

# US ROCKIES WATTENBERG PLANNING

WELD-NAD83-UTMFT13N

Cream 27-28HZ Pad

CREAM 15N-A28HZ

Plan A

Plan: Rev A0 Permit

## Sperry Drilling Services Proposal Report

14 October, 2014

Well Coordinates: 14,600,660.85 N, 1,734,109.36 E (40° 12' 09.10" N, 104° 39' 52.02" W)

Ground Level: 4,827.00 usft

Local Coordinate Origin:

Centered on Well CREAM 15N-A28HZ

Viewing Datum:

RKB = 17' @ 4844.00usft (D Rig)

TVDs to System:

N

North Reference:

True

Unit System:

Dec-Deg - API - US Survey Feet - Custom

Version: 5000.1 Build: 70

**HALLIBURTON**

**HALLIBURTON**  
Sperry Drilling

## Plan Report for CREAM 15N-A28HZ - Rev A0 Permit

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	Toolface Azimuth (°)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>CREAM 15N-A28HZ_SHL - Sec. 28 and 21-T3N-R65W</b>										
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
603.00	0.00	0.00	603.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Base Fox Hills</b>										
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,116.00	0.00	0.00	1,116.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Surface Csg Setting Depth - 9 5/8"</b>										
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Begin Nudge @ 1400.00ft</b>										
1,500.00	2.00	328.00	1,499.98	1.48	-0.92	-1.45	2.00	2.00	0.00	328.00
1,600.00	4.00	328.00	1,599.84	5.92	-3.70	-5.80	2.00	2.00	0.00	0.00
1,700.00	6.00	328.00	1,699.45	13.31	-8.32	-13.05	2.00	2.00	0.00	0.00
1,800.00	8.00	328.00	1,798.70	23.64	-14.77	-23.18	2.00	2.00	0.00	0.00
1,900.00	10.00	328.00	1,897.47	36.91	-23.06	-36.18	2.00	2.00	0.00	0.00
2,000.00	12.00	328.00	1,995.62	53.09	-33.17	-52.04	2.00	2.00	0.00	0.00
2,100.00	14.00	328.00	2,093.06	72.17	-45.09	-70.74	2.00	2.00	0.00	0.00
2,200.00	16.00	328.00	2,189.64	94.11	-58.81	-92.25	2.00	2.00	0.00	0.00
2,300.00	18.00	328.00	2,285.27	118.91	-74.30	-116.56	2.00	2.00	0.00	0.00
2,400.00	20.00	328.00	2,379.82	146.52	-91.55	-143.62	2.00	2.00	0.00	0.00
<b>End Nudge @ 2400.00ft</b>										
2,500.00	20.00	328.00	2,473.78	175.52	-109.68	-172.05	0.00	0.00	0.00	0.00
2,600.00	20.00	328.00	2,567.75	204.53	-127.80	-200.48	0.00	0.00	0.00	0.00
2,700.00	20.00	328.00	2,661.72	233.53	-145.93	-228.91	0.00	0.00	0.00	0.00
2,800.00	20.00	328.00	2,755.69	262.54	-164.05	-257.34	0.00	0.00	0.00	0.00
2,900.00	20.00	328.00	2,849.66	291.54	-182.17	-285.77	0.00	0.00	0.00	0.00
3,000.00	20.00	328.00	2,943.63	320.55	-200.30	-314.21	0.00	0.00	0.00	0.00
3,100.00	20.00	328.00	3,037.60	349.55	-218.42	-342.64	0.00	0.00	0.00	0.00
3,200.00	20.00	328.00	3,131.57	378.56	-236.55	-371.07	0.00	0.00	0.00	0.00
3,300.00	20.00	328.00	3,225.54	407.56	-254.67	-399.50	0.00	0.00	0.00	0.00
3,400.00	20.00	328.00	3,319.51	436.57	-272.80	-427.93	0.00	0.00	0.00	0.00
3,500.00	20.00	328.00	3,413.48	465.57	-290.92	-456.36	0.00	0.00	0.00	0.00
3,600.00	20.00	328.00	3,507.45	494.57	-309.04	-484.79	0.00	0.00	0.00	0.00
3,700.00	20.00	328.00	3,601.42	523.58	-327.17	-513.22	0.00	0.00	0.00	0.00
3,800.00	20.00	328.00	3,695.39	552.58	-345.29	-541.66	0.00	0.00	0.00	0.00
3,900.00	20.00	328.00	3,789.35	581.59	-363.42	-570.09	0.00	0.00	0.00	0.00
3,996.46	20.00	328.00	3,880.00	609.57	-380.90	-597.51	0.00	0.00	0.00	0.00
<b>Parkman</b>										
4,000.00	20.00	328.00	3,883.32	610.59	-381.54	-598.52	0.00	0.00	0.00	0.00
4,100.00	20.00	328.00	3,977.29	639.60	-399.67	-626.95	0.00	0.00	0.00	0.00
4,200.00	20.00	328.00	4,071.26	668.60	-417.79	-655.38	0.00	0.00	0.00	0.00
4,300.00	20.00	328.00	4,165.23	697.61	-435.91	-683.81	0.00	0.00	0.00	0.00
4,400.00	20.00	328.00	4,259.20	726.61	-454.04	-712.24	0.00	0.00	0.00	0.00
4,400.85	20.00	328.00	4,260.00	726.86	-454.19	-712.49	0.00	0.00	0.00	0.00
<b>Sussex</b>										
4,500.00	20.00	328.00	4,353.17	755.62	-472.16	-740.68	0.00	0.00	0.00	0.00

## Plan Report for CREAM 15N-A28HZ - Rev A0 Permit

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	Toolface Azimuth (°)
4,600.00	20.00	328.00	4,447.14	784.62	-490.29	-769.11	0.00	0.00	0.00	0.00
<b>Begin Drop @ 4600.00ft</b>										
4,700.00	18.00	328.00	4,541.69	812.23	-507.54	-796.17	2.00	-2.00	0.00	180.00
4,800.00	16.00	328.00	4,637.31	837.03	-523.03	-820.47	2.00	-2.00	0.00	180.00
4,900.00	14.00	328.00	4,733.90	858.97	-536.75	-841.99	2.00	-2.00	0.00	180.00
5,000.00	12.00	328.00	4,831.33	878.05	-548.67	-860.68	2.00	-2.00	0.00	180.00
5,100.00	10.00	328.00	4,929.49	894.23	-558.78	-876.54	2.00	-2.00	0.00	180.00
5,200.00	8.00	328.00	5,028.25	907.50	-567.07	-889.55	2.00	-2.00	0.00	180.00
5,300.00	6.00	328.00	5,127.50	917.83	-573.52	-899.68	2.00	-2.00	0.00	180.00
5,400.00	4.00	328.00	5,227.12	925.22	-578.14	-906.92	2.00	-2.00	0.00	180.00
5,500.00	2.00	328.00	5,326.98	929.66	-580.92	-911.27	2.00	-2.00	0.00	180.00
5,600.00	0.00	0.00	5,426.95	931.14	-581.84	-912.72	2.00	-2.00	0.00	180.00
<b>End Drop @ 5600.00ft</b>										
5,700.00	0.00	0.00	5,526.95	931.14	-581.84	-912.72	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,626.95	931.14	-581.84	-912.72	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,726.95	931.14	-581.84	-912.72	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	5,826.95	931.14	-581.84	-912.72	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	5,926.95	931.14	-581.84	-912.72	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,026.95	931.14	-581.84	-912.72	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,126.95	931.14	-581.84	-912.72	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,226.95	931.14	-581.84	-912.72	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,326.95	931.14	-581.84	-912.72	0.00	0.00	0.00	0.00
6,560.09	0.00	0.00	6,387.04	931.14	-581.84	-912.72	0.00	0.00	0.00	0.00
<b>Top of 4.5" Liner @ 6560.09ft</b>										
6,600.00	0.00	0.00	6,426.95	931.14	-581.84	-912.72	0.00	0.00	0.00	0.00
6,660.09	0.00	0.00	6,487.04	931.14	-581.84	-912.72	0.00	0.00	0.00	0.00
<b>KOP @ 6660.09ft</b>										
6,700.00	3.99	181.77	6,526.92	929.75	-581.88	-911.33	10.00	10.00	0.00	181.77
6,800.00	13.99	181.77	6,625.57	914.15	-582.37	-895.73	10.00	10.00	0.00	0.00
6,900.00	23.99	181.77	6,720.01	881.67	-583.37	-863.23	10.00	10.00	0.00	0.00
7,000.00	33.99	181.77	6,807.36	833.28	-584.86	-814.82	10.00	10.00	0.00	0.00
7,058.35	39.83	181.77	6,854.00	798.27	-585.94	-779.79	10.00	10.00	0.00	0.00
<b>SSPG</b>										
7,100.00	43.99	181.77	6,884.99	770.47	-586.80	-751.98	10.00	10.00	0.00	0.00
<b>DLS = 10°/100'</b>										
7,141.83	48.17	181.77	6,914.00	740.36	-587.73	-721.85	10.00	10.00	0.00	0.00
<b>NBRR</b>										
7,200.00	53.99	181.77	6,950.52	695.14	-589.13	-676.62	10.00	10.00	0.00	0.00
7,205.95	54.59	181.77	6,954.00	690.31	-589.28	-671.78	10.00	10.00	0.00	0.00
<b>N470_B_CK</b>										
7,300.00	63.99	181.77	7,001.98	609.58	-591.77	-591.02	10.00	10.00	0.00	0.00
7,400.00	73.99	181.77	7,037.78	516.39	-594.64	-497.78	10.00	10.00	0.00	0.00
7,408.25	74.82	181.77	7,040.00	508.45	-594.89	-489.84	10.00	10.00	0.00	0.00
<b>N700_C_CK</b>										
7,500.00	83.99	181.77	7,056.85	418.41	-597.67	-399.75	10.00	10.00	0.00	0.00
7,560.09	90.00	181.77	7,060.00	358.46	-599.52	-339.77	10.00	10.00	0.00	0.00
<b>End Build @ 7560.09ft - Landing Target (Heel) - 7"</b>										
7,600.00	90.00	181.77	7,060.00	318.56	-600.75	-299.86	0.00	0.00	0.00	0.00
7,700.00	90.00	181.77	7,060.00	218.61	-603.84	-199.86	0.00	0.00	0.00	0.00
7,800.00	90.00	181.77	7,060.00	118.66	-606.92	-99.86	0.00	0.00	0.00	0.00
7,900.00	90.00	181.77	7,060.00	18.71	-610.01	0.14	0.00	0.00	0.00	0.00
8,000.00	90.00	181.77	7,060.00	-81.25	-613.09	100.14	0.00	0.00	0.00	0.00
8,100.00	90.00	181.77	7,060.00	-181.20	-616.18	200.14	0.00	0.00	0.00	0.00
8,200.00	90.00	181.77	7,060.00	-281.15	-619.26	300.14	0.00	0.00	0.00	0.00
8,300.00	90.00	181.77	7,060.00	-381.10	-622.35	400.14	0.00	0.00	0.00	0.00
8,400.00	90.00	181.77	7,060.00	-481.06	-625.43	500.14	0.00	0.00	0.00	0.00
8,500.00	90.00	181.77	7,060.00	-581.01	-628.52	600.14	0.00	0.00	0.00	0.00
8,600.00	90.00	181.77	7,060.00	-680.96	-631.61	700.14	0.00	0.00	0.00	0.00
8,700.00	90.00	181.77	7,060.00	-780.91	-634.69	800.14	0.00	0.00	0.00	0.00

## Plan Report for CREAM 15N-A28HZ - Rev A0 Permit

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	Toolface Azimuth (°)
8,800.00	90.00	181.77	7,060.00	-880.86	-637.78	900.14	0.00	0.00	0.00	0.00
8,900.00	90.00	181.77	7,060.00	-980.82	-640.86	1,000.14	0.00	0.00	0.00	0.00
9,000.00	90.00	181.77	7,060.00	-1,080.77	-643.95	1,100.14	0.00	0.00	0.00	0.00
9,100.00	90.00	181.77	7,060.00	-1,180.72	-647.03	1,200.14	0.00	0.00	0.00	0.00
9,200.00	90.00	181.77	7,060.00	-1,280.67	-650.12	1,300.14	0.00	0.00	0.00	0.00
9,300.00	90.00	181.77	7,060.00	-1,380.63	-653.20	1,400.14	0.00	0.00	0.00	0.00
9,400.00	90.00	181.77	7,060.00	-1,480.58	-656.29	1,500.14	0.00	0.00	0.00	0.00
9,500.00	90.00	181.77	7,060.00	-1,580.53	-659.37	1,600.14	0.00	0.00	0.00	0.00
9,600.00	90.00	181.77	7,060.00	-1,680.48	-662.46	1,700.14	0.00	0.00	0.00	0.00
9,700.00	90.00	181.77	7,060.00	-1,780.44	-665.55	1,800.14	0.00	0.00	0.00	0.00
9,800.00	90.00	181.77	7,060.00	-1,880.39	-668.63	1,900.14	0.00	0.00	0.00	0.00
9,900.00	90.00	181.77	7,060.00	-1,980.34	-671.72	2,000.14	0.00	0.00	0.00	0.00
10,000.00	90.00	181.77	7,060.00	-2,080.29	-674.80	2,100.14	0.00	0.00	0.00	0.00
10,100.00	90.00	181.77	7,060.00	-2,180.25	-677.89	2,200.14	0.00	0.00	0.00	0.00
10,200.00	90.00	181.77	7,060.00	-2,280.20	-680.97	2,300.14	0.00	0.00	0.00	0.00
10,300.00	90.00	181.77	7,060.00	-2,380.15	-684.06	2,400.14	0.00	0.00	0.00	0.00
10,400.00	90.00	181.77	7,060.00	-2,480.10	-687.14	2,500.14	0.00	0.00	0.00	0.00
10,500.00	90.00	181.77	7,060.00	-2,580.06	-690.23	2,600.14	0.00	0.00	0.00	0.00
10,600.00	90.00	181.77	7,060.00	-2,680.01	-693.31	2,700.14	0.00	0.00	0.00	0.00
10,700.00	90.00	181.77	7,060.00	-2,779.96	-696.40	2,800.14	0.00	0.00	0.00	0.00
10,800.00	90.00	181.77	7,060.00	-2,879.91	-699.49	2,900.14	0.00	0.00	0.00	0.00
10,900.00	90.00	181.77	7,060.00	-2,979.86	-702.57	3,000.14	0.00	0.00	0.00	0.00
11,000.00	90.00	181.77	7,060.00	-3,079.82	-705.66	3,100.14	0.00	0.00	0.00	0.00
11,100.00	90.00	181.77	7,060.00	-3,179.77	-708.74	3,200.14	0.00	0.00	0.00	0.00
11,200.00	90.00	181.77	7,060.00	-3,279.72	-711.83	3,300.14	0.00	0.00	0.00	0.00
11,300.00	90.00	181.77	7,060.00	-3,379.67	-714.91	3,400.14	0.00	0.00	0.00	0.00
11,400.00	90.00	181.77	7,060.00	-3,479.63	-718.00	3,500.14	0.00	0.00	0.00	0.00
11,500.00	90.00	181.77	7,060.00	-3,579.58	-721.08	3,600.14	0.00	0.00	0.00	0.00
11,600.00	90.00	181.77	7,060.00	-3,679.53	-724.17	3,700.14	0.00	0.00	0.00	0.00
11,700.00	90.00	181.77	7,060.00	-3,779.48	-727.25	3,800.14	0.00	0.00	0.00	0.00
11,800.00	90.00	181.77	7,060.00	-3,879.44	-730.34	3,900.14	0.00	0.00	0.00	0.00
11,900.00	90.00	181.77	7,060.00	-3,979.39	-733.43	4,000.14	0.00	0.00	0.00	0.00
12,000.00	90.00	181.77	7,060.00	-4,079.34	-736.51	4,100.14	0.00	0.00	0.00	0.00
12,100.00	90.00	181.77	7,060.00	-4,179.29	-739.60	4,200.14	0.00	0.00	0.00	0.00
12,200.00	90.00	181.77	7,060.00	-4,279.25	-742.68	4,300.14	0.00	0.00	0.00	0.00
12,300.00	90.00	181.77	7,060.00	-4,379.20	-745.77	4,400.14	0.00	0.00	0.00	0.00
12,400.00	90.00	181.77	7,060.00	-4,479.15	-748.85	4,500.14	0.00	0.00	0.00	0.00
12,500.00	90.00	181.77	7,060.00	-4,579.10	-751.94	4,600.14	0.00	0.00	0.00	0.00
12,600.00	90.00	181.77	7,060.00	-4,679.06	-755.02	4,700.14	0.00	0.00	0.00	0.00
12,700.00	90.00	181.77	7,060.00	-4,779.01	-758.11	4,800.14	0.00	0.00	0.00	0.00
12,736.96	90.00	181.77	7,060.00	-4,815.95	-759.25	4,837.10	0.00	0.00	0.00	0.00
<b>Total Depth (Toe)</b>										
12,736.97	90.00	181.77	7,060.00	-4,815.96	-759.25	4,837.11	0.00	0.00	0.00	0.00
<b>TD Well @ 12736.97ft - CREAM 15N-A28HZ_BHL</b>										

## Plan Report for CREAM 15N-A28HZ - Rev A0 Permit

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,400.00	1,400.00	0.00	0.00	Begin Nudge @ 1400.00ft
2,400.00	2,379.82	146.52	-91.55	End Nudge @ 2400.00ft
4,600.00	4,447.14	784.62	-490.29	Begin Drop @ 4600.00ft
5,600.00	5,426.95	931.14	-581.84	End Drop @ 5600.00ft
6,560.09	6,387.04	931.14	-581.84	Top of 4.5" Liner @ 6560.09ft
6,660.09	6,487.04	931.14	-581.84	KOP @ 6660.09ft
7,100.00	6,884.99	770.47	-586.80	DLS = 10°/100'
7,560.09	7,060.00	358.46	-599.52	End Build @ 7560.09ft
12,736.97	7,060.00	-4,815.96	-759.25	TD Well @ 12736.97ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
User	No Target (Freehand)	181.77	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	7,560.09	Rev A0 Permit	MWD+IFR1
7,560.09	12,736.97	Rev A0 Permit	MWD+IFR1

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,116.00	1,116.00	9 5/8"	9-5/8	13-1/2
7,560.09	7,060.00	7"	7	8-3/4

Formation Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
603.00	603.00	Base Fox Hills		0.00	
1,116.00	1,116.00	Surface Csg Setting Depth		0.00	
3,996.46	3,880.00	Parkman		0.00	
4,400.85	4,260.00	Sussex		0.00	
7,058.35	6,854.00	SSPG		0.00	
7,141.83	6,914.00	NBRR		0.00	
7,205.95	6,954.00	N470_B_CK		0.00	
7,408.25	7,040.00	N700_C_CK		0.00	
7,560.09	7,060.00	Landing Target (Heel)		0.00	
12,736.96	7,060.00	Total Depth (Toe)		0.00	

Targets associated with this wellbore

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
CREAM 15N-A28HZ_SHL	0.00	0.00	0.00	Point
Sec. 28 and 21-T3N-R65W	-20.00	1,064.56	-2,557.03	Polygon
CREAM 15N-A28HZ_BHL	7,060.00	-4,815.96	-759.25	Point

**North Reference Sheet for Cream 27-28HZ Pad - CREAM 15N-A28HZ - Plan A**

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.

Vertical Depths are relative to RKB = 17' @ 4844.00usft (D Rig). Northing and Easting are relative to CREAM 15N-A28HZ

Coordinate System is Universal Transverse Mercator (US Survey Feet), Zone 13N (108 W to 102 W) using datum North American Datum 1983, ellipsoid

Projection method is Transverse Mercator (Gauss-Kruger)

Central Meridian is -105.00°, Longitude Origin:0.000000°, Latitude Origin:0.000000°

False Easting: 1,640,416.67usft, False Northing: 0.00usft, Scale Reduction: 0.99961004

Grid Coordinates of Well: 14,600,660.85 usft N, 1,734,109.36 usft E

Geographical Coordinates of Well: 40° 12' 09.10" N, 104° 39' 52.02" W

Grid Convergence at Surface is: 0.22°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,736.97usft  
the Bottom Hole Displacement is 4,875.44usft in the Direction of 188.96° ( True).

Magnetic Convergence at surface is: -8.13° (13 October 2014, , IGRF2010)

