

# US ROCKIES WATTENBERG PLANNING

WELD-NAD83-UTMFT13N

2N-65W-16 Cook #2 Pad

COOK 16N-28HZ

Plan A

Plan: Permit Rev-1

## Sperry Drilling Services Proposal Report

19 March, 2015

Well Coordinates: 14,575,279.43 N, 1,734,774.30 E (40° 07' 58.16" N, 104° 39' 44.69" W)

Ground Level: 4,878.00 usft

Local Coordinate Origin:

Centered on Well COOK 16N-28HZ

Viewing Datum:

RKB = 17' @ 4895.00usft (D Rig)

TVDs to System:

N

North Reference:

True

Unit System:

Dec-Deg - API - US Survey Feet - Custom

Version: 5000.1 Build: 70

**HALLIBURTON**

Project: WELD-NAD83-UTMFT13N  
Site: 2N-65W-16 Cook #2 Pad  
Well: COOK 16N-28HZ  
Wellbore: Plan A  
Design: Permit Rev-1

# US ROCKIES WATTENBERG PLANNING

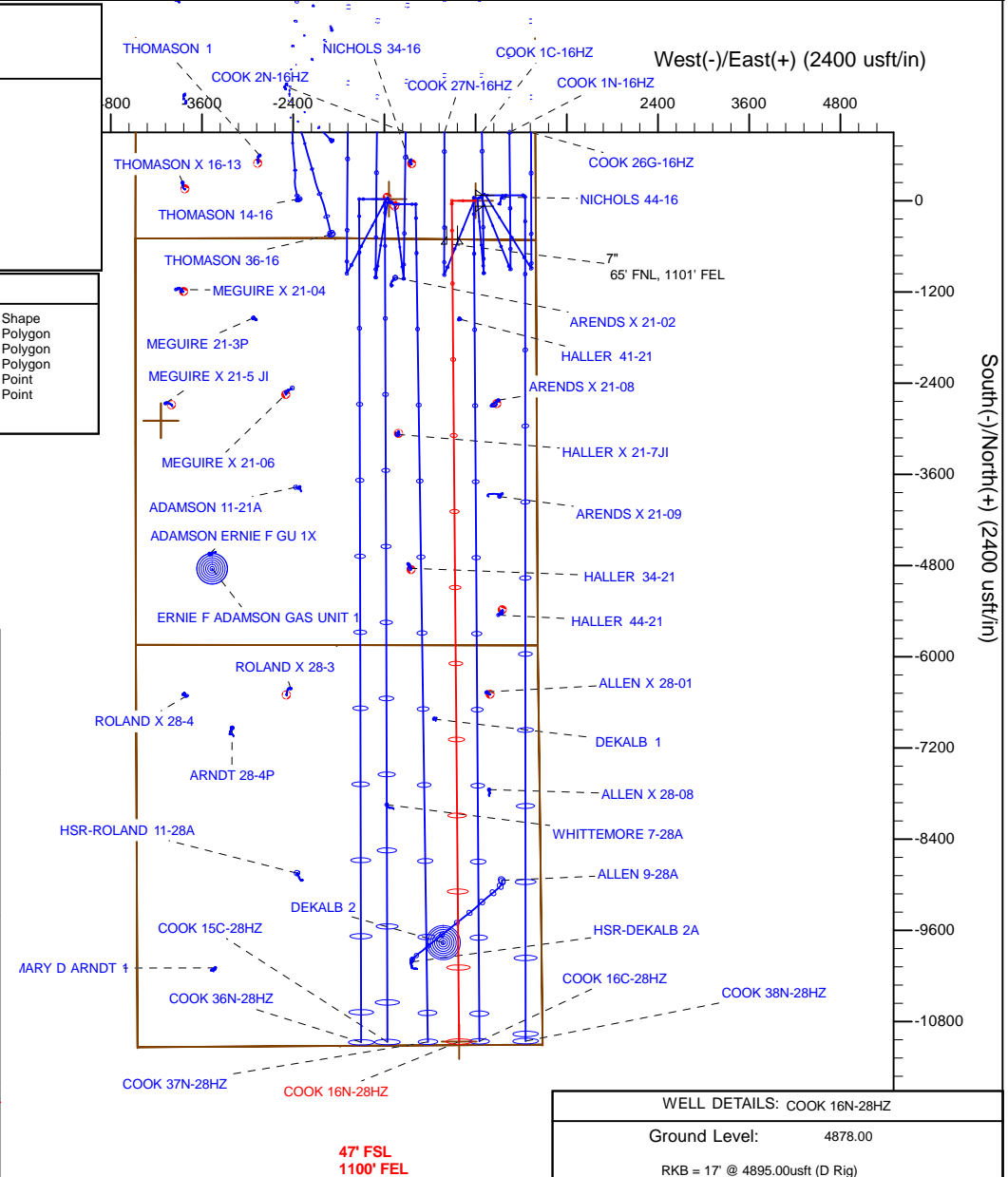
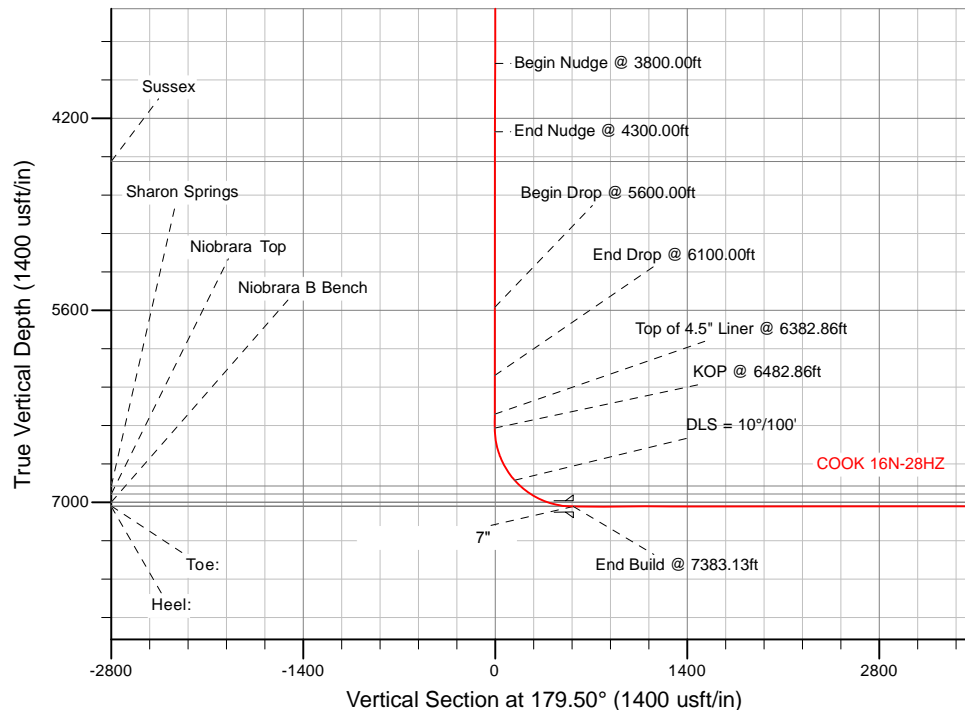
**HALLIBURTON**  
Sperry Drilling

## SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	3800.00	0.00	0.00	3800.00	0.00	0.00	0.00	0.00	0.00	
3	4300.00	10.00	270.00	4297.47	0.00	-43.52	2.00	270.00	-0.38	
4	5600.00	10.00	270.00	5577.72	0.00	-269.27	0.00	0.00	-2.35	
5	6100.00	0.00	0.00	6075.18	0.00	-312.79	2.00	180.00	-2.73	
6	6482.86	0.00	0.00	6458.04	0.00	-312.79	0.00	0.00	-2.73	
7	7383.13	90.03	179.50	7031.00	-573.21	-307.79	10.00	179.50	570.50	
8	17874.99	90.03	179.50	7026.00	-11064.66	-216.33	0.00	0.00	1062.35	COOK 16N-28HZ_BHL

## WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
2N-R65W-Sec. 16_Section Lines	-18.00	-2895.40	-4140.29	40.124871	-104.677226	Polygon
2N-R65W-Sec. 21_Section Lines	-18.00	-2895.40	-4140.29	40.124871	-104.677226	Polygon
2N-R65W-Sec. 28_Section Lines	-6.00	21.46	-1140.61	40.132882	-104.666496	Polygon
COOK 16N-28HZ_SHL	0.00	0.00	0.00	40.132823	-104.662415	Point
COOK 16N-28HZ_BHL	7026.00	-11064.66	-216.33	40.102438	-104.663189	Point



WELL DETAILS: COOK 16N-28HZ	
Ground Level:	4878.00
RKB = 17' @ 4895.00usft (D Rig)	
Plan: Permit Rev-1 (COOK 16N-28HZ/Plan A)	
Created By: Clint Eshelman	Date: 3/10/2015
Reviewed: _____	Date: _____

## Plan Report for COOK 16N-28HZ - Permit Rev-1

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
2N-R65W-Sec. 28_Section Lines - 2N-R65W-Sec. 16_Section Lines - COOK 16N-28HZ_SHL - 2N-R65W-Sec. 21_Section Lines										
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
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
1,200.00	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
1,350.00	0.00	0.00	1,350.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 5/8"										
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Begin Nudge @ 3800.00ft										
3,900.00	2.00	270.00	3,899.98	0.00	-1.75	-0.02	2.00	2.00	0.00	270.00
4,000.00	4.00	270.00	3,999.84	0.00	-6.98	-0.06	2.00	2.00	0.00	0.00
4,100.00	6.00	270.00	4,099.45	0.00	-15.69	-0.14	2.00	2.00	0.00	0.00
4,200.00	8.00	270.00	4,198.70	0.00	-27.88	-0.24	2.00	2.00	0.00	0.00
4,300.00	10.00	270.00	4,297.47	0.00	-43.52	-0.38	2.00	2.00	0.00	0.00
End Nudge @ 4300.00ft										
4,400.00	10.00	270.00	4,395.95	0.00	-60.89	-0.53	0.00	0.00	0.00	0.00
4,500.00	10.00	270.00	4,494.43	0.00	-78.25	-0.68	0.00	0.00	0.00	0.00
4,520.89	10.00	270.00	4,515.00	0.00	-81.88	-0.71	0.00	0.00	0.00	0.00
Sussex										
4,600.00	10.00	270.00	4,592.91	0.00	-95.62	-0.83	0.00	0.00	0.00	0.00
4,700.00	10.00	270.00	4,691.39	0.00	-112.98	-0.99	0.00	0.00	0.00	0.00
4,800.00	10.00	270.00	4,789.87	0.00	-130.35	-1.14	0.00	0.00	0.00	0.00
4,900.00	10.00	270.00	4,888.35	0.00	-147.71	-1.29	0.00	0.00	0.00	0.00
5,000.00	10.00	270.00	4,986.83	0.00	-165.08	-1.44	0.00	0.00	0.00	0.00

## Plan Report for COOK 16N-28HZ - Permit Rev-1

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 (°)
5,100.00	10.00	270.00	5,085.31	0.00	-182.44	-1.59	0.00	0.00	0.00	0.00
5,200.00	10.00	270.00	5,183.79	0.00	-199.81	-1.74	0.00	0.00	0.00	0.00
5,300.00	10.00	270.00	5,282.27	0.00	-217.17	-1.90	0.00	0.00	0.00	0.00
5,400.00	10.00	270.00	5,380.75	0.00	-234.54	-2.05	0.00	0.00	0.00	0.00
5,500.00	10.00	270.00	5,479.23	0.00	-251.90	-2.20	0.00	0.00	0.00	0.00
5,600.00	10.00	270.00	5,577.72	0.00	-269.27	-2.35	0.00	0.00	0.00	0.00
<b>Begin Drop @ 5600.00ft</b>										
5,700.00	8.00	270.00	5,676.48	0.00	-284.91	-2.49	2.00	-2.00	0.00	180.00
5,800.00	6.00	270.00	5,775.73	0.00	-297.09	-2.59	2.00	-2.00	0.00	180.00
5,900.00	4.00	270.00	5,875.34	0.00	-305.81	-2.67	2.00	-2.00	0.00	180.00
6,000.00	2.00	270.00	5,975.20	0.00	-311.04	-2.71	2.00	-2.00	0.00	180.00
6,100.00	0.00	0.00	6,075.18	0.00	-312.79	-2.73	2.00	-2.00	90.00	180.00
<b>End Drop @ 6100.00ft</b>										
6,200.00	0.00	0.00	6,175.18	0.00	-312.79	-2.73	0.00	0.00	0.00	180.00
6,300.00	0.00	0.00	6,275.18	0.00	-312.79	-2.73	0.00	0.00	0.00	0.00
6,382.86	0.00	0.00	6,358.04	0.00	-312.79	-2.73	0.00	0.00	0.00	0.00
<b>Top of 4.5" Liner @ 6382.86ft</b>										
6,400.00	0.00	0.00	6,375.18	0.00	-312.79	-2.73	0.00	0.00	0.00	0.00
6,482.86	0.00	0.00	6,458.04	0.00	-312.79	-2.73	0.00	0.00	0.00	0.00
<b>KOP @ 6482.86ft</b>										
6,500.00	1.71	179.50	6,475.18	-0.26	-312.79	-2.47	10.00	10.00	0.00	179.50
6,600.00	11.71	179.50	6,574.37	-11.93	-312.68	9.20	10.00	10.00	0.00	0.00
6,700.00	21.71	179.50	6,670.02	-40.65	-312.43	37.93	10.00	10.00	0.00	0.00
6,800.00	31.71	179.50	6,759.23	-85.55	-312.04	82.82	10.00	10.00	0.00	0.00
6,900.00	41.71	179.50	6,839.29	-145.25	-311.52	142.53	10.00	10.00	0.00	0.00
<b>DLS = 10°/100'</b>										
6,959.82	47.70	179.50	6,881.79	-187.31	-311.15	184.59	10.00	10.00	0.00	0.00
<b>Sharon Springs</b>										
7,000.00	51.71	179.50	6,907.77	-217.95	-310.89	215.23	10.00	10.00	0.00	0.00
7,055.12	57.23	179.50	6,939.79	-262.79	-310.50	260.07	10.00	10.00	0.00	0.00
<b>Niobrara Top</b>										
7,100.00	61.71	179.50	6,962.58	-301.44	-310.16	298.72	10.00	10.00	0.00	0.00
7,190.91	70.81	179.50	6,999.15	-384.57	-309.44	381.85	10.00	10.00	0.00	0.00
<b>Niobrara B Bench</b>										
7,200.00	71.71	179.50	7,002.07	-393.17	-309.36	390.46	10.00	10.00	0.00	0.00
7,300.00	81.71	179.50	7,025.02	-490.37	-308.51	487.66	10.00	10.00	0.00	0.00
7,383.13	90.03	179.50	7,031.00	-573.21	-307.79	570.50	10.00	10.00	0.00	0.00
<b>End Build @ 7383.13ft - Heel: - 7"</b>										
7,400.00	90.03	179.50	7,030.99	-590.08	-307.64	587.37	0.00	0.00	0.00	0.00
7,500.00	90.03	179.50	7,030.94	-690.07	-306.77	687.37	0.00	0.00	0.00	0.00
7,600.00	90.03	179.50	7,030.90	-790.07	-305.90	787.37	0.00	0.00	0.00	0.00
7,700.00	90.03	179.50	7,030.85	-890.06	-305.03	887.37	0.00	0.00	0.00	0.00
7,800.00	90.03	179.50	7,030.80	-990.06	-304.16	987.37	0.00	0.00	0.00	0.00
7,900.00	90.03	179.50	7,030.75	-1,090.06	-303.28	1,087.37	0.00	0.00	0.00	0.00
8,000.00	90.03	179.50	7,030.70	-1,190.05	-302.41	1,187.37	0.00	0.00	0.00	0.00
8,100.00	90.03	179.50	7,030.66	-1,290.05	-301.54	1,287.37	0.00	0.00	0.00	0.00
8,200.00	90.03	179.50	7,030.61	-1,390.04	-300.67	1,387.37	0.00	0.00	0.00	0.00
8,300.00	90.03	179.50	7,030.56	-1,490.04	-299.80	1,487.37	0.00	0.00	0.00	0.00
8,400.00	90.03	179.50	7,030.51	-1,590.04	-298.93	1,587.37	0.00	0.00	0.00	0.00
8,500.00	90.03	179.50	7,030.47	-1,690.03	-298.05	1,687.37	0.00	0.00	0.00	0.00
8,600.00	90.03	179.50	7,030.42	-1,790.03	-297.18	1,787.37	0.00	0.00	0.00	0.00
8,700.00	90.03	179.50	7,030.37	-1,890.03	-296.31	1,887.37	0.00	0.00	0.00	0.00
8,800.00	90.03	179.50	7,030.32	-1,990.02	-295.44	1,987.37	0.00	0.00	0.00	0.00
8,900.00	90.03	179.50	7,030.28	-2,090.02	-294.57	2,087.37	0.00	0.00	0.00	0.00
9,000.00	90.03	179.50	7,030.23	-2,190.01	-293.70	2,187.37	0.00	0.00	0.00	0.00
9,100.00	90.03	179.50	7,030.18	-2,290.01	-292.82	2,287.37	0.00	0.00	0.00	0.00
9,200.00	90.03	179.50	7,030.13	-2,390.01	-291.95	2,387.37	0.00	0.00	0.00	0.00
9,300.00	90.03	179.50	7,030.09	-2,490.00	-291.08	2,487.37	0.00	0.00	0.00	0.00

## Plan Report for COOK 16N-28HZ - Permit Rev-1

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 (°)
9,400.00	90.03	179.50	7,030.04	-2,590.00	-290.21	2,587.37	0.00	0.00	0.00	0.00
9,500.00	90.03	179.50	7,029.99	-2,690.00	-289.34	2,687.37	0.00	0.00	0.00	0.00
9,600.00	90.03	179.50	7,029.94	-2,789.99	-288.46	2,787.37	0.00	0.00	0.00	0.00
9,700.00	90.03	179.50	7,029.89	-2,889.99	-287.59	2,887.37	0.00	0.00	0.00	0.00
9,800.00	90.03	179.50	7,029.85	-2,989.98	-286.72	2,987.37	0.00	0.00	0.00	0.00
9,900.00	90.03	179.50	7,029.80	-3,089.98	-285.85	3,087.37	0.00	0.00	0.00	0.00
10,000.00	90.03	179.50	7,029.75	-3,189.98	-284.98	3,187.37	0.00	0.00	0.00	0.00
10,100.00	90.03	179.50	7,029.70	-3,289.97	-284.11	3,287.37	0.00	0.00	0.00	0.00
10,200.00	90.03	179.50	7,029.66	-3,389.97	-283.23	3,387.37	0.00	0.00	0.00	0.00
10,300.00	90.03	179.50	7,029.61	-3,489.96	-282.36	3,487.37	0.00	0.00	0.00	0.00
10,400.00	90.03	179.50	7,029.56	-3,589.96	-281.49	3,587.37	0.00	0.00	0.00	0.00
10,500.00	90.03	179.50	7,029.51	-3,689.96	-280.62	3,687.37	0.00	0.00	0.00	0.00
10,600.00	90.03	179.50	7,029.47	-3,789.95	-279.75	3,787.37	0.00	0.00	0.00	0.00
10,700.00	90.03	179.50	7,029.42	-3,889.95	-278.88	3,887.37	0.00	0.00	0.00	0.00
10,800.00	90.03	179.50	7,029.37	-3,989.95	-278.00	3,987.37	0.00	0.00	0.00	0.00
10,900.00	90.03	179.50	7,029.32	-4,089.94	-277.13	4,087.37	0.00	0.00	0.00	0.00
11,000.00	90.03	179.50	7,029.28	-4,189.94	-276.26	4,187.37	0.00	0.00	0.00	0.00
11,100.00	90.03	179.50	7,029.23	-4,289.93	-275.39	4,287.37	0.00	0.00	0.00	0.00
11,200.00	90.03	179.50	7,029.18	-4,389.93	-274.52	4,387.37	0.00	0.00	0.00	0.00
11,300.00	90.03	179.50	7,029.13	-4,489.93	-273.65	4,487.37	0.00	0.00	0.00	0.00
11,400.00	90.03	179.50	7,029.08	-4,589.92	-272.77	4,587.37	0.00	0.00	0.00	0.00
11,500.00	90.03	179.50	7,029.04	-4,689.92	-271.90	4,687.37	0.00	0.00	0.00	0.00
11,600.00	90.03	179.50	7,028.99	-4,789.92	-271.03	4,787.37	0.00	0.00	0.00	0.00
11,700.00	90.03	179.50	7,028.94	-4,889.91	-270.16	4,887.37	0.00	0.00	0.00	0.00
11,800.00	90.03	179.50	7,028.89	-4,989.91	-269.29	4,987.37	0.00	0.00	0.00	0.00
11,900.00	90.03	179.50	7,028.85	-5,089.90	-268.41	5,087.37	0.00	0.00	0.00	0.00
12,000.00	90.03	179.50	7,028.80	-5,189.90	-267.54	5,187.37	0.00	0.00	0.00	0.00
12,100.00	90.03	179.50	7,028.75	-5,289.90	-266.67	5,287.37	0.00	0.00	0.00	0.00
12,200.00	90.03	179.50	7,028.70	-5,389.89	-265.80	5,387.37	0.00	0.00	0.00	0.00
12,300.00	90.03	179.50	7,028.66	-5,489.89	-264.93	5,487.37	0.00	0.00	0.00	0.00
12,400.00	90.03	179.50	7,028.61	-5,589.88	-264.06	5,587.37	0.00	0.00	0.00	0.00
12,500.00	90.03	179.50	7,028.56	-5,689.88	-263.18	5,687.37	0.00	0.00	0.00	0.00
12,600.00	90.03	179.50	7,028.51	-5,789.88	-262.31	5,787.37	0.00	0.00	0.00	0.00
12,700.00	90.03	179.50	7,028.47	-5,889.87	-261.44	5,887.37	0.00	0.00	0.00	0.00
12,800.00	90.03	179.50	7,028.42	-5,989.87	-260.57	5,987.37	0.00	0.00	0.00	0.00
12,900.00	90.03	179.50	7,028.37	-6,089.87	-259.70	6,087.37	0.00	0.00	0.00	0.00
13,000.00	90.03	179.50	7,028.32	-6,189.86	-258.83	6,187.37	0.00	0.00	0.00	0.00
13,100.00	90.03	179.50	7,028.27	-6,289.86	-257.95	6,287.37	0.00	0.00	0.00	0.00
13,200.00	90.03	179.50	7,028.23	-6,389.85	-257.08	6,387.37	0.00	0.00	0.00	0.00
13,300.00	90.03	179.50	7,028.18	-6,489.85	-256.21	6,487.37	0.00	0.00	0.00	0.00
13,400.00	90.03	179.50	7,028.13	-6,589.85	-255.34	6,587.37	0.00	0.00	0.00	0.00
13,500.00	90.03	179.50	7,028.08	-6,689.84	-254.47	6,687.37	0.00	0.00	0.00	0.00
13,600.00	90.03	179.50	7,028.04	-6,789.84	-253.59	6,787.37	0.00	0.00	0.00	0.00
13,700.00	90.03	179.50	7,027.99	-6,889.84	-252.72	6,887.37	0.00	0.00	0.00	0.00
13,800.00	90.03	179.50	7,027.94	-6,989.83	-251.85	6,987.37	0.00	0.00	0.00	0.00
13,900.00	90.03	179.50	7,027.89	-7,089.83	-250.98	7,087.37	0.00	0.00	0.00	0.00
14,000.00	90.03	179.50	7,027.85	-7,189.82	-250.11	7,187.37	0.00	0.00	0.00	0.00
14,100.00	90.03	179.50	7,027.80	-7,289.82	-249.24	7,287.37	0.00	0.00	0.00	0.00
14,200.00	90.03	179.50	7,027.75	-7,389.82	-248.36	7,387.37	0.00	0.00	0.00	0.00
14,300.00	90.03	179.50	7,027.70	-7,489.81	-247.49	7,487.37	0.00	0.00	0.00	0.00
14,400.00	90.03	179.50	7,027.66	-7,589.81	-246.62	7,587.37	0.00	0.00	0.00	0.00
14,500.00	90.03	179.50	7,027.61	-7,689.80	-245.75	7,687.37	0.00	0.00	0.00	0.00
14,600.00	90.03	179.50	7,027.56	-7,789.80	-244.88	7,787.37	0.00	0.00	0.00	0.00
14,700.00	90.03	179.50	7,027.51	-7,889.80	-244.01	7,887.37	0.00	0.00	0.00	0.00
14,800.00	90.03	179.50	7,027.47	-7,989.79	-243.13	7,987.37	0.00	0.00	0.00	0.00
14,900.00	90.03	179.50	7,027.42	-8,089.79	-242.26	8,087.37	0.00	0.00	0.00	0.00
15,000.00	90.03	179.50	7,027.37	-8,189.79	-241.39	8,187.37	0.00	0.00	0.00	0.00
15,100.00	90.03	179.50	7,027.32	-8,289.78	-240.52	8,287.37	0.00	0.00	0.00	0.00
15,200.00	90.03	179.50	7,027.27	-8,389.78	-239.65	8,387.37	0.00	0.00	0.00	0.00
15,300.00	90.03	179.50	7,027.23	-8,489.77	-238.77	8,487.37	0.00	0.00	0.00	0.00

## Plan Report for COOK 16N-28HZ - Permit Rev-1

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 (°)
15,400.00	90.03	179.50	7,027.18	-8,589.77	-237.90	8,587.37	0.00	0.00	0.00	0.00
15,500.00	90.03	179.50	7,027.13	-8,689.77	-237.03	8,687.37	0.00	0.00	0.00	0.00
15,600.00	90.03	179.50	7,027.08	-8,789.76	-236.16	8,787.37	0.00	0.00	0.00	0.00
15,700.00	90.03	179.50	7,027.04	-8,889.76	-235.29	8,887.37	0.00	0.00	0.00	0.00
15,800.00	90.03	179.50	7,026.99	-8,989.76	-234.42	8,987.37	0.00	0.00	0.00	0.00
15,900.00	90.03	179.50	7,026.94	-9,089.75	-233.54	9,087.37	0.00	0.00	0.00	0.00
16,000.00	90.03	179.50	7,026.89	-9,189.75	-232.67	9,187.37	0.00	0.00	0.00	0.00
16,100.00	90.03	179.50	7,026.85	-9,289.74	-231.80	9,287.37	0.00	0.00	0.00	0.00
16,200.00	90.03	179.50	7,026.80	-9,389.74	-230.93	9,387.37	0.00	0.00	0.00	0.00
16,300.00	90.03	179.50	7,026.75	-9,489.74	-230.06	9,487.37	0.00	0.00	0.00	0.00
16,400.00	90.03	179.50	7,026.70	-9,589.73	-229.19	9,587.37	0.00	0.00	0.00	0.00
16,500.00	90.03	179.50	7,026.66	-9,689.73	-228.31	9,687.37	0.00	0.00	0.00	0.00
16,600.00	90.03	179.50	7,026.61	-9,789.72	-227.44	9,787.37	0.00	0.00	0.00	0.00
16,700.00	90.03	179.50	7,026.56	-9,889.72	-226.57	9,887.37	0.00	0.00	0.00	0.00
16,800.00	90.03	179.50	7,026.51	-9,989.72	-225.70	9,987.37	0.00	0.00	0.00	0.00
16,900.00	90.03	179.50	7,026.46	-10,089.71	-224.83	10,087.37	0.00	0.00	0.00	0.00
17,000.00	90.03	179.50	7,026.42	-10,189.71	-223.96	10,187.37	0.00	0.00	0.00	0.00
17,100.00	90.03	179.50	7,026.37	-10,289.71	-223.08	10,287.37	0.00	0.00	0.00	0.00
17,200.00	90.03	179.50	7,026.32	-10,389.70	-222.21	10,387.37	0.00	0.00	0.00	0.00
17,300.00	90.03	179.50	7,026.27	-10,489.70	-221.34	10,487.37	0.00	0.00	0.00	0.00
17,400.00	90.03	179.50	7,026.23	-10,589.69	-220.47	10,587.37	0.00	0.00	0.00	0.00
17,500.00	90.03	179.50	7,026.18	-10,689.69	-219.60	10,687.37	0.00	0.00	0.00	0.00
17,600.00	90.03	179.50	7,026.13	-10,789.69	-218.72	10,787.37	0.00	0.00	0.00	0.00
17,700.00	90.03	179.50	7,026.08	-10,889.68	-217.85	10,887.37	0.00	0.00	0.00	0.00
17,800.00	90.03	179.50	7,026.04	-10,989.68	-216.98	10,987.37	0.00	0.00	0.00	0.00
17,874.98	90.03	179.50	7,026.00	-11,064.66	-216.33	11,062.35	0.00	0.00	0.00	0.00
Toe:										
17,874.99	90.03	179.50	7,026.00	-11,064.66	-216.33	11,062.35	0.00	0.00	0.00	0.00
TD Well @ 17874.99ft - COOK 16N-28HZ_BHL										

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
3,800.00	3,800.00	0.00	0.00	Begin Nudge @ 3800.00ft
4,300.00	4,297.47	0.00	-43.52	End Nudge @ 4300.00ft
5,600.00	5,577.72	0.00	-269.27	Begin Drop @ 5600.00ft
6,100.00	6,075.18	0.00	-312.79	End Drop @ 6100.00ft
6,382.86	6,358.04	0.00	-312.79	Top of 4.5" Liner @ 6382.86ft
6,482.86	6,458.04	0.00	-312.79	KOP @ 6482.86ft
6,900.00	6,839.29	-145.25	-311.52	DLS = 10°/100'
7,383.13	7,031.00	-573.21	-307.79	End Build @ 7383.13ft
17,874.99	7,026.00	-11,064.66	-216.33	TD Well @ 17874.99ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
User	No Target (Freehand)	179.50	Slot	0.00	0.00	0.00

## Plan Report for COOK 16N-28HZ - Permit Rev-1

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	7,383.13	Permit Rev-1	APC_ISCWSA REV 2 MWD+IFR1
7,383.13	17,874.99	Permit Rev-1	APC_ISCWSA REV 2 MWD+IFR1

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,350.00	1,350.00	9 5/8"	9-5/8	13-1/2
7,383.13	7,031.00	7"	7	8-3/4

Formation Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,520.89	4,515.00	Sussex		0.00	
6,959.82	6,881.79	Sharon Springs		0.00	
7,055.12	6,939.79	Niobrara Top		0.00	
7,190.91	6,999.15	Niobrara B Bench		0.00	
7,383.13	7,031.00	Heel:		0.00	
17,874.98	7,026.00	Toe:		0.00	

Targets associated with this wellbore

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
2N-R65W-Sec. 28_Section Lines	-6.00	21.46	-1,140.61	Polygon
2N-R65W-Sec. 16_Section Lines	-18.00	-2,895.40	-4,140.29	Polygon
COOK 16N-28HZ_SHL	0.00	0.00	0.00	Point
COOK 16N-28HZ_BHL	7,026.00	-11,064.66	-216.33	Point
2N-R65W-Sec. 21_Section Lines	-18.00	-2,895.40	-4,140.29	Polygon

**North Reference Sheet for 2N-65W-16 Cook #2 Pad - COOK 16N-28HZ - 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' @ 4895.00usft (D Rig). Northing and Easting are relative to COOK 16N-28HZ

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: 0.99961018

Grid Coordinates of Well: 14,575,279.43 usft N, 1,734,774.30 usft E

Geographical Coordinates of Well: 40° 07' 58.16" N, 104° 39' 44.69" W

Grid Convergence at Surface is: 0.22°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,874.99usft  
the Bottom Hole Displacement is 11,066.78usft in the Direction of 181.12° (True).

Magnetic Convergence at surface is: -8.07° ( 6 March 2015, , IGRF2010)

