

# Chevron USA

Piceance

SKR-698-04-AV

SKR-698-04-AV-13 - Slot 13

698-4-10

Design: Actual Field Surveys

## Sperry Drilling Services

### Standard Report

29 January, 2009

Well Coordinates (NAD83): 1,641,073.99 N, 2,199,853.48 E (39° 33' 33.18" N, 108° 20' 18.22" W)

Ground Level: 5,959.00 ft

Local Coordinate Origin: Centered on Well SKR-698-04-AV-13 (Slot 13) - 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-13  
Wellbore: 698-4-10  
Plan: Actual Field Surveys

Chevron USA

HALLIBURTON

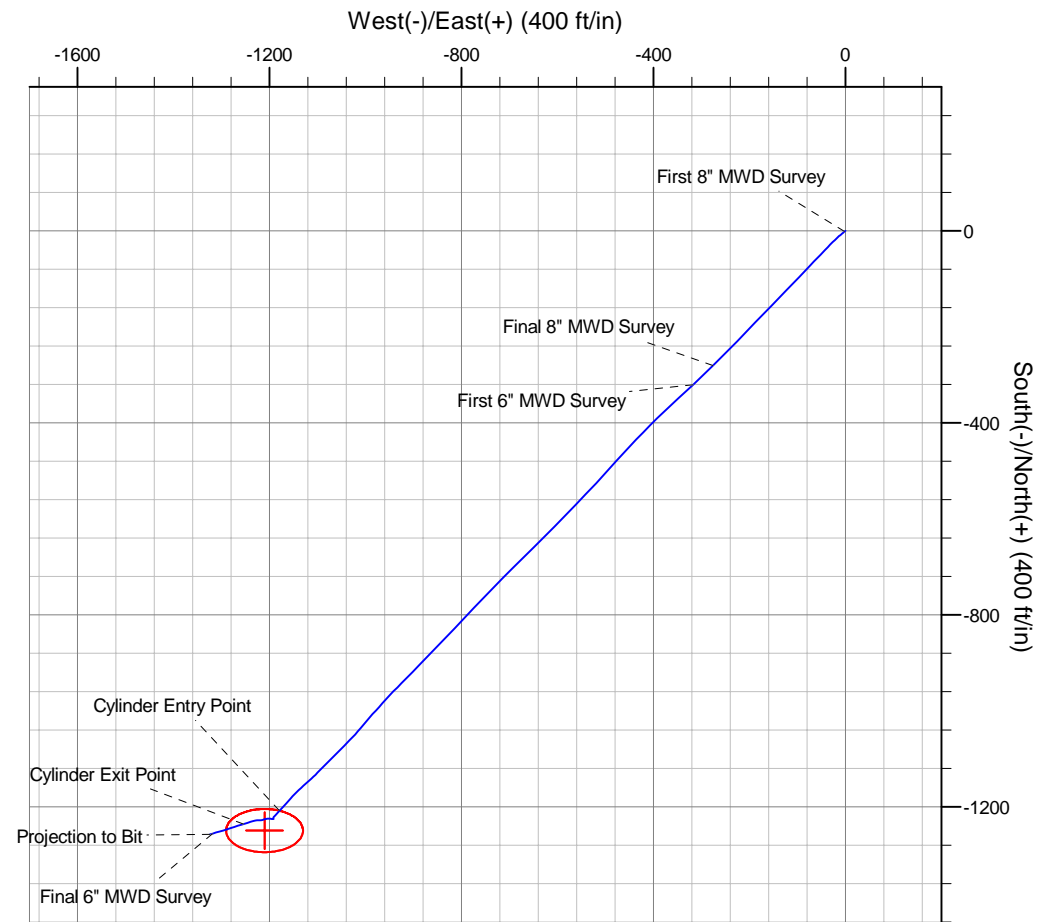
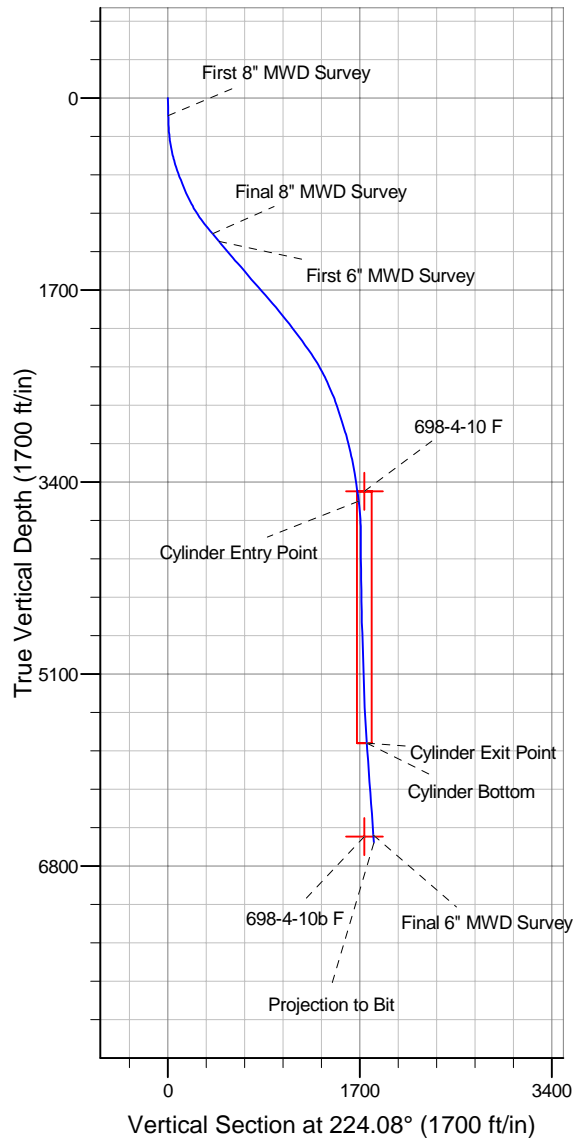
Drilling and Formation  
Evaluation

WELL DETAILS: SKR-698-04-AV-13

+N/-S	+E/-W	Northing	Ground Level: 5959.0 Easting	Latitude	Longitude	Slot
0.0	0.0	1641073.99	2199853.48	39° 33' 33.180 N	108° 20' 18.219 W	Slot 13

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
698-4-10 F	3482.0	-1249.1	-1209.8	1639824.86	2198643.69	Ellipse (Radii: L45.0 W80.0)
698-4-10b F	6538.0	-1249.1	-1209.8	1639824.86	2198643.69	Point



## Design Report for SKR-698-04-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
156.0	1.11	237.65	156.0	-0.8	-1.3	1.5	0.71
<b>First 8" MWD Survey</b>							
172.0	1.42	232.64	172.0	-1.0	-1.6	1.8	2.06
203.0	2.22	230.04	203.0	-1.6	-2.3	2.8	2.59
234.0	2.79	226.98	233.9	-2.5	-3.3	4.1	1.89
264.0	3.77	228.06	263.9	-3.7	-4.6	5.9	3.27
295.0	4.64	229.15	294.8	-5.2	-6.3	8.1	2.82
326.0	6.03	230.60	325.7	-7.0	-8.5	11.0	4.50
359.0	7.16	231.35	358.5	-9.4	-11.5	14.8	3.43
387.0	8.23	227.86	386.2	-11.9	-14.3	18.5	4.17
418.0	9.54	227.01	416.8	-15.1	-17.8	23.3	4.25
449.0	11.02	227.05	447.3	-18.9	-21.9	28.8	4.77
479.0	12.63	226.62	476.7	-23.1	-26.4	34.9	5.37
510.0	13.76	224.21	506.9	-28.1	-31.4	42.0	4.05
541.0	14.91	223.89	536.9	-33.6	-36.7	49.7	3.72
572.0	16.08	223.90	566.8	-39.5	-42.5	58.0	3.77
618.0	18.07	224.43	610.8	-49.2	-51.9	71.5	4.34
710.0	20.60	223.09	697.6	-71.2	-72.9	101.9	2.79
803.0	22.59	223.79	784.0	-96.1	-96.5	136.1	2.16
898.0	25.21	223.55	870.9	-123.9	-123.1	174.6	2.76
992.0	29.39	223.94	954.4	-155.1	-152.9	217.7	4.45
1,087.0	33.29	224.53	1,035.5	-190.4	-187.3	267.1	4.12
1,181.0	37.22	223.87	1,112.3	-229.3	-225.1	321.4	4.20
1,228.0	39.00	224.49	1,149.2	-250.1	-245.4	350.4	3.87
1,295.0	40.04	225.15	1,200.9	-280.4	-275.4	393.0	1.67
<b>Final 8" MWD Survey</b>							
1,385.0	39.90	227.41	1,269.9	-320.3	-317.2	450.8	1.62
<b>First 6" MWD Survey</b>							
1,448.0	41.28	227.15	1,317.7	-348.1	-347.3	491.7	2.21
1,543.0	39.86	226.09	1,389.9	-390.6	-392.2	553.4	1.66
1,637.0	42.08	223.12	1,460.9	-434.5	-435.5	615.0	3.14
1,731.0	40.44	222.32	1,531.5	-480.0	-477.5	677.0	1.83
1,826.0	40.32	222.72	1,603.9	-525.4	-519.1	738.5	0.30
1,920.0	42.11	224.00	1,674.6	-570.4	-561.6	800.5	2.10
2,015.0	40.99	224.88	1,745.7	-615.4	-605.8	863.5	1.33
2,109.0	40.08	225.03	1,817.1	-658.6	-648.9	924.5	0.97
2,204.0	38.77	225.73	1,890.5	-701.0	-691.9	984.9	1.46
2,298.0	38.78	223.45	1,963.8	-742.9	-733.2	1,043.7	1.52
2,392.0	37.78	223.62	2,037.6	-785.1	-773.3	1,101.9	1.07
2,487.0	37.05	223.62	2,113.1	-826.9	-813.1	1,159.7	0.77
2,581.0	35.34	223.80	2,188.9	-867.0	-851.5	1,215.2	1.82
2,675.0	33.95	224.07	2,266.2	-905.5	-888.5	1,268.6	1.49
2,770.0	31.50	225.08	2,346.2	-942.1	-924.6	1,320.0	2.64
2,864.0	27.78	222.67	2,427.8	-975.6	-956.8	1,366.4	4.15
2,958.0	24.47	220.83	2,512.2	-1,006.4	-984.4	1,407.8	3.62
3,053.0	23.08	220.49	2,599.2	-1,035.4	-1,009.4	1,446.0	1.47
3,147.0	20.09	223.90	2,686.6	-1,061.1	-1,032.5	1,480.5	3.45
3,241.0	18.25	225.68	2,775.4	-1,083.0	-1,054.2	1,511.4	2.05
3,335.0	17.52	224.92	2,864.8	-1,103.3	-1,074.8	1,540.3	0.82

**Design Report for SKR-698-04-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)
3,430.0	17.01	223.99	2,955.5	-1,123.4	-1,094.5	1,568.5	0.61
3,524.0	13.52	227.26	3,046.2	-1,140.8	-1,112.1	1,593.2	3.82
3,619.0	13.35	228.92	3,138.6	-1,155.5	-1,128.6	1,615.2	0.44
3,713.0	11.34	225.08	3,230.4	-1,169.2	-1,143.3	1,635.3	2.31
3,807.0	9.31	222.25	3,322.9	-1,181.4	-1,154.9	1,652.1	2.23
3,902.0	9.01	222.26	3,416.7	-1,192.6	-1,165.1	1,667.2	0.32
3,976.8	7.53	222.18	3,490.7	-1,200.5	-1,172.3	1,678.0	1.98
<b>698-4-10 F</b>							
3,996.0	7.15	222.16	3,509.8	-1,202.3	-1,174.0	1,680.4	1.98
4,054.7	6.87	222.35	3,568.0	-1,207.6	-1,178.8	1,687.6	0.48
<b>Cylinder Entry Point</b>							
4,090.0	6.70	222.47	3,603.1	-1,210.7	-1,181.6	1,691.8	0.48
4,185.0	4.05	222.91	3,697.6	-1,217.3	-1,187.7	1,700.6	2.79
4,279.0	2.10	210.45	3,791.5	-1,221.2	-1,190.8	1,705.6	2.18
4,373.0	1.61	159.71	3,885.5	-1,223.9	-1,191.2	1,707.9	1.76
4,468.0	0.20	314.98	3,980.4	-1,225.0	-1,190.9	1,708.5	1.89
4,562.0	0.48	293.46	4,074.4	-1,224.8	-1,191.3	1,708.6	0.32
4,657.0	0.75	278.14	4,169.4	-1,224.5	-1,192.3	1,709.1	0.33
4,751.0	1.19	266.68	4,263.4	-1,224.5	-1,193.9	1,710.2	0.51
4,845.0	1.14	277.08	4,357.4	-1,224.4	-1,195.8	1,711.5	0.23
4,939.0	1.54	274.01	4,451.4	-1,224.2	-1,198.0	1,712.8	0.43
5,034.0	1.75	267.53	4,546.3	-1,224.2	-1,200.7	1,714.7	0.29
5,128.0	1.95	271.76	4,640.3	-1,224.2	-1,203.7	1,716.8	0.26
5,223.0	2.13	258.23	4,735.2	-1,224.5	-1,207.1	1,719.4	0.54
5,317.0	2.20	250.16	4,829.2	-1,225.5	-1,210.5	1,722.5	0.33
5,412.0	2.22	251.86	4,924.1	-1,226.7	-1,214.0	1,725.7	0.07
5,506.0	2.26	260.44	5,018.0	-1,227.6	-1,217.5	1,728.8	0.36
5,601.0	2.42	270.36	5,112.9	-1,227.9	-1,221.4	1,731.7	0.46
5,695.0	2.65	266.35	5,206.9	-1,228.0	-1,225.5	1,734.7	0.31
5,789.0	2.74	262.94	5,300.7	-1,228.4	-1,229.9	1,738.1	0.20
5,884.0	2.81	256.28	5,395.6	-1,229.2	-1,234.4	1,741.8	0.35
5,978.0	3.33	248.51	5,489.5	-1,230.8	-1,239.2	1,746.2	0.71
6,072.0	3.96	251.46	5,583.3	-1,232.8	-1,244.8	1,751.6	0.70
6,201.0	4.27	253.13	5,712.0	-1,235.6	-1,253.7	1,759.8	0.26
<b>Cylinder Bottom - Cylinder Exit Point</b>							
6,261.0	4.42	253.82	5,771.8	-1,236.9	-1,258.0	1,763.7	0.26
6,356.0	4.67	253.81	5,866.5	-1,239.0	-1,265.2	1,770.3	0.26
6,450.0	4.58	251.80	5,960.2	-1,241.2	-1,272.5	1,776.9	0.20
6,544.0	4.91	251.84	6,053.9	-1,243.7	-1,279.9	1,783.8	0.35
6,639.0	4.94	251.33	6,148.5	-1,246.3	-1,287.6	1,791.0	0.06
6,733.0	4.95	252.21	6,242.2	-1,248.8	-1,295.3	1,798.2	0.08
6,827.0	4.85	254.46	6,335.8	-1,251.1	-1,303.0	1,805.2	0.23
6,922.0	4.90	255.69	6,430.5	-1,253.2	-1,310.8	1,812.1	0.12
7,016.0	4.65	252.91	6,524.2	-1,255.3	-1,318.3	1,818.9	0.36
<b>Final 6" MWD Survey - 698-4-10b F</b>							
7,085.0	4.65	252.91	6,592.9	-1,256.9	-1,323.7	1,823.8	0.00
<b>Projection to Bit</b>							

**Design Report for SKR-698-04-AV-13 - Actual Field Surveys****Design Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
156.0	156.0	-0.8	-1.3	First 8" MWD Survey
1,295.0	1,200.9	-280.4	-275.4	Final 8" MWD Survey
1,385.0	1,269.9	-320.3	-317.2	First 6" MWD Survey
4,054.7	3,568.0	-1,207.6	-1,178.8	Cylinder Entry Point
6,201.0	5,712.0	-1,235.6	-1,253.7	Cylinder Bottom
6,201.0	5,712.0	-1,235.6	-1,253.7	Cylinder Exit Point
7,016.0	6,524.2	-1,255.3	-1,318.3	Final 6" MWD Survey
7,085.0	6,592.9	-1,256.9	-1,323.7	Projection to Bit

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/_S (ft)	+E/-W (ft)	
Target	698-4-10 F	224.08	Slot	0.0	0.0	0.0

**Survey tool program**

From (ft)	To (ft)	Survey/Plan	Survey Tool
156.0	1,295.0	8" EM Surveys	MWD
1,385.0	7,085.0	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
698-4-10 F	0.00	360.00	3,482.0	-1,249.1	-1,209.8	1,639,824.86	2,198,643.69	39° 33' 20.467 N	108° 20' 33.159 W
- actual wellpath misses target center by 62.0ft at 3976.8ft MD (3490.7 TVD, -1200.5 N, -1172.3 E)									
- Ellipse (radii L45.0 W80.0 on 360.00 azi) - Target Cylinder 96.14% Intersected									
698-4-10b F	0.00	360.00	6,538.0	-1,249.1	-1,209.8	1,639,824.86	2,198,643.69	39° 33' 20.467 N	108° 20' 33.159 W
- actual wellpath misses target center by 109.6ft at 7016.0ft MD (6524.2 TVD, -1255.3 N, -1318.3 E)									
- Point									