

# US ROCKIES WATTENBERG PLANNING

WELD-NAD83-UTMFT13N

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

LAND FED 13N-32HZ

Plan A

Plan: Permit Rev-1

## Sperry Drilling Services Proposal Report

27 May, 2015

Well Coordinates: 14,562,852.97 N, 1,694,802.24 E (40° 05' 56.50" N, 104° 48' 19.87" W)

Ground Level: 4,897.00 usft

Local Coordinate Origin:

Centered on Well LAND FED 13N-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 13N-32HZ  
Wellbore: Plan A  
Design: Permit Rev-1

# US ROCKIES WATTENBERG PLANNING

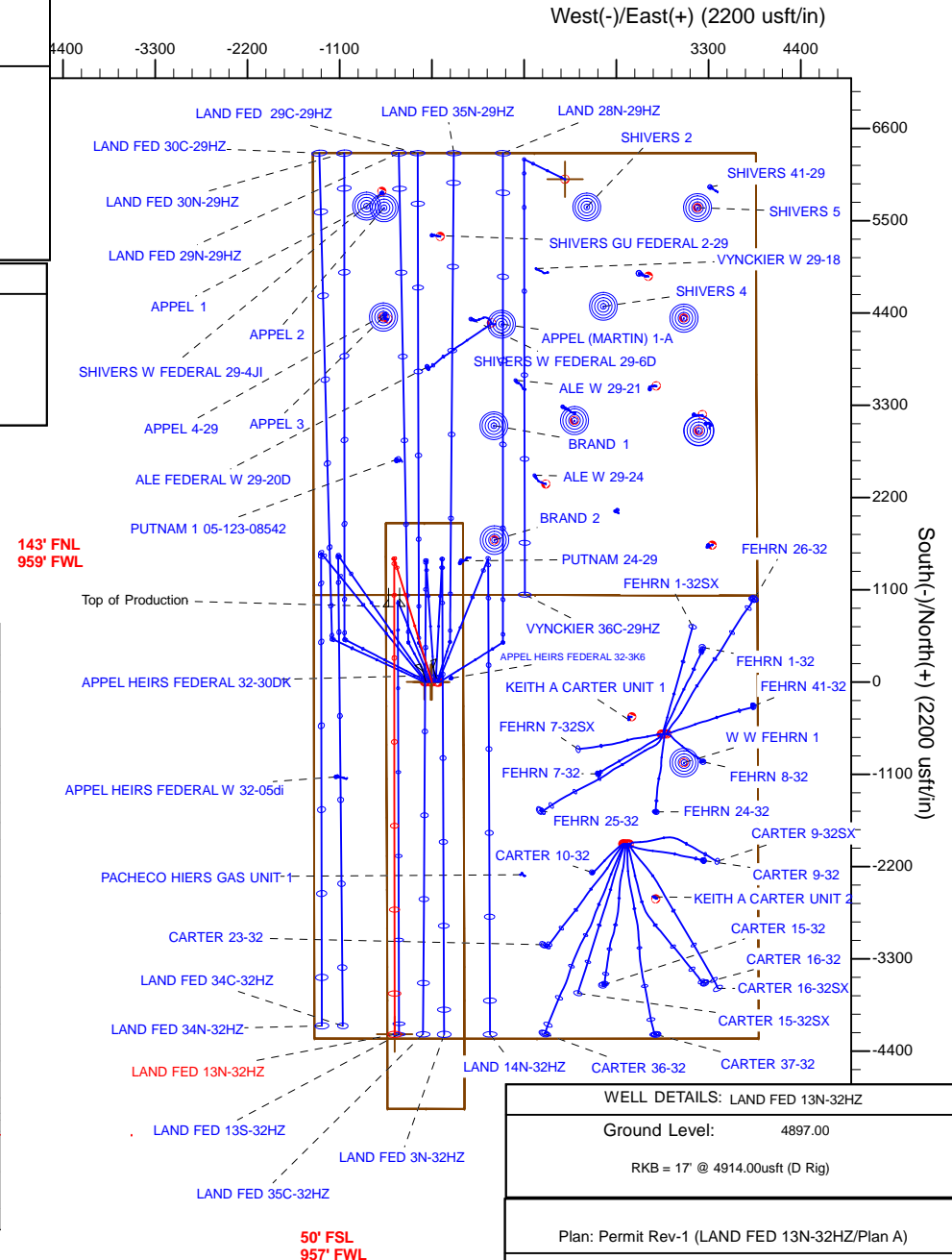
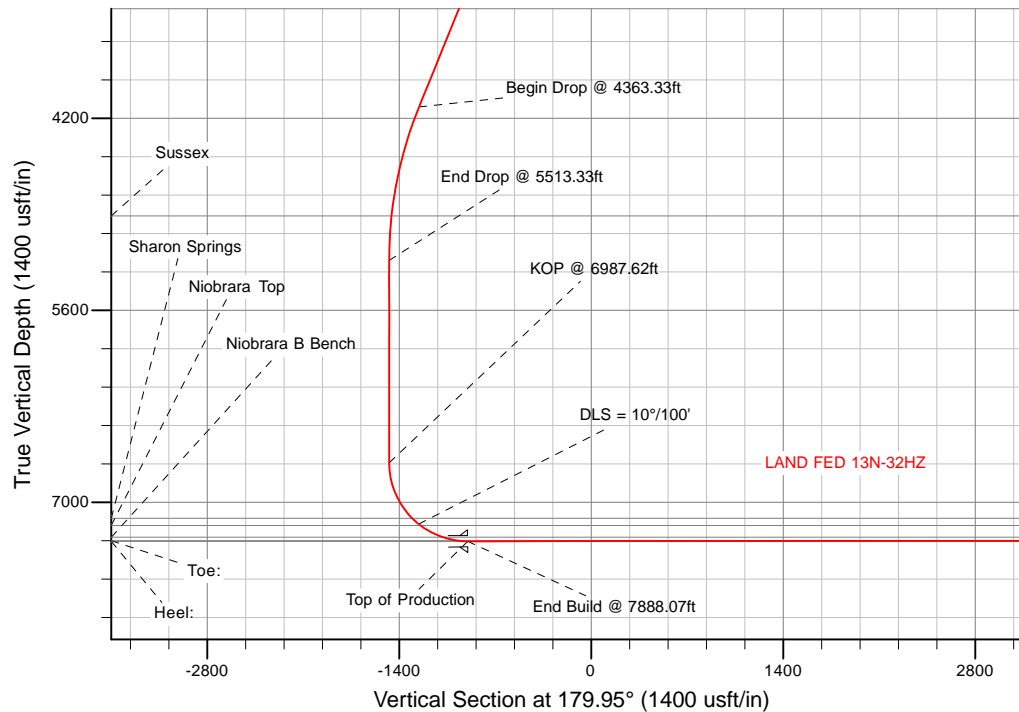
**HALLIBURTON**  
Sperry Drilling

## 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	1783.33	23.00	343.00	1742.48	290.38	-88.78	1.50	343.00	-290.46	
4	4363.33	23.00	343.00	4117.39	1254.42	-383.51	0.00	0.00	-1254.75	
5	5513.33	0.00	0.00	5236.75	1472.20	-450.10	2.00	180.00	-1472.60	
6	6987.62	0.00	0.00	6711.04	1472.20	-450.10	0.00	0.00	-1472.60	
7	7888.07	90.04	179.95	7284.00	898.80	-449.58	10.00	179.95	-899.19	
8	12986.22	90.04	179.95	7280.00	-4199.34	-444.99	0.00	0.00	4198.96	LAND FED 13N-32HZ_BHL

## WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
LAND FED 13N-32HZ_SHL	0.00	0.00	0.00	40.099027	-104.805520	Point
LAND FED 13N-32HZ_BHL	7280.00	-4199.34	-444.99	40.087495	-104.807111	Point



## Plan Report for LAND FED 13N-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
<b>2N-R66W-Sec. 32_Section Lines - LAND FED 13N-32HZ_SHL - Land Fed 13N-32HZ_Landing Diagram</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
250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Begin Nudge @ 250.00ft</b>										
300.00	0.75	343.00	300.00	0.31	-0.10	-0.31	1.50	1.50	0.00	343.00
400.00	2.25	343.00	399.96	2.82	-0.86	-2.82	1.50	1.50	0.00	0.00
500.00	3.75	343.00	499.82	7.82	-2.39	-7.82	1.50	1.50	0.00	0.00
600.00	5.25	343.00	599.51	15.32	-4.68	-15.33	1.50	1.50	0.00	0.00
700.00	6.75	343.00	698.96	25.32	-7.74	-25.33	1.50	1.50	0.00	0.00
800.00	8.25	343.00	798.10	37.80	-11.56	-37.81	1.50	1.50	0.00	0.00
900.00	9.75	343.00	896.87	52.76	-16.13	-52.78	1.50	1.50	0.00	0.00
1,000.00	11.25	343.00	995.19	70.19	-21.46	-70.21	1.50	1.50	0.00	0.00
1,100.00	12.75	343.00	1,093.00	90.07	-27.54	-90.09	1.50	1.50	0.00	0.00
1,200.00	14.25	343.00	1,190.24	112.39	-34.36	-112.42	1.50	1.50	0.00	0.00
1,300.00	15.75	343.00	1,286.83	137.14	-41.93	-137.18	1.50	1.50	0.00	0.00
1,322.02	16.08	343.00	1,308.00	142.92	-43.69	-142.96	1.50	1.50	0.00	0.00
<b>Fox Hills</b>										
1,400.00	17.25	343.00	1,382.71	164.30	-50.23	-164.35	1.50	1.50	0.00	0.00
1,500.00	18.75	343.00	1,477.81	193.85	-59.27	-193.91	1.50	1.50	0.00	0.00
1,600.00	20.25	343.00	1,572.07	225.78	-69.03	-225.84	1.50	1.50	0.00	0.00
1,629.81	20.70	343.00	1,600.00	235.75	-72.08	-235.81	1.50	1.50	0.00	0.00
<b>9 5/8"</b>										
1,700.00	21.75	343.00	1,665.43	260.05	-79.50	-260.11	1.50	1.50	0.00	0.00
1,783.33	23.00	343.00	1,742.48	290.38	-88.78	-290.46	1.50	1.50	0.00	0.00
<b>End Nudge @ 1783.33ft</b>										
1,800.00	23.00	343.00	1,757.82	296.61	-90.68	-296.69	0.00	0.00	0.00	0.00
1,900.00	23.00	343.00	1,849.88	333.97	-102.11	-334.06	0.00	0.00	0.00	0.00
2,000.00	23.00	343.00	1,941.93	371.34	-113.53	-371.44	0.00	0.00	0.00	0.00
2,100.00	23.00	343.00	2,033.98	408.71	-124.95	-408.82	0.00	0.00	0.00	0.00
2,128.03	23.00	343.00	2,059.78	419.18	-128.16	-419.29	0.00	0.00	0.00	0.00
<b>2N-R66W-Sec. 29_Section Lines</b>										
2,200.00	23.00	343.00	2,126.03	446.07	-136.38	-446.19	0.00	0.00	0.00	0.00
2,300.00	23.00	343.00	2,218.08	483.44	-147.80	-483.57	0.00	0.00	0.00	0.00
2,400.00	23.00	343.00	2,310.13	520.80	-159.23	-520.94	0.00	0.00	0.00	0.00
2,500.00	23.00	343.00	2,402.18	558.17	-170.65	-558.32	0.00	0.00	0.00	0.00
2,600.00	23.00	343.00	2,494.23	595.54	-182.07	-595.69	0.00	0.00	0.00	0.00
2,700.00	23.00	343.00	2,586.28	632.90	-193.50	-633.07	0.00	0.00	0.00	0.00
2,800.00	23.00	343.00	2,678.33	670.27	-204.92	-670.45	0.00	0.00	0.00	0.00
2,900.00	23.00	343.00	2,770.38	707.63	-216.34	-707.82	0.00	0.00	0.00	0.00
3,000.00	23.00	343.00	2,862.43	745.00	-227.77	-745.20	0.00	0.00	0.00	0.00
3,100.00	23.00	343.00	2,954.48	782.36	-239.19	-782.57	0.00	0.00	0.00	0.00
3,200.00	23.00	343.00	3,046.53	819.73	-250.62	-819.95	0.00	0.00	0.00	0.00
3,300.00	23.00	343.00	3,138.58	857.10	-262.04	-857.32	0.00	0.00	0.00	0.00
3,400.00	23.00	343.00	3,230.63	894.46	-273.46	-894.70	0.00	0.00	0.00	0.00
3,500.00	23.00	343.00	3,322.68	931.83	-284.89	-932.08	0.00	0.00	0.00	0.00
3,600.00	23.00	343.00	3,414.73	969.19	-296.31	-969.45	0.00	0.00	0.00	0.00
3,700.00	23.00	343.00	3,506.78	1,006.56	-307.74	-1,006.83	0.00	0.00	0.00	0.00
3,800.00	23.00	343.00	3,598.83	1,043.92	-319.16	-1,044.20	0.00	0.00	0.00	0.00
3,900.00	23.00	343.00	3,690.88	1,081.29	-330.58	-1,081.58	0.00	0.00	0.00	0.00
4,000.00	23.00	343.00	3,782.94	1,118.66	-342.01	-1,118.95	0.00	0.00	0.00	0.00
4,100.00	23.00	343.00	3,874.99	1,156.02	-353.43	-1,156.33	0.00	0.00	0.00	0.00
4,200.00	23.00	343.00	3,967.04	1,193.39	-364.86	-1,193.71	0.00	0.00	0.00	0.00
4,300.00	23.00	343.00	4,059.09	1,230.75	-376.28	-1,231.08	0.00	0.00	0.00	0.00
4,363.33	23.00	343.00	4,117.38	1,254.42	-383.51	-1,254.75	0.00	0.00	0.00	0.00
<b>Begin Drop @ 4363.33ft</b>										

## Plan Report for LAND FED 13N-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 (°)
4,400.00	22.27	343.00	4,151.23	1,267.91	-387.64	-1,268.25	2.00	-2.00	0.00	180.00
4,500.00	20.27	343.00	4,244.41	1,302.60	-398.24	-1,302.94	2.00	-2.00	0.00	180.00
4,600.00	18.27	343.00	4,338.81	1,334.15	-407.89	-1,334.51	2.00	-2.00	0.00	180.00
4,700.00	16.27	343.00	4,434.30	1,362.53	-416.57	-1,362.90	2.00	-2.00	0.00	180.00
4,800.00	14.27	343.00	4,530.76	1,387.71	-424.27	-1,388.08	2.00	-2.00	0.00	180.00
4,900.00	12.27	343.00	4,628.09	1,409.66	-430.98	-1,410.03	2.00	-2.00	0.00	180.00
5,000.00	10.27	343.00	4,726.16	1,428.34	-436.69	-1,428.72	2.00	-2.00	0.00	180.00
5,100.00	8.27	343.00	4,824.85	1,443.74	-441.40	-1,444.12	2.00	-2.00	0.00	180.00
5,187.89	6.51	343.00	4,912.00	1,454.55	-444.70	-1,454.93	2.00	-2.00	0.00	180.00
<b>Sussex</b>										
5,200.00	6.27	343.00	4,924.04	1,455.83	-445.09	-1,456.22	2.00	-2.00	0.00	-180.00
5,300.00	4.27	343.00	5,023.61	1,464.61	-447.78	-1,465.00	2.00	-2.00	0.00	180.00
5,400.00	2.27	343.00	5,123.44	1,470.06	-449.44	-1,470.45	2.00	-2.00	0.00	180.00
5,500.00	0.27	343.00	5,223.41	1,472.17	-450.09	-1,472.57	2.00	-2.00	0.00	180.00
5,513.33	0.00	343.00	5,236.74	1,472.20	-450.10	-1,472.60	2.00	-2.00	0.00	-180.00
<b>End Drop @ 5513.33ft</b>										
5,600.00	0.00	0.00	5,323.41	1,472.20	-450.10	-1,472.60	0.00	0.00	0.00	180.00
5,700.00	0.00	0.00	5,423.41	1,472.20	-450.10	-1,472.60	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,523.41	1,472.20	-450.10	-1,472.60	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,623.41	1,472.20	-450.10	-1,472.60	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	5,723.41	1,472.20	-450.10	-1,472.60	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	5,823.41	1,472.20	-450.10	-1,472.60	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	5,923.41	1,472.20	-450.10	-1,472.60	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,023.41	1,472.20	-450.10	-1,472.60	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,123.41	1,472.20	-450.10	-1,472.60	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,223.41	1,472.20	-450.10	-1,472.60	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,323.41	1,472.20	-450.10	-1,472.60	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,423.41	1,472.20	-450.10	-1,472.60	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,523.41	1,472.20	-450.10	-1,472.60	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,623.41	1,472.20	-450.10	-1,472.60	0.00	0.00	0.00	0.00
6,987.62	0.00	0.00	6,711.03	1,472.20	-450.10	-1,472.60	0.00	0.00	0.00	0.00
<b>KOP @ 6987.62ft</b>										
7,000.00	1.24	179.95	6,723.41	1,472.07	-450.10	-1,472.46	10.00	10.00	0.00	179.95
7,100.00	11.24	179.95	6,822.70	1,461.22	-450.09	-1,461.61	10.00	10.00	0.00	0.00
7,200.00	21.24	179.95	6,918.58	1,433.29	-450.06	-1,433.68	10.00	10.00	0.00	0.00
7,300.00	31.24	179.95	7,008.17	1,389.14	-450.02	-1,389.53	10.00	10.00	0.00	0.00
7,400.00	41.24	179.95	7,088.72	1,330.10	-449.97	-1,330.49	10.00	10.00	0.00	0.00
7,438.34	45.07	179.95	7,116.68	1,303.89	-449.95	-1,304.28	10.00	10.00	0.00	0.00
<b>Sharon Springs</b>										
7,500.00	51.24	179.95	7,157.80	1,257.97	-449.91	-1,258.36	10.00	10.00	0.00	0.00
<b>DLS = 10°/100'</b>										
7,519.39	53.18	179.95	7,169.68	1,242.65	-449.89	-1,243.04	10.00	10.00	0.00	0.00
<b>Niobrara Top</b>										
7,600.00	61.24	179.95	7,213.31	1,174.94	-449.83	-1,175.33	10.00	10.00	0.00	0.00
7,700.00	71.24	179.95	7,253.55	1,083.54	-449.75	-1,083.93	10.00	10.00	0.00	0.00
7,703.73	71.61	179.95	7,254.74	1,080.00	-449.75	-1,080.39	10.00	10.00	0.00	0.00
<b>Niobrara B Bench</b>										
7,800.00	81.24	179.95	7,277.31	986.53	-449.66	-986.92	10.00	10.00	0.00	0.00
7,888.07	90.04	179.95	7,284.00	898.80	-449.58	-899.19	10.00	10.00	0.00	0.00
<b>End Build @ 7888.07ft - Heel: - Top of Production</b>										
7,900.00	90.04	179.95	7,283.99	886.87	-449.57	-887.26	0.00	0.00	0.00	0.00
8,000.00	90.04	179.95	7,283.91	786.87	-449.48	-787.26	0.00	0.00	0.00	0.00
8,100.00	90.04	179.95	7,283.83	686.87	-449.39	-687.26	0.00	0.00	0.00	0.00
8,200.00	90.04	179.95	7,283.75	586.87	-449.30	-587.26	0.00	0.00	0.00	0.00
8,300.00	90.04	179.95	7,283.67	486.87	-449.21	-487.26	0.00	0.00	0.00	0.00
8,400.00	90.04	179.95	7,283.59	386.87	-449.12	-387.26	0.00	0.00	0.00	0.00
8,500.00	90.04	179.95	7,283.52	286.87	-449.03	-287.26	0.00	0.00	0.00	0.00
8,600.00	90.04	179.95	7,283.44	186.87	-448.94	-187.26	0.00	0.00	0.00	0.00
8,700.00	90.04	179.95	7,283.36	86.87	-448.85	-87.26	0.00	0.00	0.00	0.00

## Plan Report for LAND FED 13N-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 (°)
8,800.00	90.04	179.95	7,283.28	-13.13	-448.76	12.74	0.00	0.00	0.00	0.00
8,900.00	90.04	179.95	7,283.20	-113.13	-448.67	112.74	0.00	0.00	0.00	0.00
9,000.00	90.04	179.95	7,283.12	-213.13	-448.58	212.74	0.00	0.00	0.00	0.00
9,100.00	90.04	179.95	7,283.05	-313.13	-448.49	312.74	0.00	0.00	0.00	0.00
9,200.00	90.04	179.95	7,282.97	-413.13	-448.40	412.74	0.00	0.00	0.00	0.00
9,300.00	90.04	179.95	7,282.89	-513.13	-448.31	512.74	0.00	0.00	0.00	0.00
9,400.00	90.04	179.95	7,282.81	-613.13	-448.22	612.74	0.00	0.00	0.00	0.00
9,500.00	90.04	179.95	7,282.73	-713.13	-448.13	712.74	0.00	0.00	0.00	0.00
9,600.00	90.04	179.95	7,282.65	-813.13	-448.04	812.74	0.00	0.00	0.00	0.00
9,700.00	90.04	179.95	7,282.58	-913.13	-447.95	912.74	0.00	0.00	0.00	0.00
9,800.00	90.04	179.95	7,282.50	-1,013.13	-447.86	1,012.74	0.00	0.00	0.00	0.00
9,900.00	90.04	179.95	7,282.42	-1,113.13	-447.77	1,112.74	0.00	0.00	0.00	0.00
10,000.00	90.04	179.95	7,282.34	-1,213.13	-447.68	1,212.74	0.00	0.00	0.00	0.00
10,100.00	90.04	179.95	7,282.26	-1,313.13	-447.59	1,312.74	0.00	0.00	0.00	0.00
10,200.00	90.04	179.95	7,282.18	-1,413.13	-447.50	1,412.74	0.00	0.00	0.00	0.00
10,300.00	90.04	179.95	7,282.11	-1,513.13	-447.41	1,512.74	0.00	0.00	0.00	0.00
10,400.00	90.04	179.95	7,282.03	-1,613.13	-447.32	1,612.74	0.00	0.00	0.00	0.00
10,500.00	90.04	179.95	7,281.95	-1,713.13	-447.23	1,712.74	0.00	0.00	0.00	0.00
10,600.00	90.04	179.95	7,281.87	-1,813.13	-447.14	1,812.74	0.00	0.00	0.00	0.00
10,700.00	90.04	179.95	7,281.79	-1,913.13	-447.05	1,912.74	0.00	0.00	0.00	0.00
10,800.00	90.04	179.95	7,281.71	-2,013.13	-446.96	2,012.74	0.00	0.00	0.00	0.00
10,900.00	90.04	179.95	7,281.63	-2,113.13	-446.87	2,112.74	0.00	0.00	0.00	0.00
11,000.00	90.04	179.95	7,281.56	-2,213.13	-446.78	2,212.74	0.00	0.00	0.00	0.00
11,100.00	90.04	179.95	7,281.48	-2,313.13	-446.69	2,312.74	0.00	0.00	0.00	0.00
11,200.00	90.04	179.95	7,281.40	-2,413.13	-446.60	2,412.74	0.00	0.00	0.00	0.00
11,300.00	90.04	179.95	7,281.32	-2,513.13	-446.51	2,512.74	0.00	0.00	0.00	0.00
11,400.00	90.04	179.95	7,281.24	-2,613.13	-446.42	2,612.74	0.00	0.00	0.00	0.00
11,500.00	90.04	179.95	7,281.16	-2,713.13	-446.33	2,712.74	0.00	0.00	0.00	0.00
11,600.00	90.04	179.95	7,281.09	-2,813.13	-446.24	2,812.74	0.00	0.00	0.00	0.00
11,700.00	90.04	179.95	7,281.01	-2,913.13	-446.15	2,912.74	0.00	0.00	0.00	0.00
11,800.00	90.04	179.95	7,280.93	-3,013.13	-446.06	3,012.74	0.00	0.00	0.00	0.00
11,900.00	90.04	179.95	7,280.85	-3,113.13	-445.97	3,112.74	0.00	0.00	0.00	0.00
12,000.00	90.04	179.95	7,280.77	-3,213.13	-445.88	3,212.74	0.00	0.00	0.00	0.00
12,100.00	90.04	179.95	7,280.69	-3,313.13	-445.79	3,312.74	0.00	0.00	0.00	0.00
12,200.00	90.04	179.95	7,280.62	-3,413.13	-445.70	3,412.74	0.00	0.00	0.00	0.00
12,300.00	90.04	179.95	7,280.54	-3,513.13	-445.61	3,512.74	0.00	0.00	0.00	0.00
12,400.00	90.04	179.95	7,280.46	-3,613.13	-445.52	3,612.74	0.00	0.00	0.00	0.00
12,500.00	90.04	179.95	7,280.38	-3,713.13	-445.43	3,712.74	0.00	0.00	0.00	0.00
12,600.00	90.04	179.95	7,280.30	-3,813.13	-445.34	3,812.74	0.00	0.00	0.00	0.00
12,700.00	90.04	179.95	7,280.22	-3,913.13	-445.25	3,912.74	0.00	0.00	0.00	0.00
12,800.00	90.04	179.95	7,280.15	-4,013.13	-445.16	4,012.74	0.00	0.00	0.00	0.00
12,900.00	90.04	179.95	7,280.07	-4,113.13	-445.07	4,112.74	0.00	0.00	0.00	0.00
12,986.22	90.04	179.95	7,280.00	-4,199.34	-444.99	4,198.96	0.00	0.00	0.00	0.00

TD Well @ 12986.22ft - LAND FED 13N-32HZ\_BHL

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
1,783.33	1,742.48	290.38	-88.78	End Nudge @ 1783.33ft
4,363.33	4,117.38	1,254.42	-383.51	Begin Drop @ 4363.33ft
5,513.33	5,236.74	1,472.20	-450.10	End Drop @ 5513.33ft
6,987.62	6,711.03	1,472.20	-450.10	KOP @ 6987.62ft
7,500.00	7,157.80	1,257.97	-449.91	DLS = 10°/100'
7,888.07	7,284.00	898.80	-449.58	End Build @ 7888.07ft
12,986.22	7,280.00	-4,199.34	-444.99	TD Well @ 12986.22ft

**Plan Report for LAND FED 13N-32HZ - Permit Rev-1****Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	179.95	Slot	0.00	0.00	0.00

**Survey tool program**

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	7,888.07	Permit Rev-1	APC_ISCWSA REV 2 MWD+IFR1
7,888.07	12,986.22	Permit Rev-1	APC_ISCWSA REV 2 MWD+IFR1

**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
7,888.07	7,284.00	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	
5,187.89	4,912.00	Sussex		0.00	
7,438.34	7,116.68	Sharon Springs		0.00	
7,519.39	7,169.68	Niobrara Top		0.00	
7,703.73	7,254.74	Niobrara B Bench		0.00	
7,888.07	7,284.00	Heel:		0.00	
12,986.22	7,280.00	Toe:		0.00	

**Targets associated with this wellbore**

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
2N-R66W-Sec. 29_Section Lines	10.00	5,993.57	1,588.29	Polygon
2N-R66W-Sec. 32_Section Lines	0.00	0.73	-90.05	Polygon
LAND FED 13N-32HZ_SHL	0.00	0.00	-15.10	Point
Land Fed 13N-32HZ_Landing Diagram	0.00	0.00	0.00	Polygon
LAND FED 13N-32HZ_BHL	7,280.00	-4,199.34	-444.99	Point

## North Reference Sheet for 2N-66W-32 Land Fed 13S-32HZ Pad - LAND FED 13N-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 13N-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: 14,562,852.97 usft N, 1,694,802.24 usft E

Geographical Coordinates of Well: 40° 05' 56.50" N, 104° 48' 19.87" W

Grid Convergence at Surface is: 0.13°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,986.22usft  
the Bottom Hole Displacement is 4,222.86usft in the Direction of 186.05° (True).

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

