

# US ROCKIES WATTENBERG PLANNING

WELD-NAD83-UTMFT13N  
4N-67W-31 Frank 16-31HZ Pad  
Frank 13N-31HZ

Plan C

Plan: Permit Rev-3

## Sperry Drilling Services Proposal Report

22 December, 2014

Well Coordinates: 14,622,860.20 N, 1,661,449.86 E (40° 15' 50.23" N, 104° 55' 28.57" W)  
Ground Level: 4,931.00 usft

Local Coordinate Origin:	Centered on Well Frank 13N-31HZ
Viewing Datum:	RKB = 17' @ 4948.00usft (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: 4N-67W-31 Frank 16-31HZ Pad

Well: Frank 13N-31HZ

Wellbore: Plan C

Design: Permit Rev-3

# 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	1575.00	0.00	0.00	1575.00	0.00	0.00	0.00	0.00	0.00	
3	2075.00	10.00	42.00	2072.47	32.34	29.12	2.00	42.00	-28.66	
4	4225.00	10.00	42.00	4189.80	309.79	278.94	0.00	0.00	-274.53	
5	4725.00	0.00	0.00	4687.27	342.14	308.06	2.00	180.00	-303.19	
6	6522.78	0.00	0.00	6485.05	342.14	308.06	0.00	0.00	-303.19	
7	7424.05	90.13	270.81	7058.00	350.24	-266.11	10.00	270.81	271.04	
8	11472.00	90.13	270.81	7049.00	407.39	-4313.65	0.00	0.00	4318.98	Frank 13N-31HZ_Toe

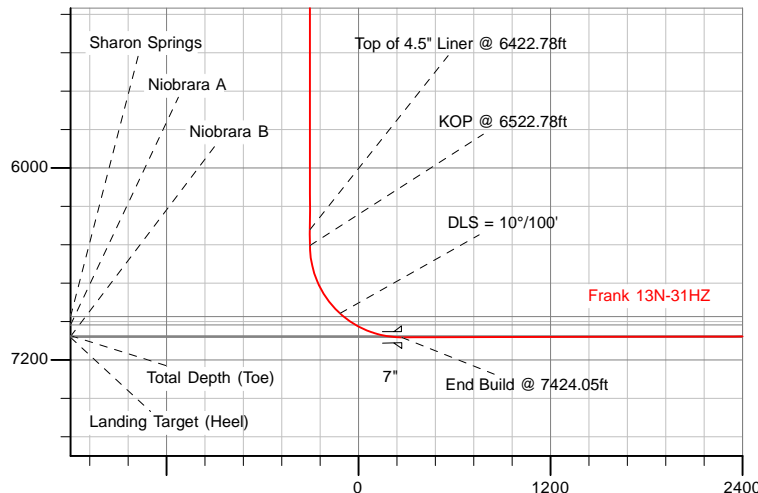
WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Polygon
4N-R67W-Sec. 31_Section Lines	0.00	0.00	0.00	40.263952	-104.924604	
Frank 13N-31HZ_SHL	0.00	0.00	0.00	40.263952	-104.924604	
Frank 13N-31HZ_Toe	7049.00	407.39	-4313.65	40.265070	-104.940067	

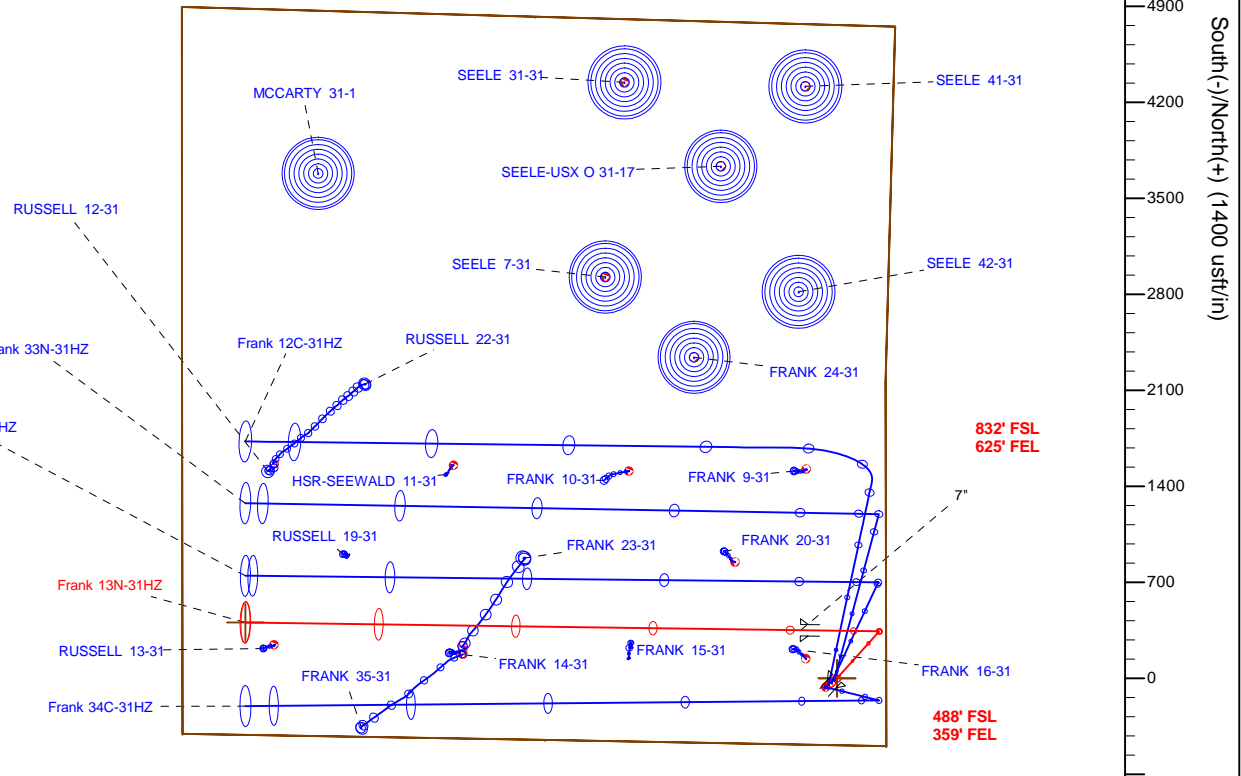
West(-)/East(+) (1400 usft/in)

-3500 -2800 -2100 -1400 -700 0 700 1400

True Vertical Depth (1200 usft/in)



Vertical Section at 270.81° (1200 usft/in)



TVD MD

6385.05 6422.78 Top of 4.5" Liner @ 6422.78ft  
6485.05 6522.78 KOP @ 6522.78ft

WELL DETAILS: Frank 13N-31HZ

Ground Level: 4931.00

RKB = 17' @ 4948.00usft (D Rig)

Plan: Permit Rev-3 (Frank 13N-31HZ/Plan C)

Created By: Clint Eshelman

Reviewed:

Date: 12/18/2014

Date:

## Plan Report for Frank 13N-31HZ - Permit Rev-3

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>4N-R67W-Sec. 31_Section Lines - Frank 13N-31HZ_SHL</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
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
1,217.00	0.00	0.00	1,217.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Fox Hills Marker</b>										
1,267.00	0.00	0.00	1,267.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>9 5/8"</b>										
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
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,575.00	0.00	0.00	1,575.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Begin Nudge @ 1575.00ft</b>										
1,600.00	0.50	42.00	1,600.00	0.08	0.07	-0.07	2.00	2.00	0.00	42.00
1,700.00	2.50	42.00	1,699.96	2.03	1.82	-1.80	2.00	2.00	0.00	0.00
1,800.00	4.50	42.00	1,799.77	6.56	5.91	-5.82	2.00	2.00	0.00	0.00
1,900.00	6.50	42.00	1,899.30	13.69	12.32	-12.13	2.00	2.00	0.00	0.00
2,000.00	8.50	42.00	1,998.44	23.38	21.06	-20.72	2.00	2.00	0.00	0.00
2,075.00	10.00	42.00	2,072.47	32.34	29.12	-28.66	2.00	2.00	0.00	0.00
<b>End Nudge @ 2075.00ft</b>										
2,100.00	10.00	42.00	2,097.09	35.57	32.03	-31.52	0.00	0.00	0.00	0.00
2,200.00	10.00	42.00	2,195.57	48.47	43.65	-42.96	0.00	0.00	0.00	0.00
2,300.00	10.00	42.00	2,294.05	61.38	55.27	-54.39	0.00	0.00	0.00	0.00
2,400.00	10.00	42.00	2,392.53	74.28	66.89	-65.83	0.00	0.00	0.00	0.00
2,500.00	10.00	42.00	2,491.01	87.19	78.50	-77.26	0.00	0.00	0.00	0.00
2,600.00	10.00	42.00	2,589.49	100.09	90.12	-88.70	0.00	0.00	0.00	0.00
2,700.00	10.00	42.00	2,687.97	113.00	101.74	-100.14	0.00	0.00	0.00	0.00
2,800.00	10.00	42.00	2,786.45	125.90	113.36	-111.57	0.00	0.00	0.00	0.00
2,900.00	10.00	42.00	2,884.93	138.81	124.98	-123.01	0.00	0.00	0.00	0.00
3,000.00	10.00	42.00	2,983.41	151.71	136.60	-134.44	0.00	0.00	0.00	0.00
3,100.00	10.00	42.00	3,081.89	164.62	148.22	-145.88	0.00	0.00	0.00	0.00
3,200.00	10.00	42.00	3,180.37	177.52	159.84	-157.31	0.00	0.00	0.00	0.00
3,300.00	10.00	42.00	3,278.85	190.42	171.46	-168.75	0.00	0.00	0.00	0.00
3,400.00	10.00	42.00	3,377.34	203.33	183.08	-180.19	0.00	0.00	0.00	0.00
3,500.00	10.00	42.00	3,475.82	216.23	194.70	-191.62	0.00	0.00	0.00	0.00
3,600.00	10.00	42.00	3,574.30	229.14	206.32	-203.06	0.00	0.00	0.00	0.00
3,700.00	10.00	42.00	3,672.78	242.04	217.94	-214.49	0.00	0.00	0.00	0.00
3,800.00	10.00	42.00	3,771.26	254.95	229.56	-225.93	0.00	0.00	0.00	0.00
3,900.00	10.00	42.00	3,869.74	267.85	241.18	-237.36	0.00	0.00	0.00	0.00
4,000.00	10.00	42.00	3,968.22	280.76	252.79	-248.80	0.00	0.00	0.00	0.00
4,100.00	10.00	42.00	4,066.70	293.66	264.41	-260.24	0.00	0.00	0.00	0.00
4,158.18	10.00	42.00	4,124.00	301.17	271.17	-266.89	0.00	0.00	0.00	0.00
<b>Sussex</b>										
4,200.00	10.00	42.00	4,165.18	306.57	276.03	-271.67	0.00	0.00	0.00	0.00
4,225.00	10.00	42.00	4,189.80	309.79	278.94	-274.53	0.00	0.00	0.00	0.00
<b>Begin Drop @ 4225.00ft</b>										
4,300.00	8.50	42.00	4,263.82	318.75	287.00	-282.47	2.00	-2.00	0.00	180.00

## Plan Report for Frank 13N-31HZ - Permit Rev-3

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 (°)
4,400.00	6.50	42.00	4,362.96	328.45	295.74	-291.07	2.00	-2.00	0.00	180.00
4,500.00	4.50	42.00	4,462.50	335.57	302.15	-297.38	2.00	-2.00	0.00	180.00
4,600.00	2.50	42.00	4,562.31	340.11	306.24	-301.40	2.00	-2.00	0.00	180.00
4,670.73	1.09	42.00	4,633.00	341.75	307.72	-302.85	2.00	-2.00	0.00	180.00
<b>Shannon</b>										
4,700.00	0.50	42.00	4,662.27	342.05	307.99	-303.12	2.00	-2.00	0.00	-180.00
4,725.00	0.00	0.00	4,687.27	342.14	308.06	-303.19	2.00	-2.00	0.00	-180.00
<b>End Drop @ 4725.00ft</b>										
4,800.00	0.00	0.00	4,762.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,862.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
5,000.00	0.00	0.00	4,962.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,062.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
5,200.00	0.00	0.00	5,162.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,262.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
5,400.00	0.00	0.00	5,362.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,462.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
5,600.00	0.00	0.00	5,562.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,662.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,762.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,862.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	5,962.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,062.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,162.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,262.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,362.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
6,422.78	0.00	0.00	6,385.05	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
<b>Top of 4.5" Liner @ 6422.78ft</b>										
6,500.00	0.00	0.00	6,462.27	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
6,522.78	0.00	0.00	6,485.05	342.14	308.06	-303.19	0.00	0.00	0.00	0.00
<b>KOP @ 6522.78ft</b>										
6,600.00	7.72	270.81	6,562.03	342.21	302.86	-298.00	10.00	10.00	0.00	270.81
6,700.00	17.72	270.81	6,659.46	342.52	280.87	-276.00	10.00	10.00	0.00	0.00
6,800.00	27.72	270.81	6,751.58	343.06	242.30	-237.43	10.00	10.00	0.00	0.00
6,900.00	37.72	270.81	6,835.60	343.83	188.32	-183.44	10.00	10.00	0.00	0.00
7,000.00	47.72	270.81	6,908.97	344.78	120.57	-115.68	10.00	10.00	0.00	0.00
<b>DLS = 10°/100'</b>										
7,030.69	50.79	270.81	6,929.00	345.11	97.32	-92.43	10.00	10.00	0.00	0.00
<b>Sharon Springs</b>										
7,100.00	57.72	270.81	6,969.46	345.90	41.10	-36.21	10.00	10.00	0.00	0.00
7,120.30	59.75	270.81	6,980.00	346.15	23.75	-18.86	10.00	10.00	0.00	0.00
<b>Niobrara A</b>										
7,200.00	67.72	270.81	7,015.24	347.16	-47.65	52.56	10.00	10.00	0.00	0.00
7,300.00	77.72	270.81	7,044.90	348.50	-143.01	147.92	10.00	10.00	0.00	0.00
7,346.99	82.42	270.81	7,053.00	349.16	-189.28	194.20	10.00	10.00	0.00	0.00
<b>Niobrara B</b>										
7,400.00	87.72	270.81	7,057.55	349.90	-242.07	246.99	10.00	10.00	0.00	0.00
7,424.05	90.13	270.81	7,058.00	350.24	-266.11	271.04	10.00	10.00	0.00	0.00
<b>End Build @ 7424.05ft - Landing Target (Heel) - 7"</b>										
7,500.00	90.13	270.81	7,057.83	351.31	-342.05	346.98	0.00	0.00	0.00	0.00
7,600.00	90.13	270.81	7,057.61	352.73	-442.04	446.98	0.00	0.00	0.00	0.00
7,700.00	90.13	270.81	7,057.39	354.14	-542.03	546.98	0.00	0.00	0.00	0.00
7,800.00	90.13	270.81	7,057.17	355.55	-642.02	646.98	0.00	0.00	0.00	0.00
7,900.00	90.13	270.81	7,056.95	356.96	-742.01	746.98	0.00	0.00	0.00	0.00
8,000.00	90.13	270.81	7,056.72	358.37	-842.00	846.98	0.00	0.00	0.00	0.00
8,100.00	90.13	270.81	7,056.50	359.79	-941.99	946.98	0.00	0.00	0.00	0.00
8,200.00	90.13	270.81	7,056.28	361.20	-1,041.98	1,046.98	0.00	0.00	0.00	0.00
8,300.00	90.13	270.81	7,056.06	362.61	-1,141.97	1,146.98	0.00	0.00	0.00	0.00
8,400.00	90.13	270.81	7,055.83	364.02	-1,241.96	1,246.98	0.00	0.00	0.00	0.00
8,500.00	90.13	270.81	7,055.61	365.43	-1,341.95	1,346.98	0.00	0.00	0.00	0.00

## Plan Report for Frank 13N-31HZ - Permit Rev-3

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 (°)
8,600.00	90.13	270.81	7,055.39	366.84	-1,441.94	1,446.98	0.00	0.00	0.00	0.00
8,700.00	90.13	270.81	7,055.17	368.26	-1,541.93	1,546.98	0.00	0.00	0.00	0.00
8,800.00	90.13	270.81	7,054.94	369.67	-1,641.92	1,646.98	0.00	0.00	0.00	0.00
8,900.00	90.13	270.81	7,054.72	371.08	-1,741.91	1,746.98	0.00	0.00	0.00	0.00
9,000.00	90.13	270.81	7,054.50	372.49	-1,841.90	1,846.98	0.00	0.00	0.00	0.00
9,100.00	90.13	270.81	7,054.28	373.90	-1,941.89	1,946.98	0.00	0.00	0.00	0.00
9,200.00	90.13	270.81	7,054.05	375.31	-2,041.88	2,046.98	0.00	0.00	0.00	0.00
9,300.00	90.13	270.81	7,053.83	376.73	-2,141.87	2,146.98	0.00	0.00	0.00	0.00
9,400.00	90.13	270.81	7,053.61	378.14	-2,241.86	2,246.98	0.00	0.00	0.00	0.00
9,500.00	90.13	270.81	7,053.39	379.55	-2,341.85	2,346.98	0.00	0.00	0.00	0.00
9,600.00	90.13	270.81	7,053.16	380.96	-2,441.84	2,446.98	0.00	0.00	0.00	0.00
9,700.00	90.13	270.81	7,052.94	382.37	-2,541.83	2,546.98	0.00	0.00	0.00	0.00
9,800.00	90.13	270.81	7,052.72	383.79	-2,641.82	2,646.98	0.00	0.00	0.00	0.00
9,900.00	90.13	270.81	7,052.50	385.20	-2,741.81	2,746.98	0.00	0.00	0.00	0.00
10,000.00	90.13	270.81	7,052.27	386.61	-2,841.80	2,846.98	0.00	0.00	0.00	0.00
10,100.00	90.13	270.81	7,052.05	388.02	-2,941.79	2,946.98	0.00	0.00	0.00	0.00
10,200.00	90.13	270.81	7,051.83	389.43	-3,041.78	3,046.98	0.00	0.00	0.00	0.00
10,300.00	90.13	270.81	7,051.61	390.84	-3,141.77	3,146.98	0.00	0.00	0.00	0.00
10,400.00	90.13	270.81	7,051.38	392.26	-3,241.76	3,246.98	0.00	0.00	0.00	0.00
10,500.00	90.13	270.81	7,051.16	393.67	-3,341.75	3,346.98	0.00	0.00	0.00	0.00
10,600.00	90.13	270.81	7,050.94	395.08	-3,441.74	3,446.98	0.00	0.00	0.00	0.00
10,700.00	90.13	270.81	7,050.72	396.49	-3,541.73	3,546.98	0.00	0.00	0.00	0.00
10,800.00	90.13	270.81	7,050.49	397.90	-3,641.72	3,646.98	0.00	0.00	0.00	0.00
10,900.00	90.13	270.81	7,050.27	399.31	-3,741.71	3,746.98	0.00	0.00	0.00	0.00
11,000.00	90.13	270.81	7,050.05	400.73	-3,841.70	3,846.98	0.00	0.00	0.00	0.00
11,100.00	90.13	270.81	7,049.83	402.14	-3,941.68	3,946.98	0.00	0.00	0.00	0.00
11,200.00	90.13	270.81	7,049.61	403.55	-4,041.67	4,046.98	0.00	0.00	0.00	0.00
11,300.00	90.13	270.81	7,049.38	404.96	-4,141.66	4,146.98	0.00	0.00	0.00	0.00
11,400.00	90.13	270.81	7,049.16	406.37	-4,241.65	4,246.98	0.00	0.00	0.00	0.00
11,472.00	90.13	270.81	7,049.00	407.39	-4,313.65	4,318.98	0.00	0.00	0.00	0.00

TD Well @ 11472.00ft - Total Depth (Toe) - Frank 13N-31HZ\_Toe

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,575.00	1,575.00	0.00	0.00	Begin Nudge @ 1575.00ft
2,075.00	2,072.47	32.34	29.12	End Nudge @ 2075.00ft
4,225.00	4,189.80	309.79	278.94	Begin Drop @ 4225.00ft
4,725.00	4,687.27	342.14	308.06	End Drop @ 4725.00ft
6,422.78	6,385.05	342.14	308.06	Top of 4.5" Liner @ 6422.78ft
6,522.78	6,485.05	342.14	308.06	KOP @ 6522.78ft
7,000.00	6,908.97	344.78	120.57	DLS = 10°/100'
7,424.05	7,058.00	350.24	-266.11	End Build @ 7424.05ft
11,472.00	7,049.00	407.39	-4,313.65	TD Well @ 11472.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
User	No Target (Freehand)	270.81	Slot	0.00	0.00	0.00

## Plan Report for Frank 13N-31HZ - Permit Rev-3

**Survey tool program**

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	7,424.05	Permit Rev-3	MWD+IFR1
7,424.05	11,472.00	Permit Rev-3	MWD+IFR1

**Casing Details**

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,267.00	1,267.00	9 5/8"	9-5/8	13-1/2
7,424.05	7,058.00	7"	7	8-3/4

**Formation Details**

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,217.00	1,217.00	Fox Hills Marker		0.00	
4,158.18	4,124.00	Sussex		0.00	
4,670.73	4,633.00	Shannon		0.00	
7,030.69	6,929.00	Sharon Springs		0.00	
7,120.30	6,980.00	Niobrara A		0.00	
7,346.99	7,053.00	Niobrara B		0.00	
7,424.05	7,058.00	Landing Target (Heel)		0.00	
11,472.00	7,049.00	Total Depth (Toe)		0.00	

**Targets associated with this wellbore**

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
4N-R67W-Sec. 31_Section Lines	0.00	0.00	0.00	Polygon
Frank 13N-31HZ_Toe	7,049.00	407.39	-4,313.65	Point
Frank 13N-31HZ_SHL	0.00	0.00	0.00	Point

## North Reference Sheet for 4N-67W-31 Frank 16-31HZ Pad - Frank 13N-31HZ - Plan C

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' @ 4948.00usft (D Rig). Northing and Easting are relative to Frank 13N-31HZ

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: 0.99960051

Grid Coordinates of Well: 14,622,860.20 usft N, 1,661,449.86 usft E

Geographical Coordinates of Well: 40° 15' 50.23" N, 104° 55' 28.57" W

Grid Convergence at Surface is: 0.05°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,472.00usft  
the Bottom Hole Displacement is 4,332.84usft in the Direction of 275.40° (True).

Magnetic Convergence at surface is: -8.42° (17 December 2014, , IGRF2010)

