APPENDIX C

WELL DEVELOPMENT LOGS

Groundwater Well Development Log

Fort McClellan , Alabama

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

Parcel No.: 517
Well No.: CMM-517-MW01
Date started: 12.5.01

Monitoring Well Information

Development Method: Surge/Purge
Development Equipment: Whale pump / hose, PID, Horiba U-10, Orion Tech. meter, WLM
Casing Diameter: 2"

Beginning Measurments
Depth to Water (ft): 30.25'
Total depth of Well (ft): 34.36

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	0.0	30.25	6.20	.423	172	3.76	20.4	grey	Began development on 12.5.01 PR=.32gpm, Pump @ 34' btoc
15:25	3.28	32.89	—	—	—	—	—	—	Pump at bottom of well PR=.13gpm
15:30	3.85	33.30	5.93	.369	49	3.17	20.7	light grey	"
15:35	4.5	brop	—	—	—	—	—	—	Well dry, waiting 20 min for 80% recovery, DTW=31.07 for 80% recovery.
15:55	4.5	32.82	—	—	—	—	—	—	well not recharged 80%. Stopped development for 12.5.01
08:15	4.5	30.25	—	—	—	—	—	—	Resumed development on 12.6.01 Pump=34.1 btoc, PR=.05gpm
08:30	5.25	31.37	5.9	.263	47	8.70	17.8	light tan	"

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

34.36 - 30.25 = 4.11 x .163 = 0.67g x 5 = 3.35gal + 20 = 23.35

QC'd [illegible] 12/10/01

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11/17/00

brop = below top of pump

Parcel No.: 517
Well ID: cwu-517-mw01
Date: 12.6.01

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
08:45	5.25	31.37	5.91	.306	38	4.10	19.6	light tan	pump = 34.1 broc PR = .05 gpm
09:00	6.75	31.98	5.85	.303	29	3.91	21.1	"	"
09:15	7.50	32.19	5.86	.301	21	3.86	22.1	"	"
09:30	8.25	32.33	5.90	.305	13.4	3.85	22.2	clear	"
09:45	9.0	32.52	5.89	.301	10.3	3.81	22.5	"	"
10:00	9.75	32.63	5.95	.308	9.8	3.87	23.1	"	"
10:15	10.5	32.63	5.91	.305	26	3.89	23.9	"	"
10:30	11.25	32.86	5.92	.300	15	3.90	23.8	"	"
10:45	12.00	32.92	6.02	.326	12.7	3.82	24.4	"	"
11:00	12.75	33.11	6.00	.319	11.8	3.83	24.6	"	"
11:15	13.5	33.25	6.01	.320	12.0	3.88	25.1	"	Pump lowered to bottom of well. PR = .05 gpm.
11:30	14.25	33.39	5.98	.325	22.0	3.85	26.0	"	"
11:45	15.00	drop	6.00	.322	26.0	3.81	26.2	"	~~stopped development for lunch.~~ JP 12.6.01

Parcel No.: 517
Well ID: CWM-517-MW01
Date: 12.6.01 / 12.7.01

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
12:00	15.75	brop	6.02	.318	25	3.89	26.5	clear	Stopped development for lunch.
13:30	15.75	32.28	6.01	.323	48	3.90	22.9	light tan	Ressumed development, Pump=bottom of well, PR=.05
13:45	16.5	32.90	6.02	.326	44	3.95	23.2	"	"
14:00	17.25	33.26	6.00	.320	38	3.85	24.5	"	"
14:15	18.00	33.35	5.98	.319	30	3.81	25.0	"	"
14:30	18.75	brop	6.02	.323	31	3.88	25.6	"	"
14:45	19.50	brop	6.01	.328	27	3.91	26.0	"	"
15:00	20.75	brop	6.00	.321	23	3.85	26.2	"	"
15:05	21.00	—	—	—	—	—	—	—	well dry, waiting 20 min for 80% recharge.
15:25	21.00	32.25 ~~30.75~~	—	—	—	—	—	—	Stopped development for 12.6.01. Not recharged 80%
07:45	21.00	30.35	—	—	—	—	—	—	Ressumed development for 12.7.01 Pump=34.3', PR=.05gpm
08:00	21.75	31.45	5.87	.227	24	4.25	18.6	clear	"
08:15	22.50	31.90	5.93	.310	19	3.91	19.2	"	"

Parcel No.: 517
Well ID: CWM-517-MW01
Date: 12.2.01

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
08:30	23.25	32.33	6.01	.321	16.1	3.96	19.9	clear	Pump = 34.3' DH = .05gpm
08:45	24.00 ~~24.00~~	32.55	6.02	.330	15.0	3.89	20.0	"	"
09:00	24.75 ~~24.75~~	32.60	5.98	.319	13.5	3.99	21.2	"	"
09:15	25.50 ~~26.00~~	32.72	6.01	.328	9.4	3.87	21.8	"	"
09:30	26.25	32.91	6.03	.331	8.0	3.91	22.4	"	"
09:45	27.00	33.06	6.00	.329	7.4	3.88	23.0	"	"
10:00	27.75	33.20	6.01	.322	7.0	3.87	23.5	"	"
10:15	28.5	33.35	6.03	.325	7.3	3.90	24.1	"	Development Complete.
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12.7 gal

Groundwater Well Development Log

Fort McClellan , Alabama

Project Number: 786887
Form Completed by: Z. Parham
Well Developed by (person/firm): Z. Parham (IT)

Parcel No.: 517
Well No.: CWM-517-MW02
Date started: 12.10.01

Monitoring Well Information

Development Method: bailer
Development Equipment: bailer, WLM (water level meter) K.H. 12-12-01

Casing Diameter: 2"

Beginning Measurments
Depth to Water (ft): 18.78' (DRY) K.H. 12/12/01
Total depth of Well (ft): 18.98'

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.)
09:35	0.0	18.78'	—	—	—	—	—	—	insufficient water volume to take readings. Bailing well dry.
09:37	—								Well dry. Waiting 20 min to check recharge.
09:57	—	18.89'							Well not recharged. Called well dry.
07:45	0.0	18.89' ~~18.98'~~ K.H. 12/11/01							insufficient water volume to take readings. bailed well dry for 12.11.01
07:46	—	—	—	—	—	—	—	—	well bailed dry for 2nd time. Waited 20 min to check recharge.
08:06	—	18.90'	—	—	—	—	—	—	Well not recovered 80%.
07:50	0.0	18.98'	—	—	—	—	—	—	12.12.01. well dry.

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

Note: Well considered Dry - only 0.2" of water in/fall/hr. K.H. 12/12/01

Ed Keitts

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Groundwater Well Development Log

Fort McClellan , Alabama

Project Number: 786887
Form Completed by: Z. Parham
Well Developed by (person/firm): Z. Parham (IT)

Parcel No.: 517
Well No.: CWM-517-MW03
Date started: 12.10.01

Monitoring Well Information

Development Method: surge/purge
Development Equipment: whale pump hose, PID, Horiba U-10, Turbidity meter, WLM,
Casing Diameter: 2"

Beginning Measurments
Depth to Water (ft): 3.57'
Total depth of Well (ft): 11.81'

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.)
11:15	0.0	3.23	5.80	.553	>999	2.96	14.4	dark grey	Pump at 11.7' bmc. PR=.3 gpm
11:20	1.5	6.77	—	—	—	—	—	—	PR=.05 gpm
11:30	2.25	6.65	5.75	.540	610	2.23	15.0	grey	"
11:45	3.00	6.59	5.81	.502	225	2.32	15.8	"	"
12:00	3.75	6.41	5.77	.511	212	2.33	16.4	"	PR=.08 gpm
12:15	4.95	7.15	5.80	.502	180	2.30	16.9	"	"
12:30	6.15	7.15	5.79	.501	183	2.31	17.0	"	"

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

11.81 - 3.57 = 8.24 x .163 = 1.34 g x 5 = 6.71 g + 0.0 = 6.71 gal.

QC: [illegible]

12/12/01

Parcel No.: 517
Well ID: cwm-517-mw03
Date: 12.10.01 / 12.11.01

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	7.35	7.15	5.79	.502	185	2.29	17.5	light grey	Pump raised to 10' btoc. PR = .08 gpm
13:00	8.55	7.15	5.80	.500	90	2.30	17.9	very light grey	"
13:15	9.75	7.16	5.82	.503	88	2.32	18.4	"	"
13:30	10.95	7.18	5.80	.501	54	2.33	18.5	"	"
13:45	12.15	7.28	5.78	.509	55	2.31	19.0	"	"
14:00	13.35	7.31	5.86	.502	84	2.28	19.9	"	Pump raised to 9' btoc PR = .08
14:15	14.55	7.29	5.80	.510	92	2.39	19.7	"	"
14:30	15.75	7.29	5.75	.511	75	2.25	20.1	"	"
14:45	16.95	7.33	5.71	.501	70	2.30	20.1	"	"
15:00	18.15	7.29	5.82	.509	73	2.41	20.5	"	"
15:15	19.35	7.25	5.80	.502	70	2.39	20.2	"	Ceased development for 12.10.01
08:45	19.35	3.63	—	—	—	—	—	—	Resumed development for 12.11.01 Pump = 10' btoc / PR = .08 gpm
09:00	20.55	6.01	5.96	.494	624	3.04	14.3	grey	"

Parcel No.: 517
Well ID: CWM-517-MW03
Date: 12.11.01

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
09:15	21.75	7.01	6.20	.435	185	2.54	16.2	grey	Pump at 10' btoc. PR = .08 gpm.
09:30	22.95	7.09	6.28	.420	180	2.95	16.6	"	"
09:45	24.15	7.12	6.25	.412	103	3.10	16.8	light grey	Pump raised to 9' btoc. PR = .08 gpm
10:00	25.35	7.10	6.22	.413	85	3.56	16.8	"	"
10:15	26.55	7.24	6.21	.415	81	3.43	16.9	"	"
10:30	27.75	7.39	6.25	.419	75	3.72	17.3	"	"
10:45	28.95	7.36	6.30	.418	105	3.27	16.7	"	"
11:00	30.15	7.44	6.28	.407	86	3.21	17.1	"	Pump lowered to 9' btoc. PR = .08 gpm
11:15	31.35	7.52	6.25	.411	69	3.22	17.1	"	stopped pumping well.
13:10	31.35	3.98	—	—	—	—	—	—	Resumed development. Pump at 9' btoc / PR = .08 gpm
13:25	32.55	6.78	6.22	.415	175	3.35	16.5	grey	"
13:40	33.75	6.71	6.28	.417	165	3.05	17.6	"	"
13:55	34.95	6.94	6.22	.415	169	3.30	17.9	"	"

Parcel No.: 517
Well ID: CVM-517-MW03
Date: 12.11.01

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
14:10	36.15	7.06	6.25	.410	140	3.21	18.1	light grey	Pump @ 9' btoc PR=.08 gpm
14:25	37.35	7.09	6.22	.416	103	3.33	18.2	"	"
14:40	38.55	7.14	6.28	.419	75	3.29	18.4	"	4hr development complete. 1 L HDPE photo sample taken.
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Sarah Pergl 12.11.01

Groundwater Well Development Log

Fort McClellan , Alabama

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

Parcel No.: CWM 517
Well No.: MW 04
Date started: 12-10-01

12-10-01 PID 0.0 , DTW 13.21 TOC

Monitoring Well Information

Development Method: Surge + purge
Development Equipment: whale pumps + 12v. battery

Casing Diameter: 2" .163

Beginning Measurments
Depth to Water (ft): 13.21 TOC
Total depth of Well (ft): 16.04 TOC

12-10-01 PID 0.0 , TD 16.04', Screen 4'-14'

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 Screen –
09:55	Ø	13.21	6.27	.495	999+	9.55	11.7	Brown	Purge Rate .10 gpm Depth 16.4. Light Rain
10:10	1.5	13.80	6.40	.512	999+	9.25	14.7	Brown	" "
10:25	3.0	14.23	6.57	.543	737	9.31	15.2	TAN	Purge Rate .10 gpm Depth 16.4.
10:40	4.5	14.83	6.57	.537	999+	9.21	16.2	TAN	" "
10:55	6.0	Below Pump	6.79	.522	999+	9.23	13.8	TAN	" "
11:10	7.5	Below Pump	6.82	.520	999+	9.72	13.8	TAN	" "
11:15	7.5	Dry – well RAN Dry –			—	—	—	—	WAit 20 min And check W.L. For 80% recovery

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

~~16.04 - 13.21 = 2.83 x .163 2.83 x .163 x 5 = .46 + 5 + 2.31 = 7.31 g~~ K.H. 12/12/01 K.H. 12/12/01

16.04 - 13.21 = 2.83 x .163 = .46 x 5 = 2.31 + 5 gy = 7.31 g

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80% = 2.83 x .80 = 2.264 - 16.04 TD = 13.78 ft. water level

QC'd [illegible] 12/12/01

Parcel No.: CWM S17
Well ID: MW04
Date: 12-10-01

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
11:35	7.5	14.29	Well did not cover 80%				Recharge	Rate =	16.04 TO -14.29 = 1.75/20 min = .0875 ft/min.
:									Stopped Parameters For the DAY ~~Lee Flippen~~ 12-10-01
12/11/01 Kyle Wilson TAKES OVER 09:15	7.5	12.2	6.05	.667	835	4.52	14.1	Brown	Pump@16' P.R. .05
09:30	stopped Pumping								KW
10:00	8.25	17.6	6.25	.583	1316	3.57	14.2	Brown	Pump@16' P.R .05
10:15	9.0	13.59	6.49	.585	285	3.50	15.0	Gray	Pump@16' P.R .05
10:30	9.75	13.85	6.45	.578	232	4.16	15.5	Gray	Pump@16' P.R .05
10:45	10.50	13.98	6.27	.582	163	4.29	15.7	Gray	Pump@16' P.R .05
11:00	11.25	14.07	6.31	.584	210	4.00	15.2	Gray	Pump@16' P.R .05
11:15	12.0	14.11	6.36	.576	167	3.50	15.1	Gray	Pump@16' P.R .05
11:30	12.75	14.20	6.38	.578	141	3.54	15.1	Gray	Pump@16' P.R .05
:	stopped pumping								KW
13:00	12.75	13.58	6.56	.547	418	2.89	15.1	Gray	Pump@16' P.R .05

Parcel No.: 517
Well ID: mw04
Date: 12/11/01

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)
13:15	13.50	13.77	6.32	.557	240	2.96	15.0	Gray	Pump @ 16' P.R. .05
13:30	14.25	13.99	6.30	.565	44.5	4.63	16.4	CLEAR	Pump @ 16' P.R. .05
13:45	15.0	14.18	6.29	.582	23.5	4.28	17.1	CLEAR	pump @ 16' P.R. .05
14:00	15.75	14.33	6.33	.583	60.4	4.44	16.4	cloudy/clear	pump @ 16' P.R. .05
14:15	16.50	14.83	6.29	.562	34.6	3.32	16.9	CLEAR	pump @ 16' P.R. .05
14:30	17.25	WELL WENT DRY WHILE FILLING SAMPLE							
									EQW
2/6/01 08:30	17.25	12.99	6.03	.484	236	-.22	15.0	Lt. Brown gray	pump @ 16' P.R. .055
08:45	18.0	13.51	6.36	.450	96.6	-.07	16.7	gray	pump @ 16' P.R. .05
09:00	18.75	13.73	6.38	.452	78.6	-.10	17.0	gray	pump @ 16' P.R. .05
09:15	19.50	13.90	6.41	.457	49.2	-0.15	17.2	Cloudy	pump @ 16' PR .05
09:30	20.25	14.06	~~.461~~ 6.39 EQW	.461	77.2	-0.13	17.4	Cloudy	pump @ 16' PR .05

Parcel No.: 517
Well ID: mw04
Date: 12/12/01

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 (Date if different from start date)
09 : 45	21.0	14.16	6.41	.460	84.3	-.13	17.9	cloudy	pump @ 16' P.R. .05
10 : 00	21.75	14.22	6.41	.464	87.2	-.13	17.9	cloudy	pump @ 16' P.R. .05
10 : 15	22.50	14.22	6.31	.463	171	-.16	16.4	cloudy	pump @ 16' PR .05
10 : 30	23.25	14.28	6.32	.457	159	-.12	16.3	cloudy	pump @ 16' PR .05
10 : 45	24.0	14.33	6.39	.452	79.8	-.10	16.3	cloudy	pump @ 16' PR .05
11 : 00	24.75		6.48	.476	138	-.15	17.3	cloudy	pump @ 16' P.R. .05
: WELL WENT DRY going to let RECHARGE & finish.									
11 : 30	24.75	+4 13.98	6.37	.458	230	-.14	15.9	gray	pump @ 16' P.R. .05
11 : 45	25.50	14.44	6.38	.453	396	-.15	15.8	gray	pump @ 16' P.R. .05
12 : 00	26.25	Dry			196			gray	took 1L sample for photo; WELL
:									went dry
:									