

## **APPENDIX L**



## Monitoring Well Development Log

Date Started (mo/day/yr)	<u>7/27/2007</u>	Date Completed (mo/day/yr)	<u>7/27/2007</u>
Field Personnel	<u>[REDACTED]</u>		
Site Name	<u>Guterl Steel</u>		
Earth Tech Job #	<u>100657</u>		
Well ID #	<u>600D</u>		
Investigative Area	<u>BKG (A05B)</u>		
Weather Conditions	<u>overcast, showers</u>		
Air Temperature	<u>65-70</u>	°F	

Total Well Depth (TWD) =	<u>24.79</u>	1/100 ft
Depth to Ground Water (DGW) =	<u>10.83</u>	1/100 ft
Length of Water Column (LWC) = TWD - DGW =	<u>13.96</u>	1/100 ft
1 Casing Volume (OCV) = LWC x <u>0.163</u> =	<u>2.28</u>	gallons
5 Casing Volumes =	<u>11.38</u>	gallons
Method of Well Development	<u>purge/surge with electric submersible pump</u>	
Total Volume of Water Removed	<u>50</u>	gallons

Date/Time	Discharge Rate (gpm)	Volume Purged (gallons)	Water Temperature (°C)	DO (%)	pH	ORP (mV)	Specific Conductivity (µmhos/cm)	Turbidity (NTU)/Color	Water Level (ft BTIC)	Remarks
9:00	-	-	-	-	-	-	-	-	10.83	
9:10	1	10	11.46	0.90	7.47	27.1	7.927	1230 / lt. gray	13.71	
9:15	1	15	11.55	0.41	7.51	1.6	8.031	256 / lt. gray	13.45	
9:20	1	20	11.42	2.15	7.43	-13.5	8.380	743 / lt. gray	13.49	
9:25	1	25	11.39	1.92	7.42	-21.5	8.450	180 / lt. gray	13.56	
9:30	1	30	11.45	0.79	7.37	-25.9	8.579	541 / lt. gray	13.63	
9:35	1	35	11.44	0.47	7.35	-30.0	8.574	211 / lt. gray	13.69	
9:40	1	40	11.43	0.36	7.32	-32.0	8.597	130 / lt. gray-clear	13.70	
9:45	1	45	11.42	0.34	7.3	-33.8	8.619	60 / clear	13.75	
9:50	1	50	11.43	0.30	7.29	-35.5	8.642	35 / clear	13.75	

COMMENTS/OBSERVATIONS: At 9:30, after recording parameters move pump to center of screen.

## Monitoring Well Development Log

Date Started (mo/day/yr)	<u>7/26/2007</u>	Date Completed (mo/day/yr)	<u>7/26/2007</u>
Field Personnel	<u>[REDACTED]</u>		
Site Name	<u>Guterl Steel</u>		
Earth Tech Job #	<u>100657</u>		
Well ID #	<u>601D</u>		
Investigative Area	<u>A04A</u>		
Weather Conditions	<u>sunny, breezy</u>		
Air Temperature	<u>85-90</u>	°F	

Total Well Depth (TWD) =	<u>22.58</u>	1/100 ft
Depth to Ground Water (DGW) =	<u>10.7</u>	1/100 ft
Length of Water Column (LWC) = TWD - DGW =	<u>11.88</u>	1/100 ft
1 Casing Volume (OCV) = LWC x <u>0.163</u> =	<u>1.94</u>	gallons
5 Casing Volumes =	<u>9.68</u>	gallons
Method of Well Development	<u>purge/surge with electric submersible pump</u>	
Total Volume of Water Removed	<u>50</u>	gallons

Date/Time	Discharge Rate (gpm)	Volume Purged (gallons)	Water Temperature (°C)	DO (%)	pH	ORP (mV)	Specific Conductivity (µmhos/cm)	Turbidity (NTU)/Color	Water Level (ft BTIC)	Remarks
13:45	-	-	-	-	-	-	-	-	10.70	
13:55	1	10	14.36	1.05	7.67	-51.0	1.267	1125 / gray	11.89	
14:00	1	15	14.26	0.12	8.00	-71.5	1.243	342 / lt. gray	11.70	
14:05	1	20	14.34	0.08	8.01	-76.3	1.260	365 / lt. gray	11.72	
14:10	1	25	14.58	0.07	7.33	-65.4	1.199	481 / lt. gray	11.75	
14:15	1	30	14.51	0.06	7.65	-89.2	1.218	58 / lt. gray	11.82	
14:20	1	35	14.47	0.07	7.78	-96.6	1.220	38 / lt. gray	11.92	
14:25	1	40	14.51	0.05	7.63	-80.0	1.224	30 / clear	11.89	
14:30	1	45	14.54	0.05	7.60	-82.9	1.236	18 / clear	11.88	
14:35	1	50	14.51	0.05	7.54	-81.0	1.236	18 / clear	11.89	

**COMMENTS/OBSERVATIONS:** At 14:15, done with surge and move pump to center of screen. Air bubbles are noted in the tubing (no explanation); pump is well below water level.

## Monitoring Well Development Log

Date Started (mo/day/yr)	<u>7/26/2007</u>	Date Completed (mo/day/yr)	<u>7/26/2007</u>
Field Personnel	<u>[REDACTED]</u>		
Site Name	<u>Guterl Steel</u>		
Earth Tech Job #	<u>100657</u>		
Well ID #	<u>602D</u>		
Investigative Area	<u>A04A</u>		
Weather Conditions	<u>sunny, breezy</u>		
Air Temperature	<u>85-90</u>	°F	

Total Well Depth (TWD) =	<u>22.10</u>	1/100 ft
Depth to Ground Water (DGW) =	<u>9.97</u>	1/100 ft
Length of Water Column (LWC) = TWD - DGW =	<u>12.13</u>	1/100 ft
1 Casing Volume (OCV) = LWC x <u>0.163</u> =	<u>1.98</u>	gallons
5 Casing Volumes =	<u>9.89</u>	gallons
Method of Well Development	<u>purge/surge with electric submersible pump</u>	
Total Volume of Water Removed	<u>50</u>	gallons

Date/Time	Discharge Rate (gpm)	Volume Purged (gallons)	Water Temperature (°C)	DO (%)	pH	ORP (mV)	Specific Conductivity (µmhos/cm)	Turbidity (NTU)/Color	Water Level (ft BTIC)	Remarks
14:55	-	-	-	-	-	-	-	-	9.97	
15:05	1	10	13.13	0.47	7.36	-45.0	1.683	844 / gray	13.14	
15:10	1	15	13.31	0.25	7.13	-50.1	1.727	145 / lt. gray	12.40	
15:15	1	20	13.23	0.27	7.11	-64.8	1.774	762 / lt. gray	12.59	
15:20	1	25	13.57	1.13	7.19	-75.7	1.716	1175 / lt. gray	12.14	
15:25	1	30	13.42	0.40	7.05	-78.6	1.706	392 / lt. gray	12.54	
15:30	1	35	13.38	0.26	7.04	-79.5	1.725	104 / lt. gray	12.55	
15:35	1	40	13.48	0.16	7.06	-78.2	1.731	30 / clear	12.55	
15:40	1	45	13.49	0.17	7.02	-80.2	1.728	20 / clear	12.55	
15:45	1	50	13.47	0.16	7.19	-86.2	1.731	18 / clear	12.55	

COMMENTS/OBSERVATIONS: At 15:20 after taking readings, stop surging and place pump at center of screen.

## Monitoring Well Development Log

Date Started (mo/day/yr)	<u>7/27/2007</u>	Date Completed (mo/day/yr)	<u>7/27/2007</u>
Field Personnel	<u>[REDACTED]</u>		
Site Name	<u>Guterl Steel</u>		
Earth Tech Job #	<u>100657</u>		
Well ID #	<u>603D</u>		
Investigative Area	<u>A04A</u>		
Weather Conditions	<u>humid cloudy + rain showers</u>		
Air Temperature	<u>70-75</u>		°F

Total Well Depth (TWD) =	<u>22.65*</u>	1/100 ft
Depth to Ground Water (DGW) =	<u>7.30</u>	1/100 ft
Length of Water Column (LWC) = TWD - DGW =	<u>15.35**</u>	1/100 ft
1 Casing Volume (OCV) = LWC x <u>0.163</u> =	<u>2.50</u>	gallons
5 Casing Volumes =	<u>12.51</u>	gallons
Method of Well Development	<u>purge/surge with electric submersible pump</u>	
Total Volume of Water Removed	<u>45</u>	gallons

Date/Time	Discharge Rate (gpm)	Volume Purged (gallons)	Water Temperature (°C)	DO (%)	pH	ORP (mV)	Specific Conductivity (µmhos/cm)	Turbidity (NTU)/Color	Water Level (ft BTIC)	Remarks
10:30	-	-	-	-	-	-	-	-	7.30	
10:40	stop pump and let recharge, surge while recharging									
10:45	start pump and surge									
10:50	stop pump and let recharge - hook up to YSI									
11:00	start pump and surge									
11:02	1	15	12.36	3.35	7.27	22.0	1.390	864 / gray	11.95	
11:07	1	20	11.74	2.32	7.16	18.2	1.409	663 / gray	14.90	
11:12	1	25	12.14	2.15	7.19	16.0	1.383	364 / gray	16.41	
11:17	1	30	12.2	1.70	7.15	6.1	1.268	1156 / gray	17.61	
11:22	1	35	11.95	1.09	7.06	-11.7	1.328	109 / gray	18.02	
11:27	1	40	11.96	1.01	7.06	-17.6	1.323	54 / clear	17.91	
11:32	1	45	11.96	1.01	7.05	-19.0	1.325	49 / clear	-	

**COMMENTS/OBSERVATIONS:** At 11:17, stopped surge and set pump at center of screen. \* The Total Well Depth was 22.20 ft at the start of well development. The Total Well Depth at the end of well development was 22.65. \*\*The ending TWD is used in calculating length of water column.

## Monitoring Well Development Log

Date Started (mo/day/yr)	<u>7/25/2007</u>	Date Completed (mo/day/yr)	<u>7/25/2007</u>
Field Personnel	<u>[REDACTED]</u>		
Site Name	<u>Guterl Steel</u>		
Earth Tech Job #	<u>100657</u>		
Well ID #	<u>604D</u>		
Investigative Area	<u>A04D</u>		
Weather Conditions	<u>partly cloudy and windy</u>		
Air Temperature	<u>75-80</u>	°F	

Total Well Depth (TWD) =	<u>18.08</u>	1/100 ft
Depth to Ground Water (DGW) =	<u>5.92</u>	1/100 ft
Length of Water Column (LWC) = TWD - DGW =	<u>12.16</u>	1/100 ft
1 Casing Volume (OCV) = LWC x <u>0.163</u> =	<u>1.98</u>	gallons
5 Casing Volumes =	<u>9.91</u>	gallons
Method of Well Development	<u>purge/surge with electric submersible pump</u>	
Total Volume of Water Removed	<u>100</u>	gallons

Date/Time	Discharge Rate (gpm)	Volume Purged (gallons)	Water Temperature (°C)	DO (%)	pH	ORP (mV)	Specific Conductivity (µmhos/cm)	Turbidity (NTU)/Color	Water Level (ft BTIC)	Remarks
14:36	<1	20	14.16	0.94	7.58	128.0	1.691	1161 / gray	9.52	
14:46	<1	30	14.39	1.59	7.34	86.0	1.688	640 / gray	9.72	
14:56	<1	40	14.38	1.78	7.09	81.0	1.668	227 / gray	9.72	
15:01	<1	45	14.48	1.17	7.09	82.4	1.659	92 / gray	9.74	
15:06	<1	50	14.4	0.75	7.27	88.7	1.651	100 / gray	9.78	
15:13	<1	55	14.28	0.54	7.34	89.0	1.645	75 / gray	9.78	
15:20	<1	60	14.4	0.44	7.48	94.5	1.637	44 / clear	9.78	
15:27	>1	65	14.38	0.35	7.66	78.1	1.627	58 / clear	9.78	*start truck
15:36	>1	75	14.3	0.35	7.32	87.1	1.612	298 / gray	10.72	
15:45	>1	85	14.29	0.20	7.19	66.4	1.616	249 / gray	10.75	
15:54	>1	95	14.26	0.18	7.18	48.3	1.604	205 / clear	10.68	
15:59	>1	100	14.32	0.20	7.22	48.9	1.599	117 / clear	10.73	

COMMENTS/OBSERVATIONS: \* At 15:27, started truck which caused the pump to pump faster.

## Monitoring Well Development Log

Date Started (mo/day/yr)	<u>7/19/2007</u>	Date Completed (mo/day/yr)	<u>7/19/2007</u>
Field Personnel	<u>[REDACTED]</u>		
Site Name	<u>Guterl Steel</u>		
Earth Tech Job #	<u>100657</u>		
Well ID #	<u>605D</u>		
Investigative Area	<u>A04B</u>		
Weather Conditions	<u>muggy and cloudy</u>		
Air Temperature	<u>75</u>	°F	

Total Well Depth (TWD) =	<u>18.5</u>	1/100 ft
Depth to Ground Water (DGW) =	<u>3.8</u>	1/100 ft
Length of Water Column (LWC) = TWD - DGW =	<u>14.7</u>	1/100 ft
1 Casing Volume (OCV) = LWC x <u>0.163</u> =	<u>2.40</u>	gallons
5 Casing Volumes =	<u>11.98</u>	gallons
Method of Well Development	<u>surge with surge block;</u>	
	<u>purge with electric submersible pump</u>	
Total Volume of Water Removed	<u>55</u>	gallons

Date/Time	Discharge Rate (gpm)	Volume Purged (gallons)	Water Temperature (°C)	DO (%)	pH	ORP (mV)	Specific Conductivity (µmhos/cm)	Turbidity (NTU)/Color	Water Level (ft BTIC)	Remarks
14:30	1	2	16.80	-	7.74	-	0.957	5.46	-	
14:48	1	9.5	17.90	1.43	7.75	-34.3	0.890	gray-cloudy	-	
15:02	1	14.5	16.08	3.19	7.56	-44.4	0.851	964 / gray-turbid	-	
15:07	1	19.5	16.28	1.21	7.46	-34.0	0.832	137 / gray-clearing	5.00	
15:11	1	24.5	15.72	0.78	7.35	-22.1	0.840	>1000 / gray	4.93	
15:20	1	35	15.46	0.01	7.27	-13.4	0.834	>1000 / gray	4.95	
15:25	1	40	16.87	0.51	7.29	-2.7	0.789	866 / gray	4.95	
15:30	1	45	16.57	0.61	7.31	29.0	0.800	93 / lt. gray	5.02	
15:35	1	50	16.41	0.48	7.12	41.4	0.803	39.1 / clear	5.02	
15:40	1	55	16.38	0.50	7.09	45.0	0.806	28.0 / clear	5.02	

**COMMENTS/OBSERVATIONS:** Used surge block, purged (raising and lowering pump during purging). Water clears if pump sits in place and is not surged. At 15:30 moved pump to middle of screen.

## Monitoring Well Development Log

Date Started (mo/day/yr)	<u>7/26/2007</u>	Date Completed (mo/day/yr)	<u>7/26/2007</u>
Field Personnel	<u>[REDACTED]</u>		
Site Name	<u>Guterl Steel</u>		
Earth Tech Job #	<u>100657</u>		
Well ID #	<u>606D</u>		
Investigative Area	<u>A03</u>		
Weather Conditions	<u>sunny, lt. breeze</u>		
Air Temperature	<u>75-80</u>	°F	

Total Well Depth (TWD) =	<u>22.6</u>	1/100 ft
Depth to Ground Water (DGW) =	<u>7.81</u>	1/100 ft
Length of Water Column (LWC) = TWD - DGW =	<u>14.79</u>	1/100 ft
1 Casing Volume (OCV) = LWC x <u>0.163</u> =	<u>2.41</u>	gallons
5 Casing Volumes =	<u>12.05</u>	gallons
Method of Well Development	<u>purge/surge with electric submersible pump</u>	
Total Volume of Water Removed	<u>50</u>	gallons

Date/Time	Discharge Rate (gpm)	Volume Purged (gallons)	Water Temperature (°C)	DO (%)	pH	ORP (mV)	Specific Conductivity (µmhos/cm)	Turbidity (NTU)/Color	Water Level (ft BTIC)	Remarks
10:20	-	-	-	-	-	-	-	-	7.81	
10:30	1	10	13.72	2.86	7.73	-75.2	1.399	655 / brown	10.36	hook up YSI
10:35	1	15	13.37	2.69	7.35	-83.0	1.390	435 / brown	10.38	
10:40	1	20	14.14	2.77	7.4	-86.4	1.450	1075 / brown	10.29	
10:45	1	25	13.54	2.69	7.38	-102.7	1.512	1094 / brown	10.46	
10:50	1	30	13.73	0.97	7.35	-108.1	1.538	360 / brown	10.52	
10:55	1	35	13.72	0.59	7.36	-114.5	1.554	275 / lt. brown-gray	10.55	
11:00	1	40	13.73	0.34	7.35	-119.1	1.569	244 / lt. brown-gray	10.56	
11:05	1	45	13.7	0.18	7.41	-129.3	1.589	177 / lt. brown-gray	10.58	
11:10	1	50	13.7	0.07	7.33	-133.7	1.605	139 / lt. brown-gray	10.60	

COMMENTS/OBSERVATIONS: At 10:45 after readings, place pump at center of screen.



## Monitoring Well Development Log

Date Started (mo/day/yr)	<u>7/26/2007</u>	Date Completed (mo/day/yr)	<u>7/26/2007</u>
Field Personnel	<u>[REDACTED]</u>		
Site Name	<u>Guterl Steel</u>		
Earth Tech Job #	<u>100657</u>		
Well ID #	<u>607D</u>		
Investigative Area	<u>A03</u>		
Weather Conditions	<u>sunny, breezy</u>		
Air Temperature	<u>70-80</u>		<u>°F</u>

Total Well Depth (TWD) =	<u>19.78</u>	<u>1/100</u> ft
Depth to Ground Water (DGW) =	<u>8.03</u>	<u>1/100</u> ft
Length of Water Column (LWC) = TWD - DGW =	<u>11.75</u>	<u>1/100</u> ft
1 Casing Volume (OCV) = LWC x <u>0.163</u> =	<u>1.92</u>	gallons
5 Casing Volumes =	<u>9.58</u>	gallons
Method of Well Development	<u>purge/surge with electric submersible pump</u>	
Total Volume of Water Removed	<u>50</u>	gallons

Date/Time	Discharge Rate (gpm)	Volume Purged (gallons)	Water Temperature (°C)	DO (%)	pH	ORP (mV)	Specific Conductivity (µmhos/cm)	Turbidity (NTU)/Color	Water Level (ft BTIC)	Remarks
9:04	-	-	-	-	-	-	-	-	8.03	
9:14	1	10	12.8	0.33	7.68	-160.4	1.289	1160 / gray	12.86	hook up YSI
9:19	1	15	13.48	0.26	7.64	-167.1	1.284	606 / gray	12.52	
9:24	1	20	13.43	0.21	7.55	-169.3	1.286	300 / gray	12.29	
9:29	1	25	13.40	0.19	7.48	-170.8	1.290	200 / gray	12.29	
9:34	1	30	13.39	0.19	7.4	-172.9	1.293	126 / lt. gray	12.31	
9:39	1	35	13.39	0.23	7.38	-176.1	1.295	88 / lt. gray	12.36	
9:44	1	40	13.39	0.28	7.34	-178.1	1.298	72 / lt. gray	12.34	
9:49	1	45	13.37	0.25	7.32	-180.6	1.300	67 / lt. gray	12.36	
9:54	1	50	13.37	0.24	7.31	-183.2	1.303	49 / lt. gray	12.38	

**COMMENTS/OBSERVATIONS:** At 9:14 noted sulfur smell. At 9:19 after readings set pump in the center of the screen. Background 30 cpm. Well surged on 7/20/07, surged for 15 gallons on 7/26/07 then placed pump in center of screen. \*Surge block (2 in. diameter PVC, 6 in. in length) stuck in the bottom of this well.