | 0.38                  |
| 2,000.0                            | 5.50            | 280.45      | 1,993.4             | 9.7        | -148.8     | 149.1                 | 1.34                  |
| 2,100.0                            | 5.30            | 283.19      | 2,092.9             | 11.8       | -158.2     | 158.6                 | 0.33                  |
| 2,200.0                            | 4.80            | 281.89      | 2,192.5             | 13.7       | -166.8     | 167.4                 | 0.51                  |
| 2,300.0                            | 4.62            | 276.68      | 2,292.2             | 15.1       | -174.9     | 175.5                 | 0.47                  |
| 2,400.0                            | 5.25            | 278.46      | 2,391.8             | 16.3       | -183.5     | 184.2                 | 0.65                  |
| 2,500.0                            | 5.04            | 272.11      | 2,491.4             | 17.0       | -192.3     | 193.0                 | 0.61                  |
| 2,600.0                            | 5.62            | 277.30      | 2,591.0             | 17.9       | -201.7     | 202.5                 | 0.75                  |
| 2,700.0                            | 5.05            | 275.99      | 2,690.5             | 18.7       | -211.0     | 211.8                 | 0.58                  |
| 2,800.0                            | 4.25            | 284.74      | 2,790.2             | 20.5       | -218.9     | 219.8                 | 1.07                  |
| 2,900.0                            | 3.99            | 282.62      | 2,890.0             | 21.9       | -225.7     | 226.7                 | 0.30                  |
| 3,000.0                            | 4.17            | 287.58      | 2,989.7             | 23.9       | -232.7     | 233.8                 | 0.40                  |
| 3,100.0                            | 3.83            | 288.62      | 3,089.5             | 26.0       | -239.4     | 240.7                 | 0.35                  |
| 3,200.0                            | 4.23            | 292.51      | 3,189.2             | 28.4       | -245.6     | 247.1                 | 0.49                  |
| 3,300.0                            | 4.34            | 292.86      | 3,288.9             | 31.5       | -252.8     | 254.6                 | 0.11                  |
| 3,400.0                            | 3.27            | 293.36      | 3,388.7             | 34.1       | -259.1     | 261.0                 | 1.07                  |
| 3,500.0                            | 2.61            | 295.11      | 3,488.6             | 36.2       | -263.6     | 265.7                 | 0.67                  |
| 3,600.0                            | 2.14            | 295.85      | 3,588.5             | 37.9       | -267.3     | 269.6                 | 0.47                  |
| 3,700.0                            | 1.58            | 300.10      | 3,688.4             | 39.4       | -270.2     | 272.6                 | 0.58                  |
| 3,800.0                            | 1.52            | 289.36      | 3,788.4             | 40.6       | -272.6     | 275.0                 | 0.30                  |
| 3,900.0                            | 1.48            | 285.29      | 3,888.4             | 41.4       | -275.1     | 277.6                 | 0.11                  |

**Design Report for SKR-598-36-AV-01 - Actual Field Surveys**

| Measured Depth (ft)                          | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) |
|--|-----------------|-------------|---------------------|------------|------------|-----------------------|-----------------------|
| 3,982.7                                      | 1.57            | 281.94      | 3,971.0             | 41.9       | -277.2     | 279.7                 | 0.15                  |
| <b>Cylinder Entry Point</b>                  |                 |             |                     |            |            |                       |                       |
| 3,983.2                                      | 1.57            | 281.94      | 3,971.5             | 41.9       | -277.2     | 279.8                 | 0.00                  |
| <b>598-36-26</b>                             |                 |             |                     |            |            |                       |                       |
| 4,000.0                                      | 1.59            | 281.11      | 3,988.3             | 42.0       | -277.7     | 280.2                 | 0.17                  |
| 4,100.0                                      | 1.58            | 272.06      | 4,088.3             | 42.3       | -280.4     | 283.0                 | 0.25                  |
| 4,200.0                                      | 1.58            | 271.53      | 4,188.3             | 42.4       | -283.2     | 285.7                 | 0.02                  |
| 4,300.0                                      | 1.74            | 270.27      | 4,288.2             | 42.4       | -286.0     | 288.5                 | 0.16                  |
| 4,400.0                                      | 2.22            | 271.84      | 4,388.2             | 42.6       | -289.5     | 292.1                 | 0.49                  |
| 4,500.0                                      | 2.27            | 262.83      | 4,488.1             | 42.3       | -293.4     | 295.9                 | 0.36                  |
| 4,600.0                                      | 2.38            | 259.40      | 4,588.0             | 41.7       | -297.4     | 299.8                 | 0.18                  |
| 4,700.0                                      | 2.45            | 253.52      | 4,687.9             | 40.7       | -301.6     | 303.9                 | 0.26                  |
| 4,800.0                                      | 1.77            | 248.89      | 4,787.8             | 39.5       | -305.3     | 307.5                 | 0.70                  |
| 4,900.0                                      | 0.86            | 221.96      | 4,887.8             | 38.4       | -307.2     | 309.3                 | 1.07                  |
| 5,000.0                                      | 0.54            | 199.21      | 4,987.8             | 37.3       | -307.6     | 309.7                 | 0.41                  |
| 5,100.0                                      | 0.15            | 250.87      | 5,087.8             | 36.8       | -307.9     | 309.9                 | 0.47                  |
| 5,200.0                                      | 0.47            | 352.10      | 5,187.8             | 37.2       | -308.1     | 310.1                 | 0.51                  |
| 5,300.0                                      | 0.44            | 348.51      | 5,287.8             | 38.0       | -308.2     | 310.3                 | 0.04                  |
| 5,400.0                                      | 0.30            | 50.13       | 5,387.8             | 38.6       | -308.1     | 310.3                 | 0.40                  |
| 5,500.0                                      | 0.77            | 78.96       | 5,487.8             | 38.9       | -307.3     | 309.4                 | 0.53                  |
| 5,600.0                                      | 1.60            | 73.19       | 5,587.8             | 39.4       | -305.3     | 307.5                 | 0.84                  |
| 5,700.0                                      | 1.65            | 55.30       | 5,687.7             | 40.6       | -302.8     | 305.1                 | 0.51                  |
| 5,800.0                                      | 1.74            | 52.31       | 5,787.7             | 42.4       | -300.4     | 302.9                 | 0.13                  |
| 5,900.0                                      | 1.88            | 49.50       | 5,887.6             | 44.3       | -297.8     | 300.5                 | 0.16                  |
| 6,000.0                                      | 1.57            | 28.11       | 5,987.6             | 46.7       | -296.0     | 298.8                 | 0.71                  |
| 6,065.4                                      | 1.21            | 19.53       | 6,053.0             | 48.2       | -295.3     | 298.3                 | 0.63                  |
| <b>Cylinder Exit Point - Cylinder Bottom</b> |                 |             |                     |            |            |                       |                       |
| 6,100.0                                      | 1.16            | 18.92       | 6,087.6             | 48.8       | -295.1     | 298.1                 | 0.15                  |
| 6,200.0                                      | 1.17            | 23.68       | 6,187.5             | 50.7       | -294.4     | 297.6                 | 0.10                  |
| 6,264.9                                      | 1.22            | 28.87       | 6,252.4             | 51.9       | -293.8     | 297.1                 | 0.19                  |
| <b>SKR-598-36-26b</b>                        |                 |             |                     |            |            |                       |                       |
| 6,274.0                                      | 1.23            | 29.56       | 6,261.5             | 52.1       | -293.7     | 297.0                 | 0.19                  |
| <b>Final 6" MWD Survey</b>                   |                 |             |                     |            |            |                       |                       |
| 6,300.0                                      | 1.23            | 29.56       | 6,287.5             | 52.6       | -293.4     | 296.7                 | 0.00                  |

**Design Annotations**

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates |            | Comment                     |
|---------------------|---------------------|-------------------|------------|-----------------------------|
|                     |                     | +N/-S (ft)        | +E/-W (ft) |                             |
| 45.0                | 45.0                | 0.0               | 0.0        | First Conductor Gyro Survey |
| 105.0               | 105.0               | 0.0               | -0.2       | Final Conductor Gyro Survey |
| 120.0               | 120.0               | 0.0               | -0.2       | First 8" MWD Survey         |
| 1,669.0             | 1,663.6             | 8.3               | -120.2     | Final 8" MWD Survey         |
| 1,733.0             | 1,727.4             | 8.9               | -125.9     | First 6" MWD Survey         |
| 3,982.7             | 3,971.0             | 41.9              | -277.2     | Cylinder Entry Point        |
| 6,065.4             | 6,053.0             | 48.2              | -295.3     | Cylinder Exit Point         |
| 6,065.4             | 6,053.0             | 48.2              | -295.3     | Cylinder Bottom             |
| 6,274.0             | 6,261.5             | 52.1              | -293.7     | Final 6" MWD Survey         |
| 6,330.0             | 6,317.5             | 53.1              | -293.1     | Projection to Bit           |

**Design Report for SKR-598-36-AV-01 - Actual Field Surveys****Vertical Section Information**

| Angle<br>Type | Target    | Azimuth<br>(°) | Origin<br>Type | Origin<br>+N/_S<br>(ft) | Origin<br>+E/-W<br>(ft) | Start<br>TVD<br>(ft) |
|---------------|-----------|----------------|----------------|-------------------------|-------------------------|----------------------|
| Target        | 598-36-26 | 274.71         | Slot           | 0.0                     | 0.0                     | 0.0                  |

**Survey tool program**

| From<br>(ft) | To<br>(ft) | Survey/Plan       | Survey Tool |
|--------------|------------|-------------------|-------------|
| 45.0         | 105.0      | Conductor Gyros   | NS-GYRO-MS  |
| 120.0        | 1,669.0    | 8" EM MWD Surveys | MWD         |
| 1,733.0      | 6,330.0    | 6" MWD Surveys    | MWD         |

**Casing Details**

| Measured<br>Depth<br>(ft) | Vertical<br>Depth<br>(ft) | Name | Casing<br>Diameter<br>(") | Hole<br>Diameter<br>(") |
|---------------------------|---------------------------|------|---------------------------|-------------------------|
|---------------------------|---------------------------|------|---------------------------|-------------------------|

**Targets**

| Target Name<br>- hit/miss target<br>- Shape                                      | Dip<br>Angle<br>(°) | Dip<br>Dir.<br>(°) | TVD<br>(ft) | +N/-S<br>(ft) | +E/-W<br>(ft) | Northing<br>(ft) | Easting<br>(ft) | Latitude         | Longitude         |
|--|---------------------|--------------------|-------------|---------------|---------------|------------------|-----------------|------------------|-------------------|
| 598-36-26  | 0.00                | 0.00               | 3,971.0     | 24.7          | -299.8        | 1,645,982.00     | 2,199,194.00    | 39° 34' 21.461 N | 108° 20' 28.595 W |
| - actual wellpath misses by 28.4ft at 3983.2ft MD (3971.5 TVD, 41.9 N, -277.2 E) |                     |                    |             |               |               |                  |                 |                  |                   |
| - Ellipse (radii L45.0 W80.0 on 360.00 azi) - Target Cylinder 100% Intersected   |                     |                    |             |               |               |                  |                 |                  |                   |
| SKR-598-36-26b   | 0.00                | 360.00             | 6,253.0     | 24.7          | -299.8        | 1,645,982.00     | 2,199,194.00    | 39° 34' 21.461 N | 108° 20' 28.595 W |
| - actual wellpath misses by 27.9ft at 6264.9ft MD (6252.4 TVD, 51.9 N, -293.8 E) |                     |                    |             |               |               |                  |                 |                  |                   |
| - Point  |                     |                    |             |               |               |                  |                 |                  |                   |