

US ROCKIES WATTENBERG PLANNING

WELD-NAD83-UTMFT13N

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

LAND FED 13S-32HZ

Plan A

Plan: Permit Rev-1

Sperry Drilling Services Proposal Report

27 May, 2015

Well Coordinates: 14,562,852.94 N, 1,694,787.13 E (40° 05' 56.50" N, 104° 48' 20.07" W)

Ground Level: 4,897.00 usft

Local Coordinate Origin:

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

US ROCKIES WATTENBERG PLANNING

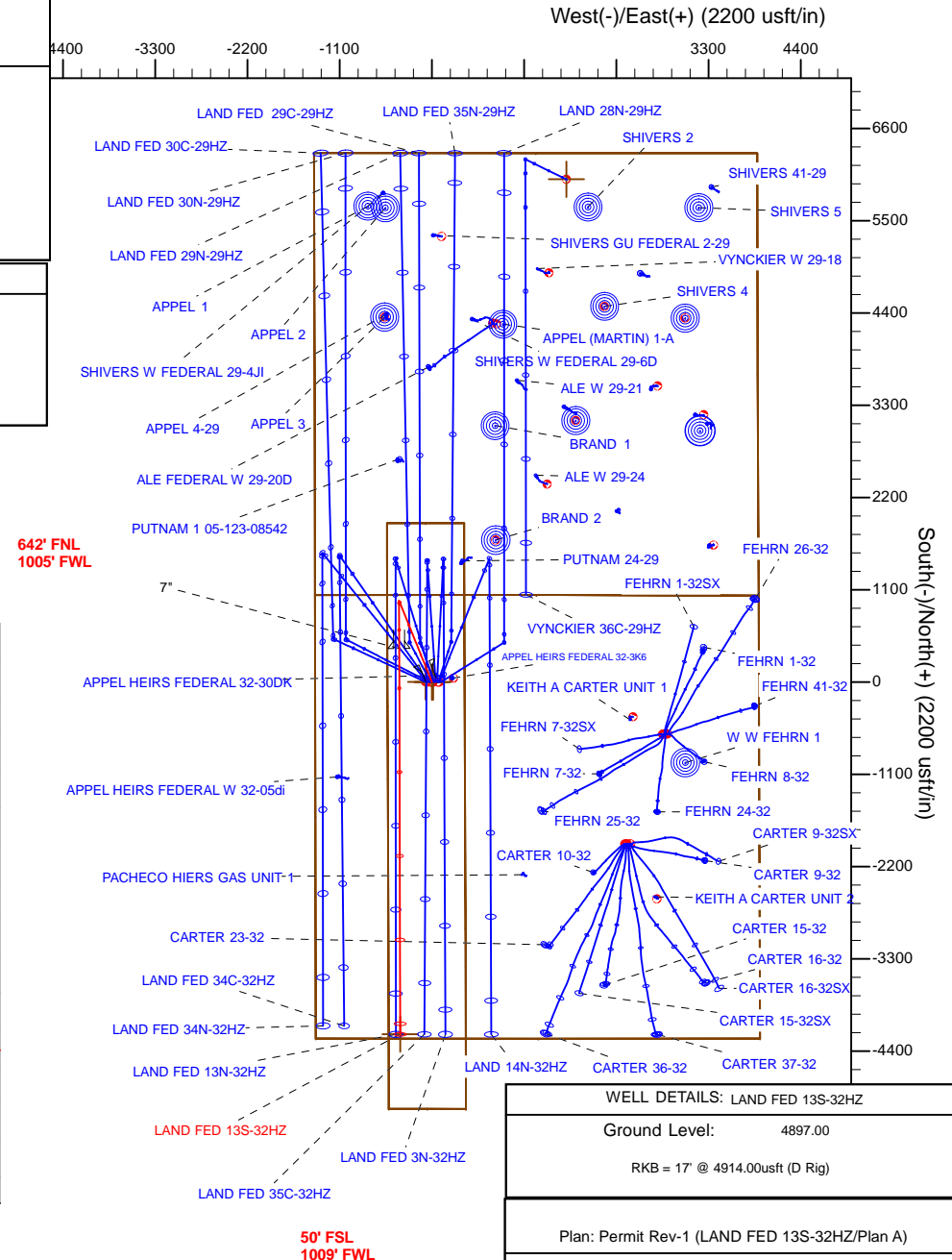
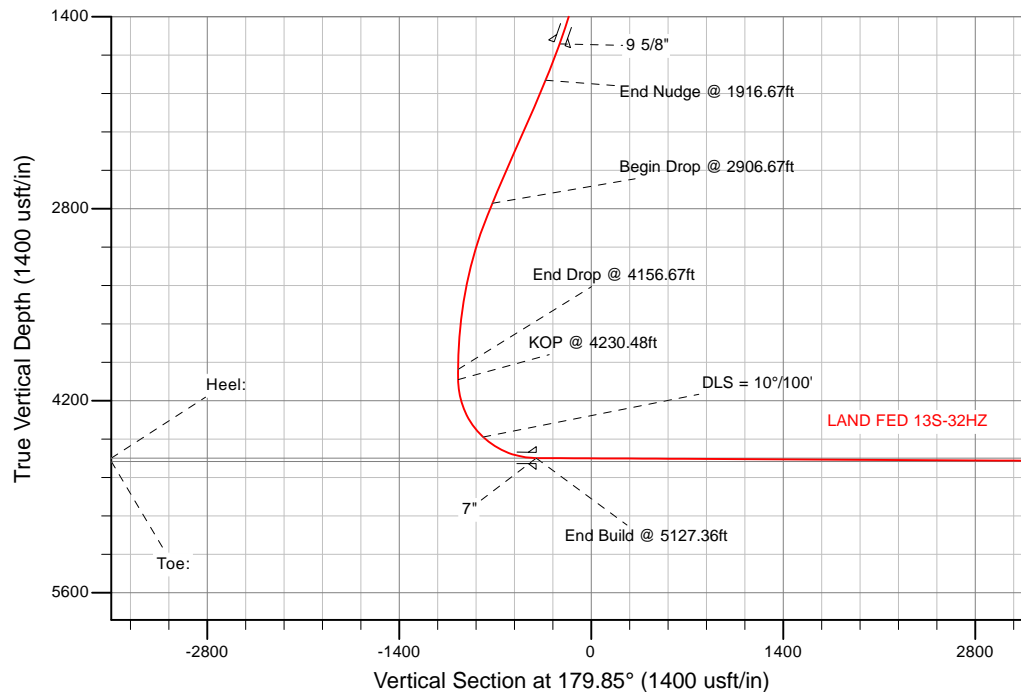
HALLIBURTON
Sperry Drilling

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	338.00	1864.28	331.82	-134.06	1.50	338.00	-332.17	
4	2906.67	25.00	338.00	2761.53	719.74	-290.80	0.00	0.00	-720.50	
5	4156.67	0.00	0.00	3972.24	968.61	-391.34	2.00	180.00	-969.63	
6	4230.48	0.00	0.00	4046.05	968.61	-391.34	0.00	0.00	-969.63	
7	5127.36	89.69	179.85	4619.00	398.77	-389.86	10.00	179.85	-399.79	
8	9725.56	89.69	179.85	4644.00	-4199.35	-377.87	0.00	0.00	4198.35	LAND FED 13S-32HZ_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
LAND FED 13S-32HZ_SHL	0.00	0.00	0.00	40.099027	-104.805574	Point
LAND FED 13S-32HZ_BHL	4644.00	-4199.35	-377.87	40.087495	-104.806925	Point



WELL DETAILS: LAND FED 13S-32HZ

Ground Level: 4897.00

RKB = 17" @ 4914.00usft (D Rig)

Plan: Permit Rev-1 (LAND FED 13S-32HZ/Plan A)

Created By: Clint Eshelman

Date: 5/27/2015

Reviewed:

Date:

Plan Report for LAND FED 13S-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 13S-32HZ_SHL - LAND FED 13S-32HZ_Landing Diagram										
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	338.00	300.00	0.30	-0.12	-0.30	1.50	1.50	0.00	338.00
400.00	2.25	338.00	399.96	2.73	-1.10	-2.73	1.50	1.50	0.00	0.00
500.00	3.75	338.00	499.82	7.58	-3.06	-7.59	1.50	1.50	0.00	0.00
600.00	5.25	338.00	599.51	14.86	-6.00	-14.87	1.50	1.50	0.00	0.00
700.00	6.75	338.00	698.96	24.55	-9.92	-24.57	1.50	1.50	0.00	0.00
800.00	8.25	338.00	798.10	36.65	-14.81	-36.69	1.50	1.50	0.00	0.00
900.00	9.75	338.00	896.87	51.15	-20.67	-51.21	1.50	1.50	0.00	0.00
1,000.00	11.25	338.00	995.19	68.05	-27.49	-68.12	1.50	1.50	0.00	0.00
1,100.00	12.75	338.00	1,093.00	87.33	-35.28	-87.42	1.50	1.50	0.00	0.00
1,200.00	14.25	338.00	1,190.24	108.97	-44.03	-109.09	1.50	1.50	0.00	0.00
1,300.00	15.75	338.00	1,286.83	132.97	-53.72	-133.11	1.50	1.50	0.00	0.00
1,322.02	16.08	338.00	1,308.00	138.57	-55.98	-138.71	1.50	1.50	0.00	0.00
Fox Hills										
1,400.00	17.25	338.00	1,382.71	159.30	-64.36	-159.47	1.50	1.50	0.00	0.00
1,500.00	18.75	338.00	1,477.81	187.95	-75.94	-188.15	1.50	1.50	0.00	0.00
1,600.00	20.25	338.00	1,572.07	218.90	-88.44	-219.13	1.50	1.50	0.00	0.00
1,629.81	20.70	338.00	1,600.00	228.57	-92.35	-228.81	1.50	1.50	0.00	0.00
9 5/8"										
1,700.00	21.75	338.00	1,665.43	252.13	-101.87	-252.39	1.50	1.50	0.00	0.00
1,800.00	23.25	338.00	1,757.81	287.61	-116.20	-287.91	1.50	1.50	0.00	0.00
1,900.00	24.75	338.00	1,849.16	325.32	-131.44	-325.66	1.50	1.50	0.00	0.00
1,916.67	25.00	338.00	1,864.29	331.82	-134.06	-332.17	1.50	1.50	0.00	0.00
End Nudge @ 1916.67ft										
2,000.00	25.00	338.00	1,939.81	364.47	-147.26	-364.86	0.00	0.00	0.00	0.00
2,100.00	25.00	338.00	2,030.44	403.66	-163.09	-404.08	0.00	0.00	0.00	0.00
2,179.58	25.00	338.00	2,102.56	434.84	-175.69	-435.30	0.00	0.00	0.00	0.00
2N-R66W-Sec. 29_Section Lines										
2,200.00	25.00	338.00	2,121.07	442.84	-178.92	-443.31	0.00	0.00	0.00	0.00
2,300.00	25.00	338.00	2,211.70	482.03	-194.75	-482.53	0.00	0.00	0.00	0.00
2,400.00	25.00	338.00	2,302.33	521.21	-210.58	-521.76	0.00	0.00	0.00	0.00
2,500.00	25.00	338.00	2,392.96	560.39	-226.41	-560.99	0.00	0.00	0.00	0.00
2,600.00	25.00	338.00	2,483.59	599.58	-242.25	-600.21	0.00	0.00	0.00	0.00
2,700.00	25.00	338.00	2,574.22	638.76	-258.08	-639.44	0.00	0.00	0.00	0.00
2,800.00	25.00	338.00	2,664.85	677.95	-273.91	-678.66	0.00	0.00	0.00	0.00
2,900.00	25.00	338.00	2,755.49	717.13	-289.74	-717.89	0.00	0.00	0.00	0.00
2,906.67	25.00	338.00	2,761.53	719.75	-290.80	-720.51	0.00	0.00	0.00	0.00
Begin Drop @ 2906.67ft										
3,000.00	23.13	338.00	2,846.74	755.03	-305.05	-755.83	2.00	-2.00	0.00	180.00
3,100.00	21.13	338.00	2,939.37	789.96	-319.17	-790.80	2.00	-2.00	0.00	180.00
3,200.00	19.13	338.00	3,033.25	821.88	-332.06	-822.74	2.00	-2.00	0.00	180.00
3,300.00	17.13	338.00	3,128.28	850.73	-343.72	-851.63	2.00	-2.00	0.00	180.00
3,400.00	15.13	338.00	3,224.34	876.49	-354.13	-877.42	2.00	-2.00	0.00	180.00
3,500.00	13.13	338.00	3,321.31	899.13	-363.27	-900.08	2.00	-2.00	0.00	180.00
3,600.00	11.13	338.00	3,419.07	918.62	-371.15	-919.59	2.00	-2.00	0.00	180.00
3,700.00	9.13	338.00	3,517.50	934.93	-377.74	-935.92	2.00	-2.00	0.00	180.00
3,800.00	7.13	338.00	3,616.49	948.05	-383.04	-949.05	2.00	-2.00	0.00	180.00
3,900.00	5.13	338.00	3,715.92	957.96	-387.04	-958.97	2.00	-2.00	0.00	180.00
4,000.00	3.13	338.00	3,815.65	964.64	-389.74	-965.66	2.00	-2.00	0.00	180.00
4,100.00	1.13	338.00	3,915.58	968.09	-391.13	-969.11	2.00	-2.00	0.00	180.00
4,156.67	0.00	0.00	3,972.24	968.61	-391.34	-969.63	2.00	-2.00	38.82	180.00
End Drop @ 4156.67ft										
4,200.00	0.00	0.00	4,015.57	968.61	-391.34	-969.63	0.00	0.00	0.00	0.00

Plan Report for LAND FED 13S-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 (°)
4,230.48	0.00	0.00	4,046.05	968.61	-391.34	-969.63	0.00	0.00	0.00	0.00
KOP @ 4230.48ft										
4,300.00	6.95	179.85	4,115.40	964.40	-391.33	-965.42	10.00	10.00	258.70	179.85
4,400.00	16.95	179.85	4,213.11	943.71	-391.28	-944.73	10.00	10.00	0.00	0.00
4,500.00	26.95	179.85	4,305.74	906.38	-391.18	-907.40	10.00	10.00	0.00	0.00
4,600.00	36.95	179.85	4,390.48	853.52	-391.04	-854.54	10.00	10.00	0.00	0.00
4,700.00	46.95	179.85	4,464.76	786.76	-390.87	-787.78	10.00	10.00	0.00	0.00
DLS = 10°/100'										
4,800.00	56.95	179.85	4,526.31	708.11	-390.66	-709.13	10.00	10.00	0.00	0.00
4,900.00	66.95	179.85	4,573.27	619.96	-390.43	-620.98	10.00	10.00	0.00	0.00
5,000.00	76.95	179.85	4,604.22	525.00	-390.19	-526.02	10.00	10.00	0.00	0.00
5,100.00	86.95	179.85	4,618.20	426.12	-389.93	-427.13	10.00	10.00	0.00	0.00
5,127.36	89.69	179.85	4,619.00	398.77	-389.86	-399.79	10.00	10.00	0.00	0.00
End Build @ 5127.36ft - Heel: - 7"										
5,200.00	89.69	179.85	4,619.39	326.13	-389.67	-327.15	0.00	0.00	0.00	0.00
5,300.00	89.69	179.85	4,619.94	226.13	-389.41	-227.15	0.00	0.00	0.00	0.00
5,400.00	89.69	179.85	4,620.48	126.13	-389.15	-127.15	0.00	0.00	0.00	0.00
5,500.00	89.69	179.85	4,621.03	26.14	-388.89	-27.15	0.00	0.00	0.00	0.00
5,600.00	89.69	179.85	4,621.57	-73.86	-388.63	72.84	0.00	0.00	0.00	0.00
5,700.00	89.69	179.85	4,622.11	-173.86	-388.36	172.84	0.00	0.00	0.00	0.00
5,800.00	89.69	179.85	4,622.66	-273.86	-388.10	272.84	0.00	0.00	0.00	0.00
5,900.00	89.69	179.85	4,623.20	-373.86	-387.84	372.84	0.00	0.00	0.00	0.00
6,000.00	89.69	179.85	4,623.74	-473.85	-387.58	472.84	0.00	0.00	0.00	0.00
6,100.00	89.69	179.85	4,624.29	-573.85	-387.32	572.84	0.00	0.00	0.00	0.00
6,200.00	89.69	179.85	4,624.83	-673.85	-387.06	672.84	0.00	0.00	0.00	0.00
6,300.00	89.69	179.85	4,625.37	-773.85	-386.80	772.83	0.00	0.00	0.00	0.00
6,400.00	89.69	179.85	4,625.92	-873.85	-386.54	872.83	0.00	0.00	0.00	0.00
6,500.00	89.69	179.85	4,626.46	-973.85	-386.28	972.83	0.00	0.00	0.00	0.00
6,600.00	89.69	179.85	4,627.01	-1,073.84	-386.02	1,072.83	0.00	0.00	0.00	0.00
6,700.00	89.69	179.85	4,627.55	-1,173.84	-385.76	1,172.83	0.00	0.00	0.00	0.00
6,800.00	89.69	179.85	4,628.09	-1,273.84	-385.50	1,272.83	0.00	0.00	0.00	0.00
6,900.00	89.69	179.85	4,628.64	-1,373.84	-385.24	1,372.82	0.00	0.00	0.00	0.00
7,000.00	89.69	179.85	4,629.18	-1,473.84	-384.98	1,472.82	0.00	0.00	0.00	0.00
7,100.00	89.69	179.85	4,629.72	-1,573.83	-384.71	1,572.82	0.00	0.00	0.00	0.00
7,200.00	89.69	179.85	4,630.27	-1,673.83	-384.45	1,672.82	0.00	0.00	0.00	0.00
7,300.00	89.69	179.85	4,630.81	-1,773.83	-384.19	1,772.82	0.00	0.00	0.00	0.00
7,400.00	89.69	179.85	4,631.36	-1,873.83	-383.93	1,872.82	0.00	0.00	0.00	0.00
7,500.00	89.69	179.85	4,631.90	-1,973.83	-383.67	1,972.82	0.00	0.00	0.00	0.00
7,600.00	89.69	179.85	4,632.44	-2,073.83	-383.41	2,072.81	0.00	0.00	0.00	0.00
7,700.00	89.69	179.85	4,632.99	-2,173.82	-383.15	2,172.81	0.00	0.00	0.00	0.00
7,800.00	89.69	179.85	4,633.53	-2,273.82	-382.89	2,272.81	0.00	0.00	0.00	0.00
7,900.00	89.69	179.85	4,634.07	-2,373.82	-382.63	2,372.81	0.00	0.00	0.00	0.00
8,000.00	89.69	179.85	4,634.62	-2,473.82	-382.37	2,472.81	0.00	0.00	0.00	0.00
8,100.00	89.69	179.85	4,635.16	-2,573.82	-382.11	2,572.81	0.00	0.00	0.00	0.00
8,200.00	89.69	179.85	4,635.71	-2,673.81	-381.85	2,672.81	0.00	0.00	0.00	0.00
8,300.00	89.69	179.85	4,636.25	-2,773.81	-381.59	2,772.80	0.00	0.00	0.00	0.00
8,400.00	89.69	179.85	4,636.79	-2,873.81	-381.33	2,872.80	0.00	0.00	0.00	0.00
8,500.00	89.69	179.85	4,637.34	-2,973.81	-381.07	2,972.80	0.00	0.00	0.00	0.00
8,600.00	89.69	179.85	4,637.88	-3,073.81	-380.80	3,072.80	0.00	0.00	0.00	0.00
8,700.00	89.69	179.85	4,638.42	-3,173.81	-380.54	3,172.80	0.00	0.00	0.00	0.00
8,800.00	89.69	179.85	4,638.97	-3,273.80	-380.28	3,272.80	0.00	0.00	0.00	0.00
8,900.00	89.69	179.85	4,639.51	-3,373.80	-380.02	3,372.80	0.00	0.00	0.00	0.00
9,000.00	89.69	179.85	4,640.06	-3,473.80	-379.76	3,472.79	0.00	0.00	0.00	0.00
9,100.00	89.69	179.85	4,640.60	-3,573.80	-379.50	3,572.79	0.00	0.00	0.00	0.00
9,200.00	89.69	179.85	4,641.14	-3,673.80	-379.24	3,672.79	0.00	0.00	0.00	0.00
9,300.00	89.69	179.85	4,641.69	-3,773.79	-378.98	3,772.79	0.00	0.00	0.00	0.00
9,400.00	89.69	179.85	4,642.23	-3,873.79	-378.72	3,872.79	0.00	0.00	0.00	0.00
9,500.00	89.69	179.85	4,642.77	-3,973.79	-378.46	3,972.79	0.00	0.00	0.00	0.00
9,600.00	89.69	179.85	4,643.32	-4,073.79	-378.20	4,072.78	0.00	0.00	0.00	0.00

Plan Report for LAND FED 13S-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 (°)
9,700.00	89.69	179.85	4,643.86	-4,173.79	-377.94	4,172.78	0.00	0.00	0.00	0.00
9,725.56	89.69	179.85	4,644.00	-4,199.35	-377.87	4,198.34	0.00	0.00	0.00	0.00
TD Well @ 9725.56ft - Toe: - LAND FED 13S-32HZ_BHL										

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
250.00	250.00	0.00	0.00	Begin Nudge @ 250.00ft
1,916.67	1,864.29	331.82	-134.06	End Nudge @ 1916.67ft
2,906.67	2,761.53	719.75	-290.80	Begin Drop @ 2906.67ft
4,156.67	3,972.24	968.61	-391.34	End Drop @ 4156.67ft
4,230.48	4,046.05	968.61	-391.34	KOP @ 4230.48ft
4,700.00	4,464.76	786.76	-390.87	DLS = 10°/100'
5,127.36	4,619.00	398.77	-389.86	End Build @ 5127.36ft
9,725.56	4,644.00	-4,199.35	-377.87	TD Well @ 9725.56ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	+E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	179.85	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	5,127.36	Permit Rev-1	APC_ISCWSA REV 2 MWD+IFR1
5,127.36	9,725.56	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
5,127.36	4,619.00	7"	7	8-3/4

Formation Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,322.02	1,308.00	Fox Hills		0.00	
5,127.36	4,619.00	Heel:		0.00	
9,725.56	4,644.00	Toe:		0.00	

Plan Report for LAND FED 13S-32HZ - Permit Rev-1

Targets associated with this wellbore

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
LAND FED 13S-32HZ_BHL	4,644.00	-4,199.35	-377.87	Point
2N-R66W-Sec. 29_Section Lines	10.00	5,993.57	1,603.39	Polygon
2N-R66W-Sec. 32_Section Lines	0.00	0.73	-74.95	Polygon
LAND FED 13S-32HZ_SHL	0.00	0.00	15.10	Point
LAND FED 13S-32HZ_Landing Diagram	0.00	0.00	0.00	Polygon

North Reference Sheet for 2N-66W-32 Land Fed 13S-32HZ Pad - LAND FED 13S-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 13S-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: 14,562,852.94 usft N, 1,694,787.13 usft E

Geographical Coordinates of Well: 40° 05' 56.50" N, 104° 48' 20.07" W

Grid Convergence at Surface is: 0.13°

Based upon Minimum Curvature type calculations, at a Measured Depth of 9,725.56usft
the Bottom Hole Displacement is 4,216.31usft in the Direction of 185.14° (True).

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

