
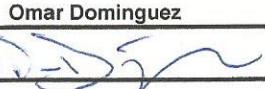
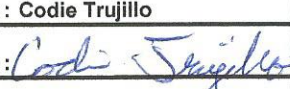



SPERRY-SUN DRILLING SERVICES

CERTIFIED SURVEY WORK SHEET

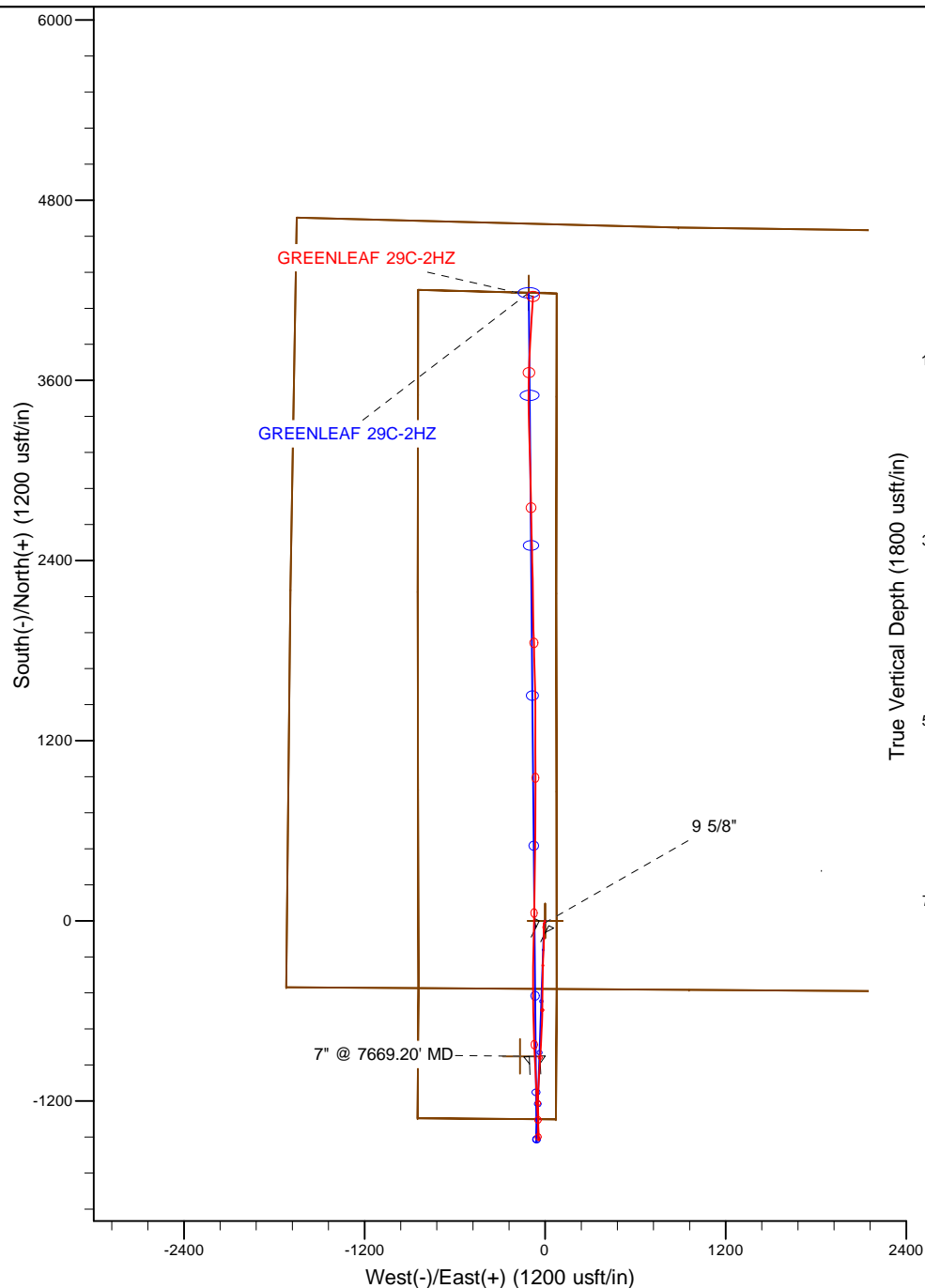
OPERATOR:	Anadarko Petroleum Corp
WELL:	Greenleaf 29C-2HZ
FIELD:	Wattenberg
RIG:	Ensign 145
LEGALS:	Sec 2-T2N-R65W
COUNTY:	Weld
STATE:	Colorado
CAL. METHOD:	Minimum Curvature
MAG. DECL. APPLIED:	8.41
VERTICAL SEC. DIR. :	359.480

SSDS Job Number :	901929201
Start Date of Job :	6-Jan-14
End Date of Job :	16-Jan-14
Lead Directional Driller:	Omar Dominguez
Other SSDS DD's :	Daniel Dietrich
	Francisco Pauda
SSDS MWD Engineers :	Alexsey Treskov
	Codie Trujillo
	Matthew Busche

Main Hole =====>		1st Side Track =====>	2nd Side Track =====>	3rd Side Track =====>	4th Side Track =====>
		Tie On	Tie On	Tie On	Tie On
Tie On Point	1241.00 Gyro				
First Survey	1373.00 MWD				
KOP Depth	6785.00 KOP	KOP-ST1	KOP-ST2	KOP-ST3	KOP-ST4
Last Survey Depth	12691.00 MWD				
		MWD	MWD	MWD	MWD
Bit Extrapolation to TD	12733.00 Projection		MWD	MWD	MWD
		T.D.	T.D.	T.D.	T.D.
The following personnel listed below, certify the above survey information to be accurate to the their knowledge. :					
Print Name : Daniel Dietrich		Print Name : Omar Dominguez		Print Name : Codie Trujillo	
Sign Name : 		Sign Name : 		Sign Name : 	
Print Name : Francisco Pauda		Print Name : Alexsey Treskov		Print Name :	
Sign Name : 		Sign Name :		Sign Name :	
TieOn	Tie On to Surface Casing (Assumed Vertical), Tie On to existing MWD Survey (prior drilled hole)				
MWD	Sperry Sun Drilling Services (SSDS) Measurement While Drilling (MWD) Survey's				
ESS	Sperry Sun Drilling Services (SSDS) Electronic Survey System (ESS) Survey's				
Gyro	Gyro Survey's ; Provided by third party vendor, or by Sperry Sun Drilling Services (SSDS)				
SS	Single Shot (SS) Survey's ; Provided by Sperry Sun Drilling Services (SSDS) or third party vendor.				

Examples of Survey Types:

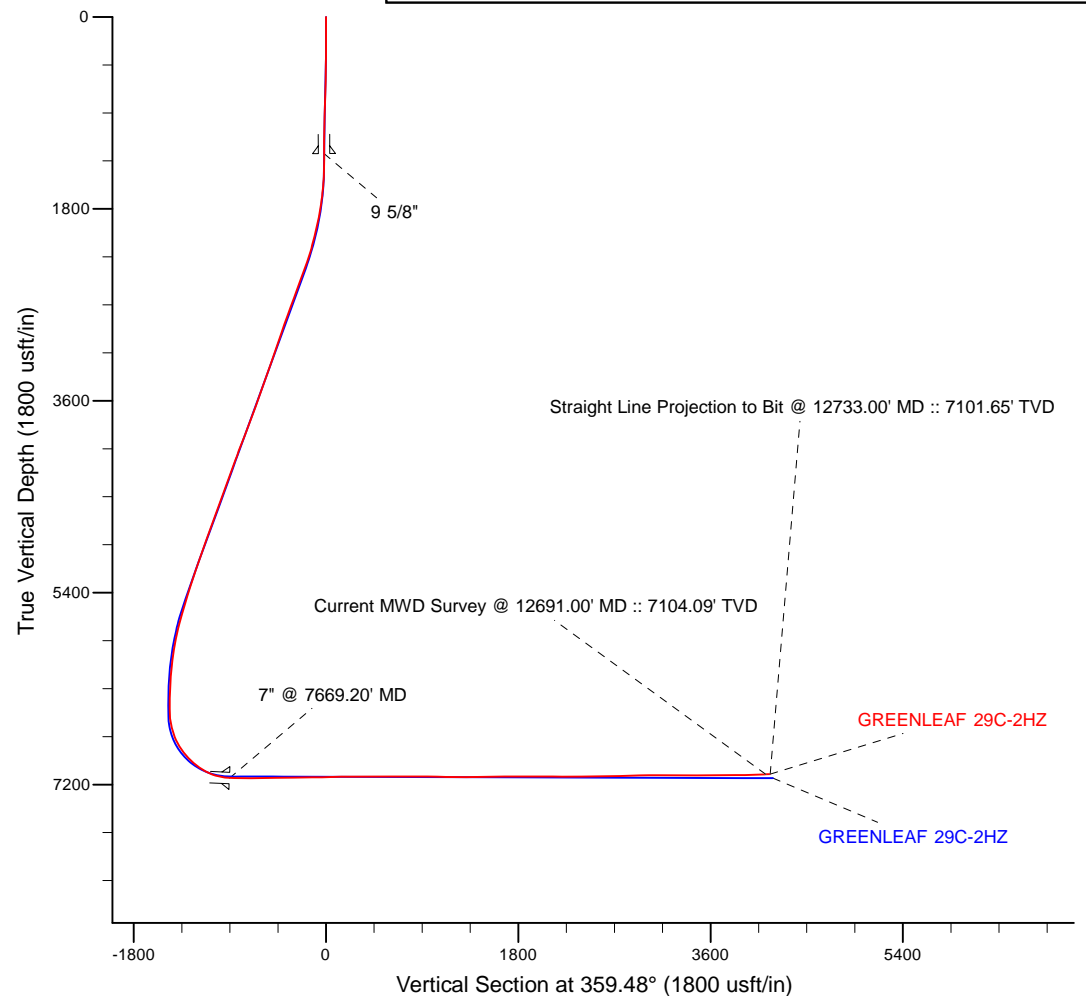
Project: Weld County, CO (NAD 83)
 Site: Sec. 2-T2N-R65W
 Well: GREENLEAF 29C-2HZ
 Wellbore: Plan B
 Design: Actual Surveys



LEGEND

GREENLEAF 29C-2HZ, Plan B, Rev B0 V0

Actual Surveys



7" Casing: ~449.65' FNL, ~1656.53' FWL
 Lat/Long: 40.159234 N, -104.634538 E
 State Planes - CO Northern: 1,302,032.62' N, 3,241,892.29' E
 Location: Sec. 11-T2N-R65W

BHL: ~483.61' FNL, ~1579.11' FWL
 Lat/Long: 40.173128 N, -104.634578 E
 State Planes - CO Northern: 1,307,093.45' N, 3,241,831.74' E
 Location: Sec. 2-T2N-R65W

WELL DETAILS: GREENLEAF 29C-2HZ	
Ground Level:	4854.00
RKB = 6' @ 4860.00usft (Gyro)	
Design: Actual Surveys (GREENLEAF 29C-2HZ/Plan B)	
Created By: Katie Benner	Date: 1/28/2015
Reviewed: _____	Date: _____

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 2-T2N-R65W

GREENLEAF 29C-2HZ

Plan B

Design: Actual Surveys

Sperry Drilling Services

Standard Report

28 January, 2015

Well Coordinates: 1,302,935.88 N, 3,241,952.26 E (40° 09' 42.16" N, 104° 38' 03.45" W)

Ground Level: 4,854.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well GREENLEAF 29C-2HZ

RKB = 6' @ 4860.00usft (Gyro)

N

True

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Design Report for GREENLEAF 29C-2HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GREENLEAF 29C-2HZ_SHL - GREENLEAF 29C-2HZ_SEC - GREENLEAF 29C-2HZ_LD							
122.00	0.10	157.90	122.00	-0.10	0.04	-0.10	0.08
201.00	0.50	316.10	201.00	0.09	-0.17	0.09	0.75
280.00	0.30	298.40	280.00	0.43	-0.59	0.44	0.29
360.00	0.50	259.10	360.00	0.47	-1.12	0.48	0.41
440.00	1.10	191.60	439.99	-0.35	-1.62	-0.34	1.27
520.00	0.90	212.50	519.98	-1.63	-2.11	-1.61	0.52
600.00	1.60	174.10	599.96	-3.28	-2.33	-3.25	1.32
680.00	1.30	181.40	679.93	-5.29	-2.24	-5.27	0.44
760.00	1.90	185.90	759.90	-7.52	-2.40	-7.50	0.77
840.00	1.60	191.00	839.86	-9.94	-2.75	-9.91	0.42
920.00	2.00	199.50	919.82	-12.35	-3.43	-12.32	0.60
1,000.00	1.90	245.80	999.78	-14.21	-5.10	-14.16	1.92
1,080.00	1.70	185.90	1,079.75	-15.93	-6.43	-15.87	2.26
1,160.00	0.90	194.50	1,159.73	-17.72	-6.71	-17.66	1.03
1,241.00	0.80	18.90	1,240.73	-17.80	-6.69	-17.74	2.10
1,282.80	0.41	26.32	1,282.52	-17.39	-6.53	-17.33	0.95
9 5/8"							
1,373.00	0.47	178.00	1,372.72	-17.47	-6.37	-17.41	0.95
1,466.00	2.21	190.49	1,465.69	-19.61	-6.69	-19.55	1.89
1,560.00	4.04	195.98	1,559.55	-24.58	-7.93	-24.51	1.97
1,653.00	6.19	188.31	1,652.17	-32.69	-9.55	-32.60	2.42
1,748.00	8.38	178.47	1,746.41	-44.68	-10.11	-44.59	2.65
1,841.00	10.00	175.99	1,838.21	-59.51	-9.36	-59.43	1.79
1,934.00	12.06	180.15	1,929.49	-77.29	-8.82	-77.20	2.37
2,028.00	13.44	176.88	2,021.17	-98.01	-8.26	-97.94	1.66
2,121.00	14.26	181.68	2,111.47	-120.26	-8.00	-120.18	1.52
2,214.00	16.63	180.55	2,201.10	-145.02	-8.47	-144.93	2.57
2,308.00	18.40	181.97	2,290.74	-173.30	-9.11	-173.21	1.94
2,401.00	20.95	183.78	2,378.31	-204.56	-10.71	-204.45	2.82
2,491.00	20.23	182.44	2,462.56	-236.16	-12.43	-236.04	0.96
2,581.00	19.56	182.19	2,547.18	-266.76	-13.67	-266.63	0.75
2,671.00	20.71	181.47	2,631.68	-297.73	-14.65	-297.58	1.31
2,761.00	20.08	181.45	2,716.04	-329.08	-15.45	-328.93	0.70
2,851.00	19.55	181.16	2,800.71	-359.58	-16.15	-359.42	0.60
2,941.00	19.52	180.23	2,885.53	-389.67	-16.51	-389.51	0.35
3,031.00	18.85	179.78	2,970.53	-419.25	-16.52	-419.08	0.76
3,121.00	18.61	178.15	3,055.77	-448.14	-16.00	-447.98	0.64
3,211.00	19.69	182.21	3,140.79	-477.65	-16.12	-477.48	1.90
3,301.00	18.81	182.12	3,225.76	-507.30	-17.24	-507.12	0.98
3,391.00	19.90	182.33	3,310.67	-537.10	-18.40	-536.91	1.21
3,481.00	18.29	178.95	3,395.72	-566.53	-18.76	-566.34	2.17
3,571.00	18.82	180.26	3,481.04	-595.17	-18.57	-594.97	0.75
3,661.00	20.85	181.75	3,565.69	-625.70	-19.13	-625.50	2.32
3,751.00	19.65	181.05	3,650.13	-656.84	-19.89	-656.63	1.36
3,841.00	20.21	182.58	3,734.74	-687.50	-20.87	-687.28	0.85
3,931.00	21.25	182.77	3,818.91	-719.32	-22.36	-719.08	1.16
4,021.00	20.94	183.19	3,902.88	-751.67	-24.04	-751.42	0.38
4,111.00	21.36	182.67	3,986.82	-784.10	-25.70	-783.83	0.51



Design Report for GREENLEAF 29C-2HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,201.00	20.46	183.09	4,070.89	-816.18	-27.31	-815.89	1.01
4,291.00	19.18	182.16	4,155.56	-846.66	-28.72	-846.36	1.46
4,382.00	21.09	183.66	4,240.99	-877.94	-30.32	-877.63	2.17
4,472.00	20.23	183.46	4,325.20	-909.63	-32.30	-909.30	0.96
4,561.00	19.02	183.55	4,409.03	-939.47	-34.12	-939.12	1.36
4,651.00	20.52	183.39	4,493.73	-969.85	-35.97	-969.48	1.67
4,741.00	20.64	183.81	4,577.98	-1,001.42	-37.95	-1,001.04	0.21
4,831.00	19.84	183.28	4,662.42	-1,032.50	-39.88	-1,032.10	0.91
4,921.00	20.49	183.70	4,746.91	-1,063.47	-41.77	-1,063.04	0.74
5,012.00	19.04	183.32	4,832.54	-1,094.18	-43.66	-1,093.74	1.60
5,101.00	19.38	182.45	4,916.59	-1,123.43	-45.13	-1,122.97	0.50
5,192.00	19.02	181.76	5,002.53	-1,153.33	-46.23	-1,152.87	0.47
5,281.00	20.50	180.62	5,086.28	-1,183.41	-46.84	-1,182.94	1.72
5,371.00	18.78	180.60	5,171.04	-1,213.66	-47.17	-1,213.18	1.91
5,461.00	18.18	177.73	5,256.41	-1,242.18	-46.76	-1,241.70	1.21
5,551.00	18.60	179.04	5,341.81	-1,270.56	-45.97	-1,270.09	0.65
5,641.00	16.38	178.30	5,427.64	-1,297.60	-45.35	-1,297.13	2.48
5,731.00	16.07	180.19	5,514.06	-1,322.74	-45.01	-1,322.28	0.68
5,821.00	15.65	181.49	5,600.63	-1,347.33	-45.37	-1,346.86	0.61
5,911.00	15.25	183.37	5,687.38	-1,371.28	-46.38	-1,370.80	0.71
6,001.00	13.17	181.92	5,774.62	-1,393.35	-47.42	-1,392.86	2.34
6,091.00	10.61	179.58	5,862.69	-1,411.88	-47.70	-1,411.39	2.89
6,181.00	8.53	175.99	5,951.43	-1,426.83	-47.18	-1,426.34	2.40
6,271.00	6.85	174.15	6,040.62	-1,438.83	-46.16	-1,438.35	1.89
6,361.00	5.43	168.93	6,130.10	-1,448.35	-44.80	-1,447.88	1.69
6,451.00	4.11	161.86	6,219.79	-1,455.59	-42.98	-1,455.14	1.60
6,541.00	2.25	164.42	6,309.64	-1,460.36	-41.50	-1,459.92	2.07
6,631.00	0.72	153.49	6,399.61	-1,462.57	-40.77	-1,462.13	1.72
6,721.00	0.62	136.43	6,489.60	-1,463.42	-40.18	-1,463.00	0.25
6,811.00	6.26	356.36	6,579.44	-1,458.87	-40.16	-1,458.45	7.50
6,901.00	12.94	354.91	6,668.13	-1,443.92	-41.37	-1,443.49	7.43
6,991.00	21.80	359.14	6,753.94	-1,417.12	-42.51	-1,416.68	9.94
7,081.00	30.50	356.25	6,834.65	-1,377.54	-44.26	-1,377.09	9.77
7,171.00	39.49	356.87	6,908.31	-1,326.07	-47.32	-1,325.59	10.00
7,261.00	46.06	355.82	6,974.33	-1,265.11	-51.25	-1,264.60	7.34
7,307.00	49.13	356.74	7,005.35	-1,231.22	-53.45	-1,230.69	6.84
7,352.00	53.00	357.68	7,033.63	-1,196.27	-55.14	-1,195.72	8.75
7,442.00	62.46	357.69	7,081.62	-1,120.32	-58.21	-1,119.74	10.51
7,487.00	67.69	357.18	7,100.58	-1,079.57	-60.04	-1,078.98	11.67
7,532.00	72.42	357.24	7,115.93	-1,037.33	-62.10	-1,036.72	10.51
7,622.00	82.83	356.92	7,135.19	-949.65	-66.58	-949.01	11.57
7,634.00	84.63	357.19	7,136.50	-937.74	-67.19	-937.09	15.17
7,669.20	87.25	357.61	7,138.99	-902.67	-68.78	-902.01	7.54
7" @ 7669.20' MD							
7,672.23	87.48	357.65	7,139.13	-899.64	-68.91	-898.98	7.54
GREENLEAF 29C-2HZ_HEEL							
7,692.00	88.95	357.88	7,139.75	-879.90	-69.68	-879.23	7.54
7,747.00	89.63	357.63	7,140.43	-824.95	-71.84	-824.26	1.32
7,814.00	90.59	358.25	7,140.30	-757.99	-74.24	-757.29	1.71
7,904.00	90.03	357.69	7,139.81	-668.05	-77.43	-667.32	0.88
7,994.00	91.11	359.30	7,138.92	-578.09	-79.80	-577.34	2.15

Design Report for GREENLEAF 29C-2HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
8,085.00	90.89	0.01	7,137.33	-487.11	-80.34	-486.36	0.82
8,174.00	89.75	0.03	7,136.83	-398.11	-80.31	-397.36	1.28
8,265.00	91.05	0.82	7,136.20	-307.12	-79.64	-306.38	1.67
8,354.00	90.92	0.61	7,134.67	-218.14	-78.53	-217.41	0.28
8,444.00	90.89	1.13	7,133.24	-128.16	-77.16	-127.45	0.58
8,534.00	91.14	1.35	7,131.65	-38.19	-75.21	-37.51	0.37
8,624.00	91.23	1.33	7,129.79	51.76	-73.11	52.42	0.10
8,714.00	91.23	1.34	7,127.86	141.72	-71.01	142.36	0.01
8,804.00	90.18	1.39	7,126.75	231.68	-68.87	232.30	1.17
8,894.00	90.19	1.02	7,126.46	321.66	-66.98	322.26	0.41
8,985.00	90.03	0.62	7,126.28	412.65	-65.67	413.23	0.47
9,075.00	90.15	0.50	7,126.14	502.65	-64.79	503.22	0.19
9,165.00	90.37	0.40	7,125.73	592.65	-64.09	593.20	0.27
9,255.00	90.40	359.94	7,125.13	682.64	-63.82	683.19	0.51
9,345.00	90.09	359.79	7,124.74	772.64	-64.03	773.19	0.38
9,435.00	90.06	0.05	7,124.63	862.64	-64.16	863.19	0.29
9,525.00	89.57	0.08	7,124.92	952.64	-64.06	953.18	0.55
9,615.00	88.64	359.94	7,126.32	1,042.63	-64.04	1,043.17	1.04
9,705.00	88.27	0.28	7,128.75	1,132.60	-63.87	1,133.13	0.56
9,795.00	88.43	359.54	7,131.34	1,222.56	-64.01	1,223.09	0.84
9,885.00	91.36	0.02	7,131.51	1,312.55	-64.35	1,313.08	3.30
9,975.00	91.60	359.72	7,129.18	1,402.52	-64.56	1,403.04	0.43
10,065.00	90.43	359.25	7,127.59	1,492.50	-65.37	1,493.03	1.40
10,155.00	89.85	358.74	7,127.37	1,582.48	-66.95	1,583.02	0.86
10,245.00	90.59	357.73	7,127.02	1,672.44	-69.72	1,673.00	1.39
10,335.00	91.45	359.13	7,125.42	1,762.39	-72.18	1,762.97	1.83
10,424.00	89.38	358.21	7,124.77	1,851.35	-74.25	1,851.95	2.55
10,514.00	90.31	357.96	7,125.02	1,941.30	-77.26	1,941.92	1.07
10,604.00	89.94	359.29	7,124.82	2,031.27	-79.42	2,031.91	1.53
10,694.00	89.14	359.59	7,125.54	2,121.27	-80.30	2,121.91	0.95
10,784.00	89.48	358.94	7,126.63	2,211.25	-81.45	2,211.90	0.82
10,874.00	90.49	358.73	7,126.65	2,301.23	-83.28	2,301.89	1.15
10,964.00	90.62	358.77	7,125.78	2,391.21	-85.24	2,391.88	0.15
11,055.00	90.62	358.58	7,124.80	2,482.18	-87.35	2,482.87	0.21
11,144.00	91.05	358.80	7,123.50	2,571.14	-89.38	2,571.85	0.54
11,234.00	91.69	358.74	7,121.35	2,661.10	-91.31	2,661.82	0.71
11,325.00	90.62	358.82	7,119.51	2,752.06	-93.25	2,752.79	1.18
11,415.00	91.69	359.26	7,117.70	2,842.02	-94.76	2,842.77	1.29
11,505.00	91.79	358.91	7,114.97	2,931.97	-96.19	2,932.72	0.40
11,595.00	91.36	358.27	7,112.49	3,021.91	-98.41	3,022.68	0.86
11,685.00	89.14	358.64	7,112.10	3,111.87	-100.83	3,112.66	2.50
11,775.00	89.26	358.23	7,113.36	3,201.83	-103.29	3,202.63	0.47
11,865.00	89.63	357.88	7,114.23	3,291.77	-106.35	3,292.60	0.57
11,955.00	89.97	359.43	7,114.54	3,381.74	-108.46	3,382.59	1.76
12,045.00	90.65	359.28	7,114.05	3,471.73	-109.47	3,472.58	0.77
12,135.00	90.71	0.80	7,112.99	3,561.73	-109.41	3,562.57	1.69
12,225.00	89.97	1.81	7,112.45	3,651.70	-107.36	3,652.52	1.39
12,316.00	91.17	2.10	7,111.55	3,742.64	-104.26	3,743.43	1.36
12,406.00	90.22	3.48	7,110.46	3,832.52	-99.88	3,833.27	1.86
12,496.00	90.15	3.44	7,110.17	3,922.36	-94.44	3,923.05	0.09
12,586.00	91.66	3.52	7,108.74	4,012.18	-88.98	4,012.82	1.68

Design Report for GREENLEAF 29C-2HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
12,676.00	93.18	3.56	7,104.94	4,101.92	-83.43	4,102.51	1.69
12,691.00	93.33	3.52	7,104.09	4,116.87	-82.50	4,117.45	1.03
Current MWD Survey @ 12691.00' MD :: 7104.09' TVD							
12,733.00	93.33	3.52	7,101.65	4,158.72	-79.93	4,159.28	0.00
Straight Line Projection to Bit @ 12733.00' MD :: 7101.65' TVD - GREENLEAF 29C-2HZ_BHL							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
12,691.00	7,104.09	4,116.87	-82.50	Current MWD Survey @ 12691.00' MD :: 7104.09' TVD
12,733.00	7,101.65	4,158.72	-79.93	Straight Line Projection to Bit @ 12733.00' MD :: 7101.65' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	+E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	359.48	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
122.00	1,241.00	Surface Gyro Survey	MWD
1,373.00	7,634.00	MWD Vertical/Build Surveys	MWD+IFR1+SC
7,692.00	12,733.00	MWD Lateral Surveys	MWD+IFR1+SC

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,282.80	1,282.52	9 5/8"	9-5/8	13-1/2
7,669.20	7,138.99	7" @ 7669.20' MD	7	8-3/4

Design Report for GREENLEAF 29C-2HZ - Actual Surveys**Wellbore 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
GREENLEAF 29C-2H; - actual wellpath misses target center by 7.00usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	-7.00	0.00	0.00	1,302,935.89	3,241,952.26	40.161712	-104.634292
GREENLEAF 29C-2H; - actual wellpath misses target center by 7.00usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Polygon	0.00	0.00	-7.00	0.00	0.00	1,302,935.89	3,241,952.26	40.161712	-104.634292
Point 1				-7.00	-448.11	-842.11	1,302,479.60	3,241,114.60	
Point 2				-7.00	872.80	-844.38	1,303,800.36	3,241,099.43	
Point 3				-7.00	2,193.74	-846.65	1,305,121.16	3,241,084.27	
Point 4				-7.00	3,506.35	-844.24	1,306,433.68	3,241,073.87	
Point 5				-7.00	4,202.33	-842.96	1,307,129.61	3,241,068.35	
Point 6				-7.00	4,178.23	77.04	1,307,114.49	3,241,988.50	
Point 7				-7.00	3,494.25	75.79	1,306,430.56	3,241,993.93	
Point 8				-7.00	2,182.15	73.39	1,305,118.56	3,242,004.34	
Point 9				-7.00	864.13	75.65	1,303,800.68	3,242,019.47	
Point 10				-7.00	-453.94	77.93	1,302,482.75	3,242,034.61	
Point 11				-7.00	-1,322.54	72.50	1,301,614.17	3,242,037.66	
Point 12				-7.00	-1,315.46	-847.52	1,301,612.27	3,241,117.66	
GREENLEAF 29C-2H; - actual wellpath misses target center by 7.00usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Polygon	0.00	0.00	-7.00	0.00	0.00	1,302,935.89	3,241,952.26	40.161712	-104.634292
Point 1				-7.00	4,683.65	-1,650.24	1,307,603.01	3,240,256.44	
Point 2				-7.00	4,617.21	885.99	1,307,561.33	3,242,793.10	
Point 3				-7.00	4,583.44	3,495.36	1,307,553.04	3,245,402.56	
Point 4				-7.00	2,138.25	3,562.47	1,305,108.72	3,245,493.54	
Point 5				-7.00	-476.76	3,634.28	1,302,494.65	3,245,590.87	
Point 6				-7.00	-459.49	956.49	1,302,485.77	3,242,913.15	
Point 7				-7.00	-442.54	-1,720.69	1,302,476.59	3,240,236.04	
Point 8				-7.00	2,204.39	-1,693.19	1,305,123.55	3,240,237.70	
GREENLEAF 29C-2H; - actual wellpath misses target center by 98.17usft at 7672.23usft MD (7139.13 TVD, -899.64 N, -68.91 E) - Point	0.00	0.00	7,125.00	-903.00	-166.00	1,302,031.35	3,241,795.09	40.159233	-104.634886
GREENLEAF 29C-2H; - actual wellpath misses target center by 53.85usft at 12733.00usft MD (7101.65 TVD, 4158.72 N, -79.93 E) - Point	0.00	0.00	7,140.00	4,183.23	-108.71	1,307,117.68	3,241,802.72	40.173195	-104.634681

Directional Difficulty Index

Average Dogleg over Survey:	1.79 °/100usft	Maximum Dogleg over Survey:	15.17 °/100usft at 7,634.00 usft
Net Tortousity applicable to Plans:	0.67 °/100usft	Directional Difficulty Index:	6.461

Audit Info

North Reference Sheet for Sec. 2-T2N-R65W - GREENLEAF 29C-2HZ - Plan B

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

Vertical Depths are relative to RKB = 6' @ 4860.00usft (Gyro). Northing and Easting are relative to GREENLEAF 29C-2HZ

Coordinate System is US State Plane 1983, Colorado Northern Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99995805

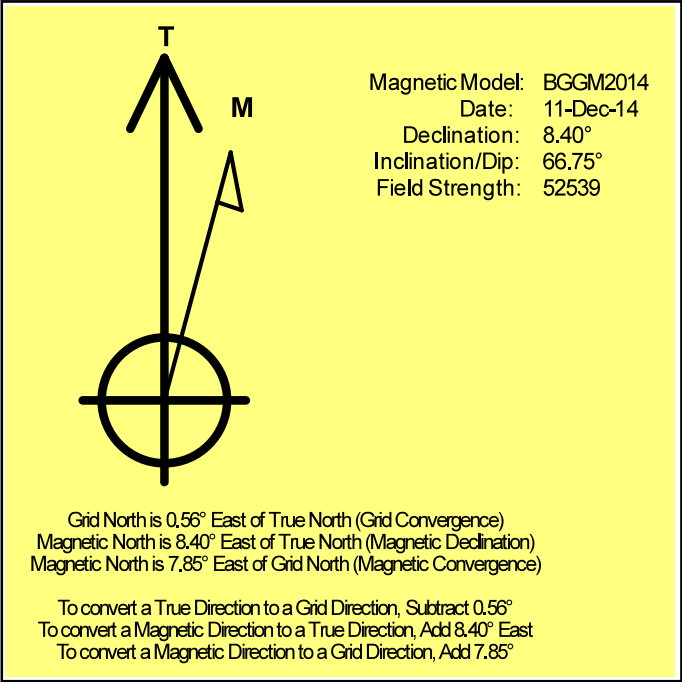
Grid Coordinates of Well: 1,302,935.88 usft N, 3,241,952.26 usft E

Geographical Coordinates of Well: 40° 09' 42.16" N, 104° 38' 03.45" W

Grid Convergence at Surface is: 0.56°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,733.00usft the Bottom Hole Displacement is 4,159.49usft in the Direction of 358.90° (True).

Magnetic Convergence at surface is: -7.85° (11 December 2014, , BGGM2014)



Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 2-T2N-R65W

GREENLEAF 29C-2HZ

Plan B

Design: Actual Surveys

Sperry Drilling Services

Geodetic Report

28 January, 2015

Well Coordinates: 1,302,935.88 N, 3,241,952.26 E (40° 09' 42.16" N, 104° 38' 03.45" W)

Ground Level: 4,854.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well GREENLEAF 29C-2HZ

RKB = 6' @ 4860.00usft (Gyro)

N

True

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Design Report for GREENLEAF 29C-2HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	40.161712	-104.634292	1,302,935.88	3,241,952.26
122.00	0.10	157.90	122.00	-0.10	0.04	40.161712	-104.634292	1,302,935.78	3,241,952.30
201.00	0.50	316.10	201.00	0.09	-0.17	40.161712	-104.634293	1,302,935.97	3,241,952.09
280.00	0.30	298.40	280.00	0.43	-0.59	40.161713	-104.634294	1,302,936.31	3,241,951.66
360.00	0.50	259.10	360.00	0.47	-1.12	40.161713	-104.634296	1,302,936.34	3,241,951.13
440.00	1.10	191.60	439.99	-0.35	-1.62	40.161711	-104.634298	1,302,935.51	3,241,950.64
520.00	0.90	212.50	519.98	-1.63	-2.11	40.161708	-104.634300	1,302,934.23	3,241,950.17
600.00	1.60	174.10	599.96	-3.28	-2.33	40.161703	-104.634301	1,302,932.58	3,241,949.96
680.00	1.30	181.40	679.93	-5.29	-2.24	40.161698	-104.634300	1,302,930.57	3,241,950.07
760.00	1.90	185.90	759.90	-7.52	-2.40	40.161691	-104.634301	1,302,928.34	3,241,949.93
840.00	1.60	191.00	839.86	-9.94	-2.75	40.161685	-104.634302	1,302,925.92	3,241,949.61
920.00	2.00	199.50	919.82	-12.35	-3.43	40.161678	-104.634305	1,302,923.50	3,241,948.95
1,000.00	1.90	245.80	999.78	-14.21	-5.10	40.161673	-104.634311	1,302,921.63	3,241,947.30
1,080.00	1.70	185.90	1,079.75	-15.93	-6.43	40.161668	-104.634315	1,302,919.89	3,241,945.98
1,160.00	0.90	194.50	1,159.73	-17.72	-6.71	40.161663	-104.634316	1,302,918.10	3,241,945.72
1,241.00	0.80	18.90	1,240.73	-17.80	-6.69	40.161663	-104.634316	1,302,918.02	3,241,945.74
1,282.80	0.41	26.32	1,282.52	-17.39	-6.53	40.161664	-104.634316	1,302,918.43	3,241,945.90
1,373.00	0.47	178.00	1,372.72	-17.47	-6.37	40.161664	-104.634315	1,302,918.35	3,241,946.06
1,466.00	2.21	190.49	1,465.69	-19.61	-6.69	40.161658	-104.634316	1,302,916.20	3,241,945.77
1,560.00	4.04	195.98	1,559.55	-24.58	-7.93	40.161645	-104.634321	1,302,911.23	3,241,944.57
1,653.00	6.19	188.31	1,652.17	-32.69	-9.55	40.161622	-104.634326	1,302,903.10	3,241,943.02
1,748.00	8.38	178.47	1,746.41	-44.68	-10.11	40.161589	-104.634328	1,302,891.10	3,241,942.59
1,841.00	10.00	175.99	1,838.21	-59.51	-9.36	40.161549	-104.634326	1,302,876.28	3,241,943.48
1,934.00	12.06	180.15	1,929.49	-77.29	-8.82	40.161500	-104.634324	1,302,858.52	3,241,944.19
2,028.00	13.44	176.88	2,021.17	-98.01	-8.26	40.161443	-104.634322	1,302,837.80	3,241,944.96
2,121.00	14.26	181.68	2,111.47	-120.26	-8.00	40.161382	-104.634321	1,302,815.56	3,241,945.43
2,214.00	16.63	180.55	2,201.10	-145.02	-8.47	40.161314	-104.634323	1,302,790.80	3,241,945.21
2,308.00	18.40	181.97	2,290.74	-173.30	-9.11	40.161236	-104.634325	1,302,762.51	3,241,944.85
2,401.00	20.95	183.78	2,378.31	-204.56	-10.71	40.161151	-104.634331	1,302,731.24	3,241,943.55
2,491.00	20.23	182.44	2,462.56	-236.16	-12.43	40.161064	-104.634337	1,302,699.62	3,241,942.14
2,581.00	19.56	182.19	2,547.18	-266.76	-13.67	40.160980	-104.634341	1,302,669.01	3,241,941.20
2,671.00	20.71	181.47	2,631.68	-297.73	-14.65	40.160895	-104.634345	1,302,638.04	3,241,940.51
2,761.00	20.08	181.45	2,716.04	-329.08	-15.45	40.160809	-104.634348	1,302,606.68	3,241,940.02
2,851.00	19.55	181.16	2,800.71	-359.58	-16.15	40.160725	-104.634350	1,302,576.17	3,241,939.62
2,941.00	19.52	180.23	2,885.53	-389.67	-16.51	40.160642	-104.634351	1,302,546.08	3,241,939.55
3,031.00	18.85	179.78	2,970.53	-419.25	-16.52	40.160561	-104.634351	1,302,516.51	3,241,939.84
3,121.00	18.61	178.15	3,055.77	-448.14	-16.00	40.160482	-104.634350	1,302,487.62	3,241,940.64
3,211.00	19.69	182.21	3,140.79	-477.65	-16.12	40.160401	-104.634350	1,302,458.12	3,241,940.80
3,301.00	18.81	182.12	3,225.76	-507.30	-17.24	40.160320	-104.634354	1,302,428.46	3,241,939.97
3,391.00	19.90	182.33	3,310.67	-537.10	-18.40	40.160238	-104.634358	1,302,398.65	3,241,939.10
3,481.00	18.29	178.95	3,395.72	-566.53	-18.76	40.160157	-104.634359	1,302,369.22	3,241,939.03
3,571.00	18.82	180.26	3,481.04	-595.17	-18.57	40.160078	-104.634359	1,302,340.59	3,241,939.50

Design Report for GREENLEAF 29C-2HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
3,661.00	20.85	181.75	3,565.69	-625.70	-19.13	40.159995	-104.634361	1,302,310.06	3,241,939.24
3,751.00	19.65	181.05	3,650.13	-656.84	-19.89	40.159909	-104.634363	1,302,278.91	3,241,938.78
3,841.00	20.21	182.58	3,734.74	-687.50	-20.87	40.159825	-104.634367	1,302,248.24	3,241,938.10
3,931.00	21.25	182.77	3,818.91	-719.32	-22.36	40.159738	-104.634372	1,302,216.41	3,241,936.93
4,021.00	20.94	183.19	3,902.88	-751.67	-24.04	40.159649	-104.634378	1,302,184.05	3,241,935.56
4,111.00	21.36	182.67	3,986.82	-784.10	-25.70	40.159560	-104.634384	1,302,151.61	3,241,934.22
4,201.00	20.46	183.09	4,070.89	-816.18	-27.31	40.159472	-104.634390	1,302,119.51	3,241,932.92
4,291.00	19.18	182.16	4,155.56	-846.66	-28.72	40.159388	-104.634395	1,302,089.02	3,241,931.81
4,382.00	21.09	183.66	4,240.99	-877.94	-30.32	40.159302	-104.634401	1,302,057.73	3,241,930.51
4,472.00	20.23	183.46	4,325.20	-909.63	-32.30	40.159215	-104.634408	1,302,026.02	3,241,928.84
4,561.00	19.02	183.55	4,409.03	-939.47	-34.12	40.159133	-104.634414	1,301,996.17	3,241,927.31
4,651.00	20.52	183.39	4,493.73	-969.85	-35.97	40.159050	-104.634421	1,301,965.77	3,241,925.77
4,741.00	20.64	183.81	4,577.98	-1,001.42	-37.95	40.158963	-104.634428	1,301,934.18	3,241,924.09
4,831.00	19.84	183.28	4,662.42	-1,032.50	-39.88	40.158878	-104.634435	1,301,903.08	3,241,922.46
4,921.00	20.49	183.70	4,746.91	-1,063.47	-41.77	40.158793	-104.634442	1,301,872.10	3,241,920.87
5,012.00	19.04	183.32	4,832.54	-1,094.18	-43.66	40.158709	-104.634448	1,301,841.37	3,241,919.29
5,101.00	19.38	182.45	4,916.59	-1,123.43	-45.13	40.158628	-104.634454	1,301,812.11	3,241,918.10
5,192.00	19.02	181.76	5,002.53	-1,153.33	-46.23	40.158546	-104.634458	1,301,782.20	3,241,917.29
5,281.00	20.50	180.62	5,086.28	-1,183.41	-46.84	40.158464	-104.634460	1,301,752.12	3,241,916.97
5,371.00	18.78	180.60	5,171.04	-1,213.66	-47.17	40.158381	-104.634461	1,301,721.87	3,241,916.94
5,461.00	18.18	177.73	5,256.41	-1,242.18	-46.76	40.158302	-104.634460	1,301,693.36	3,241,917.63
5,551.00	18.60	179.04	5,341.81	-1,270.56	-45.97	40.158224	-104.634457	1,301,664.99	3,241,918.70
5,641.00	16.38	178.30	5,427.64	-1,297.60	-45.35	40.158150	-104.634455	1,301,637.96	3,241,919.58
5,731.00	16.07	180.19	5,514.06	-1,322.74	-45.01	40.158081	-104.634453	1,301,612.82	3,241,920.16
5,821.00	15.65	181.49	5,600.63	-1,347.33	-45.37	40.158014	-104.634455	1,301,588.23	3,241,920.05
5,911.00	15.25	183.37	5,687.38	-1,371.28	-46.38	40.157948	-104.634458	1,301,564.27	3,241,919.27
6,001.00	13.17	181.92	5,774.62	-1,393.35	-47.42	40.157887	-104.634462	1,301,542.20	3,241,918.44
6,091.00	10.61	179.58	5,862.69	-1,411.88	-47.70	40.157836	-104.634463	1,301,523.66	3,241,918.34
6,181.00	8.53	175.99	5,951.43	-1,426.83	-47.18	40.157795	-104.634461	1,301,508.72	3,241,919.02
6,271.00	6.85	174.15	6,040.62	-1,438.83	-46.16	40.157762	-104.634457	1,301,496.73	3,241,920.15
6,361.00	5.43	168.93	6,130.10	-1,448.35	-44.80	40.157736	-104.634453	1,301,487.23	3,241,921.60
6,451.00	4.11	161.86	6,219.79	-1,455.59	-42.98	40.157716	-104.634446	1,301,480.00	3,241,923.50
6,541.00	2.25	164.42	6,309.64	-1,460.36	-41.50	40.157703	-104.634441	1,301,475.25	3,241,925.02
6,631.00	0.72	153.49	6,399.61	-1,462.57	-40.77	40.157697	-104.634438	1,301,473.05	3,241,925.77
6,721.00	0.62	136.43	6,489.60	-1,463.42	-40.18	40.157695	-104.634436	1,301,472.20	3,241,926.37
6,811.00	6.26	356.36	6,579.44	-1,458.87	-40.16	40.157707	-104.634436	1,301,476.75	3,241,926.35
6,901.00	12.94	354.91	6,668.13	-1,443.92	-41.37	40.157748	-104.634440	1,301,491.68	3,241,924.99
6,991.00	21.80	359.14	6,753.94	-1,417.12	-42.51	40.157822	-104.634444	1,301,518.47	3,241,923.58
7,081.00	30.50	356.25	6,834.65	-1,377.54	-44.26	40.157931	-104.634451	1,301,558.03	3,241,921.45
7,171.00	39.49	356.87	6,908.31	-1,326.07	-47.32	40.158072	-104.634462	1,301,609.46	3,241,917.89
7,261.00	46.06	355.82	6,974.33	-1,265.11	-51.25	40.158239	-104.634476	1,301,670.38	3,241,913.36
7,307.00	49.13	356.74	7,005.35	-1,231.22	-53.45	40.158332	-104.634483	1,301,704.25	3,241,910.83

Design Report for GREENLEAF 29C-2HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
7,352.00	53.00	357.68	7,033.63	-1,196.27	-55.14	40.158428	-104.634490	1,301,739.18	3,241,908.80
7,442.00	62.46	357.69	7,081.62	-1,120.32	-58.21	40.158637	-104.634501	1,301,815.10	3,241,904.99
7,487.00	67.69	357.18	7,100.58	-1,079.57	-60.04	40.158749	-104.634507	1,301,855.83	3,241,902.76
7,532.00	72.42	357.24	7,115.93	-1,037.33	-62.10	40.158865	-104.634514	1,301,898.04	3,241,900.29
7,622.00	82.83	356.92	7,135.19	-949.65	-66.58	40.159105	-104.634530	1,301,985.66	3,241,894.96
7,634.00	84.63	357.19	7,136.50	-937.74	-67.19	40.159138	-104.634533	1,301,997.57	3,241,894.23
7,669.20	87.25	357.61	7,138.99	-902.67	-68.78	40.159234	-104.634538	1,302,032.62	3,241,892.29
7,672.23	87.48	357.65	7,139.13	-899.64	-68.91	40.159243	-104.634539	1,302,035.65	3,241,892.14
7,692.00	88.95	357.88	7,139.75	-879.90	-69.68	40.159297	-104.634542	1,302,055.38	3,241,891.17
7,747.00	89.63	357.63	7,140.43	-824.95	-71.84	40.159448	-104.634549	1,302,110.31	3,241,888.48
7,814.00	90.59	358.25	7,140.30	-757.99	-74.24	40.159631	-104.634558	1,302,177.23	3,241,885.42
7,904.00	90.03	357.69	7,139.81	-668.05	-77.43	40.159878	-104.634569	1,302,267.14	3,241,881.36
7,994.00	91.11	359.30	7,138.92	-578.09	-79.80	40.160125	-104.634578	1,302,357.07	3,241,878.11
8,085.00	90.89	0.01	7,137.33	-487.11	-80.34	40.160375	-104.634580	1,302,448.04	3,241,876.68
8,174.00	89.75	0.03	7,136.83	-398.11	-80.31	40.160619	-104.634580	1,302,537.03	3,241,875.84
8,265.00	91.05	0.82	7,136.20	-307.12	-79.64	40.160869	-104.634577	1,302,628.02	3,241,875.63
8,354.00	90.92	0.61	7,134.67	-218.14	-78.53	40.161113	-104.634573	1,302,717.00	3,241,875.87
8,444.00	90.89	1.13	7,133.24	-128.16	-77.16	40.161360	-104.634568	1,302,806.98	3,241,876.36
8,534.00	91.14	1.35	7,131.65	-38.19	-75.21	40.161607	-104.634561	1,302,896.96	3,241,877.43
8,624.00	91.23	1.33	7,129.79	51.76	-73.11	40.161854	-104.634554	1,302,986.93	3,241,878.65
8,714.00	91.23	1.34	7,127.86	141.72	-71.01	40.162101	-104.634546	1,303,076.89	3,241,879.87
8,804.00	90.18	1.39	7,126.75	231.68	-68.87	40.162348	-104.634539	1,303,166.87	3,241,881.13
8,894.00	90.19	1.02	7,126.46	321.66	-66.98	40.162595	-104.634532	1,303,256.86	3,241,882.15
8,985.00	90.03	0.62	7,126.28	412.65	-65.67	40.162845	-104.634527	1,303,347.86	3,241,882.56
9,075.00	90.15	0.50	7,126.14	502.65	-64.79	40.163092	-104.634524	1,303,437.85	3,241,882.56
9,165.00	90.37	0.40	7,125.73	592.65	-64.09	40.163339	-104.634522	1,303,527.85	3,241,882.39
9,255.00	90.40	359.94	7,125.13	682.64	-63.82	40.163586	-104.634521	1,303,617.84	3,241,881.78
9,345.00	90.09	359.79	7,124.74	772.64	-64.03	40.163833	-104.634521	1,303,707.83	3,241,880.69
9,435.00	90.06	0.05	7,124.63	862.64	-64.16	40.164080	-104.634522	1,303,797.82	3,241,879.69
9,525.00	89.57	0.08	7,124.92	952.64	-64.06	40.164327	-104.634521	1,303,887.81	3,241,878.91
9,615.00	88.64	359.94	7,126.32	1,042.63	-64.04	40.164574	-104.634521	1,303,977.79	3,241,878.05
9,705.00	88.27	0.28	7,128.75	1,132.60	-63.87	40.164821	-104.634521	1,304,067.75	3,241,877.34
9,795.00	88.43	359.54	7,131.34	1,222.56	-64.01	40.165068	-104.634521	1,304,157.71	3,241,876.32
9,885.00	91.36	0.02	7,131.51	1,312.55	-64.35	40.165315	-104.634523	1,304,247.68	3,241,875.10
9,975.00	91.60	359.72	7,129.18	1,402.52	-64.56	40.165562	-104.634523	1,304,337.64	3,241,874.02
10,065.00	90.43	359.25	7,127.59	1,492.50	-65.37	40.165809	-104.634526	1,304,427.61	3,241,872.33
10,155.00	89.85	358.74	7,127.37	1,582.48	-66.95	40.166056	-104.634532	1,304,517.57	3,241,869.87
10,245.00	90.59	357.73	7,127.02	1,672.44	-69.72	40.166303	-104.634542	1,304,607.49	3,241,866.22
10,335.00	91.45	359.13	7,125.42	1,762.39	-72.18	40.166550	-104.634551	1,304,697.40	3,241,862.88
10,424.00	89.38	358.21	7,124.77	1,851.35	-74.25	40.166794	-104.634558	1,304,786.34	3,241,859.94
10,514.00	90.31	357.96	7,125.02	1,941.30	-77.26	40.167041	-104.634569	1,304,876.26	3,241,856.06
10,604.00	89.94	359.29	7,124.82	2,031.27	-79.42	40.167288	-104.634576	1,304,966.20	3,241,853.02

Design Report for GREENLEAF 29C-2HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
10,694.00	89.14	359.59	7,125.54	2,121.27	-80.30	40.167535	-104.634580	1,305,056.17	3,241,851.26
10,784.00	89.48	358.94	7,126.63	2,211.25	-81.45	40.167782	-104.634584	1,305,146.14	3,241,849.23
10,874.00	90.49	358.73	7,126.65	2,301.23	-83.28	40.168029	-104.634590	1,305,236.09	3,241,846.52
10,964.00	90.62	358.77	7,125.78	2,391.21	-85.24	40.168276	-104.634597	1,305,326.04	3,241,843.68
11,055.00	90.62	358.58	7,124.80	2,482.18	-87.35	40.168526	-104.634605	1,305,416.98	3,241,840.69
11,144.00	91.05	358.80	7,123.50	2,571.14	-89.38	40.168770	-104.634612	1,305,505.92	3,241,837.79
11,234.00	91.69	358.74	7,121.35	2,661.10	-91.31	40.169017	-104.634619	1,305,595.85	3,241,834.98
11,325.00	90.62	358.82	7,119.51	2,752.06	-93.25	40.169266	-104.634626	1,305,686.78	3,241,832.15
11,415.00	91.69	359.26	7,117.70	2,842.02	-94.76	40.169513	-104.634631	1,305,776.73	3,241,829.77
11,505.00	91.79	358.91	7,114.97	2,931.97	-96.19	40.169760	-104.634636	1,305,866.65	3,241,827.45
11,595.00	91.36	358.27	7,112.49	3,021.91	-98.41	40.170007	-104.634644	1,305,956.56	3,241,824.36
11,685.00	89.14	358.64	7,112.10	3,111.87	-100.83	40.170254	-104.634653	1,306,046.49	3,241,821.06
11,775.00	89.26	358.23	7,113.36	3,201.83	-103.29	40.170501	-104.634662	1,306,136.41	3,241,817.72
11,865.00	89.63	357.88	7,114.23	3,291.77	-106.35	40.170748	-104.634673	1,306,226.32	3,241,813.79
11,955.00	89.97	359.43	7,114.54	3,381.74	-108.46	40.170995	-104.634680	1,306,316.26	3,241,810.80
12,045.00	90.65	359.28	7,114.05	3,471.73	-109.47	40.171242	-104.634684	1,306,406.24	3,241,808.91
12,135.00	90.71	0.80	7,112.99	3,561.73	-109.41	40.171489	-104.634684	1,306,496.22	3,241,808.09
12,225.00	89.97	1.81	7,112.45	3,651.70	-107.36	40.171736	-104.634676	1,306,586.20	3,241,809.26
12,316.00	91.17	2.10	7,111.55	3,742.64	-104.26	40.171986	-104.634665	1,306,677.17	3,241,811.48
12,406.00	90.22	3.48	7,110.46	3,832.52	-99.88	40.172232	-104.634650	1,306,767.09	3,241,814.98
12,496.00	90.15	3.44	7,110.17	3,922.36	-94.44	40.172479	-104.634630	1,306,856.97	3,241,819.53
12,586.00	91.66	3.52	7,108.74	4,012.18	-88.98	40.172726	-104.634611	1,306,946.83	3,241,824.12
12,676.00	93.18	3.56	7,104.94	4,101.92	-83.43	40.172972	-104.634591	1,307,036.62	3,241,828.79
12,691.00	93.33	3.52	7,104.09	4,116.87	-82.50	40.173013	-104.634587	1,307,051.58	3,241,829.57
12,733.00	93.33	3.52	7,101.65	4,158.72	-79.93	40.173128	-104.634578	1,307,093.45	3,241,831.74

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
12,691.00	7,104.09	4,116.87	-82.50	Current MWD Survey @ 12691.00' MD :: 7104.09' TVD
12,733.00	7,101.65	4,158.72	-79.93	Straight Line Projection to Bit @ 12733.00' MD :: 7101.65' TVD

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Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	359.48	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
122.00	1,241.00	Suface Gyro Survey	MWD
1,373.00	7,634.00	MWD Vertical/Build Surveys	MWD+IFR1+SC
7,692.00	12,733.00	MWD Lateral Surveys	MWD+IFR1+SC

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,282.80	1,282.52	9 5/8"	9-5/8	13-1/2
7,669.20	7,138.99	7" @ 7669.20' MD	7	8-3/4

Design Targets

Shape	Target Name	TVD ()	Northing ()	Easting ()	+N/-S	+E/-W	Created	Updated
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Directional Difficulty Index

Average Dogleg over Survey:	1.79 °/100usft	Maximum Dogleg over Survey:	15.17 °/100usft at 7,634.00 usft
Net Tortousity applicable to Plans:	0.67 °/100usft	Directional Difficulty Index:	6.461

Design Report for GREENLEAF 29C-2HZ - Actual Surveys

Audit Info

North Reference Sheet for Sec. 2-T2N-R65W - GREENLEAF 29C-2HZ - Plan B

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

Vertical Depths are relative to RKB = 6' @ 4860.00usft (Gyro). Northing and Easting are relative to GREENLEAF 29C-2HZ

Coordinate System is US State Plane 1983, Colorado Northern Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99995805

Grid Coordinates of Well: 1,302,935.88 usft N, 3,241,952.26 usft E

Geographical Coordinates of Well: 40° 09' 42.16" N, 104° 38' 03.45" W

Grid Convergence at Surface is: 0.56°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,733.00usft

the Bottom Hole Displacement is 4,159.49usft in the Direction of 358.90° (True).

Magnetic Convergence at surface is: -7.85° (11 December 2014, , BGGM2014)

