

US ROCKIES WATTENBERG PLANNING

WELD-NAD83-UTMFT13N

1N-66W-09 Highlands 1-9HZ Pad

HIGHLANDS 27C-33HZ

Plan A

Plan: Permit Rev-2

Sperry Drilling Services Proposal Report

26 May, 2015

Well Coordinates: 14,553,057.96 N, 1,702,953.97 E (40° 04' 19.47" N, 104° 46' 35.25" W)

Ground Level: 4,998.00 usft

Local Coordinate Origin:

Centered on Well HIGHLANDS 27C-33HZ

Viewing Datum:

RKB = 17' @ 5015.00usft (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: 1N-66W-09 Highlands 1-9HZ Pad
Well: HIGHLANDS 27C-33HZ
Wellbore: Plan A
Design: Permit Rev-2

US ROCKIES WATTENBERG PLANNING

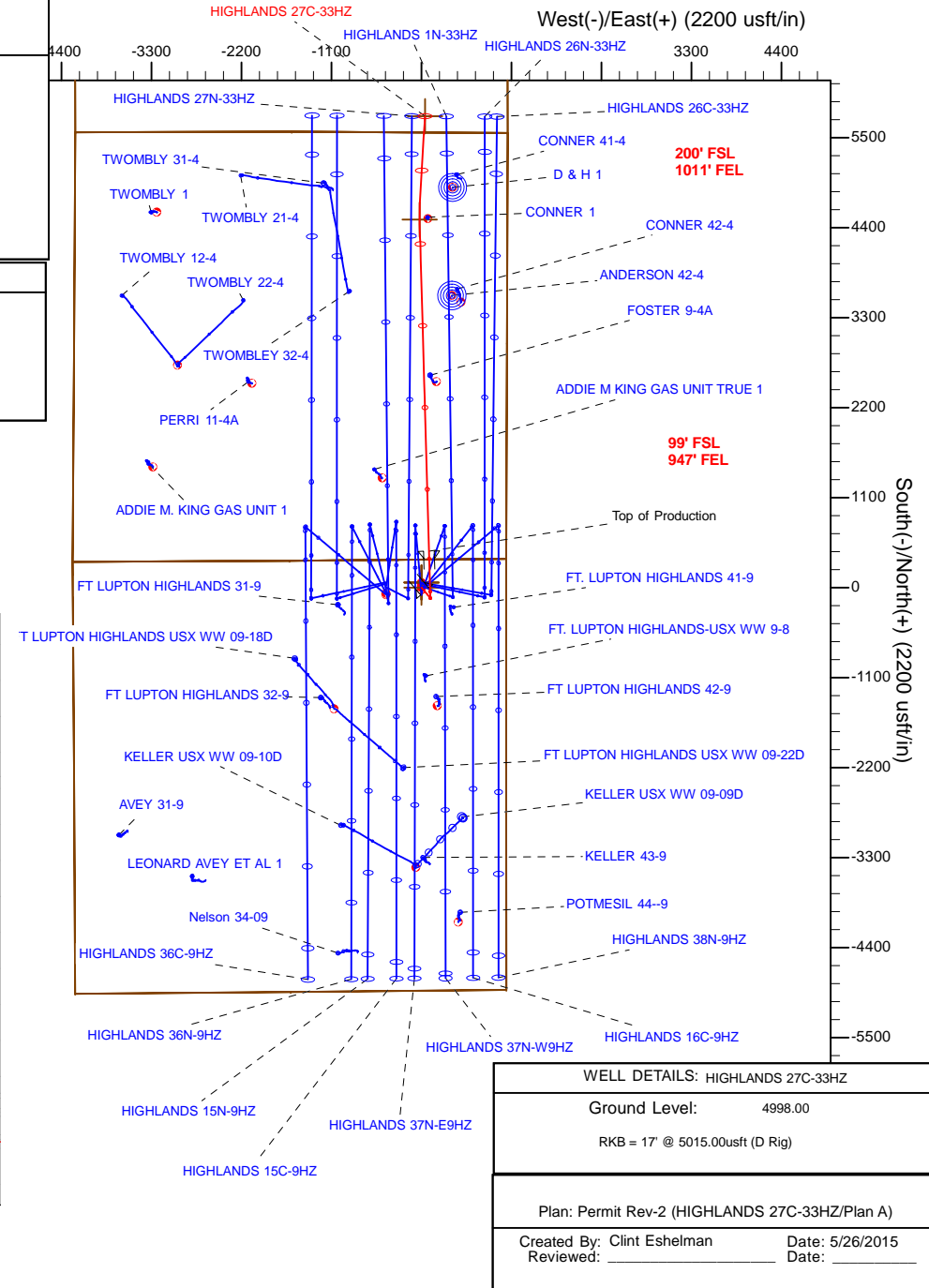
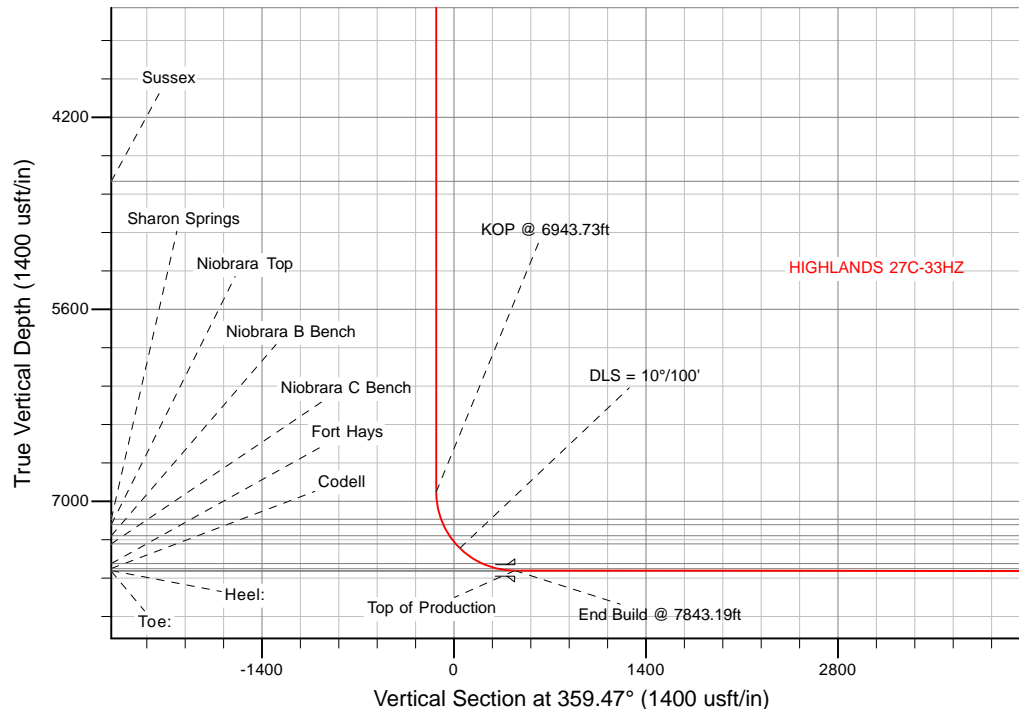
HALLIBURTON
Sperry Drilling

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	900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	
3	1566.67	10.00	140.00	1563.29	-44.45	37.30	1.50	140.00	-44.80	
4	1946.67	10.00	140.00	1937.51	-95.00	79.72	0.00	0.00	-95.74	
5	2446.67	0.00	0.00	2434.98	-128.34	107.69	2.00	180.00	-129.33	
6	6943.73	0.00	0.00	6932.04	-128.34	107.69	0.00	0.00	-129.33	
7	7843.19	89.95	358.38	7505.00	443.85	91.53	10.00	358.38	442.98	
8	11900.00	89.95	358.38	7508.81	4499.04	-23.01	0.00	0.00	4499.06	HIGHLANDS 27C-33HZ_Lateral Target
9	12155.62	89.95	3.49	7509.05	4754.55	-18.83	2.00	90.00	4754.52	
10	13164.49	89.95	3.49	7510.00	5761.54	42.67	0.00	0.00	5760.90	HIGHLANDS 27C-33HZ_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
HIGHLANDS 27C-33HZ_SHL	0.00	0.00	0.00	40.072076	-104.776458	Point
HIGHLANDS 27C-33HZ_Lateral Target	7508.81	4499.04	-23.01	40.084431	-104.776540	Point
HIGHLANDS 27C-33HZ_BHL	7510.00	5761.54	42.67	40.087898	-104.776305	Point



Plan Report for HIGHLANDS 27C-33HZ - Permit Rev-2

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
HIGHLANDS 27C-33HZ_SHL - 1N-R66W-Sec. 9_Section Lines - 2N-R66W-Sec. 33_Section Lines - 1N-R66W-Sec. 4_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
Begin Nudge @ 900.00ft										
1,000.00	1.50	140.00	999.99	-1.00	0.84	-1.01	1.50	1.50	0.00	140.00
1,100.00	3.00	140.00	1,099.91	-4.01	3.36	-4.04	1.50	1.50	0.00	0.00
1,200.00	4.50	140.00	1,199.69	-9.02	7.57	-9.09	1.50	1.50	0.00	0.00
1,300.00	6.00	140.00	1,299.27	-16.03	13.45	-16.15	1.50	1.50	0.00	0.00
1,400.00	7.50	140.00	1,398.57	-25.03	21.01	-25.23	1.50	1.50	0.00	0.00
1,471.13	8.57	140.00	1,469.00	-32.65	27.39	-32.90	1.50	1.50	0.00	0.00
Fox Hills										
1,500.00	9.00	140.00	1,497.54	-36.02	30.23	-36.30	1.50	1.50	0.00	0.00
1,566.67	10.00	140.00	1,563.29	-44.45	37.30	-44.80	1.50	1.50	0.00	0.00
End Nudge @ 1566.67ft										
1,600.00	10.00	140.00	1,596.11	-48.89	41.02	-49.27	0.00	0.00	0.00	0.00
1,603.95	10.00	140.00	1,600.00	-49.41	41.46	-49.79	0.00	0.00	0.00	0.00
9 5/8"										
1,700.00	10.00	140.00	1,694.59	-62.19	52.18	-62.67	0.00	0.00	0.00	0.00
1,800.00	10.00	140.00	1,793.08	-75.49	63.35	-76.07	0.00	0.00	0.00	0.00
1,900.00	10.00	140.00	1,891.56	-88.79	74.51	-89.48	0.00	0.00	0.00	0.00
1,946.67	10.00	140.00	1,937.52	-95.00	79.72	-95.74	0.00	0.00	0.00	0.00
Begin Drop @ 1946.67ft										
2,000.00	8.93	140.00	1,990.12	-101.72	85.35	-102.51	2.00	-2.00	0.00	180.00
2,100.00	6.93	140.00	2,089.16	-112.29	94.23	-113.16	2.00	-2.00	0.00	180.00
2,200.00	4.93	140.00	2,188.62	-120.21	100.87	-121.14	2.00	-2.00	0.00	180.00
2,300.00	2.93	140.00	2,288.38	-125.47	105.28	-126.44	2.00	-2.00	0.00	180.00
2,400.00	0.93	140.00	2,388.31	-128.05	107.45	-129.04	2.00	-2.00	0.00	180.00
2,446.67	0.00	0.00	2,434.98	-128.34	107.69	-129.33	2.00	-2.00	0.00	-180.00
End Drop @ 2446.67ft										
2,500.00	0.00	0.00	2,488.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,588.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,688.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,788.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,888.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	2,988.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,088.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,188.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,288.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,388.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,488.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,588.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,688.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,788.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,888.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	3,988.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,088.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,188.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,288.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,388.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00

Plan Report for HIGHLANDS 27C-33HZ - Permit Rev-2

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 (°)
4,500.00	0.00	0.00	4,488.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,588.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
4,677.69	0.00	0.00	4,666.00	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
Sussex										
4,700.00	0.00	0.00	4,688.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,788.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,888.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
5,000.00	0.00	0.00	4,988.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,088.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
5,200.00	0.00	0.00	5,188.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,288.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
5,400.00	0.00	0.00	5,388.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,488.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
5,600.00	0.00	0.00	5,588.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,688.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,788.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,888.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	5,988.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,088.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,188.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,288.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,388.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,488.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,588.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,688.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,788.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,888.31	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
6,943.73	0.00	0.00	6,932.04	-128.34	107.69	-129.33	0.00	0.00	0.00	0.00
KOP @ 6943.73ft										
7,000.00	5.63	358.38	6,988.22	-125.58	107.61	-126.57	10.00	10.00	0.00	358.38
7,100.00	15.63	358.38	7,086.38	-107.17	107.09	-108.16	10.00	10.00	0.00	0.00
7,146.04	20.23	358.38	7,130.17	-93.01	106.69	-93.99	10.00	10.00	0.00	0.00
Sharon Springs										
7,190.41	24.67	358.38	7,171.17	-76.07	106.22	-77.05	10.00	10.00	0.00	0.00
Niobrara Top										
7,200.00	25.63	358.38	7,179.85	-72.00	106.10	-72.98	10.00	10.00	0.00	0.00
7,281.65	33.79	358.38	7,250.71	-31.58	104.96	-32.55	10.00	10.00	0.00	0.00
Niobrara B Bench										
7,300.00	35.63	358.38	7,265.79	-21.14	104.66	-22.11	10.00	10.00	0.00	0.00
7,358.06	41.43	358.38	7,311.20	15.00	103.64	14.04	10.00	10.00	0.00	0.00
Niobrara C Bench										
7,400.00	45.63	358.38	7,341.59	43.86	102.83	42.91	10.00	10.00	0.00	0.00
DLS = 10°/100'										
7,500.00	55.63	358.38	7,404.95	121.04	100.65	120.10	10.00	10.00	0.00	0.00
7,598.21	65.45	358.38	7,453.20	206.41	98.24	205.50	10.00	10.00	0.00	0.00
Fort Hays										
7,600.00	65.63	358.38	7,453.94	208.04	98.19	207.12	10.00	10.00	0.00	0.00
7,700.00	75.63	358.38	7,487.06	302.22	95.53	301.32	10.00	10.00	0.00	0.00
7,716.26	77.25	358.38	7,490.88	318.02	95.08	317.12	10.00	10.00	0.00	0.00
Codell										
7,800.00	85.63	358.38	7,503.33	400.72	92.75	399.85	10.00	10.00	0.00	0.00
7,843.19	89.95	358.38	7,505.00	443.85	91.53	442.98	10.00	10.00	0.00	0.00
End Build @ 7843.19ft - Heel: - Top of Production										
7,900.00	89.95	358.38	7,505.05	500.64	89.93	499.78	0.00	0.00	0.00	0.00
8,000.00	89.95	358.38	7,505.14	600.60	87.10	599.77	0.00	0.00	0.00	0.00
8,100.00	89.95	358.38	7,505.24	700.56	84.28	699.75	0.00	0.00	0.00	0.00
8,200.00	89.95	358.38	7,505.33	800.52	81.46	799.73	0.00	0.00	0.00	0.00
8,300.00	89.95	358.38	7,505.43	900.48	78.63	899.71	0.00	0.00	0.00	0.00
8,400.00	89.95	358.38	7,505.52	1,000.44	75.81	999.69	0.00	0.00	0.00	0.00

Plan Report for HIGHLANDS 27C-33HZ - Permit Rev-2

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 (°)
8,500.00	89.95	358.38	7,505.61	1,100.40	72.99	1,099.68	0.00	0.00	0.00	0.00
8,600.00	89.95	358.38	7,505.71	1,200.36	70.16	1,199.66	0.00	0.00	0.00	0.00
8,700.00	89.95	358.38	7,505.80	1,300.32	67.34	1,299.64	0.00	0.00	0.00	0.00
8,800.00	89.95	358.38	7,505.90	1,400.28	64.52	1,399.62	0.00	0.00	0.00	0.00
8,900.00	89.95	358.38	7,505.99	1,500.24	61.69	1,499.60	0.00	0.00	0.00	0.00
9,000.00	89.95	358.38	7,506.08	1,600.20	58.87	1,599.59	0.00	0.00	0.00	0.00
9,100.00	89.95	358.38	7,506.18	1,700.16	56.05	1,699.57	0.00	0.00	0.00	0.00
9,200.00	89.95	358.38	7,506.27	1,800.12	53.22	1,799.55	0.00	0.00	0.00	0.00
9,300.00	89.95	358.38	7,506.37	1,900.08	50.40	1,899.53	0.00	0.00	0.00	0.00
9,400.00	89.95	358.38	7,506.46	2,000.04	47.58	1,999.51	0.00	0.00	0.00	0.00
9,500.00	89.95	358.38	7,506.55	2,100.00	44.75	2,099.50	0.00	0.00	0.00	0.00
9,600.00	89.95	358.38	7,506.65	2,199.96	41.93	2,199.48	0.00	0.00	0.00	0.00
9,700.00	89.95	358.38	7,506.74	2,299.92	39.10	2,299.46	0.00	0.00	0.00	0.00
9,800.00	89.95	358.38	7,506.84	2,399.88	36.28	2,399.44	0.00	0.00	0.00	0.00
9,900.00	89.95	358.38	7,506.93	2,499.84	33.46	2,499.42	0.00	0.00	0.00	0.00
10,000.00	89.95	358.38	7,507.02	2,599.80	30.63	2,599.41	0.00	0.00	0.00	0.00
10,100.00	89.95	358.38	7,507.12	2,699.76	27.81	2,699.39	0.00	0.00	0.00	0.00
10,200.00	89.95	358.38	7,507.21	2,799.72	24.99	2,799.37	0.00	0.00	0.00	0.00
10,300.00	89.95	358.38	7,507.31	2,899.68	22.16	2,899.35	0.00	0.00	0.00	0.00
10,400.00	89.95	358.38	7,507.40	2,999.64	19.34	2,999.33	0.00	0.00	0.00	0.00
10,500.00	89.95	358.38	7,507.49	3,099.60	16.52	3,099.31	0.00	0.00	0.00	0.00
10,600.00	89.95	358.38	7,507.59	3,199.56	13.69	3,199.30	0.00	0.00	0.00	0.00
10,700.00	89.95	358.38	7,507.68	3,299.52	10.87	3,299.28	0.00	0.00	0.00	0.00
10,800.00	89.95	358.38	7,507.78	3,399.48	8.05	3,399.26	0.00	0.00	0.00	0.00
10,900.00	89.95	358.38	7,507.87	3,499.44	5.22	3,499.24	0.00	0.00	0.00	0.00
11,000.00	89.95	358.38	7,507.96	3,599.40	2.40	3,599.22	0.00	0.00	0.00	0.00
11,100.00	89.95	358.38	7,508.06	3,699.36	-0.42	3,699.21	0.00	0.00	0.00	0.00
11,200.00	89.95	358.38	7,508.15	3,799.32	-3.25	3,799.19	0.00	0.00	0.00	0.00
11,300.00	89.95	358.38	7,508.25	3,899.28	-6.07	3,899.17	0.00	0.00	0.00	0.00
11,400.00	89.95	358.38	7,508.34	3,999.24	-8.89	3,999.15	0.00	0.00	0.00	0.00
11,500.00	89.95	358.38	7,508.43	4,099.20	-11.72	4,099.13	0.00	0.00	0.00	0.00
11,600.00	89.95	358.38	7,508.53	4,199.16	-14.54	4,199.12	0.00	0.00	0.00	0.00
11,700.00	89.95	358.38	7,508.62	4,299.12	-17.36	4,299.10	0.00	0.00	0.00	0.00
11,800.00	89.95	358.38	7,508.72	4,399.08	-20.19	4,399.08	0.00	0.00	0.00	0.00
11,900.00	89.95	358.38	7,508.81	4,499.04	-23.01	4,499.06	0.00	0.00	0.00	0.00
Begin Turn @ 11900.00ft - HIGHLANDS 27C-33HZ_Lateral Target										
12,000.00	89.95	0.38	7,508.90	4,599.03	-24.09	4,599.06	2.00	0.00	2.00	90.00
12,100.00	89.95	2.38	7,509.00	4,699.00	-21.68	4,699.00	2.00	0.00	2.00	90.00
12,155.62	89.95	3.49	7,509.05	4,754.54	-18.83	4,754.51	2.00	0.00	2.00	90.00
End Turn @ 12155.62ft										
12,200.00	89.95	3.49	7,509.09	4,798.84	-16.12	4,798.78	0.00	0.00	0.00	90.00
12,300.00	89.95	3.49	7,509.19	4,898.65	-10.02	4,898.54	0.00	0.00	0.00	0.00
12,400.00	89.95	3.49	7,509.28	4,998.47	-3.93	4,998.29	0.00	0.00	0.00	0.00
12,500.00	89.95	3.49	7,509.37	5,098.28	2.17	5,098.04	0.00	0.00	0.00	0.00
12,600.00	89.95	3.49	7,509.47	5,198.10	8.26	5,197.80	0.00	0.00	0.00	0.00
12,700.00	89.95	3.49	7,509.56	5,297.91	14.36	5,297.55	0.00	0.00	0.00	0.00
12,800.00	89.95	3.49	7,509.66	5,397.72	20.45	5,397.30	0.00	0.00	0.00	0.00
12,900.00	89.95	3.49	7,509.75	5,497.54	26.55	5,497.06	0.00	0.00	0.00	0.00
13,000.00	89.95	3.49	7,509.85	5,597.35	32.64	5,596.81	0.00	0.00	0.00	0.00
13,100.00	89.95	3.49	7,509.94	5,697.17	38.74	5,696.56	0.00	0.00	0.00	0.00
13,164.49	89.95	3.49	7,510.00	5,761.54	42.67	5,760.89	0.00	0.00	0.00	0.00
TD Well @ 13164.49ft - Toe: - HIGHLANDS 27C-33HZ_BHL										

Plan Report for HIGHLANDS 27C-33HZ - Permit Rev-2

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
900.00	900.00	0.00	0.00	Begin Nudge @ 900.00ft
1,566.67	1,563.29	-44.45	37.30	End Nudge @ 1566.67ft
1,946.67	1,937.52	-95.00	79.72	Begin Drop @ 1946.67ft
2,446.67	2,434.98	-128.34	107.69	End Drop @ 2446.67ft
6,943.73	6,932.04	-128.34	107.69	KOP @ 6943.73ft
7,400.00	7,341.59	43.86	102.83	DLS = 10°/100'
7,843.19	7,505.00	443.85	91.53	End Build @ 7843.19ft
11,900.00	7,508.81	4,499.04	-23.01	Begin Turn @ 11900.00ft
12,155.62	7,509.05	4,754.54	-18.83	End Turn @ 12155.62ft
13,164.49	7,510.00	5,761.54	42.67	TD Well @ 13164.49ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
User	No Target (Freehand)	359.47	Slot	0.00	0.00	7,510.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	7,843.19	Permit Rev-2	APC_ISCWSA REV 2 MWD+IFR1
7,843.19	13,164.49	Permit Rev-2	APC_ISCWSA REV 2 MWD+IFR1

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,603.95	1,600.00	9 5/8"	9-5/8	13-1/2
7,843.19	7,505.00	Top of Production	5-1/2	7-7/8

Formation Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,471.13	1,469.00	Fox Hills		0.00	
4,677.69	4,666.00	Sussex		0.00	
7,146.04	7,130.17	Sharon Springs		0.00	
7,190.41	7,171.17	Niobrara Top		0.00	
7,281.65	7,250.71	Niobrara B Bench		0.00	
7,358.06	7,311.20	Niobrara C Bench		0.00	
7,598.21	7,453.20	Fort Hays		0.00	
7,716.26	7,490.88	Codell		0.00	
7,843.19	7,505.00	Heel:		0.00	
13,164.49	7,510.00	Toe:		0.00	

Plan Report for HIGHLANDS 27C-33HZ - Permit Rev-2

Targets associated with this wellbore

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
HIGHLANDS 27C-33HZ_SHL	0.00	0.00	0.00	Point
1N-R66W-Sec. 9_Section Lines	0.00	60.08	0.28	Polygon
HIGHLANDS 27C-33HZ_Lateral Target	7,508.81	4,499.04	-23.01	Point
HIGHLANDS 27C-33HZ_BHL	7,510.00	5,761.54	42.67	Point
2N-R66W-Sec. 33_Section Lines	0.00	60.08	0.28	Polygon
1N-R66W-Sec. 4_Section Lines	0.00	60.08	0.28	Polygon

North Reference Sheet for 1N-66W-09 Highlands 1-9HZ Pad - HIGHLANDS 27C-33HZ - 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' @ 5015.00usft (D Rig). Northing and Easting are relative to HIGHLANDS 27C-33HZ

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: 0.99960447

Grid Coordinates of Well: 14,553,057.96 usft N, 1,702,953.97 usft E

Geographical Coordinates of Well: 40° 04' 19.47" N, 104° 46' 35.25" W

Grid Convergence at Surface is: 0.14°

Based upon Minimum Curvature type calculations, at a Measured Depth of 13,164.49usft
the Bottom Hole Displacement is 5,761.69usft in the Direction of 0.42° (True).

Magnetic Convergence at surface is: -8.17° (12 May 2015, , IGRF2010)

