

# Directional Survey Report

CalEnergy Company

Well ID: 86-21Y551040

Well Name: NEWBERRY 86-21

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Plane of Vertical Section: 105 degrees

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Coordinates		Vertical Section	Dog Leg Severity
					N-S	E-W		
MSS	6406.00	20.00	105.00	6250.50	S 349.26	E 1116.05	1168.42	0.44
MSS	6532.00	19.75	105.00	6369.00	S 360.35	E 1157.43	1211.25	0.20
MSS	6655.00	18.75	106.00	6485.12	S 371.18	E 1196.50	1251.80	0.86
MSS	6776.00	19.50	104.00	6599.44	S 381.42	E 1234.79	1291.44	0.82
MSS	6901.00	20.00	105.00	6717.09	S 392.00	E 1275.69	1333.68	0.48
MSS	7025.00	21.00	109.00	6833.24	S 404.73	E 1317.18	1377.05	1.39
MSS	7144.00	21.00	110.00	6944.34	S 418.96	E 1357.38	1419.56	0.30
MSS	7269.00	22.00	112.00	7060.64	S 435.39	E 1400.14	1465.11	0.99
MSS	7393.00	21.50	105.00	7175.83	S 449.98	E 1443.63	1510.90	2.13
MSS	7517.00	20.00	113.00	7291.81	S 464.15	E 1485.11	1554.63	2.58
MSS	7679.00	20.50	110.00	7443.80	S 484.67	E 1537.26	1610.33	0.71
MSS	7805.00	21.00	106.00	7561.63	S 498.44	E 1579.70	1654.88	1.19
MSS	7929.00	20.00	107.00	7677.78	S 510.77	E 1621.34	1698.29	0.85
MSS	8053.00	21.00	118.00	7793.97	S 527.41	E 1661.25	1741.15	3.20
MSS	8177.00	21.75	115.00	7909.44	S 547.55	E 1701.69	1785.43	1.07
MSS	8303.00	22.00	110.00	8026.38	S 565.49	E 1745.03	1831.93	1.49
MSS	8428.00	22.50	115.00	8142.08	S 583.61	E 1788.72	1878.81	1.57
MSS	8558.00	22.00	105.00	8262.45	S 600.43	E 1834.80	1927.68	2.93
MSS	8685.00	22.00	107.00	8380.20	S 613.54	E 1880.52	1975.24	0.59
MSS	8811.00	22.00	110.00	8497.03	S 628.51	E 1925.27	2022.34	0.89
MSS	8937.00	20.00	109.00	8614.65	S 643.60	E 1967.82	2067.35	1.61
MSS	9054.00	19.00	110.00	8724.94	S 656.63	E 2004.64	2106.28	0.90
MSS	9154.00	18.00	113.00	8819.77	S 668.23	E 2034.16	2137.80	1.38

Calculations using Minimum Curvature Method

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End of Report

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Plane of Vertical Section: 105 degrees

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Coordinates		Vertical Section	Dog Leg Severity
					N-S	E-W		
MSS	2739.00	11.00	112.00	2713.46	S 77.57	E 235.23	247.29	0.43
MSS	2862.00	10.75	112.00	2834.25	S 86.26	E 256.75	270.32	0.20
MSS	2986.00	11.25	113.00	2955.97	S 95.32	E 278.60	293.78	0.43
MSS	3108.00	11.00	115.00	3075.68	S 104.89	E 300.11	317.03	0.38
MSS	3232.00	11.00	112.00	3197.40	S 114.32	E 321.80	340.42	0.46
MSS	3356.00	11.00	113.00	3319.12	S 123.38	E 343.65	363.88	0.15
MSS	3480.00	10.50	115.00	3440.94	S 132.77	E 364.78	386.72	0.50
MSS	3605.00	10.00	117.00	3563.95	S 142.52	E 384.78	408.55	0.49
MSS	3728.00	10.25	117.00	3685.03	S 152.33	E 404.04	429.70	0.20
MSS	3850.00	10.00	118.00	3805.13	S 162.23	E 423.07	450.64	0.25
MSS	3974.00	10.00	117.00	3927.25	S 172.17	E 442.17	471.66	0.14
MSS	4099.00	9.75	117.00	4050.40	S 181.91	E 461.27	492.63	0.20
MSS	4185.00	9.50	119.00	4135.19	S 188.65	E 473.96	506.64	0.49
MSS	4293.00	9.50	120.00	4241.71	S 197.43	E 489.48	523.90	0.15
MSS	4341.00	10.25	116.00	4288.99	S 201.28	E 496.75	531.92	2.12
MSS	4372.00	10.50	113.00	4319.49	S 203.60	E 501.82	537.42	1.92
MSS	4405.00	10.75	110.00	4351.92	S 205.82	E 507.48	543.46	1.84
MSS	4438.00	11.00	108.00	4384.33	S 207.85	E 513.37	549.67	1.37
MSS	4542.00	12.75	104.00	4486.10	S 213.69	E 533.94	571.06	1.86
MSS	4635.00	13.75	103.00	4576.63	S 218.66	E 554.67	592.37	1.10
MSS	4728.00	15.25	104.00	4666.66	S 224.11	E 577.31	615.64	1.64
MSS	4819.00	16.50	104.00	4754.19	S 230.13	E 601.46	640.53	1.37
MSS	4911.00	18.75	104.00	4841.86	S 236.87	E 628.49	668.38	2.45
MSS	5041.00	19.50	102.00	4964.69	S 246.43	E 669.99	710.94	0.77
MSS	5167.00	20.50	104.00	5083.09	S 256.14	E 711.97	754.00	0.96
MSS	5290.00	20.50	102.00	5198.30	S 265.83	E 753.93	797.04	0.57
MSS	5414.00	18.75	105.00	5315.10	S 275.51	E 794.42	838.66	1.63
MSS	5501.00	19.50	102.00	5397.30	S 282.14	E 822.13	867.15	1.42
MSS	5630.00	19.50	106.00	5518.90	S 292.56	E 863.89	910.18	1.03
MSS	5755.00	19.00	101.00	5636.92	S 302.19	E 903.93	951.34	1.38
MSS	5878.00	19.25	97.00	5753.14	S 308.48	E 943.71	991.39	1.08
MSS	6002.00	19.00	104.00	5870.31	S 315.86	E 983.59	1031.82	1.86
MSS	6128.00	19.75	105.00	5989.17	S 326.33	E 1024.05	1073.62	0.65
MSS	6252.00	20.00	103.00	6105.79	S 336.52	E 1064.95	1115.76	0.58

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Plane of Vertical Section: 105 degrees

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Coordinates		Vertical Section	Dog Leg Severity
					N-S	E-W		
** Tieln	0.00	0.00	0.00	0.00			0.00	
MSS	218.00	0.25	111.00	214.38	S 13.43	E 31.69	34.08	8.49
MSS	510.00	0.75	211.00	506.37	S 15.30	E 31.30	34.19	0.28
MSS	707.00	2.50	322.00	703.31	S 13.02	E 27.99	30.40	1.45
MSS	902.00	3.25	291.00	898.08	S 7.68	E 20.21	21.51	0.87
MSS	997.00	2.25	284.00	992.97	S 6.27	E 15.88	16.96	1.11
MSS	1078.00	2.75	287.00	1073.89	S 5.32	E 12.48	13.43	0.64
MSS	1110.00	2.50	287.00	1105.86	S 4.89	E 11.08	11.97	0.78
MSS	1141.00	1.75	290.00	1136.84	S 4.53	E 9.99	10.82	2.44
MSS	1171.00	1.00	298.00	1166.83	S 4.25	E 9.33	10.11	2.57
MSS	1203.00	0.75	357.00	1198.82	S 3.91	E 9.07	9.77	2.78
MSS	1232.00	1.00	40.00	1227.82	S 3.52	E 9.22	9.82	2.35
MSS	1262.00	1.00	60.00	1257.82	S 3.19	E 9.62	10.12	1.16
MSS	1294.00	1.25	110.00	1289.81	S 3.17	E 10.19	10.66	3.05
MSS	1325.00	2.00	120.00	1320.80	S 3.56	E 10.97	11.52	2.58
MSS	1356.00	2.75	123.00	1351.77	S 4.23	E 12.07	12.75	2.45
MSS	1387.00	3.50	127.00	1382.72	S 5.21	E 13.44	14.34	2.52
MSS	1417.00	4.50	127.00	1412.65	S 6.47	E 15.12	16.28	3.33
MSS	1447.00	5.00	124.00	1442.55	S 7.91	E 17.14	18.60	1.86
MSS	1479.00	5.75	119.00	1474.41	S 9.46	E 19.70	21.48	2.76
MSS	1509.00	6.50	117.00	1504.24	S 10.96	E 22.53	24.60	2.60
MSS	1541.00	6.75	108.00	1536.02	S 12.37	E 25.93	28.25	3.33
MSS	1604.00	8.00	101.00	1598.50	S 14.35	E 33.75	36.32	2.44
MSS	1635.00	8.75	100.00	1629.17	S 15.17	E 38.19	40.82	2.46
MSS	1719.00	9.50	107.00	1712.11	S 18.31	E 51.11	54.11	1.59
MSS	1781.00	9.75	101.00	1773.24	S 20.80	E 61.16	64.46	1.67
MSS	1874.00	9.25	102.00	1864.96	S 23.86	E 76.20	79.78	0.57
MSS	1925.00	10.00	105.00	1915.24	S 25.86	E 84.49	88.30	1.77
MSS	1986.00	11.25	104.00	1975.20	S 28.67	E 95.38	99.55	2.07
MSS	2121.00	11.75	107.00	2107.49	S 35.87	E 121.30	126.45	0.58
MSS	2241.00	11.25	109.00	2225.08	S 43.26	E 144.05	150.34	0.53
MSS	2369.00	11.50	111.00	2350.57	S 51.89	E 167.77	175.49	0.36
MSS	2493.00	11.00	110.00	2472.18	S 60.37	E 190.43	199.57	0.43
MSS	2615.00	11.50	111.00	2591.84	S 68.71	E 212.72	223.26	0.44