

HALLIBURTON

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State of Texas, Lea County

I, Alex Bradley certify that I am employed by Halliburton Energy Services, Inc. (aka Sperry Drilling) and that on the dates of July 16, 2019 through August 04, 2019, I did conduct or supervise the taking of MWD directional surveys for the Ender Wiggins 14 WD FC 2H well from a depth of 1071' MD to a depth of 21101' 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 WD FC 2H well in Lea County. 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.)



Alex Bradley
Field Engineer



Marathon Oil Permian LLC

GL+KB 25' @ 3356.00usft (PD 601)

3331.00

Project: Lea County, New Mexico (NAD27)
Site: Ender Wiggins 14 Pad (Grid)
Well: WD FC 2H
Wellbore: Wellbore #1
Design: Final Surveys
Rig: PD 601

Map System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1886
Zone Name: New Mexico East 3001

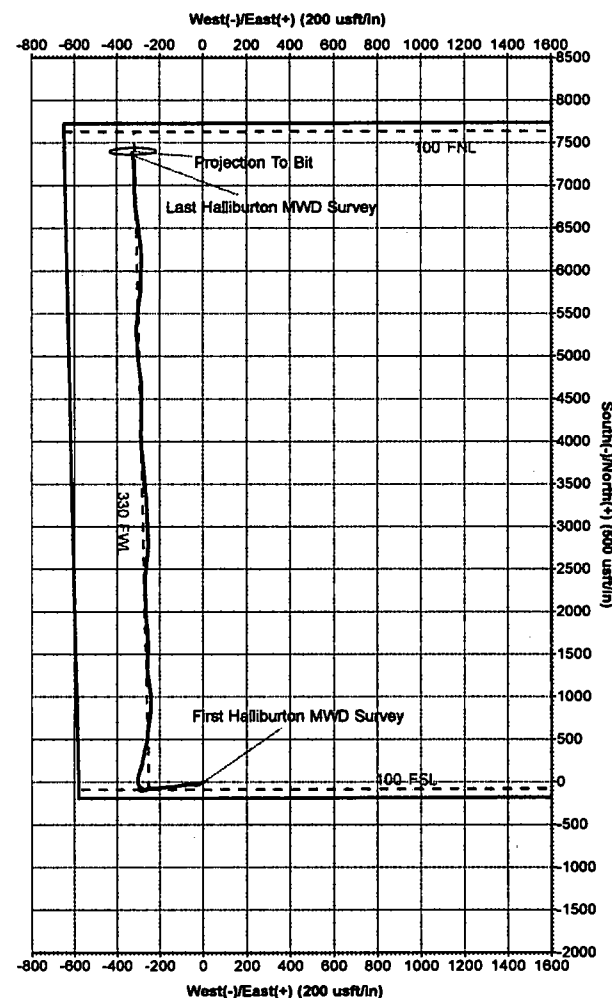
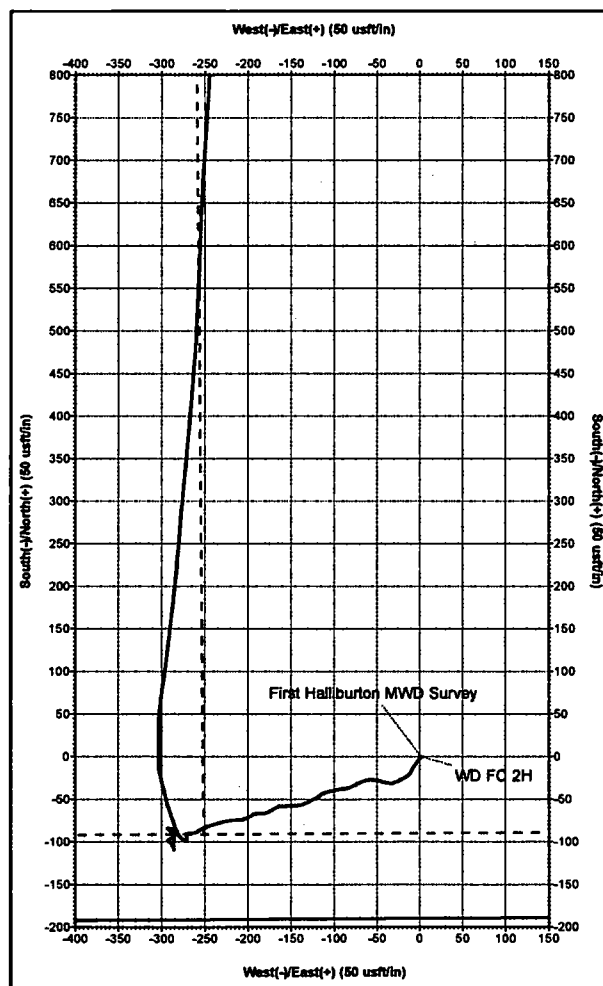
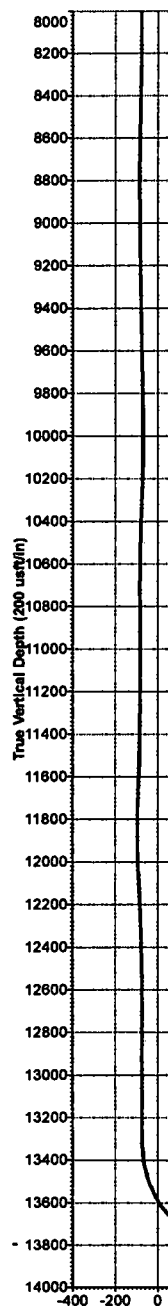


Azimuths to Grid North
True North: -0.47°
Magnetic North: 6.15°
Magnetic Field
Strength: 47512.7nT
Dip Angle: 66.75°
Date: 4/15/2019
Model: HDGM_2019

WELL DETAILS

3331.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	412472.66	774390.11	32.13090054	-103.44694265



HOBBS OCD

JAN 21 2020

RECEIVED

Vertical Section at 357.47° (200 usft/in)

HALLIBURTON | Sperry Drilling

PD 601

Marathon Oil Permian LLC

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

API#

WD FC 2H

Wellbore #1

Design: Final Surveys

Sperry Drilling Services

Combo Report

20 June, 2019

Well Coordinates: 32.13090054
-103.44894265

NAD 1927 (NADCON CONUS)
New Mexico East 3001
412,472.68 N
774,390.11 E

Ground Level: 3,331.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Centered on Well WD FC 2H
GL+KB 25' @ 3356.00usft (PD 601)
N
Grid
Midcon (2 decimal)

Version: 5000.15 Build: 91

Report Version: Midcon Combo v1.13

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Design Report for WD FC 2H - 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	412,472.66	774,390.11	0.00	0.00	0.00	
87.00	0.20	309.11	87.00	0.10 N	0.12 W	412,472.76	774,389.99	0.23	0.10	309.11	
175.00	0.40	101.11	175.00	0.13 N	0.06 E	412,472.79	774,390.17	0.66	0.13	161.25	
258.00	0.50	170.11	258.00	0.28 S	0.41 E	412,472.38	774,390.52	0.62	-0.30	115.32	
350.00	0.60	72.11	349.99	0.53 S	0.94 E	412,472.13	774,391.05	0.91	-0.57	-134.48	
445.00	0.20	243.11	444.99	0.45 S	1.26 E	412,472.21	774,391.37	0.84	-0.50	177.75	
539.00	0.30	172.11	538.99	0.77 S	1.15 E	412,471.89	774,391.26	0.32	-0.82	-109.84	
633.00	0.20	267.11	632.99	1.02 S	1.02 E	412,471.64	774,391.13	0.40	-1.06	147.88	
728.00	0.20	250.11	727.99	1.08 S	0.70 E	412,471.58	774,390.81	0.06	-1.11	-98.50	
822.00	0.60	76.11	821.99	1.02 S	1.02 E	412,471.64	774,391.13	0.85	-1.07	-175.50	
917.00	0.60	29.11	916.99	0.47 S	1.75 E	412,472.19	774,391.86	0.50	-0.54	-113.50	
992.00	0.40	235.11	991.98	0.27 S	1.72 E	412,472.39	774,391.83	1.30	-0.35	-169.64	
1,071.00	0.15	133.80	1,070.98	0.50 S	1.57 E	412,472.16	774,391.68	0.57	-0.57	-161.09	First Halliburton MWD Survey
1,161.00	0.14	195.71	1,160.98	0.69 S	1.63 E	412,471.97	774,391.74	0.17	-0.76	124.25	
1,251.00	0.25	216.96	1,250.98	0.95 S	1.48 E	412,471.71	774,391.59	0.14	-1.02	44.25	
1,340.00	0.35	218.36	1,339.98	1.32 S	1.19 E	412,471.34	774,391.30	0.11	-1.37	4.89	
1,430.00	0.44	214.71	1,429.98	1.82 S	0.83 E	412,470.84	774,390.94	0.10	-1.86	-17.45	
1,519.00	0.59	220.85	1,518.98	2.45 S	0.33 E	412,470.21	774,390.44	0.18	-2.46	23.29	
1,609.00	0.69	226.03	1,608.97	3.18 S	0.36 W	412,469.48	774,389.75	0.13	-3.16	32.66	
1,698.00	0.72	220.84	1,697.96	3.97 S	1.11 W	412,468.69	774,389.00	0.08	-3.92	-67.45	
1,788.00	0.89	224.19	1,787.95	4.90 S	1.97 W	412,467.76	774,388.14	0.20	-4.81	17.15	
1,877.00	0.99	218.74	1,876.94	5.99 S	2.93 W	412,466.67	774,387.18	0.15	-5.86	-44.55	
1,966.00	1.32	216.37	1,965.92	7.42 S	4.02 W	412,465.24	774,386.09	0.37	-7.24	-9.42	
2,056.00	1.28	216.89	2,055.90	9.06 S	5.24 W	412,463.60	774,384.87	0.05	-8.82	163.83	
2,146.00	1.38	216.39	2,145.88	10.74 S	6.48 W	412,461.92	774,383.63	0.11	-10.44	-6.87	
2,235.00	1.55	211.05	2,234.85	12.63 S	7.74 W	412,460.03	774,382.37	0.24	-12.27	-41.46	
2,325.00	1.79	206.84	2,324.81	14.93 S	9.00 W	412,457.73	774,381.11	0.30	-14.51	-29.19	
2,414.00	2.03	206.77	2,413.76	17.57 S	10.34 W	412,455.09	774,379.77	0.27	-17.10	-0.59	
2,504.00	2.19	218.30	2,503.70	20.35 S	12.13 W	412,452.31	774,377.98	0.50	-19.79	75.17	
2,593.00	2.50	233.35	2,592.63	22.84 S	14.74 W	412,449.82	774,375.37	0.77	-22.17	70.93	
2,683.00	2.53	238.42	2,682.54	25.05 S	18.00 W	412,447.61	774,372.11	0.25	-24.23	84.86	
2,772.00	2.81	245.99	2,771.44	26.97 S	21.67 W	412,445.69	774,368.44	0.51	-25.98	55.37	
2,862.00	2.86	242.35	2,861.33	28.91 S	25.67 W	412,443.75	774,364.44	0.21	-27.75	-76.30	
2,952.00	2.78	251.23	2,951.22	30.65 S	29.73 W	412,442.01	774,360.38	0.49	-29.31	104.79	
3,041.00	2.82	272.52	3,040.12	31.25 S	33.96 W	412,441.41	774,356.15	1.16	-29.72	98.46	
3,131.00	2.84	279.56	3,130.01	30.78 S	38.37 W	412,441.88	774,351.74	0.39	-29.06	90.23	

Design Report for WD FC 2H - 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)				
3,220.00	2.79	283.91	3,218.90	29.90 S	42.65 W	412,442.76	774,347.46	0.25	-27.98	105.34	
3,310.00	2.50	287.05	3,308.81	28.79 S	46.65 W	412,443.87	774,343.46	0.36	-26.71	155.01	
3,399.00	2.22	281.51	3,397.73	27.88 S	50.20 W	412,444.78	774,339.91	0.41	-25.64	-143.57	
3,488.00	2.37	275.09	3,486.66	27.37 S	53.72 W	412,445.29	774,336.39	0.33	-24.97	-62.97	
3,578.00	2.72	267.66	3,576.57	27.30 S	57.70 W	412,445.36	774,332.41	0.53	-24.72	-47.06	
3,667.00	2.61	262.79	3,665.48	27.64 S	61.82 W	412,445.02	774,328.29	0.28	-24.88	-116.33	
3,757.00	2.68	247.53	3,755.38	28.70 S	65.80 W	412,443.96	774,324.31	0.78	-25.76	-91.98	
3,846.00	2.66	249.67	3,844.28	30.21 S	69.66 W	412,442.45	774,320.45	0.11	-27.10	102.41	
3,936.00	2.79	243.67	3,934.18	31.91 S	73.58 W	412,440.75	774,316.53	0.35	-28.63	-68.52	
4,025.00	2.43	242.06	4,023.09	33.75 S	77.19 W	412,438.91	774,312.92	0.41	-30.31	-169.29	
4,115.00	2.15	240.71	4,113.02	35.47 S	80.35 W	412,437.19	774,309.76	0.32	-31.89	-169.77	
4,204.00	2.42	251.98	4,201.95	36.87 S	83.59 W	412,435.79	774,306.52	0.59	-33.14	64.71	
4,293.00	3.62	263.28	4,290.82	37.78 S	86.17 W	412,434.88	774,301.94	1.50	-33.85	32.10	
4,383.00	3.73	262.57	4,380.64	38.49 S	93.89 W	412,434.17	774,296.22	0.13	-34.31	-22.83	
4,472.00	3.62	257.69	4,469.46	39.46 S	99.51 W	412,433.20	774,290.60	0.37	-35.03	-111.80	
4,562.00	3.62	257.03	4,559.28	40.71 S	105.05 W	412,431.95	774,285.06	0.05	-36.03	-90.33	
4,651.00	3.05	253.54	4,648.13	42.01 S	110.06 W	412,430.65	774,280.05	0.68	-37.11	-162.13	
4,741.00	2.52	236.43	4,738.02	43.78 S	114.01 W	412,428.88	774,276.10	1.09	-38.70	-130.87	
4,830.00	2.56	231.99	4,826.93	46.09 S	117.20 W	412,426.57	774,272.91	0.23	-40.67	-80.73	
4,920.00	3.53	241.96	4,916.81	48.63 S	121.23 W	412,424.03	774,268.88	1.22	-43.23	33.67	
5,009.00	3.44	239.61	5,005.64	51.27 S	125.96 W	412,421.39	774,264.15	0.19	-45.65	-123.38	
5,098.00	3.86	243.11	5,094.46	53.97 S	130.93 W	412,418.69	774,259.18	0.53	-48.14	29.70	
5,188.00	4.31	252.01	5,184.23	56.39 S	136.85 W	412,416.27	774,253.26	0.86	-50.29	59.13	
5,281.00	5.20	267.50	5,276.91	57.65 S	144.38 W	412,415.01	774,245.73	1.67	-51.22	63.16	
5,359.00	5.46	268.54	5,354.58	57.90 S	151.62 W	412,414.76	774,238.49	0.36	-51.15	20.90	
5,449.00	5.28	267.96	5,444.18	58.16 S	160.04 W	412,414.50	774,230.07	0.21	-51.03	-163.51	
5,538.00	3.43	244.53	5,532.93	59.45 S	166.54 W	412,413.21	774,223.57	2.84	-52.03	-147.40	
5,628.00	3.38	239.69	5,622.77	61.94 S	171.26 W	412,410.72	774,218.85	0.32	-54.32	-102.28	
5,718.00	3.30	237.89	5,712.62	64.66 S	175.75 W	412,408.00	774,214.36	0.15	-56.83	-128.23	
5,807.00	2.58	257.49	5,801.50	66.45 S	179.87 W	412,406.21	774,210.24	1.38	-58.45	135.13	
5,897.00	2.14	271.26	5,891.43	66.86 S	183.53 W	412,405.80	774,206.58	0.79	-58.69	134.56	
5,986.00	2.13	267.46	5,980.36	66.89 S	186.84 W	412,405.77	774,203.27	0.16	-58.58	-95.94	
6,076.00	2.19	269.50	6,070.30	66.98 S	190.23 W	412,405.68	774,199.88	0.11	-58.52	53.06	
6,166.00	3.12	241.65	6,160.21	68.16 S	194.11 W	412,404.50	774,196.00	1.74	-59.52	-68.66	
6,256.00	3.27	237.53	6,250.07	70.70 S	198.43 W	412,401.96	774,191.68	0.30	-61.87	-58.91	
6,345.00	3.32	248.97	6,338.92	72.99 S	202.98 W	412,399.67	774,187.13	0.74	-63.95	91.38	
6,435.00	3.93	266.76	6,428.74	74.10 S	208.49 W	412,398.56	774,181.62	1.41	-64.82	70.60	

Design Report for WD FC 2H - 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)				
6,524.00	3.78	284.81	6,517.54	74.54 S	214.46 W	412,398.12	774,175.65	0.22	-64.99	-139.82	
6,614.00	3.85	285.16	6,607.34	75.06 S	220.42 W	412,397.60	774,169.69	0.08	-65.25	18.58	
6,704.00	2.79	259.26	6,697.19	75.72 S	225.58 W	412,396.94	774,164.53	1.24	-65.69	-165.06	
6,793.00	1.85	251.80	6,786.12	76.58 S	229.08 W	412,396.08	774,161.03	1.11	-66.38	-165.89	
6,883.00	1.85	253.60	6,876.07	77.44 S	231.85 W	412,395.22	774,158.26	0.08	-67.12	90.90	
6,972.00	1.74	254.69	6,965.03	78.20 S	234.53 W	412,394.46	774,155.58	0.13	-67.77	163.30	
7,062.00	1.67	254.42	7,054.99	78.91 S	237.11 W	412,393.75	774,153.00	0.08	-68.37	-173.59	
7,152.00	1.61	251.68	7,144.95	79.66 S	239.58 W	412,393.00	774,150.53	0.11	-69.01	-128.79	
7,241.00	2.44	252.14	7,233.89	80.84 S	242.57 W	412,392.02	774,147.54	0.93	-69.85	1.35	
7,331.00	2.50	249.53	7,323.81	81.91 S	246.23 W	412,390.75	774,143.88	0.14	-70.96	-63.23	
7,420.00	2.47	246.64	7,412.72	83.35 S	249.81 W	412,389.31	774,140.30	0.14	-72.24	-104.91	
7,510.00	2.45	243.04	7,502.64	84.99 S	253.30 W	412,387.67	774,138.81	0.17	-73.72	-99.17	
7,600.00	2.35	237.60	7,592.56	86.85 S	256.57 W	412,385.81	774,133.54	0.28	-75.44	-116.40	
7,689.00	2.15	240.33	7,681.49	88.66 S	259.57 W	412,384.00	774,130.54	0.25	-77.11	153.17	
7,779.00	2.35	263.18	7,771.43	89.71 S	262.87 W	412,382.95	774,127.24	1.01	-78.02	88.99	
7,868.00	2.40	263.06	7,860.35	90.16 S	266.53 W	412,382.50	774,123.58	0.06	-78.30	-4.79	
7,958.00	2.40	261.75	7,950.27	90.65 S	270.26 W	412,382.01	774,119.85	0.06	-78.63	-90.65	
8,047.00	0.39	275.71	8,039.24	90.89 S	272.41 W	412,381.77	774,117.70	2.27	-78.77	177.33	
8,137.00	0.19	110.45	8,129.24	90.91 S	272.57 W	412,381.75	774,117.54	0.64	-78.79	-175.18	
8,227.00	0.42	152.73	8,219.24	91.26 S	272.28 W	412,381.40	774,117.83	0.34	-79.14	66.86	
8,316.00	0.63	150.52	8,308.24	91.97 S	271.89 W	412,380.89	774,118.22	0.24	-79.88	-6.61	
8,406.00	0.76	166.71	8,398.23	92.99 S	271.51 W	412,379.67	774,118.60	0.26	-80.90	64.77	
8,495.00	0.93	172.36	8,487.22	94.28 S	271.28 W	412,378.38	774,118.83	0.21	-82.20	28.95	
8,585.00	0.96	175.03	8,577.21	95.75 S	271.12 W	412,376.91	774,118.99	0.06	-83.68	57.07	
8,674.00	1.01	178.07	8,666.19	97.28 S	271.03 W	412,375.38	774,119.08	0.08	-85.21	47.79	
8,764.00	0.96	182.29	8,756.18	98.82 S	271.03 W	412,373.84	774,119.08	0.10	-86.76	126.67	
8,853.00	0.80	292.96	8,845.17	99.33 S	271.63 W	412,373.33	774,118.48	1.63	-87.23	148.93	
8,943.00	1.33	295.62	8,935.16	98.63 S	273.15 W	412,374.03	774,116.96	0.59	-86.47	6.66	
9,032.00	1.40	297.80	9,024.13	97.68 S	275.04 W	412,374.98	774,115.07	0.10	-85.43	37.66	
9,122.00	1.22	306.06	9,114.11	96.60 S	276.79 W	412,376.06	774,113.32	0.29	-84.28	137.71	
9,211.00	1.02	321.80	9,203.09	95.42 S	278.05 W	412,377.24	774,112.06	0.41	-83.05	130.73	
9,301.00	1.23	320.06	9,293.08	94.05 S	279.16 W	412,378.61	774,110.95	0.24	-81.63	-10.11	
9,390.00	1.41	312.30	9,382.05	92.58 S	280.59 W	412,380.08	774,109.52	0.28	-80.10	-48.73	
9,480.00	1.49	305.01	9,472.02	91.18 S	282.36 W	412,381.50	774,107.75	0.22	-78.60	-70.23	
9,569.00	1.56	295.24	9,560.99	89.98 S	284.41 W	412,382.68	774,105.70	0.30	-77.33	-79.85	
9,659.00	0.90	33.34	9,650.98	88.87 S	285.13 W	412,383.79	774,104.98	2.12	-76.19	152.15	
9,748.00	2.71	321.31	9,739.94	86.64 S	286.06 W	412,386.02	774,104.05	2.90	-73.92	-91.41	

Design Report for WD FC 2H - 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	1.20	277.28	9,829.89	84.86 S	288.32 W	412,387.80	774,101.79	2.25	-72.05	-155.70	
9,927.00	1.50	286.52	9,918.86	84.41 S	290.36 W	412,388.25	774,099.75	0.42	-71.51	40.64	
10,017.00	1.43	271.16	10,008.83	84.06 S	292.62 W	412,388.60	774,097.49	0.44	-71.05	-107.73	
10,107.00	0.62	133.23	10,098.82	84.37 S	293.38 W	412,388.29	774,096.73	2.15	-71.33	-167.60	
10,196.00	2.43	132.12	10,187.79	85.96 S	291.63 W	412,386.70	774,098.48	2.03	-73.00	-1.49	
10,286.00	2.46	144.77	10,277.71	88.82 S	289.10 W	412,383.84	774,101.01	0.60	-75.96	93.15	
10,375.00	1.89	152.29	10,366.64	91.68 S	287.32 W	412,380.98	774,102.79	0.71	-78.90	157.13	
10,464.00	1.52	204.07	10,455.61	94.06 S	287.12 W	412,378.60	774,102.99	1.71	-81.28	128.48	
10,554.00	2.38	230.70	10,545.56	96.33 S	289.05 W	412,376.33	774,101.06	1.36	-83.47	60.33	
10,643.00	0.83	232.90	10,634.52	97.89 S	291.00 W	412,374.77	774,099.11	1.74	-84.94	178.82	
10,733.00	0.60	266.95	10,724.51	98.31 S	291.99 W	412,374.35	774,098.12	0.53	-85.31	134.74	
10,823.00	0.17	5.65	10,814.51	98.20 S	292.44 W	412,374.46	774,097.67	0.72	-85.19	164.97	
10,912.00	0.09	305.12	10,903.51	98.03 S	292.49 W	412,374.63	774,097.62	0.17	-85.01	-148.07	
11,001.00	1.16	57.29	10,992.51	97.50 S	291.79 W	412,375.16	774,098.32	1.34	-84.52	116.16	
11,091.00	0.96	48.98	11,082.49	96.51 S	290.45 W	412,376.15	774,099.66	0.28	-83.59	-146.56	
11,180.00	1.54	225.58	11,171.48	96.86 S	290.74 W	412,375.80	774,099.37	2.81	-83.93	177.91	
11,270.00	0.98	250.70	11,261.46	97.96 S	292.33 W	412,374.70	774,097.78	0.86	-84.96	147.49	
11,359.00	0.68	172.67	11,350.45	98.74 S	292.99 W	412,373.92	774,097.12	1.20	-85.70	-141.59	
11,448.00	1.64	118.30	11,439.44	99.86 S	291.80 W	412,372.80	774,098.31	1.53	-86.88	-78.32	
11,538.00	1.96	132.06	11,529.39	101.51 S	289.52 W	412,371.15	774,100.59	0.60	-88.62	60.49	
11,590.00	2.05	144.53	11,581.36	102.86 S	288.32 W	412,369.80	774,101.79	0.85	-90.03	84.62	
11,731.00	2.34	170.20	11,722.26	107.75 S	286.37 W	412,364.91	774,103.74	0.72	-95.00	86.65	
11,825.00	0.31	138.54	11,816.23	109.83 S	285.87 W	412,362.83	774,104.24	2.22	-97.10	-175.52	
11,919.00	1.16	358.33	11,910.23	109.07 S	285.73 W	412,363.59	774,104.38	1.50	-96.35	-148.28	
12,013.00	1.48	345.88	12,004.20	106.94 S	286.05 W	412,365.72	774,104.06	0.46	-94.20	-48.20	
12,107.00	3.08	358.84	12,098.12	103.24 S	286.40 W	412,369.42	774,103.71	1.78	-90.49	24.41	
12,202.00	2.80	7.26	12,193.00	98.39 S	286.16 W	412,374.27	774,103.95	0.54	-85.65	127.11	
12,296.00	1.96	5.93	12,286.92	94.51 S	285.70 W	412,378.15	774,104.41	0.90	-81.80	-176.90	
12,391.00	1.52	340.33	12,381.87	91.71 S	285.96 W	412,380.95	774,104.15	0.93	-78.99	-131.89	
12,486.00	1.12	347.14	12,476.85	89.62 S	286.59 W	412,383.04	774,103.52	0.45	-76.87	161.97	
12,580.00	1.51	354.81	12,570.82	87.49 S	286.91 W	412,385.17	774,103.20	0.45	-74.73	28.16	
12,673.00	1.15	119.37	12,663.81	86.72 S	286.21 W	412,385.94	774,103.90	2.54	-74.00	156.34	
12,767.00	1.22	115.35	12,757.79	87.62 S	284.48 W	412,385.04	774,105.63	0.12	-74.97	-51.92	
12,861.00	0.58	127.72	12,851.78	88.34 S	283.20 W	412,384.32	774,106.91	0.71	-75.74	169.23	
12,955.00	0.33	25.16	12,945.78	88.38 S	282.71 W	412,384.28	774,107.40	0.77	-75.81	-153.70	
13,049.00	0.07	93.97	13,039.78	88.14 S	282.53 W	412,384.52	774,107.58	0.33	-75.58	167.91	

Design Report for WD FC 2H - 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)				
13,143.00	0.11	277.14	13,133.78	88.13 S	282.57 W	412,384.53	774,107.54	0.19	-75.57	-178.06	
13,179.00	0.06	99.02	13,169.78	88.13 S	282.58 W	412,384.53	774,107.53	0.47	-75.57	-179.34	
13,239.00	0.03	109.21	13,229.78	88.14 S	282.54 W	412,384.52	774,107.57	0.05	-75.58	170.12	
13,332.00	0.40	295.39	13,322.78	88.01 S	282.81 W	412,384.65	774,107.30	0.46	-75.43	-174.25	
13,426.00	10.89	342.53	13,416.20	79.38 S	285.78 W	412,393.28	774,104.33	11.30	-66.68	48.70	
13,519.00	21.52	340.31	13,505.37	54.87 S	294.19 W	412,417.79	774,095.92	11.45	-41.82	-4.41	
13,613.00	30.51	351.76	13,589.82	14.91 S	303.44 W	412,457.75	774,086.87	10.92	-1.49	34.46	
13,707.00	47.04	5.69	13,662.98	43.44 N	303.45 W	412,516.10	774,086.66	19.79	56.80	33.52	
13,737.00	52.08	6.35	13,682.44	66.14 N	301.05 W	412,538.80	774,089.06	16.88	79.37	5.91	
13,801.00	61.25	8.10	13,717.57	119.12 N	294.29 W	412,591.78	774,095.82	14.51	132.00	8.55	
13,896.00	70.79	5.13	13,756.14	205.24 N	284.39 W	412,677.90	774,105.72	10.44	217.60	-16.50	
13,989.00	77.99	4.59	13,781.15	294.43 N	278.81 W	412,767.09	774,113.30	7.76	306.37	-4.21	
14,084.00	81.47	5.81	13,798.09	387.51 N	268.33 W	412,860.17	774,121.78	3.87	398.98	19.14	
14,179.00	86.17	3.52	13,808.31	481.61 N	260.66 W	412,954.27	774,129.45	5.50	492.65	-25.98	
14,273.00	88.08	1.58	13,813.03	575.39 N	256.49 W	413,048.05	774,133.62	2.89	586.16	-45.46	
14,367.00	89.91	2.99	13,814.68	669.30 N	252.74 W	413,141.96	774,137.37	2.46	679.81	37.62	
14,461.00	94.45	4.27	13,811.10	763.01 N	246.80 W	413,235.87	774,143.31	5.02	773.17	15.71	
14,555.00	86.32	1.62	13,810.47	856.80 N	241.97 W	413,329.46	774,148.14	9.10	866.65	-161.92	
14,650.00	86.08	358.47	13,816.77	951.58 N	241.90 W	413,424.24	774,148.21	3.32	961.33	-94.47	
14,744.00	88.06	357.29	13,821.57	1,045.39 N	245.37 W	413,518.05	774,144.74	2.45	1,055.20	-30.79	
14,838.00	86.97	357.21	13,825.65	1,139.19 N	249.88 W	413,611.85	774,140.23	1.16	1,149.11	-175.81	
14,932.00	91.76	356.25	13,826.69	1,233.00 N	255.24 W	413,705.66	774,134.87	5.20	1,243.07	-11.34	
15,026.00	93.84	359.77	13,822.10	1,326.81 N	258.50 W	413,799.47	774,131.61	4.35	1,336.93	59.31	
15,120.00	89.60	1.00	13,819.28	1,420.74 N	257.87 W	413,893.40	774,132.24	4.70	1,430.75	163.81	
15,214.00	88.98	1.20	13,820.44	1,514.72 N	256.06 W	413,987.38	774,134.05	0.69	1,524.55	162.12	
15,307.00	90.80	359.45	13,820.62	1,607.71 N	255.54 W	414,080.37	774,134.57	2.71	1,617.43	-43.88	
15,401.00	90.43	358.66	13,819.61	1,701.69 N	257.09 W	414,174.35	774,133.02	0.93	1,711.38	-115.09	
15,590.00	94.55	357.58	13,811.40	1,890.37 N	263.28 W	414,363.03	774,126.83	2.25	1,900.15	-14.66	
15,685.00	91.36	359.64	13,806.50	1,985.20 N	265.58 W	414,457.86	774,124.53	4.00	1,994.99	147.12	
15,779.00	90.80	359.21	13,804.73	2,079.17 N	266.52 W	414,551.83	774,123.59	0.75	2,088.92	-142.48	
15,873.00	90.22	359.92	13,803.89	2,173.17 N	267.23 W	414,645.83	774,122.88	0.98	2,182.85	129.24	
15,966.00	91.33	359.35	13,802.64	2,266.15 N	267.83 W	414,738.81	774,122.28	1.34	2,275.77	-27.18	
16,060.00	93.43	359.93	13,798.73	2,360.07 N	268.42 W	414,832.73	774,121.69	2.32	2,369.62	15.42	
16,154.00	93.12	1.60	13,793.36	2,453.90 N	267.16 W	414,926.56	774,122.95	1.80	2,463.30	100.48	
16,248.00	91.27	2.76	13,789.76	2,547.76 N	263.59 W	415,020.42	774,126.52	2.32	2,556.91	147.91	
16,341.00	92.23	3.38	13,786.92	2,640.58 N	258.61 W	415,113.24	774,131.50	1.23	2,649.42	32.83	
16,414.00	91.70	1.48	13,784.42	2,713.47 N	255.52 W	415,186.13	774,134.59	2.70	2,722.10	-105.56	

Design Report for WD FC 2H - 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)				
16,509.00	87.37	359.62	13,785.19	2,808.43 N	254.61 W	415,281.09	774,135.50	4.96	2,816.94	-156.75	
16,603.00	89.38	358.48	13,787.86	2,902.38 N	256.16 W	415,375.04	774,133.95	2.46	2,910.86	-29.57	
16,696.00	89.66	358.85	13,788.64	2,995.35 N	258.33 W	415,468.01	774,131.78	0.50	3,003.83	52.88	
16,790.00	90.09	358.83	13,788.84	3,089.33 N	260.23 W	415,561.99	774,129.88	0.46	3,097.81	-2.66	
16,884.00	90.71	359.28	13,788.18	3,183.31 N	261.78 W	415,655.97	774,128.33	0.81	3,191.77	35.97	
16,979.00	88.39	359.17	13,788.93	3,278.29 N	263.07 W	415,750.95	774,127.04	2.44	3,286.71	-177.29	
17,073.00	91.83	357.57	13,788.75	3,372.24 N	265.74 W	415,844.90	774,124.37	4.04	3,380.68	-24.95	
17,167.00	92.78	357.42	13,784.97	3,468.07 N	269.85 W	415,938.73	774,120.26	1.02	3,474.81	-8.96	
17,261.00	93.43	358.47	13,779.88	3,559.87 N	273.21 W	416,032.53	774,116.90	1.31	3,568.46	58.18	
17,355.00	91.08	358.56	13,776.18	3,653.76 N	275.65 W	416,126.42	774,114.46	2.50	3,662.37	177.81	
17,449.00	92.51	358.04	13,773.23	3,747.67 N	278.43 W	416,220.33	774,111.68	1.62	3,756.31	-19.97	
17,544.00	90.06	357.33	13,771.10	3,842.56 N	282.27 W	416,315.22	774,107.84	2.68	3,851.28	-163.83	
17,638.00	93.50	357.64	13,768.18	3,938.41 N	286.39 W	416,409.07	774,103.72	3.67	3,945.22	5.14	
17,732.00	95.98	359.42	13,760.42	4,030.05 N	288.80 W	416,502.71	774,101.31	3.24	4,038.87	35.51	
17,827.00	92.63	359.93	13,753.29	4,124.76 N	289.33 W	416,597.42	774,100.78	3.57	4,133.52	171.35	
17,920.00	91.76	1.15	13,749.73	4,217.69 N	288.46 W	416,690.35	774,101.65	1.61	4,226.31	125.49	
18,015.00	92.63	1.12	13,746.09	4,312.60 N	286.58 W	416,785.26	774,103.53	0.92	4,321.05	-1.97	
18,108.00	90.87	359.88	13,743.25	4,405.55 N	285.77 W	416,878.21	774,104.34	2.31	4,413.87	-144.83	
18,202.00	91.17	359.83	13,741.57	4,499.53 N	286.01 W	416,972.19	774,104.10	0.32	4,507.77	-9.46	
18,296.00	91.55	359.10	13,739.34	4,593.50 N	286.88 W	417,066.16	774,103.23	0.88	4,601.69	-62.49	
18,389.00	90.68	358.54	13,737.53	4,688.46 N	288.80 W	417,159.12	774,101.31	1.11	4,694.84	-147.23	
18,483.00	89.66	358.87	13,737.25	4,780.38 N	292.56 W	417,253.04	774,097.55	2.08	4,788.84	-121.41	
18,577.00	91.24	357.65	13,736.52	4,874.27 N	297.05 W	417,346.93	774,093.06	1.87	4,882.63	26.27	
18,671.00	91.05	357.28	13,734.64	4,968.16 N	301.21 W	417,440.82	774,088.90	0.44	4,976.61	-117.18	
18,765.00	91.98	358.87	13,732.15	5,062.07 N	304.37 W	417,534.73	774,085.74	1.96	5,070.57	59.65	
18,859.00	92.26	358.68	13,728.67	5,155.98 N	306.38 W	417,628.64	774,083.73	0.38	5,164.48	-34.14	
18,953.00	92.38	357.83	13,724.87	5,249.86 N	309.24 W	417,722.52	774,080.87	0.91	5,258.39	-81.94	
19,047.00	94.33	1.60	13,719.37	5,343.67 N	309.71 W	417,816.33	774,080.40	4.51	5,352.14	62.51	
19,140.00	94.49	2.95	13,712.21	5,436.32 N	306.03 W	417,908.98	774,084.08	1.46	5,444.54	83.17	
19,235.00	93.03	1.69	13,705.98	5,531.04 N	302.19 W	418,003.70	774,087.92	2.03	5,538.99	-139.22	
19,328.00	90.53	3.30	13,703.10	5,623.89 N	298.14 W	418,096.55	774,091.97	3.20	5,631.57	147.20	
19,422.00	89.72	2.21	13,702.89	5,717.78 N	293.62 W	418,190.44	774,096.49	1.44	5,725.17	-126.61	
19,517.00	89.66	2.46	13,703.40	5,812.70 N	289.75 W	418,285.36	774,100.36	0.27	5,819.83	103.50	
19,611.00	89.23	359.82	13,704.32	5,906.67 N	287.88 W	418,379.33	774,102.23	2.85	5,913.62	-99.26	
19,705.00	89.60	0.24	13,705.28	6,000.67 N	287.83 W	418,473.33	774,102.28	0.60	6,007.52	48.62	
19,799.00	90.25	0.11	13,705.40	6,094.66 N	287.55 W	418,567.32	774,102.56	0.71	6,101.42	-11.31	
19,894.00	90.50	359.13	13,704.78	6,189.66 N	288.18 W	418,662.32	774,101.93	1.06	6,196.35	-75.69	

Design Report for WD FC 2H - 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)				
19,989.00	90.84	358.16	13,703.67	6,284.62 N	290.42 W	418,757.28	774,099.69	1.08	6,291.32	-70.68	
20,083.00	90.86	358.91	13,702.19	6,378.52 N	294.47 W	418,851.18	774,095.64	1.34	6,385.31	-84.51	
20,178.00	91.61	357.45	13,700.06	6,473.38 N	299.14 W	418,946.04	774,090.97	0.89	6,480.28	39.71	
20,270.00	91.36	356.50	13,697.67	6,565.22 N	303.99 W	419,037.88	774,086.12	1.07	6,572.24	-104.74	
20,365.00	92.10	357.37	13,694.81	6,660.04 N	309.07 W	419,132.70	774,081.04	1.20	6,667.20	49.59	
20,458.00	90.77	357.02	13,692.48	6,752.90 N	313.62 W	419,225.56	774,076.49	1.48	6,760.16	-165.26	
20,552.00	92.81	358.82	13,689.54	6,846.78 N	317.03 W	419,319.44	774,073.08	2.89	6,854.11	41.39	
20,646.00	93.71	359.71	13,684.20	6,940.62 N	318.23 W	419,413.28	774,071.88	1.35	6,947.90	44.61	
20,741.00	92.29	0.67	13,679.22	7,035.49 N	317.92 W	419,508.15	774,072.19	1.80	7,042.66	145.95	
20,834.00	89.97	358.86	13,677.39	7,128.46 N	318.30 W	419,601.12	774,071.81	3.16	7,135.56	-142.02	
20,928.00	93.31	357.70	13,674.70	7,222.36 N	321.12 W	419,695.02	774,068.99	3.76	7,229.50	-19.13	
21,022.00	95.36	358.47	13,667.59	7,316.04 N	324.25 W	419,788.70	774,065.86	2.33	7,323.22	20.50	
21,049.00	95.39	357.98	13,665.07	7,342.90 N	325.09 W	419,815.56	774,065.02	1.81	7,350.10	-86.46	Last Halliburton MWD Survey
21,101.00	95.39	357.98	13,660.18	7,394.64 N	326.91 W	419,867.30	774,063.20	0.00	7,401.87	0.00	Projection To Bit

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,071.00	1,070.98	-0.50	1.57	First Halliburton MWD Survey
21,049.00	13,665.07	7,342.90	-325.09	Last Halliburton MWD Survey
21,101.00	13,660.18	7,394.64	-326.91	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)	357.47	Slot	0.00	0.00	0.00

Design Report for WD FC 2H - Final Surveys

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
87.00	992.00	Spudder (12.25")	2_MWD
1,071.00	5,281.00	BHA #1 (12.25")	2_MWD+HRGM+AX
5,359.00	10,017.00	BHA #2 (8.75")	2_MWD+HRGM+AX
10,107.00	11,590.00	BHA #3 (8.75")	2_MWD+HRGM+AX
11,731.00	13,179.00	BHA #4 (6.125")	2_MWD+HRGM+AX
13,239.00	13,519.00	BHA #5 (6.125")	2_MWD+HRGM+AX
13,613.00	13,737.00	BHA #6 (6.125")	2_MWD+HRGM+AX
13,801.00	16,341.00	BHA #7 (6.125")	2_MWD+HRGM+AX
16,414.00	17,732.00	BHA #8 (6.125")	2_MWD+HRGM+AX
17,827.00	21,049.00	BHA #9 (6.125")	2_MWD+HRGM+AX
21,101.00	21,101.00	Projection To Bit	2_Blind

Design Targets

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

Directional Difficulty Index

Average Dogleg over Survey:	1.54 °/100usft	Maximum Dogleg over Survey:	19.79 °/100usft at 13,707.00 usft
Net Tortousity applicable to Plans:	0.05 °/100usft	Directional Difficulty Index:	6.595

Audit Info

HALLIBURTON

North Reference Sheet for Ender Wiggins 14 Pad (Grid) - WD FC 2H - 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' @ 3356.00usft (PD 601). Northing and Easting are relative to WD FC 2H

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: 0.99999532

Grid Coordinates of Well: 412,472.66 usft N, 774,390.11 usft E

Geographical Coordinates of Well: 32° 07' 51.24" N, 103° 26' 48.99" W

Grid Convergence at Surface is: 0.47°

Based upon Minimum Curvature type calculations, at a Measured Depth of 21,101.00usft
the Bottom Hole Displacement is 7,401.87usft in the Direction of 357.47° (Grid).

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

