APPENDIX C

WELL DEVELOPMENT LOGS

Groundwater Well Development Log

Fort McClellan , Alabama

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

Parcel No.: CWM-509
Well No.: MW01
Date started: 10/24/01

Monitoring Well Information

Development Method: Surge and Purge
Development Equipment: Whale pump tubing, bailers, PID, Turbidity meter, Horiba, bucket
Casing Diameter: 2in

Beginning Measurments
Depth to Water (ft): 3.21 TOC
Total depth of Well (ft): 18.58 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.)
11:00	—	3.2	6.40	0.636	999	2.01	23.3	dark grey	0.197gpm - 0.5' from bottom
11:10	1.87	—	—	—	—	—	—	—	0.125gpm
11:15	2.495	5.75	6.33	0.627	999	2.82	24.6	dark grey	0.197gpm
11:20	3.43	—	—	—	—	—	—	—	0.6gpm - raised pump 1ft
11:30	9.43	9.55	6.17	0.840	469	3.05	22.7	lt. grey (cloudy)	0.6gpm
11:35	12.43	—	—	—	—	—	—	—	0.375gpm
11:45	16.18	8.70	6.41	0.841	269	2.85	23.4	pt. clear	0.375gpm raised pump 2ft

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

18.58 − 3.26 = 15.38 X 0.163 = 2.50 X 5 = 12.5 + 50 gal = 62.5

2 K.H. 10/25/01 0 K.H. 10/25/01 0 K.H. 10/25/01

O.C.d. K.H. 10/25/01

Parcel No.: CWM-590
Well ID: MW01
Date: 10/24/01

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 (Date if different from start date)
11:50	18.05	—	—	—	—	—	—	—	0.3gpm
12:00	21.05	8.35	6.27	0.849	217	3.11	24.0	pt.clear	0.3gpm raised pump 1ft
12:15	25.55	8.30	6.39	0.854	200	2.87	23.9	"	0.27gpm
12:30	29.60	8.30	6.34	0.855	97	2.92	24.5	pt.clear	0.27gpm raised 1ft
12:45	33.65	8.25	6.32	0.853	93	2.62	24.1	"	0.27gpm
13:00	37.70	8.30	6.35	0.852	56	3.02	24.0	clear	0.27gpm
13:10	40.40	—	—	—	—	—	—	"	0.28gpm
13:15	41.80	8.35	6.25	0.838	53	3.40	23.6	"	0.28gpm
13:20	43.20	—	—	—	—	—	—	clear	0.26gpm
13:30	45.8	8.25	6.39	0.838	190	3.20	23.9	pt.clear	0.26gpm
13:45	49.7	8.21	6.37	0.855	30	2.85	23.9	clear	0.26gpm raised pump 1ft
14:00	53.6	8.15	6.32	0.836	20	2.83	24.0	"	0.26gpm raised pump 1ft

Water Quality Equipment Used_____

Comments_____

Parcel No.: CWM-590
Well ID: MW01
Date: 10/24/01

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 (Date if different from start date)
14:05	54.9	—	—	—	—	—	—	—	0.240 gpm
14:15	59.7	7.75	6.40	0.853	30	2.63	24.8	clear	0.227 gpm
14:30	63.105	7.70	6.37	0.848	19.2	2.59	24.0	"	"
14:45	66.51	7.60	6.25	0.842	11.0	2.69	23.8	"	0.20 gpm
15:00	69.51	7.55	6.33	0.851	9.2	2.58	23.5	clear	"
15:05	—	—	—	—	—	—	—	—	Collected photo sample in 1L poly bottle
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No Further Entry
Reginald Lim 10/24/01

Water Quality Equipment Used Horiba U-10 # 005441, Orion Turbidity Meter # LVE002079, H2O Level Indicator #LVE00203.
Comments

Groundwater Well Development Log

Fort McClellan , Alabama

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

Parcel No.: CWM-509
Well No.: MW02
Date started: 10/25/01

Monitoring Well Information

Development Method: Surge and Purge
Development Equipment: Whale pump, 210 gal tank, PVD, turdidity Meter, Waterlevel indicator
Casing Diameter: 2in

Beginning Measurments
Depth to Water (ft): 3.7
Total depth of Well (ft): ~~5.83~~ 18.8 K.H. 10/29/01

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 (Date if different from start date) (Purge Rate, Pump Position, Misc.)
08:35	—	3.70	6.77	0.688	999	0.49	19.0	muddy	PR=0.36gpm pump-18.5 bTOC
08:45	3.6	—	—	—	—	—	—	—	~~PR=0.36gpm~~ PR=0.33gpm
08:50	5.25	7.00	6.11	0.754	999	5.76	18.7	muddy	"
09:05	10.2	7.36	6.25	0.884	999	3.61	19.9	cloudy	17.5' bTOC pump
09:10	11.45	—	—	—	—	—	—	—	PR=0.25gpm
09:15	12.7	7.20	6.36	0.904	3.88	3.92	19.7	cloudy	"
09:25	15.2	—	—	—	—	—	—	—	PR=1.37gpm 16.5' bTOC pump

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

18.8 - 3.7 = 15.1 X 0.163 = 2.46 X 5 = 12.3 + 55 gal = 67.3 gal

Parcel No.: CWM - 509
Well ID: MW02
Date: 10/26/01

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 (Date if different from start date)
09:28	19.31	—	—	—	—	—	—	—	PR=0.39 gpm
09:30	20.09	8.20	6.31	0.970	999	3.72	19.8	muddy	"
09:45	25.94	8.64	6.41	0.900	316	4.09	19.9	cloudy	"
10:00	31.79	8.75	6.52	0.929	196	2.94	19.9	"	"
10:15	37.64	9.05	6.36	0.925	264	4.22	20.3	"	pump-15.5' bTOC
10:25	41.54	—	—	—	—	—	—	—	PR=0.30
10:30	43.04	8.05	6.57	0.976	165	3.62	19.8	cloudy	"
10:45	47.54	8.05	6.42	0.935	87	3.96	20.5	clear	"
13:00	47.54	6.05	6.39	0.905	423	3.83	21.2	cloudy	PR=0.28
13:15	51.74	6.21	6.32	0.880	454	2.44	21.9	"	"
13:30	55.94	6.41	7.09	0.930	212	3.29	22.2	"	pump-14.5' bTOC
13:45	60.14	7.21	6.53	0.930	166	1.70	22.4	milky	pump 13.5' bTOC

Parcel No.: CWM-509
Well ID: MW02
Date: 10/26/01

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 (Date if different from start date)
14:00	64.34	7.09	6.50	0.937	99	1.35	22.4	clear	PR=0.28gpm
14:05	65.74	—	—	—	—	—	—	—	PR=0.25gpm
14:15	68.24	7.12	6.48	0.940	149	1.29	22.3	clear	"
14:30	71.99	7.25	6.51	0.930	68	2.35	22.7	"	pump-12.5' bTOC
14:45	75.75	7.25	6.40	0.938	200	2.29	22.4	cloudy	PR=0.25gpm
15:00	79.49	7.27	6.43	0.927	94	3.27	22.5	clear	"
15:15	83.24	7.31	6.51	0.949	71	2.55	22.7	clear	pump-11.5' bTOC
15:30	86.99	7.28	6.54	0.943	84	2.85	23.0	"	PR=.23gpm
15:35	88.14	—	—	—	—	—	—	—	PR=0.24gpm
15:45	90.54	7.10	6.55	0.936	102	2.73	22.8	cloudy	PR=0.26gpm
16:00	94.44	6.97	6.50	0.940	79	3.56	22.9	clear	PR=0.23gpm
16:15	97.89	6.92	6.51	0.936	96	3.59	22.3	"	PR=0.21gpm

Parcel No.: CWM-509
Well ID: MW02
Date: 10/26/01

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 (Date if different from start date)
16:30	101.04	6.90	6.48	0.945	64	3.32	22.2	Clear	PR=0.21gpm
16:45	104.19	6.90	6.52	0.941	58	3.29	22.0	"	"
08:55	104.19	3.7	—	—	—	—	—	—	10/26/01 pump=10.87bTOC PR=0.21gpm
09:10	107.34	6.13	6.18	0.910	999	8.28	17.6	cloudy	PR=0.23gpm
09:25	110.79	6.24	6.40	0.970	437	2.05	17.4	"	PR=0.23gpm
09:40	114.24	6.34	6.46	0.925	223	1.83	18.7	"	"
09:55	117.69	6.44	6.65	0.928	197	2.82	17.5	"	PR=0.125
10:10	119.57	5.78	6.10	0.923	190	2.98	17.8	"	"
10:25	121.44	5.81	6.22	0.923	141	2.54	18.3	clear	"
10:40	123.32	5.80	6.93	0.934	72	3.05	18.0	clear	
10:55	125.20	5.83	6.80	0.943	48	1.98	18.9	clear	collected photo sample in 1L poly bottle.
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Regulatory Approval 10/26/01

Groundwater Well Development Log

Fort McClellan, Alabama

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

Parcel No.: CWM-509
Well No.: MW03
Date started: 10/29/01

Monitoring Well Information

Development Method: Surge & Purge
Development Equipment: Whale Pump, PID, Horiba U-10, Orion Turbidity Meter
Casing Diameter: 2in

Beginning Measurments
Depth to Water (ft): 3.24
Total depth of Well (ft): 11.31

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.)
09:10	—	3.24	6.03	0.549	999	4.36	18.1	muddy (dark brown)	PR-0.42gpm, 3in from bottom
09:15	2.1	—	—	—	—	—	—	—	0.24gpm
09:20	3.3	—	—	—	—	—	—	—	0.187gpm
09:25	4.24	7.75	6.36	0.530	549	4.40	19.2	cloudy (brown)	1.3' from bottom
09:33	5.74	—	—	—	—	—	—	—	0.125gpm
09:40	6.62	9.05	6.45	0.597	999	4.36	19.3	muddy (dark brown)	lowered to 3in from bottom
09:43	6.99	—	—	—	—	—	—	—	0.8gpm

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

11.31 − 3.24 = 8.07 x 0.163 = 1.3159 x 5 = 6.58 + 30 = 36.58

QC'd by [illegible] 11-1-01

Parcel No.: CWM-509
Well ID: MW03
Date: 10/1/01

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
09:44	7.79	—	—	—	—	—	—	—	Well is dry
09:09	7.79	3.36	6.18	0.686	999	4.31	19.8	muddy (dark gray)	10/30/01 PR-0.16gpm 2' from bottom
09:24	10.19	6.53	6.34	0.690	703	5.24	21.5	cloudy (gray)	PR-0.16gpm 1' from position (raised)
09:33	11.95	—	—	—	—	—	—	—	PR-0.15gpm lowered pump 1 ft
09:39	12.85	8.50	6.48	0.647	280	5.03	22.8	cloudy (gray)	PR-0.15gpm lowered pump 1 ft
09:54	15.1	BTOP	6.46	0.716	999	4.15	24.1	muddy (gray)	PR-0.13gpm
09:58	15.62	—	—	—	—	—	—	—	PR-0.5gpm
09:59	15.87	—	—	—	—	—	—	—	Well is dry
11:57	15.87	3.36	6.45	0.728	999	3.77	24.9	muddy (gray)	10/31/01 pump-3" from bottom PR-0.1gpm
12:03	16.44	—	—	—	—	—	—	—	PR-0.06gpm
12:07	16.68	—	—	—	—	—	—	—	PR-0.156gpm
12:12	17.46	6.15	6.53	0.735	999	4.57	25.0	cloudy (gray)	PR-0.156gpm pump-raised 1' from position
12:27	19.8	8.08	6.46	0.722	204	5.36	24.9	cloudy	PR-0.156gpm

Parcel No.: CWM-509
Well ID: MW03
Date: 11/1/01

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 (Date if different from start date)
12:42	22.14	BTOP	6.42	0.751	999	4.25	25.6	cloudy (grey)	0.15 gpm. pump lowered 3 in from bottom
12:50	23.39	—	—	—	—	—	—	—	Well is dry
07:55	23.39	3.5	6.25	0.703	195	3.65	19.3	cloudy	Photo sample collected w/ bailer.
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Final Entry
Reynold Sorin
11/1/01

Groundwater Well Development Log

Fort McClellan , Alabama

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

Parcel No.: CWM-509
Well No.: MW04
Date started: 10/29/01

Monitoring Well Information

Development Method: Surge and Purge
Development Equipment: Whale pump, water indicator, PID, Horiba U-10, Orion turbidity Meter
Casing Diameter: 2 in

Beginning Measurments
Depth to Water (ft): 5.00
Total depth of Well (ft): 21.4

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.)
14:23	—	5.00	6.40	0.732	999	2.86	22.8	muddy (gray)	pump - 3" from bottom PR. 0.375 gpm
14:28	1.875	—	—	—	—	—	—	—	PR - 0.3 gpm
14:38	4.875	8.70	6.50	0.698	386	3.51	22.8	cloudy (gray)	PR - 0.27 gpm pump - 1' from position
14:45	6.225	—	—	—	—	—	—	—	PR - 0.25 gpm
14:53	8.725	10.14	6.47	0.814	286	3.88	22.7	cloudy	PR - 0.25 gpm
15:08	12.475	11.28	6.56	0.855	154	2.83	22.7	"	PR - 0.187 gpm pump - 1ft from position
15:15	13.784	—	—	—	—	—	—	—	1.0 gpm

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

21.4 − 5.00 = 16.40 x 0.163 = 2.67 x 5 = 13.35 + 7.5 = 88.35

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11/17/00

QC'd by [illegible] 11-1-01

Parcel No.: CrM-509
Well ID: MW04
Date: 11/1/01

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 (Date if different from start date)
15:16	14.784	—	—	—	—	—	—	—	PR-0.23gpm
15:23	16.394	11.75	6.52	0.878	3.58	3.23	22.1	cloudy	PR-0.25gpm
15:38	20.144	12.15	6.55	0.909	3.67	3.65	21.6	"	PR-0.25gpm pump-1' from position
15:53	23.89	12.55	6.43	0.911	2.58	4.06	21.5	"	PR-0.25gpm pump-1' from position
16:08	27.64	12.85	6.57	0.928	2.26	2.98	20.7	"	PR-0.25
16:15	29.39	—	—	—	—	—	—	—	PR-0.238gpm
16:23	31.29	13.13	6.43	0.927	148	3.33	20.2	"	"
16:38	34.86	13.3	6.39	0.944	120	4.00	18.7	"	"
16:40	35.34	—	—	—	—	—	—	—	1.25gpm
16:46	42.84	—	—	—	—	—	—	—	Well dry.
13:23	42.84	5.42	6.42	0.940	999	3.64	24.9	muddy (gray)	10/30/01 PR-0.197gpm pump-1' from bottom
13:30	44.15	—	—	—	—	—	—	—	PR-0.14gpm

Parcel No.: Ckm-509
Well ID: MW04
Date: 11/1/01

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 (Date if different from start date)
13:33	44.57	—	—	—	—	—	—	—	PR-0.187gpm
13:38	45.51	7.09	6.40	0.961	672	4.23	24.9	cloudy grey	PR-0.178gpm 1' from position
13:48	47.29	—	—	—	—	—	—	—	PR-0.187gpm
13:53	48.23	7.85	6.47	0.970	247	4.26	24.8	cloudy (grey)	PR-0.187gpm pump - 1' from position
14:00	49.54	—	—	—	—	—	—	—	PR-0.178gpm
14:02	49.99	—	—	—	—	—	—	—	PR-0.22gpm
14:08	51.31	8.55	6.44	0.977	209	4.30	24.9	cloudy	PR-0.22gpm pump - 1' from position
14:12	52.19	—	—	—	—	—	—	—	PR-0.3gpm
14:23	55.49	9.89	6.49	0.950	131	4.84	24.0	cloudy	PR-0.3gpm 1' from position
14:38	59.99	11.00	6.51	0.940	112	5.01	24.1	cloudy	"
14:48	62.99	—	—	—	—	—	—	—	PR-0.107gpm
14:53	63.53	10.90	6.64	0.960	31	3.15	24.8	clear	"

Parcel No.: Chm-509
Well ID: mw04
Date: 11/1/01

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 (Date if different from start date)
15:08	65.14	9.60	6.53	0.960	11.3	4.22	24.5	clear	PR-0.107gpm 1' from position
15:23	66.75	8.96	6.47	0.995	26.0	4.45	24.1	clear	PR-0.107gpm
15:38	68.35	8.62	6.52	0.970	10.0	3.87	23.7	"	PR-0.107 gpm
15:53	69.96	8.39	6.54	0.960	9.9	3.95	23.0	"	"
16:08	71.57	8.28	6.46	0.960	25	4.23	22.2	"	"
16:23	73.175	8.15	6.29	0.960	8.2	3.80	21.2	"	PR.0.107gpm pump-3" from bottom
16:27	73.603	—	—	—	—	—	—	—	1.5gpm
16:34	84.107	—	—	—	—	—	—	—	0.43 gpm
16:38	85.823	20.23	6.34	0.960	999	4.15	19.6	muddy	"
16:39	86.253	—	—	—	—	—	—	—	Well dry
14:23	86.253	5.72	6.46	0.970	198	4.63	24.6	cloudy	10/31/01 1' from bottom 0.1gpm
14:38	87.153	6.50	6.54	0.990	82	4.38	25.6	"	0.1gpm - 1' from position

Parcel No.: CWM-509
Well ID: MW04
Date: 11/1/01

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 (Date if different from start date)
14:53	89.253	6.51	6.50	0.960	~~199~~ 43	4.56	25.4	cloudy	0.09 gpm IRT from position
15:08	90.60	6.58	6.57	0.990	~~82~~ 189	4.61	24.7	clear	"
15:23	91.92	6.54	6.53	0.972	~~43~~ 10.3	4.75	24.6	"	"
15:38	93.23	6.52	6.58	0.982	~~18.9~~ 9.6	4.90	24.3	"	0.09 gpm
15:40	—	—	—	—	—	—	—	—	Collected photo sample w/ poly bailer in 1L bottle.
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Final Entry
Reynold Sima 11/1/01