APPENDIX C

WELL DEVELOPMENT LOGS

Groundwater Well Development Log

Fort McClellan , Alabama

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

Parcel No.: HR-88Q-MW01
Well No.: MW01
Date started: 2/13/02

Monitoring Well Information

Development Method: Surge and Purge
Development Equipment: Whale pump and ~~bailer~~ (PC)
Horiba U-22, PID, Turbidity Meter
Casing Diameter: 2in

Beginning Measurments
Depth to Water (ft): 28.76
Total depth of Well (ft): 67.85

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.)
15:35	ϕ	29.75	5.91	0.293	999	9.98	15.59	muddy (red-brown)	PR-0.25gpm, Pump-1' from bottom
15:50	3.45	36.20	5.63	0.257	999	9.01	16.52	cloudy (red-brown)	PR-0.16gpm
15:55	4.25	—	rate change	—	—	—	—	—	PR-0.125gpm
16:00	4.87	40.15	5.95	0.242	999	8.78	16.28	cloudy (red-brown)	PR-0.125gpm
10:30	4.87	28.9	5.54	0.253	999	10.25	14.75	muddy (red-brown)	2/14/02 PR-0.16gpm, pump-1' from bottom
10:40	6.47	—	rate change	—	—	—	—	—	PR-0.125gpm
10:50	7.72	—	stopped purging	—	—	—	—	—	stopped purging problem w/ generator

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

67.85 − 28.76 = 39.09 x 0.163 = 6.37gal x 5 = 31.85gal + 130 gal = 161.85

QC's [illegible] 2/14/02

Parcel No.: HR-880
Well ID: HR-880-MW01
Date: 2.19.02

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	
									Resumed development on 2.19.02	
12:10	7.72	29.03	6.37	.284	>999	10.29	15.32	brown	Pump = 66' toc	PR = .20 gpm
12:20	10.22				rate change				"	PR = .125 gpm
12:25	10.85	33.4	6.35	.269	>999	10.14	15.92	brown	"	"
12:40	12.73	39.71	6.41	.270	480	9.79	17.21	light brown	"	"
12:55	14.6	43.03	6.41	.239	214	9.28	17.37	tan	Pump = 64' toc	PR = .125 gpm
13:00	15.23				rate change				"	PR = .08 gpm
13:10	16.03	45.78	6.55	.267	>999	9.49	18.19	brown	"	"
13:25	17.23	47.98	6.68	.225	307	9.31	18.05	tan	"	"
13:40	18.43	48.90	6.58	.230	180	8.47	18.97	light tan	Pump = 62' toc	"
13:55	19.63	48.98	6.56	.213	187	8.24	18.98	"	"	PR = .125 gpm
14:10	21.51	49.71	6.71	.233	200	8.70	19.34	tan	"	"
14:25	23.38	49.92	6.59	.266	166	9.23	19.16	"	Pump = 60 toc	"
14:40	25.22	50.12	6.70	.250	205	9.12	19.20	"	"	"

toc = below top of column gpm = gallons per minute

Parcel No.: HR-88Q-MW01
Well ID: MW01
Date: 2/19/02

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)
13:05	32.15	—	—	pump	malfunction	—	—	—	—
13:35	32.15	29.42	—	—	—	—	—	—	2/22/02 purged w/ bailer
13:39	33.15	34.15	5.99	0.198	969	10.09	15.1	clouds (red-brown)	
13:45	34.15	37.10	6.13	0.205	850	9.78	15.6	"	
13:54	35.15	39.90	6.20	0.199	700	11.28	15.0	"	
14:00	36.15	42.45	6.01	0.198	667	12.05	14.9	"	
14:09	37.15	44.35	6.03	0.197	870	11.61	14.9	"	
14:17	38.15	46.10	6.05	0.200	899	10.99	15.0	"	
14:23	39.15	48.05	6.09	0.225	976	11.37	14.9	"	
14:30	40.15	50.52	6.11	0.248	892	10.95	15.2	"	
14:35	41.15	53.00	6.03	0.237	950	11.01	15.3	"	
14:42	42.15	55.25	6.12	0.243	999	11.29	15.1	"	

4hr

Parcel No.: HR-880-mw01
Well ID: mw01
Date: 2/22/01

3-7-02 Lee FLIPPEN screen 46'-66', PID 1.4 BZ 0.0, TD 67.85', DTW 30.36', WC = 37.49

	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
	14:49	43.15	57.18	6.09	0.250	999	11.09	14.9	Clouds (red-brown)	
3½ hrs	3-7-02 WC= 37.49 ft. Lee FLIPPEN PID 1.4 BZ 0.0, DTW=43.15', TD 67.85ft.									
	10:00	43.15	30.36	5.55	.232	413	8.56	16.8	Brown	Moved to 48 ft. Depth 46 ft. Purge Rate = .4 gpm
5 hrs	10:15	49.15	46.31	5.76	.189	817	7.30	17.9	Brown	Depth 50 ft, 52 ft, 54 ft. PR. .4 gpm
	10:30	55.15	48.19	5.75	.206	999+	5.41	17.5	Brown	Depth 56 ft, 58 ft, 60 ft. PR .4 gpm
	10:45	61.15	49.91	5.94	.298	999+	4.40	17.9	Brown	Depth 62, 64 ft PR .4 gpm
	11:00	67.15	58.11	6.11	.357	999+	3.76	17.6	Brown	Depth 66 ft PR .4 gpm
6 hrs	11:15	73.15	60.93	6.05	.358	999+	4.36	17.0	Brown	Depth 66 ft. PR .4 gpm
	11:30	79.15	61.88	6.10	.370	999+	4.18	17.6	Brown	Depth 66 ft PR .4 gpm
	11:45	85.15	62.40	6.25	.439	999+	4.08	17.5	Brown	Generator cut OFF - Restarted Depth 66 ft. PR. .25 gpm
	12:00	88.9	65.81	6.13	.421	999+	4.04	17.7	Brown	Depth 67 ft. PR. .10 gpm
7 hrs	12:15	90.4	64.19	6.34	.474	999+	4.07	16.8	Brown	Depth 66 ft. PR .10 gpm
	12:30	91.9	63.83	6.24	.346	999+	4.02	17.1	cloudy	Depth 66 ft. PR .10 gpm

Parcel No.: HR 88Q
Well ID: MW01
Date: 3-7-02

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
12:35	Generator problems - Errors-GF9 (Ground Fault) + UC1 (overload) + UU (undercurrent)								
13:05	91.9	60.11	6.42	.493	918	4.44	16.8	cloudy	Depth 66 ft. Purge Rate .10 gpm
13:20	93.4	62.21	6.34	.411	999+	4.78	17.5	cloudy	Depth 66 ft PR .10 gpm
13:35	94.9	63.32	6.47	.504	999+	4.33	17.0	cloudy	Depth 66 ft. PR. 10 gpm
13:50	96.4	64.18	6.45	.498	999+	4.78	17.3	cloudy	- 8 hours Development time - Took 1 l. H2O Photo Sample
13:55		Purge well Dry @ .4 gpm							- Purged to Dry - Depth 67 ft. PR. 4 gpm
14:01	98.8	well Dry @ 14:01 - 2.4 gr purged -							Well Development Completed
:									Lee Flippen 3-7-02
:									
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Lee Flippen 3-7-02

Groundwater Well Development Log

Fort McClellan , Alabama

Project Number: 796897
Form Completed by: L. Coins
Well Developed by (person/firm): R. Coins / JS

Parcel No.: HR-889
Well No.: MW02
Date started: 2/7/02

Monitoring Well Information

Development Method: Surge & Purge
Development Equipment: Whale Pump, 210 gal tank, Horiba U-10, Turbidimeter
Casing Diameter: 2 in

Beginning Measurments
Depth to Water (ft): 26.34
Total depth of Well (ft): 45.09

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.)
11:50	–	26.34	6.69	0.313	999	8.53	12.2	cloudy (brown)	PR - 0.4gpm, pump - 0.5ft below location
11:53	1.2	—	—	rate change	—	—	—	—	PR - 0.16gpm
12:05	3.12	28.85	6.73	0.297	999	6.72	12.2	cloudy (brown)	"
12:12	4.24	—	—	rate change	—	—	—	—	PR - 0.187gpm
12:20	5.74	29.75	6.95	0.296	999	6.45	12.4	lt brown	PR - 0.197gpm, 1ft below from prev. position
12:35	8.55	29.70	6.83	0.287	700	6.59	12.5	"	PR - 0.25gpm
12:50	12.30	30.05	6.80	0.289	658	5.05	12.6	"	PR - 0.25gpm, 1ft below from prev. position

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

45.09 - 26.34 = 19.75 x 0.163 = 3.05gal x 5 = 15.25 + 105gal = 120.25

QC'd [illegible] 2/12/02

Parcel No.: HR-880
Well ID: MW02
Date: 2/7/02

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
13:05	16.05	30.01	7.28	0.271	500	7.22	12.9	lt brown	PR-0.33gpm, pump lift from previous position
13:20	21.00	30.55	7.03	0.260	577	6.77	13.2	"	PR-0.3gpm
13:35	25.5	30.74	6.93	0.259	315	4.06	13.6	beige	PR-0.31gpm, pump lift from prev. position
13:50	30.15	30.70	7.09	0.250	465	6.78	13.3	"	PR-0.31gpm
14:05	34.80	30.85	6.99	0.253	140	5.32	13.2	"	PR-0.31gpm, pump lift from prev. position
14:20	39.45	30.95	7.28	0.250	100	6.62	13.3	"	"
14:35	44.10	31.05	6.96	0.274	61	7.20	13.9	"	PR-0.31gpm,
14:50	48.75	30.80	7.05	0.238	50	7.11	13.7	"	PR-0.25gpm
14:55	50.00	stopped purging							
15:00	50.00	resume purging							PR-0.25gpm
15:05	51.25	30.40	7.15	0.225	703	7.89	14.1	brown	"
15:25	55.00	30.85	7.29	0.268	200	6.55	14.6	brown	" , stopped pumping @ 1525.
:									

Parcel No.: HR 880
Well ID: MW02
Date: 2/11/02

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
10:15	55.00	27.2	5.34	0.219	999	9.00	13.29	cloudy (red-brown)	2/11/01 PR~0.27 g/min pump - 5ft from bottom
10:25	57.70	—	—	— rate	change	—	—	—	PR~0.25 g/min
10:30	58.95	31.08	5.90	0.229	999	8.43	14.50	cloudy (red-brown)	PR~0.25 g/min
10:40	61.45	—	—	stopped	purging	—	—	—	
11:00	61.45	27.30	6.32	0.269	999	9.24	15.39	cloudy (red-brown)	PR~0.21 g/min 5ft from bottom
11:15	64.60	30.10	6.51	0.265	234	9.49	15.34	cloudy (dark tan)	PR~0.20 g/min - 2ft from prev. position
11:30	67.60	30.57	6.60	0.266	218	10.30	16.01	"	PR 0.25 g/min
11:45	71.35	30.70	6.70	0.251	178	10.22	15.97	"	PR~0.27 g/min
12:00	74.80	31.05	6.95	0.252	85	10.54	15.70	pt. cloudy (tan)	PR~0.23 g/min, 2ft from previous position.
12:15	78.25	31.29	6.95	0.263	138	10.54	15.85	"	" "
12:30	81.70	31.38	6.92	0.254	98	9.73	16.25	"	PR~0.23 g/min
12:45	85.15	31.42	6.85	0.252	40	9.03	16.07	clear	PR~0.23 g/min, 2ft. from position
13:00	88.60	31.55	7.03	0.248	120	8.89	16.50	tan	PR~0.23 g/min

Parcel No.: WR-880
Well ID: MW02
Date: 2/11/02

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
13:15	92.25	31.45	6.99	0.251	37.0	8.83	15.76	clear	PR-0.23 g/min
13:30	95.5	31.41	7.10	0.250	71	8.56	16.36	pt. cloudy	PR-0.24 g/min, pump @ top of screen
13:35	96.7	→	note	change	→				PR-0.23 g/min
13:45	100.15	31.64	7.09	0.239	26	8.59	16.33	clear	"
14:00	103.60	31.65	7.01	0.241	18	8.62	15.76	clear	"
14:15	107.05	31.68	7.03	0.242	15.2	8.58	16.05	"	PR-0.22 g/min
14:30	110.35	31.72	7.00	0.243	11.8	8.55	16.16	"	"
14:45	113.65	31.75	7.02	0.241	9.9	8.59	16.25	"	"
15:00	116.95	31.77	7.03	0.244	9.7	8.63	16.43	clear	PR-0.22 g/min
15:05	118.05	31.78	7.01	0.243	9.9	8.60	16.45	"	"
15:10	119.15	31.77	7.04	0.242	9.6	8.58	16.42	"	"
15:15	120.25	31.80	7.03	0.244	9.3	8.61	16.45	"	"
15:20	121.35	31.81	7.02	0.245	9.1	8.57	16.46	"	PR-0.22 g/min

Parcel No.: HR-889
Well ID: MW02
Date: 2/11/02

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
15:20	→	—	—	—	—	—	—	—	Collected 1L poly bottle of purge water
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Reginald Long
Mr
Further Entries
2/11/02

Groundwater Well Development Log

Fort McClellan , Alabama

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

Parcel No.: HR-88Q
Well No.: MW67
Date started: 2/12/02

Monitoring Well Information

Development Method: Surge and Purge
Development Equipment: Whale Pump, PID, Horiba U-22, Turbidity Meter
Casing Diameter: 2in

Beginning Measurments
Depth to Water (ft): 24.40
Total depth of Well (ft): 50.27

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	∅	24.40	5.52	0.103	999	10.01	14.99	cloudy (red brown)	PR-0.5g/min, pump - 0.5' from bottom
09:18	4.0			stopped	purging				
09:25	4.0			resume	purging				PR-0.16g/min
09:30	4.8	26.85	5.26	0.060	999	10.33	14.06	cloudy (red-brown)	PR-0.125g/min
09:45	6.68	27.25	5.14	0.058	999	10.82	14.35	"	PR-0.33g/min
09:52	8.99			rate	change				PR-0.125g/min
10:00	9.99	27.85	5.23	0.060	875	11.08	14.52	cloudy (red-brown	PR-0.16g/min

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

50.27 - 24.40 = 25.87 X 0.163 = 4.22 X 5 = 21.1 gal 140 gal = 161.1 gal

QC'd 2/14/02

Parcel No.: HR-880
Well ID: MW03
Date: 2/13/02

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
10:15	12.49	28.88	5.33	0.057	604	10.27	15.15	cloudy (dark beige)	PR-0.16 g/min, pump-mud 2ft from previous position
10:30	14.97	29.60	5.80	0.057	569	12.50	16.20	"	PR-0.187 g/min
10:45	17.77	29.94	5.87	0.068	229	13.20	17.10	pt. cloudy lt. beige	PR-0.187 g/min, mud 2ft from previous position
11:00	20.57	29.65	5.26	0.053	207	13.37	18.57	"	PR-0.216 g/min, mud 2ft
11:15	23.81	30.11	5.39	0.057	484	14.02	18.32	"	PR-0.2 g/min
11:20	24.81	—	rate change	—	—	—	—	—	PR-0.3 g/min
11:30	27.81	30.95	5.49	0.052	179	14.33	18.75	pt. cloudy lt. beige	PR-0.25 g/min
11:35	29.06	—	stopped	pumping					
13:40	29.06	24.55	5.49	0.057	999	15.69	~~15.69~~ 16.79	cloudy (red brown)	PR-0.3 g/min, pump-6' from bottom
13:48	31.46	—	rate change	—	—	—	—	—	PR-0.23 g/min
13:55	33.07	29.20	5.44	0.051	999	13.41	16.86	cloudy (red-brown)	PR-0.21 gpm
14:10	36.22	29.75	5.52	0.054	370	12.02	16.59	cloudy (lt. red-brown)	"
14:25	39.37	29.93	5.47	0.050	64	11.74	16.51	pt. cloudy (lt. beige)	"

Parcel No.: HR-880
Well ID: MW03
Date: 2/12/02

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)
14:40	42.52	30.00	5.55	0.047	25	11.10	16.24	clear	PR-0.21gpm, pump-2ft from previous position
14:55	45.67	30.02	5.41	0.045	600	11.70	16.29	cloudy (red-brown)	PR-0.21gpm
15:10	48.82	30.06	5.50	0.045	89	10.40	16.21	pt cloudy (lt. beige)	PR-0.25gpm
15:25	52.57	31.35	5.57	0.040	29	10.38	16.18	clear	PR-0.27gpm
15:40	56.62	31.90	5.60	0.038	28	10.20	16.04	"	"
15:55	60.67	32.10	5.59	0.035	125	9.29	15.84	"	PR-0.75gpm
16:09	71.17	—							Well is dry.
08:20	71.17	24.65	5.06	0.066	999	10.23	13.07	cloudy (red-brown)	2/13/02 PR-0.187g/min, pump-7' above bottom of well
08:30	73.04	—		rate	change	—			PR-0.~~188~~ 0.176g/min
08:35	77.92	27.60	5.12	0.053	750	8.97	14.57	cloudy (red-brown)	#1
08:50	76.56	28.40	5.06	0.044	414	9.28	14.27	"	"
09:06	78.32	—		rate	change	—			PR-0.187g/min

Parcel No.: HR-88Q
Well ID: MW03
Date: 2/13/02

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
09:05	79.25	28.75	5.04	0.045	71	8.67	14.67	pt. cloudy (beige)	PR-0.187gpm
09:20	82.06	28.89	5.10	0.043	29	8.87	14.90	clear	PR-0.176gpm, pump-10ft from bottom
09:30	83.82	—	—	rate	change	—	—	—	PR-0.240gpm
09:35	85.02	29.61	5.07	0.044	424	9.91	15.47	cloudy (red-brown)	PR-0.170gpm
09:45	86.92	—	—	rate	change	—	—	—	PR-0.125gpm
09:50	87.54	29.15	5.09	0.045	212	10.16	16.45	pt. cloudy (beige)	PR-0.190gpm
10:05	90.39	29.44	5.11	0.042	80	10.30	16.53	"	"
10:20	93.24	29.73	5.19	0.043	51	10.49	17.23	clear	PR-0.190gpm, pump 12' from bottom
10:35	96.09	30.15	5.22	0.039	180	11.34	17.23	pt. cloudy (beige)	PR-0.190gpm
10:50	98.94	30.38	5.18	0.040	116	10.98	17.35	"	"
11:05	101.79	30.50	5.14	0.038	68	11.05	17.68	"	PR-0.187gpm
11:20	104.59	30.72	5.10	0.041	50	11.16	17.92	"	~~PR-0.16~~ PR-0.187gpm, pump 14' from bottom
11:35	107.39	30.85	5.12	0.043	438	10.88	17.85	cloudy (red-brown)	PR-0.187gpm

Parcel No.: HR-88Q
Well ID: MW03
Date: 2/13/02

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)
11:50	110.24	30.26	5.13	0.040	125	11.05	18.03	cloudy (red brown)	PR-0.190 gpm
12:05	113.09	31.20	5.11	0.038	200	11.16	18.15	"	PR-0.190 gpm, pump-16' from bottom
12:15	114.99	31.48	5.10	0.037	188	11.20	18.18	"	PR-0.190 gpm
12:20	115.94	31.55	5.12	0.039	55	11.18	18.10	pt. cloudy (beige)	"
12:25	116.89	31.61	5.09	0.040	34	11.15	18.13	clear	Collected photo sample in 1L poly bottle.
:								~~clear~~	
:									8hr period ended.
:									
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:									

Reginald Dunn 2/13/02
Final Entry

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 102 Q
Well No.: MW01
Date started: 2-12-02

PID 0.6 BZ 0.0 screen 20'-40'

Monitoring Well Information

W.C. = 18.23' (Water Column)

Development Method: Surge + Purge
Development Equipment: whale Pumps, Horiba U-10 Aqua fast II, Heron water indicator
Casing Diameter: 2" .163

Beginning Measurments
Depth to Water (ft): 23.88 ft. bgs TOC
Total depth of Well (ft): 42.11 ft. bgs 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.)
									-Surged Entire well Screen-
13:35	Ø	23.88	5.77	.110	999+	3.91	16.9	Brown	Depth 40', Purge Rate = .35 gpm
13:50	5.25	28.48	5.50	.088	999+	3.52	17.8	Brown	Depth 40', PR .35 gpm
14:05	10.5	29.98	5.45	.084	999+	2.56	19.0	Brown	Depth 40', PR .35 gpm
14:20	15.75	32.82	5.20	.069	999+	4.53	18.2	Brown	Depth 40', PR .35 gpm
14:35	21.0	38.58	5.28	.069	999+	6.08	18.2	Brown	Depth 40', PR .10 gpm
14:50	22.5	32.12	5.24	.078	999+	5.46	19.2	Brown	Depth 40', PR .10 gpm
15:05	24.0	30.13	5.19	.062	999+	5.58	18.7	Brown	Depth 40', PR .20 gpm

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

42.11 - 23.88 = 18.23 x .163 = 2.97 x 5 = 14.85++ 110 g Loss = 124.85 g

Dec'd [illegible] 2/14/02

Parcel No.: HR102Q
Well ID: MW01
Date: 2-12-02

2-13-02 PID 0.0, DTW 24.39', WC= 17.72' 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
15:20	27.0	30.38	5.01	.042	162	6.45	18.1	cloudy	Depth 40 ft. Purge Rate .25 gpm
15:35	30.75	30.20	4.99	.040	60	7.68	17.8	cloudy	Depth 40 ft. PR .60 gpm
2hrs 15:50	39.75 (39.75 ft 2-12-02)	33.22	5.02	.042	280	8.42	17.5	cloudy	2-12-02 ~~Sealed Flippen~~ stopped parameters 2-13-02
2-13-02 09:10	39.75	24.39	5.07	.072	273	8.51	18.0	cloudy	Depth 26 ft, 28 ft, 30 ft PR=.25 gpm
09:25	43.5	26.36	4.21	.043	251	7.84	17.4	cloudy	Depth 32 ft, 34 ft, PR .25 gpm
09:40	47.25	27.98	4.22	.040	190	7.05	17.4	cloudy	Depth 36', 38', PR .25 gpm
09:55	51.0	28.97	4.45	.043	58	6.73	17.6	cloudy	Depth 40', PR .25 gpm
3hrs 10:10	54.75	29.92	4.52	.038	148	6.43	17.7	cloudy	Depth 40' PR .25 gpm
10:25	58.5	30.29	4.64	.039	50	6.68	17.8	cloudy	Depth 40' PR .25 gpm
10:40	62.25	29.93	4.75	.038	91	6.49	17.7	cloudy	Depth 40' PR .25 gpm
10:55	66.0	30.24	4.72	.035	24	6.30	18.2	clear	Depth 40' PR .25 gpm
4hrs 11:10	69.75	29.48	4.83	.036	16.3	5.81	18.1	clear	Depth 40' PR .25 gpm
11:25	73.5	30.77	4.91	.037	55	6.24	17.6	cloudy	Depth 40' PR .35 gpm

Parcel No.: HR102Q
Well ID: MW01
Date: 2-13-02

2-13-02 PID 0.0 DTW 24.39' WC 17.72' 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
11:40	78.75	31.66	4.90	.037	26	7.04	17.9	clear	Depth 40' Purge Rate .35gpm
11:55	84.0	32.67	4.91	.036	3.2	6.92	17.9	clear	Depth 40' PR .35gpm
12:10	89.25	33.10	4.90	.034	38	7.12	17.8	clear	Depth 40' PR .35gpm
12:25	94.5	33.72	4.87	.033	101	6.52	17.9	cloudy	Depth 40' PR .35gpm
12:40	99.75	33.94	4.90	.033	196	6.97	17.8	cloudy	Depth 40' PR .35gpm
12:55	105.0	34.48	4.88	.032	40	6.41	17.8	cloudy	Depth 40' PR .35gpm
6hrs 13:10	110.25	34.92	4.91	.032	21	6.67	17.6	clear	Depth 40' PR .25gpm
13:25	114.0	32.91	4.88	.032	36	7.05	17.4	clear	Depth 40' PR .25gpm
13:40	117.25	31.61	4.93	.032	87	6.69	16.3	cloudy	Depth 40' PR .20gpm
13:55	120.25	29.99	4.87	.032	35	6.84	17.6	clear	Depth 40' PR .20gpm
14:10	123.25	29.73	4.91	.032	12	6.54	18.0	clear	Depth 40' PR .10gpm
14:25	124.75	29.06	4.91	.031	7.7	6.45	16.8	clear	Depth 40' PR .10gpm
14:40	126.25	28.30	4.92	.032	5.9	6.58	16.2	clear	-Reached TArget Purge Volume - Depth 40' PR .10gpm
8hrs 14:55	127.75	27.72	4.93	.032	8.6	6.51	15.6	clear	-8hrs Development time Completed - Took 1 l. H2O Photo Sample

Lee Flippen
2-13-02

Groundwater Well Development Log

Fort McClellan , Alabama

Project Number: 196887
Form Completed by: R. Gains
Well Developed by (person/firm): R. Gains

Parcel No.: HR-1060X
Well No.: MW03
Date started: 2/20/01

Monitoring Well Information

Development Method: Surge and Purge
Development Equipment: Bailer, Whale pump, 210 gal poly tank, Horiba U-10, Orion Turbidity Meter
Casing Diameter: 2in

Beginning Measurments
Depth to Water (ft): 26.66
Total depth of Well (ft): 33.57

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.)
09:00	Ø	26.66	6.41	0.627	999	6.85	16.4	muddy (red-brown)	purged w/bailer
09:10	0.75	29.40	6.45	0.612	999	5.10	16.1	"	"
09:17	1.5	28.75	6.49	0.605	999	6.29	15.9	"	"
09:45	1.5	27.20	6.53	0.499	999	5.82	16.64	"	PR-0.3gpm, pump-0.5ft from bottom
09:50	3.0	—	—	note	change	—	—	—	PR-0.166gpm
09:55	3.83	—	—	note	change	—	—	—	PR-0.25gpm
10:00	5.08	27.60	6.60	0.359	999	6.84	16.70	muddy (red-brown)	PR-0.125gpm, raised pump 1ft

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

33.57'-26.66' = 6.91' x 0.163 gal/ft = 1.13 gal x 5 = 5.65 gal + 85 gal = 90.65

QC'd 2/26/02

Parcel No.: HR-1060X
Well ID: MW01
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
10:10	6.33	—	—	note	change	—	—		PR-1 gpm
10:12	8.33	—	—	note	change	—	—		PR-0.25 gpm
10:15	9.08	27.85	6.65	0.295	999	5.25	16.85	muddy (red-brown)	"
10:30	12.83	27.79	6.70	0.285	"	6.55	16.90	"	"
10:45	16.58	27.74	6.74	0.267	"	5.55	16.90	"	"
11:00	20.33	27.72	6.76	0.271	916	6.19	17.10	"	"
11:15	24.08	27.71	6.77	0.275	999	5.96	17.10	"	"
11:30	27.83	27.68	6.78	0.266	701	6.55	17.10	lt. brown (pts cloudy)	"
11:37	29.58	—	—	—	note	change	—	—	PR-0.3 gpm
11:45	31.98	28.05	6.81	0.267	333	6.61	17.2	(lt. brown) pts cloudy	"
12:00	36.48	27.95	6.93	0.263	327	6.65	17.2	"	PR-0.28 gpm
12:08	38.72	—	—	note	change	—	—	—	PR-0.30 gpm
12:15	40.82	28:06	6.80	0.273	184	6.36	17.3	(lt. brown (pts cloudy)	"

Parcel No.: HR-1060X
Well ID: MW01
Date: 2/25/02

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
12:30	45.32	28.05	6.82	0.268	164	6.52	17.3	lt. brown (pt. cloudy)	PR-0.33gpm
12:40	48.62	—	—	no	change	—	—	—	PR-0.35gpm
12:45	50.37	28.25	6.85	0.270	117	6.48	17.4	lt. brown (pt. cloudy)	PR-0.35gpm, raised pump 1 ft
13:00	55.62	28.25	6.87	0.267	341	5.66	17.4	red-brown (cloudy).	PR-0.35gpm
13:15	60.87	28.26	6.81	0.269	199	5.38	17.3	"	"
13:30	66.12	28.26	6.83	0.268	120	5.67	17.2	"	"
13:45	71.37	28.26	6.84	0.267	128	5.35	17.3	"	"
14:00	76.67	28.25	6.84	0.266	198	6.43	17.2	"	"
14:15	81.87	28.26	6.84	0.267	90	6.54	17.1	pt. cloudy (lt. brown)	"
14:30	87.12	28.26	6.87	0.264	127	5.70	17.3	red-brown (cloudy)	PR-0.35gpm
14:45	92.37	"	6.89	0.263	93	5.98	17.2	pt. cloudy lt. brown	"
15:00	97.62	"	6.88	0.263	67	6.39	17.2	"	PR-1.2gpm, lowered pump to 3" from bottom
15:15	115.62	31.75	6.74	0.288	999	6.13	16.8	muddy red-brown	PR-1.0gpm

Parcel No.: HR-106QY
Well ID: MW01
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
15:30	133.62	31.29	6.98	0.276	476	6.29	16.6	cloudy (red-brown)	PR-1.2gpm
15:45	151.62	31.05	6.82	0.266	176	6.49	16.8	pt. cloudy (red-brown)	" , raised pump to 2ft from bottom
08:30	151.62	27.00	6.44	0.404	584	8.42	14.2	(lt. brown) (red) cloudy	2/22/02 pump at 2ft from bottom, PR-0.187gpm
08:45	154.33	27.50	6.57	0.314	92	10.47	15.0	pt. cloudy (lt. brown)	PR-0.187gpm
09:00	157.13	27.51	6.67	0.296	34	11.00	15.4	clear	PR-0.187gpm, raised pump 1ft
09:15	159.93	27.61	6.63	0.296	117	10.85	15.5	cloudy (lt. brown)	PR-0.187gpm
09:30	162.73	27.60	6.64	0.289	71	9.97	15.5	pt cloudy (lt brown)	"
09:45	165.53	27.60	6.63	0.296	53	10.04	15.4	"	"
10:00	168.33	27.60	6.64	0.290	39	9.89	15.8	clear	"
10:15	171.13	27.59	6.67	0.282	47	11.10	15.5	pt. cloudy (lt. brown)	"
10:20	172.06	27.60	6.66	0.285	65	10.98	15.6	"	"
10:25	172.99	27.60	6.68	0.283	68	10.73	15.7	"	"
10:30	173.92	27.61	6.65	0.285	52	11.06	15.5	"	PR-0.187gpm, 8hr. period established

Parcel No.: HP-106QX
Well ID: MW01
Date: 2/22/01

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)
10:35	174.85	27.60	6.67	0.282	40	10.95	15.9	pt cloudy lt brown	PPR = 0.187 gpm
:									8hr period cont. @ 1030 Collected photosample.
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Final Entry
Regraded from 2/22/02

APPENDIX D

SURVEY DATA

Appendix D

Survey Data
Range 30 Firing Line Area, Parcels 88Q, 102Q, and 106Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location	Northing	Easting	Ground Elevation (ft amsl)	Top of Casing Elevation (ft amsl)
HR-88Q-GP01	1180348.47	674049.72	767.94	NA
HR-88Q-GP02	1180506.27	674268.28	763.61	NA
HR-88Q-GP03	1180503.50	673924.10	771.67	NA
HR-88Q-GP04	1180576.11	674033.40	770.25	NA
HR-88Q-GP05	1180599.45	673891.33	776.69	NA
HR-88Q-GP06	1180993.25	674330.21	761.53	NA
HR-88Q-GP07	1180989.11	674198.98	763.39	NA
HR-88Q-GP08	1181040.52	674542.58	791.31	NA
HR-88Q-GP09	1180904.67	674478.93	764.87	NA
HR-88Q-GP10	1180949.07	674551.96	766.73	NA
HR-88Q-GP11	1181050.00	674640.72	765.83	NA
HR-88Q-GP12	1180916.35	674582.15	765.70	NA
HR-88Q-GP13	1180713.81	674548.22	760.88	NA
HR-88Q-GP14	1180949.07	674533.06	767.15	NA
HR-88Q-GP15	1180939.95	674549.00	767.55	NA
HR-88Q-GP16	1180667.05	674102.43	766.98	NA
HR-88Q-GP17	1180798.13	674179.35	759.16	NA
HR-88Q-GP18	1180979.42	674473.54	764.63	NA
HR-88Q-GP19	1180440.88	673820.99	800.06	NA
HR-88Q-GP20	1180735.85	674026.17	771.97	NA
HR-88Q-GP21	1180885.55	674118.61	767.56	NA
HR-88Q-GP22	1180375.63	674535.33	766.86	NA
HR-88Q-GP23	1180589.02	674725.08	771.80	NA
HR-88Q-GP24	1180167.24	674627.34	767.66	NA
HR-88Q-GP25	1180352.24	674873.56	771.66	NA
HR-88Q-MW01	1180343.25	674343.92	764.76	766.83
HR-88Q-MW02	1180634.06	674406.87	762.62	764.68
HR-88Q-MW03	1180905.90	674235.20	759.76	761.71
HR-88Q-SW/SD01	1180965.34	674972.72	762.38	NA
HR-88Q-SW/SD02	1181208.87	674628.96	759.64	NA
HR-102Q-GP01	1180551.63	675129.08	775.75	NA
HR-102Q-GP02	1180744.49	675038.86	769.71	NA
HR-102Q-MW01	1180740.44	674796.08	764.28	766.32
HR-106Q-GP01	1180823.18	673952.40	773.43	NA
HR-106Q-GP02	1180916.23	674029.11	774.31	NA
HR-106Q-GP03	1180851.27	674052.06	779.72	NA
HR-106Q-GP04	1181124.64	674093.26	758.66	NA
HR-106Q-GP05	1181013.05	673927.19	773.46	NA
HR-106Q-GP06	1181010.85	674175.39	761.28	NA
HR-106Q-GP07	1180711.88	673885.60	771.97	NA
HR-106Q-MW01	1181125.30	673948.38	760.73	762.86
HR-106Q-SW/SD01	1181426.24	674181.98	770.99	NA

Horizontal coordinates referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983 (NAD83).

Elevations referenced to the North American Vertical Datum of 1988 (NAVD88).

ft amsl - Feet above mean sea level.
NA - Not applicable.

APPENDIX E

VARIANCE REPORT

INTERNATIONAL TECHNOLOGY CORPORATION

Variance No: PARCEL106Q-XJUNE02.VR01

Linked w/NC No: x

Date of Issue: 6-18-02

Page _1 of 1__

Project Name: **Fort McClellan** – CK11

Project Number: 796887.11020300

-Variance Report -

I.Description: (by the person identifying the change)

FINAL SITE-SPECIFIC FIELD SAMPLING PLAN, FORMER GRENADE RANGE/AREA, PARCEL 106Q-X

The Final Site-Specific Field Sampling Plan (FSSFSP) proposed a surface water sample and sediment sample at sample location HR-106QX-SW\SD01. Surface water and sediment were not collected at this location. A depositional soil sample HR-106QX-DEP01 was collected.

Identified by: Jeffrey J. Tarr, PG – IT Site Manager

Date: 6-18-02

II. Justification for Variance:

The FSSFSP proposed a surface water sample and sediment sample at sample location HR-106QX-SW\SD01. Sample location HR-106QX-SW\SD01 was proposed in a surface water drainage feature located along the north and eastern boundary of the area of investigation. However, surface water and sediment were not present in the drainage feature. Therefore, a depositional soil sample HR-106QX-DEP01 was collected at that location to determine the presence or absence of contamination. This variance will not alter the scope or intent of the Site Investigation at Parcel 106Q-X.

III. Applicable Document/Work Plan: (by the person identifying the change)

Final Site-Specific Field Sampling Plan, Site-Specific Safety and Health Plan, and Site-Specific Unexploded Ordnance Safety Plan Attachments; Range 30, Confidence Course (Firing Line), Parcel 88Q, Former Rifle \ Machine Gun Range, Parcel 102Q, Former Grenade Range/Area, Parcel 106Q-X, Tank Sub-Caliber/Carbine Transition/Machine Gun Range (OA-08) Grenade Court (OA-15) Unnamed Small Arms Range, Fort McClellan, Calhoun County, Alabama, January 2002.

Distribution List:
1. Jeanne Yacoub, IT Project Manager
2. Steve Moran, IT Technical Lead
3. Jeffrey Tarr, IT Site Manager
4. Randy McBride, IT QA Officer
5. Mr. Ellis Pope, US Army Corps of Engineers
6. Mr. Ross McCollum, US Army Corps of Engineers

- Signatures -

Requested by: Jeffrey Tarr, PG - IT Site Manager — Jeffrey J. Tarr — 6-18-02 (Date)

Approved by: COE — [illegible] — 6/19/02 (Date)

Project Manager Approval: Jeanne Yacoub — 6/25/02 (Date)

QA Approval: Randall L. McBride — 06-24-02 (Date)