Chevron USA

Piceance
SKR-598-36-BV (New)
SKR-598-36-BV-21 - Slot 21

698-4-1

Design: Actual Field Surveys

Sperry Drilling Services

Standard Report

04 March, 2009

Well Coordinates (NAD83): 1,643,819.28 N, 2,197,635.50 E (39° 33' 59.61" N, 108° 20' 47.62" W)
Ground Level: 6,032.60 ft

Local Coordinate Origin:	Centered on Well SKR-598-36-BV-21 (Slot 21) - 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: 43I

HALLIBURTON

Project: Piceance
Site: SKR-598-36-BV (New)
Well: SKR-598-36-BV-21
Wellbore: 698-4-1
Plan: Actual Field Surveys

Chevron USA

HALLIBURTON
Drilling and Formation Evaluation

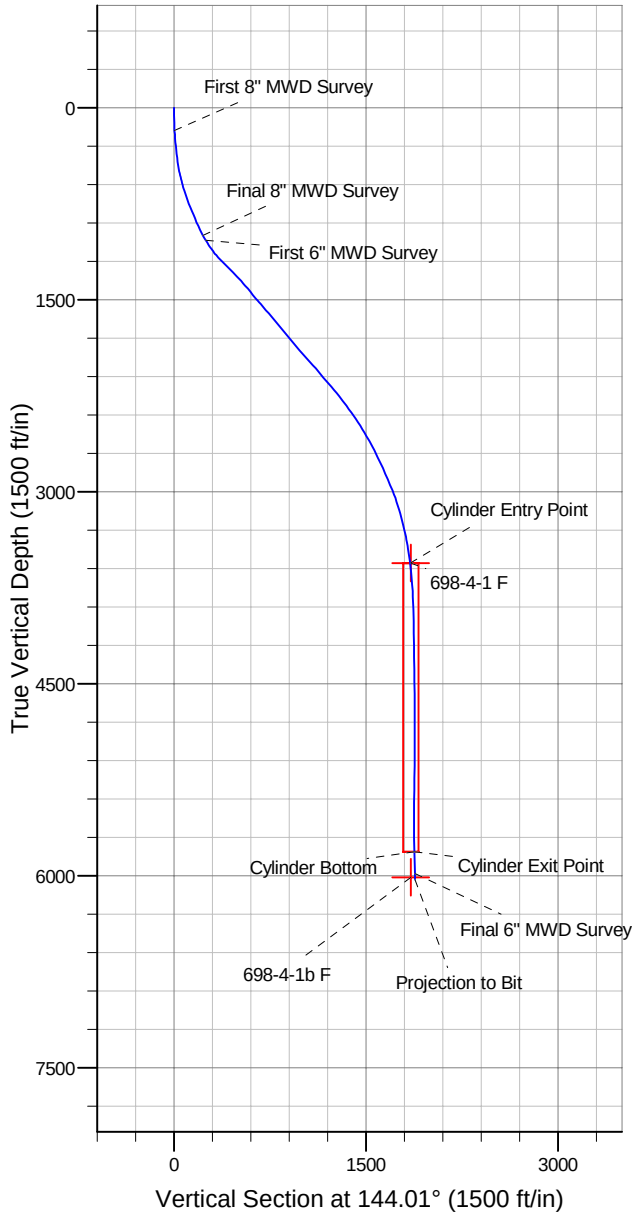
WELL DETAILS: SKR-598-36-BV-21

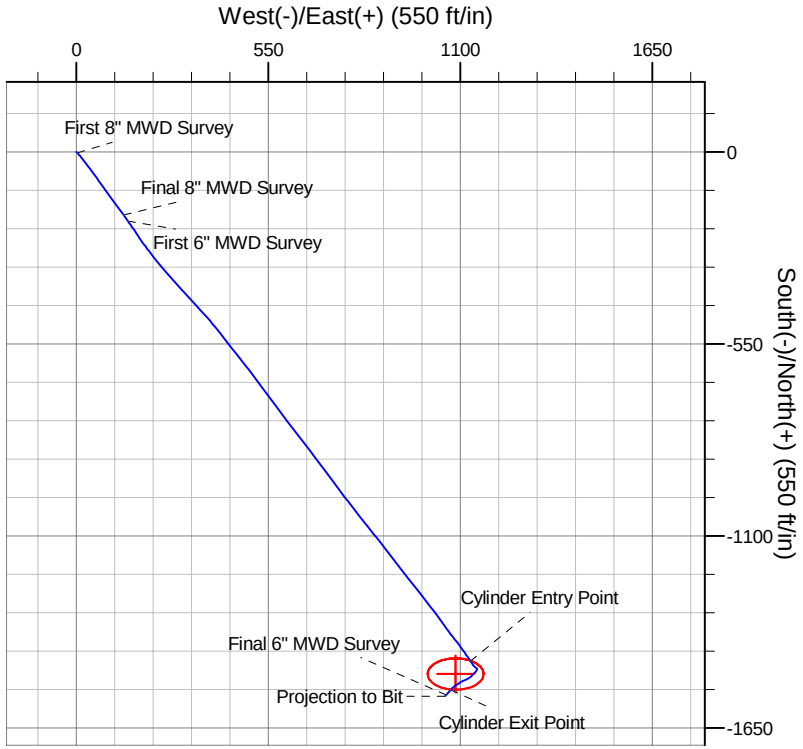
Ground Level: 6032.6

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1643819.28	2197635.50	39° 33' 59.614 N	108° 20' 47.623 W	Slot 21

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
698-4-1 F	3557.0	-1495.9	1086.3	1642323.41	2198721.77	Ellipse (Radii: L45.0 W80.0)
698-4-1b F	6011.0	-1495.9	1086.3	1642323.41	2198721.77	Point





Design Report for SKR-598-36-BV-21 - 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
177.0	2.89	140.13	176.9	-3.4	2.9	4.5	1.63
First 8" MWD Survey							
208.0	3.77	138.82	207.9	-4.8	4.0	6.2	2.85
238.0	4.55	135.79	237.8	-6.4	5.5	8.4	2.70
269.0	5.49	136.91	268.7	-8.4	7.4	11.1	3.05
300.0	5.55	139.93	299.5	-10.6	9.4	14.1	0.96
331.0	5.86	140.83	330.4	-13.0	11.3	17.1	1.04
361.0	6.52	140.99	360.2	-15.5	13.4	20.4	2.20
392.0	7.53	141.48	391.0	-18.4	15.7	24.2	3.26
423.0	8.45	143.77	421.7	-21.9	18.3	28.5	3.14
453.0	9.67	143.63	451.3	-25.7	21.1	33.2	4.07
484.0	10.83	142.43	481.8	-30.1	24.5	38.7	3.80
515.0	12.01	142.52	512.2	-34.9	28.2	44.8	3.81
546.0	13.30	142.40	542.4	-40.3	32.3	51.6	4.16
576.0	14.60	142.71	571.5	-46.1	36.7	58.9	4.34
607.0	15.85	143.17	601.5	-52.6	41.6	67.0	4.05
638.0	17.19	143.35	631.2	-59.6	46.9	75.8	4.33
668.0	18.38	144.06	659.7	-67.0	52.3	85.0	4.03
699.0	19.32	144.48	689.1	-75.1	58.2	95.0	3.06
731.0	20.24	144.28	719.2	-83.9	64.5	105.8	2.88
762.0	21.10	143.90	748.2	-92.8	70.9	116.8	2.81
794.0	21.61	144.68	778.0	-102.3	77.7	128.4	1.82
825.0	21.95	144.48	806.8	-111.6	84.4	139.9	1.12
857.0	22.48	144.02	836.4	-121.5	91.4	152.0	1.74
888.0	23.16	143.73	865.0	-131.2	98.5	164.0	2.22
920.0	24.03	143.66	894.3	-141.5	106.1	176.8	2.72
951.0	24.90	143.83	922.5	-151.8	113.7	189.7	2.82
983.0	25.77	144.39	951.4	-162.9	121.7	203.4	2.82
1,033.0	28.17	144.07	996.0	-181.3	135.0	226.0	4.81
Final 8" MWD Survey							
1,077.0	30.00	144.40	1,034.5	-198.7	147.5	247.4	4.18
First 6" MWD Survey							
1,171.0	36.60	146.00	1,113.0	-241.1	176.9	299.0	7.08
1,266.0	43.90	142.60	1,185.4	-290.8	212.8	360.3	8.02
1,360.0	45.40	139.50	1,252.3	-342.1	254.3	426.3	2.81
1,455.0	44.30	137.70	1,319.7	-392.4	298.6	493.0	1.77
1,549.0	40.60	136.90	1,389.0	-439.0	341.6	556.0	3.98
1,643.0	38.80	138.40	1,461.3	-483.4	382.1	615.6	2.17
1,738.0	42.00	143.10	1,533.7	-531.1	420.9	677.1	4.65
1,832.0	40.00	140.80	1,604.6	-579.7	458.9	738.7	2.67
1,927.0	40.00	142.50	1,677.4	-627.5	496.8	799.7	1.15
2,021.0	39.60	143.50	1,749.6	-675.6	533.0	859.8	0.80
2,116.0	39.90	143.60	1,822.7	-724.5	569.1	920.6	0.32
2,210.0	40.00	143.20	1,894.7	-772.9	605.1	980.9	0.29
2,305.0	42.80	141.60	1,966.0	-822.7	643.4	1,043.7	3.15
2,399.0	40.20	142.80	2,036.4	-871.9	681.6	1,106.0	2.89
2,494.0	40.80	143.80	2,108.6	-921.3	718.5	1,167.7	0.93
2,588.0	40.90	143.40	2,179.7	-970.8	755.0	1,229.2	0.30
2,683.0	38.20	141.40	2,253.0	-1,018.8	791.8	1,289.6	3.14

Design Report for SKR-598-36-BV-21 - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
2,777.0	36.60	142.50	2,327.7	-1,063.7	827.0	1,346.7	1.84
2,872.0	34.50	141.00	2,404.9	-1,107.1	861.2	1,401.8	2.39
2,966.0	32.40	142.60	2,483.4	-1,147.8	893.3	1,453.6	2.42
3,061.0	30.00	142.00	2,564.6	-1,186.7	923.4	1,502.8	2.55
3,155.0	28.30	142.10	2,646.7	-1,222.8	951.5	1,548.6	1.81
3,249.0	25.90	142.20	2,730.4	-1,256.6	977.8	1,591.4	2.55
3,344.0	24.40	140.90	2,816.4	-1,288.3	1,002.9	1,631.7	1.68
3,439.0	23.30	144.50	2,903.3	-1,318.8	1,026.2	1,670.1	1.92
3,533.0	21.60	144.40	2,990.1	-1,348.0	1,047.0	1,706.0	1.81
3,627.0	18.90	142.40	3,078.3	-1,374.1	1,066.4	1,738.5	2.96
3,722.0	15.10	141.30	3,169.2	-1,396.0	1,083.5	1,766.2	4.01
3,816.0	14.20	144.10	3,260.1	-1,414.9	1,098.0	1,790.0	1.22
3,910.0	12.10	145.50	3,351.6	-1,432.3	1,110.3	1,811.4	2.26
4,005.0	8.60	143.90	3,445.1	-1,446.3	1,120.1	1,828.4	3.70
4,099.0	7.40	144.40	3,538.2	-1,456.9	1,127.8	1,841.5	1.28
4,118.0	7.07	145.46	3,557.0	-1,458.8	1,129.2	1,843.9	1.86
Cylinder Entry Point							
4,119.0	7.06	145.52	3,558.0	-1,458.9	1,129.2	1,844.0	1.86
698-4-1 F							
4,194.0	5.80	150.90	3,632.5	-1,466.1	1,133.7	1,852.4	1.86
4,288.0	3.90	142.80	3,726.2	-1,472.8	1,137.9	1,860.3	2.14
4,383.0	2.80	118.50	3,821.0	-1,476.4	1,141.9	1,865.7	1.87
4,477.0	1.80	119.10	3,915.0	-1,478.2	1,145.2	1,869.1	1.06
4,572.0	1.40	145.10	4,009.9	-1,479.9	1,147.2	1,871.6	0.86
4,666.0	1.00	173.60	4,103.9	-1,481.7	1,147.9	1,873.4	0.75
4,761.0	1.30	205.70	4,198.9	-1,483.5	1,147.6	1,874.7	0.73
4,855.0	1.80	213.30	4,292.8	-1,485.7	1,146.3	1,875.7	0.57
4,950.0	2.40	212.50	4,387.8	-1,488.6	1,144.4	1,877.0	0.63
5,044.0	2.70	227.10	4,481.7	-1,491.8	1,141.7	1,877.9	0.76
5,139.0	3.00	231.50	4,576.6	-1,494.8	1,138.1	1,878.3	0.39
5,233.0	2.70	218.70	4,670.5	-1,498.1	1,134.8	1,879.0	0.75
5,327.0	2.50	220.10	4,764.4	-1,501.4	1,132.1	1,880.1	0.22
5,422.0	3.10	237.40	4,859.2	-1,504.4	1,128.6	1,880.4	1.08
5,516.0	3.30	238.20	4,953.1	-1,507.2	1,124.2	1,880.1	0.22
5,611.0	3.40	238.80	5,047.9	-1,510.1	1,119.5	1,879.7	0.11
5,705.0	3.20	246.70	5,141.8	-1,512.5	1,114.7	1,878.8	0.53
5,800.0	3.50	244.70	5,236.6	-1,514.8	1,109.6	1,877.7	0.34
5,894.0	4.10	244.40	5,330.4	-1,517.5	1,104.0	1,876.6	0.64
5,988.0	4.20	238.70	5,424.2	-1,520.7	1,098.0	1,875.7	0.45
6,083.0	4.30	233.60	5,518.9	-1,524.7	1,092.2	1,875.4	0.41
6,177.0	4.50	233.60	5,612.6	-1,528.9	1,086.4	1,875.5	0.21
6,272.0	5.40	232.30	5,707.3	-1,533.9	1,079.8	1,875.7	0.95
6,366.0	6.30	221.70	5,800.8	-1,540.4	1,072.9	1,876.9	1.49
6,377.3	6.35	221.56	5,812.0	-1,541.4	1,072.1	1,877.2	0.44
Cylinder Bottom - Cylinder Exit Point							
6,461.0	6.70	220.60	5,895.2	-1,548.5	1,065.8	1,879.3	0.44
6,548.0	6.50	221.50	5,981.6	-1,556.1	1,059.3	1,881.5	0.26
Final 6" MWD Survey - 698-4-1b F							
6,595.0	6.50	221.50	6,028.3	-1,560.1	1,055.7	1,882.7	0.00
Projection to Bit							

Design Report for SKR-598-36-BV-21 - Actual Field Surveys

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
177.0	176.9	-3.4	2.9	First 8" MWD Survey
1,033.0	996.0	-181.3	135.0	Final 8" MWD Survey
1,077.0	1,034.5	-198.7	147.5	First 6" MWD Survey
4,118.0	3,557.0	-1,458.8	1,129.2	Cylinder Entry Point
6,377.3	5,812.0	-1,541.4	1,072.1	Cylinder Bottom
6,377.3	5,812.0	-1,541.4	1,072.1	Cylinder Exit Point
6,548.0	5,981.6	-1,556.1	1,059.3	Final 6" MWD Survey
6,595.0	6,028.3	-1,560.1	1,055.7	Projection to Bit

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (ft)	Origin +E/-W (ft)	Start TVD (ft)
Target	698-4-1 F	144.01	Slot	0.0	0.0	0.0

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
177.0	1,033.0	8" EM Surveys	MWD
1,077.0	6,595.0	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
698-4-1 F	0.00	0.00	3,557.0	-1,495.9	1,086.3	1,642,323.41	2,198,721.77	39° 33' 45.173 N	108° 20' 33.161 W
- actual wellpath misses target center by 56.7ft at 4118.8ft MD (3557.8 TVD, -1458.9 N, 1129.2 E) - Ellipse (radii L45.0 W80.0 on 0.00 azi) - Target Cylinder 100% Intersected									
698-4-1b F	0.00	0.00	6,011.0	-1,495.9	1,086.3	1,642,323.41	2,198,721.77	39° 33' 45.173 N	108° 20' 33.161 W
- actual wellpath misses target center by 72.3ft at 6548.0ft MD (5981.6 TVD, -1556.1 N, 1059.3 E) - Point									