

# US ROCKIES WATTENBERG PLANNING

WELD-NAD83-UTMFT13N

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

LAND FED 35C-32HZ

Plan A

Plan: Permit Rev-1

## Sperry Drilling Services Proposal Report

27 May, 2015

Well Coordinates: 14,562,852.67 N, 1,694,832.16 E (40° 05' 56.49" N, 104° 48' 19.49" W)

Ground Level: 4,897.00 usft

Local Coordinate Origin:

Centered on Well LAND FED 35C-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 35C-32HZ  
Wellbore: Plan A  
Design: Permit Rev-1

# US ROCKIES WATTENBERG PLANNING

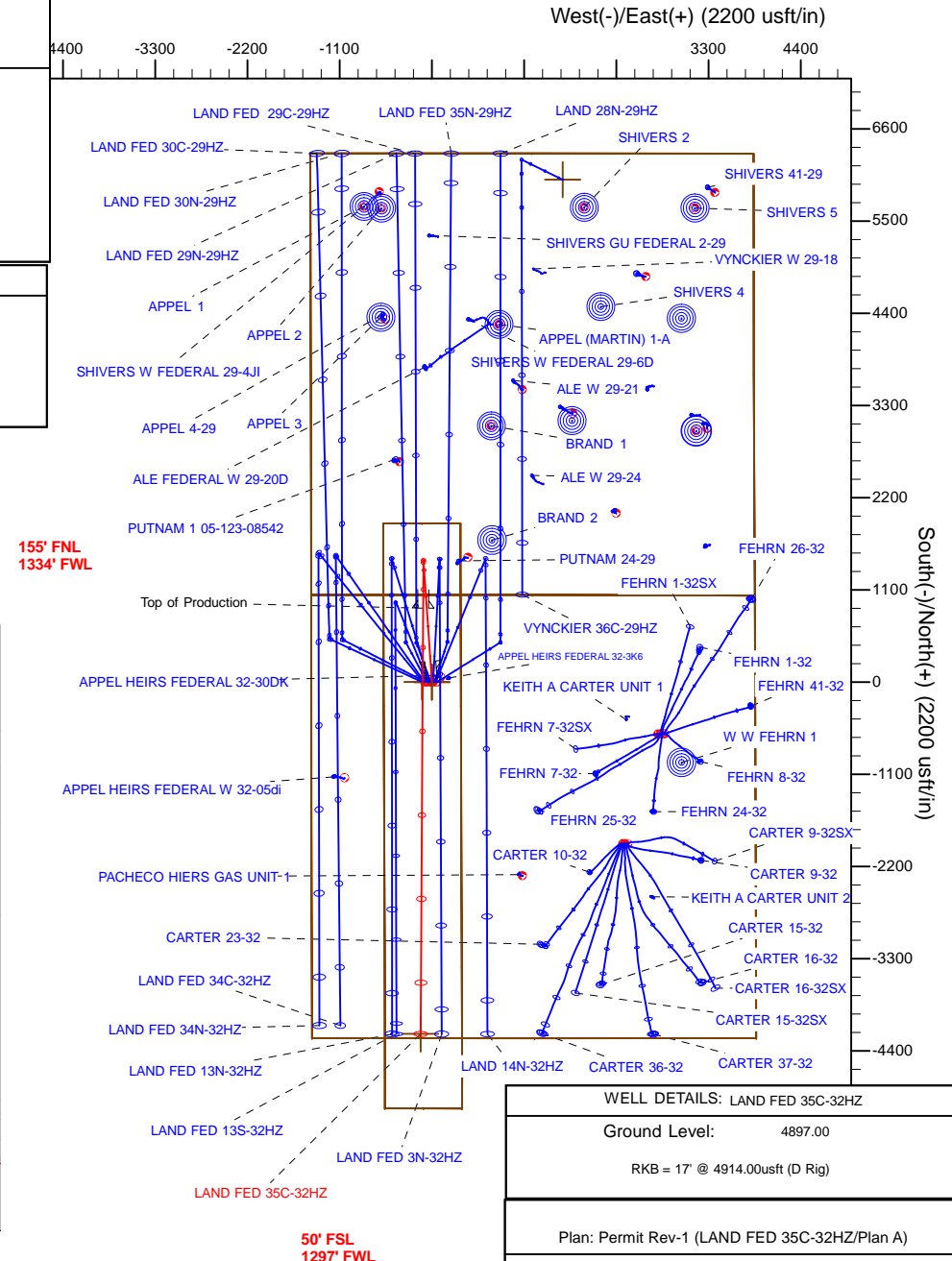
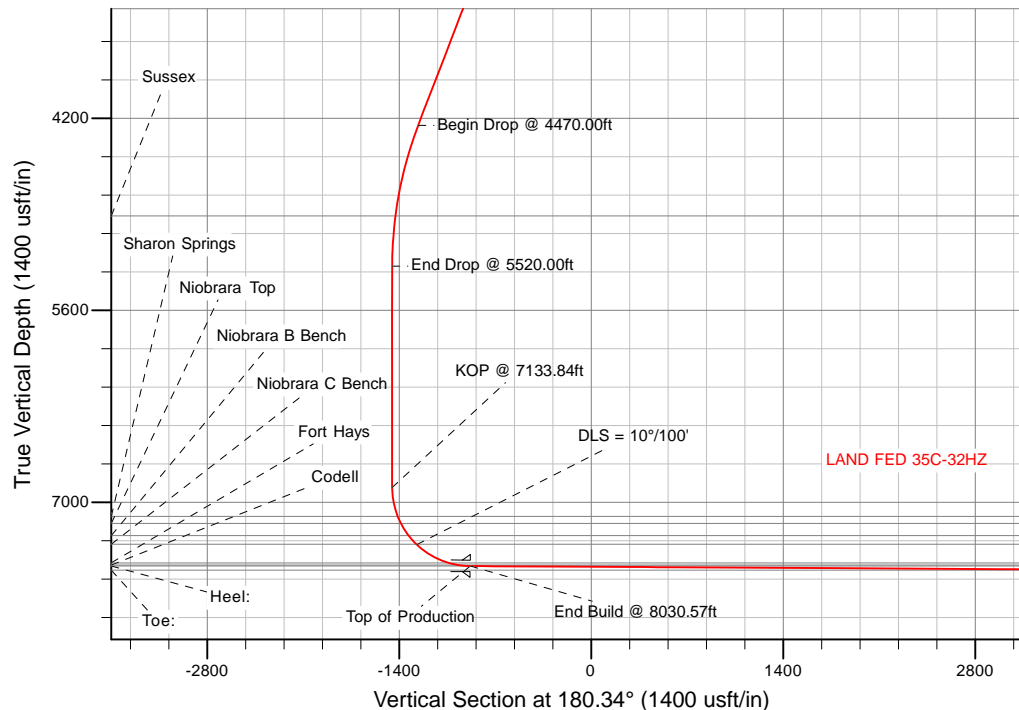
**HALLIBURTON**  
Sperry Drilling

## 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	1650.00	21.00	356.00	1618.86	253.09	-17.70	1.50	356.00	-252.98	
4	4470.00	21.00	356.00	4251.56	1261.22	-88.19	0.00	0.00	-1260.68	
5	5520.00	0.00	0.00	5278.21	1451.04	-101.47	2.00	180.00	-1450.41	
6	7133.84	0.00	0.00	6892.05	1451.04	-101.47	0.00	0.00	-1450.41	
7	8030.57	89.67	180.34	7465.00	881.36	-104.86	10.00	180.34	-880.72	
8	13111.09	89.67	180.34	7494.00	-4198.98	-135.09	0.00	0.00	4199.71	LAND 35C-32HZ_BHL

## WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
LAND 35C-32HZ_SHL	0.00	0.00	0.00	40.099026	-104.805413	Point
LAND 35C-32HZ_BHL	7494.00	-4198.98	-135.09	40.087495	-104.805896	Point



## WELL DETAILS: LAND FED 35C-32HZ

Ground Level: 4897.00

RKB = 17' @ 4914.00usft (D Rig)

Plan: Permit Rev-1 (LAND FED 35C-32HZ/Plan A)

Created By: Clint Eshelman

Date: 5/27/2015

Reviewed:

Date:

## Plan Report for LAND FED 35C-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
LAND 35C-32HZ_Landing Diagram - 2N-R66W-Sec. 32_Section Lines - LAND 35C-32HZ_SHL										
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	356.00	300.00	0.33	-0.02	-0.33	1.50	1.50	0.00	356.00
400.00	2.25	356.00	399.96	2.94	-0.21	-2.94	1.50	1.50	0.00	0.00
500.00	3.75	356.00	499.82	8.16	-0.57	-8.15	1.50	1.50	0.00	0.00
600.00	5.25	356.00	599.51	15.98	-1.12	-15.98	1.50	1.50	0.00	0.00
700.00	6.75	356.00	698.96	26.41	-1.85	-26.40	1.50	1.50	0.00	0.00
800.00	8.25	356.00	798.10	39.43	-2.76	-39.42	1.50	1.50	0.00	0.00
900.00	9.75	356.00	896.87	55.04	-3.85	-55.01	1.50	1.50	0.00	0.00
1,000.00	11.25	356.00	995.19	73.22	-5.12	-73.18	1.50	1.50	0.00	0.00
1,100.00	12.75	356.00	1,093.00	93.96	-6.57	-93.92	1.50	1.50	0.00	0.00
1,200.00	14.25	356.00	1,190.24	117.24	-8.20	-117.19	1.50	1.50	0.00	0.00
1,300.00	15.75	356.00	1,286.83	143.06	-10.00	-143.00	1.50	1.50	0.00	0.00
1,322.02	16.08	356.00	1,308.00	149.08	-10.42	-149.02	1.50	1.50	0.00	0.00
Fox Hills										
1,400.00	17.25	356.00	1,382.71	171.39	-11.98	-171.32	1.50	1.50	0.00	0.00
1,500.00	18.75	356.00	1,477.81	202.22	-14.14	-202.13	1.50	1.50	0.00	0.00
1,600.00	20.25	356.00	1,572.07	235.52	-16.47	-235.41	1.50	1.50	0.00	0.00
1,629.81	20.70	356.00	1,600.00	245.92	-17.20	-245.81	1.50	1.50	0.00	0.00
9 5/8"										
1,650.00	21.00	356.00	1,618.86	253.09	-17.70	-252.98	1.50	1.50	0.00	0.00
End Nudge @ 1650.00ft										
1,700.00	21.00	356.00	1,665.54	270.96	-18.95	-270.84	0.00	0.00	0.00	0.00
1,800.00	21.00	356.00	1,758.90	306.71	-21.45	-306.58	0.00	0.00	0.00	0.00
1,900.00	21.00	356.00	1,852.26	342.46	-23.95	-342.31	0.00	0.00	0.00	0.00
2,000.00	21.00	356.00	1,945.62	378.21	-26.45	-378.05	0.00	0.00	0.00	0.00
2,100.00	21.00	356.00	2,038.98	413.96	-28.95	-413.78	0.00	0.00	0.00	0.00
2,160.92	21.00	356.00	2,095.85	435.74	-30.47	-435.55	0.00	0.00	0.00	0.00
2N-R66W-Sec. 29_Section Lines										
2,200.00	21.00	356.00	2,132.33	449.71	-31.45	-449.51	0.00	0.00	0.00	0.00
2,300.00	21.00	356.00	2,225.69	485.46	-33.95	-485.25	0.00	0.00	0.00	0.00
2,400.00	21.00	356.00	2,319.05	521.21	-36.45	-520.98	0.00	0.00	0.00	0.00
2,500.00	21.00	356.00	2,412.41	556.96	-38.95	-556.72	0.00	0.00	0.00	0.00
2,600.00	21.00	356.00	2,505.77	592.71	-41.45	-592.45	0.00	0.00	0.00	0.00
2,700.00	21.00	356.00	2,599.12	628.46	-43.95	-628.18	0.00	0.00	0.00	0.00
2,800.00	21.00	356.00	2,692.48	664.21	-46.45	-663.92	0.00	0.00	0.00	0.00
2,900.00	21.00	356.00	2,785.84	699.95	-48.95	-699.65	0.00	0.00	0.00	0.00
3,000.00	21.00	356.00	2,879.20	735.70	-51.45	-735.39	0.00	0.00	0.00	0.00
3,100.00	21.00	356.00	2,972.56	771.45	-53.95	-771.12	0.00	0.00	0.00	0.00
3,200.00	21.00	356.00	3,065.91	807.20	-56.45	-806.85	0.00	0.00	0.00	0.00
3,300.00	21.00	356.00	3,159.27	842.95	-58.95	-842.59	0.00	0.00	0.00	0.00
3,400.00	21.00	356.00	3,252.63	878.70	-61.44	-878.32	0.00	0.00	0.00	0.00
3,500.00	21.00	356.00	3,345.99	914.45	-63.94	-914.06	0.00	0.00	0.00	0.00
3,600.00	21.00	356.00	3,439.35	950.20	-66.44	-949.79	0.00	0.00	0.00	0.00
3,700.00	21.00	356.00	3,532.70	985.95	-68.94	-985.52	0.00	0.00	0.00	0.00
3,800.00	21.00	356.00	3,626.06	1,021.70	-71.44	-1,021.26	0.00	0.00	0.00	0.00
3,900.00	21.00	356.00	3,719.42	1,057.45	-73.94	-1,056.99	0.00	0.00	0.00	0.00
4,000.00	21.00	356.00	3,812.78	1,093.20	-76.44	-1,092.73	0.00	0.00	0.00	0.00
4,100.00	21.00	356.00	3,906.14	1,128.95	-78.94	-1,128.46	0.00	0.00	0.00	0.00
4,200.00	21.00	356.00	3,999.49	1,164.70	-81.44	-1,164.19	0.00	0.00	0.00	0.00
4,300.00	21.00	356.00	4,092.85	1,200.45	-83.94	-1,199.93	0.00	0.00	0.00	0.00
4,400.00	21.00	356.00	4,186.21	1,236.20	-86.44	-1,235.66	0.00	0.00	0.00	0.00
4,470.00	21.00	356.00	4,251.56	1,261.22	-88.19	-1,260.68	0.00	0.00	0.00	0.00

## Plan Report for LAND FED 35C-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 (°)
<b>Begin Drop @ 4470.00ft</b>										
4,500.00	20.40	356.00	4,279.62	1,271.80	-88.93	-1,271.25	2.00	-2.00	0.00	180.00
4,600.00	18.40	356.00	4,373.94	1,304.93	-91.25	-1,304.37	2.00	-2.00	0.00	180.00
4,700.00	16.40	356.00	4,469.36	1,334.76	-93.34	-1,334.19	2.00	-2.00	0.00	180.00
4,800.00	14.40	356.00	4,565.77	1,361.25	-95.19	-1,360.66	2.00	-2.00	0.00	180.00
4,900.00	12.40	356.00	4,663.04	1,384.37	-96.80	-1,383.77	2.00	-2.00	0.00	180.00
5,000.00	10.40	356.00	4,761.06	1,404.09	-98.18	-1,403.48	2.00	-2.00	0.00	180.00
5,100.00	8.40	356.00	4,859.71	1,420.38	-99.32	-1,419.76	2.00	-2.00	0.00	180.00
5,152.79	7.34	356.00	4,912.00	1,427.59	-99.83	-1,426.97	2.00	-2.00	0.00	180.00
<b>Sussex</b>										
5,200.00	6.40	356.00	4,958.88	1,433.23	-100.22	-1,432.61	2.00	-2.00	0.00	180.00
5,300.00	4.40	356.00	5,058.43	1,442.61	-100.88	-1,441.99	2.00	-2.00	0.00	180.00
5,400.00	2.40	356.00	5,158.25	1,448.53	-101.29	-1,447.90	2.00	-2.00	0.00	180.00
5,500.00	0.40	356.00	5,258.21	1,450.97	-101.46	-1,450.34	2.00	-2.00	0.00	180.00
5,520.00	0.00	0.00	5,278.21	1,451.04	-101.47	-1,450.41	2.00	-2.00	20.00	180.00
<b>End Drop @ 5520.00ft</b>										
5,600.00	0.00	0.00	5,358.21	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,458.21	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,558.21	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,658.21	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	5,758.21	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	5,858.21	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	5,958.21	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,058.21	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,158.21	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,258.21	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,358.21	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,458.21	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,558.21	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,658.21	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
7,000.00	0.00	0.00	6,758.21	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
7,100.00	0.00	0.00	6,858.21	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
7,133.84	0.00	0.00	6,892.05	1,451.04	-101.47	-1,450.41	0.00	0.00	0.00	0.00
<b>KOP @ 7133.84ft</b>										
7,200.00	6.62	180.34	6,958.06	1,447.22	-101.49	-1,446.59	10.00	10.00	-271.55	-179.66
7,300.00	16.62	180.34	7,055.89	1,427.11	-101.61	-1,426.48	10.00	10.00	0.00	0.00
7,348.47	21.46	180.34	7,101.70	1,411.30	-101.70	-1,410.68	10.00	10.00	0.00	0.00
<b>Sharon Springs</b>										
7,400.00	26.62	180.34	7,148.74	1,390.32	-101.83	-1,389.69	10.00	10.00	0.00	0.00
7,406.68	27.28	180.34	7,154.70	1,387.29	-101.85	-1,386.66	10.00	10.00	0.00	0.00
<b>Niobrara Top</b>										
7,500.00	36.62	180.34	7,233.79	1,337.97	-102.14	-1,337.34	10.00	10.00	0.00	0.00
7,510.08	37.62	180.34	7,241.83	1,331.88	-102.18	-1,331.25	10.00	10.00	0.00	0.00
<b>Niobrara B Bench</b>										
7,594.81	46.10	180.34	7,304.88	1,275.39	-102.51	-1,274.76	10.00	10.00	0.00	0.00
<b>Niobrara C Bench</b>										
7,600.00	46.62	180.34	7,308.46	1,271.64	-102.53	-1,271.01	10.00	10.00	0.00	0.00
<b>DLS = 10°/100'</b>										
7,700.00	56.62	180.34	7,370.47	1,193.35	-103.00	-1,192.72	10.00	10.00	0.00	0.00
7,800.00	66.62	180.34	7,417.95	1,105.49	-103.52	-1,104.85	10.00	10.00	0.00	0.00
7,874.08	74.02	180.34	7,442.88	1,035.79	-103.94	-1,035.15	10.00	10.00	0.00	0.00
<b>Fort Hays</b>										
7,900.00	76.62	180.34	7,449.45	1,010.71	-104.09	-1,010.08	10.00	10.00	0.00	0.00
7,941.69	80.79	180.34	7,457.61	969.84	-104.33	-969.20	10.00	10.00	0.00	0.00
<b>Codell</b>										
8,000.00	86.62	180.34	7,464.01	911.91	-104.68	-911.27	10.00	10.00	0.00	0.00
8,030.57	89.67	180.34	7,465.00	881.36	-104.86	-880.72	10.00	10.00	0.00	0.00
<b>End Build @ 8030.57ft - Heel: - Top of Production</b>										

## Plan Report for LAND FED 35C-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 (°)
8,100.00	89.67	180.34	7,465.39	811.93	-105.27	-811.29	0.00	0.00	0.00	0.00
8,200.00	89.67	180.34	7,465.97	711.93	-105.87	-711.29	0.00	0.00	0.00	0.00
8,300.00	89.67	180.34	7,466.54	611.94	-106.46	-611.30	0.00	0.00	0.00	0.00
8,400.00	89.67	180.34	7,467.11	511.94	-107.06	-511.30	0.00	0.00	0.00	0.00
8,500.00	89.67	180.34	7,467.68	411.94	-107.65	-411.30	0.00	0.00	0.00	0.00
8,600.00	89.67	180.34	7,468.25	311.95	-108.25	-311.30	0.00	0.00	0.00	0.00
8,700.00	89.67	180.34	7,468.82	211.95	-108.84	-211.30	0.00	0.00	0.00	0.00
8,800.00	89.67	180.34	7,469.39	111.95	-109.44	-111.30	0.00	0.00	0.00	0.00
8,900.00	89.67	180.34	7,469.96	11.96	-110.03	-11.31	0.00	0.00	0.00	0.00
9,000.00	89.67	180.34	7,470.53	-88.04	-110.63	88.69	0.00	0.00	0.00	0.00
9,100.00	89.67	180.34	7,471.10	-188.03	-111.22	188.69	0.00	0.00	0.00	0.00
9,200.00	89.67	180.34	7,471.67	-288.03	-111.82	288.69	0.00	0.00	0.00	0.00
9,300.00	89.67	180.34	7,472.24	-388.03	-112.41	388.69	0.00	0.00	0.00	0.00
9,400.00	89.67	180.34	7,472.82	-488.02	-113.01	488.69	0.00	0.00	0.00	0.00
9,500.00	89.67	180.34	7,473.39	-588.02	-113.60	588.69	0.00	0.00	0.00	0.00
9,600.00	89.67	180.34	7,473.96	-688.02	-114.20	688.68	0.00	0.00	0.00	0.00
9,700.00	89.67	180.34	7,474.53	-788.01	-114.79	788.68	0.00	0.00	0.00	0.00
9,800.00	89.67	180.34	7,475.10	-888.01	-115.39	888.68	0.00	0.00	0.00	0.00
9,900.00	89.67	180.34	7,475.67	-988.01	-115.98	988.68	0.00	0.00	0.00	0.00
10,000.00	89.67	180.34	7,476.24	-1,088.00	-116.58	1,088.68	0.00	0.00	0.00	0.00
10,100.00	89.67	180.34	7,476.81	-1,188.00	-117.17	1,188.68	0.00	0.00	0.00	0.00
10,200.00	89.67	180.34	7,477.38	-1,288.00	-117.77	1,288.67	0.00	0.00	0.00	0.00
10,300.00	89.67	180.34	7,477.95	-1,387.99	-118.36	1,388.67	0.00	0.00	0.00	0.00
10,400.00	89.67	180.34	7,478.52	-1,487.99	-118.96	1,488.67	0.00	0.00	0.00	0.00
10,500.00	89.67	180.34	7,479.09	-1,587.99	-119.55	1,588.67	0.00	0.00	0.00	0.00
10,600.00	89.67	180.34	7,479.67	-1,687.98	-120.15	1,688.67	0.00	0.00	0.00	0.00
10,700.00	89.67	180.34	7,480.24	-1,787.98	-120.74	1,788.67	0.00	0.00	0.00	0.00
10,800.00	89.67	180.34	7,480.81	-1,887.98	-121.34	1,888.66	0.00	0.00	0.00	0.00
10,900.00	89.67	180.34	7,481.38	-1,987.97	-121.93	1,988.66	0.00	0.00	0.00	0.00
11,000.00	89.67	180.34	7,481.95	-2,087.97	-122.53	2,088.66	0.00	0.00	0.00	0.00
11,100.00	89.67	180.34	7,482.52	-2,187.97	-123.12	2,188.66	0.00	0.00	0.00	0.00
11,200.00	89.67	180.34	7,483.09	-2,287.96	-123.72	2,288.66	0.00	0.00	0.00	0.00
11,300.00	89.67	180.34	7,483.66	-2,387.96	-124.32	2,388.66	0.00	0.00	0.00	0.00
11,400.00	89.67	180.34	7,484.23	-2,487.96	-124.91	2,488.65	0.00	0.00	0.00	0.00
11,500.00	89.67	180.34	7,484.80	-2,587.95	-125.51	2,588.65	0.00	0.00	0.00	0.00
11,600.00	89.67	180.34	7,485.37	-2,687.95	-126.10	2,688.65	0.00	0.00	0.00	0.00
11,700.00	89.67	180.34	7,485.94	-2,787.95	-126.70	2,788.65	0.00	0.00	0.00	0.00
11,800.00	89.67	180.34	7,486.52	-2,887.94	-127.29	2,888.65	0.00	0.00	0.00	0.00
11,900.00	89.67	180.34	7,487.09	-2,987.94	-127.89	2,988.65	0.00	0.00	0.00	0.00
12,000.00	89.67	180.34	7,487.66	-3,087.94	-128.48	3,088.64	0.00	0.00	0.00	0.00
12,100.00	89.67	180.34	7,488.23	-3,187.93	-129.08	3,188.64	0.00	0.00	0.00	0.00
12,200.00	89.67	180.34	7,488.80	-3,287.93	-129.67	3,288.64	0.00	0.00	0.00	0.00
12,300.00	89.67	180.34	7,489.37	-3,387.93	-130.27	3,388.64	0.00	0.00	0.00	0.00
12,400.00	89.67	180.34	7,489.94	-3,487.92	-130.86	3,488.64	0.00	0.00	0.00	0.00
12,500.00	89.67	180.34	7,490.51	-3,587.92	-131.46	3,588.64	0.00	0.00	0.00	0.00
12,600.00	89.67	180.34	7,491.08	-3,687.92	-132.05	3,688.63	0.00	0.00	0.00	0.00
12,700.00	89.67	180.34	7,491.65	-3,787.91	-132.65	3,788.63	0.00	0.00	0.00	0.00
12,800.00	89.67	180.34	7,492.22	-3,887.91	-133.24	3,888.63	0.00	0.00	0.00	0.00
12,900.00	89.67	180.34	7,492.80	-3,987.91	-133.84	3,988.63	0.00	0.00	0.00	0.00
13,000.00	89.67	180.34	7,493.37	-4,087.90	-134.43	4,088.63	0.00	0.00	0.00	0.00
13,100.00	89.67	180.34	7,493.94	-4,187.90	-135.03	4,188.63	0.00	0.00	0.00	0.00
13,111.08	89.67	180.34	7,494.00	-4,198.98	-135.09	4,199.71	0.00	0.00	0.00	0.00
Toe:										
13,111.09	89.67	180.34	7,494.00	-4,198.98	-135.09	4,199.71	0.00	0.00	0.00	0.00
TD Well @ 13111.09ft - LAND 35C-32HZ_BHL										

## Plan Report for LAND FED 35C-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
1,650.00	1,618.86	253.09	-17.70	End Nudge @ 1650.00ft
4,470.00	4,251.56	1,261.22	-88.19	Begin Drop @ 4470.00ft
5,520.00	5,278.21	1,451.04	-101.47	End Drop @ 5520.00ft
7,133.84	6,892.05	1,451.04	-101.47	KOP @ 7133.84ft
7,600.00	7,308.46	1,271.64	-102.53	DLS = 10°/100'
8,030.57	7,465.00	881.36	-104.86	End Build @ 8030.57ft
13,111.09	7,494.00	-4,198.98	-135.09	TD Well @ 13111.09ft

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	180.34	Slot	0.00	0.00	0.00

**Survey tool program**

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	8,030.57	Permit Rev-1	APC_ISCWSA REV 2 MWD+IFR1
8,030.57	13,111.09	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
8,030.57	7,465.00	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	
5,152.79	4,912.00	Sussex		0.00	
7,348.47	7,101.70	Sharon Springs		0.00	
7,406.68	7,154.70	Niobrara Top		0.00	
7,510.08	7,241.83	Niobrara B Bench		0.00	
7,594.81	7,304.88	Niobrara C Bench		0.00	
7,874.08	7,442.88	Fort Hays		0.00	
7,941.69	7,457.61	Codell		0.00	
8,030.57	7,465.00	Heel:		0.00	
13,111.08	7,494.00	Toe:		0.00	

**Plan Report for LAND FED 35C-32HZ - Permit Rev-1**

*Targets associated with this wellbore*

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
LAND 35C-32HZ_BHL	7,494.00	-4,198.98	-135.09	Point
LAND 35C-32HZ_Landing Diagram	0.00	0.00	0.00	Polygon
2N-R66W-Sec. 29_Section Lines	10.00	5,993.93	1,558.38	Polygon
2N-R66W-Sec. 32_Section Lines	0.00	1.09	-119.97	Polygon
LAND 35C-32HZ_SHL	0.00	0.00	0.00	Point

## North Reference Sheet for 2N-66W-32 Land Fed 13S-32HZ Pad - LAND FED 35C-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 35C-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: 0.99960339

Grid Coordinates of Well: 14,562,852.67 usft N, 1,694,832.16 usft E

Geographical Coordinates of Well: 40° 05' 56.49" N, 104° 48' 19.49" W

Grid Convergence at Surface is: 0.13°

Based upon Minimum Curvature type calculations, at a Measured Depth of 13,111.09usft the Bottom Hole Displacement is 4,201.16usft in the Direction of 181.84° (True).

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

