

HALLIBURTON

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State of New Mexico, Lea

I, Jesus Contreras certify that I am employed by Halliburton Energy Services, Inc. (aka Sperry Drilling) and that on the dates of May 06, 2019 through July 15, 2019, I did conduct or supervise the taking of MWD directional surveys for the Ender Wiggins 14 WA FC 1H well from a depth of 116' MD to a depth of 19319' MD. This data is true, correct, complete and within the limitations of the tools as set forth by Halliburton Energy Services, Inc. (aka Sperry Drilling). I am authorized and qualified to make this report and these surveys were conducted at the request of Marathon Oil Permian LLC, for the Ender Wiggins 14 WA FC 1H well in Lea. I have reviewed this report and find that it confirms to the principles and procedures as set forth by Halliburton Energy Services, Inc. (aka Sperry Drilling.)



Jesus Contreras
Field Engineer



Marathon Oil Permian LLC

GL+KB 25' @ 3357.00usft (PD 601)

3332.00

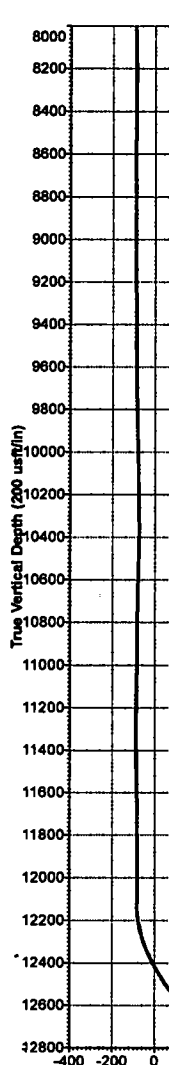
Project: Lea County, New Mexico (NAD27)
 Site: Ender Wiggins 14 Pad (Grid)
 Well: WA FC 1H
 Wellbore: Wellbore #1
 Design: Final Surveys
 Rig: PD 601

Map System: US State Plane 1927 (Exact solution)
 Datum: NAD 1927 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone Name: New Mexico East 3001



Azimuths to Grid North
 True North: -0.47°
 Magnetic North: 6.15°
 Magnetic Field
 Strength: 478.12 nT
 Dip Angle: 69.75°
 Date: 4/15/2019
 Model: HDGM_2019

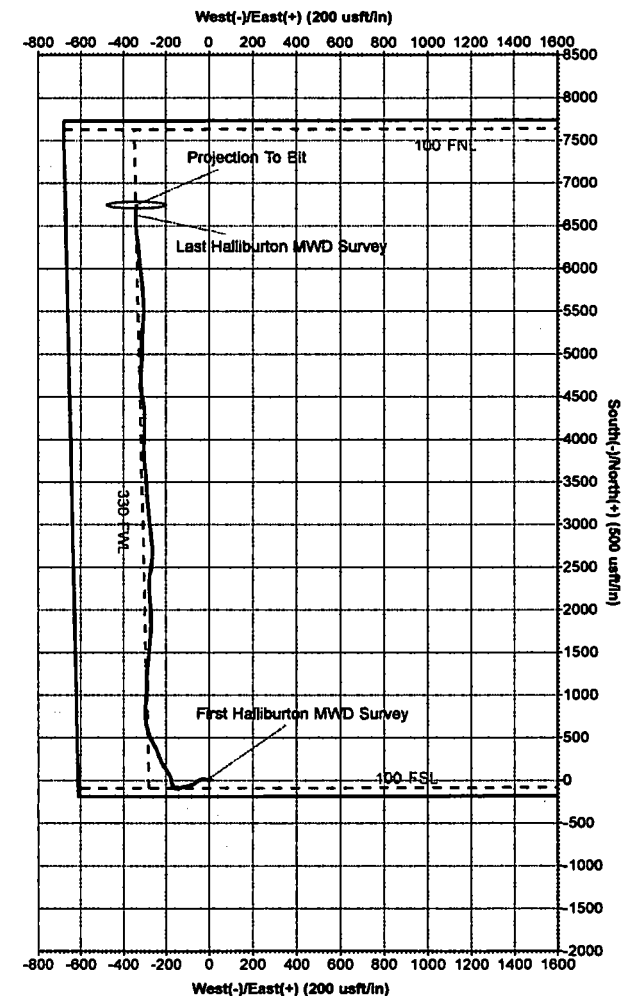
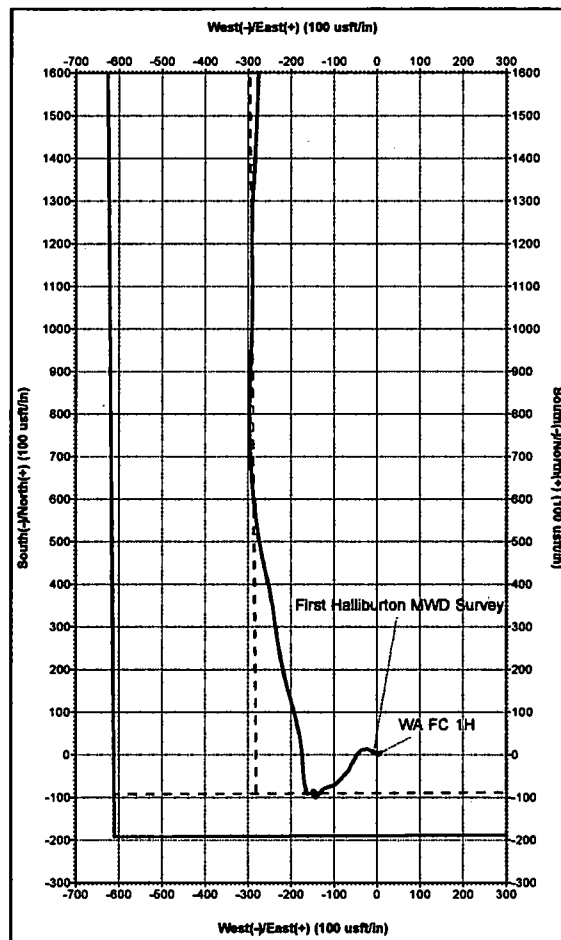
WELL DETAILS					
3332.00					
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	412472.57	774420.08	32.13089962	-103.44684585



HOBBS OCD

JAN 21 2020

RECEIVED



Last Halliburton MWD Survey Projection To Bit

Vertical Section at 357.12° (200 usft/in)

HALLIBURTON | Sperry Drilling

PD 601

Marathon Oil Permian LLC

Lea County, New Mexico (NAD27) Ender Wiggins 14 Pad (Grid)

API#

WA FC 1H

Wellbore #1

Design: Final Surveys

Sperry Drilling Services

Combo Report

26 July, 2019

Well Coordinates: 32.13089981
-103.44684584

NAD 1927 (NADCON CONUS)
New Mexico East 3001
412,472.57 N
774,420.08 E

Ground Level: 3,332.00 usft

Local Coordinate Origin:

Centered on Well WA FC 1H

Viewing Datum:

GL+KB 25' @ 3357.00usft (PD 601)

TVDs to System:

N

North Reference:

Grid

Unit System:

Midcon (2 decimal)

Version: 5000.15 Build: 91

Report Version: Midcon Combo v1.13

HALLIBURTON

Design Report for WA FC 1H - Final Surveys

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Toolface Angle (°)	Comments
				Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)				
0.00	0.00	0.00	0.00	0.00 N	0.00 E	412,472.57	774,420.08	0.00	0.00	0.00	
116.00	0.30	12.22	116.00	0.30 N	0.06 E	412,472.87	774,420.14	0.26	0.29	12.22	
204.00	1.10	318.22	203.99	1.15 N	0.45 W	412,473.72	774,419.63	1.09	1.17	-68.72	
287.00	1.10	304.22	286.98	2.19 N	1.64 W	412,474.76	774,418.44	0.32	2.27	-97.00	
379.00	0.40	334.22	378.97	2.98 N	2.51 W	412,475.55	774,417.57	0.85	3.10	165.14	
474.00	1.10	336.22	473.96	4.11 N	3.02 W	412,476.68	774,417.06	0.74	4.26	3.14	
571.00	0.60	295.22	570.95	5.18 N	3.86 W	412,477.75	774,416.22	0.78	5.37	-148.69	
665.00	0.30	304.22	664.95	5.53 N	4.50 W	412,478.10	774,415.58	0.33	5.75	171.22	
760.00	0.50	281.22	759.95	5.75 N	5.12 W	412,478.32	774,414.96	0.27	6.00	-50.64	
854.00	0.90	335.22	853.94	6.50 N	5.83 W	412,479.07	774,414.25	0.78	6.78	87.72	
949.00	0.80	281.22	948.93	7.31 N	6.79 W	412,479.88	774,413.29	0.82	7.64	-123.58	
1,029.00	0.10	349.22	1,028.93	7.48 N	7.35 W	412,480.05	774,412.73	0.96	7.84	173.07	
1,071.00	0.38	289.50	1,070.93	7.57 N	7.49 W	412,480.14	774,412.59	0.81	7.93	-74.40	First Halliburton MWD Survey
1,160.00	0.46	278.70	1,159.92	7.72 N	8.12 W	412,480.29	774,411.96	0.13	8.12	-50.19	
1,250.00	0.62	283.34	1,249.92	7.89 N	8.95 W	412,480.46	774,411.13	0.18	8.33	17.61	
1,339.00	0.25	270.36	1,338.92	8.00 N	9.62 W	412,480.57	774,410.46	0.43	8.47	-171.51	
1,429.00	0.57	134.26	1,428.92	7.69 N	9.49 W	412,480.26	774,410.59	0.86	8.15	-149.11	
1,519.00	0.84	125.53	1,518.91	6.99 N	8.63 W	412,479.56	774,411.45	0.32	7.42	-26.10	
1,608.00	0.68	131.28	1,607.90	6.26 N	7.71 W	412,478.83	774,412.37	0.20	6.64	157.37	
1,698.00	0.98	123.77	1,697.89	5.48 N	6.67 W	412,478.05	774,413.41	0.35	5.81	-23.71	
1,787.00	1.02	127.96	1,786.88	4.57 N	5.41 W	412,477.14	774,414.67	0.09	4.84	63.43	
1,877.00	1.23	129.22	1,876.86	3.47 N	4.03 W	412,476.04	774,416.05	0.23	3.67	7.35	
1,966.00	1.65	137.24	1,965.83	1.92 N	2.42 W	412,474.49	774,417.66	0.52	2.04	29.68	
2,055.00	1.22	125.94	2,054.81	0.43 N	0.78 W	412,473.00	774,419.30	0.58	0.47	-152.21	
2,145.00	0.56	133.05	2,144.79	0.43 S	0.32 E	412,472.14	774,420.40	0.74	-0.45	174.04	
2,235.00	0.86	119.23	2,234.79	1.06 S	1.23 E	412,471.51	774,421.31	0.38	-1.12	-36.75	
2,324.00	0.87	81.02	2,323.78	1.29 S	2.48 E	412,471.28	774,422.56	0.64	-1.41	-108.15	
2,414.00	1.20	21.28	2,413.76	0.30 S	3.49 E	412,472.27	774,423.57	1.19	-0.48	-104.35	
2,503.00	1.64	33.00	2,502.74	1.64 N	4.53 E	412,474.21	774,424.61	0.59	1.41	39.38	
2,593.00	1.52	39.50	2,592.70	3.64 N	5.99 E	412,476.21	774,426.07	0.24	3.33	127.02	
2,682.00	2.11	51.97	2,681.66	5.56 N	8.03 E	412,478.13	774,428.11	0.79	5.15	40.14	
2,772.00	0.66	102.06	2,771.63	6.47 N	9.84 E	412,479.04	774,429.92	1.96	5.97	163.29	
2,861.00	1.40	214.22	2,860.62	5.46 N	9.73 E	412,478.03	774,429.81	1.98	4.97	132.49	
2,951.00	2.58	253.28	2,950.57	3.97 N	7.17 E	412,476.54	774,427.25	1.93	3.61	69.62	
3,040.00	2.33	263.33	3,039.49	3.19 N	3.46 E	412,475.76	774,423.54	0.56	3.01	125.10	
3,130.00	2.11	263.31	3,129.42	2.78 N	0.01 W	412,475.35	774,420.07	0.24	2.78	-179.81	

HALLIBURTON**Design Report for WA FC 1H - Final Surveys**

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Toolface Angle (°)	Comments
				Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)				
3,219.00	2.14	275.04	3,218.36	2.73 N	3.29 W	412,475.30	774,416.79	0.49	2.90	91.93	
3,309.00	1.92	280.80	3,308.30	3.16 N	6.44 W	412,475.73	774,413.64	0.33	3.48	140.01	
3,398.00	1.85	302.37	3,397.26	4.21 N	9.12 W	412,476.78	774,410.96	0.80	4.67	106.35	
3,488.00	2.11	307.99	3,487.20	6.01 N	11.65 W	412,478.58	774,408.43	0.36	6.59	39.58	
3,577.00	2.77	315.41	3,576.12	8.55 N	14.46 W	412,481.12	774,405.62	0.82	9.27	29.32	
3,667.00	3.74	293.64	3,665.98	11.28 N	18.67 W	412,483.85	774,401.41	1.73	12.20	-63.08	
3,756.00	4.54	274.93	3,754.75	12.74 N	24.84 W	412,485.31	774,395.24	1.75	13.98	-68.92	
3,846.00	4.27	263.78	3,844.49	12.69 N	31.72 W	412,485.26	774,388.36	1.00	14.26	-113.01	
3,935.00	3.94	235.81	3,933.27	10.61 N	37.54 W	412,483.18	774,382.54	2.26	12.48	-113.13	
4,025.00	4.17	218.29	4,023.05	6.30 N	42.13 W	412,478.87	774,377.95	1.39	8.41	-88.30	
4,114.00	3.43	218.74	4,111.85	1.69 N	45.80 W	412,474.26	774,374.28	0.83	3.99	177.92	
4,203.00	2.57	209.77	4,200.73	2.12 S	48.46 W	412,470.45	774,371.62	1.10	0.31	-155.80	
4,292.00	3.18	209.00	4,289.61	6.01 S	50.64 W	412,466.56	774,369.44	0.69	-3.46	-4.01	
4,382.00	3.41	207.02	4,379.47	10.58 S	53.07 W	412,461.99	774,367.01	0.29	-7.90	-27.32	
4,471.00	3.14	207.07	4,468.32	15.11 S	55.38 W	412,457.46	774,364.70	0.30	-12.31	179.42	
4,561.00	2.85	216.54	4,558.20	19.10 S	57.84 W	412,453.47	774,362.24	0.64	-16.17	125.05	
4,651.00	2.87	210.87	4,648.09	22.83 S	60.33 W	412,449.74	774,359.75	0.31	-19.77	-88.79	
4,740.00	3.04	199.06	4,736.97	26.98 S	62.24 W	412,445.59	774,357.84	0.71	-23.82	-80.35	
4,829.00	3.10	196.23	4,825.84	31.52 S	63.68 W	412,441.05	774,356.40	0.18	-28.28	-69.82	
4,919.00	3.54	212.74	4,915.69	36.19 S	65.87 W	412,436.38	774,354.21	1.16	-32.84	73.68	
5,008.00	3.73	221.55	5,004.51	40.67 S	69.27 W	412,431.90	774,350.81	0.66	-37.14	75.64	
5,098.00	3.65	225.09	5,094.33	44.88 S	73.24 W	412,427.69	774,346.84	0.27	-41.15	111.11	
5,187.00	3.81	223.66	5,183.14	49.02 S	77.29 W	412,423.55	774,342.79	0.21	-45.08	-30.89	
5,277.00	3.82	225.20	5,272.94	53.30 S	81.48 W	412,419.27	774,338.60	0.11	-49.14	85.19	
5,301.00	3.86	225.59	5,298.88	54.43 S	82.63 W	412,418.14	774,337.45	0.20	-50.21	33.34	
5,449.00	3.89	222.06	5,444.55	61.64 S	89.55 W	412,410.93	774,330.53	0.16	-57.06	-84.60	
5,539.00	3.99	224.56	5,534.33	66.14 S	93.79 W	412,406.43	774,326.29	0.22	-61.34	61.05	
5,628.00	3.49	232.45	5,623.14	69.99 S	98.11 W	412,402.58	774,321.97	0.80	-64.98	138.06	
5,718.00	3.13	252.11	5,713.00	72.42 S	102.62 W	412,400.15	774,317.46	1.32	-67.17	117.25	
5,807.00	3.13	253.39	5,801.86	73.86 S	107.26 W	412,398.71	774,312.82	0.08	-68.38	90.64	
5,897.00	3.01	252.58	5,891.74	75.27 S	111.87 W	412,397.30	774,308.21	0.14	-69.56	-160.53	
5,987.00	2.95	252.04	5,981.61	76.69 S	116.33 W	412,395.88	774,303.75	0.07	-70.75	-155.20	
6,077.00	2.94	253.23	6,071.49	78.07 S	120.74 W	412,394.50	774,299.34	0.07	-71.91	99.88	
6,166.00	1.72	235.97	6,160.42	79.48 S	124.03 W	412,393.09	774,296.05	1.57	-73.15	-158.53	
6,256.00	1.55	223.53	6,250.38	81.12 S	125.99 W	412,391.45	774,294.09	0.44	-74.69	-121.72	
6,346.00	1.53	222.28	6,340.35	82.89 S	127.64 W	412,389.68	774,292.44	0.04	-76.37	-121.39	
6,435.00	1.55	218.43	6,429.32	84.71 S	129.18 W	412,387.86	774,290.90	0.12	-78.11	-80.99	

Design Report for WA FC 1H - Final Surveys

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Toolface Angle (°)	Comments
				Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)				
6,525.00	1.44	219.63	6,519.29	86.53 S	130.66 W	412,386.04	774,289.42	0.13	-79.86	164.71	
6,614.00	1.46	216.70	6,608.26	88.30 S	132.05 W	412,384.27	774,288.03	0.09	-81.56	-76.37	
6,704.00	1.38	221.86	6,698.23	90.03 S	133.46 W	412,382.54	774,286.62	0.17	-83.21	124.59	
6,794.00	1.38	220.20	6,788.21	91.67 S	134.88 W	412,380.90	774,285.20	0.04	-84.78	-90.83	
6,883.00	1.34	222.13	6,877.18	93.26 S	136.27 W	412,379.31	774,283.81	0.07	-86.29	132.09	
6,973.00	0.64	249.41	6,967.17	94.21 S	137.45 W	412,378.36	774,282.63	0.92	-87.19	159.17	
7,063.00	0.55	281.63	7,057.16	94.45 S	138.35 W	412,378.12	774,281.73	0.17	-87.38	131.35	
7,152.00	0.54	243.80	7,146.16	94.70 S	139.15 W	412,377.87	774,280.93	0.19	-87.59	-102.26	
7,242.00	0.54	236.03	7,236.16	95.12 S	139.88 W	412,377.45	774,280.20	0.08	-87.98	-93.88	
7,331.00	0.61	228.06	7,325.15	95.68 S	140.58 W	412,376.89	774,279.50	0.12	-88.49	-52.84	
7,421.00	0.70	219.82	7,415.14	96.42 S	141.29 W	412,376.15	774,278.79	0.14	-89.20	-50.47	
7,510.00	0.70	217.04	7,504.14	97.27 S	141.96 W	412,375.30	774,278.12	0.04	-90.02	-91.39	
7,600.00	0.90	213.87	7,594.13	98.29 S	142.69 W	412,374.28	774,277.39	0.23	-91.00	-14.07	
7,690.00	0.83	203.44	7,684.12	99.48 S	143.34 W	412,373.09	774,276.74	0.19	-92.15	-119.12	
7,779.00	0.68	179.71	7,773.11	100.60 S	143.60 W	412,371.97	774,276.48	0.39	-93.26	-127.17	
7,868.00	0.16	350.28	7,862.11	101.00 S	143.61 W	412,371.57	774,276.47	0.94	-93.66	178.21	
7,958.00	0.63	358.93	7,952.11	100.39 S	143.65 W	412,372.18	774,276.43	0.52	-93.05	11.57	
8,048.00	0.65	343.85	8,042.10	99.40 S	143.80 W	412,373.17	774,276.28	0.19	-92.05	-90.81	
8,137.00	0.34	321.34	8,131.10	98.71 S	144.10 W	412,373.86	774,275.98	0.40	-91.35	-158.82	
8,227.00	0.25	265.68	8,221.10	98.52 S	144.46 W	412,374.05	774,275.62	0.32	-91.14	-133.95	
8,316.00	0.32	237.89	8,310.10	98.66 S	144.87 W	412,373.91	774,275.21	0.17	-91.26	-77.49	
8,406.00	0.45	193.69	8,400.09	99.14 S	145.17 W	412,373.43	774,274.91	0.35	-91.72	-89.52	
8,496.00	0.64	180.18	8,490.09	99.99 S	145.25 W	412,372.58	774,274.83	0.25	-92.56	-40.95	
8,585.00	0.11	333.99	8,579.09	100.41 S	145.29 W	412,372.16	774,274.79	0.83	-92.98	176.24	
8,675.00	0.19	23.98	8,669.09	100.19 S	145.27 W	412,372.38	774,274.81	0.16	-92.77	85.23	
8,764.00	0.21	5.74	8,758.09	99.90 S	145.19 W	412,372.67	774,274.89	0.07	-92.48	-81.82	
8,854.00	0.17	302.70	8,848.09	99.66 S	145.29 W	412,372.91	774,274.79	0.22	-92.24	-131.26	
8,943.00	0.50	290.79	8,937.09	99.45 S	145.76 W	412,373.12	774,274.32	0.38	-92.00	-17.81	
9,033.00	0.83	299.05	9,027.08	98.99 S	146.70 W	412,373.58	774,273.38	0.38	-91.50	20.36	
9,122.00	0.84	96.68	9,116.08	98.76 S	146.61 W	412,373.81	774,273.47	1.84	-91.27	168.75	
9,212.00	0.87	88.88	9,206.07	98.82 S	145.27 W	412,373.75	774,274.81	0.13	-91.40	-79.47	
9,301.00	0.26	65.80	9,295.06	98.72 S	144.41 W	412,373.85	774,275.67	0.72	-91.35	-170.82	
9,390.00	0.51	334.06	9,384.06	98.29 S	144.40 W	412,374.28	774,275.68	0.65	-90.91	-118.39	
9,480.00	0.81	301.13	9,474.05	97.60 S	145.12 W	412,374.97	774,274.96	0.52	-90.18	-68.90	
9,570.00	1.34	286.65	9,564.04	96.97 S	146.68 W	412,375.60	774,273.40	0.66	-89.48	-34.50	
9,659.00	0.53	332.70	9,653.03	96.30 S	147.86 W	412,376.27	774,272.22	1.17	-88.75	158.57	
9,749.00	1.23	340.88	9,743.02	95.02 S	148.37 W	412,377.55	774,271.71	0.79	-87.45	14.28	

Design Report for WA FC 1H - Final Surveys

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Toolface Angle (°)	Comments
				Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)				
9,838.00	1.58	351.74	9,831.99	92.90 S	148.86 W	412,379.67	774,271.22	0.49	-85.31	42.78	
9,928.00	1.55	345.73	9,921.96	90.49 S	149.34 W	412,382.08	774,270.74	0.19	-82.88	-103.35	
10,018.00	1.64	347.48	10,011.92	88.06 S	149.92 W	412,384.51	774,270.16	0.11	-80.42	29.30	
10,107.00	0.93	351.15	10,100.90	86.10 S	150.30 W	412,386.47	774,269.78	0.80	-78.44	175.22	
10,197.00	0.89	28.38	10,190.89	84.76 S	150.08 W	412,387.81	774,270.00	0.65	-77.12	112.35	
10,286.00	1.09	73.18	10,279.88	83.91 S	148.94 W	412,388.66	774,271.14	0.87	-76.32	98.63	
10,375.00	0.92	86.02	10,368.86	83.62 S	147.42 W	412,388.95	774,272.66	0.32	-76.11	133.35	
10,465.00	1.36	136.45	10,458.85	84.34 S	145.96 W	412,388.23	774,274.12	1.17	-76.90	92.92	
10,554.00	1.68	148.23	10,547.81	86.22 S	144.55 W	412,386.35	774,275.53	0.50	-78.85	50.31	
10,644.00	1.54	149.13	10,637.78	88.37 S	143.24 W	412,384.20	774,276.84	0.16	-81.07	170.21	
10,733.00	1.49	152.13	10,726.75	90.42 S	142.08 W	412,382.15	774,278.00	0.11	-83.17	123.72	
10,823.00	0.25	180.92	10,816.74	91.66 S	141.54 W	412,380.91	774,278.54	1.42	-84.43	174.59	
10,912.00	0.33	180.16	10,905.73	92.11 S	141.54 W	412,380.46	774,278.54	0.09	-84.88	-3.13	
11,002.00	0.73	175.54	10,995.73	92.94 S	141.50 W	412,379.63	774,278.58	0.45	-85.71	-8.41	
11,091.00	1.38	188.79	11,084.72	94.56 S	141.62 W	412,378.01	774,278.46	0.78	-87.33	27.28	
11,180.00	1.31	231.79	11,173.69	96.25 S	142.58 W	412,376.32	774,277.50	1.11	-88.97	115.27	
11,270.00	2.26	245.39	11,263.65	97.62 S	145.00 W	412,374.95	774,275.08	1.15	-90.22	30.93	
11,359.00	1.33	274.38	11,352.61	98.28 S	147.63 W	412,374.29	774,272.45	1.43	-90.74	149.55	
11,449.00	1.33	12.13	11,442.59	97.18 S	148.45 W	412,375.39	774,271.63	2.23	-89.80	138.87	
11,538.00	1.75	21.42	11,531.56	94.90 S	147.74 W	412,377.67	774,272.34	0.55	-87.36	35.43	
11,588.00	1.17	3.84	11,581.54	93.68 S	147.42 W	412,378.89	774,272.66	1.45	-86.16	-150.89	
11,677.00	0.91	302.52	11,670.53	92.39 S	147.96 W	412,380.18	774,272.12	1.22	-84.85	-132.56	
11,775.00	1.72	287.11	11,768.50	91.54 S	150.02 W	412,381.03	774,270.06	0.89	-83.89	-31.42	
11,873.00	2.12	272.47	11,866.45	91.03 S	153.24 W	412,381.54	774,266.84	0.64	-83.22	-58.27	
11,967.00	2.19	270.92	11,960.38	90.93 S	156.77 W	412,381.64	774,263.31	0.10	-82.94	-40.56	
12,061.00	2.36	256.05	12,054.31	91.37 S	160.44 W	412,381.20	774,259.64	0.65	-83.19	-81.45	
12,098.00	2.26	258.22	12,091.28	91.70 S	161.90 W	412,380.87	774,258.18	0.36	-83.45	139.91	
12,155.00	1.93	267.45	12,148.24	91.97 S	163.96 W	412,380.60	774,256.12	0.83	-83.62	138.91	
12,202.00	8.54	349.72	12,195.05	88.57 S	165.37 W	412,384.00	774,254.71	18.08	-80.15	95.18	
12,249.00	13.57	352.71	12,241.17	78.66 S	166.69 W	412,392.91	774,253.39	10.77	-71.18	7.97	
12,296.00	18.32	349.81	12,286.35	66.91 S	168.70 W	412,405.66	774,251.38	10.24	-58.35	-10.92	
12,344.00	22.02	353.31	12,331.40	50.54 S	171.09 W	412,422.03	774,248.99	8.10	-41.89	19.72	
12,391.00	24.81	355.57	12,374.52	31.96 S	172.87 W	412,440.61	774,247.21	6.24	-23.23	18.88	
12,438.00	29.74	357.92	12,416.28	10.46 S	174.06 W	412,462.11	774,246.02	10.73	-1.71	13.37	
12,524.00	32.73	350.18	12,489.84	33.79 N	178.80 W	412,506.36	774,241.28	5.81	42.73	-56.67	
12,605.00	42.81	346.44	12,553.88	82.15 N	188.99 W	412,554.72	774,231.09	12.51	91.54	-14.53	

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Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Toolface Angle (°)	Comments
				Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)				
12,699.00	57.32	344.25	12,614.19	151.54 N	207.29 W	412,624.11	774,212.79	15.75	161.76	-7.23	
12,792.00	72.66	349.85	12,653.42	233.45 N	225.86 W	412,706.02	774,194.22	17.37	244.50	19.57	
12,886.00	77.81	352.87	12,677.37	323.27 N	239.48 W	412,795.84	774,180.60	6.30	334.89	29.95	
12,980.00	88.98	346.17	12,688.18	414.88 N	256.49 W	412,887.45	774,163.59	13.83	427.24	-31.24	
13,097.00	94.42	351.97	12,684.70	529.62 N	278.66 W	413,002.19	774,141.42	6.79	542.94	46.77	
13,191.00	93.76	354.18	12,678.00	622.69 N	289.96 W	413,095.26	774,130.12	2.45	636.46	106.59	
13,285.00	90.83	358.53	12,674.23	716.39 N	295.92 W	413,188.96	774,124.16	5.58	730.35	123.88	
13,379.00	89.97	359.78	12,673.58	810.37 N	297.31 W	413,282.94	774,122.77	1.61	824.28	124.52	
13,473.00	91.98	2.09	12,671.98	904.34 N	295.78 W	413,376.91	774,124.30	3.26	918.05	48.95	
13,567.00	90.90	2.44	12,669.61	998.23 N	292.06 W	413,470.80	774,128.02	1.21	1,011.64	162.04	
13,661.00	92.96	359.91	12,666.45	1,092.15 N	290.14 W	413,564.72	774,129.94	3.47	1,105.34	-50.79	
13,755.00	91.12	358.40	12,663.10	1,186.07 N	291.52 W	413,658.64	774,128.56	2.53	1,199.21	-140.61	
13,848.00	92.25	2.73	12,660.37	1,279.00 N	290.61 W	413,751.57	774,129.47	4.81	1,291.98	75.31	
13,941.00	92.16	3.18	12,656.79	1,371.81 N	285.82 W	413,844.38	774,134.26	0.49	1,384.43	101.31	
14,035.00	92.07	2.81	12,653.32	1,465.62 N	280.91 W	413,938.19	774,139.17	0.40	1,477.87	-103.67	
14,128.00	92.13	1.28	12,649.91	1,558.49 N	277.59 W	414,031.06	774,142.49	1.65	1,570.47	-87.72	
14,222.00	92.35	1.89	12,646.24	1,652.38 N	274.99 W	414,124.95	774,145.09	0.69	1,664.11	70.14	
14,317.00	90.86	2.25	12,643.58	1,747.28 N	271.56 W	414,219.85	774,148.52	1.61	1,758.71	166.42	
14,410.00	88.48	359.45	12,644.11	1,840.25 N	270.18 W	414,312.82	774,149.90	3.95	1,851.50	-130.37	
14,504.00	88.86	358.96	12,646.29	1,934.22 N	271.49 W	414,406.79	774,148.59	0.66	1,945.41	-52.20	
14,598.00	90.12	359.08	12,647.13	2,028.20 N	273.10 W	414,500.77	774,146.98	1.35	2,039.36	5.44	
14,692.00	89.20	358.34	12,647.69	2,122.17 N	275.21 W	414,594.74	774,144.87	1.28	2,133.32	-141.19	
14,786.00	90.09	357.42	12,648.27	2,216.10 N	278.69 W	414,688.67	774,141.39	1.36	2,227.30	-45.95	
14,880.00	90.46	1.43	12,647.82	2,310.08 N	279.63 W	414,782.65	774,140.45	4.28	2,321.21	84.72	
14,974.00	90.92	1.97	12,646.69	2,404.03 N	276.84 W	414,876.60	774,143.24	0.75	2,414.90	49.57	
15,069.00	91.64	5.46	12,644.56	2,498.79 N	270.69 W	414,971.36	774,149.39	3.75	2,509.23	78.30	
15,162.00	90.62	1.50	12,642.73	2,591.58 N	265.05 W	415,064.15	774,155.03	4.40	2,601.62	-104.40	
15,256.00	92.66	359.81	12,640.04	2,685.53 N	263.97 W	415,158.10	774,156.11	2.82	2,695.40	-39.61	
15,350.00	92.41	357.40	12,635.88	2,779.40 N	266.26 W	415,251.97	774,153.82	2.58	2,789.27	-95.87	
15,443.00	92.87	357.22	12,631.60	2,872.20 N	270.62 W	415,344.77	774,149.46	0.53	2,882.17	-21.35	
15,537.00	90.74	357.93	12,628.64	2,966.06 N	274.60 W	415,438.63	774,145.48	2.39	2,976.11	161.56	
15,632.00	90.19	358.44	12,627.87	3,061.01 N	277.60 W	415,533.58	774,142.48	0.79	3,071.09	137.16	
15,725.00	87.10	356.42	12,630.07	3,153.88 N	281.77 W	415,626.45	774,138.31	3.97	3,164.05	-146.85	
15,819.00	90.96	357.66	12,631.66	3,247.72 N	286.62 W	415,720.29	774,133.46	4.31	3,258.02	17.82	
15,911.00	92.40	358.68	12,628.96	3,339.63 N	289.56 W	415,812.20	774,130.52	1.92	3,349.96	35.29	
16,005.00	92.50	359.48	12,624.94	3,433.53 N	291.07 W	415,906.10	774,129.01	0.86	3,443.82	82.85	
16,100.00	87.41	358.59	12,625.02	3,528.48 N	292.67 W	416,001.05	774,127.41	5.44	3,538.73	-170.08	

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Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Toolface Angle (°)	Comments
				Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)				
16,194.00	87.74	358.31	12,628.99	3,622.30 N	296.85 W	416,094.87	774,123.23	2.45	3,632.64	-81.81	
16,288.00	89.54	358.06	12,631.22	3,716.15 N	301.46 W	416,188.72	774,118.62	2.67	3,726.60	44.21	
16,382.00	92.59	359.24	12,629.48	3,810.10 N	303.67 W	416,282.67	774,116.41	3.48	3,820.54	21.14	
16,476.00	93.24	359.62	12,624.70	3,903.97 N	304.61 W	416,376.54	774,115.47	0.80	3,914.34	30.27	
16,570.00	92.31	0.87	12,620.15	3,997.86 N	304.21 W	416,470.43	774,115.87	1.66	4,008.09	126.65	
16,664.00	92.96	1.26	12,615.82	4,091.74 N	302.46 W	416,564.31	774,117.62	0.81	4,101.77	30.93	
16,757.00	86.35	359.62	12,616.38	4,184.68 N	301.75 W	416,657.25	774,118.33	7.32	4,194.56	-166.06	
16,851.00	90.09	0.53	12,619.30	4,278.62 N	301.62 W	416,751.19	774,118.46	4.09	4,288.37	13.69	
16,945.00	91.66	357.41	12,617.87	4,372.58 N	303.31 W	416,845.15	774,116.77	3.72	4,382.29	-63.27	
17,039.00	91.58	353.98	12,615.21	4,466.26 N	310.36 W	416,938.83	774,109.72	3.65	4,476.21	-91.29	
17,133.00	90.56	359.15	12,613.45	4,560.04 N	315.99 W	417,032.61	774,104.09	5.61	4,570.16	101.11	
17,227.00	88.39	359.15	12,614.31	4,654.02 N	317.39 W	417,126.59	774,102.69	2.31	4,664.09	180.00	
17,321.00	87.96	0.07	12,617.31	4,747.97 N	318.03 W	417,220.54	774,102.05	1.08	4,757.95	115.08	
17,415.00	89.29	0.95	12,619.56	4,841.94 N	317.19 W	417,314.51	774,102.89	1.70	4,851.76	33.49	
17,509.00	90.86	2.38	12,619.44	4,935.89 N	314.46 W	417,408.46	774,105.62	2.26	4,945.46	42.33	
17,603.00	88.30	358.50	12,620.13	5,029.86 N	313.74 W	417,502.43	774,106.34	4.94	5,039.27	-123.42	
17,697.00	89.26	0.45	12,622.13	5,123.83 N	314.60 W	417,596.40	774,105.48	2.31	5,133.16	63.81	
17,791.00	90.65	1.43	12,622.21	5,217.81 N	313.06 W	417,690.38	774,107.02	1.81	5,226.95	35.19	
17,886.00	91.82	2.14	12,620.16	5,312.74 N	310.10 W	417,785.31	774,109.98	1.44	5,321.61	31.24	
17,980.00	92.81	2.16	12,616.36	5,406.60 N	306.57 W	417,879.17	774,113.51	1.05	5,415.17	1.16	
18,074.00	91.91	359.84	12,612.49	5,500.50 N	304.94 W	417,973.07	774,115.14	2.65	5,508.87	-111.17	
18,168.00	91.11	359.24	12,610.01	5,594.46 N	305.69 W	418,067.03	774,114.39	1.06	5,602.75	-143.13	
18,262.00	88.86	358.11	12,610.04	5,688.43 N	307.86 W	418,161.00	774,112.22	2.68	5,696.71	-153.33	
18,356.00	87.87	357.24	12,612.72	5,782.31 N	311.68 W	418,254.88	774,108.40	1.40	5,790.67	-138.71	
18,451.00	86.82	357.83	12,617.12	5,877.12 N	315.76 W	418,349.69	774,104.32	1.27	5,885.56	150.71	
18,544.00	88.79	358.24	12,620.68	5,969.99 N	318.94 W	418,442.56	774,101.14	2.16	5,978.48	11.76	
18,639.00	90.34	357.50	12,621.40	6,064.92 N	322.47 W	418,537.49	774,097.61	1.81	6,073.46	-25.52	
18,732.00	92.10	357.63	12,619.42	6,157.81 N	326.42 W	418,630.38	774,093.66	1.90	6,166.44	4.22	
18,826.00	91.98	357.35	12,616.08	6,251.66 N	330.54 W	418,724.23	774,089.54	0.32	6,260.37	-113.21	
18,920.00	91.05	356.43	12,613.59	6,345.49 N	335.64 W	418,818.06	774,084.44	1.39	6,354.34	-135.31	
19,014.00	91.67	358.76	12,611.36	6,439.37 N	339.58 W	418,911.94	774,080.50	2.56	6,448.30	75.07	
19,108.00	92.01	358.84	12,608.34	6,533.30 N	341.55 W	419,005.87	774,078.53	0.37	6,542.21	13.23	
19,203.00	92.01	1.18	12,605.01	6,628.24 N	341.53 W	419,100.81	774,078.55	2.46	6,637.03	89.96	Last Halliburton MWD Survey
19,319.00	92.01	1.18	12,600.94	6,744.14 N	339.14 W	419,216.71	774,080.94	0.00	6,752.66	0.00	Projection To Bit

Design Report for WA FC 1H - Final Surveys

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,071.00	1,070.93	7.57	-7.49	First Halliburton MWD Survey
19,203.00	12,605.01	6,628.24	-341.53	Last Halliburton MWD Survey
19,319.00	12,600.94	6,744.14	-339.14	Projection To Bit

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
TD	No Target (Freehand)	357.12	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
116.00	1,029.00	Spudder (12.25")	2_MWD
1,071.00	5,301.00	BHA #1 (12.25")	2_MWD+HRGM+AX
5,449.00	5,539.00	BHA #2 (8.75")	2_MWD+HRGM+AX
5,628.00	11,091.00	BHA #3 (8.75")	2_MWD+HRGM+AX
11,180.00	11,588.00	BHA #4 (8.75")	2_MWD+HRGM+AX
11,677.00	11,677.00	BHA #5 (8.125")	2_MWD+HRGM+AX
11,775.00	12,524.00	BHA #6 (8.125")	2_MWD+HRGM+AX
12,605.00	12,980.00	BHA #7 (8.125")	2_MWD+HRGM+AX
13,097.00	19,203.00	BHA #8 (8.125")	2_MWD+HRGM+AX
19,319.00	19,319.00	Projection To Bit	2_Blind

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,500.00	1,499.91	Surface	12-3/4	17-1/4

Design Report for WA FC 1H - Final Surveys

Design Targets

Target Name	Dip	Dip							
- hit/miss target	Angle	Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	()	()	()	()	()	()	()		
0									

Directional Difficulty Index

Average Dogleg over Survey:	1.66 °/100usft	Maximum Dogleg over Survey:	18.08 °/100usft at 12,202.00 usft
Net Tortousity applicable to Plans:	0.79 °/100usft	Directional Difficulty Index:	6.545

Audit Info

HALLIBURTON

North Reference Sheet for Ender Wiggins 14 Pad (Grid) - WA FC 1H - Wellbore #1

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

Vertical Depths are relative to GL+KB 25' @ 3357.00usft (PD 601). Northing and Easting are relative to WA FC 1H

Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 3001 using datum NAD 1927 (NADCON CONUS), ellipsoid Clarke 1866

Projection method is Transverse Mercator (Gauss-Kruger)

Central Meridian is -104.33333333°, Longitude Origin:0.00000000°, Latitude Origin:0.00000000°

False Easting: 500,000.00usft, False Northing: 0.00usft, Scale Reduction: 0.99999534

Grid Coordinates of Well: 412,472.57 usft N, 774,420.08 usft E

Geographical Coordinates of Well: 32° 07' 51.24" N, 103° 26' 48.65" W

Grid Convergence at Surface is: 0.47°

Based upon Minimum Curvature type calculations, at a Measured Depth of 19,319.00usft
the Bottom Hole Displacement is 6,752.66usft in the Direction of 357.12° (Grid).

Magnetic Convergence at surface is: -6.15° (15 April 2019, , HDGM_2019)

