

US ROCKIES WATTENBERG PLANNING

WELD-NAD83-UTMFT13N

2N-66W-32 Land Fed 13S-32HZ Pad

LAND FED 34C-32HZ

Plan A

Plan: Permit Rev-1

Sperry Drilling Services Proposal Report

27 May, 2015

Well Coordinates: 14,562,853.20 N, 1,694,742.11 E (40° 05' 56.50" N, 104° 48' 20.65" W)

Ground Level: 4,897.00 usft

Local Coordinate Origin:

Centered on Well LAND FED 34C-32HZ

Viewing Datum:

RKB = 17' @ 4914.00usft (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-66W-32 Land Fed 13S-32HZ Pad
Well: LAND FED 34C-32HZ
Wellbore: Plan A
Design: Permit Rev-1

US ROCKIES WATTENBERG PLANNING

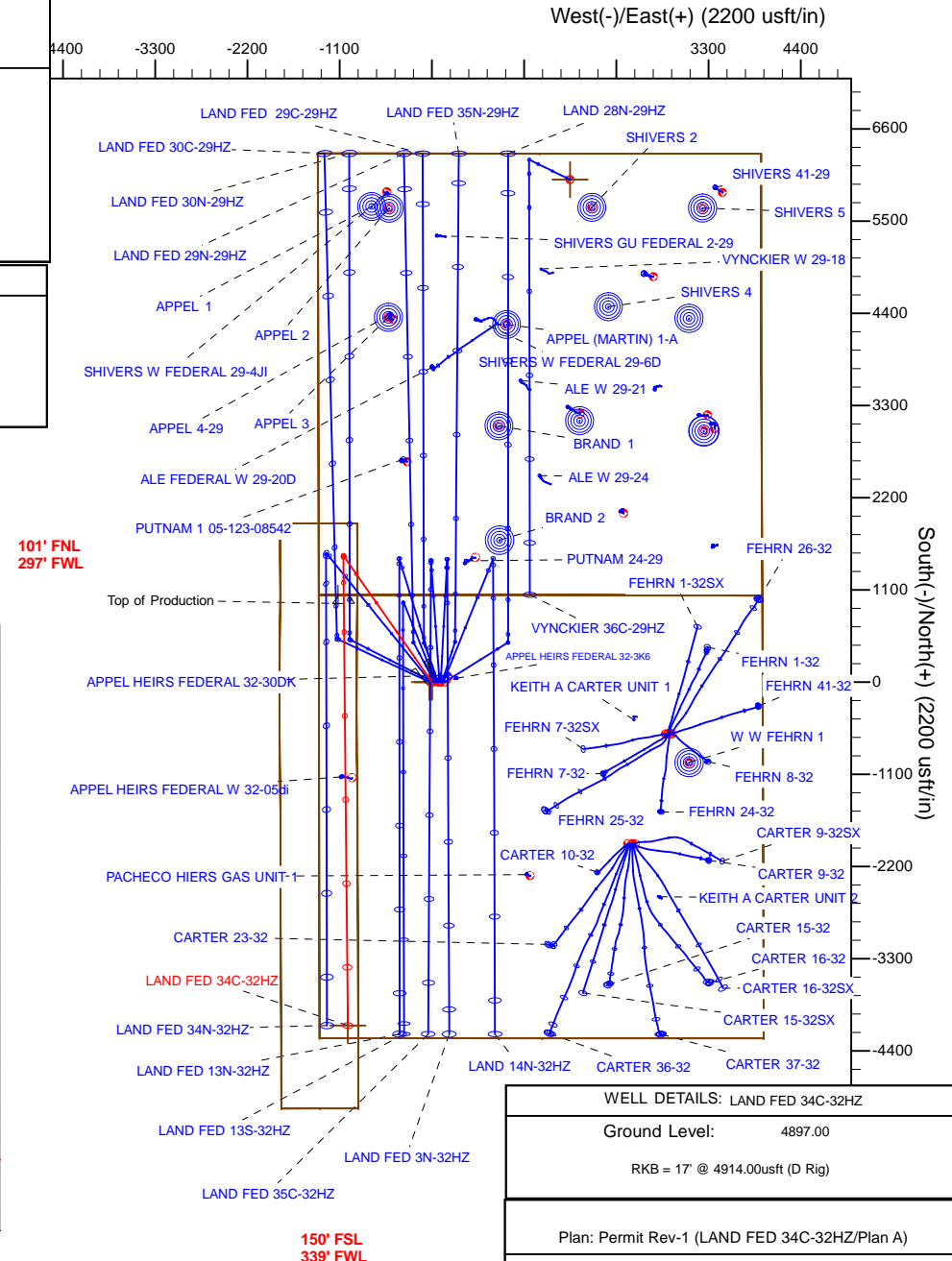
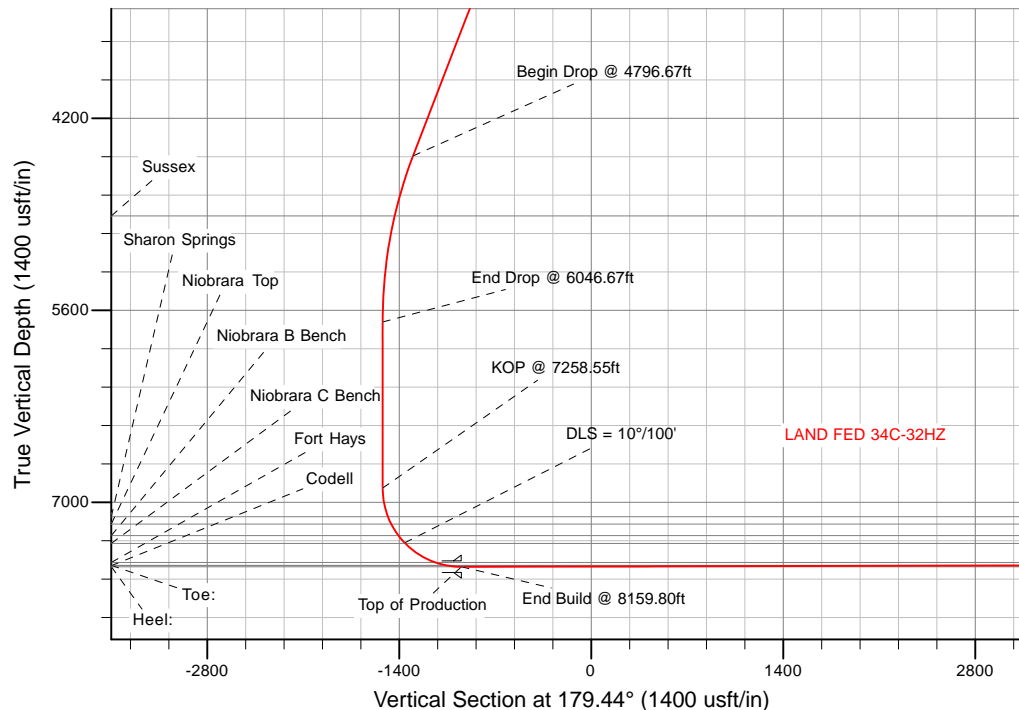
HALLIBURTON
Sperry Drilling

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	250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	
3	1916.67	25.00	325.00	1864.28	293.16	-205.27	1.50	325.00	-295.15	
4	4796.67	25.00	325.00	4474.45	1290.18	-903.39	0.00	0.00	-1298.95	
5	6046.67	0.00	0.00	5685.16	1510.05	-1057.35	2.00	180.00	-1520.31	
6	7258.55	0.00	0.00	6897.04	1510.05	-1057.35	0.00	0.00	-1520.31	
7	8159.80	90.13	179.44	7470.00	935.87	-1051.75	10.00	179.44	-946.10	
8	13195.10	90.13	179.44	7459.00	-4099.19	-1002.63	0.00	0.00	4089.19	LAND FED 34C-32HZ_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
LAND FED 34C-32HZ_SHL	0.00	0.00	0.00	40.099028	-104.805735	Point
LAND FED 34C-32HZ_BHL	7459.00	-4099.19	-1002.63	40.087771	-104.809320	Point



WELL DETAILS: LAND FED 34C-32HZ

Ground Level: 4897.00

RKB = 17' @ 4914.00usft (D Rig)

Plan: Permit Rev-1 (LAND FED 34C-32HZ/Plan A)

Created By: Clint Eshelman

Date: 5/27/2015

Reviewed:

Date:

Plan Report for LAND FED 34C-32HZ - 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-R66W-Sec. 32_Section Lines - LAND FED 34C-32HZ_Landing Diagram - LAND FED 34C-32HZ_SHL										
10.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2N-R66W-Sec. 29_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
250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Begin Nudge @ 250.00ft										
300.00	0.75	325.00	300.00	0.27	-0.19	-0.27	1.50	1.50	0.00	325.00
400.00	2.25	325.00	399.96	2.41	-1.69	-2.43	1.50	1.50	0.00	0.00
500.00	3.75	325.00	499.82	6.70	-4.69	-6.74	1.50	1.50	0.00	0.00
600.00	5.25	325.00	599.51	13.13	-9.19	-13.22	1.50	1.50	0.00	0.00
700.00	6.75	325.00	698.96	21.69	-15.19	-21.84	1.50	1.50	0.00	0.00
800.00	8.25	325.00	798.10	32.38	-22.67	-32.60	1.50	1.50	0.00	0.00
900.00	9.75	325.00	896.87	45.19	-31.65	-45.50	1.50	1.50	0.00	0.00
1,000.00	11.25	325.00	995.19	60.12	-42.10	-60.53	1.50	1.50	0.00	0.00
1,100.00	12.75	325.00	1,093.00	77.15	-54.02	-77.68	1.50	1.50	0.00	0.00
1,200.00	14.25	325.00	1,190.24	96.27	-67.41	-96.93	1.50	1.50	0.00	0.00
1,300.00	15.75	325.00	1,286.83	117.47	-82.26	-118.27	1.50	1.50	0.00	0.00
1,322.02	16.08	325.00	1,308.00	122.42	-85.72	-123.25	1.50	1.50	0.00	0.00
Fox Hills										
1,400.00	17.25	325.00	1,382.71	140.74	-98.55	-141.70	1.50	1.50	0.00	0.00
1,500.00	18.75	325.00	1,477.81	166.05	-116.27	-167.18	1.50	1.50	0.00	0.00
1,600.00	20.25	325.00	1,572.07	193.40	-135.42	-194.71	1.50	1.50	0.00	0.00
1,629.81	20.70	325.00	1,600.00	201.94	-141.40	-203.31	1.50	1.50	0.00	0.00
9 5/8"										
1,700.00	21.75	325.00	1,665.43	222.75	-155.97	-224.26	1.50	1.50	0.00	0.00
1,800.00	23.25	325.00	1,757.81	254.10	-177.92	-255.82	1.50	1.50	0.00	0.00
1,900.00	24.75	325.00	1,849.16	287.41	-201.25	-289.37	1.50	1.50	0.00	0.00
1,916.67	25.00	325.00	1,864.29	293.16	-205.27	-295.15	1.50	1.50	0.00	0.00
End Nudge @ 1916.67ft										
2,000.00	25.00	325.00	1,939.81	322.01	-225.47	-324.19	0.00	0.00	0.00	0.00
2,100.00	25.00	325.00	2,030.44	356.62	-249.71	-359.05	0.00	0.00	0.00	0.00
2,200.00	25.00	325.00	2,121.07	391.24	-273.95	-393.90	0.00	0.00	0.00	0.00
2,300.00	25.00	325.00	2,211.70	425.86	-298.19	-428.76	0.00	0.00	0.00	0.00
2,400.00	25.00	325.00	2,302.33	460.48	-322.43	-463.61	0.00	0.00	0.00	0.00
2,500.00	25.00	325.00	2,392.96	495.10	-346.67	-498.46	0.00	0.00	0.00	0.00
2,600.00	25.00	325.00	2,483.59	529.72	-370.91	-533.32	0.00	0.00	0.00	0.00
2,700.00	25.00	325.00	2,574.22	564.34	-395.15	-568.17	0.00	0.00	0.00	0.00
2,800.00	25.00	325.00	2,664.85	598.96	-419.39	-603.03	0.00	0.00	0.00	0.00
2,900.00	25.00	325.00	2,755.49	633.58	-443.63	-637.88	0.00	0.00	0.00	0.00
3,000.00	25.00	325.00	2,846.12	668.19	-467.87	-672.74	0.00	0.00	0.00	0.00
3,100.00	25.00	325.00	2,936.75	702.81	-492.11	-707.59	0.00	0.00	0.00	0.00
3,200.00	25.00	325.00	3,027.38	737.43	-516.36	-742.44	0.00	0.00	0.00	0.00
3,300.00	25.00	325.00	3,118.01	772.05	-540.60	-777.30	0.00	0.00	0.00	0.00
3,400.00	25.00	325.00	3,208.64	806.67	-564.84	-812.15	0.00	0.00	0.00	0.00
3,500.00	25.00	325.00	3,299.27	841.29	-589.08	-847.01	0.00	0.00	0.00	0.00
3,600.00	25.00	325.00	3,389.90	875.91	-613.32	-881.86	0.00	0.00	0.00	0.00
3,700.00	25.00	325.00	3,480.53	910.53	-637.56	-916.71	0.00	0.00	0.00	0.00
3,800.00	25.00	325.00	3,571.16	945.14	-661.80	-951.57	0.00	0.00	0.00	0.00
3,900.00	25.00	325.00	3,661.79	979.76	-686.04	-986.42	0.00	0.00	0.00	0.00
4,000.00	25.00	325.00	3,752.42	1,014.38	-710.28	-1,021.28	0.00	0.00	0.00	0.00
4,100.00	25.00	325.00	3,843.05	1,049.00	-734.52	-1,056.13	0.00	0.00	0.00	0.00
4,200.00	25.00	325.00	3,933.69	1,083.62	-758.76	-1,090.98	0.00	0.00	0.00	0.00
4,300.00	25.00	325.00	4,024.32	1,118.24	-783.00	-1,125.84	0.00	0.00	0.00	0.00
4,400.00	25.00	325.00	4,114.95	1,152.86	-807.24	-1,160.69	0.00	0.00	0.00	0.00
4,500.00	25.00	325.00	4,205.58	1,187.48	-831.48	-1,195.55	0.00	0.00	0.00	0.00
4,600.00	25.00	325.00	4,296.21	1,222.10	-855.72	-1,230.40	0.00	0.00	0.00	0.00

Plan Report for LAND FED 34C-32HZ - 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 (°)
4,700.00	25.00	325.00	4,386.84	1,256.71	-879.96	-1,265.26	0.00	0.00	0.00	0.00
4,796.67	25.00	325.00	4,474.45	1,290.18	-903.39	-1,298.95	0.00	0.00	0.00	0.00
Begin Drop @ 4796.67ft										
4,800.00	24.93	325.00	4,477.47	1,291.33	-904.20	-1,300.11	2.00	-2.00	0.00	180.00
4,900.00	22.93	325.00	4,568.87	1,324.56	-927.47	-1,333.56	2.00	-2.00	0.00	180.00
5,000.00	20.93	325.00	4,661.63	1,355.16	-948.89	-1,364.37	2.00	-2.00	0.00	180.00
5,100.00	18.93	325.00	4,755.63	1,383.08	-968.45	-1,392.48	2.00	-2.00	0.00	180.00
5,200.00	16.93	325.00	4,850.77	1,408.30	-986.11	-1,417.87	2.00	-2.00	0.00	180.00
5,263.80	15.66	325.00	4,912.00	1,422.97	-996.37	-1,432.64	2.00	-2.00	0.00	180.00
Sussex										
5,300.00	14.93	325.00	4,946.92	1,430.79	-1,001.85	-1,440.51	2.00	-2.00	0.00	180.00
5,400.00	12.93	325.00	5,043.97	1,450.51	-1,015.66	-1,460.37	2.00	-2.00	0.00	180.00
5,500.00	10.93	325.00	5,141.81	1,467.45	-1,027.52	-1,477.42	2.00	-2.00	0.00	180.00
5,600.00	8.93	325.00	5,240.30	1,481.58	-1,037.41	-1,491.65	2.00	-2.00	0.00	180.00
5,700.00	6.93	325.00	5,339.34	1,492.89	-1,045.33	-1,503.03	2.00	-2.00	0.00	180.00
5,800.00	4.93	325.00	5,438.80	1,501.35	-1,051.26	-1,511.56	2.00	-2.00	0.00	180.00
5,900.00	2.93	325.00	5,538.56	1,506.97	-1,055.19	-1,517.21	2.00	-2.00	0.00	180.00
6,000.00	0.93	325.00	5,638.50	1,509.74	-1,057.13	-1,520.00	2.00	-2.00	0.00	180.00
6,046.67	0.00	0.00	5,685.16	1,510.05	-1,057.35	-1,520.31	2.00	-2.00	74.99	180.00
End Drop @ 6046.67ft										
6,100.00	0.00	0.00	5,738.49	1,510.05	-1,057.35	-1,520.31	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	5,838.49	1,510.05	-1,057.35	-1,520.31	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	5,938.49	1,510.05	-1,057.35	-1,520.31	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,038.49	1,510.05	-1,057.35	-1,520.31	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,138.49	1,510.05	-1,057.35	-1,520.31	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,238.49	1,510.05	-1,057.35	-1,520.31	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,338.49	1,510.05	-1,057.35	-1,520.31	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,438.49	1,510.05	-1,057.35	-1,520.31	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,538.49	1,510.05	-1,057.35	-1,520.31	0.00	0.00	0.00	0.00
7,000.00	0.00	0.00	6,638.49	1,510.05	-1,057.35	-1,520.31	0.00	0.00	0.00	0.00
7,100.00	0.00	0.00	6,738.49	1,510.05	-1,057.35	-1,520.31	0.00	0.00	0.00	0.00
7,200.00	0.00	0.00	6,838.49	1,510.05	-1,057.35	-1,520.31	0.00	0.00	0.00	0.00
7,258.55	0.00	0.00	6,897.04	1,510.05	-1,057.35	-1,520.31	0.00	0.00	0.00	0.00
KOP @ 7258.55ft										
7,300.00	4.15	179.44	6,938.46	1,508.55	-1,057.33	-1,518.81	10.00	10.00	432.91	179.44
7,400.00	14.15	179.44	7,037.06	1,492.68	-1,057.18	-1,502.94	10.00	10.00	0.00	0.00
7,471.11	21.26	179.44	7,104.76	1,471.07	-1,056.97	-1,481.33	10.00	10.00	0.00	0.00
Sharon Springs										
7,500.00	24.15	179.44	7,131.41	1,459.92	-1,056.86	-1,470.18	10.00	10.00	0.00	0.00
7,529.22	27.07	179.44	7,157.76	1,447.29	-1,056.73	-1,457.55	10.00	10.00	0.00	0.00
Niobrara Top										
7,600.00	34.15	179.44	7,218.64	1,411.28	-1,056.38	-1,421.54	10.00	10.00	0.00	0.00
7,628.80	37.03	179.44	7,242.06	1,394.53	-1,056.22	-1,404.78	10.00	10.00	0.00	0.00
Niobrara B Bench										
7,700.00	44.15	179.44	7,296.10	1,348.24	-1,055.77	-1,358.49	10.00	10.00	0.00	0.00
DLS = 10°/100'										
7,705.93	44.74	179.44	7,300.33	1,344.08	-1,055.73	-1,354.34	10.00	10.00	0.00	0.00
Niobrara C Bench										
7,800.00	54.15	179.44	7,361.43	1,272.70	-1,055.03	-1,282.95	10.00	10.00	0.00	0.00
7,900.00	64.15	179.44	7,412.65	1,186.97	-1,054.19	-1,197.21	10.00	10.00	0.00	0.00
7,967.16	70.86	179.44	7,438.33	1,124.96	-1,053.59	-1,135.20	10.00	10.00	0.00	0.00
Fort Hays										
8,000.00	74.15	179.44	7,448.20	1,093.64	-1,053.28	-1,103.88	10.00	10.00	0.00	0.00
8,062.52	80.40	179.44	7,461.97	1,032.69	-1,052.69	-1,042.93	10.00	10.00	0.00	0.00
Codell										
8,100.00	84.15	179.44	7,467.01	995.56	-1,052.33	-1,005.80	10.00	10.00	0.00	0.00
8,159.80	90.13	179.44	7,470.00	935.86	-1,051.75	-946.10	10.00	10.00	0.00	0.00
End Build @ 8159.80ft - Heel: - Top of Production										

Plan Report for LAND FED 34C-32HZ - 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 (°)
8,200.00	90.13	179.44	7,469.91	895.67	-1,051.35	-905.90	0.00	0.00	0.00	0.00
8,300.00	90.13	179.44	7,469.69	795.67	-1,050.38	-805.90	0.00	0.00	0.00	0.00
8,400.00	90.13	179.44	7,469.47	695.68	-1,049.40	-705.90	0.00	0.00	0.00	0.00
8,500.00	90.13	179.44	7,469.25	595.68	-1,048.43	-605.90	0.00	0.00	0.00	0.00
8,600.00	90.13	179.44	7,469.04	495.69	-1,047.45	-505.90	0.00	0.00	0.00	0.00
8,700.00	90.13	179.44	7,468.82	395.69	-1,046.48	-405.90	0.00	0.00	0.00	0.00
8,800.00	90.13	179.44	7,468.60	295.70	-1,045.50	-305.90	0.00	0.00	0.00	0.00
8,900.00	90.13	179.44	7,468.38	195.70	-1,044.53	-205.90	0.00	0.00	0.00	0.00
9,000.00	90.13	179.44	7,468.16	95.71	-1,043.55	-105.90	0.00	0.00	0.00	0.00
9,100.00	90.13	179.44	7,467.94	-4.29	-1,042.57	-5.90	0.00	0.00	0.00	0.00
9,200.00	90.13	179.44	7,467.73	-104.28	-1,041.60	94.10	0.00	0.00	0.00	0.00
9,300.00	90.13	179.44	7,467.51	-204.28	-1,040.62	194.10	0.00	0.00	0.00	0.00
9,400.00	90.13	179.44	7,467.29	-304.27	-1,039.65	294.10	0.00	0.00	0.00	0.00
9,500.00	90.13	179.44	7,467.07	-404.27	-1,038.67	394.10	0.00	0.00	0.00	0.00
9,600.00	90.13	179.44	7,466.85	-504.26	-1,037.70	494.10	0.00	0.00	0.00	0.00
9,700.00	90.13	179.44	7,466.63	-604.26	-1,036.72	594.10	0.00	0.00	0.00	0.00
9,800.00	90.13	179.44	7,466.42	-704.25	-1,035.75	694.10	0.00	0.00	0.00	0.00
9,900.00	90.13	179.44	7,466.20	-804.25	-1,034.77	794.10	0.00	0.00	0.00	0.00
10,000.00	90.13	179.44	7,465.98	-904.24	-1,033.80	894.10	0.00	0.00	0.00	0.00
10,100.00	90.13	179.44	7,465.76	-1,004.24	-1,032.82	994.10	0.00	0.00	0.00	0.00
10,200.00	90.13	179.44	7,465.54	-1,104.23	-1,031.84	1,094.10	0.00	0.00	0.00	0.00
10,300.00	90.13	179.44	7,465.32	-1,204.23	-1,030.87	1,194.10	0.00	0.00	0.00	0.00
10,400.00	90.13	179.44	7,465.10	-1,304.22	-1,029.89	1,294.10	0.00	0.00	0.00	0.00
10,500.00	90.13	179.44	7,464.89	-1,404.22	-1,028.92	1,394.10	0.00	0.00	0.00	0.00
10,600.00	90.13	179.44	7,464.67	-1,504.21	-1,027.94	1,494.10	0.00	0.00	0.00	0.00
10,700.00	90.13	179.44	7,464.45	-1,604.21	-1,026.97	1,594.10	0.00	0.00	0.00	0.00
10,800.00	90.13	179.44	7,464.23	-1,704.20	-1,025.99	1,694.10	0.00	0.00	0.00	0.00
10,900.00	90.13	179.44	7,464.01	-1,804.20	-1,025.02	1,794.10	0.00	0.00	0.00	0.00
11,000.00	90.13	179.44	7,463.79	-1,904.19	-1,024.04	1,894.10	0.00	0.00	0.00	0.00
11,100.00	90.13	179.44	7,463.58	-2,004.19	-1,023.07	1,994.10	0.00	0.00	0.00	0.00
11,200.00	90.13	179.44	7,463.36	-2,104.19	-1,022.09	2,094.09	0.00	0.00	0.00	0.00
11,300.00	90.13	179.44	7,463.14	-2,204.18	-1,021.12	2,194.09	0.00	0.00	0.00	0.00
11,400.00	90.13	179.44	7,462.92	-2,304.18	-1,020.14	2,294.09	0.00	0.00	0.00	0.00
11,500.00	90.13	179.44	7,462.70	-2,404.17	-1,019.16	2,394.09	0.00	0.00	0.00	0.00
11,600.00	90.13	179.44	7,462.48	-2,504.17	-1,018.19	2,494.09	0.00	0.00	0.00	0.00
11,700.00	90.13	179.44	7,462.27	-2,604.16	-1,017.21	2,594.09	0.00	0.00	0.00	0.00
11,800.00	90.13	179.44	7,462.05	-2,704.16	-1,016.24	2,694.09	0.00	0.00	0.00	0.00
11,900.00	90.13	179.44	7,461.83	-2,804.15	-1,015.26	2,794.09	0.00	0.00	0.00	0.00
12,000.00	90.13	179.44	7,461.61	-2,904.15	-1,014.29	2,894.09	0.00	0.00	0.00	0.00
12,100.00	90.13	179.44	7,461.39	-3,004.14	-1,013.31	2,994.09	0.00	0.00	0.00	0.00
12,200.00	90.13	179.44	7,461.17	-3,104.14	-1,012.34	3,094.09	0.00	0.00	0.00	0.00
12,300.00	90.13	179.44	7,460.96	-3,204.13	-1,011.36	3,194.09	0.00	0.00	0.00	0.00
12,400.00	90.13	179.44	7,460.74	-3,304.13	-1,010.39	3,294.09	0.00	0.00	0.00	0.00
12,500.00	90.13	179.44	7,460.52	-3,404.12	-1,009.41	3,394.09	0.00	0.00	0.00	0.00
12,600.00	90.13	179.44	7,460.30	-3,504.12	-1,008.43	3,494.09	0.00	0.00	0.00	0.00
12,700.00	90.13	179.44	7,460.08	-3,604.11	-1,007.46	3,594.09	0.00	0.00	0.00	0.00
12,800.00	90.13	179.44	7,459.86	-3,704.11	-1,006.48	3,694.09	0.00	0.00	0.00	0.00
12,900.00	90.13	179.44	7,459.64	-3,804.10	-1,005.51	3,794.09	0.00	0.00	0.00	0.00
13,000.00	90.13	179.44	7,459.43	-3,904.10	-1,004.53	3,894.09	0.00	0.00	0.00	0.00
13,100.00	90.13	179.44	7,459.21	-4,004.09	-1,003.56	3,994.09	0.00	0.00	0.00	0.00
13,195.10	90.13	179.44	7,459.00	-4,099.19	-1,002.63	4,089.19	0.00	0.00	0.00	0.00

TD Well @ 13195.10ft - Toe: - LAND FED 34C-32HZ_BHL

Plan Report for LAND FED 34C-32HZ - Permit Rev-1

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
250.00	250.00	0.00	0.00	Begin Nudge @ 250.00ft
1,916.67	1,864.29	293.16	-205.27	End Nudge @ 1916.67ft
4,796.67	4,474.45	1,290.18	-903.39	Begin Drop @ 4796.67ft
6,046.67	5,685.16	1,510.05	-1,057.35	End Drop @ 6046.67ft
7,258.55	6,897.04	1,510.05	-1,057.35	KOP @ 7258.55ft
7,700.00	7,296.10	1,348.24	-1,055.77	DLS = 10°/100'
8,159.80	7,470.00	935.86	-1,051.75	End Build @ 8159.80ft
13,195.10	7,459.00	-4,099.19	-1,002.63	TD Well @ 13195.10ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	179.44	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	8,159.80	Permit Rev-1	APC_ISCWSA REV 2 MWD+IFR1+MSA
8,159.80	13,195.10	Permit Rev-1	APC_ISCWSA REV 2 MWD+IFR1+MSA

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,629.81	1,600.00	9 5/8"	9-5/8	13-1/2
8,159.80	7,470.00	Top of Production	5-1/2	7-7/8

Formation Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,322.02	1,308.00	Fox Hills		0.00	
5,263.80	4,912.00	Sussex		0.00	
7,471.11	7,104.76	Sharon Springs		0.00	
7,529.22	7,157.76	Niobrara Top		0.00	
7,628.80	7,242.06	Niobrara B Bench		0.00	
7,705.93	7,300.33	Niobrara C Bench		0.00	
7,967.16	7,438.33	Fort Hays		0.00	
8,062.52	7,461.97	Codell		0.00	
8,159.80	7,470.00	Heel:		0.00	
13,195.10	7,459.00	Toe:		0.00	

Plan Report for LAND FED 34C-32HZ - Permit Rev-1

Targets associated with this wellbore

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
2N-R66W-Sec. 29_Section Lines	10.00	5,993.21	1,648.40	Polygon
2N-R66W-Sec. 32_Section Lines	0.00	0.36	-29.92	Polygon
LAND FED 34C-32HZ_BHL	7,459.00	-4,099.19	-1,002.63	Point
LAND FED 34C-32HZ_Landing Diagram	0.00	0.00	0.00	Polygon
LAND FED 34C-32HZ_SHL	0.00	0.00	0.00	Point

North Reference Sheet for 2N-66W-32 Land Fed 13S-32HZ Pad - LAND FED 34C-32HZ - 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' @ 4914.00usft (D Rig). Northing and Easting are relative to LAND FED 34C-32HZ

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: 0.99960338

Grid Coordinates of Well: 14,562,853.20 usft N, 1,694,742.11 usft E

Geographical Coordinates of Well: 40° 05' 56.50" N, 104° 48' 20.65" W

Grid Convergence at Surface is: 0.13°

Based upon Minimum Curvature type calculations, at a Measured Depth of 13,195.10usft
the Bottom Hole Displacement is 4,220.02usft in the Direction of 193.74° (True).

Magnetic Convergence at surface is: -8.21° (19 May 2015, , IGRF2010)

