

# Merit Energy

Haskell Co., KS  
Emma Ward  
Emma Ward #2

Emma Ward #2  
Design #1

## Anticollision Report

15 March, 2019

<b>Company:</b>	Merit Energy	<b>Local Co-ordinate Reference:</b>	Well Emma Ward #2
<b>Project:</b>	Haskell Co., KS	<b>TVD Reference:</b>	Duke 9 @ 3044.70usft (Duke 9 ( 3032.7 GE + 12 KB = 3044.7))
<b>Reference Site:</b>	Emma Ward	<b>MD Reference:</b>	Duke 9 @ 3044.70usft (Duke 9 ( 3032.7 GE + 12 KB = 3044.7))
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Emma Ward #2	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Emma Ward #2	<b>Database:</b>	Gyrodata NWDB
<b>Reference Design:</b>	Design #1	<b>Offset TVD Reference:</b>	Reference Datum

<b>Reference</b>	Design #1		
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
<b>Interpolation Method:</b>	MD + Stations Interval 100.00usft	<b>Error Model:</b>	ISCWSA
<b>Depth Range:</b>	Unlimited	<b>Scan Method:</b>	Closest Approach 3D
<b>Results Limited by:</b>	Maximum center-center distance of 35,000.00 u	<b>Error Surface:</b>	Pedal Curve
<b>Warning Levels Evaluated at:</b>	2.80 Sigma	<b>Casing Method:</b>	Not applied

<b>Survey Tool Program</b>	<b>Date</b>	03/15/19		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.00	5,801.29	Design #1 (Emma Ward #2)	MWD+HDGM	OWSG MWD + HDGM

<b>Summary</b>						
<b>Site Name</b>	<b>Reference Measured Depth (usft)</b>	<b>Offset Measured Depth (usft)</b>	<b>Distance Between Centres (usft)</b>	<b>Distance Between Ellipses (usft)</b>	<b>Separation Factor</b>	<b>Warning</b>
<b>Offset Well - Wellbore - Design</b>						
Emma Ward						
Emma Ward #1 - Emma Ward #1 - Emma Ward #1	1,493.25	1,493.96	105.07	91.48	7.733	CC
Emma Ward #1 - Emma Ward #1 - Emma Ward #1	1,800.00	1,799.75	107.12	90.67	6.509	ES
Emma Ward #1 - Emma Ward #1 - Emma Ward #1	2,200.00	2,209.92	114.55	95.77	6.098	SF

<b>Offset Design</b>													<b>Offset Site Error:</b>	0.00 usft
Survey Program: 407-MWD, 1852-MWD+HDGM													<b>Offset Well Error:</b>	0.00 usft
Reference		Offset		Semi Major Axis			Distance				Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Tooface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)		Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.60	0.00	0.00	0.00	-105.37	-31.14	-113.31	117.51					
100.00	100.00	101.11	100.51	0.16	0.18	-105.41	-31.17	-113.07	117.29	116.82	0.47	250.909		
200.00	200.00	201.62	201.01	0.52	0.35	-105.56	-31.28	-112.36	116.64	115.42	1.21	96.122		
300.00	300.00	302.11	301.50	0.87	0.53	-105.80	-31.45	-111.18	115.55	113.59	1.96	58.975		
400.00	400.00	402.60	401.97	1.23	0.70	-106.14	-31.69	-109.53	114.04	111.33	2.71	42.155		
500.00	500.00	502.34	501.70	1.59	1.05	-106.56	-32.04	-107.73	112.40	108.71	3.70	30.417		
600.00	600.00	602.06	601.40	1.95	1.41	-107.05	-32.54	-106.13	111.01	106.32	4.70	23.637		
700.00	700.00	701.84	701.17	2.31	1.77	-107.63	-33.27	-104.69	109.85	104.16	5.70	19.280		
800.00	800.00	801.56	800.88	2.67	2.13	-108.43	-34.42	-103.30	108.89	102.19	6.70	16.257		
900.00	900.00	900.94	900.25	3.03	2.48	-109.01	-35.30	-102.46	108.37	100.68	7.69	14.088		
1,000.00	1,000.00	1,001.13	1,000.44	3.38	2.83	-109.19	-35.56	-102.18	108.20	99.51	8.69	12.453		
1,100.00	1,100.00	1,101.82	1,101.12	3.74	3.19	-109.14	-35.24	-101.52	107.47	97.79	9.68	11.098		
1,200.00	1,200.00	1,201.56	1,200.86	4.10	3.54	-109.04	-34.77	-100.73	106.57	95.89	10.68	9.982		
1,300.00	1,300.00	1,301.36	1,300.65	4.46	3.89	-109.04	-34.53	-100.07	105.86	94.19	11.67	9.071		
1,400.00	1,400.00	1,401.17	1,400.47	4.82	4.25	-109.30	-34.81	-99.41	105.33	92.67	12.67	8.315		
1,493.25	1,493.25	1,493.96	1,493.25	5.15	4.57	-109.71	-35.44	-98.91	105.07	91.48	13.59	7.733	CC	
1,500.00	1,500.00	1,500.66	1,499.95	5.18	4.59	-109.73	-35.47	-98.90	105.07	91.42	13.65	7.696		
1,600.00	1,600.00	1,599.89	1,599.18	5.53	4.93	-109.78	-35.69	-99.25	105.48	90.85	14.63	7.211		
1,700.00	1,700.00	1,699.85	1,699.14	5.89	5.27	-109.60	-35.65	-100.12	106.29	90.69	15.59	6.816		
1,800.00	1,800.00	1,799.75	1,799.03	6.25	5.53	-109.44	-35.65	-101.01	107.12	90.67	16.46	6.509	ES	
1,900.00	1,900.00	1,899.82	1,899.10	6.61	5.63	-109.33	-35.76	-101.97	108.07	90.97	17.10	6.319		
1,975.00	1,975.00	1,975.12	1,974.40	6.88	5.65	-109.42	-36.11	-102.40	108.59	91.08	17.50	6.204		

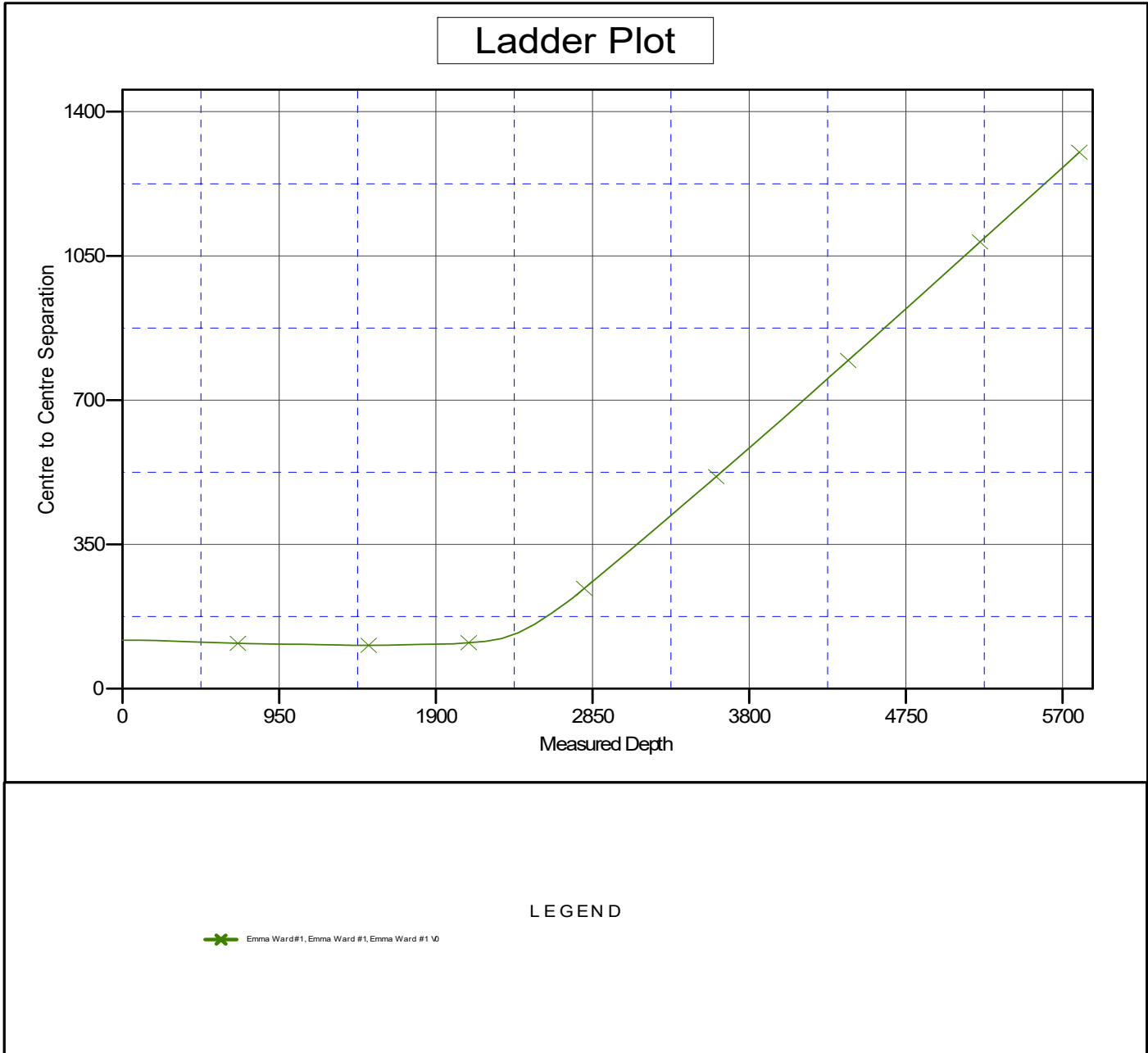
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

<b>Company:</b>	Merit Energy	<b>Local Co-ordinate Reference:</b>	Well Emma Ward #2
<b>Project:</b>	Haskell Co., KS	<b>TVD Reference:</b>	Duke 9 @ 3044.70usft (Duke 9 ( 3032.7 GE + 12 KB = 3044.7))
<b>Reference Site:</b>	Emma Ward	<b>MD Reference:</b>	Duke 9 @ 3044.70usft (Duke 9 ( 3032.7 GE + 12 KB = 3044.7))
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Emma Ward #2	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Emma Ward #2	<b>Database:</b>	Gyrodata NWDB
<b>Reference Design:</b>	Design #1	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft		
Survey Program: 407-MWD, 1852-MWD+HDGM													Offset Well Error:	0.00 usft		
Reference Offset Semi Major Axis													Distance			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning			
2,000.00	2,000.00	2,000.74	2,000.02	6.97	5.66	-161.28	-36.36	-102.40	108.82	91.17	17.65	6.167				
2,100.00	2,099.91	2,103.43	2,102.60	7.32	5.71	-164.04	-39.77	-99.73	111.32	93.11	18.21	6.113				
2,200.00	2,199.48	2,209.92	2,208.54	7.68	5.80	-169.54	-45.08	-90.61	114.55	95.77	18.79	6.098 SF				
2,300.00	2,298.43	2,308.35	2,306.19	8.03	5.91	-175.36	-50.21	-79.36	121.63	102.19	19.44	6.256				
2,400.00	2,396.50	2,405.75	2,402.90	8.40	6.04	179.71	-55.35	-68.99	135.69	115.56	20.13	6.741				
2,500.00	2,493.41	2,502.46	2,499.03	8.78	6.19	176.10	-60.25	-59.64	156.29	135.45	20.84	7.501				
2,600.00	2,588.90	2,600.62	2,596.72	9.18	6.35	173.76	-64.54	-50.98	182.53	160.97	21.56	8.466				
2,700.00	2,682.71	2,701.67	2,697.16	9.61	6.55	172.23	-66.36	-40.19	210.89	188.59	22.31	9.455				
2,731.46	2,711.84	2,730.46	2,725.76	9.75	6.61	171.84	-66.92	-36.91	220.75	198.19	22.55	9.789				
2,800.00	2,775.07	2,793.63	2,788.49	10.08	6.74	171.09	-68.75	-29.70	243.21	220.13	23.08	10.539				
2,900.00	2,867.33	2,887.16	2,881.37	10.57	6.95	170.16	-71.83	-19.13	276.39	252.53	23.87	11.580				
3,000.00	2,959.58	2,980.73	2,974.33	11.10	7.17	169.49	-74.92	-8.92	309.87	285.19	24.68	12.553				
3,100.00	3,051.84	3,074.31	3,067.34	11.64	7.41	168.99	-77.91	1.00	343.51	317.98	25.52	13.458				
3,200.00	3,144.10	3,167.28	3,159.78	12.20	7.65	168.64	-80.87	10.44	377.42	351.04	26.38	14.307				
3,300.00	3,236.36	3,260.74	3,252.75	12.77	7.90	168.40	-83.73	19.50	411.55	384.30	27.26	15.099				
3,400.00	3,328.62	3,354.31	3,345.91	13.36	8.15	168.30	-86.14	27.95	445.75	417.60	28.15	15.837				
3,500.00	3,420.87	3,447.40	3,438.63	13.96	8.41	168.28	-88.34	35.85	480.13	451.08	29.04	16.531				
3,600.00	3,513.13	3,541.29	3,532.04	14.58	8.69	168.10	-91.51	44.85	514.55	484.58	29.97	17.167				
3,700.00	3,605.39	3,634.25	3,624.45	15.20	8.97	167.87	-95.10	54.22	549.04	518.12	30.91	17.760				
3,800.00	3,697.65	3,726.33	3,716.06	15.83	9.25	167.72	-98.55	62.92	583.82	551.96	31.86	18.326				
3,900.00	3,789.91	3,820.05	3,809.33	16.46	9.54	167.63	-101.85	71.42	618.67	585.85	32.82	18.850				
4,000.00	3,882.16	3,911.52	3,900.39	17.10	9.83	167.56	-105.10	79.56	653.66	619.88	33.77	19.354				
4,100.00	3,974.42	4,000.30	3,988.80	17.75	10.11	167.53	-108.46	86.83	689.23	654.52	34.71	19.857				
4,200.00	4,066.68	4,093.40	4,081.55	18.41	10.40	167.52	-112.05	94.06	725.12	689.43	35.69	20.319				
4,300.00	4,158.94	4,188.27	4,176.10	19.06	10.71	167.55	-115.36	101.14	760.92	724.24	36.68	20.742				
4,400.00	4,251.20	4,283.77	4,271.29	19.73	11.02	167.59	-118.36	108.27	796.48	758.79	37.69	21.131				
4,500.00	4,343.45	4,376.63	4,363.84	20.39	11.32	167.64	-121.16	115.20	831.95	793.26	38.68	21.507				
4,600.00	4,435.71	4,467.34	4,454.29	21.06	11.62	167.70	-123.88	121.62	867.64	827.98	39.66	21.878				
4,700.00	4,527.97	4,560.26	4,546.95	21.73	11.92	167.77	-126.65	127.92	903.49	862.83	40.65	22.223				
4,800.00	4,620.23	4,652.84	4,639.31	22.41	12.22	167.87	-129.13	133.79	939.40	897.75	41.65	22.555				
4,900.00	4,712.48	4,742.40	4,728.64	23.08	12.52	167.94	-131.87	139.53	975.55	932.92	42.62	22.888				
5,000.00	4,804.74	4,834.35	4,820.36	23.76	12.83	167.99	-134.95	145.39	1,011.91	968.29	43.62	23.197				
5,100.00	4,897.00	4,929.46	4,915.21	24.44	13.15	168.05	-138.19	151.55	1,048.25	1,003.59	44.66	23.472				
5,200.00	4,989.26	5,030.99	5,016.48	25.13	13.49	168.12	-140.98	158.12	1,084.14	1,038.38	45.76	23.693				
5,300.00	5,081.52	5,120.65	5,105.93	25.81	13.79	168.18	-143.30	163.98	1,119.87	1,073.13	46.75	23.957				
5,400.00	5,173.77	5,210.97	5,196.01	26.50	14.10	168.24	-145.91	169.85	1,155.85	1,108.10	47.75	24.209				
5,500.00	5,266.03	5,302.79	5,287.63	27.19	14.42	168.31	-148.41	175.37	1,192.00	1,143.24	48.76	24.448				
5,598.60	5,357.00	5,395.96	5,380.63	27.87	14.73	168.40	-150.61	180.66	1,227.59	1,177.81	49.78	24.661				
5,600.00	5,358.29	5,397.25	5,381.92	27.88	14.74	168.40	-150.64	180.73	1,228.10	1,178.30	49.79	24.664				
5,700.00	5,450.55	5,493.02	5,477.53	28.57	15.06	168.51	-152.59	185.87	1,264.16	1,213.32	50.84	24.866				
5,800.00	5,542.81	5,535.00	5,519.44	29.05	15.20	168.56	-153.33	188.08	1,301.11	1,249.89	51.23	25.400				
5,802.05	5,544.70	5,535.00	5,519.44	29.06	15.20	168.56	-153.33	188.08	1,301.93	1,250.70	51.22	25.416				

<b>Company:</b>	Merit Energy	<b>Local Co-ordinate Reference:</b>	Well Emma Ward #2
<b>Project:</b>	Haskell Co., KS	<b>TVD Reference:</b>	Duke 9 @ 3044.70usft (Duke 9 ( 3032.7 GE + 12 KB = 3044.7))
<b>Reference Site:</b>	Emma Ward	<b>MD Reference:</b>	Duke 9 @ 3044.70usft (Duke 9 ( 3032.7 GE + 12 KB = 3044.7))
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Emma Ward #2	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Emma Ward #2	<b>Database:</b>	Gyrodata NWDB
<b>Reference Design:</b>	Design #1	<b>Offset TVD Reference:</b>	Reference Datum

Reference Depths are relative to Duke 9 @ 3044.70usft (Duke 9 ( 3032Coordinates are relative to: Emma Ward #2  
 Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1927 (Exact solution), Kansas South 1502  
 Central Meridian is -98.500000 Grid Convergence at Surface is: -1.55°



<b>Company:</b>	Merit Energy	<b>Local Co-ordinate Reference:</b>	Well Emma Ward #2
<b>Project:</b>	Haskell Co., KS	<b>TVD Reference:</b>	Duke 9 @ 3044.70usft (Duke 9 ( 3032.7 GE + 12 KB = 3044.7))
<b>Reference Site:</b>	Emma Ward	<b>MD Reference:</b>	Duke 9 @ 3044.70usft (Duke 9 ( 3032.7 GE + 12 KB = 3044.7))
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Emma Ward #2	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Emma Ward #2	<b>Database:</b>	Gyrodata NWDB
<b>Reference Design:</b>	Design #1	<b>Offset TVD Reference:</b>	Reference Datum

Reference Depths are relative to Duke 9 @ 3044.70usft (Duke 9 ( 3032Coordinates are relative to: Emma Ward #2  
 Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1927 (Exact solution), Kansas South 1502  
 Central Meridian is -98.500000 Grid Convergence at Surface is: -1.55°

