

Ground Loop Design

Borehole Design Project Report - 4/3/2015



Project Name: Geothermal Design	
Designer Name: Designer	
Date: 4/3/2015	Project Start Date: 4/3/2015
Client Name: Test Design	
Address Line 1:	
Address Line 2:	
City: Metropolis	Phone:
State: CA	Fax:
Zip: 12345	Email:

Monthly Inlet Temperature Results		
	Temp. (°F)	Month
Average Temperature		
Maximum Average Temperature	80.1	236
Minimum Average Temperature	34.2	2
Peak Temperature		
Maximum Peak Temperature	86.7	236
Minimum Peak Temperature	31.1	14

Time (Months)	Q (Btu/hr*ft)	Power (kW-hr)	TBorehole (°F)	Tf (°F)	ExWT (°F)	EWT (°F)	MinEWT (°F)	MaxEWT (°F)
1	9.76	8976.77	43.80	43.80	43.80	43.80	43.80	43.80
2	6.18	6666.20	35.21	32.91	31.59	34.22	34.22	34.22
3	2.37	4560.43	37.43	35.98	35.14	36.81	32.14	37.44
4	-0.97	2997.95	40.58	40.02	39.70	40.34	36.18	41.85
5	-8.39	4205.09	43.70	43.93	44.06	43.79	40.55	46.08
6	-14.57	6297.13	50.60	52.58	53.71	51.45	48.60	54.03
7	-20.29	8724.79	56.94	60.38	62.35	58.42	56.60	63.32
8	-16.72	7451.10	63.11	67.90	70.64	65.16	63.79	71.57
9	-11.26	5772.38	61.24	65.19	67.45	62.94	62.47	69.56
10	-1.92	3541.96	56.96	59.62	61.14	58.10	57.13	63.70
11	3.69	4401.52	48.69	49.14	49.40	48.88	47.13	55.25
12	7.28	7077.64	42.96	42.09	41.59	42.58	40.05	46.75
13	9.61	9409.19	38.86	37.14	36.16	38.12	34.71	40.72
14	6.19	6620.86	35.92	33.65	32.36	34.95	31.14	36.05
15	2.38	4538.90	38.12	36.66	35.83	37.50	32.81	38.13
16	-0.97	2993.17	41.25	40.69	40.37	41.01	36.84	42.52
17	-8.40	4219.60	44.33	44.56	44.69	44.42	41.17	46.72
18	-14.58	6327.36	51.19	53.17	54.30	52.04	49.19	54.62
19	-20.31	8769.91	57.49	60.94	62.90	58.97	57.15	63.88
20	-16.74	7489.26	63.63	68.42	71.16	65.68	64.31	72.09
21	-11.27	5795.48	61.73	65.68	67.94	63.42	62.95	70.05

22	-1.93	3544.68	57.41	60.07	61.60	58.55	57.58	64.15
23	3.69	4391.48	49.10	49.56	49.82	49.30	47.54	55.67
24	7.29	7056.59	43.34	42.47	41.97	42.97	40.43	47.14
25	9.62	9379.66	39.22	37.50	36.51	38.48	35.07	41.08
26	6.20	6600.42	36.26	33.99	32.69	35.29	31.46	36.39
27	2.38	4533.11	38.31	36.85	36.01	37.69	32.99	38.32
28	-0.97	2994.05	41.13	40.56	40.24	40.88	36.71	42.39
29	-8.40	4212.71	44.03	44.26	44.39	44.13	40.87	46.42
30	-14.57	6310.19	50.85	52.84	53.97	51.70	48.86	54.29
31	-20.30	8753.99	57.30	60.74	62.71	58.77	56.96	63.68
32	-16.74	7503.94	63.82	68.62	71.36	65.88	64.51	72.29
33	-11.29	5834.57	62.53	66.49	68.75	64.23	63.76	70.86
34	-1.93	3554.49	58.89	61.55	63.08	60.03	59.06	65.64
35	3.71	4346.02	51.05	51.51	51.77	51.25	49.49	57.64
36	7.33	6943.28	45.49	44.61	44.11	45.11	42.57	49.30
37	9.68	9217.34	41.26	39.53	38.54	40.52	37.09	43.12
38	6.24	6496.09	38.03	35.74	34.44	37.05	33.21	38.16
39	2.40	4486.85	39.87	38.40	37.56	39.24	34.52	39.87
40	-0.96	2984.10	42.66	42.09	41.77	42.41	38.22	43.93
41	-8.41	4247.94	45.52	45.75	45.88	45.62	42.35	47.92
42	-14.60	6386.50	52.32	54.31	55.44	53.17	50.32	55.76
43	-20.35	8873.70	58.74	62.19	64.16	60.22	58.39	65.13
44	-16.78	7608.71	65.22	70.02	72.77	67.28	65.90	73.70
45	-11.31	5900.53	63.86	67.82	70.09	65.56	65.09	72.21
46	-1.93	3563.95	60.16	62.83	64.36	61.30	60.33	66.92
47	3.72	4319.16	52.27	52.73	52.99	52.47	50.70	58.87
48	7.35	6883.11	46.69	45.81	45.31	46.31	43.76	50.50
49	9.71	9126.09	42.47	40.73	39.74	41.73	38.28	44.33
50	6.26	6426.60	39.27	36.97	35.66	38.28	34.43	39.39
51	2.41	4450.90	41.15	39.67	38.83	40.52	35.78	41.15
52	-0.96	2976.75	43.96	43.40	43.07	43.72	39.51	45.24
53	-8.42	4279.99	46.83	47.06	47.19	46.93	43.65	49.23
54	-14.63	6455.07	53.60	55.59	56.73	54.46	51.59	57.05
55	-20.38	8979.70	59.98	63.44	65.41	61.46	59.64	66.39
56	-16.82	7703.38	66.44	71.26	74.01	68.50	67.12	74.94
57	-11.34	5961.88	65.06	69.03	71.30	66.76	66.29	73.43
58	-1.94	3573.47	61.33	64.00	65.53	62.47	61.50	68.11
59	3.73	4295.31	53.40	53.86	54.12	53.60	51.83	60.01
60	7.37	6830.06	47.78	46.90	46.40	47.41	44.85	51.60
61	9.74	9048.53	43.53	41.79	40.80	42.79	39.34	45.40
62	6.29	6370.75	40.30	38.00	36.69	39.31	35.45	40.42
63	2.42	4423.65	42.17	40.68	39.84	41.53	36.78	42.17
64	-0.96	2971.81	44.97	44.40	44.07	44.72	40.50	46.24
65	-8.43	4305.18	47.82	48.05	48.18	47.92	44.63	50.22
66	-14.65	6509.00	54.59	56.58	57.72	55.44	52.57	58.03
67	-20.42	9064.94	60.96	64.42	66.40	62.44	60.61	67.38
68	-16.85	7780.41	67.42	72.24	74.99	69.48	68.10	75.93
69	-11.35	6012.18	66.02	70.00	72.28	67.73	67.26	74.41
70	-1.94	3581.71	62.27	64.95	66.48	63.42	62.44	69.06
71	3.73	4276.49	54.33	54.79	55.05	54.52	52.75	60.94
72	7.39	6786.19	48.72	47.83	47.33	48.34	45.78	52.54

73	9.76	8982.79	44.46	42.72	41.72	43.71	40.26	46.33
74	6.30	6323.02	41.21	38.90	37.59	40.22	36.34	41.33
75	2.43	4400.76	43.05	41.57	40.72	42.42	37.65	43.05
76	-0.96	2968.14	45.81	45.23	44.91	45.56	41.33	47.08
77	-8.44	4325.26	48.59	48.82	48.95	48.69	45.40	50.99
78	-14.66	6547.80	55.28	57.28	58.42	56.14	53.26	58.73
79	-20.44	9121.34	61.60	65.06	67.04	63.08	61.25	68.02
80	-16.86	7828.95	68.02	72.85	75.61	70.09	68.71	76.54
81	-11.37	6043.93	66.62	70.60	72.88	68.33	67.85	75.01
82	-1.94	3587.27	62.87	65.55	67.09	64.02	63.04	69.67
83	3.74	4264.47	54.93	55.39	55.65	55.13	53.36	61.56
84	7.40	6758.96	49.31	48.43	47.92	48.93	46.37	53.14
85	9.78	8942.71	45.04	43.29	42.29	44.29	40.83	46.91
86	6.31	6294.01	41.77	39.47	38.15	40.78	36.90	41.89
87	2.43	4386.70	43.61	42.12	41.27	42.97	38.20	43.61
88	-0.96	2965.93	46.36	45.79	45.46	46.12	41.88	47.64
89	-8.44	4339.91	49.15	49.37	49.50	49.24	45.94	51.55
90	-14.67	6578.89	55.84	57.83	58.97	56.69	53.81	59.29
91	-20.45	9170.60	62.15	65.62	67.60	63.64	61.80	68.58
92	-16.88	7873.68	68.57	73.40	76.16	70.64	69.26	77.10
93	-11.38	6073.35	67.17	71.15	73.43	68.88	68.40	75.57
94	-1.94	3592.39	63.41	66.09	67.63	64.56	63.58	70.21
95	3.74	4254.31	55.46	55.92	56.18	55.65	53.88	62.09
96	7.41	6735.79	49.82	48.94	48.43	49.44	46.88	53.65
97	9.79	8908.52	45.54	43.79	42.79	44.79	41.33	47.41
98	6.32	6269.24	42.27	39.95	38.63	41.27	37.39	42.38
99	2.44	4374.72	44.10	42.61	41.75	43.46	38.68	44.10
100	-0.96	2964.16	46.85	46.27	45.94	46.60	42.36	48.12
101	-8.45	4352.87	49.63	49.85	49.98	49.73	46.42	52.03
102	-14.68	6606.35	56.32	58.31	59.45	57.17	54.29	59.77
103	-20.47	9214.16	62.63	66.10	68.08	64.12	62.28	69.06
104	-16.90	7913.30	69.06	73.89	76.65	71.13	69.74	77.59
105	-11.39	6099.46	67.65	71.64	73.92	69.36	68.88	76.05
106	-1.94	3597.03	63.88	66.57	68.10	65.03	64.05	70.69
107	3.74	4245.54	55.92	56.38	56.64	56.11	54.34	62.55
108	7.42	6715.66	50.27	49.39	48.88	49.89	47.32	54.10
109	9.80	8878.78	45.98	44.23	43.23	45.23	41.76	47.85
110	6.33	6247.66	42.70	40.38	39.06	41.71	37.81	42.82
111	2.44	4364.32	44.53	43.04	42.18	43.89	39.10	44.53
112	-0.96	2962.69	47.28	46.70	46.37	47.03	42.78	48.55
113	-8.45	4364.51	50.06	50.28	50.41	50.15	46.85	52.46
114	-14.69	6630.98	56.75	58.74	59.88	57.60	54.71	60.20
115	-20.48	9253.23	63.06	66.53	68.51	64.55	62.71	69.49
116	-16.91	7947.31	69.47	74.30	77.07	71.54	70.15	78.01
117	-11.39	6112.75	67.89	71.88	74.16	69.60	69.12	76.30
118	-1.95	3598.35	64.01	66.70	68.24	65.16	64.18	70.82
119	3.75	4243.82	56.01	56.47	56.73	56.21	54.43	62.65
120	7.42	6710.32	50.39	49.51	49.00	50.01	47.44	54.23
121	9.81	8860.22	46.26	44.51	43.51	45.51	42.04	48.13
122	6.34	6221.13	43.24	40.92	39.60	42.25	38.35	43.36
123	2.45	4343.49	45.42	43.92	43.06	44.77	39.98	45.41

124	-0.96	2959.24	48.44	47.86	47.53	48.19	43.93	49.72
125	-8.46	4401.83	51.40	51.62	51.75	51.49	48.18	53.80
126	-14.72	6710.88	58.11	60.11	61.25	58.97	56.07	61.57
127	-20.53	9373.31	64.36	67.83	69.82	65.85	64.00	70.80
128	-16.95	8046.98	70.65	75.50	78.27	72.73	71.34	79.21
129	-11.42	6178.35	69.06	73.07	75.35	70.78	70.30	77.49
130	-1.95	3610.37	65.17	67.86	69.40	66.32	65.34	71.99
131	3.75	4222.95	57.14	57.60	57.86	57.34	55.56	63.79
132	7.43	6662.12	51.50	50.61	50.11	51.12	48.55	55.34
133	9.83	8789.15	47.35	45.60	44.59	46.60	43.12	49.22
134	6.36	6169.92	44.31	41.99	40.66	43.32	39.41	44.43
135	2.46	4319.35	46.48	44.98	44.12	45.84	41.03	46.48
136	-0.95	2956.74	49.51	48.93	48.60	49.26	44.99	50.78
137	-8.48	4432.47	52.46	52.69	52.81	52.56	49.23	54.87
138	-14.74	6774.99	59.18	61.18	62.32	60.03	57.13	62.64
139	-20.56	9474.96	65.43	68.91	70.90	66.92	65.07	71.88
140	-16.98	8139.63	71.73	76.59	79.36	73.81	72.42	80.30
141	-11.44	6239.53	70.13	74.14	76.44	71.85	71.38	78.58
142	-1.95	3622.00	66.22	68.92	70.47	67.38	66.40	73.06
143	3.76	4204.68	58.17	58.63	58.89	58.37	56.59	64.83
144	7.45	6619.46	52.51	51.62	51.12	52.13	49.55	56.36
145	9.86	8726.20	48.35	46.59	45.58	47.59	44.11	50.22
146	6.37	6124.57	45.29	42.96	41.63	44.29	40.38	45.41
147	2.47	4298.18	47.46	45.95	45.09	46.81	41.99	47.45
148	-0.95	2954.99	50.48	49.90	49.57	50.23	45.95	51.76
149	-8.49	4461.24	53.43	53.66	53.79	53.53	50.20	55.85
150	-14.77	6834.90	60.15	62.16	63.30	61.01	58.11	63.63
151	-20.60	9569.97	66.41	69.90	71.89	67.90	66.06	72.88
152	-17.01	8226.36	72.72	77.58	80.36	74.80	73.41	81.31
153	-11.46	6296.92	71.12	75.13	77.43	72.84	72.36	79.58
154	-1.96	3633.25	67.19	69.90	71.44	68.35	67.37	74.04
155	3.77	4188.49	59.12	59.58	59.84	59.32	57.53	65.79
156	7.46	6581.30	53.44	52.55	52.05	53.06	50.48	57.29
157	9.88	8669.79	49.26	47.50	46.49	48.51	45.02	51.14
158	6.39	6083.94	46.19	43.86	42.53	45.19	41.27	46.31
159	2.47	4279.39	48.36	46.85	45.99	47.71	42.88	48.35
160	-0.95	2953.82	51.38	50.80	50.46	51.13	46.84	52.66
161	-8.50	4488.44	54.33	54.56	54.69	54.43	51.09	56.75
162	-14.79	6891.29	61.06	63.06	64.21	61.92	59.01	64.53
163	-20.63	9659.42	67.32	70.81	72.80	68.81	66.96	73.79
164	-17.05	8308.17	73.63	78.50	81.29	75.72	74.33	82.23
165	-11.48	6351.17	72.03	76.05	78.35	73.75	73.27	80.51
166	-1.96	3644.17	68.09	70.80	72.35	69.25	68.26	74.95
167	3.77	4173.99	59.99	60.46	60.72	60.19	58.41	66.68
168	7.48	6546.80	54.31	53.42	52.91	53.93	51.34	58.16
169	9.90	8618.75	50.11	48.35	47.34	49.36	45.86	51.99
170	6.40	6047.19	47.03	44.69	43.36	46.03	42.10	47.15
171	2.48	4262.55	49.19	47.68	46.82	48.55	43.71	49.19
172	-0.95	2953.11	52.22	51.63	51.30	51.97	47.67	53.50
173	-8.51	4514.29	55.17	55.39	55.52	55.27	51.92	57.59
174	-14.81	6944.68	61.90	63.91	65.05	62.76	59.84	65.38

175	-20.66	9744.12	68.16	71.66	73.66	69.66	67.81	74.65
176	-17.07	8385.73	74.48	79.36	82.15	76.58	75.18	83.10
177	-11.50	6402.69	72.87	76.91	79.21	74.60	74.12	81.37
178	-1.97	3654.77	68.92	71.64	73.19	70.09	69.10	75.80
179	3.78	4160.91	60.81	61.28	61.54	61.01	59.22	67.51
180	7.49	6515.38	55.11	54.22	53.71	54.73	52.14	58.97
181	9.91	8572.22	50.91	49.14	48.13	50.15	46.65	52.78
182	6.42	6013.70	47.81	45.47	44.13	46.81	42.87	47.93
183	2.48	4247.34	49.97	48.46	47.59	49.33	44.48	49.97
184	-0.95	2952.78	53.00	52.41	52.08	52.75	48.44	54.28
185	-8.51	4538.93	55.95	56.18	56.30	56.05	52.70	58.37
186	-14.82	6995.41	62.68	64.69	65.84	63.54	60.62	66.16
187	-20.69	9824.62	68.95	72.45	74.45	70.45	68.60	75.44
188	-17.10	8459.55	75.28	80.17	82.96	77.37	75.98	83.91
189	-11.52	6451.80	73.67	77.70	80.01	75.40	74.92	82.17
190	-1.97	3665.08	69.70	72.43	73.98	70.87	69.88	76.59
191	3.78	4149.00	61.58	62.05	62.31	61.78	59.99	68.28
192	7.50	6486.47	55.87	54.98	54.47	55.49	52.89	59.73
193	9.93	8529.33	51.65	49.88	48.87	50.90	47.39	53.53
194	6.43	5982.84	48.55	46.21	44.87	47.55	43.60	48.66
195	2.49	4233.48	50.71	49.19	48.32	50.06	45.20	50.70
196	-0.95	2952.75	53.73	53.14	52.81	53.48	49.17	55.01
197	-8.52	4562.35	56.68	56.91	57.03	56.78	53.42	59.10
198	-14.84	7043.23	63.41	65.42	66.57	64.27	61.35	66.90
199	-20.72	9900.23	69.68	73.19	75.19	71.18	69.33	76.18
200	-17.13	8528.86	76.02	80.91	83.71	78.11	76.72	84.65
201	-11.54	6497.99	74.40	78.45	80.76	76.13	75.66	82.92
202	-1.97	3674.96	70.43	73.16	74.71	71.60	70.61	77.33
203	3.79	4138.28	62.29	62.76	63.02	62.49	60.70	69.00
204	7.51	6460.27	56.57	55.68	55.16	56.19	53.59	60.44
205	9.94	8490.47	52.35	50.57	49.56	51.59	48.07	54.22
206	6.44	5954.89	49.23	46.88	45.54	48.23	44.28	49.35
207	2.49	4221.02	51.39	49.87	49.00	50.74	45.87	51.38
208	-0.95	2952.97	54.41	53.82	53.49	54.16	49.84	55.69
209	-8.53	4584.63	57.36	57.59	57.72	57.46	54.10	59.79
210	-14.86	7088.82	64.10	66.11	67.26	64.96	62.03	67.59
211	-20.75	9972.62	70.37	73.88	75.89	71.88	70.02	76.88
212	-17.15	8595.40	76.71	81.61	84.41	78.81	77.41	85.36
213	-11.55	6542.38	75.09	79.15	81.46	76.83	76.35	83.63
214	-1.98	3684.59	71.12	73.84	75.40	72.29	71.30	78.02
215	3.79	4128.44	62.96	63.43	63.70	63.16	61.37	69.68
216	7.52	6436.00	57.23	56.34	55.82	56.85	54.25	61.10
217	9.95	8454.43	53.00	51.22	50.21	52.24	48.72	54.88
218	6.45	5928.99	49.88	47.53	46.18	48.87	44.92	49.99
219	2.50	4209.58	52.03	50.51	49.64	51.38	46.51	52.02
220	-0.95	2953.39	55.06	54.47	54.13	54.80	50.48	56.34
221	-8.54	4606.02	58.01	58.23	58.36	58.10	54.74	60.43
222	-14.87	7132.53	64.74	66.76	67.91	65.61	62.68	68.24
223	-20.77	10042.03	71.03	74.54	76.54	72.53	70.67	77.54
224	-17.18	8659.28	77.37	82.28	85.08	79.48	78.07	86.03
225	-11.57	6585.03	75.75	79.81	82.13	77.49	77.01	84.30

226	-1.98	3693.97	71.77	74.50	76.06	72.94	71.95	78.68
227	3.79	4119.35	63.60	64.07	64.34	63.80	62.01	70.33
228	7.53	6413.42	57.86	56.96	56.45	57.47	54.87	61.73
229	9.97	8420.88	53.62	51.84	50.82	52.85	49.33	55.50
230	6.45	5904.89	50.49	48.13	46.79	49.48	45.52	50.60
231	2.50	4199.01	52.64	51.12	50.25	51.99	47.11	52.63
232	-0.95	2953.98	55.67	55.08	54.74	55.41	51.08	56.95
233	-8.55	4626.63	58.62	58.84	58.97	58.71	55.35	61.05
234	-14.89	7174.51	65.36	67.38	68.53	66.22	63.29	68.85
235	-20.80	10108.74	71.64	75.16	77.17	73.15	71.29	78.16
236	-17.20	8720.75	78.00	82.91	85.72	80.10	78.70	86.67
237	-11.59	6626.12	76.38	80.44	82.76	78.12	77.64	84.93
238	-1.98	3703.11	72.38	75.12	76.68	73.55	72.57	79.31
239	3.80	4110.93	64.20	64.67	64.94	64.41	62.61	70.94
240	7.53	6392.32	58.45	57.56	57.04	58.07	55.47	62.33