



Company: SandRidge  
 Well: Murray 3406 1-5H  
 Location: Harper County KS  
 Rig: Unit 310

Job Number: 5426102  
 Magnetic Decl.: 4.53  
 Grid Corr.: 0.32  
 Total Grid Corr.: 4.21

Calculation Method  
 Proposed Azimuth 359.17  
 Depth Reference  
 Tie Into:

Survey Tool Type	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Direction	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates			Closure		Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
Tie In Coordinates															
Tie In	0	0.00	0.00	N 0.0 E	0	0	0	N/S (ft)	E/W (ft)	Distance (ft)	Angle (deg)				
MWD	15	0.00	0.00	N 0.0 E	15	15.00	0.00	0.00 N	0.00 E	0.00	0.00	0.00	0.00	0.00	0.00
MWD	250	0.25	106.79	S 73.2 E	235	250.00	-0.16	0.15 S	0.49 E	0.51	106.79	0.11	0.11	0.11	45.44
MWD	500	0.25	106.79	S 73.2 E	250	500.00	-0.49	0.46 S	1.54 E	1.60	106.79	0.00	0.00	0.00	0.00
MWD	648	0.25	106.79	S 73.2 E	148	648.00	-0.68	0.65 S	2.15 E	2.25	106.79	0.00	0.00	0.00	0.00
MWD	723	0.07	106.79	S 73.2 E	75	722.99	-0.74	0.71 S	2.35 E	2.46	106.79	0.24	-0.24	0.00	0.00
MWD	815	0.11	223.50	S 43.5 W	92	814.99	-0.82	0.79 S	2.35 E	2.48	108.62	0.17	0.04	0.04	126.86
MWD	907	0.11	345.28	N 14.7 W	92	906.99	-0.80	0.77 S	2.26 E	2.39	108.77	0.21	0.00	0.00	132.37
MWD	998	0.14	195.67	S 15.7 W	91	997.99	-0.82	0.79 S	2.21 E	2.35	109.70	0.27	0.03	0.03	-164.41
MWD	1090	0.09	285.74	N 74.3 W	92	1089.99	-0.91	0.88 S	2.11 E	2.29	112.63	0.18	-0.05	0.00	97.90
MWD	1182	0.10	0.07	N 0.1 E	92	1181.99	-0.81	0.78 S	2.04 E	2.19	110.92	0.13	0.01	0.01	80.79
MWD	1274	0.09	292.72	N 67.3 W	92	1273.99	-0.70	0.67 S	1.98 E	2.09	108.79	0.11	-0.01	0.01	-73.21
MWD	1365	0.10	94.23	S 85.8 E	91	1364.99	-0.68	0.65 S	1.99 E	2.09	108.11	0.21	0.01	0.01	-218.12
MWD	1457	0.11	350.38	N 9.6 W	92	1456.99	-0.60	0.57 S	2.05 E	2.13	105.49	0.18	0.01	0.01	278.42
MWD	1549	0.11	177.05	S 2.9 E	92	1548.99	-0.60	0.57 S	2.04 E	2.12	105.60	0.24	0.00	0.00	-188.40
MWD	1640	0.10	112.97	S 67.0 E	91	1639.99	-0.72	0.69 S	2.12 E	2.23	107.99	0.12	-0.01	0.01	-70.42
MWD	1732	0.09	238.10	S 58.1 W	92	1731.99	-0.79	0.76 S	2.13 E	2.26	109.56	0.18	-0.01	0.01	136.01
MWD	1826	0.07	107.82	S 72.2 E	94	1825.99	-0.85	0.81 S	2.13 E	2.28	110.97	0.15	-0.02	0.02	-138.60
MWD	1921	0.06	123.62	S 56.4 E	95	1920.99	-0.89	0.86 S	2.22 E	2.38	111.15	0.02	-0.01	0.01	16.63
MWD	2016	0.10	354.55	N 5.4 W	95	2015.99	-0.84	0.81 S	2.26 E	2.40	109.64	0.15	0.04	0.04	243.08
MWD	2111	0.14	15.50	N 15.5 E	95	2110.99	-0.64	0.61 S	2.28 E	2.36	105.00	0.06	0.04	0.04	22.05
MWD	2206	0.19	71.50	N 71.5 E	95	2205.99	-0.48	0.45 S	2.46 E	2.50	100.34	0.17	0.05	0.05	58.95
MWD	2300	0.16	72.75	N 72.8 E	94	2299.99	-0.40	0.36 S	2.73 E	2.76	97.52	0.03	-0.03	0.03	1.33
MWD	2395	0.15	335.22	N 24.8 W	95	2394.99	-0.25	0.21 S	2.81 E	2.82	94.24	0.25	-0.01	0.01	-102.66
MWD	2490	0.07	196.23	S 16.2 W	95	2489.99	-0.19	0.15 S	2.74 E	2.74	93.16	0.22	-0.08	0.08	-146.31
MWD	2585	0.10	118.93	S 61.1 E	95	2584.99	-0.29	0.25 S	2.80 E	2.81	95.05	0.11	0.03	0.03	-81.37
MWD	2680	0.03	241.67	S 61.7 W	95	2679.99	-0.34	0.30 S	2.85 E	2.86	95.99	0.13	-0.07	0.07	129.20
MWD	2774	0.11	145.82	S 34.2 E	94	2773.99	-0.43	0.39 S	2.88 E	2.90	97.63	0.12	0.09	0.09	-101.97
MWD	2964	0.20	304.63	N 55.4 W	190	2963.99	-0.39	0.35 S	2.70 E	2.73	97.32	0.16	0.05	0.05	83.58
MWD	3059	0.09	48.47	N 48.5 E	95	3058.99	-0.24	0.20 S	2.62 E	2.63	94.44	0.25	-0.12	0.12	109.31
MWD	3154	0.07	359.47	N 0.5 W	95	3153.99	-0.14	0.10 S	2.68 E	2.68	92.06	0.07	-0.02	0.02	-51.58
MWD	3249	0.09	26.47	N 26.5 E	95	3248.99	-0.01	0.03 N	2.71 E	2.71	89.40	0.04	0.02	0.02	28.42
MWD	3344	0.09	6.18	N 6.2 E	95	3343.99	0.13	0.17 N	2.75 E	2.76	86.48	0.03	0.00	0.00	-21.36
MWD	3439	0.11	112.76	S 67.2 E	95	3438.99	0.17	0.21 N	2.85 E	2.85	85.81	0.17	0.02	0.02	112.19



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Calculation Method Minimum Curvature  
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Survey Tool Type	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Direction	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	N/S (ft)	E/W (ft)	Closure Distance (ft)	Closure Angle (deg)	Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
MWD	3533	0.07	325.74	N 34.3 W	94	3532.99	0.18	0.22 N	2.90 E	2.91	85.64	0.18	-0.04	226.57
MWD	3628	0.11	88.58	N 88.6 E	95	3627.99	0.23	0.27 N	2.96 E	2.97	84.76	0.17	0.04	129.31
MWD	3723	0.11	69.83	N 69.8 E	95	3722.99	0.26	0.30 N	3.13 E	3.15	84.44	0.04	0.00	-19.74
MWD	3786	2.71	345.60	N 14.4 W	63	3785.97	1.73	1.77 N	2.82 E	3.33	57.89	4.29	4.13	-133.70
MWD	3817	5.31	347.00	N 13.0 W	31	3816.89	3.84	3.88 N	2.31 E	4.51	30.83	8.39	8.39	4.52
MWD	3849	7.93	349.38	N 10.6 W	32	3848.67	7.47	7.49 N	1.57 E	7.65	11.86	8.23	8.19	7.44
MWD	3881	11.15	348.64	N 11.4 W	32	3880.22	12.68	12.69 N	0.56 E	12.71	2.51	10.07	10.06	-2.31
MWD	3913	14.56	346.35	N 13.7 W	32	3911.42	19.65	19.64 N	1.00 W	19.66	357.08	10.77	10.66	-7.16
MWD	3944	18.60	345.08	N 14.9 W	31	3941.12	28.25	28.21 N	3.20 W	28.39	353.54	13.08	13.03	-4.10
MWD	3976	21.94	345.33	N 14.7 W	32	3971.14	39.01	38.92 N	6.02 W	39.39	351.20	10.44	10.44	0.78
MWD	4008	24.90	345.60	N 14.4 W	32	4000.50	51.36	51.23 N	9.21 W	52.06	349.80	9.26	9.25	0.84
MWD	4039	27.29	346.21	N 13.8 W	31	4028.34	64.63	64.46 N	12.53 W	65.67	349.00	7.76	7.71	1.97
MWD	4071	28.63	346.98	N 13.0 W	32	4056.60	79.28	79.05 N	16.01 W	80.66	348.55	4.34	4.19	2.41
MWD	4102	30.37	348.86	N 11.1 W	31	4083.58	94.25	93.98 N	19.20 W	95.92	348.46	6.36	5.61	6.06
MWD	4134	32.35	351.17	N 8.8 W	32	4110.91	110.69	110.38 N	22.07 W	112.56	348.69	7.24	6.19	7.22
MWD	4165	33.79	353.63	N 6.4 W	31	4136.88	127.48	127.14 N	24.30 W	129.44	349.18	6.35	4.65	7.94
MWD	4197	35.13	355.42	N 4.6 W	32	4163.27	145.53	145.17 N	26.03 W	147.48	349.84	5.25	4.19	5.59
MWD	4229	36.54	357.37	N 2.6 W	32	4189.21	164.24	163.86 N	27.20 W	166.10	350.58	5.67	4.41	6.09
MWD	4261	38.74	358.14	N 1.9 W	32	4214.55	183.77	183.39 N	27.96 W	185.51	351.33	7.03	6.88	2.41
MWD	4292	40.84	358.61	N 1.4 W	31	4238.37	203.61	203.22 N	28.52 W	205.21	352.01	6.84	6.77	1.52
MWD	4324	42.56	359.29	N 0.7 W	32	4262.26	224.89	224.50 N	28.91 W	226.35	352.66	5.56	5.38	2.13
MWD	4356	44.78	359.26	N 0.7 W	32	4285.41	246.99	246.59 N	29.19 W	248.31	353.25	6.94	6.94	-0.09
MWD	4387	47.33	358.65	N 1.4 W	31	4306.92	269.31	268.91 N	29.60 W	270.53	353.72	8.35	8.23	-1.97
MWD	4419	50.14	357.83	N 2.2 W	32	4328.02	293.35	292.95 N	30.34 W	294.51	354.09	8.99	8.78	-2.56
MWD	4451	52.24	357.60	N 2.4 W	32	4348.07	318.28	317.86 N	31.34 W	319.40	354.37	6.59	6.56	-0.72
MWD	4483	54.13	358.09	N 1.9 W	32	4367.25	343.89	343.46 N	32.30 W	344.97	354.63	6.03	5.91	1.53
MWD	4514	56.44	358.31	N 1.7 W	31	4384.90	369.37	368.93 N	33.10 W	370.41	354.87	7.47	7.45	0.71
MWD	4546	59.21	358.90	N 1.1 W	32	4401.94	396.45	396.00 N	33.75 W	397.44	355.13	8.80	8.66	1.84
MWD	4578	62.13	358.92	N 1.1 W	32	4417.61	424.34	423.89 N	34.28 W	425.28	355.38	9.13	9.13	0.06
MWD	4609	63.76	359.12	N 0.9 W	31	4431.71	451.95	451.49 N	34.76 W	452.83	355.60	5.29	5.26	0.65
MWD	4641	65.57	359.68	N 0.3 W	32	4445.41	480.87	480.41 N	35.06 W	481.69	355.83	5.87	5.66	1.75
MWD	4672	67.69	359.73	N 0.3 W	31	4457.70	509.32	508.87 N	35.20 W	510.08	356.04	6.84	6.84	0.16
MWD	4704	69.96	0.23	N 0.2 E	32	4469.26	539.16	538.71 N	35.21 W	539.85	356.26	7.24	7.09	1.56
MWD	4736	72.17	0.44	N 0.4 E	32	4479.64	569.42	568.97 N	35.04 W	570.05	356.48	6.93	6.91	0.66
MWD	4767	74.58	0.70	N 0.7 E	31	4488.51	599.11	598.67 N	34.74 W	599.68	356.68	7.82	7.77	0.84



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Survey Tool Type	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Direction	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates		Closure		Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
								N/S (ft)	E/W (ft)	Distance (ft)	Angle (deg)			
MWD	4799	77.02	0.64	N 0.6 E	32	4496.36	630.12	629.69 N	34.38 W	630.63	356.88	7.63	7.62	-0.19
MWD	4830	78.75	1.01	N 1.0 E	31	4502.87	660.42	659.99 N	33.94 W	660.87	357.06	5.70	5.58	1.19
MWD	4862	80.91	0.95	N 1.0 E	32	4508.52	691.90	691.49 N	33.40 W	692.29	357.23	6.75	6.75	-0.19
MWD	4894	83.93	0.66	N 0.7 E	32	4512.74	723.60	723.20 N	32.96 W	723.95	357.39	9.48	9.44	-0.91
MWD	4925	86.12	0.31	N 0.3 E	31	4515.43	754.47	754.08 N	32.70 W	754.79	357.52	7.15	7.06	-1.13
MWD	4957	86.06	359.95	N 0.1 W	32	4517.61	786.39	786.00 N	32.62 W	786.68	357.62	1.14	-0.19	-1.13
MWD	5020	85.32	359.70	N 0.3 W	63	4522.34	849.21	848.83 N	32.82 W	849.46	357.79	1.24	-1.17	-0.40
MWD	5083	85.38	359.41	N 0.6 W	63	4527.45	912.00	911.62 N	33.30 W	912.22	357.91	0.47	0.10	-0.46
MWD	5146	85.29	359.96	N 0.0 W	63	4532.57	974.79	974.41 N	33.65 W	974.99	358.02	0.88	-0.14	0.87
MWD	5210	85.22	0.04	N 0.0 E	64	4537.87	1038.57	1038.19 N	33.65 W	1038.73	358.14	0.17	-0.11	0.13
MWD	5241	86.86	359.33	N 0.7 W	31	4540.01	1069.49	1069.11 N	33.82 W	1069.65	358.19	5.76	5.29	-2.29
MWD	5317	91.20	359.10	N 0.9 W	76	4541.30	1145.46	1145.07 N	34.86 W	1145.61	358.26	5.72	5.71	-0.30
MWD	5380	90.12	359.31	N 0.7 W	63	4540.57	1208.45	1208.06 N	35.73 W	1208.59	358.31	1.75	-1.71	0.33
MWD	5443	90.22	359.48	N 0.5 W	63	4540.38	1271.45	1271.06 N	36.40 W	1271.58	358.36	0.31	0.16	0.27
MWD	5507	90.43	358.75	N 1.3 W	64	4540.02	1335.45	1335.05 N	37.39 W	1335.57	358.40	1.19	0.33	-1.14
MWD	5570	90.94	357.74	N 2.3 W	63	4539.27	1398.44	1398.02 N	39.32 W	1398.57	358.39	1.80	0.81	-1.60
MWD	5633	89.78	359.57	N 0.4 W	63	4538.87	1461.43	1460.99 N	40.80 W	1461.56	358.40	3.44	-1.84	2.90
MWD	5696	89.75	0.55	N 0.6 E	63	4539.13	1524.42	1523.99 N	40.73 W	1524.54	358.47	1.56	-0.05	1.56
MWD	5791	90.15	0.84	N 0.8 E	95	4539.21	1619.39	1618.98 N	39.58 W	1619.47	358.60	0.52	0.42	0.31
MWD	5885	90.15	359.99	N 0.0 W	94	4538.97	1713.36	1712.98 N	38.90 W	1713.42	358.70	0.90	0.00	-0.90
MWD	5980	90.37	0.14	N 0.1 E	95	4538.54	1808.35	1807.98 N	38.79 W	1808.40	358.77	0.28	0.23	0.16
MWD	6075	90.37	359.80	N 0.2 W	95	4537.92	1903.34	1902.98 N	38.84 W	1903.37	358.83	0.36	0.00	-0.36
MWD	6170	90.22	359.53	N 0.5 W	95	4537.43	1998.34	1997.97 N	39.39 W	1998.36	358.87	0.33	-0.16	-0.28
MWD	6265	90.53	359.17	N 0.8 W	95	4536.81	2093.33	2092.97 N	40.47 W	2093.36	358.89	0.50	0.33	-0.38
MWD	6360	91.42	359.06	N 0.9 W	95	4535.19	2188.32	2187.94 N	41.94 W	2188.34	358.90	0.94	0.94	-0.12
MWD	6423	89.38	359.63	N 0.4 W	63	4534.75	2251.31	2250.93 N	42.66 W	2251.34	358.91	3.36	-3.24	0.90
MWD	6487	88.89	359.35	N 0.6 W	64	4535.72	2315.30	2314.92 N	43.23 W	2315.32	358.93	0.88	-0.77	-0.44
MWD	6550	88.55	359.04	N 1.0 W	63	4537.13	2378.29	2377.90 N	44.11 W	2378.31	358.94	0.73	-0.54	-0.49
MWD	6645	88.23	358.94	N 1.1 W	95	4539.80	2473.25	2472.85 N	45.79 W	2473.27	358.94	0.35	-0.34	-0.11
MWD	6740	89.66	358.74	N 1.3 W	95	4541.55	2568.23	2567.81 N	47.71 W	2568.25	358.94	1.52	1.51	-0.21
MWD	6835	90.53	359.39	N 0.6 W	95	4541.39	2663.23	2662.79 N	49.26 W	2663.25	358.94	1.14	0.92	0.68
MWD	6929	91.36	359.15	N 0.9 W	94	4539.84	2757.21	2756.77 N	50.46 W	2757.23	358.95	0.92	0.88	-0.26
MWD	7024	91.63	359.99	N 0.0 W	95	4537.36	2852.18	2851.74 N	51.17 W	2852.20	358.97	0.93	0.28	0.88
MWD	7119	91.51	0.37	N 0.4 E	95	4534.76	2947.13	2946.70 N	50.87 W	2947.14	359.01	0.42	-0.13	0.40
MWD	7213	90.83	359.85	N 0.1 W	94	4532.84	3041.10	3040.68 N	50.69 W	3041.10	359.04	0.91	-0.72	-0.55

