

Chevron USA

Piceance

SKR-698-04-AV

SKR-698-04-AV-09 - Slot 9

698-4-8

Design: Actual Field Surveys

Sperry Drilling Services

Standard Report

28 January, 2009

Well Coordinates (NAD83): 1,641,082.51 N, 2,199,841.23 E (39° 33' 33.26" N, 108° 20' 18.38" W)

Ground Level: 5,959.00 ft

Local Coordinate Origin: Centered on Well SKR-698-04-AV-09 (Slot 9) - Slot S

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-09
Wellbore: 698-4-8
Plan: Actual Field Surveys

Chevron USA

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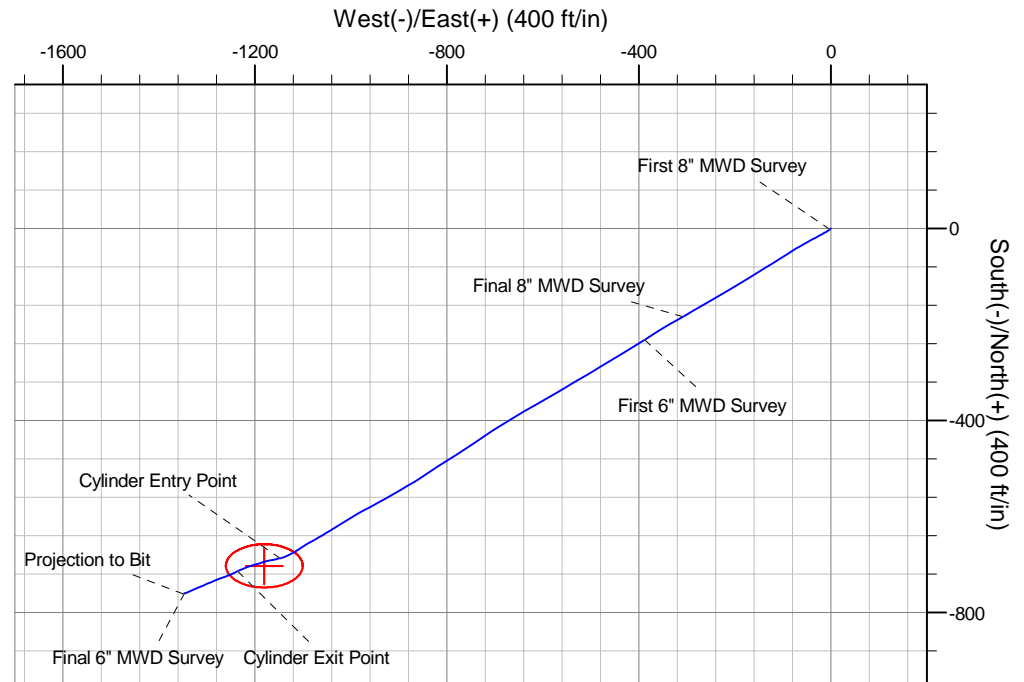
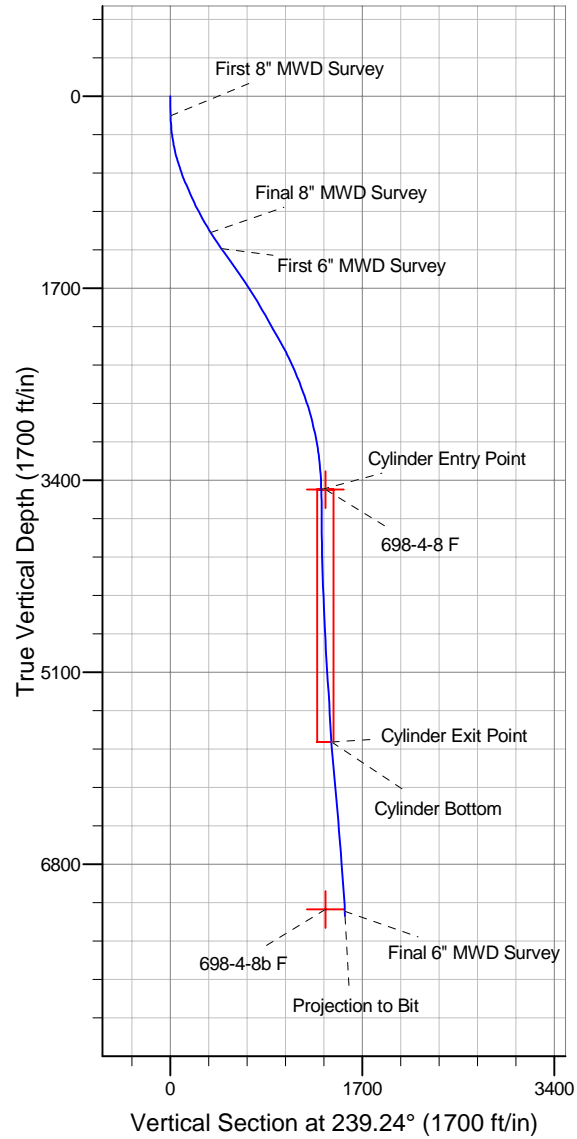
Drilling and Formation
Evaluation

WELL DETAILS: SKR-698-04-AV-09

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1641082.51	2199841.23	39° 33' 33.261 N	108° 20' 18.378 W	Slot 9

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
698-4-8 F	3483.0	-702.4	-1180.2	1640380.10	2198661.01	Ellipse (Radii: L45.0 W80.0)
698-4-8b F	7200.0	-702.4	-1180.2	1640380.10	2198661.01	Point



Design Report for SKR-698-04-AV-09 - 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
172.0	1.54	234.48	172.0	-1.3	-1.9	2.3	0.90
First 8" MWD Survey							
203.0	2.70	230.26	203.0	-2.1	-2.8	3.4	3.77
234.0	3.86	234.75	233.9	-3.1	-4.2	5.2	3.83
264.0	4.71	235.00	263.8	-4.4	-6.0	7.4	2.83
295.0	5.78	237.25	294.7	-6.0	-8.4	10.3	3.51
326.0	6.94	239.18	325.5	-7.8	-11.3	13.7	3.80
357.0	8.24	241.10	356.2	-9.8	-14.9	17.8	4.27
387.0	9.27	241.85	385.9	-12.0	-18.9	22.4	3.45
418.0	10.75	242.02	416.4	-14.5	-23.6	27.7	4.78
449.0	11.87	241.16	446.8	-17.4	-29.0	33.8	3.65
479.0	12.75	241.37	476.1	-20.5	-34.6	40.2	2.94
510.0	14.08	241.66	506.3	-23.9	-40.9	47.4	4.30
541.0	14.97	240.87	536.3	-27.7	-47.7	55.2	2.94
572.0	16.01	240.92	566.1	-31.7	-55.0	63.4	3.36
618.0	17.88	240.12	610.2	-38.3	-66.6	76.8	4.10
664.0	19.21	238.00	653.8	-45.8	-79.2	91.5	3.24
710.0	20.65	237.78	697.0	-54.2	-92.4	107.1	3.13
756.0	21.75	238.27	739.9	-63.0	-106.6	123.8	2.42
802.0	22.83	238.09	782.5	-72.2	-121.4	141.2	2.35
851.0	23.58	237.87	827.5	-82.4	-137.7	160.5	1.54
898.0	24.14	238.01	870.5	-92.5	-153.9	179.5	1.20
945.0	24.41	238.62	913.3	-102.6	-170.3	198.8	0.78
1,040.0	26.75	239.14	999.0	-123.8	-205.4	239.9	2.47
1,134.0	29.52	239.79	1,081.9	-146.3	-243.6	284.2	2.96
1,228.0	30.83	240.58	1,163.1	-169.8	-284.6	331.4	1.46
1,280.0	32.41	240.27	1,207.4	-183.3	-308.3	358.7	3.05
Final 8" MWD Survey							
1,448.0	34.90	237.64	1,347.3	-231.4	-388.0	451.8	1.72
First 6" MWD Survey							
1,543.0	35.97	238.54	1,424.7	-260.5	-434.8	506.8	1.25
1,637.0	34.30	238.45	1,501.5	-288.7	-480.9	560.9	1.78
1,731.0	34.76	240.72	1,579.0	-315.7	-526.8	614.2	1.45
1,826.0	32.44	238.92	1,658.1	-342.1	-572.3	666.7	2.66
1,920.0	33.21	240.79	1,737.1	-367.7	-616.4	717.7	1.35
2,015.0	31.76	238.84	1,817.2	-393.3	-660.5	768.7	1.88
2,109.0	30.59	237.13	1,897.7	-419.1	-701.7	817.3	1.56
2,204.0	29.58	235.39	1,979.9	-445.5	-741.3	864.9	1.40
2,298.0	29.26	238.15	2,061.7	-470.8	-779.9	911.0	1.48
2,392.0	29.30	237.40	2,143.7	-495.3	-818.8	957.0	0.39
2,487.0	28.55	236.32	2,226.9	-520.5	-857.3	1,002.9	0.96
2,581.0	25.71	240.62	2,310.5	-542.9	-893.8	1,045.7	3.67
2,675.0	24.38	240.54	2,395.7	-562.5	-928.4	1,085.5	1.42
2,770.0	22.41	242.22	2,482.9	-580.6	-961.5	1,123.2	2.19
2,864.0	20.78	238.88	2,570.3	-597.5	-991.7	1,157.8	2.17
2,958.0	18.99	238.40	2,658.7	-614.2	-1,019.0	1,189.7	1.91
3,053.0	17.00	238.34	2,749.0	-629.6	-1,044.0	1,219.1	2.09
3,147.0	14.86	239.99	2,839.4	-642.8	-1,066.1	1,244.9	2.33
3,241.0	13.76	241.26	2,930.5	-654.2	-1,086.3	1,268.1	1.22

Design Report for SKR-698-04-AV-09 - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
3,335.0	11.18	235.67	3,022.3	-664.7	-1,103.7	1,288.4	3.03
3,430.0	8.79	239.22	3,115.8	-673.6	-1,117.5	1,304.8	2.60
3,524.0	6.38	243.33	3,209.0	-679.6	-1,128.3	1,317.2	2.63
3,619.0	5.00	250.79	3,303.5	-683.4	-1,137.0	1,326.5	1.65
3,713.0	3.37	248.65	3,397.3	-685.7	-1,143.4	1,333.3	1.74
3,798.8	1.91	277.53	3,483.0	-686.5	-1,147.2	1,336.9	2.25
Cylinder Entry Point							
3,799.8	1.90	278.08	3,484.0	-686.5	-1,147.2	1,336.9	2.25
698-4-8 F							
3,807.0	1.82	282.42	3,491.2	-686.4	-1,147.4	1,337.1	2.25
3,902.0	0.28	254.30	3,586.2	-686.2	-1,149.1	1,338.4	1.66
3,996.0	0.48	241.48	3,680.2	-686.4	-1,149.7	1,339.0	0.23
4,090.0	0.75	240.87	3,774.2	-686.9	-1,150.6	1,340.0	0.29
4,185.0	0.74	253.91	3,869.1	-687.4	-1,151.7	1,341.2	0.18
4,279.0	0.79	259.55	3,963.1	-687.7	-1,152.9	1,342.4	0.10
4,373.0	1.22	249.66	4,057.1	-688.1	-1,154.5	1,344.0	0.49
4,468.0	1.62	248.35	4,152.1	-689.0	-1,156.7	1,346.4	0.42
4,562.0	2.00	260.71	4,246.0	-689.7	-1,159.6	1,349.2	0.58
4,657.0	2.32	259.83	4,341.0	-690.3	-1,163.1	1,352.5	0.34
4,751.0	2.41	263.20	4,434.9	-690.9	-1,166.9	1,356.1	0.18
4,845.0	2.45	258.15	4,528.8	-691.5	-1,170.9	1,359.8	0.23
5,034.0	2.92	253.46	4,717.6	-693.7	-1,179.4	1,368.3	0.27
5,128.0	2.91	252.34	4,811.5	-695.1	-1,184.0	1,373.0	0.06
5,223.0	2.93	252.21	4,906.4	-696.6	-1,188.6	1,377.7	0.02
5,317.0	3.43	255.19	5,000.2	-698.1	-1,193.6	1,382.7	0.56
5,412.0	4.02	251.19	5,095.0	-699.9	-1,199.5	1,388.7	0.68
5,506.0	3.90	255.09	5,188.8	-701.8	-1,205.7	1,395.0	0.31
5,601.0	3.75	251.90	5,283.6	-703.6	-1,211.8	1,401.1	0.27
5,695.0	3.32	245.47	5,377.4	-705.6	-1,217.2	1,406.9	0.62
5,789.0	2.84	245.17	5,471.3	-707.7	-1,221.8	1,411.9	0.51
5,884.0	3.13	252.37	5,566.1	-709.5	-1,226.4	1,416.7	0.50
5,978.0	3.94	247.05	5,660.0	-711.6	-1,231.8	1,422.4	0.93
6,036.2	4.41	244.81	5,718.0	-713.3	-1,235.7	1,426.6	0.86
Cylinder Bottom - Cylinder Exit Point							
6,072.0	4.71	243.66	5,753.7	-714.5	-1,238.2	1,429.5	0.86
6,167.0	5.12	245.06	5,848.3	-718.0	-1,245.6	1,437.6	0.45
6,261.0	5.12	246.70	5,942.0	-721.5	-1,253.2	1,445.9	0.16
6,356.0	5.07	249.87	6,036.6	-724.6	-1,261.1	1,454.3	0.30
6,450.0	5.14	250.59	6,130.2	-727.4	-1,268.9	1,462.5	0.10
6,544.0	5.05	248.88	6,223.8	-730.3	-1,276.8	1,470.7	0.19
6,639.0	4.86	246.58	6,318.5	-733.4	-1,284.4	1,478.8	0.29
6,733.0	4.76	248.39	6,412.2	-736.4	-1,291.6	1,486.6	0.19
6,827.0	4.78	247.19	6,505.8	-739.4	-1,298.9	1,494.3	0.11
6,922.0	4.41	245.88	6,600.5	-742.4	-1,305.9	1,501.9	0.40
7,016.0	4.43	245.80	6,694.3	-745.4	-1,312.5	1,509.1	0.02
7,111.0	4.25	247.62	6,789.0	-748.2	-1,319.1	1,516.2	0.24
7,299.0	3.90	246.34	6,976.5	-753.5	-1,331.4	1,529.4	0.19
7,488.0	3.79	246.08	7,165.1	-758.6	-1,343.0	1,542.0	0.06
7,511.5	3.79	247.36	7,188.5	-759.2	-1,344.4	1,543.5	0.36
698-4-8b F							
7,538.0	3.79	248.81	7,215.0	-759.8	-1,346.0	1,545.3	0.36

Design Report for SKR-698-04-AV-09 - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
Final 6" MWD Survey							
7,585.0	3.79	248.81	7,261.9	-761.0	-1,348.9	1,548.3	0.00
Projection to Bit							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
172.0	172.0	-1.3	-1.9	First 8" MWD Survey
1,280.0	1,207.4	-183.3	-308.3	Final 8" MWD Survey
1,448.0	1,347.3	-231.4	-388.0	First 6" MWD Survey
3,798.8	3,483.0	-686.5	-1,147.2	Cylinder Entry Point
6,036.2	5,718.0	-713.3	-1,235.7	Cylinder Bottom
6,036.2	5,718.0	-713.3	-1,235.7	Cylinder Exit Point
7,538.0	7,215.0	-759.8	-1,346.0	Final 6" MWD Survey
7,585.0	7,261.9	-761.0	-1,348.9	Projection to Bit

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/_S (ft)	+E/-W (ft)	
Target	698-4-8 F	239.24	Slot	0.0	0.0	0.0

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
172.0	1,280.0	8" EM Surveys	MWD
1,448.0	7,585.0	6" EM Surveys	MWD

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
1,280.0	1,207.4	8 5/8"	8-5/8	12-1/4

Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
698-4-8b F	0.00	360.00	7,200.0	-702.4	-1,180.2	1,640,380.10	2,198,661.01	39° 33' 25.957 N	108° 20' 33.160 W
- actual wellpath misses target center by 174.1ft at 7511.5ft MD (7188.5 TVD, -759.2 N, -1344.4 E)									
- Point									
698-4-8 F	0.00	360.00	3,483.0	-702.4	-1,180.2	1,640,380.10	2,198,661.01	39° 33' 25.957 N	108° 20' 33.160 W
- actual wellpath misses target center by 36.7ft at 3799.8ft MD (3484.0 TVD, -686.5 N, -1147.2 E)									
- Ellipse (radii L45.0 W80.0 on 360.00 azi) - Target Cylinder 100% Intersected									