



# **Merit Energy**

**Haskell Co., KS**

**Emma Ward #1**

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**Design: Emma Ward #1**

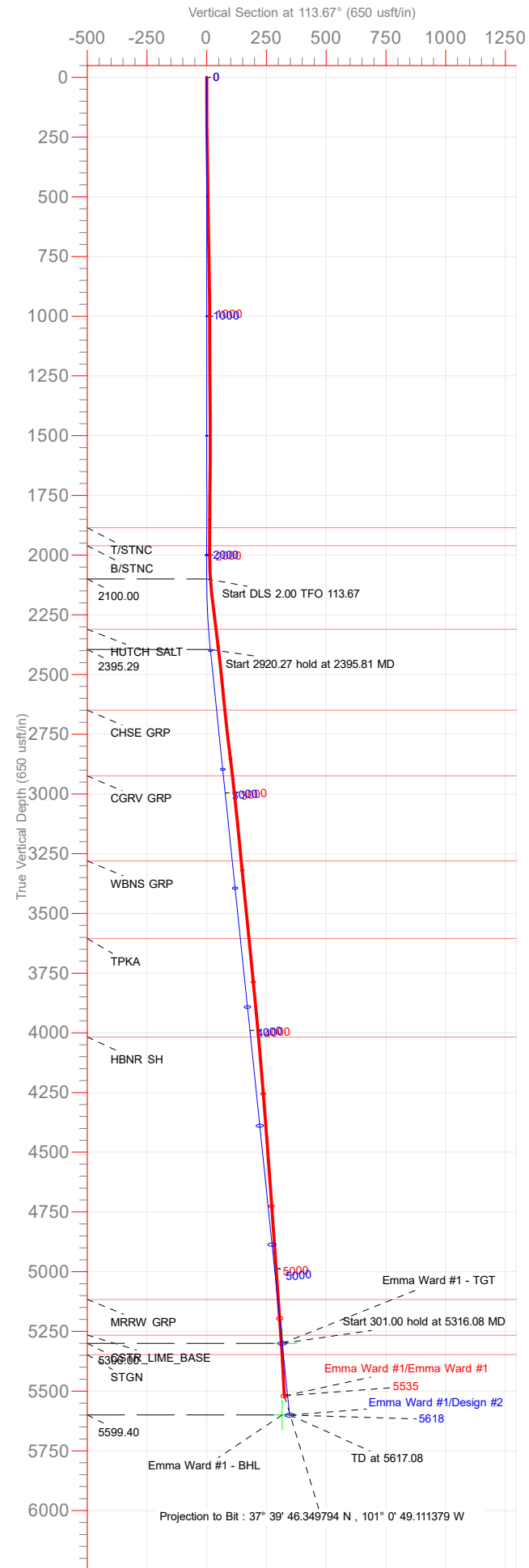
## **Standard Survey Report**

**06 February, 2019**

***gyro/data***

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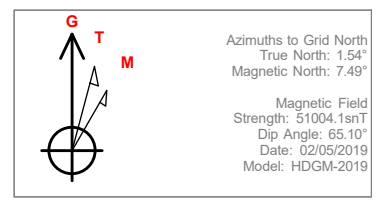
Plan: Design #2 (Emma Ward #1/Emma Ward #1)  
12 KB @ 3045.30usft (3033.3 GE + 12 KB = 3045.3)



FORMATION TOPS ALONG WELLPATH		
TVDPPath	MDPath	Formation
1885.50	1885.50	T/STNC
1960.50	1960.50	B/STNC
2310.50	2310.69	HUTCH SALT
2649.40	2651.29	CHSE GRP
2924.40	2927.76	CGRV GRP
3280.20	3285.46	WBNS GRP
3605.20	3612.20	TPKA
4017.40	4026.61	HBNR SH
5116.60	5131.70	MRRW GRP
5266.08	5281.98	CSTR_LIME_BASE
5347.20	5383.53	STGN

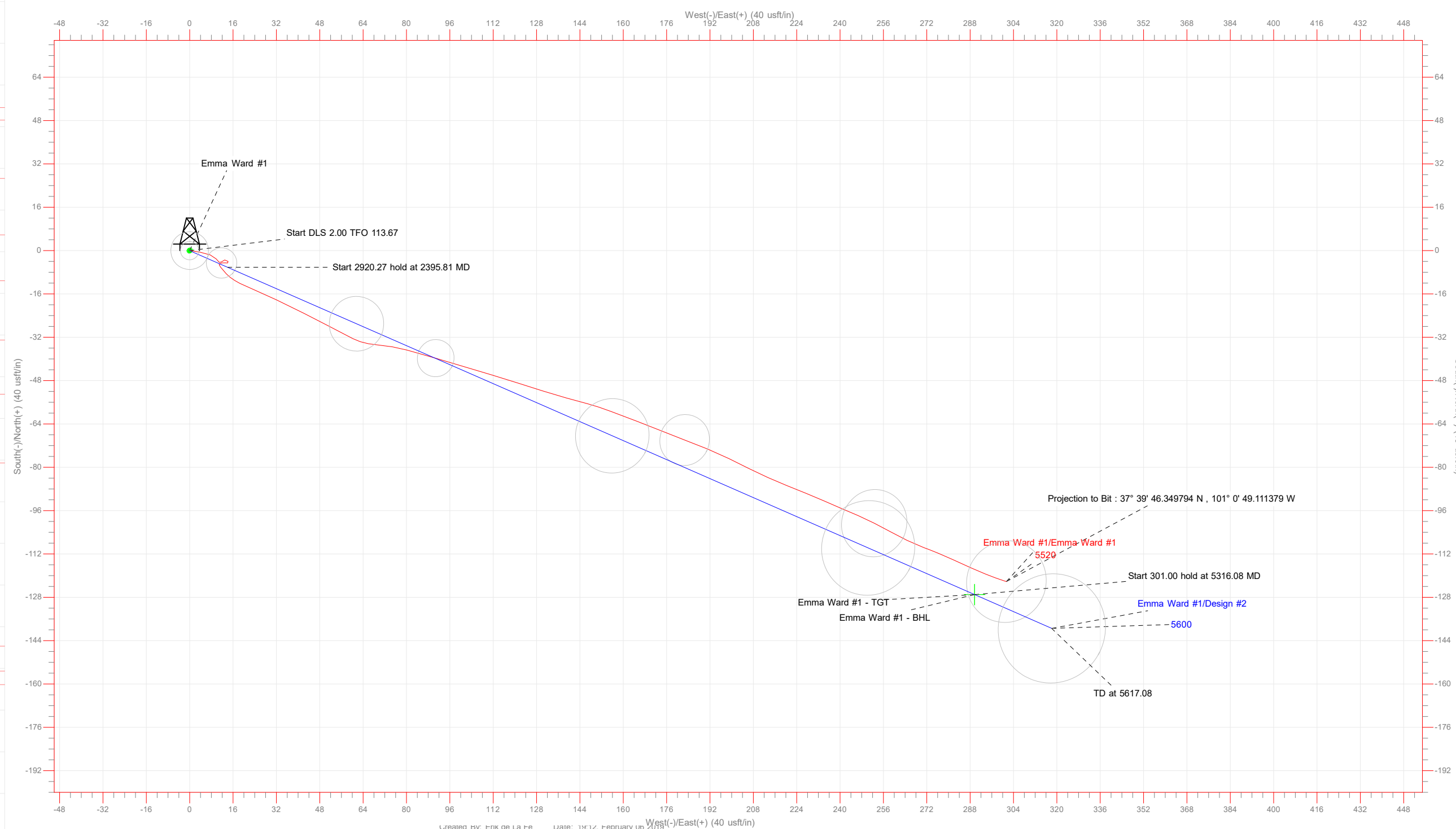
PROJECT DETAILS: Haskell Co., KS	
Geodetic System:	US State Plane 1927 (Exact solution)
Datum:	NAD 1927 (NADCON CONUS)
Ellipsoid:	Clarke 1866
Zone:	Kansas South 1502
North Reference:	Grid
System Datum:	Mean Sea Level
To convert a Magnetic Direction to a Grid Direction, Add 7.49°	
To convert a Magnetic Direction to a True Direction, Add 5.95° East	
To convert a True Direction to a Grid Direction, Add 1.55°	

SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	2100.00	0.00	0.00	2100.00	0.00	0.00	0.00	0.00	0.00	
3	2395.81	5.92	113.67	2395.29	-6.13	13.98	2.00	113.67	15.26	
4	5316.08	5.92	113.67	5300.00	-126.97	289.66	0.00	0.00	316.27	Emma Ward #1 - TGT
5	5617.08	5.92	113.67	5599.40	-139.43	318.08	0.00	0.00	347.29	Emma Ward #1 - BHL



CASING DETAILS	
No casing data is available	
Notice: Casing Depths are Estimates Only	

WELLBORE TARGET DETAILS						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape Point
Emma Ward #1 - TGT	5300.00	-126.97	289.66	372535.69	1272454.20	
Emma Ward #1 - BHL	5599.40	-126.97	289.66	372535.69	1272454.20	



<b>Company:</b>	Merit Energy	<b>Local Co-ordinate Reference:</b>	Well Emma Ward #1
<b>Project:</b>	Haskell Co., KS	<b>TVD Reference:</b>	12 KB @ 3045.30usft (3033.3 GE + 12 KB = 3045.3)
<b>Site:</b>	Emma Ward #1	<b>MD Reference:</b>	12 KB @ 3045.30usft (3033.3 GE + 12 KB = 3045.3)
<b>Well:</b>	Emma Ward #1	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Emma Ward #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Emma Ward #1	<b>Database:</b>	Gyrodata NWDB

<b>Project</b>	Haskell Co., KS		
<b>Map System:</b>	US State Plane 1927 (Exact solution)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD 1927 (NADCON CONUS)		
<b>Map Zone:</b>	Kansas South 1502		

<b>Site</b>	Emma Ward #1				
<b>Site Position:</b>		<b>Northing:</b>	372,662.66 usft	<b>Latitude:</b>	37° 39' 47.477079 N
<b>From:</b>	Map	<b>Easting:</b>	1,272,164.54 usft	<b>Longitude:</b>	101° 0' 52.899273 W
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13.20 in	<b>Grid Convergence:</b>	-1.55 °

<b>Well</b>	Emma Ward #1					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	372,662.66 usft	<b>Latitude:</b>	37° 39' 47.477079 N
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	1,272,164.54 usft	<b>Longitude:</b>	101° 0' 52.899273 W
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b>	3,033.30 usft

<b>Wellbore</b>	Emma Ward #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM-2019	02/05/19	5.95	65.10	51,004.15

<b>Design</b>	Emma Ward #1				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	114.57	

<b>Survey Program</b>	<b>Date</b>	02/06/19			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
407.00	1,755.00	Survey #1 (Emma Ward #1)	MWD	MWD - Standard	
1,852.00	5,535.00	Survey #2 (Emma Ward #1)	MWD+HDGM	OWSG MWD + HDGM	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
407.00	1.10	98.30	406.98	-0.56	3.87	3.75	0.27	0.27	0.00	
630.00	0.90	113.30	629.94	-1.57	7.59	7.56	0.15	-0.09	6.73	
784.00	1.10	133.30	783.92	-3.06	9.78	10.17	0.26	0.13	12.99	
939.00	0.20	159.30	938.91	-4.33	10.96	11.77	0.60	-0.58	16.77	
1,097.00	0.60	56.30	1,096.90	-4.13	11.74	12.40	0.43	0.25	-65.19	
1,255.00	0.40	67.30	1,254.90	-3.46	12.94	13.21	0.14	-0.13	6.96	
1,445.00	0.60	140.30	1,444.89	-3.97	14.19	14.55	0.32	0.11	38.42	

<b>Company:</b>	Merit Energy	<b>Local Co-ordinate Reference:</b>	Well Emma Ward #1
<b>Project:</b>	Haskell Co., KS	<b>TVD Reference:</b>	12 KB @ 3045.30usft (3033.3 GE + 12 KB = 3045.3)
<b>Site:</b>	Emma Ward #1	<b>MD Reference:</b>	12 KB @ 3045.30usft (3033.3 GE + 12 KB = 3045.3)
<b>Well:</b>	Emma Ward #1	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Emma Ward #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Emma Ward #1	<b>Database:</b>	Gyrodata NWDB

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
1,603.00	0.50	274.30	1,602.89	-4.55	14.03	14.65	0.64	-0.06	84.81	
1,755.00	0.50	270.30	1,754.88	-4.50	12.70	13.42	0.02	0.00	-2.63	
1,852.00	0.60	265.65	1,851.88	-4.54	11.77	12.59	0.11	0.10	-4.79	
1,979.00	0.42	208.11	1,978.87	-5.00	10.89	11.98	0.41	-0.14	-45.31	
2,102.00	3.96	138.13	2,101.77	-8.56	13.52	15.85	3.12	2.88	-56.89	
2,196.00	7.18	112.84	2,195.33	-13.26	21.10	24.70	4.23	3.43	-26.90	
2,291.00	7.25	115.39	2,289.58	-18.13	31.99	36.63	0.35	0.07	2.68	
2,385.00	6.64	116.82	2,382.89	-23.13	42.19	47.99	0.67	-0.65	1.52	
2,479.00	6.15	118.09	2,476.30	-27.95	51.49	58.45	0.54	-0.52	1.35	
2,576.00	5.42	116.79	2,572.81	-32.46	60.16	68.21	0.76	-0.75	-1.34	
2,669.00	6.57	94.12	2,665.31	-34.82	69.39	77.59	2.81	1.24	-24.38	
2,764.00	6.79	105.15	2,759.67	-36.68	80.23	88.22	1.37	0.23	11.61	
2,857.00	6.77	106.58	2,852.02	-39.68	90.79	99.07	0.18	-0.02	1.54	
2,951.00	6.49	106.89	2,945.39	-42.81	101.18	109.82	0.30	-0.30	0.33	
3,046.00	6.33	106.70	3,039.80	-45.87	111.34	120.33	0.17	-0.17	-0.20	
3,140.00	6.05	107.61	3,133.25	-48.86	121.02	130.38	0.32	-0.30	0.97	
3,234.00	5.79	107.62	3,226.75	-51.79	130.26	140.00	0.28	-0.28	0.01	
3,327.00	5.28	105.33	3,319.31	-54.35	138.86	148.89	0.60	-0.55	-2.46	
3,421.00	4.91	105.26	3,412.94	-56.55	146.91	157.12	0.39	-0.39	-0.07	
3,515.00	6.16	110.49	3,506.50	-59.37	155.52	166.12	1.43	1.33	5.56	
3,610.00	6.23	111.15	3,600.95	-63.02	165.10	176.35	0.11	0.07	0.69	
3,703.00	5.69	111.84	3,693.44	-66.55	174.09	186.00	0.59	-0.58	0.74	
3,797.00	5.55	110.96	3,786.99	-69.91	182.66	195.19	0.17	-0.15	-0.94	
3,890.00	5.49	111.93	3,879.56	-73.18	190.98	204.12	0.12	-0.06	1.04	
3,985.00	5.04	116.30	3,974.16	-76.73	198.94	212.83	0.63	-0.47	4.60	
4,078.00	4.94	116.53	4,066.81	-80.33	206.18	220.92	0.11	-0.11	0.25	
4,173.00	4.61	114.22	4,161.48	-83.72	213.33	228.82	0.40	-0.35	-2.43	
4,267.00	4.67	112.09	4,255.17	-86.71	220.32	236.42	0.19	0.06	-2.27	
4,361.00	4.59	111.91	4,348.86	-89.55	227.35	244.00	0.09	-0.09	-0.19	
4,456.00	4.31	113.67	4,443.58	-92.40	234.15	251.37	0.33	-0.29	1.85	
4,552.00	4.21	113.67	4,539.31	-95.27	240.68	258.50	0.10	-0.10	0.00	
4,645.00	3.76	112.32	4,632.09	-97.79	246.63	264.96	0.49	-0.48	-1.45	
4,739.00	4.32	117.77	4,725.85	-100.61	252.61	271.57	0.72	0.60	5.80	
4,833.00	3.96	117.67	4,819.61	-103.77	258.62	278.35	0.38	-0.38	-0.11	
4,927.00	4.41	117.69	4,913.36	-106.96	264.69	285.20	0.48	0.48	0.02	
5,023.00	3.75	108.64	5,009.11	-109.68	270.94	292.01	0.96	-0.69	-9.43	
5,116.00	4.25	113.51	5,101.89	-112.02	276.98	298.48	0.65	0.54	5.24	
5,210.00	3.93	114.46	5,195.65	-114.75	283.10	305.18	0.35	-0.34	1.01	
5,302.00	3.64	114.30	5,287.45	-117.25	288.64	311.25	0.32	-0.32	-0.17	
5,314.83	3.61	113.47	5,300.25	-117.58	289.38	312.07	0.48	-0.25	-6.44	
<b>Emma Ward #1 - TGT</b>										
5,334.00	3.56	112.21	5,319.38	-118.05	290.48	313.26	0.48	-0.25	-6.59	

<b>Company:</b>	Merit Energy	<b>Local Co-ordinate Reference:</b>	Well Emma Ward #1
<b>Project:</b>	Haskell Co., KS	<b>TVD Reference:</b>	12 KB @ 3045.30usft (3033.3 GE + 12 KB = 3045.3)
<b>Site:</b>	Emma Ward #1	<b>MD Reference:</b>	12 KB @ 3045.30usft (3033.3 GE + 12 KB = 3045.3)
<b>Well:</b>	Emma Ward #1	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Emma Ward #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Emma Ward #1	<b>Database:</b>	Gyrodata NWDB

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
5,427.00	3.34	111.98	5,412.21	-120.15	295.67	318.85	0.24	-0.24	-0.25	
5,490.00	3.18	108.51	5,475.11	-121.39	299.02	322.43	0.40	-0.25	-5.51	
5,535.00	3.18	108.51	5,520.04	-122.19	301.39	324.91	0.00	0.00	0.00	
<b>Projection to Bit : 37° 39' 46.349794 N , 101° 0' 49.111379 W - Emma Ward #1 - BHL</b>										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
5,535.00	5,520.04	-122.19	301.39	Projection to Bit : 37° 39' 46.349794 N , 101° 0' 49.111379 W	

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_