APPENDIX C

WELL DEVELOPMENT LOGS

Groundwater Well Development Log

Fort McClellan , Alabama

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

Parcel No.: 100Q
Well No.: HR-100Q-MW01
Date started: 3.21.02

Monitoring Well Information

Development Method: Surge/purge
Development Equipment: PCR, WLM, Turbidity Meter, Horiba U-10, ~~Grimm~~, whale pump
Casing Diameter: 2"

Beginning Measurments
Depth to Water (ft): 25.32
Total depth of Well (ft): 40.84

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.)
13:40	0.0	25.32	6.86	.084	>999	9.35	20.4	brown	Began development on 3.21.02 Pump=40.0' / PR=.25 gpm
13:55	3.75	27.0	6.04	.057	380	7.97	19.9	brown	"
14:10	7.50	27.0	5.87	.053	55	7.07	19.9	light tan	Pump=40' / PR=0.45 gpm
14:25	14.25	27.2	5.98	.059	81	7.63	20.1	"	Pump=35' / PR=0.45 gpm
14:40	21.00	27.9	6.03	.055	35	7.50	21.2	"	"
14:55	27.75	28.0	5.95	.068	31	7.28	21.4	clear	"
15:10	34.5	28.0	5.90	.045	12	7.35	21.7	"	Pump=33' / PR=0.45

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

40.84 − 25.32 = 15.52 × .163 = 2.53 × 5 = 12.65 + 200 = 212.65

rec'd Knotts 3/25/02

Parcel No.: 100Q
Well ID: HR-100Q-MW01
Date: 3.21.02 / 3.22.02

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
15:25	41.25	28.2	5.93	.061	11	7.55	21.3	clear	Pump = 33' btoc. PR = .45 gpm
15:40	48.0	28.2	6.05	.051	7.5	7.47	21.8	"	"
15:55	54.75	28.3	5.99	.059	7.5	7.59	22.1	"	Pump = 40' btoc PR = .45 gpm
16:10	61.5	28.4	6.01	.055	9.2	7.49	22.5	clear	Stopped development for 3.21.02
08:00	61.5	25.94	4.65	.103	>999	7.86	14.6	brown	Resumed development on 3.22.02. Pump = 40' btoc PR = .5 gpm
08:15	69.0	26.85	4.71	.063	112	7.53	14.9	light tan	"
08:30	76.5	26.93	5.21	.051	98	7.91	16.2	"	"
08:45	84.0	27.08	5.11	.072	41	7.62	17.0	"	Pump = 35' btoc PR = .5 gpm
09:00	91.5	27.09	5.22	.059	12	7.88	17.1	clear	"
09:15	99.0	27.09	5.25	.055	10	7.75	17.5	"	"
09:30	106.5	27.15	5.55	.061	11	7.69	17.5	"	"
09:45	114.0	27.15	5.72	.051	10	7.87	18.1	"	"
10:00	121.5	27.15	5.61	.055	8.5	7.61	18.2	"	"

Parcel No.: 100Q
Well ID: HA-100Q-MW01
Date: 3.22.02

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	129	27.17	5.55	.063	8.0	7.59	18.3	clear	~~Pump=37'~~ Pump=35' bTOC PR=.5 gpm
10:10	136.5	27.21	5.63	.052	8.0	7.55	18.3	"	~~3 consecutive readings of NTU<10~~ 3.22.02 ~~Completed development at well~~ 3.22.02 Stopped development for 3.22.02
— well development continued on 03/25/02 by Nick Muloski (IT) —									
10:45	136.5	23.87	—	—	—	—	—		Started Purging. Pump @ 35' bTOC Purge rate = 0.5 gpm
11:00	144.0	24.62	5.32	.051	522	5.10	22.3	Reddish-brown	Pump @ 35' bTOC Purge rate = 0.5 gpm
11:15	151.5	25.30	5.38	.048	205	5.12	21.9	Reddish-brown	Pump @ 35' bTOC Purge rate = 0.5 gpm
11:30	159.0	26.12	5.46	.044	81	5.16	21.5	Light-Tan	Pump @ 35' bTOC Purge rate = 0.5 gpm
11:45	166.5	26.87	5.47	.042	72	5.17	21.2	Light-tan	Pump @ 35' bTOC Purge rate = 0.5 gpm
12:00	174.0	27.65	5.47	.042	59	5.17	20.8	Milky	Pump @ 37' bTOC Purge rate = 0.5 gpm
12:15	181.5	27.70	5.45	.042	53	5.18	20.9	Clear	Pump @ 37' bTOC Purge rate = 0.5 gpm
12:30	189.0	27.92	5.41	.040	46	5.17	21.0	Clear	Pump @ 37' bTOC Purge rate = 0.5 gpm
12:45	196.5	28.02	5.36	.038	39	5.16	21.2	Clear	Pump @ 37' bTOC Purge rate = 0.5 gpm
13:00	204	28.19	5.33	.038	34	5.17	21.2	Clear	Pump @ 37' bTOC Purge rate = 0.5 gpm

Parcel No.: 100 Q
Well ID: HR-100Q-MW01
Date: 03-25-02

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)
13 :15	211.5	28.20	5.34	.037	22.1	5.17	21.0	clear	pump @ 37' bTOC PR = 0.5 gpm
13 :30	219.0	28.21	5.34	.037	14.3	5.17	20.8	clear	pump @ 37' bTOC PR = 0.5 gpm
13 :40	224.0	28.22	5.33	.038	11.2	5.17	20.6	clear	pump @ 37' bTOC PR = 0.5 gpm
13 :45	226.5	28.22	5.33	.038	9.9	5.17	20.6	clear	pump @ 37' bTOC PR = 0.5 gpm / collected photo-sample
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03-25-02

Groundwater Well Development Log

Fort McClellan, Alabama

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

Parcel No.: HR-100Q
Well No.: HR-100Q-MW02
Date started: 2.20.02

Monitoring Well Information

Development Method: surge/purge
Development Equipment: PID, WLM, whale pump, Horiba U-22, Turbidity meter
Casing Diameter: 2"

Beginning Measurments
Depth to Water (ft): 11.98
Total depth of Well (ft): 26.71

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.)	
10:45	0.0	11.98	5.29	.071	>999	11.11	17.3	brown	began development on 2.20.02 Pump = 26.5' toc	PR = 1.0 gpm
10:55	10.0	15.21			note	change			"	PR = 0.4 gpm
11:00	12.0	15.78	5.28	.056	520	10.77	17.5	light brown	"	"
11:15	18.0	16.66	5.21	.041	106.0	11.52	17.75	light tan	Pump = 24'	"
11:30	24.0	16.71	5.27	.051	92	10.88	18.2	"	"	"
11:45	30.0	16.74	5.21	.040	56	11.63	18.9	"	"	"
12:00	36.0	16.78	5.31	.038	49	10.82	19.2	clear	"	"

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

26.71 - 11.98 = 14.73 x .163 = 2.4 x 5 = 12 + 95 = 107.0

rec'd [illegible] 2/22/02

Parcel No.: HA-100Q
Well ID: HA-100Q-MW02
Date: 2.20.02

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
12:15	42.0	16.84	5.25	.042	53	11.71	20.3	clear	Pump=22' brc / PR=0.4 gpm
12:30	48.0	16.84	5.28	.030	79	10.81	19.14	light tan	" / "
12:45	54.0	16.84	5.29	.035	72	10.52	19.18	"	" / "
13:00	60.0	16.85	5.30	.031	61	11.81	19.87	"	" / "
13:15	66.0	16.84	5.32	.029	68	10.60	19.43	"	Pump=20' brc / "
13:30	72.0	16.84	5.57	.028	55	10.68	18.89	"	" / "
13:45	78.0	16.83	5.48	.031	50	10.58	18.91	"	" / "
14:00	84.0	16.83	5.51	.027	48	10.75	19.30	"	" / "
14:15	90.0	16.83	5.45	.030	41	10.15	19.12	"	Pump=22' brc / "
14:30	96.0	16.83	5.50	.025	43	10.32	19.52	clear	" / "
14:45	102.0	16.83	5.57	.029	44	10.71	19.62	"	" / "
15:00	108.0	16.83	5.49	.033	48	10.30	19.92	"	Stopped development for 2.20.02
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brc = below top of column

Groundwater Well Development Log

Fort McClellan , Alabama

Project Number: 796887
Form Completed by: Lee FLIPPEN
Well Developed by (person/firm): Lee FLIPPEN / IT Corp.

Parcel No.: HR 101 Q MW01
Well No.: MW01
Date started: 2-14-02

PID 1.6 BZ 0.0

Monitoring Well Information

Development Method: Surge + purge
Development Equipment: whale pumps, 12v. battery, Horiba U-10, Aquafast II, Horiba water indicator
Casing Diameter: 2" .163

Beginning Measurments
Depth to Water (ft): 18.56 ft. TOC
Total depth of Well (ft): 46.33 ft TOC

PID 1.6 BZ 0.0 TD 46.33 ft. DTW 18.56 ft WC = 27.77 screen 24'-44'

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.)
									- surged Entire well Screen -
09:15	Ø	18.56	5.36	.060	999+	2.80	13.8	Brown	Depth 44', Purge Rate .40 gpm
09:30	6.0	28.18	5.56	.096	999+	2.96	15.2	Brown	Depth 44' PR .65 gpm
09:45	15.75	31.29	5.14	.049	999+	4.01	16.6	Brown	Depth 44' PR .65 gpm
10:00	25.5	40.70	5.08	.041	999+	3.97	16.9	Brown	Depth 44' PR .20 gpm
10:15	28.5	38.38	5.25	.049	999+	3.37	17.4	Brown	Depth 44' PR .20 gpm
10:30	31.5	35.58	5.13	.033	668	2.89	17.6	Brown	Depth 44' PR .20 gpm
10:45	34.5	35.81	5.14	.032	242	3.15	17.4	cloudy	Depth 44' PR .20 gpm

hr

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

46.33 ft. - 18.56 = 27.77 x .163 = 4.53 x 5 = 22.65 + 115 g = 137.65 g

acd 2/19/02

Parcel No.: HR101Q
Well ID: MW07
Date: 2-14-02

Lee FLIPPEN

	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
	11:00	37.5	35.80	5.14	.031	546	6.18	17.8	cloudy	Depth 44' Purge Rate .20 gpm
	11:15	40.5	35.60	5.14	.030	449	6.33	18.2	cloudy	Depth 44' PR .20 gpm
2hrs	11:30	43.5	33.97	5.15	.029	381	6.80	18.5	cloudy	Depth 44' PR .25 gpm
	11:45	47.25	36.88	5.13	.029	215	6.11	17.7	cloudy	Depth 44' PR .25 gpm
	12:00	51.0 LF 2hrs ~~51.0~~	38.60	5.09	.030	475	5.96	18.1	cloudy	Depth 44' PR .20 gpm
	12:15	54.0	37.10	5.10	.030	281	6.03	18.6	cloudy	Depth 44' PR .20 gpm
3hrs	12:30	57.0	37.47	5.11	.027	128	6.56	18.3	cloudy	Depth 44' PR .20 gpm
	12:45	60.0	36.60	5.09	.026	102	6.61	18.2	cloudy	Depth 44' PR .20 gpm
	13:00	63.0	35.95	5.10	.027	109	6.48	18.7	cloudy	Depth 44' PR .20 gpm
	13:15	66.0	38.18	5.11	.026	133	6.83	18.7	cloudy	Depth 44' PR .20 gpm
4hrs	13:30	69.0	39.38	5.09	.027	257	6.12	18.4	cloudy	Depth 44' PR .15 gpm
	13:45	71.25	36.64	5.11	.029	303	6.14	18.7	cloudy	Depth 44' PR .15 gpm
	14:00	73.5	35.93	5.12	.026	195	6.38	18.7	cloudy	Depth 44' PR .15 gpm

Parcel No.: HR 101Q
Well ID: MW01
Date: 2-14-02

2-15-02 PID 1.0 BZ 0.0, DTW 18.68, WC = 27.65 ft. Lee FLIPPEN

	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
	14:15	75.75	35.08	5.14	.025	87	6.89	18.8	cloudy	Depth 44', PurgeRate .15gpm
5hrs	14:30	78.0	33.18	5.14	.025	73	7.77	18.8	cloudy	Depth 44', PR .25gpm
	14:45	81.75	35.46	5.14	.024	534	6.88	18.4	cloudy	Depth 44', PR .25gpm
	15:00	85.5	41.05	5.18	.035	453	5.59	18.4	cloudy	Depth 46' PR .25gpm
	15:15	89.25	42.08	5.22	.035	999+	5.69	18.5	cloudy	Depth 46' PR .30gpm
6hrs	15:25	92.25	well Ran Dry - Wait 20 min and check W.L. For 80% .80 x 27.77 = 22.22 - 46.33 = 24.11 ft water level						recovery	80% = waterlevel 24.11 ft.
	15:45	92.25	35.88	well Did not Recover 80% Recharge Rate = 46.33 TD - 35.88 ft = 10.45 ft/20min						[illegible] 2-14-02 = .52 ft/min
	2-15-02 08:55	92.25	18.68	4.90	.067	232	6.67	14.7	cloudy	2-15-02 → 26ft, 28ft. Depth 24 ft, PR .25gpm
	09:10	96.0	24.12	5.04	.025	744	7.86	16.7	cloudy	Depth 30ft, 32ft, 34ft. PR .25gpm .25gpm
	09:25	99.75	25.71	5.05	.023	52	7.08	17.7	cloudy	Depth 36', 38', 40' PR .25gpm
	09:40	103.5	25.81	5.16	.027	999+	7.45	17.6	cloudy	Depth 42' PR .25gpm
7hrs	09:55	107.25	26.82	5.10	.024	430	7.78	17.3	cloudy	Depth 42' PR .25gpm → .10gpm
	10:10	111.0	26.09	5.06	.021	765	6.97	17.9	cloudy	Depth 42' PR .10 gpm

Parcel No.: HR 101 Q
Well ID: MW 01
Date: 2-15-02

2-15-02 PID 1.0 BZ 0.0, DTW 18.68', WC = 27.65 ft. Lee FLIPPEN

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
10:25	112.50	26.09	5.06	.020	445	7.54	18.5	Cloudy	Depth 42' Purge Rate .10 gpm
10:40	114.0	25.90	5.06	.020	483	6.88	18.2	Cloudy	Depth 42' Purge Rate .10 gpm -8hrs Dev. Time-
10:55	115.5	25.22	5.01	.018	114	6.75	19.2	Cloudy	Depth 42' PR .10 gpm
8hrs 11:10	117.0	24.93	5.01	.018	38	6.83	19.5	clear	Depth 42' PR .10 gpm
11:25	118.5	24.71	5.00	.018	28	6.77	19.6	Clear	stopped Parameters - well Development Completed - Took 1 l. H2O Photo Sample 2-15-02 - @ 11:25 Lee Flippen
8½hrs :									
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