

# Chevron USA

Piceance

SKR-698-04-AV

SKR-698-04-AV-15 - Slot 15

698-4-21

Design: Actual Field Surveys

## Sperry Drilling Services

### Standard Report

03 March, 2009

Well Coordinates (NAD83): 1,641,069.63 N, 2,199,859.73 E (39° 33' 33.14" N, 108° 20' 18.14" W)

Ground Level: 5,959.00 ft

Local Coordinate Origin:	Centered on Well SKR-698-04-AV-15 (Slot 15) - Slot
Viewing Datum:	RFE @ 5984.0ft (RFE)
TVDs to System:	N
North Reference:	Grid
Unit System:	API - US Survey Feet

Version: 2003.16 Build: 431

**HALLIBURTON**

Project: Piceance  
 Site: SKR-698-04-AV  
 Well: SKR-698-04-AV-15  
 Wellbore: 698-4-21  
 Plan: Actual Field Surveys

# Chevron USA

**HALLIBURTON**

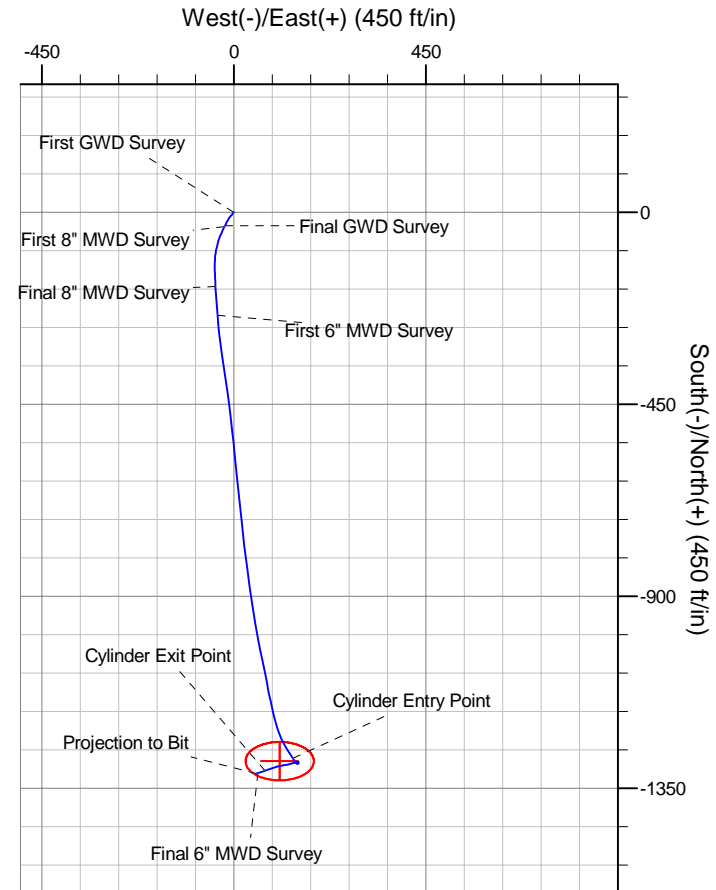
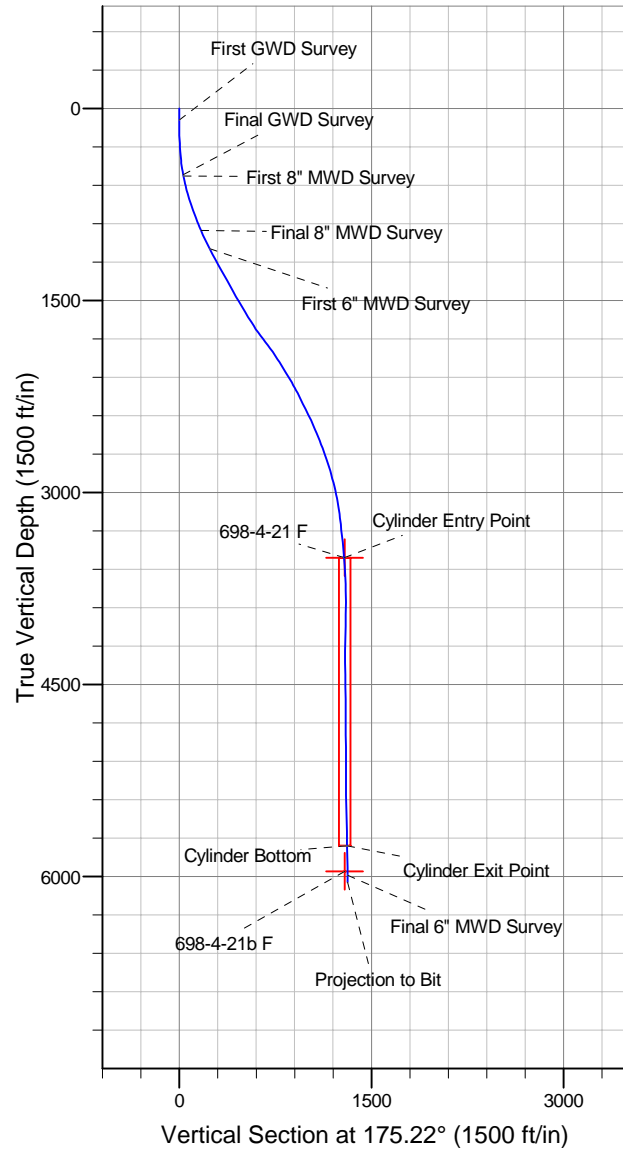
Drilling and Formation  
 Evaluation

### WELL DETAILS: SKR-698-04-AV-15

+N/-S	+E/-W	Northing	Ground Level: 5959.0	Easting	Latitude	Longitude	Slot
0.0	0.0	1641069.63	2199859.73	39° 33' 33.139 N	108° 20' 18.137 W	Slot 15	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
698-4-21 F	3509.0	-1286.1	107.5	1639783.48	2199967.21	Ellipse (Radii: L45.0 W80.0)
698-4-21b F	5958.0	-1286.1	107.5	1639783.48	2199967.21	Point



## Design Report for SKR-698-04-AV-15 - 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
89.0	0.09	303.76	89.0	0.0	-0.1	0.0	0.10
<b>First GWD Survey</b>							
151.0	1.15	250.01	151.0	-0.1	-0.7	0.1	1.77
181.0	2.03	233.27	181.0	-0.6	-1.4	0.4	3.29
212.0	2.56	211.07	212.0	-1.5	-2.2	1.3	3.31
243.0	3.35	205.96	242.9	-2.9	-2.9	2.6	2.68
274.0	3.79	220.41	273.9	-4.5	-4.0	4.1	3.22
304.0	4.41	221.47	303.8	-6.1	-5.4	5.6	2.08
335.0	5.37	220.06	334.7	-8.1	-7.1	7.5	3.12
382.0	6.78	212.30	381.4	-12.1	-10.0	11.3	3.47
427.0	8.37	212.66	426.0	-17.1	-13.2	16.0	3.53
473.0	10.22	206.49	471.4	-23.6	-16.8	22.1	4.56
519.0	12.16	207.90	516.5	-31.6	-20.9	29.7	4.26
<b>Final GWD Survey</b>							
531.0	12.78	206.53	528.2	-33.9	-22.1	31.9	5.72
<b>First 8" MWD Survey</b>							
578.0	14.52	205.33	573.9	-43.8	-27.0	41.4	3.75
624.0	16.34	201.29	618.3	-55.1	-31.8	52.2	4.59
670.0	17.51	197.74	662.3	-67.7	-36.2	64.4	3.39
716.0	18.39	193.22	706.0	-81.4	-40.0	77.7	3.58
762.0	18.98	188.46	749.6	-95.8	-42.8	91.9	3.55
809.0	19.64	183.54	794.0	-111.3	-44.4	107.2	3.73
856.0	20.45	179.51	838.1	-127.4	-44.8	123.2	3.41
903.0	21.75	177.82	882.0	-144.3	-44.4	140.1	3.05
951.0	22.91	176.70	926.4	-162.5	-43.5	158.3	2.57
979.0	23.65	176.34	952.1	-173.5	-42.8	169.4	2.69
<b>Final 8" MWD Survey</b>							
1,138.0	26.81	175.85	1,095.9	-241.1	-38.2	237.1	1.99
<b>First 6" MWD Survey</b>							
1,233.0	28.48	173.62	1,180.1	-285.0	-34.1	281.2	2.07
1,327.0	29.81	171.90	1,262.2	-330.4	-28.4	326.9	1.67
1,422.0	29.17	170.77	1,344.8	-376.7	-21.3	373.6	0.89
1,516.0	28.68	172.23	1,427.1	-421.6	-14.6	418.9	0.91
1,610.0	30.41	173.39	1,508.9	-467.6	-8.8	465.2	1.94
1,705.0	30.98	173.56	1,590.6	-515.8	-3.3	513.7	0.61
1,799.0	32.63	174.61	1,670.5	-565.1	1.8	563.2	1.85
1,894.0	35.01	174.04	1,749.4	-617.7	7.0	616.1	2.53
1,988.0	37.65	174.13	1,825.1	-673.1	12.8	671.8	2.81
2,082.0	35.43	173.79	1,900.6	-728.7	18.7	727.7	2.37
2,177.0	31.59	173.44	1,979.8	-780.8	24.5	780.1	4.05
2,271.0	31.61	172.22	2,059.9	-829.7	30.6	829.4	0.68
2,365.0	30.24	172.20	2,140.5	-877.6	37.2	877.6	1.46
2,460.0	27.20	171.32	2,223.8	-922.7	43.7	923.2	3.23
2,554.0	27.11	170.40	2,307.5	-965.1	50.5	965.9	0.46
2,648.0	25.65	169.35	2,391.7	-1,006.2	57.8	1,007.5	1.63
2,743.0	24.47	167.75	2,477.7	-1,045.6	65.8	1,047.5	1.43
2,837.0	22.11	168.38	2,564.1	-1,082.0	73.5	1,084.4	2.52
2,932.0	19.96	169.99	2,652.7	-1,115.5	79.9	1,118.3	2.34
3,026.0	18.56	167.24	2,741.5	-1,145.9	86.0	1,149.1	1.77

**Design Report for SKR-698-04-AV-15 - Actual Field Surveys**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
3,120.0	17.27	166.66	2,830.9	-1,174.0	92.6	1,177.7	1.39
3,215.0	14.70	163.55	2,922.2	-1,199.3	99.2	1,203.4	2.85
3,309.0	12.05	159.86	3,013.7	-1,220.0	106.0	1,224.6	2.96
3,404.0	9.86	154.95	3,106.9	-1,236.7	112.8	1,241.8	2.50
3,498.0	7.87	148.49	3,199.8	-1,249.4	119.6	1,255.1	2.36
3,592.0	6.87	149.34	3,293.0	-1,259.8	125.8	1,265.9	1.07
3,687.0	6.22	144.01	3,387.4	-1,268.8	131.8	1,275.4	0.94
3,781.0	5.39	146.78	3,480.9	-1,276.6	137.2	1,283.6	0.93
3,808.2	5.26	147.41	3,508.0	-1,278.7	138.5	1,285.8	0.53
<b>698-4-21 F</b>							
3,809.2	5.25	147.44	3,509.0	-1,278.8	138.6	1,285.9	0.53
<b>Cylinder Entry Point</b>							
3,875.0	4.94	149.11	3,574.6	-1,283.8	141.7	1,291.1	0.53
3,969.0	3.37	141.05	3,668.3	-1,289.4	145.5	1,297.1	1.78
4,064.0	1.77	129.32	3,763.2	-1,292.5	148.4	1,300.4	1.76
4,158.0	1.28	47.00	3,857.2	-1,292.7	150.3	1,300.7	2.17
4,253.0	1.21	28.77	3,952.2	-1,291.1	151.5	1,299.3	0.42
4,347.0	0.92	2.12	4,046.1	-1,289.5	152.0	1,297.7	0.60
4,441.0	0.68	338.30	4,140.1	-1,288.2	151.9	1,296.4	0.43
4,535.0	0.83	282.51	4,234.1	-1,287.6	151.0	1,295.7	0.76
4,630.0	1.33	255.00	4,329.1	-1,287.7	149.2	1,295.6	0.74
4,724.0	1.77	249.49	4,423.1	-1,288.5	146.8	1,296.2	0.49
4,818.0	1.88	249.07	4,517.0	-1,289.5	144.0	1,297.1	0.12
4,913.0	2.30	257.22	4,612.0	-1,290.5	140.7	1,297.8	0.54
5,007.0	2.69	255.44	4,705.9	-1,291.5	136.7	1,298.4	0.42
5,101.0	3.19	251.76	4,799.8	-1,292.9	132.1	1,299.4	0.57
5,196.0	3.11	260.29	4,894.6	-1,294.1	127.1	1,300.2	0.50
5,290.0	3.16	259.29	4,988.5	-1,295.0	122.0	1,300.7	0.08
5,384.0	3.44	260.51	5,082.3	-1,296.0	116.7	1,301.2	0.31
5,479.0	3.28	257.73	5,177.2	-1,297.0	111.2	1,301.8	0.24
5,573.0	3.64	257.98	5,271.0	-1,298.2	105.7	1,302.5	0.38
5,668.0	3.94	255.20	5,365.8	-1,299.7	99.6	1,303.5	0.37
5,762.0	4.45	253.05	5,459.5	-1,301.6	93.0	1,304.8	0.57
5,951.0	3.96	249.24	5,648.0	-1,306.0	79.8	1,308.1	0.30
6,045.0	3.99	253.43	5,741.8	-1,308.1	73.7	1,309.7	0.31
6,061.3	4.04	252.87	5,758.0	-1,308.4	72.6	1,309.9	0.37
<b>Cylinder Bottom - Cylinder Exit Point</b>							
6,140.0	4.26	250.31	5,836.5	-1,310.2	67.2	1,311.3	0.37
6,234.0	4.28	250.87	5,930.3	-1,312.6	60.6	1,313.1	0.05
6,257.7	4.28	250.90	5,953.9	-1,313.1	58.9	1,313.5	0.02
<b>698-4-21b F</b>							
6,294.0	4.29	250.95	5,990.1	-1,314.0	56.3	1,314.2	0.02
<b>Final 6" MWD Survey</b>							
6,350.0	4.29	250.95	6,046.0	-1,315.4	52.4	1,315.2	0.00
<b>Projection to Bit</b>							

**Design Report for SKR-698-04-AV-15 - Actual Field Surveys****Design Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
89.0	89.0	0.0	-0.1	First GWD Survey
519.0	516.5	-31.6	-20.9	Final GWD Survey
531.0	528.2	-33.9	-22.1	First 8" MWD Survey
979.0	952.1	-173.5	-42.8	Final 8" MWD Survey
1,138.0	1,095.9	-241.1	-38.2	First 6" MWD Survey
3,809.2	3,509.0	-1,278.8	138.6	Cylinder Entry Point
6,061.3	5,758.0	-1,308.4	72.6	Cylinder Bottom
6,061.3	5,758.0	-1,308.4	72.6	Cylinder Exit Point
6,294.0	5,990.1	-1,314.0	56.3	Final 6" MWD Survey
6,350.0	6,046.0	-1,315.4	52.4	Projection to Bit

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	698-4-21 F	175.22	Slot	0.0	0.0	0.0

**Survey tool program**

From (ft)	To (ft)	Survey/Plan	Survey Tool
89.0	519.0	GWD Surveys	GYD_GWD_SS
531.0	979.0	8" MWD Surveys	MWD
979.0	6,350.0	6" MWD Surveys	MWD

**Casing Details**

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
1,000.0	971.3	9 5/8"	9-5/8	12-1/4

**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
698-4-21b F	0.00	360.00	5,958.0	-1,286.1	107.5	1,639,783.48	2,199,967.21	39° 33' 20.467 N	108° 20' 16.253 W
- actual wellpath misses target center by 55.7ft at 6257.7ft MD (5953.9 TVD, -1313.1 N, 58.9 E)									
- Point									
698-4-21 F	0.00	360.00	3,509.0	-1,286.1	107.5	1,639,783.48	2,199,967.21	39° 33' 20.467 N	108° 20' 16.253 W
- actual wellpath misses target center by 31.9ft at 3808.2ft MD (3508.0 TVD, -1278.7 N, 138.5 E)									
- Ellipse (radii L45.0 W80.0 on 360.00 azi) - Target Cylinder 100% Intersected									