

Project: WELD-NAD83-UTMFT13N
 Site: 3N-65W-29 RW 15-29HZ P₂
 Well: RW 26N-29HZ
 Wellbore: Original Wellbore
 Design: Final Surveys



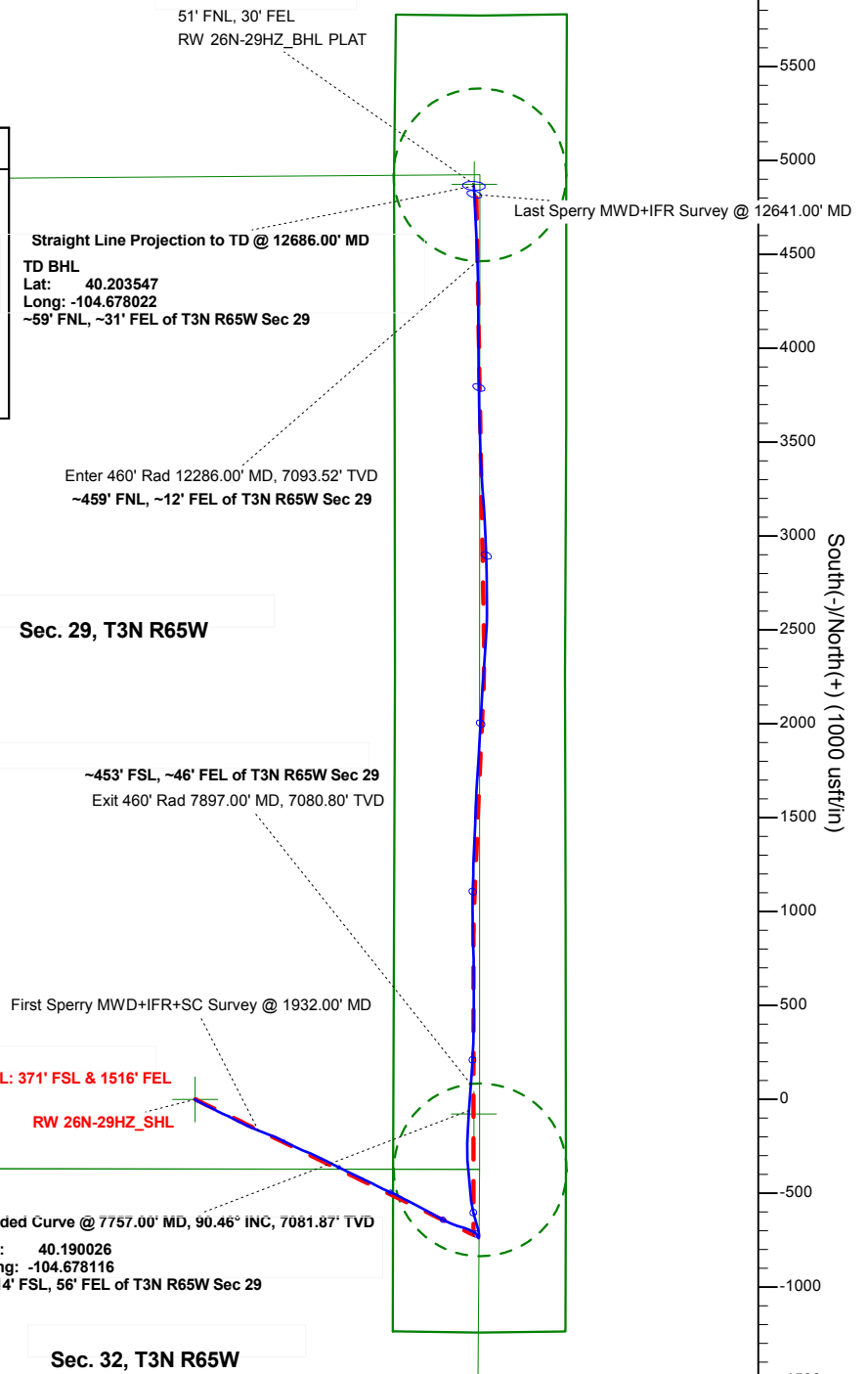
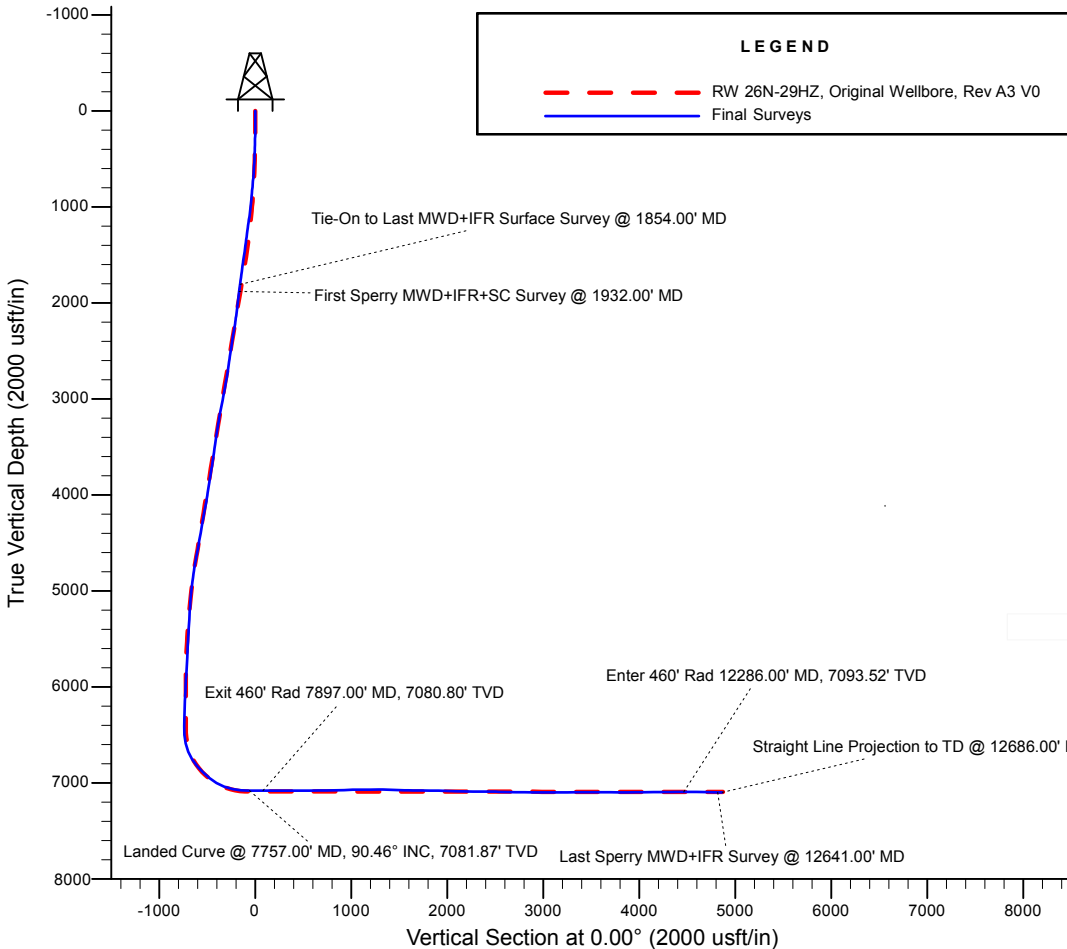
West(-)/East(+) (1000 usft/in)
 0 500 1000 1500 2000 2500 3000

US ROCKIES WATTENBERG PLANNING

WELL DETAILS: RW 26N-29HZ		Design: Final Surveys (RW 26N-29HZ/Original Wellbore)	
Ground Level: 4869.00 RKB 21' @ 4890.00usft (Precision 464)		Created By: Jerry Popp Date: 9:29, October 05 2017	

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Annotation
13.00	0.00	0.00	13.00	0.00	0.00	Tie-On to Surface @ 0.00' MD (KB 8')
132.00	0.70	334.50	132.00	0.66	-0.31	First Total MWD+IFR Survey @ 119.00' MD (KB 8')
1854.00	18.24	113.54	1807.00	-156.54	313.46	Last Total MWD+IFR Survey @ 1841.00' MD (KB 8')
1854.00	18.24	113.54	1807.00	-156.54	313.46	Tie-On to Last MWD+IFR Surface Survey @ 1854.00' MD
1932.00	18.82	112.17	1880.95	-166.16	336.30	First Sperry MWD+IFR+SC Survey @ 1932.00' MD
7757.00	90.46	3.94	7081.87	-59.38	1458.93	Landed Curve @ 7757.00' MD, 90.46° INC, 7081.87' TVD
7897.00	90.27	3.95	7080.80	80.27	1468.76	Exit 460' Rad 7897.00' MD, 7080.80' TVD
12286.00	90.15	357.93	7093.52	4465.04	1504.12	Enter 460' Rad 12286.00' MD, 7093.52' TVD
12641.00	88.71	357.08	7098.47	4819.58	1487.26	Last Sperry MWD+IFR Survey @ 12641.00' MD
12686.00	88.71	357.08	7099.49	4864.51	1484.97	Straight Line Projection to TD @ 12686.00' MD



Job# 904218786
Precision 464

US ROCKIES WATTENBERG PLANNING

WELD-NAD83-UTMFT13N 3N-65W-29 RW 15-29HZ Pad

API# 05-123-44749

RW 26N-29HZ

Original Wellbore

Design: Final Surveys

Sperry Drilling Services

Combo Report

05 October, 2017

Well Coordinates: 40° 11' 24.68" N
104° 41' 00.02" W

North American Datum 1983
Zone 13N (108 W to 102 W)
14,596,147.82 N
1,728,851.15 E

Ground Level: 4,869.00 usft

Local Coordinate Origin:

Centered on Well RW 26N-29HZ

Viewing Datum:

RKB 21' @ 4890.00usft (Precision 464)

TVDs to System:

N

North Reference:

True

Unit System:

Dec-Deg - API - US Survey Feet - Custom

Version: 5000.1 Build: 81D

Report Version: Midcon Combo v1.11

HALLIBURTON



Design Report for RW 26N-29HZ - Final Surveys

Measured Depth (usft)	Inclination (°)	True Azimuth (°)	TVD below System (usft)	Vertical Depth (usft)	Local Coordinates (usft)		Map Coordinates (usft)		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
					Northing	Easting	Northing	Easting			
0.00	0.00	0.00	-4,890.00	0.00	0.00 N	0.00 E	14,596,147.82	1,728,851.15	0.00	0.00	
13.00	0.00	0.00	-4,877.00	13.00	0.00 N	0.00 E	14,596,147.82	1,728,851.15	0.00	0.00	Tie-On to Surface @ 0.00' MD (KB 8')
132.00	0.70	334.50	-4,758.00	132.00	0.66 N	0.31 W	14,596,148.47	1,728,850.84	0.59	0.66	First Total MWD+IFR Survey @ 119.00' MD (KB 8')
195.00	0.70	247.92	-4,695.01	194.99	0.86 N	0.84 W	14,596,148.68	1,728,850.31	1.52	0.86	
227.00	0.70	175.77	-4,663.01	226.99	0.59 N	1.00 W	14,596,148.41	1,728,850.15	2.58	0.59	
259.00	0.83	187.89	-4,631.01	258.99	0.17 N	1.02 W	14,596,147.98	1,728,850.13	0.65	0.17	
290.00	1.23	155.29	-4,600.02	289.98	0.36 S	0.91 W	14,596,147.46	1,728,850.24	2.24	-0.36	
322.00	1.23	157.84	-4,568.02	321.98	0.99 S	0.64 W	14,596,146.83	1,728,850.52	0.17	-0.99	
354.00	1.54	142.81	-4,536.03	353.97	1.65 S	0.25 W	14,596,146.17	1,728,850.91	1.48	-1.65	
385.00	2.24	139.55	-4,505.05	384.95	2.44 S	0.40 E	14,596,145.38	1,728,851.56	2.28	-2.44	
417.00	3.34	126.11	-4,473.09	416.91	3.47 S	1.56 E	14,596,144.36	1,728,852.72	3.98	-3.47	
449.00	4.44	125.76	-4,441.16	448.84	4.74 S	3.31 E	14,596,143.09	1,728,854.48	3.44	-4.74	
481.00	5.27	121.54	-4,409.28	480.72	6.23 S	5.57 E	14,596,141.61	1,728,856.75	2.82	-6.23	
512.00	6.11	116.00	-4,378.43	511.57	7.70 S	8.27 E	14,596,140.15	1,728,859.45	3.23	-7.70	
544.00	6.72	117.67	-4,346.63	543.37	9.32 S	11.46 E	14,596,138.54	1,728,862.64	1.99	-9.32	
575.00	6.81	114.15	-4,315.85	574.15	10.91 S	14.74 E	14,596,136.96	1,728,865.93	1.37	-10.91	
607.00	7.78	116.44	-4,284.10	605.90	12.65 S	18.41 E	14,596,135.23	1,728,869.61	3.16	-12.65	
638.00	8.75	116.53	-4,253.43	636.57	14.64 S	22.40 E	14,596,133.26	1,728,873.60	3.13	-14.64	
670.00	9.89	117.23	-4,221.85	668.15	16.98 S	27.02 E	14,596,130.93	1,728,878.23	3.58	-16.98	
702.00	10.11	116.18	-4,190.34	699.66	19.48 S	31.98 E	14,596,128.45	1,728,883.21	0.89	-19.48	
734.00	10.68	118.20	-4,158.86	731.14	22.12 S	37.12 E	14,596,125.83	1,728,888.35	2.11	-22.12	
765.00	10.90	117.75	-4,128.41	761.59	24.84 S	42.24 E	14,596,123.13	1,728,893.48	0.76	-24.84	
797.00	11.16	116.09	-4,097.00	793.00	27.61 S	47.70 E	14,596,120.38	1,728,898.95	1.28	-27.61	
829.00	11.34	116.53	-4,065.62	824.38	30.38 S	53.30 E	14,596,117.63	1,728,904.56	0.62	-30.38	
860.00	11.51	115.91	-4,035.23	854.77	33.09 S	58.81 E	14,596,114.94	1,728,910.08	0.68	-33.09	
892.00	12.08	116.97	-4,003.91	886.09	36.01 S	64.66 E	14,596,112.04	1,728,915.94	1.91	-36.01	
923.00	12.39	115.91	-3,973.61	916.39	38.93 S	70.55 E	14,596,109.14	1,728,921.84	1.23	-38.93	
955.00	12.35	114.95	-3,942.35	947.65	41.88 S	76.74 E	14,596,106.22	1,728,928.04	0.65	-41.88	
987.00	12.70	116.61	-3,911.11	978.89	44.90 S	82.98 E	14,596,103.22	1,728,934.30	1.57	-44.90	
1,018.00	14.24	116.70	-3,880.97	1,009.03	48.13 S	89.44 E	14,596,100.00	1,728,940.76	4.97	-48.13	
1,050.00	15.12	117.93	-3,850.01	1,039.99	51.86 S	96.64 E	14,596,096.31	1,728,947.98	2.92	-51.86	
1,082.00	16.00	117.23	-3,819.19	1,070.81	55.83 S	104.25 E	14,596,092.36	1,728,955.60	2.81	-55.83	
1,113.00	16.33	117.58	-3,789.41	1,100.59	59.80 S	111.91 E	14,596,088.42	1,728,963.28	1.11	-59.80	
1,145.00	16.88	117.67	-3,758.75	1,131.25	64.04 S	120.01 E	14,596,084.20	1,728,971.39	1.72	-64.04	
1,177.00	17.36	116.00	-3,728.16	1,161.84	68.29 S	128.42 E	14,596,079.98	1,728,979.82	2.15	-68.29	
1,208.00	17.80	115.65	-3,698.61	1,191.39	72.37 S	136.85 E	14,596,075.94	1,728,988.26	1.46	-72.37	
1,240.00	18.46	115.47	-3,668.20	1,221.80	76.67 S	145.83 E	14,596,071.67	1,728,997.26	2.07	-76.67	
1,272.00	17.93	113.63	-3,637.80	1,252.20	80.82 S	154.92 E	14,596,067.55	1,729,006.36	2.44	-80.82	
1,303.00	18.33	114.51	-3,608.34	1,281.66	84.76 S	163.72 E	14,596,063.65	1,729,015.18	1.56	-84.76	
1,335.00	17.89	113.98	-3,577.92	1,312.08	88.84 S	172.79 E	14,596,059.60	1,729,024.26	1.47	-88.84	
1,366.00	17.53	115.39	-3,548.39	1,341.61	92.78 S	181.36 E	14,596,055.69	1,729,032.84	1.81	-92.78	



Design Report for RW 26N-29HZ - Final Surveys

Measured Depth (usft)	Inclination (°)	True Azimuth (°)	TVD below System (usft)	Vertical Depth (usft)	Local Coordinates (usft)		Map Coordinates (usft)		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
					Northing	Easting	Northing	Easting			
1,398.00	17.89	117.41	-3,517.91	1,372.09	97.11 S	190.08 E	14,596,051.39	1,729,041.58	2.23	-97.11	
1,461.00	16.39	116.79	-3,457.71	1,432.29	105.57 S	206.60 E	14,596,042.99	1,729,058.13	2.40	-105.57	
1,493.00	17.93	118.64	-3,427.13	1,462.87	109.97 S	214.96 E	14,596,038.62	1,729,066.50	5.11	-109.97	
1,557.00	18.59	117.14	-3,366.36	1,523.64	119.34 S	232.68 E	14,596,029.31	1,729,084.26	1.27	-119.34	
1,588.00	18.28	115.26	-3,336.95	1,553.05	123.67 S	241.48 E	14,596,025.01	1,729,093.07	2.16	-123.67	
1,620.00	17.18	115.03	-3,306.47	1,583.53	127.81 S	250.30 E	14,596,020.90	1,729,101.91	3.44	-127.81	
1,650.00	17.05	116.00	-3,277.80	1,612.20	131.61 S	258.27 E	14,596,017.13	1,729,109.89	1.05	-131.61	
1,682.00	16.92	115.56	-3,247.19	1,642.81	135.68 S	266.68 E	14,596,013.09	1,729,118.32	0.57	-135.68	
1,714.00	16.96	114.07	-3,216.58	1,673.42	139.59 S	275.15 E	14,596,009.21	1,729,126.79	1.36	-139.59	
1,746.00	16.83	113.80	-3,185.96	1,704.04	143.36 S	283.65 E	14,596,005.47	1,729,135.31	0.47	-143.36	
1,778.00	17.31	114.42	-3,155.37	1,734.63	147.20 S	292.22 E	14,596,001.66	1,729,143.90	1.60	-147.20	
1,809.00	17.58	113.98	-3,125.80	1,764.20	151.01 S	300.70 E	14,595,997.88	1,729,152.39	0.97	-151.01	
1,841.00	18.24	113.01	-3,095.35	1,794.65	154.93 S	309.72 E	14,595,993.99	1,729,161.42	2.26	-154.93	
1,854.00	18.24	113.54	-3,083.00	1,807.00	156.54 S	313.46 E	14,595,992.40	1,729,165.17	1.28	-156.54	Last Total MWD+IFR Survey @ 1841.00' MD (KB 8') - Tie-On to Last MWD+IFR Surface Survey @ 1854.00' MD
1,932.00	18.82	112.17	-3,009.05	1,880.95	166.16 S	336.30 E	14,595,982.86	1,729,188.04	0.93	-166.16	First Sperry MWD+IFR+SC Survey @ 1932.00' MD
2,021.00	18.20	110.83	-2,924.65	1,965.35	176.52 S	362.59 E	14,595,972.59	1,729,214.37	0.84	-176.52	
2,111.00	19.36	111.92	-2,839.44	2,050.56	187.09 S	389.56 E	14,595,962.12	1,729,241.38	1.35	-187.09	
2,200.00	18.62	109.93	-2,755.29	2,134.71	197.44 S	416.61 E	14,595,951.87	1,729,268.46	1.10	-197.44	
2,290.00	20.60	116.74	-2,670.50	2,219.50	209.47 S	444.26 E	14,595,939.94	1,729,296.16	3.36	-209.47	
2,379.00	20.21	117.78	-2,587.08	2,302.92	223.68 S	471.84 E	14,595,925.83	1,729,323.79	0.60	-223.68	
2,469.00	18.63	116.43	-2,502.21	2,387.79	237.32 S	498.47 E	14,595,912.28	1,729,350.47	1.82	-237.32	
2,558.00	19.69	115.00	-2,418.14	2,471.86	249.99 S	524.79 E	14,595,899.71	1,729,376.83	1.30	-249.99	
2,648.00	18.56	114.14	-2,333.11	2,556.89	262.25 S	551.61 E	14,595,887.54	1,729,403.69	1.29	-262.25	
2,737.00	21.07	112.36	-2,249.38	2,640.62	274.13 S	579.33 E	14,595,875.76	1,729,431.46	2.90	-274.13	
2,827.00	21.31	112.44	-2,165.47	2,724.53	286.53 S	609.41 E	14,595,863.47	1,729,461.58	0.27	-286.53	
2,916.00	23.19	116.33	-2,083.09	2,806.91	300.48 S	640.06 E	14,595,849.63	1,729,492.29	2.68	-300.48	
3,006.00	22.74	115.71	-2,000.23	2,889.77	315.88 S	671.62 E	14,595,834.34	1,729,523.89	0.57	-315.88	
3,096.00	22.12	115.34	-1,917.03	2,972.97	330.68 S	702.61 E	14,595,819.65	1,729,554.93	0.71	-330.68	
3,185.00	23.65	118.20	-1,835.04	3,054.96	346.29 S	733.49 E	14,595,804.15	1,729,585.87	2.12	-346.29	
3,275.00	22.73	116.32	-1,752.31	3,137.69	362.53 S	764.98 E	14,595,788.02	1,729,617.42	1.31	-362.53	
3,365.00	21.36	116.19	-1,668.89	3,221.11	377.47 S	795.27 E	14,595,773.19	1,729,647.77	1.52	-377.47	
3,454.00	20.17	115.16	-1,585.68	3,304.32	391.15 S	823.71 E	14,595,759.61	1,729,676.25	1.40	-391.15	
3,544.00	20.05	115.58	-1,501.16	3,388.84	404.41 S	851.67 E	14,595,746.45	1,729,704.26	0.21	-404.41	
3,633.00	19.08	116.51	-1,417.30	3,472.70	417.49 S	878.45 E	14,595,733.47	1,729,731.08	1.14	-417.49	
3,723.00	17.45	115.50	-1,331.84	3,558.16	429.87 S	903.79 E	14,595,721.18	1,729,756.47	1.84	-429.87	
3,813.00	18.30	112.87	-1,246.18	3,643.82	441.17 S	928.99 E	14,595,709.97	1,729,781.71	1.30	-441.17	
3,902.00	20.07	119.36	-1,162.12	3,727.88	454.09 S	955.18 E	14,595,697.14	1,729,807.95	3.11	-454.09	
3,992.00	19.00	117.14	-1,077.30	3,812.70	468.34 S	981.68 E	14,595,682.98	1,729,834.50	1.45	-468.34	
4,081.00	21.05	114.33	-993.68	3,896.32	481.54 S	1,009.14 E	14,595,669.88	1,729,862.00	2.54	-481.54	
4,171.00	20.67	112.76	-909.58	3,980.42	494.34 S	1,038.51 E	14,595,657.19	1,729,891.42	0.75	-494.34	



Design Report for RW 26N-29HZ - Final Surveys

Measured Depth (usft)	Inclination (°)	True Azimuth (°)	TVD below System (usft)	Vertical Depth (usft)	Local Coordinates (usft)		Map Coordinates (usft)		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
					Northing	Easting	Northing	Easting			
4,260.00	22.44	116.26	-826.81	4,063.19	507.94 S	1,068.24 E	14,595,643.70	1,729,921.19	2.46	-507.94	
4,350.00	21.85	118.06	-743.44	4,146.56	523.41 S	1,098.42 E	14,595,628.33	1,729,951.43	1.00	-523.41	
4,440.00	20.21	116.85	-659.44	4,230.56	538.32 S	1,127.07 E	14,595,613.53	1,729,980.14	1.88	-538.32	
4,529.00	21.08	116.40	-576.16	4,313.84	552.38 S	1,155.12 E	14,595,599.57	1,730,008.24	0.99	-552.38	
4,619.00	21.07	118.85	-492.18	4,397.82	567.38 S	1,183.79 E	14,595,584.67	1,730,036.96	0.98	-567.38	
4,708.00	19.87	118.44	-408.80	4,481.20	582.30 S	1,211.10 E	14,595,569.84	1,730,064.33	1.36	-582.30	
4,798.00	21.83	118.39	-324.70	4,565.30	597.54 S	1,239.28 E	14,595,554.70	1,730,092.55	2.18	-597.54	
4,888.00	21.20	118.77	-240.97	4,649.03	613.33 S	1,268.26 E	14,595,539.02	1,730,121.60	0.72	-613.33	
4,978.00	19.12	119.08	-156.49	4,733.51	628.33 S	1,295.41 E	14,595,524.12	1,730,148.80	2.31	-628.33	
5,067.00	17.06	117.96	-71.89	4,818.11	641.54 S	1,319.68 E	14,595,511.00	1,730,173.12	2.35	-641.54	
5,157.00	15.79	114.59	14.44	4,904.44	652.82 S	1,342.48 E	14,595,499.79	1,730,195.95	1.76	-652.82	
5,336.00	14.75	109.16	187.13	5,077.13	670.44 S	1,386.15 E	14,595,482.33	1,730,239.69	0.99	-670.44	
5,426.00	13.60	107.56	274.38	5,164.38	677.39 S	1,407.07 E	14,595,475.45	1,730,260.63	1.35	-677.39	
5,516.00	11.83	104.58	362.17	5,252.17	682.90 S	1,426.08 E	14,595,470.01	1,730,279.66	2.10	-682.90	
5,606.00	10.63	110.88	450.45	5,340.45	688.19 S	1,442.77 E	14,595,464.78	1,730,296.37	1.91	-688.19	
5,785.00	7.10	118.56	627.29	5,517.29	699.36 S	1,467.92 E	14,595,453.70	1,730,321.56	2.08	-699.36	
5,875.00	5.73	114.56	716.73	5,606.73	703.89 S	1,476.89 E	14,595,449.20	1,730,330.55	1.60	-703.89	
5,964.00	5.03	107.30	805.34	5,695.34	706.90 S	1,484.66 E	14,595,446.22	1,730,338.32	1.10	-706.90	
6,054.00	5.31	136.92	894.99	5,784.99	711.11 S	1,491.27 E	14,595,442.03	1,730,344.95	2.95	-711.11	
6,144.00	5.21	142.75	984.61	5,874.61	717.41 S	1,496.59 E	14,595,435.76	1,730,350.29	0.60	-717.41	
6,233.00	3.62	157.13	1,073.34	5,963.34	723.21 S	1,500.13 E	14,595,429.96	1,730,353.85	2.16	-723.21	
6,323.00	2.56	155.53	1,163.21	6,053.21	727.66 S	1,502.06 E	14,595,425.52	1,730,355.80	1.18	-727.66	
6,413.00	2.40	151.31	1,253.13	6,143.13	731.14 S	1,503.80 E	14,595,422.05	1,730,357.55	0.27	-731.14	
6,592.00	2.22	150.56	1,431.98	6,321.98	737.45 S	1,507.30 E	14,595,415.75	1,730,361.08	0.10	-737.45	
6,682.00	1.37	117.03	1,521.94	6,411.94	739.46 S	1,509.12 E	14,595,413.75	1,730,362.90	1.46	-739.46	
6,772.00	4.96	15.02	1,611.82	6,501.82	736.19 S	1,511.09 E	14,595,417.03	1,730,364.86	6.01	-736.19	
6,861.00	11.58	1.69	1,699.86	6,589.86	723.53 S	1,512.35 E	14,595,429.69	1,730,366.07	7.69	-723.53	
6,951.00	22.48	345.71	1,785.82	6,675.82	697.73 S	1,508.36 E	14,595,455.47	1,730,361.99	13.07	-697.73	
7,040.00	35.48	342.46	1,863.52	6,753.52	656.44 S	1,496.32 E	14,595,496.73	1,730,349.80	14.71	-656.44	
7,130.00	41.33	346.25	1,934.02	6,824.02	602.61 S	1,481.37 E	14,595,550.50	1,730,334.66	7.00	-602.61	
7,220.00	44.67	353.00	1,999.87	6,889.87	542.29 S	1,470.44 E	14,595,610.77	1,730,323.52	6.32	-542.29	
7,309.00	50.39	356.08	2,059.95	6,949.95	476.98 S	1,464.28 E	14,595,676.07	1,730,317.12	6.91	-476.98	
7,399.00	59.08	353.82	2,111.86	7,001.86	403.86 S	1,457.74 E	14,595,749.16	1,730,310.32	9.87	-403.86	
7,489.00	71.54	356.05	2,149.39	7,039.39	322.57 S	1,450.61 E	14,595,830.42	1,730,302.91	14.03	-322.57	
7,578.00	78.21	2.81	2,172.62	7,062.62	236.76 S	1,449.84 E	14,595,916.23	1,730,301.83	10.48	-236.76	
7,668.00	83.33	2.49	2,187.05	7,077.05	148.05 S	1,453.94 E	14,596,004.95	1,730,305.62	5.70	-148.05	
7,757.00	90.46	3.94	2,191.87	7,081.87	59.38 S	1,458.93 E	14,596,093.64	1,730,310.28	8.17	-59.38	Landed Curve @ 7757.00' MD, 90.46° INC, 7081.87' TVD
7,847.00	90.49	4.11	2,191.13	7,081.13	30.39 N	1,465.25 E	14,596,183.44	1,730,316.28	0.19	30.39	
7,897.00	90.27	3.95	2,190.80	7,080.80	80.27 N	1,468.76 E	14,596,233.32	1,730,319.62	0.54	80.27	Exit 460' Rad 7897.00' MD, 7080.80' TVD
7,937.00	90.09	3.83	2,190.67	7,080.67	120.17 N	1,471.48 E	14,596,273.24	1,730,322.19	0.54	120.17	

Design Report for RW 26N-29HZ - Final Surveys

Measured Depth (usft)	Inclination (°)	True Azimuth (°)	TVD below System (usft)	Vertical Depth (usft)	Local Coordinates (usft)		Map Coordinates (usft)		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
					Northing	Easting	Northing	Easting			
8,027.00	90.18	3.53	2,190.46	7,080.46	209.99 N	1,477.25 E	14,596,363.08	1,730,327.65	0.35	209.99	
8,116.00	89.60	1.48	2,190.63	7,080.63	298.90 N	1,481.14 E	14,596,452.00	1,730,331.22	2.39	298.90	
8,206.00	89.41	1.41	2,191.41	7,081.41	388.87 N	1,483.41 E	14,596,541.97	1,730,333.17	0.22	388.87	
8,295.00	90.28	359.84	2,191.65	7,081.65	477.86 N	1,484.38 E	14,596,630.97	1,730,333.82	2.02	477.86	
8,385.00	90.71	359.81	2,190.87	7,080.87	567.85 N	1,484.11 E	14,596,720.96	1,730,333.23	0.48	567.85	
8,475.00	91.36	359.98	2,189.24	7,079.24	657.84 N	1,483.94 E	14,596,810.95	1,730,332.74	0.75	657.84	
8,565.00	90.09	358.87	2,188.11	7,078.11	747.82 N	1,483.04 E	14,596,900.93	1,730,331.52	1.87	747.82	
8,654.00	91.02	358.46	2,187.24	7,077.24	836.79 N	1,480.97 E	14,596,989.89	1,730,329.13	1.14	836.79	
8,744.00	92.43	358.92	2,184.53	7,074.53	926.73 N	1,478.91 E	14,597,079.82	1,730,326.75	1.65	926.73	
8,834.00	91.23	359.47	2,181.66	7,071.66	1,016.67 N	1,477.65 E	14,597,169.75	1,730,325.16	1.47	1,016.67	
8,923.00	89.97	2.02	2,180.73	7,070.73	1,105.65 N	1,478.80 E	14,597,258.74	1,730,326.00	3.20	1,105.65	
9,013.00	90.40	0.83	2,180.44	7,070.44	1,195.62 N	1,481.04 E	14,597,348.71	1,730,327.92	1.41	1,195.62	
9,103.00	90.34	2.38	2,179.86	7,069.86	1,285.58 N	1,483.56 E	14,597,438.68	1,730,330.12	1.72	1,285.58	
9,192.00	88.43	2.73	2,180.81	7,070.81	1,374.48 N	1,487.53 E	14,597,527.60	1,730,333.77	2.18	1,374.48	
9,282.00	88.15	2.24	2,183.50	7,073.50	1,464.35 N	1,491.43 E	14,597,617.49	1,730,337.35	0.63	1,464.35	
9,372.00	87.90	2.05	2,186.60	7,076.60	1,554.24 N	1,494.80 E	14,597,707.38	1,730,340.40	0.35	1,554.24	
9,461.00	89.54	3.06	2,188.59	7,078.59	1,643.12 N	1,498.76 E	14,597,796.28	1,730,344.05	2.16	1,643.12	
9,551.00	89.54	3.91	2,189.31	7,079.31	1,732.95 N	1,504.23 E	14,597,886.13	1,730,349.20	0.94	1,732.95	
9,640.00	89.45	3.82	2,190.09	7,080.09	1,821.75 N	1,510.23 E	14,597,974.94	1,730,354.88	0.14	1,821.75	
9,730.00	88.71	3.25	2,191.54	7,081.54	1,911.56 N	1,515.78 E	14,598,064.78	1,730,360.11	1.04	1,911.56	
9,820.00	88.18	2.93	2,193.98	7,083.98	2,001.40 N	1,520.63 E	14,598,154.63	1,730,364.64	0.69	2,001.40	
9,909.00	88.55	3.30	2,196.52	7,086.52	2,090.23 N	1,525.47 E	14,598,243.48	1,730,369.15	0.59	2,090.23	
9,999.00	88.40	3.09	2,198.92	7,088.92	2,180.06 N	1,530.48 E	14,598,333.32	1,730,373.85	0.29	2,180.06	
10,089.00	89.32	3.99	2,200.71	7,090.71	2,269.87 N	1,536.04 E	14,598,423.15	1,730,379.08	1.43	2,269.87	
10,178.00	89.75	4.19	2,201.43	7,091.43	2,358.64 N	1,542.38 E	14,598,511.94	1,730,385.11	0.53	2,358.64	
10,267.00	90.18	3.91	2,201.48	7,091.48	2,447.42 N	1,548.67 E	14,598,600.74	1,730,391.08	0.58	2,447.42	
10,357.00	88.71	2.14	2,202.35	7,092.35	2,537.28 N	1,553.42 E	14,598,690.62	1,730,395.51	2.56	2,537.28	
10,447.00	88.68	359.47	2,204.41	7,094.41	2,627.24 N	1,554.68 E	14,598,780.59	1,730,396.45	2.97	2,627.24	
10,536.00	89.05	359.56	2,206.17	7,096.17	2,716.22 N	1,553.93 E	14,598,869.56	1,730,395.38	0.43	2,716.22	
10,626.00	88.98	359.10	2,207.72	7,097.72	2,806.20 N	1,552.88 E	14,598,959.54	1,730,394.01	0.52	2,806.20	
10,716.00	89.91	357.81	2,208.59	7,098.59	2,896.16 N	1,550.45 E	14,599,049.49	1,730,391.26	1.77	2,896.16	
10,805.00	89.82	357.53	2,208.80	7,098.80	2,985.09 N	1,546.83 E	14,599,138.40	1,730,387.33	0.33	2,985.09	
10,895.00	89.38	357.00	2,209.42	7,099.42	3,074.98 N	1,542.54 E	14,599,228.28	1,730,382.71	0.77	3,074.98	
10,984.00	90.71	356.16	2,209.36	7,099.36	3,163.82 N	1,537.23 E	14,599,317.10	1,730,377.09	1.77	3,163.82	
11,074.00	89.94	355.69	2,208.84	7,098.84	3,253.59 N	1,530.83 E	14,599,406.85	1,730,370.37	1.00	3,253.59	
11,164.00	91.17	357.50	2,207.97	7,097.97	3,343.42 N	1,525.49 E	14,599,496.66	1,730,364.71	2.43	3,343.42	
11,253.00	90.37	356.37	2,206.78	7,096.78	3,432.28 N	1,520.73 E	14,599,585.50	1,730,359.63	1.56	3,432.28	
11,343.00	89.94	358.89	2,206.53	7,096.53	3,522.20 N	1,517.01 E	14,599,675.41	1,730,355.59	2.84	3,522.20	
11,433.00	89.45	358.18	2,207.01	7,097.01	3,612.17 N	1,514.71 E	14,599,765.37	1,730,352.97	0.96	3,612.17	
11,522.00	89.41	358.95	2,207.90	7,097.90	3,701.13 N	1,512.48 E	14,599,854.32	1,730,350.42	0.87	3,701.13	
11,612.00	90.31	359.50	2,208.12	7,098.12	3,791.12 N	1,511.26 E	14,599,944.31	1,730,348.88	1.17	3,791.12	



Design Report for RW 26N-29HZ - Final Surveys

Measured Depth (usft)	Inclination (°)	True Azimuth (°)	TVD below System (usft)	Vertical Depth (usft)	Local Coordinates (usft)		Map Coordinates (usft)		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
					Northing	Easting	Northing	Easting			
11,702.00	89.48	359.05	2,208.28	7,098.28	3,881.12 N	1,510.12 E	14,600,034.30	1,730,347.42	1.05	3,881.12	
11,791.00	91.33	359.97	2,207.65	7,097.65	3,970.10 N	1,509.36 E	14,600,123.28	1,730,346.34	2.32	3,970.10	
11,881.00	90.68	359.68	2,206.07	7,096.07	4,060.09 N	1,509.09 E	14,600,213.27	1,730,345.75	0.79	4,060.09	
11,971.00	90.43	359.58	2,205.20	7,095.20	4,150.08 N	1,508.51 E	14,600,303.26	1,730,344.85	0.30	4,150.08	
12,060.00	90.43	359.64	2,204.54	7,094.54	4,239.08 N	1,507.90 E	14,600,392.25	1,730,343.92	0.07	4,239.08	
12,150.00	90.18	359.39	2,204.06	7,094.06	4,329.07 N	1,507.14 E	14,600,482.24	1,730,342.84	0.39	4,329.07	
12,240.00	90.28	358.56	2,203.69	7,093.69	4,419.06 N	1,505.53 E	14,600,572.22	1,730,340.91	0.93	4,419.06	
12,286.00	90.15	357.93	2,203.52	7,093.52	4,465.04 N	1,504.12 E	14,600,618.19	1,730,339.34	1.39	4,465.04	Enter 460' Rad 12286.00' MD, 7093.52' TVD
12,330.00	90.03	357.33	2,203.45	7,093.45	4,509.00 N	1,502.30 E	14,600,662.15	1,730,337.36	1.39	4,509.00	
12,509.00	88.68	357.23	2,205.47	7,095.47	4,687.78 N	1,493.81 E	14,600,840.90	1,730,328.23	0.76	4,687.78	
12,641.00	88.71	357.08	2,208.47	7,098.47	4,819.58 N	1,487.26 E	14,600,972.68	1,730,321.21	0.12	4,819.58	Last Sperry MWD+IFR Survey @ 12641.00' MD
12,686.00	88.71	357.08	2,209.49	7,099.49	4,864.51 N	1,484.97 E	14,601,017.60	1,730,318.76	0.00	4,864.51	Straight Line Projection to TD @ 12686.00' MD

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
13.00	13.00	0.00	0.00	Tie-On to Surface @ 0.00' MD (KB 8')
132.00	132.00	0.66	-0.31	First Total MWD+IFR Survey @ 119.00' MD (KB 8')
1,854.00	1,807.00	-156.54	313.46	Last Total MWD+IFR Survey @ 1841.00' MD (KB 8')
1,854.00	1,807.00	-156.54	313.46	Tie-On to Last MWD+IFR Surface Survey @ 1854.00' MD
1,932.00	1,880.95	-166.16	336.30	First Sperry MWD+IFR+SC Survey @ 1932.00' MD
7,757.00	7,081.87	-59.38	1,458.93	Landed Curve @ 7757.00' MD, 90.46° INC, 7081.87' TVD
7,897.00	7,080.80	80.27	1,468.76	Exit 460' Rad 7897.00' MD, 7080.80' TVD
12,286.00	7,093.52	4,465.04	1,504.12	Enter 460' Rad 12286.00' MD, 7093.52' TVD
12,641.00	7,098.47	4,819.58	1,487.26	Last Sperry MWD+IFR Survey @ 12641.00' MD
12,686.00	7,099.49	4,864.51	1,484.97	Straight Line Projection to TD @ 12686.00' MD

Vertical Section Information

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

Design Report for RW 26N-29HZ - Final Surveys

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
13.00	1,854.00	Total MWD+IFR Surface Surveys	APC_ISCWSA REV 2 MWD+IFR1
1,854.00	12,641.00	Sperry MWD+IFR+SC Surveys	APC_ISCWSA REV 2 MWD+IFR1+SC
12,686.00	12,686.00	PTB	APC_BLIND

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
RW 26N-29HZ_BHL PLAT () - actual wellpath misses target center by 5094.52usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	4,872.91	1,486.24	14,601,026.00	1,730,320.00	40.203570	-104.678017
RW 26N-29HZ_HEEL PLAT () - actual wellpath misses target center by 1487.83usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	-78.61	1,485.75	14,596,074.51	1,730,337.17	40.189973	-104.678020
RW 26N-29HZ_SHL () - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	14,596,147.82	1,728,851.15	40.190189	-104.683340
RW 26N-29HZ_BHL A3 () - actual wellpath misses target center by 15.73usft at 12686.00usft MD (7099.49 TVD, 4864.51 N, 1484.97 E) - Point	0.00	0.00	7,094.00	4,872.91	1,497.08	14,601,026.04	1,730,330.84	40.203570	-104.677978

Directional Difficulty Index

Average Dogleg over Survey:	2.04 °/100usft	Maximum Dogleg over Survey:	14.71 °/100usft at 7,040.00 usft
Net Tortousity applicable to Plans:	0.96 °/100usft	Directional Difficulty Index:	6.530

Audit Info

North Reference Sheet for 3N-65W-29 RW 15-29HZ Pad - RW 26N-29HZ - Original Wellbore

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.

Vertical Depths are relative to RKB 21' @ 4890.00usft (Precision 464). Northing and Easting are relative to RW 26N-29HZ

Coordinate System is Universal Transverse Mercator (US Survey Feet), Zone 13N (108 W to 102 W) using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Transverse Mercator (Gauss-Kruger)

Central Meridian is -105.000000°, Longitude Origin:0.000000°, Latitude Origin:0.000000°

False Easting: 1,640,416.67usft, False Northing: 0.00usft, Scale Reduction: 0.99960894

Grid Coordinates of Well: 14,596,147.82 usft N, 1,728,851.15 usft E

Geographical Coordinates of Well: 40° 11' 24.68" N, 104° 41' 00.02" W

Grid Convergence at Surface is: 0.20°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,686.00usft the Bottom Hole Displacement is 5,086.12usft in the Direction of 16.98° (True).

Magnetic Convergence at surface is: -8.10° (4 September 2017, , BGGM2017)

