



# Directional Survey Report

Well ID: Sulphur Bank 34

Field: Geysers

**Calpine Corp**

Well Name: Sulphur Bank # 34

Sect: 12 Town: 11N Rng: 9W County: Sonoma State: CA

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Coordinates		Closure	Vertical Section	Dog Leg Severity
					N-S	E-W			
<b>Well Bore: Original Well Bore</b>				<b>Plane of Vertical Section: 24.82</b>					
MWD	125.0	0.88	191.09	125.0	-0.9	-0.2	1.0	-0.9	0.704
MWD	155.0	1.11	193.71	155.0	-1.5	-0.3	1.5	-1.4	0.781
MWD	281.0	1.11	200	281.0	-3.8	-1.0	3.9	-3.9	0.097
MWD	405.0	1.66	203.31	404.9	-6.6	-2.1	6.9	-6.8	0.448
MWD	672.0	3.50	214.01	671.6	-16.9	-8.2	18.8	-18.8	0.709
MWD	799.0	2.91	202.87	798.5	-23.1	-11.6	25.8	-25.8	0.673
MWD	862.0	1.80	193.89	861.4	-25.5	-12.5	28.4	-28.4	1.851
MWD	926.0	1.50	192.73	925.4	-27.3	-12.9	30.2	-30.2	0.472
MWD	989.0	1.21	195.99	988.4	-28.7	-13.3	31.6	-31.6	0.476
MWD	1,053.0	0.85	200.04	1,052.3	-29.8	-13.6	32.8	-32.8	0.574
MWD	1,148.0	0.80	260.29	1,147.3	-30.6	-14.5	33.9	-33.9	0.873
MWD	1,243.0	1.80	327.56	1,242.3	-29.4	-16.0	33.5	-33.4	1.751
MWD	1,274.0	1.97	349.33	1,273.3	-28.5	-16.3	32.9	-32.7	2.358
MWD	1,306.0	2.12	0.03	1,305.3	-27.4	-16.4	31.9	-31.8	1.280
MWD	1,338.0	2.60	7.72	1,337.2	-26.1	-16.3	30.8	-30.5	1.794
MWD	1,369.0	3.04	19.8	1,368.2	-24.6	-16.0	29.3	-29.0	2.378
MWD	1,401.0	3.65	23.51	1,400.2	-22.9	-15.3	27.5	-27.2	2.022
MWD	1,433.0	4.40	26.58	1,432.1	-20.8	-14.3	25.3	-24.9	2.438
MWD	1,465.0	5.22	29.96	1,464.0	-18.5	-13.0	22.6	-22.2	2.710
MWD	1,528.0	7.23	35.86	1,526.6	-12.8	-9.3	15.8	-15.5	3.344
MWD	1,560.0	8.33	36.01	1,558.3	-9.3	-6.8	11.5	-11.2	3.438
MWD	1,591.0	9.30	36.87	1,588.9	-5.5	-3.9	6.7	-6.6	3.158
MWD	1,623.0	9.66	36.47	1,620.5	-1.2	-0.8	1.5	-1.4	1.144
MWD	1,655.0	9.29	36.02	1,652.1	3.0	2.3	3.8	3.7	1.179
MWD	1,718.0	8.79	36.11	1,714.3	11.0	8.2	13.7	13.4	0.794
MWD	1,750.0	8.40	35.99	1,745.9	14.9	11.0	18.5	18.1	1.220
MWD	1,781.0	8.29	35.62	1,776.6	18.5	13.6	23.0	22.5	0.395
MWD	1,813.0	8.07	32.9	1,808.3	22.3	16.2	27.5	27.0	1.391
MWD	1,845.0	7.92	30.71	1,839.9	26.1	18.5	32.0	31.4	1.061
MWD	1,877.0	8.03	30.58	1,871.6	29.9	20.8	36.4	35.9	0.348
MWD	1,909.0	8.22	31.11	1,903.3	33.8	23.1	40.9	40.4	0.638
MWD	1,940.0	8.48	29.98	1,934.0	37.7	25.4	45.4	44.8	0.992
MWD	1,972.0	8.84	34.77	1,965.6	41.7	28.0	50.2	49.6	2.518
MWD	2,004.0	9.04	35.53	1,997.2	45.8	30.8	55.2	54.5	0.726
MWD	2,035.0	9.13	35.34	2,027.8	49.8	33.7	60.1	59.3	0.306
MWD	2,067.0	9.08	35.88	2,059.4	53.9	36.6	65.2	64.3	0.309
MWD	2,099.0	9.22	33.2	2,091.0	58.1	39.5	70.2	69.3	1.402
MWD	2,130.0	9.40	28.06	2,121.6	62.4	42.0	75.2	74.3	2.744
MWD	2,162.0	9.47	27.82	2,153.2	67.0	44.5	80.5	79.5	0.251
MWD	2,194.0	10.11	21	2,184.7	72.0	46.7	85.8	85.0	4.136
MWD	2,225.0	10.43	20.04	2,215.2	77.2	48.7	91.2	90.5	1.171
MWD	2,257.0	10.18	21.45	2,246.7	82.5	50.7	96.9	96.2	1.110
MWD	2,289.0	9.81	23.02	2,278.2	87.7	52.8	102.3	101.7	1.436
MWD	2,320.0	9.39	25.3	2,308.8	92.4	54.9	107.5	106.9	1.827



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Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Coordinates		Closure	Vertical Section	Dog Leg Severity
					N-S	E-W			
MSS	2,592.0	9.00	28.5	2,577.3	131.1	74.6	150.8	150.3	0.236
MSS	2,740.0	9.30	22.8	2,723.4	152.3	84.7	174.3	173.8	0.645
MSS	2,943.0	9.20	24.6	2,923.8	182.2	97.8	206.8	206.4	0.151
MSS	3,132.0	9.50	20	3,110.3	210.6	109.4	237.3	237.1	0.426
MSS	3,310.0	9.30	22.9	3,285.9	237.7	120.1	266.3	266.1	0.289
MSS	3,513.0	9.20	17.9	3,486.3	268.2	131.4	298.7	298.6	0.399
MSS	3,703.0	9.10	19.6	3,673.8	296.8	141.1	328.7	328.6	0.152
MSS	3,884.0	9.30	13.4	3,852.5	324.5	149.3	357.2	357.2	0.558
MSS	4,078.0	9.30	12.7	4,044.0	355.1	156.4	388.0	387.9	0.058
MSS	4,268.0	9.50	13.4	4,231.4	385.3	163.4	418.5	418.3	0.121
MSS	4,458.0	10.00	11.3	4,418.7	416.7	170.3	450.2	449.7	0.323
MSS	4,747.0	9.70	10.2	4,703.4	465.3	179.5	498.7	497.7	0.123
MSS	5,001.0	10.50	7.9	4,953.5	509.3	186.5	542.4	540.5	0.353
MSS	5,252.0	9.50	5	5,200.7	552.6	191.4	584.8	581.9	0.446
MSS	5,475.0	9.70	4.1	5,420.5	589.6	194.4	620.9	616.8	0.112
MSS	5,762.0	9.20	6.6	5,703.6	636.5	198.8	666.9	661.2	0.225
MSS	6,206.0	9.30	6.5	6,141.9	707.5	206.9	737.1	729.0	0.023
MSS	6,458.0	9.40	2.7	6,390.5	748.2	210.2	777.2	767.3	0.248
MSS	6,868.0	10.00	6.5	6,794.7	817.1	215.8	845.1	832.2	0.214
MSS	7,398.0	10.10	354.5	7,316.6	909.0	216.5	934.5	916.0	0.395
MSS	7,937.0	11.90	339.6	7,845.8	1,008.2	192.6	1,026.4	995.9	0.622
MSS	8,194.0	11.90	339	8,097.2	1,057.8	173.9	1,072.0	1,033.1	0.048
MSS	8,258.0	11.90	339	8,159.9	1,070.1	169.2	1,083.4	1,042.3	0.000

Calculations using Minimum Curvature Method