

Chevron USA

Piceance

SKR-598-36-AV

SKR-598-36-AV-13 - slot 13

598-36-48

Design: Actual Field Surveys

Sperry Drilling Services

Standard Report

02 December, 2008

Well Coordinates (NAD83): 1,645,973.01 N, 2,199,536.00 E (39° 34' 21.48" N, 108° 20' 24.23" W)

Ground Level: 6,342.00 ft

Local Coordinate Origin: Centered on Well SKR-598-36-AV-13 - Slot slot 13

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-13
 Wellbore: 598-36-48
 Plan: Actual Field Surveys

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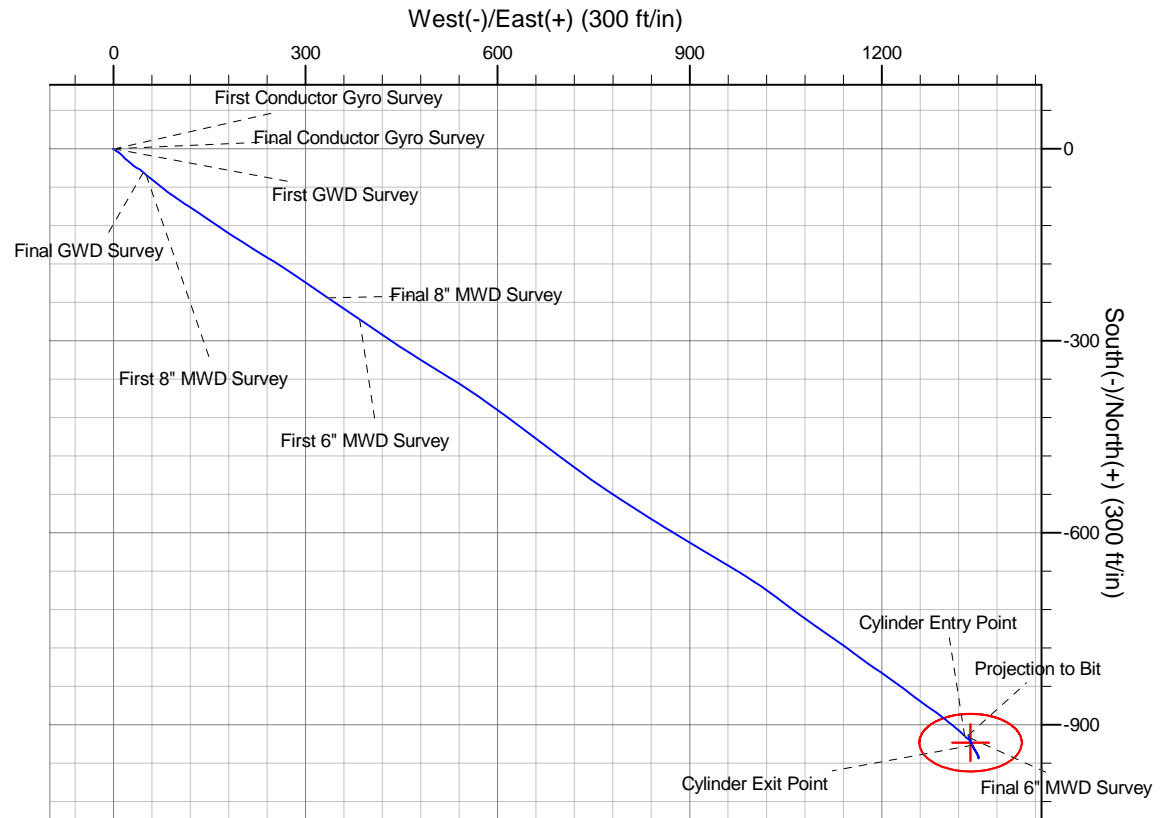
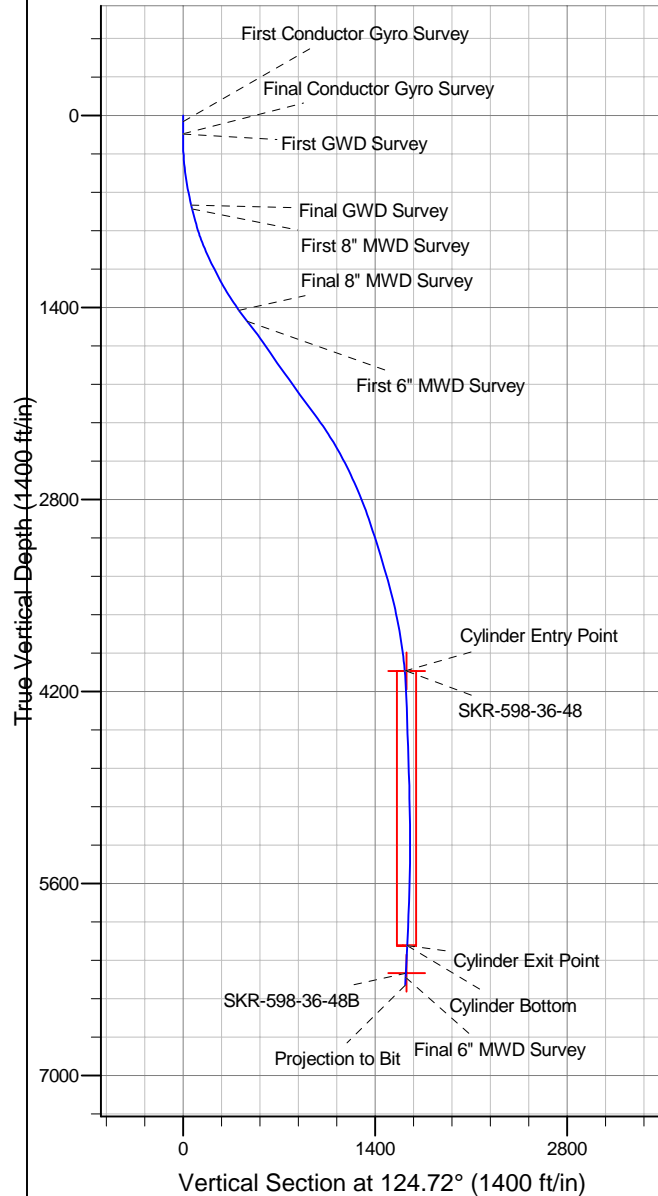
Drilling and Formation
Evaluation

WELL DETAILS: SKR-598-36-AV-13

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1645973.01	2199536.00	39° 34' 21.478 N	108° 20' 24.226 W	slot 13

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
SKR-598-36-48	4052.0	-927.7	1338.9	1645045.30	2200874.90	Ellipse (Radii: L45.0 W80.0)
SKR-598-36-48B	6254.0	-927.7	1338.9	1645045.30	2200874.90	Point



Design Report for SKR-598-36-AV-13 - 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	0.47	253.01	45.0	-0.1	-0.2	-0.1	1.04
First Conductor Gyro Survey							
65.0	0.23	325.91	65.0	0.0	-0.3	-0.2	2.29
85.0	0.19	310.83	85.0	0.0	-0.3	-0.3	0.34
105.0	0.11	309.26	105.0	0.0	-0.4	-0.3	0.40
125.0	0.10	330.98	125.0	0.1	-0.4	-0.4	0.20
135.0	0.13	337.11	135.0	0.1	-0.4	-0.4	0.32
Final Conductor Gyro Survey							
138.0	0.00	85.11	138.0	0.1	-0.4	-0.4	4.33
First GWD Survey							
168.0	0.35	90.40	168.0	0.1	-0.3	-0.3	1.17
199.0	1.06	134.80	199.0	-0.1	0.0	0.1	2.73
230.0	1.67	124.41	230.0	-0.6	0.6	0.8	2.12
261.0	2.47	130.75	261.0	-1.3	1.4	1.9	2.68
291.0	3.70	130.75	290.9	-2.3	2.7	3.5	4.10
322.0	4.67	120.36	321.8	-3.6	4.5	5.8	3.96
353.0	5.37	121.41	352.7	-5.0	6.8	8.5	2.28
383.0	6.43	123.35	382.6	-6.7	9.4	11.6	3.59
414.0	7.22	136.39	413.3	-9.0	12.2	15.2	5.59
445.0	7.75	135.16	444.1	-11.9	15.1	19.2	1.79
476.0	8.72	136.57	474.8	-15.1	18.1	23.5	3.20
506.0	9.60	130.40	504.4	-18.4	21.6	28.2	4.39
537.0	10.40	128.11	534.9	-21.8	25.8	33.6	2.88
567.0	11.37	131.99	564.4	-25.4	30.1	39.2	4.05
598.0	12.33	120.00	594.7	-29.1	35.3	45.6	8.51
629.0	12.86	122.12	625.0	-32.6	41.0	52.3	2.27
660.0	13.04	133.57	655.2	-36.9	46.5	59.2	8.28
Final GWD Survey							
687.0	13.64	128.45	681.5	-40.9	51.2	65.4	4.91
First 8" MWD Survey							
733.0	14.54	128.76	726.1	-47.9	59.9	76.6	1.96
779.0	15.33	127.93	770.5	-55.3	69.2	88.4	1.78
826.0	16.68	127.77	815.7	-63.2	79.5	101.3	2.87
874.0	18.35	125.90	861.5	-71.9	91.0	115.8	3.67
921.0	20.53	124.23	905.8	-80.9	103.9	131.4	4.79
968.0	22.25	122.99	949.5	-90.3	118.1	148.6	3.78
1,015.0	23.66	123.43	992.8	-100.4	133.5	166.9	3.02
1,062.0	24.54	124.81	1,035.7	-111.1	149.4	186.1	2.22
1,109.0	25.71	124.75	1,078.3	-122.5	165.7	206.0	2.49
1,157.0	27.21	123.10	1,121.2	-134.5	183.5	227.4	3.48
1,204.0	27.66	121.89	1,163.0	-146.1	201.8	249.0	1.52
1,251.0	28.63	121.31	1,204.4	-157.7	220.6	271.2	2.14
1,298.0	29.70	121.56	1,245.4	-169.6	240.2	294.0	2.29
1,345.0	31.01	123.46	1,286.0	-182.4	260.2	317.8	3.46
1,392.0	32.65	123.95	1,325.9	-196.2	280.8	342.6	3.53
1,440.0	34.14	124.23	1,366.0	-211.0	302.7	369.0	3.12
1,507.0	36.80	124.61	1,420.6	-233.0	334.8	407.8	3.98
Final 8" MWD Survey							
1,607.0	36.83	123.75	1,500.6	-266.6	384.3	467.8	0.52

Design Report for SKR-598-36-AV-13 - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
First 6" MWD Survey							
1,701.0	37.32	124.26	1,575.6	-298.3	431.3	524.4	0.62
1,796.0	35.27	121.85	1,652.2	-329.0	478.4	580.6	2.63
1,890.0	34.63	121.20	1,729.2	-357.2	524.3	634.4	0.79
1,984.0	34.85	124.90	1,806.5	-386.4	569.2	687.9	2.25
2,079.0	35.20	126.46	1,884.3	-418.2	613.5	742.4	1.01
2,173.0	36.20	126.89	1,960.6	-450.9	657.5	797.2	1.10
2,267.0	35.98	126.79	2,036.6	-484.1	701.8	852.6	0.24
2,362.0	36.53	125.52	2,113.2	-517.3	747.2	908.7	0.98
2,456.0	36.62	122.82	2,188.7	-548.7	793.5	964.7	1.71
2,550.0	34.65	122.16	2,265.1	-578.2	839.7	1,019.5	2.14
2,645.0	31.62	120.81	2,344.6	-605.3	883.9	1,071.3	3.28
2,739.0	30.16	121.07	2,425.3	-630.1	925.3	1,119.5	1.56
2,833.0	28.31	120.85	2,507.3	-653.7	964.7	1,165.3	1.97
2,928.0	25.62	123.21	2,592.0	-676.5	1,001.2	1,208.3	3.05
3,022.0	24.08	126.76	2,677.3	-699.1	1,033.6	1,247.8	2.28
3,116.0	22.14	127.08	2,763.7	-721.3	1,063.1	1,284.6	2.07
3,211.0	21.16	124.60	2,852.0	-741.8	1,091.5	1,319.7	1.41
3,305.0	18.66	125.18	2,940.4	-760.1	1,117.7	1,351.7	2.67
3,399.0	18.76	125.50	3,029.4	-777.6	1,142.3	1,381.8	0.15
3,494.0	17.22	127.38	3,119.8	-795.0	1,166.0	1,411.1	1.73
3,588.0	17.33	123.56	3,209.6	-811.2	1,188.7	1,439.0	1.21
3,682.0	16.43	125.41	3,299.5	-826.6	1,211.2	1,466.3	1.11
3,777.0	15.47	126.62	3,390.8	-841.9	1,232.3	1,492.4	1.07
3,871.0	14.87	127.70	3,481.6	-856.8	1,251.9	1,517.0	0.71
3,965.0	13.05	124.38	3,572.8	-870.2	1,270.2	1,539.7	2.11
4,060.0	10.76	125.59	3,665.7	-881.4	1,286.3	1,559.3	2.42
4,154.0	9.91	129.62	3,758.2	-891.7	1,299.6	1,576.1	1.19
4,249.0	8.53	127.86	3,852.0	-901.2	1,311.5	1,591.3	1.48
4,343.0	7.72	134.06	3,945.0	-909.9	1,321.5	1,604.5	1.27
4,437.0	4.97	133.68	4,038.5	-917.1	1,329.0	1,614.7	2.93
4,450.6	4.72	132.67	4,052.0	-917.9	1,329.9	1,615.9	1.95
Cylinder Entry Point							
4,451.5	4.70	132.60	4,052.9	-917.9	1,329.9	1,615.9	1.95
SKR-598-36-48							
4,532.0	3.26	123.42	4,133.2	-921.4	1,334.3	1,621.5	1.95
4,626.0	3.35	144.36	4,227.1	-925.1	1,338.1	1,626.7	1.28
4,720.0	1.91	151.90	4,321.0	-928.7	1,340.4	1,630.7	1.57
4,815.0	1.72	174.52	4,415.9	-931.5	1,341.3	1,633.1	0.77
4,909.0	2.09	152.86	4,509.9	-934.5	1,342.2	1,635.5	0.85
5,003.0	2.15	142.71	4,603.8	-937.4	1,344.1	1,638.7	0.40
5,098.0	2.22	141.79	4,698.7	-940.3	1,346.3	1,642.1	0.08
5,192.0	2.33	153.67	4,792.7	-943.4	1,348.3	1,645.5	0.51
5,287.0	1.77	154.56	4,887.6	-946.4	1,349.8	1,648.5	0.59
5,381.0	1.55	172.45	4,981.6	-949.0	1,350.5	1,650.6	0.60
5,475.0	1.10	170.30	5,075.5	-951.2	1,350.9	1,652.1	0.48
5,570.0	0.41	115.26	5,170.5	-952.2	1,351.3	1,653.1	0.98
5,664.0	0.20	113.92	5,264.5	-952.4	1,351.8	1,653.6	0.22
5,758.0	0.21	2.39	5,358.5	-952.3	1,351.9	1,653.6	0.36
5,853.0	0.98	353.16	5,453.5	-951.3	1,351.8	1,653.0	0.81
5,947.0	1.16	338.35	5,547.5	-949.7	1,351.4	1,651.7	0.35

Design Report for SKR-598-36-AV-13 - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
6,042.0	1.52	328.34	5,642.5	-947.7	1,350.4	1,649.7	0.45
6,136.0	2.16	329.44	5,736.4	-945.1	1,348.8	1,647.0	0.68
6,230.0	2.31	327.03	5,830.4	-942.0	1,346.9	1,643.6	0.19
6,325.0	3.09	334.88	5,925.2	-938.1	1,344.8	1,639.6	0.91
6,419.0	3.24	336.00	6,019.1	-933.3	1,342.6	1,635.2	0.17
6,454.0	3.22	335.39	6,054.0	-931.5	1,341.8	1,633.5	0.11
Cylinder Bottom - Cylinder Exit Point							
6,514.0	3.20	334.34	6,114.0	-928.5	1,340.4	1,630.6	0.11
6,608.0	3.23	336.32	6,207.8	-923.7	1,338.2	1,626.0	0.12
6,653.9	3.32	339.14	6,253.6	-921.3	1,337.2	1,623.8	0.40
SKR-598-36-48B							
6,685.0	3.38	340.97	6,284.7	-919.6	1,336.6	1,622.3	0.40
Final 6" MWD Survey							
6,742.0	3.38	340.97	6,341.6	-916.4	1,335.5	1,619.6	0.00
Projection to Bit							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
45.0	45.0	-0.1	-0.2	First Conductor Gyro Survey
135.0	135.0	0.1	-0.4	Final Conductor Gyro Survey
138.0	138.0	0.1	-0.4	First GWD Survey
660.0	655.2	-36.9	46.5	Final GWD Survey
687.0	681.5	-40.9	51.2	First 8" MWD Survey
1,507.0	1,420.6	-233.0	334.8	Final 8" MWD Survey
1,607.0	1,500.6	-266.6	384.3	First 6" MWD Survey
4,450.6	4,052.0	-917.9	1,329.9	Cylinder Entry Point
6,454.0	6,054.0	-931.5	1,341.8	Cylinder Bottom
6,454.0	6,054.0	-931.5	1,341.8	Cylinder Exit Point
6,685.0	6,284.7	-919.6	1,336.6	Final 6" MWD Survey
6,742.0	6,341.6	-916.4	1,335.5	Projection to Bit

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
User	SKR-598-36-48	124.72	Slot	0.0	0.0	0.0

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
45.0	135.0	Conductor Gyros	NS-GYRO-MS
138.0	660.0	GWD Surveys	GYD_GWD_SS
687.0	1,507.0	8" MWD Surveys	MWD
1,607.0	6,742.0	6" MWD Surveys	MWD



Design Report for SKR-598-36-AV-13 - Actual Field Surveys

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
SKR-598-36-48	0.00	360.00	4,052.0	-927.7	1,338.9	1,645,045.30	2,200,874.90	39° 34' 12.726 N	108° 20' 6.765 W
- actual wellpath misses by 13.3ft at 4451.5ft MD (4052.9 TVD, -917.9 N, 1329.9 E)									
- Ellipse (radii L45.0 W80.0 on 360.00 azi) - Target Cylinder 100% Intersected									
SKR-598-36-48B	0.00	0.00	6,254.0	-927.7	1,338.9	1,645,045.30	2,200,874.90	39° 34' 12.726 N	108° 20' 6.765 W
- actual wellpath misses by 6.7ft at 6653.9ft MD (6253.6 TVD, -921.3 N, 1337.2 E)									
- Point									