

Chevron USA

Piceance

SKR-598-36-BV (New)

SKR-598-36-BV-19 - Slot 19

598-36-16

Design: Actual Field Surveys

Sperry Drilling Services

Standard Report

04 March, 2009

Well Coordinates (NAD83): 1,643,826.35 N, 2,197,632.99 E (39° 33' 59.68" N, 108° 20' 47.66" W)

Ground Level: 6,032.60 ft

Local Coordinate Origin: Centered on Well SKR-598-36-BV-19 (Slot 19) - Slot

Viewing Datum: RFE @ 6057.6ft (Original Well Elev)

TVDs to System: N

North Reference: Grid

Unit System: API - US Survey Feet

Version: 2003.16 Build: 431

HALLIBURTON

Project: Piceance
 Site: SKR-598-36-BV (New)
 Well: SKR-598-36-BV-19
 Wellbore: 598-36-16
 Plan: Actual Field Surveys

Chevron USA

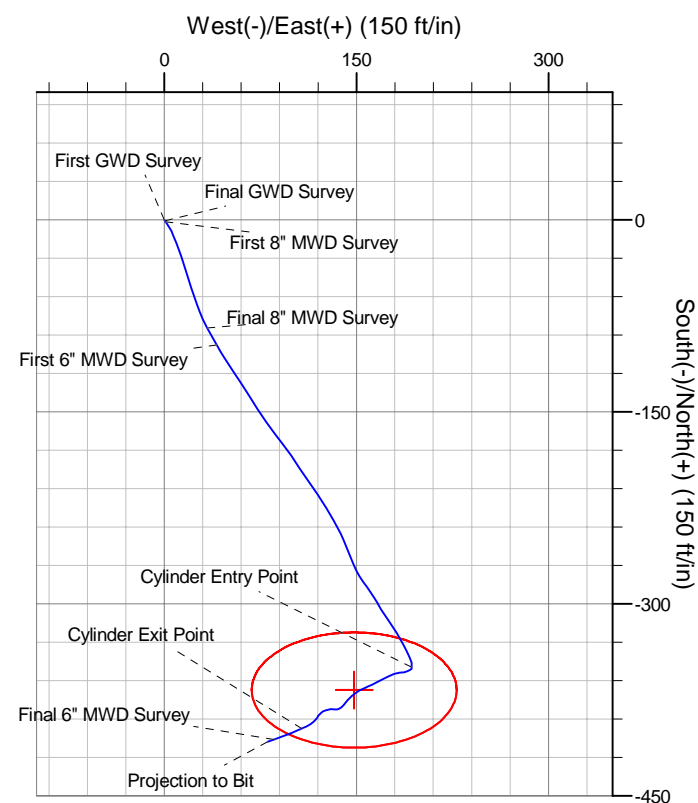
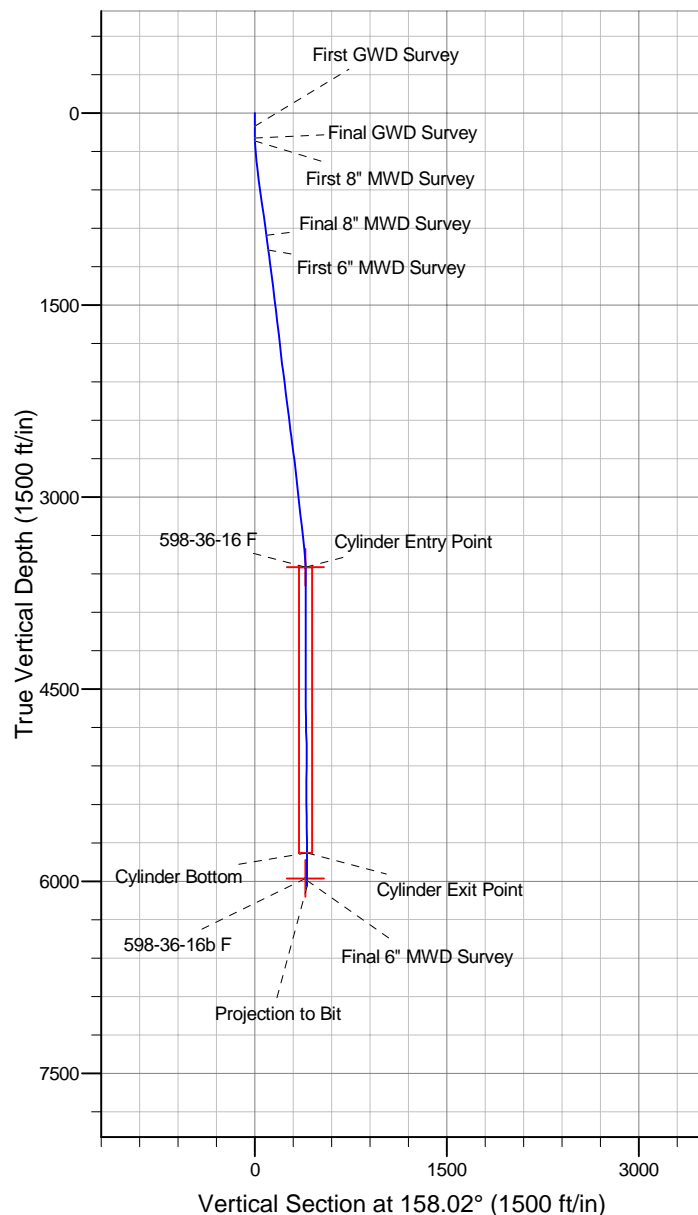
HALLIBURTON
 Drilling and Formation
 Evaluation

WELL DETAILS: SKR-598-36-BV-19

| +N/-S | +E/-W | Northing | Easting | Ground Level: 6032.6 | Latitude | Longitude | Slot |
|-------|-------|------------|------------|----------------------|------------------|-------------------|---------|
| 0.0 | 0.0 | 1643826.35 | 2197632.99 | | 39° 33' 59.683 N | 108° 20' 47.658 W | Slot 19 |

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

| Name | TVD | +N/-S | +E/-W | Northing | Easting | Shape |
|--------------|--------|--------|-------|------------|------------|------------------------------|
| 598-36-16 F | 3548.0 | -367.2 | 148.2 | 1643459.20 | 2197781.20 | Ellipse (Radii: L45.0 W80.0) |
| 598-36-16b F | 5978.0 | -367.2 | 148.2 | 1643459.20 | 2197781.20 | Point |



Design Report for SKR-598-36-BV-19 - 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 |
| 101.0 | 0.18 | 299.54 | 101.0 | 0.1 | -0.1 | -0.1 | 0.18 |
| First GWD Survey | | | | | | | |
| 132.0 | 0.26 | 83.86 | 132.0 | 0.1 | -0.1 | -0.1 | 1.35 |
| 164.0 | 0.79 | 140.24 | 164.0 | -0.1 | 0.1 | 0.1 | 2.13 |
| 194.0 | 1.41 | 160.86 | 194.0 | -0.6 | 0.4 | 0.7 | 2.42 |
| Final GWD Survey | | | | | | | |
| 218.0 | 2.57 | 143.59 | 218.0 | -1.3 | 0.8 | 1.5 | 5.39 |
| First 8" MWD Survey | | | | | | | |
| 248.0 | 3.29 | 144.39 | 247.9 | -2.5 | 1.7 | 3.0 | 2.40 |
| 279.0 | 4.22 | 149.33 | 278.9 | -4.2 | 2.8 | 4.9 | 3.17 |
| 310.0 | 5.02 | 149.07 | 309.8 | -6.4 | 4.1 | 7.4 | 2.58 |
| 341.0 | 5.68 | 152.46 | 340.6 | -8.9 | 5.5 | 10.3 | 2.36 |
| 371.0 | 6.17 | 156.31 | 370.5 | -11.7 | 6.8 | 13.4 | 2.10 |
| 433.0 | 6.56 | 157.54 | 432.1 | -18.0 | 9.5 | 20.2 | 0.67 |
| 525.0 | 7.29 | 163.08 | 523.4 | -28.4 | 13.2 | 31.3 | 1.07 |
| 617.0 | 7.97 | 162.96 | 614.6 | -40.1 | 16.8 | 43.5 | 0.74 |
| 709.0 | 8.68 | 162.15 | 705.6 | -52.8 | 20.8 | 56.8 | 0.78 |
| 804.0 | 8.07 | 159.75 | 799.6 | -65.9 | 25.3 | 70.6 | 0.74 |
| 898.0 | 7.18 | 155.17 | 892.8 | -77.4 | 30.0 | 83.0 | 1.15 |
| 960.0 | 7.06 | 151.72 | 954.3 | -84.3 | 33.4 | 90.7 | 0.72 |
| Final 8" MWD Survey | | | | | | | |
| 1,077.0 | 8.00 | 150.80 | 1,070.3 | -97.7 | 40.8 | 105.9 | 0.81 |
| First 6" MWD Survey | | | | | | | |
| 1,171.0 | 7.00 | 145.80 | 1,163.5 | -108.2 | 47.2 | 118.0 | 1.27 |
| 1,266.0 | 7.30 | 147.80 | 1,257.8 | -118.1 | 53.7 | 129.6 | 0.41 |
| 1,360.0 | 7.00 | 146.30 | 1,351.0 | -127.9 | 60.1 | 141.1 | 0.38 |
| 1,455.0 | 6.90 | 147.40 | 1,445.3 | -137.5 | 66.4 | 152.4 | 0.18 |
| 1,550.0 | 7.40 | 147.60 | 1,539.6 | -147.5 | 72.7 | 164.0 | 0.53 |
| 1,644.0 | 7.30 | 145.80 | 1,632.8 | -157.6 | 79.3 | 175.8 | 0.27 |
| 1,738.0 | 6.80 | 142.00 | 1,726.1 | -166.9 | 86.1 | 187.0 | 0.73 |
| 1,833.0 | 6.30 | 142.70 | 1,820.5 | -175.5 | 92.7 | 197.4 | 0.53 |
| 1,927.0 | 6.80 | 146.30 | 1,913.9 | -184.2 | 98.9 | 207.8 | 0.69 |
| 2,021.0 | 7.90 | 146.60 | 2,007.1 | -194.2 | 105.6 | 219.6 | 1.17 |
| 2,116.0 | 7.40 | 144.20 | 2,101.3 | -204.6 | 112.7 | 231.9 | 0.62 |
| 2,210.0 | 7.30 | 145.90 | 2,194.5 | -214.5 | 119.6 | 243.7 | 0.25 |
| 2,305.0 | 7.70 | 149.00 | 2,288.7 | -224.9 | 126.3 | 255.9 | 0.60 |
| 2,399.0 | 6.80 | 148.90 | 2,381.9 | -235.1 | 132.4 | 267.6 | 0.96 |
| 2,494.0 | 6.40 | 154.80 | 2,476.3 | -244.7 | 137.6 | 278.4 | 0.83 |
| 2,588.0 | 7.80 | 159.40 | 2,569.6 | -255.4 | 142.0 | 290.0 | 1.61 |
| 2,683.0 | 8.00 | 156.90 | 2,663.7 | -267.5 | 146.9 | 303.1 | 0.42 |
| 2,777.0 | 6.80 | 148.30 | 2,756.9 | -278.3 | 152.4 | 315.1 | 1.73 |
| 2,871.0 | 5.90 | 142.90 | 2,850.3 | -286.9 | 158.2 | 325.2 | 1.15 |
| 2,966.0 | 5.90 | 148.30 | 2,944.8 | -294.9 | 163.7 | 334.8 | 0.58 |
| 3,060.0 | 7.00 | 149.60 | 3,038.2 | -304.0 | 169.2 | 345.2 | 1.18 |
| 3,155.0 | 6.60 | 143.20 | 3,132.5 | -313.3 | 175.4 | 356.2 | 0.90 |
| 3,250.0 | 7.00 | 149.30 | 3,226.9 | -322.7 | 181.6 | 367.2 | 0.87 |
| 3,344.0 | 6.80 | 152.30 | 3,320.2 | -332.5 | 187.1 | 378.4 | 0.44 |
| 3,438.0 | 5.10 | 156.00 | 3,413.7 | -341.3 | 191.4 | 388.1 | 1.85 |
| 3,533.0 | 3.10 | 178.60 | 3,508.4 | -347.7 | 193.2 | 394.7 | 2.67 |

Design Report for SKR-598-36-BV-19 - Actual Field Surveys

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) |
|--|-----------------|-------------|---------------------|------------|------------|-----------------------|-----------------------|
| 3,572.6 | 1.93 | 181.57 | 3,548.0 | -349.4 | 193.2 | 396.4 | 2.97 |
| Cylinder Entry Point | | | | | | | |
| 3,573.1 | 1.92 | 181.62 | 3,548.5 | -349.5 | 193.2 | 396.4 | 2.97 |
| 598-36-16 F | | | | | | | |
| 3,627.0 | 0.40 | 215.00 | 3,602.4 | -350.5 | 193.1 | 397.3 | 2.97 |
| 3,722.0 | 1.10 | 240.50 | 3,697.4 | -351.2 | 192.1 | 397.6 | 0.80 |
| 3,816.0 | 1.70 | 238.70 | 3,791.4 | -352.4 | 190.1 | 397.9 | 0.64 |
| 3,911.0 | 1.90 | 265.60 | 3,886.3 | -353.3 | 187.3 | 397.7 | 0.90 |
| 4,005.0 | 2.50 | 264.10 | 3,980.2 | -353.6 | 183.7 | 396.7 | 0.64 |
| 4,100.0 | 3.00 | 249.80 | 4,075.1 | -354.7 | 179.3 | 396.0 | 0.89 |
| 4,194.0 | 3.80 | 244.30 | 4,169.0 | -356.9 | 174.2 | 396.1 | 0.92 |
| 4,289.0 | 4.20 | 242.70 | 4,263.7 | -359.8 | 168.3 | 396.7 | 0.44 |
| 4,383.0 | 4.30 | 242.50 | 4,357.5 | -363.0 | 162.1 | 397.3 | 0.11 |
| 4,477.0 | 3.20 | 247.60 | 4,451.3 | -365.7 | 156.6 | 397.7 | 1.22 |
| 4,572.0 | 2.20 | 243.40 | 4,546.2 | -367.5 | 152.5 | 397.8 | 1.07 |
| 4,666.0 | 2.10 | 233.40 | 4,640.1 | -369.3 | 149.5 | 398.4 | 0.41 |
| 4,761.0 | 2.90 | 229.40 | 4,735.0 | -371.9 | 146.3 | 399.6 | 0.86 |
| 4,855.0 | 3.00 | 222.10 | 4,828.9 | -375.3 | 142.8 | 401.5 | 0.41 |
| 4,950.0 | 2.70 | 216.10 | 4,923.8 | -378.9 | 139.8 | 403.7 | 0.44 |
| 5,044.0 | 2.40 | 243.20 | 5,017.7 | -381.6 | 136.8 | 405.1 | 1.31 |
| 5,138.0 | 2.00 | 279.80 | 5,111.6 | -382.2 | 133.4 | 404.4 | 1.52 |
| 5,233.0 | 2.20 | 262.40 | 5,206.6 | -382.2 | 129.9 | 403.0 | 0.70 |
| 5,327.0 | 2.90 | 253.60 | 5,300.5 | -383.1 | 125.9 | 402.4 | 0.85 |
| 5,422.0 | 2.20 | 230.80 | 5,395.4 | -384.9 | 122.2 | 402.7 | 1.28 |
| 5,517.0 | 1.80 | 205.40 | 5,490.3 | -387.4 | 120.1 | 404.2 | 1.01 |
| 5,611.0 | 2.80 | 222.00 | 5,584.2 | -390.5 | 117.9 | 406.2 | 1.27 |
| 5,705.0 | 3.60 | 236.30 | 5,678.1 | -393.8 | 113.9 | 407.8 | 1.20 |
| 5,800.0 | 5.00 | 246.10 | 5,772.8 | -397.1 | 107.7 | 408.6 | 1.66 |
| 5,805.2 | 5.07 | 246.22 | 5,778.0 | -397.3 | 107.3 | 408.6 | 1.40 |
| Cylinder Exit Point - Cylinder Bottom | | | | | | | |
| 5,894.0 | 6.30 | 247.90 | 5,866.4 | -400.7 | 99.1 | 408.7 | 1.40 |
| 5,998.5 | 6.46 | 250.34 | 5,970.2 | -404.9 | 88.3 | 408.5 | 0.30 |
| 598-36-16b F | | | | | | | |
| 6,023.0 | 6.50 | 250.90 | 5,994.6 | -405.8 | 85.7 | 408.4 | 0.30 |
| Final 6" MWD Survey | | | | | | | |
| 6,070.0 | 6.50 | 250.90 | 6,041.3 | -407.5 | 80.7 | 408.1 | 0.00 |
| Projection to Bit | | | | | | | |

Design Annotations

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates | | Comment |
|---------------------|---------------------|-------------------|------------|----------------------|
| | | +N/-S (ft) | +E/-W (ft) | |
| 101.0 | 101.0 | 0.1 | -0.1 | First GWD Survey |
| 194.0 | 194.0 | -0.6 | 0.4 | Final GWD Survey |
| 218.0 | 218.0 | -1.3 | 0.8 | First 8" MWD Survey |
| 960.0 | 954.3 | -84.3 | 33.4 | Final 8" MWD Survey |
| 1,077.0 | 1,070.3 | -97.7 | 40.8 | First 6" MWD Survey |
| 3,572.6 | 3,548.0 | -349.4 | 193.2 | Cylinder Entry Point |
| 5,805.2 | 5,778.0 | -397.3 | 107.3 | Cylinder Exit Point |
| 5,805.2 | 5,778.0 | -397.3 | 107.3 | Cylinder Bottom |
| 6,023.0 | 5,994.6 | -405.8 | 85.7 | Final 6" MWD Survey |
| 6,070.0 | 6,041.3 | -407.5 | 80.7 | Projection to Bit |

Design Report for SKR-598-36-BV-19 - Actual Field Surveys**Vertical Section Information**

| Angle Type | Target | Azimuth (°) | Origin Type | Origin +N/-S (ft) | Origin +E/-W (ft) | Start TVD (ft) |
|---------------|-------------|----------------|----------------|-------------------------|-------------------------|----------------------|
| Target | 598-36-16 F | 158.02 | Slot | 0.0 | 0.0 | 0.0 |

Survey tool program

| From (ft) | To (ft) | Survey/Plan | Survey Tool |
|--------------|------------|---------------|-------------|
| 101.0 | 256.0 | GWD Surveys | GYD_GWD_SS |
| 218.0 | 960.0 | 8" EM Surveys | MWD |
| 1,077.0 | 6,070.0 | 6" EM Surveys | MWD |

Targets

| Target Name - hit/miss target - Shape | Dip Angle (°) | Dip Dir. (°) | TVD (ft) | +N/-S (ft) | +E/-W (ft) | Northing (ft) | Easting (ft) | Latitude | Longitude |
|---|---------------------|--------------------|-------------|---------------|---------------|------------------|-----------------|------------------|-------------------|
| 598-36-16b F | 0.00 | 360.00 | 5,978.0 | -367.2 | 148.2 | 1,643,459.20 | 2,197,781.20 | 39° 33' 56.102 N | 108° 20' 45.619 W |
| - actual wellpath misses target center by 71.2ft at 5998.5ft MD (5970.2 TVD, -404.9 N, 88.3 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| 598-36-16 F | 0.00 | 360.00 | 3,548.0 | -367.2 | 148.2 | 1,643,459.20 | 2,197,781.20 | 39° 33' 56.102 N | 108° 20' 45.619 W |
| - actual wellpath misses target center by 48.3ft at 3573.1ft MD (3548.5 TVD, -349.5 N, 193.2 E) | | | | | | | | | |
| - Ellipse (radii L45.0 W80.0 on 360.00 azi) - Target Cylinder 100% Intersected | | | | | | | | | |