APPENDIX C

WELL DEVELOPMENT LOGS

Groundwater Well Development Log

Fort McClellan , Alabama

Project Number: 796887
Form Completed by: N. Badon
Well Developed by (person/firm): N. Badon/FT corporation

Parcel No.: 237Q-X
Well No.: MW01 (HR-237Q-MW01)
Date started: 7/1/01

Monitoring Well Information

Development Method: ~~Whale pump~~ Surge/Purge
Development Equipment: Whale Pump, poly tubing

Casing Diameter: 2"

Beginning Measurments
Depth to Water (ft): 11.4' TOC
Total depth of Well (ft): 27.85' TOC

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date) (Purge Rate, Pump Position, Misc.)
15:15	—	11.4	6.84	0.379	+999	3.52	21.6	brown	Top of Pump is at 25.55' ~~from~~ 1' from bottom purge rate 0.25 gpm
15:30	3.75	12.3	6.59	0.293	+999	6.52	23.0	brownish	
15:45	7.5	12.3	6.97	0.317	+999	4.51	20.7	brown	raw pump up and down screen, pump 1' ~~off~~ bottom purge rate = 0.5 gpm
16:00	15	13.52	6.82	0.178	669	8.40	20.0	light brown	
16:15	22.5	13.7	6.72	0.158	250	7.93	20.0	light brown	moved pump to 3' ~~off~~ bottom
16:30	30	13.72	6.48	0.141	191	8.27	18.8	light brown	
16:45	37.5	13.75	6.45	0.135	93	9.00	18.9	cloudy	

TD - DTW = WC x 2'/4' well = One PV x 5 = Min PV + H20 to install well = Minimum H20 to remove

27.85' - 11.4' = 16.45' x 0.163 gal/ft = 2.7 gal x 5 = 13.4 gal + 40 gal = 53.4 gal

QC'd by 07/12/01

Parcel No.: 237QX
Well ID: HR-237Q-MW01
Date: 7/2/01

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments
10:10	37.5	11.47	6.51	0.209	1034	7.34	21.6	light brown	7/2/01, pump 3' off bottom purge rate = 0.25gpm
10:15	41.25	12.25	6.81	0.204	505	7.57	21.5	light brown	
10:30	45	11.9	6.77	0.185	195	7.88	24.9	cloudy brownish	Moved pump to 6' off bottom
10:45	48.75	12.1	6.63	0.171	131	7.78	22.0	cloudy brown	
11:00	52.5	12.37	6.61	0.153	85	8.77	20.6	cloudy	
11:15	56.25	12.15	6.44	0.158	90	7.03	22.5	cloudy	Slowed purge rate to 0.25gpm 4.5min after taking readings
11:30	57.15	11.75	6.64	0.172	70	7.67	28.3	cloudy	
11:45	58.05	11.7	6.62	0.167	59	6.74	28.4	cloudy	stopped pumping, have to leave site
14:15	59.18	11.75	6.80	0.149	91	5.78	29.7	cloudy	
14:30	60.0	11.73	6.14	0.145	48	5.29	30.5	cloudy	
14:45	60.825	11.65	6.15	0.119	42	6.22	31.2	sl. cloudy	Moved pump to 9' off bottom
15:00	61.65	11.65	6.02	0.117	48	5.90	32.4	sl. cloudy	
15:15	62.48	11.70	6.29	0.123	38	5.38	33.0	sl. cloudy	

Parcel No.: 237QY
Well ID: HR-237QX-MW01
Date: 7/2/01

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments
15:30	63.31	11.65	6.43	0.130	24	5.46	33.3	sl. Cloudy	
15:45	64.14	11.61	6.43	0.133	27	5.29	33.2	sl. Cloudy	
16:00	64.97	11.75	6.43	0.131	19	5.98	28.8	clear	Moved pump to 12' off well bottom
16:15	65.80	11.75	6.11	0.120	58	5.82	28.8	cloudy	
16:30	66.63	11.75	6.13	0.131	23	5.88	27.2	Clear	
16:45	67.46	11.75	6.03	0.129	22	5.86	24.5	Clear	Turn pump off End of Day
08:30	67.46	11.75	5.74	0.182	325	5.70	22.5	Lt Brown	Begin pumping 7/3/01, pump 9' off well bottom, surge well
08:45	68.29	11.75	6.21	0.167	342	5.11	22.6	Lt Brown	
09:00	69.12	11.80	6.37	0.157	176	5.68	23.1	Lt Brown	
09:15	69.95	11.80	6.39	0.146	156	5.57	24.4	Lt Brown	
09:30	70.78	11.94	6.35	0.139	108	5.54	24.0	Lt Brown	Moved pump to 6' off well bottom
09:45	71.61	11.88	6.30	0.137	87	5.58	24.6	Lt Brown	
10:00	72.44	11.71	6.24	0.141	79	5.17	28.7	Lt Brown	

Parcel No.: HR-237QX
Well ID: HR-237Q-MW01
Date: 7/3/01

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments
10:15	73.27	11.85	6.28	0.136	56	5.65	26.0	Lt Brown	
10:30	74.10	11.75	6.24	0.139	57	5.17	29.3	Lt Brown	
10:45	74.93	11.75	6.30	0.131	46	5.66	27.3	Cloudy	8 hours development time End development
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07/17/01

Groundwater Well Development Log

Fort McClellan , Alabama

Project Number: 796887
Form Completed by: Z. Parham
Well Developed by (person/firm): Z. Parham

Parcel No.: HR-237Q
Well No.: MW02
Date started: 7.1.01

Monitoring Well Information

Development Method: Surge + Purge
Development Equipment: Well Pump, water level indicator, Horiba, Turbidity Meter
Casing Diameter: 2"

Beginning Measurments
Depth to Water (ft): 10.10
Total depth of Well (ft): 18.15

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date) (Purge Rate, Pump Position, Misc.)
15:15	1.31	16.8	6.18	.345	1163	2.59	22.8	brown	PR = 1gpm
15:30									well Dry, initial PR too fast, waiting 20 min. for 80% recharge
15:50	1.31	16.3	6.45	.385	483	5.07	24.1	tan	PR = .167gpm
16:00	2.98								Well Dry again, waiting additional 20min. for 80% recovery
16:25									Well not recharging to 80% recovery. Stopped pumping for 7.1.01
10:00	2.98	10.29	6.36	.328	113	5.33	23.1	cloudy	7.2.01, PR = .125gpm resume Purge 7.2.01
10:15	4.86	12.39	6.60	.284	068	6.73	26.2	cloudy	PR = .0625 gpm

TD - DTW = WC x 2'/4' well = One PV x 5 = Min PV + H20 to install well = Minimum H20 to remove

18.15 - 10.29 = 7.86 x .163 = 1.28 x 5 = 6.4 + 50 = 56.4

*note: drillers used 50gal of water to install well.

QC'd by [signature] 01/17/01

2 4

Parcel No.: HR-237Q
Well ID: 11W02
Date: 7.3.01

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments
10:30	5.8	12.95	6.52	.270	72	6.19	27.1	cloudy	PR = .0625 gpm
10:45	6.74	13.55	6.63	.271	53	6.70	27.2	cloudy	"
11:00	7.37	13.92	6.85	.272	46	6.71	26.6	clear/cloudy	PR = .042 gpm
11:15	8.0	14.33	6.82	.282	75	6.49	28.6	cloudy	"
11:30	8.63	14.64	6.66	.285	95	5.21	29.4	cloudy	"
11:45	9.26	15.02	6.73	.288	52	5.95	30.6	cloudy	"
12:00	9.89	15.34	6.8	.282	26	6.32	27.9	clear	halted pumping for lunch
14:05	9.89	13.45	7.21	.265	22	6.53	28.5	clear	resumed pumping @ PR = .042 gpm
14:20	10.52	14.14	7.07	.267	23	6.40	29.7	clear	"
14:35	11.15	14.53	7.17	.270	75	6.48	32.8	clear/cloudy	"
14:50	11.78	15.1	6.96	.276	42	6.55	31.9	clear	"
15:05	12.41	15.33	6.86	.278	22	6.42	32.3	clear	"
15:20	13.04	15.53	6.94	.278	35	6.03	32.6	clear	"

Parcel No.: HR-2372
Well ID: MW02
Date: 7/2 - 7/3/01 M.H.

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments
15:35	13.67	15.77	6.95	.282	17.3	6.10	32.7	clear	PR=.042gpm
15:50	14.33	15.93	6.93	.282	19.7	5.98	32.2	clear	"
16:05	14.93	16.08	6.92	.284	14.7	5.83	32.9	clear	"
16:20	15.56	16.24	6.95	.285	17.5	5.67	34.0	clear	"
16:35	16.19	16.32	6.92	.278	15.2	6.03	31.8	clear	"
16:50	16.82	16.64	6.79	.274	13.3	6.80	27.6	clear	stopped pumping for 7.2.01 PR=.042gpm
08:30	16.82	10.35	Started Purging						7.3.01
08:35	16.82	10.35	7.05	.273	45	9.17	24.4	clear/cloudy	PR=.042gpm
08:50	17.45	11.10	6.95	.270	39	8.56	25.6	clear/cloudy	"
09:05	18.08	12.28	7.07	.262	63	6.95	27.4	clear/cloudy	"
09:20	18.71	12.78	6.88	.259	69	6.66	29.8	cloudy	"
09:35	19.34	12.81	6.85	.261	61	5.87	32.5	cloudy	"
09:50	19.97	13.32	6.84	.251	61	6.58	28.2	cloudy	"

Parcel No.: HR-237Q
Well ID: MW02
Date: 7.7.01

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments
10:05	20.6	13.97	6.85	.258	18.7	6.48	31.1	clear	PR=.042 gpm
10:20	21.23	14.69	6.90	.260	18.2	5.93	30.7	clear	"
10:35	21.86	15.04	6.90	.261	9.6	6.34	30.7	clear	"
10:50	22.49	15.41	6.95	.261	7.5	6.44	31.2	clear	PR=.042 gpm
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7.03.01

Zach Parker

Groundwater Well Development Log

Fort McClellan , Alabama

Project Number: 796887
Form Completed by: Zach Parker
Well Developed by (person/firm): Zach Parker (IT)

Parcel No.: HA-238Q
Well No.: MW01
Date started: 7.12.01

Monitoring Well Information

Development Method: Wale Pump
Development Equipment: Wale pump, teflon coated tube, Horiba ~~Fube~~ Turbidity meter, H_2O Indicator
Casing Diameter: 2"

Beginning Measurments
Depth to Water (ft): 19.19
Total depth of Well (ft): 35.75

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date) (Purge Rate, Pump Position, Misc.)
11:00	0.0 gal.	19.19	—	—	—	—	—	—	began purging well at .198 gpm pump set @ 32.75'.
11:15	2.97	22.51	~~6.97~~ 6.39	~~0.050~~ 0.500	>2000	0.88	25.1	milky	
11:30	5.94	22.87	6.57	0.505	>2000	1.67	24.1	milky	
11:45	8.91	23.25	6.62	0.493	276	2.24	24.3	cloudy	Pump raised to 31.75'
12:00	11.88	23.48	6.63	0.471	579	1.76	24.5	cloudy	
12:15	14.85	23.68	6.83	0.430	1061	1.77	24.5	milky	
12:30	17.82	23.82	6.87	0.426	>2000	1.96	24.5	milky	Pump raised to 30.75'

TD - DTW = WC x 2'/4' well = One PV x 5 = Min PV + H20 to install well = Minimum H20 to remove

35.75 - 19.19 = 16.56 x .163 = 2.7 gal x 5 = 13.5 gal + 50 gal. = 63.5 gal.

QC'd by [signature] 07/17/01

Parcel No.: 238Q
Well ID: MW01
Date: 7.12.01

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments
12:45	20.79	23.91	6.73	0.405	>2000	1.54	24.8	milky	
13:00	23.76	23.93	6.86	0.392	1913	3.18	25.1	milky	
13:15	26.73	23.94	6.98	0.385	977	3.45	26.0	cloudy	pump raised to 29.75'
13:30	29.70	23.96	7.01	0.382	907	3.70	26.3	cloudy	
13:45	32.67	24.01	7.06	0.380	443	3.89	27.6	cloudy	
14:00	35.64	24.14	7.01	0.377	413	2.86	27.6	cloudy	pump raised to 28.75'
14:15	38.61	24.23	7.01	0.373	307	2.06	28.0	cloudy	
14:30	41.58	24.30	6.93	0.366	239	1.95	27.5	cloudy	
14:45	44.55	24.37	6.90	0.364	199	1.99	28.2	cloudy	raised pump to 27.75'
15:00	47.52	24.43	7.08	0.371	655	2.44	26.9	cloudy	
15:15	50.49	24.49	7.07	0.359	~~0.359~~ 383	2.99	25.4	cloudy	
15:30	53.46	24.55	6.95	0.351	316	2.29	25.2	cloudy	pump raised to 26.75'
15:45	56.43	24.60	7.12	0.348	229	5.19	24.6	cloudy	

Parcel No.: 238Q
Well ID: MW01
Date: 7.12.01 / 7.13.01

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments
16:00	59.40	25.23	6.87	0.373	1256	5.16	24.7	cloudy	
16:15	62.37	25.28	6.95	0.354	1237	4.06	23.9	cloudy	
16:30	65.30	25.06 ~~65.34~~	7.01	0.342	657	4.33	24.6	cloudy	stopped development for 7.12.01
10:00	69.30	19.19	—	—	—	—	—	—	began pumping 7.13.01 PR=.264, pump @ 32.75'
10:15	69.30	22.14	7.01	0.420	>2000	1.56	25.0	milky	
10:30	73.26	22.42	6.95	0.396	>2000	2.13	25.3	milky	
10:45	77.22	22.50	6.31	0.425	>2000	3.09	18.5	milky	PR = .528 gpm
10:50	—								PR = 1.58 gpm
10:55	—								PR = .198 gpm
11:00	88.75	27.54	6.68	0.345	>2000	1.82	20.5	milky	pump raised to 29.75'
11:15	91.72	27.03	6.88	0.325	1558	1.77	21.3	milky	
11:30	94.69	26.90	6.96	0.319	1864	2.06	22.1	milky	pump raised to 28.75'
11:45	97.66	26.75	7.11	0.310	849	3.26	22.4	cloudy	pump raised to 27.75'

Parcel No.: 238Q
Well ID: MW01
Date: 7.13.01

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments
12:00	100.63	26.76	7.08	0.312	480	3.01	24.4	cloudy	
12:15	103.60	26.79	7.15	0.308	295	3.77	22.0	clear/cloudy	
12:30	104.57	26.80	7.23	0.305	242	2.97	22.5	clear/cloudy	8hr spent on well. Took photo sample taken.
:		8hr development complete							
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:		Zach Parker 7.13.01							
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