

**Final**  
**Sampling Summary Report**  
**for the Blue Hole, Training Area 6C**

**Fort McClellan**  
**Calhoun County, Alabama**

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**Task Order CK05**  
**Contract No. DACA21-96-D-0018**  
**IT Project No. 774645**

**December 2002**

**Revision 1**

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## **List of Acronyms**

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EPA	U.S. Environmental Protection Agency
ESV	ecological screening value
FTMC	Fort McClellan
IT	IT Corporation
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
PRA	preliminary risk assessment
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
SSSL	site-specific screening level
SVOC	semivolatile organic compound
VOC	volatile organic compound

## **1.0 Introduction**

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This report summarizes the methodology, results, and conclusions for the surface water and sediment sampling performed at the Blue Hole within Training Area 6C at Pelham Range in Calhoun County, Alabama. The surface water and sediment samples were collected by IT Corporation (IT) to meet requirements specified in a memorandum of agreement between the U.S. Army and the Alabama Army National Guard.

Pelham Range is located 5 miles west of the Main Post of Fort McClellan (FTMC) (Figure 1). Pelham Range, which adjoins the Anniston Army Depot along its southern boundary, is an active training area used for artillery firing, smoke operations training, and field training exercises. The Blue Hole is a small surface water feature (slough) located southwest of Lake Canterras within Training Area 6C at Pelham Range (Figures 1 and 2). Smoke pots that had not completely burned out were reportedly thrown into the Blue Hole following training exercises (U.S. Army Center for Health Promotion and Preventive Medicine, 1999). This purpose of this report is to assess whether past activities have impacted the environment at the Blue Hole.

## **2.0 Methodology**

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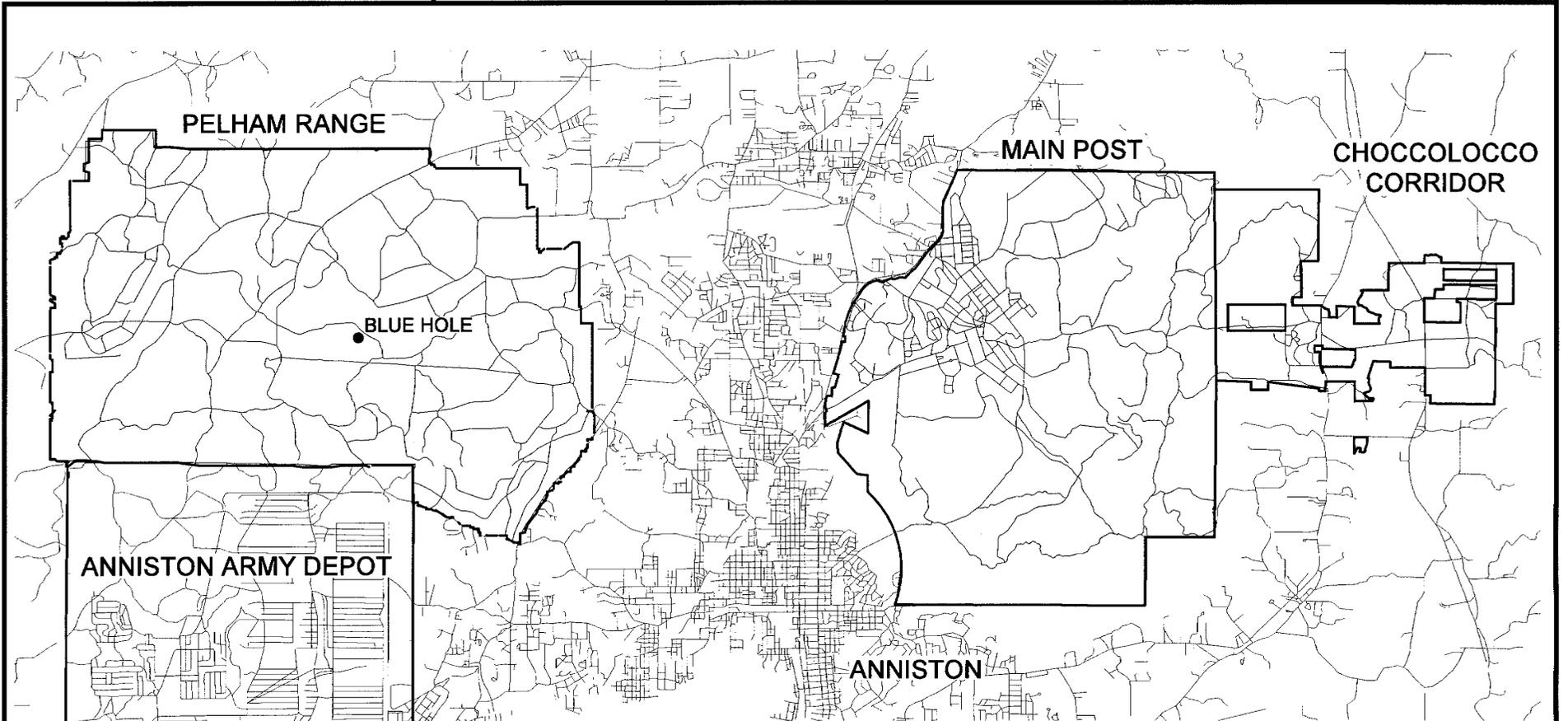
This section summarizes the surface water and sediment sampling activities conducted by IT at the Blue Hole.

### **2.1 Surface Water Sampling**

Two surface water samples were collected at the Blue Hole at the locations shown on Figure 2. Surface water samples were collected in accordance with the procedures specified in Section 4.9.1.3 of the installation-wide sampling and analysis plan (SAP) (IT, 2000a). The surface water samples were collected by dipping a stainless-steel pitcher in the water and pouring the water into the sample containers. Surface water samples were collected after field parameters (Table 1) had been measured using a calibrated water-quality meter. Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Section 2.4.

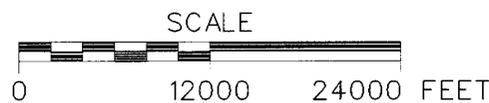
### **2.2 Sediment Sampling**

Two sediment samples were collected at the Blue Hole at the locations shown on Figure 2. Sediment samples were collected in accordance with the procedures specified in Section 4.9.1.2 of the SAP (IT, 2000a). Samples were collected from the upper 0.5-foot of sediment with a stainless-steel spoon and placed in a clean stainless-steel bowl. Samples for volatile organic



**FIGURE 1**  
**SITE LOCATION MAP**  
**BLUE HOLE, TRAINING AREA 6C**

U. S. ARMY CORPS OF ENGINEERS  
 MOBILE DISTRICT  
 FORT McCLELLAN  
 CALHOUN COUNTY, ALABAMA  
 Contract No. DACA21-96-D-0018



DBILLING

07/31/01

STARTING DATE: 03/16/01

DATE LAST REV.: 07/31/01

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INITIATOR: T. WINTON

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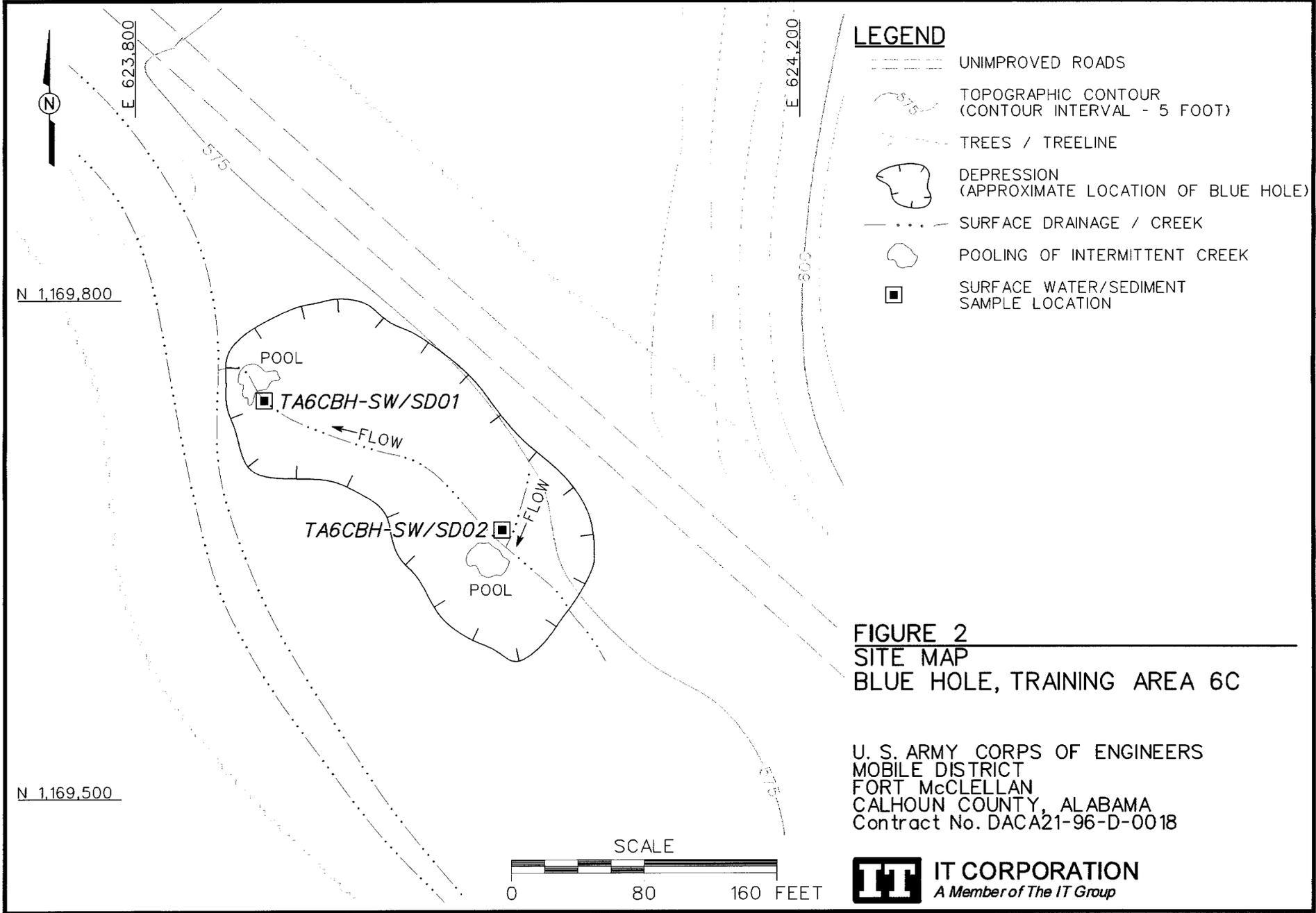
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ENGR. CHCK. BY: T. WINTON

PROJ. MGR.: J. YACOUB

PROJ. NO.: 774645



**LEGEND**

- UNIMPROVED ROADS
- TOPOGRAPHIC CONTOUR (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- DEPRESSION (APPROXIMATE LOCATION OF BLUE HOLE)
- SURFACE DRAINAGE / CREEK
- POOLING OF INTERMITTENT CREEK
- SURFACE WATER/SEDIMENT SAMPLE LOCATION

**FIGURE 2**  
**SITE MAP**  
**BLUE HOLE, TRAINING AREA 6C**

U. S. ARMY CORPS OF ENGINEERS  
MOBILE DISTRICT  
FORT McCLELLAN  
CALHOUN COUNTY, ALABAMA  
Contract No. DACA21-96-D-0018

SCALE



**IT** IT CORPORATION  
*A Member of The IT Group*

**Table 1**

**Surface Water Field Parameters  
Blue Hole, Training Area 6C  
Fort McClellan, Calhoun County, Alabama**

<b>Sample Location</b>	<b>Sample Date</b>	<b>Specific Conductivity (mS/cm)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>Temperature (°C)</b>	<b>Turbidity (NTU)</b>	<b>pH (SU)</b>
TA6CBH-SW/SD01	11-Jan-01	0.513	19.20	5.1	11	6.60
TA6CBH-SW/SD02	11-Jan-01	0.758	18.21	5.5	10	6.74

°C - Degrees Celsius.

mg/L - Milligrams per liter.

mS/cm - Millisiemens per centimeter.

NTU - Nephelometric turbidity units.

SU - Standard units.

compound (VOC) analysis were then immediately collected from the stainless-steel bowl with three EnCore<sup>®</sup> samplers. The remaining portion of the sample was homogenized and placed in the appropriate sample containers. Sample collection logs are included in Appendix A. The sediment samples were analyzed for the parameters listed in Section 2.4.

### **2.3 Surveying of Sample Locations**

The sample locations were surveyed using global positioning system survey techniques and conventional civil survey techniques described in the SAP. Horizontal coordinates were referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983. Ground elevations were referenced to the North American Vertical Datum of 1988. Horizontal coordinates and elevations are included in Appendix B.

### **2.4 Analytical Program**

The samples collected at the Blue Hole were analyzed for the following chemical parameters based on the potential site-specific chemicals:

- VOCs – U.S. Environmental Protection Agency (EPA) Method 8260B
- Semivolatile organic compounds (SVOC) – EPA Method 8270C
- Target analyte list metals – EPA Method 6010B/7470A/7471A
- Nitroaromatic and nitramine explosives – EPA Method 8330.

The samples were analyzed using EPA SW-846 methods, including Update III methods where applicable, as presented in Appendix B of the SAP (IT, 2000a). Data were reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah Level B criteria (U.S. Army Corps of Engineers, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of Appendix B of the SAP [IT, 2000a]). Chemical data were reported via hard-copy data packages by the laboratory using Contract Laboratory Program-like forms. These packages were validated in accordance with EPA National Functional Guidelines by Level III criteria. A summary of validated analytical data is included in Appendix C.

### **2.5 Sample Preservation, Packaging, and Shipping**

Sample preservation, packaging, and shipping followed requirements specified in Section 4.13.2 of the SAP (IT, 2000a). Sample containers, sample volumes, preservatives, and holding times for the analyses performed in this investigation are listed in Appendix B of the SAP. Sample

documentation and chain-of-custody records were completed as specified in Section 4.13 of the SAP.

Completed analysis request and chain-of-custody records (Appendix A) were secured and included with the shipment of samples to EMAX Laboratories, Inc. in Torrance, California.

### **3.0 Summary of Analytical Results**

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The results of chemical analysis of the surface water and sediment samples collected at the Blue Hole indicate that metals and VOCs were detected in the samples. SVOCs and explosive compounds were not detected in any of the samples. To evaluate whether the detected constituents present an unacceptable risk to human health, the analytical results were compared to human health site-specific screening levels (SSSL) and ecological screening values (ESV) for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the ongoing site investigations being performed under the Base Realignment and Closure Environmental Restoration Program at FTMC (IT, 2000b).

Metals concentrations exceeding SSSLs and ESVs were subsequently compared to background screening values to determine if the metals concentrations were within natural background concentrations (Science Applications International Corporation [SAIC], 1998). Summary statistics for background metals samples collected at FTMC are included in Appendix D. Tables 2 and 3 summarize the results of the comparison of detected constituents to the SSSLs, ESVs, and background screening values. Complete analytical results are presented in Appendix C.

#### **3.1 Surface Water Analytical Results**

Two surface water samples were collected for chemical analysis at the Blue Hole, as shown on Figure 2. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background values, as presented in Table 2.

**Metals.** A total of ten metals were detected in the surface water samples collected at the Blue Hole. With the exception of antimony in one sample, the metals results were below SSSLs. Antimony (0.0276 milligrams per liter [mg/L]) exceeded its SSSL (0.0058 mg/L) at sample location TA6CBH-SW/SD01 (Note: a background concentration for antimony was not available). The antimony result was flagged with a “J” data qualifier indicating that the metal was positively identified but the concentration was estimated.

Table 2

**Surface Water Analytical Results  
Blue Hole, Training Area 6C  
Fort McClellan, Calhoun County, Alabama**

Sample Location Sample Number Sample Date						TA6CBH-SW/SD01 XQ2001 11-Jan-01						TA6CBH-SW/SD02 XQ2002 11-Jan-01					
Parameter	Units	UBR <sup>a</sup>	BKG <sup>b</sup>	SSSL <sup>c</sup>	ESV <sup>c</sup>	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV
<b>METALS</b>																	
Aluminum	mg/L	4.78E+01	5.26E+00	1.53E+01	8.70E-02	3.28E-01					YES	2.47E-01					YES
Antimony	mg/L	NA	NA	5.85E-03	1.60E-01	2.76E-02	J			YES		ND					
Barium	mg/L	2.00E-01	7.54E-02	1.10E+00	3.90E-03	7.27E-02					YES	3.45E-02					YES
Calcium	mg/L	6.41E+01	2.52E+01	NA	1.16E+02	8.78E+00						1.49E+01					
Iron	mg/L	2.32E+02	1.96E+01	4.70E+00	1.00E+00	8.40E-01						8.42E-01					
Magnesium	mg/L	2.44E+01	1.10E+01	NA	8.20E+01	5.62E+00						8.71E+00					
Manganese	mg/L	6.06E+00	5.65E-01	6.40E-01	8.00E-02	1.58E-01					YES	4.30E-01					YES
Selenium	mg/L	NA	NA	7.82E-02	5.00E-03	ND						1.93E-03	J				
Sodium	mg/L	1.52E+01	3.44E+00	NA	6.80E+02	7.27E-01	J					8.86E-01	J				
Zinc	mg/L	1.82E-01	4.04E-02	4.65E+00	5.89E-02	1.61E-02	J					2.39E-02					
<b>VOLATILE ORGANIC COMPOUNDS</b>																	
Acetone	mg/L	NA	NA	1.57E+00	7.80E+01	ND						1.60E-02	J				
Methylene chloride	mg/L	NA	NA	1.42E-01	1.93E+00	1.80E-03	B					ND					

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

<sup>a</sup> UBR - Upper background range as given in Science Applications International Corporation (SAIC), 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

<sup>b</sup> BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998.

<sup>c</sup> Recreational site user site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Compound was positively identified; reported value is an estimated concentration.

mg/L - Milligrams per liter.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 3

**Sediment Analytical Results**  
**Blue Hole, Training Area 6C**  
**Fort McClellan, Calhoun County, Alabama**

Sample Location Sample Number Sample Date Sample Depth (Feet)						TA6CBH-SW/SD01 XQ1001 11-Jan-01 0-0.5						TA6CBH-SW/SD02 XQ1002 11-Jan-01 0-0.5					
Parameter	Units	UBR <sup>a</sup>	BKG <sup>b</sup>	SSSL <sup>c</sup>	ESV <sup>c</sup>	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV
<b>METALS</b>																	
Aluminum	mg/kg	1.74E+04	8.59E+03	1.15E+06	NA	1.33E+04			YES			1.75E+04		YES	YES		
Arsenic	mg/kg	2.00E+01	1.13E+01	5.58E+01	7.24E+00	8.91E+01		YES	YES	YES	YES	1.49E+01			YES		YES
Barium	mg/kg	2.72E+02	9.89E+01	8.36E+04	NA	9.64E+01						7.67E+01					
Beryllium	mg/kg	1.20E+00	9.70E-01	1.50E+02	NA	1.10E+00	J		YES			1.99E+00		YES	YES		
Calcium	mg/kg	2.81E+03	1.11E+03	NA	NA	1.67E+03			YES			1.07E+03					
Chromium	mg/kg	6.30E+01	3.12E+01	2.79E+03	5.23E+01	2.71E+01						7.26E+01		YES	YES		YES
Cobalt	mg/kg	2.20E+01	1.10E+01	6.72E+04	5.00E+01	1.02E+01						9.86E+00					
Copper	mg/kg	5.90E+01	1.71E+01	4.74E+04	1.87E+01	1.41E+01						7.81E+00					
Iron	mg/kg	5.75E+04	3.53E+04	3.59E+05	NA	2.55E+04						4.12E+04			YES		
Lead	mg/kg	1.10E+02	3.78E+01	4.00E+02	3.02E+01	3.82E+01			YES		YES	1.66E+01					
Magnesium	mg/kg	3.27E+03	9.06E+02	NA	NA	7.87E+02						7.04E+02					
Manganese	mg/kg	2.05E+03	7.12E+02	4.38E+04	NA	1.08E+03			YES			1.04E+03			YES		
Mercury	mg/kg	2.80E-01	1.10E-01	2.99E+02	1.30E-01	5.30E-02	J					ND					
Nickel	mg/kg	3.30E+01	1.30E+01	1.76E+04	1.59E+01	1.49E+01			YES			1.14E+01					
Potassium	mg/kg	4.81E+03	1.01E+03	NA	NA	3.70E+02	J					3.32E+02	J				
Selenium	mg/kg	1.90E+00	7.20E-01	5.96E+03	NA	8.12E-01	J		YES			5.14E-01	J				
Sodium	mg/kg	7.38E+02	6.92E+02	NA	NA	ND						3.58E+01	J				
Thallium	mg/kg	2.20E-01	1.30E-01	7.78E+01	NA	1.40E+00	J	YES	YES			ND					
Vanadium	mg/kg	6.70E+01	4.09E+01	4.83E+03	NA	5.46E+01			YES			1.04E+02		YES	YES		
Zinc	mg/kg	1.11E+02	5.27E+01	3.44E+05	1.24E+02	6.21E+01			YES			3.56E+01					
<b>VOLATILE ORGANIC COMPOUNDS</b>																	
2-Butanone	mg/kg	NA	NA	6.23E+05	1.37E-01	1.60E-02	J					1.90E-02	J				
Acetone	mg/kg	NA	NA	1.03E+05	4.53E-01	1.90E-01						1.90E-01					
Methylene chloride	mg/kg	NA	NA	9.84E+03	1.26E+00	2.30E-03	B					1.60E-03	B				

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

<sup>a</sup> UBR - Upper background range as given in Science Applications International Corporation (SAIC), 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

<sup>b</sup> BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998.

<sup>c</sup> Recreational site user site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

The concentrations of three metals (aluminum, barium, and manganese) exceeded their respective ESVs in both samples but were below background concentrations.

**VOCs.** Acetone (TA6CBH-SW/SD02) and methylene chloride (TA6CBH-SW/SD01) were detected in one surface water sample each at concentrations below SSSLs and ESVs.

**SVOCs.** SVOCs were not detected in the surface water samples collected at the site.

**Explosives.** Explosive compounds were not detected in the surface water samples collected at the site.

### **3.2 Sediment Analytical Results**

Two sediment samples were collected for chemical analysis at the Blue Hole. The sediment samples were collected at the same locations as the surface water samples, as shown on Figure 2. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background values, as presented in Table 3.

**Metals.** A total of twenty metals were detected in the sediment samples collected at the Blue Hole. With the exception of arsenic in one sample, the metals results were below SSSLs. Arsenic (89.1 milligrams per kilogram [mg/kg]) exceeded its SSSL (55.8 mg/kg), background concentration (11.3 mg/kg), and upper background range (20 mg/kg) at sample location TA6CBH-SW/SD01.

Three metals (arsenic [both locations], chromium [TA6CBH-SW/SD02], and lead [TA6CBH-SW/SD01]) were detected at concentrations exceeding ESVs and their respective background concentrations. These metals results were within their respective upper background ranges except for the following:

- Arsenic (89.1 mg/kg) exceeded its ESV (7.24 mg/kg) and upper background range (20 mg/kg) in one sample (TA6CBH-SW/SD01).
- Chromium (72.6 mg/kg) exceeded its ESV (52.3 mg/kg) and upper background range (63 mg/kg) in one sample (TA6CBH-SW/SD02).

**VOCs.** Three VOCs (2-butanone, acetone, and methylene chloride) were detected in each of the sediment samples. The VOC concentrations in sediments were below SSSLs and ESVs.

**SVOCs.** SVOCs were not detected in the sediment samples collected at the site.

**Explosives.** Explosive compounds were not detected in the sediment samples collected at the site.

### **3.3 Preliminary Risk Assessment**

A preliminary risk assessment (PRA) was performed to further characterize the potential threat to human health from exposure to site media at the Blue Hole. The PRA approach was developed at the request of EPA and ADEM to provide a fast and inexpensive estimation of risk for relatively simple sites. It was derived from the streamlined risk assessment (SRA) protocol developed for FTMC and documented in the Installation-Wide Work Plan (IT, 1998). A PRA is a simplified version of a SRA, differing primarily in that the maximum detected concentration (MDC) rather than an estimate of average is adopted as the source-term concentration (STC) for use in the risk assessment. However, a PRA cannot be less conservative (protective) than a SRA and is generally more protective. The PRA for the Blue Hole is included as Appendix E. It discusses the environmental media of interest, selection of site-related chemicals, selection of chemicals of potential concern (COPC), risk characterization, and conclusions.

The foundation of the SRA (and the PRA) is the SSSL, which incorporates all the exposure and toxicological assumptions, and precision of a complete baseline risk assessment. SSSLs are receptor-, medium-, and chemical-specific risk-based concentrations that are used to screen media to select COPCs and to characterize the risk associated with exposure to site media (i.e., compute the incremental lifetime cancer risk [ILCR] and hazard index [HI] for non-cancer effects).

The SSSLs applied to a given site represent the most highly exposed receptor scenario for each of several plausible uses for the site. For the Blue Hole, only the recreational site user scenario was evaluated. However, the assumptions for residential exposure are the same. COPCs were selected from the site-related chemicals identified in the previous sections by comparing the MDC of the site-related chemical with the appropriate SSSL. Chemicals that were identified as not being site-related were dropped from further consideration because their presence was not attributed to site activities. The COPCs selected in this manner are the chemicals in each medium that may contribute significantly to cancer risk or to the potential for non-cancer effects. As noted above, the MDC was selected as the STC for use in risk characterization. ILCR and HI values were estimated for each COPC in each medium and were summed to obtain total ILCR and HI values for each receptor.

The PRA identified antimony (in surface water) and arsenic (in sediment) as COPCs in site media. However, calculated ILCR and HI values were below threshold levels. Therefore, the PRA concluded that exposure to site media does not pose an unacceptable risk to either the recreational site user or the resident.

## **4.0 Summary and Conclusions**

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Metals and VOCs were detected in the surface water and sediment samples collected at the Blue Hole. SVOCs and explosive compounds were not detected in the samples collected. VOC concentrations in the samples were below SSSLs and ESVs. Three metals (antimony, arsenic, and chromium) were detected in one sample each at concentrations exceeding SSSLs and/or ESVs and the range of background values:

- Antimony (0.0276 mg/L) exceeded its SSSL (0.0058 mg/L) in one surface water sample (TA6CBH-SW/SD01) (note: a background concentration for antimony was not available).
- Arsenic (89.1 mg/kg) exceeded its SSSL (55.8 mg/kg), ESV (7.24 mg/kg), and upper background range (20 mg/kg) in one sediment sample (TA6CBH-SW/SD01).
- Chromium (72.6 mg/kg) exceeded its ESV (52.3 mg/kg) and upper background range (63 mg/kg) in one sediment sample (TA6CBH-SW/SD02).

Chemicals of potential ecological concern were limited to arsenic and chromium in one sediment sample each. However, these metals are not expected to pose a significant threat to ecological receptors because of the site's limited areal extent, close proximity to a road, and continued use as a military training area.

The PRA concluded that exposure to site media does not pose an unacceptable threat to either the recreational site user or the resident. The National Guardsperson was not evaluated in the PRA; however, the PRA noted that his exposure and risk would be somewhat less than the estimates for the recreational site user. Although the risk estimates for the resident and recreational site user are low and do not indicate a potential threat to human health, the BRAC Cleanup Team made a site management decision to not collect additional samples at the site and to release the Blue Hole exclusively for military training reuse.

## 5.0 References

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IT Corporation (IT), 2000a, *Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama*, March.

IT Corporation (IT), 2000b, *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

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U.S. Army Center for Health Promotion and Preventive Medicine, 1999, *Draft Preliminary Assessment No. 38-EH-1775-99, Fort McClellan Army National Guard Training Center, Fort McClellan, Alabama*, June.

U.S. Army Corps of Engineers, 1994, *Requirements for the Preparation of Sampling and Analysis Plans*, Engineer Manual EM 200-1-3, September.

**APPENDIX A**

**SAMPLE COLLECTION LOGS AND  
ANALYSIS REQUEST/CHAIN-OF-CUSTODY RECORDS**

## **SAMPLE COLLECTION LOGS**



# Sample Collection Log

## Project: 796887 Fort McClellan

Manager: Jeanne Yacoub

Site: TA6C - Blue Hole

RFA / COC Number: TA6C-D1101-EMAX

Location Code: TA6CBH-SW/SD01

Sample Number: XQ2001 <sup>1/4/01</sup>

Collection Date: 01-11-01

Sample Name: TA6CBH-SW/SD01-SW-XQ2001-REG

Collection Time: 1100

Sampling Method: GRAB <sup>SW</sup>

Start Depth: Ø

Trip Blank: \_\_\_\_\_

End Depth: Ø

Sample Team: ALLEN

Analytical Suite      Containers  
Flt Frtn Qty    Size    Units    Type

Analytical Suite	Containers	Flt	Frtn	Qty	Size	Units	Type
Volatiles	N A	3	40	MI			VOA VIAL
Semivolatiles	N B	2	1	L			AMB. GLASS
Metals	N C	1	1	L			HDPE
Nitroexplosive	N D	2	1	L			AMB. GLASS

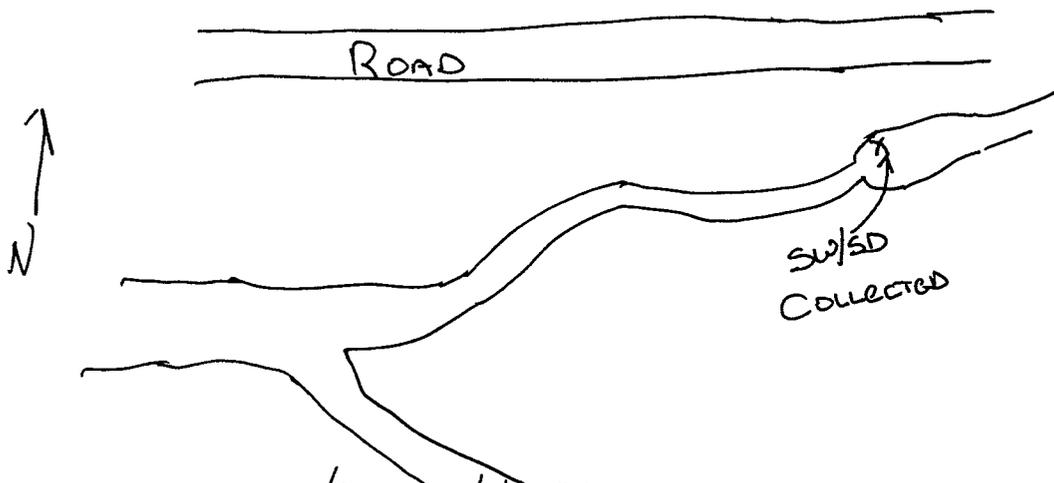
Comments: NO INDICATION OF DUMPED ITEMS

EAST SIDE OF SUSPECTED "Blue Hole"

PK    COND    Turb    DO    Temp

6.60    513    11    19.20    5.1

Sketch Location:



Logged BY/ Date: OKCee <sup>1-11-01</sup>

Reviewed BY / Date: \_\_\_\_\_



# Sample Collection Log

## Project: 796887 Fort McClellan

Manager: Jeanne Yacoub

Site: TA6C - Blue Hole

RFA / COC Number: TA6C-011101-EMAX

Location Code: TA6CBH-SW/SD01

Collection Date: 01-11-01

Sample Number: XQ1001

Collection Time: 1125

Sample Name: TA6CBH-SW/SD01-SD-XQ1001-REG

Sampling Method: GRAB

Start Depth: 0

Trip Blank: \_\_\_\_\_

End Depth: .5

Sample Team: Allen

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
------------------	-----	------	-----	------	-------	------

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
Volatiles	N	A	3	5	G	ENCORE
Semivolatiles	N	B	1	8	OZ	CWM
Metals	N	C	1	8	OZ	CWM
Nitroexplosive	N	D	1	8	OZ	CWM

Comments: See Info on XQ2001

Sample Taken From EAST Side of "Blue hole"

Sketch Location:

Logged BY/ Date: D.K.C. 1-11-01

Reviewed BY / Date: \_\_\_\_\_



# Sample Collection Log

## Project: 796887 Fort McClellan

Manager: Jeanne Yacoub

Site: TA6C - Blue Hole

RFA / COC Number: TA6A-011101-EMAX  
C

Location Code: TA6CBH-SW/SD02

Collection Date: 01-11-01

Sample Number: XQ2002

Collection Time: 1145

Sample Name: TA6CBH-SW/SD02-~~SD~~-XQ2002-REG

Sampling Method: GRAB **sw**

Start Depth: ∅

Trip Blank: \_\_\_\_\_

End Depth: ∅

Sample Team: Allen

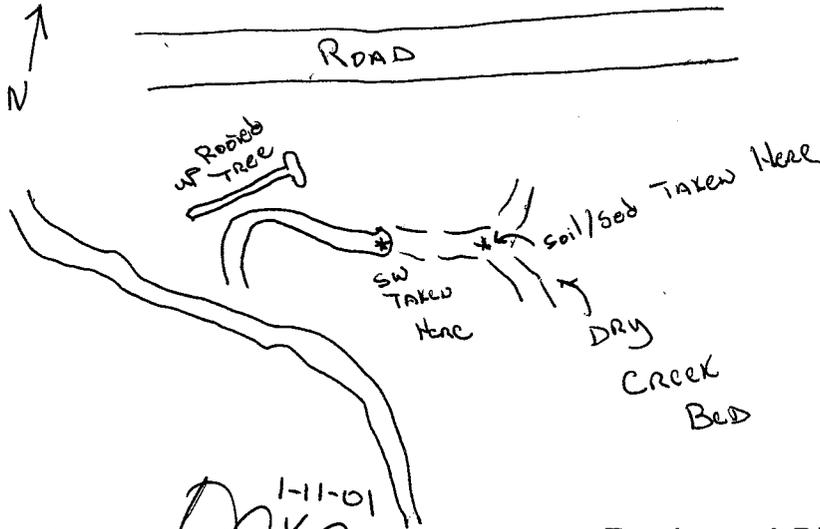
Analytical Suite	Containers			Units	Type	
	Flt	Frtn	Qty			
Volatiles	N	A	3	40	MI	VOA VIAL
Semivolatiles	N	B	2	1	L	AMB. GLASS
Metals	N	C	1	1	L	HDPE
Nitroexplosive	N	D	2	1	L	AMB. GLASS

Comments: \_\_\_\_\_

West Side of Suspected "Blue Hole"

PH	COND	Turb	DO	Temp
6.74	758	10	18.21	5.5

Sketch Location:



Logged BY/ Date: OKC 1-11-01

Reviewed BY / Date: \_\_\_\_\_



# Sample Collection Log

## Project: 796887 Fort McClellan

Manager: Jeanne Yacoub

Site: TA6C - Blue Hole

RFA / COC Number: TABC-011101-EMAX

Location Code: TA6CBH-SW/SD02

Collection Date: 01-11-01

Sample Number: XQ1002

Collection Time: 1215

Sample Name: TA6CBH-SW/SD02-SD-XQ1002-REG

Sampling Method: GRAB

Start Depth: 0

Trip Blank: \_\_\_\_\_

End Depth: .5

Sample Team: Allen

Containers

Analytical Suite    Flt Frtn Qty    Size    Units    Type

Volatiles	N	A	3	5	G	ENCORE
Semivolatiles	N	B	1	8	OZ	CWM
Metals	N	C	1	8	OZ	CWM
Nitroexplosive	N	D	1	8	OZ	CWM

Comments: \_\_\_\_\_  
Sample Taken from West Side of "Blue hole"  
 \_\_\_\_\_

Sketch Location:

See Sample Collection log XQ-2002

Logged BY/ Date: Dek <sup>01-11-01</sup>

Reviewed BY / Date: \_\_\_\_\_

## **ANALYSIS REQUEST/CHAIN-OF-CUSTODY RECORDS**



E4/E5/N2/WBS 01A076

# ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: TA6C-011101-EMAX

Page 1 of 2

Project Number: 773019  
Project Name: Fort McClellan  
Sample Coordinator: Oliver Allen  
Turnaround Time:

Samples Shipment Date: 11 JAN 2001  
Lab Destination: EMAX Laboratories, Inc.  
Lab Contact: Elizabeth McIntyre  
Project Contact: Randy McBride  
Carrier/Waybill No.: Fed Ex/

Bill To: Duane Nielsen  
312 Directors Drive  
Knoxville TN 37923  
Report To: Duane Nielsen  
312 Directors Drive  
Knoxville TN 37923

*NORMAL 7 d TAT*

Special Instructions: None

Possible Hazard Identification:

Non-hazard  Flammable  Skin Irritant  Poison B  Unknown

Sample Disposal:

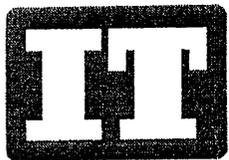
Return to Client  Disposal by Lab  Archive (mos.)

1. Relinquished By (Signature/Affiliation)	<i>DQ Kall</i>	Date: <i>01-11-01</i> Time: <i>1800</i>	1. Received By (Signature/Affiliation)	<i>[Signature]</i>	Date: <i>1-12-01</i> Time: <i>9:30</i>
2. Relinquished By (Signature/Affiliation)		Date: Time:	2. Received By (Signature/Affiliation)		Date: Time:
3. Relinquished By (Signature/Affiliation)		Date: Time:	3. Received By (Signature/Affiliation)		Date: Time:

Comments: None

*Cooler #2 T=3.8°C Cooler #3 T=2.2°C  
Cooler #1 T=2.3°C Cooler #4 T=2.5°C*

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	File	CID	Condition On Receipt
<i>15</i> XQ1001	TA6CBH-SW/SD01-SD-XQ1001-REG	04 JAN 2001	11:25	5 g EnCore	3	None except cool to 4 C	Volatiles by 8260B	N		
XQ1001	TA6CBH-SW/SD01-SD-XQ1001-REG	04 JAN 2001	11:25	8 oz CWM	1	None except cool to 4 C	Semivolatiles by 8270C	N		
XQ1001	TA6CBH-SW/SD01-SD-XQ1001-REG	04 JAN 2001	11:25	8 oz CWM	1	None except cool to 4 C	TAL Metals by 6010B/7471A - Soils	N		
XQ1001	TA6CBH-SW/SD01-SD-XQ1001-REG	04 JAN 2001	11:25	8 oz CWM	1	None except cool to 4 C	Nitroaromatics by 8330	N		
XQ1002	TA6CBH-SW/SD02-SD-XQ1002-REG	04 JAN 2001	12:15	5 g EnCore	3	None except cool to 4 C	Volatiles by 8260B	N		
<i>20</i> XQ1002	TA6CBH-SW/SD02-SD-XQ1002-REG	04 JAN 2001	12:15	8 oz CWM	1	None except cool to 4 C	Semivolatiles by 8270C	N		
XQ1002	TA6CBH-SW/SD02-SD-XQ1002-REG	04 JAN 2001	12:15	8 oz CWM	1	None except cool to 4 C	TAL Metals by 6010B/7471A - Soils	N		
XQ1002	TA6CBH-SW/SD02-SD-XQ1002-REG	04 JAN 2001	12:15	8 oz CWM	1	None except cool to 4 C	Nitroaromatics by 8330	N		



IT CORPORATION

A Member of The IT Group

EH/ES/N2/WBS

01A076

# ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: TA6C-011101-EMAX

Page 2 of 2

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	File	CID	Condition On Receipt
3	XQ2001	TA6CBH-SW/SD01-SW-XQ2001-REG	11 JAN 2001	11:00	1 L Amb. Glass	2 None except cool to 4 C	Nitroaromatics by 8330		N
	XQ2001	TA6CBH-SW/SD01-SW-XQ2001-REG	11 JAN 2001	11:00	40 ml VOA VIAL	3 HCl<pH 2	Volatiles by 8260B		N
	XQ2001	TA6CBH-SW/SD01-SW-XQ2001-REG	11 JAN 2001	11:00	1 L HDPE	1 HNO3<pH 2	TAL Metals by 6010B/7470A - Water		N
4	XQ2001	TA6CBH-SW/SD01-SW-XQ2001-REG	11 JAN 2001	11:00	1 L Amb. Glass	2 None except cool to 4 C	Semivolatiles by 8270C		N
	XQ2002	TA6CBH-SW/SD02-SW-XQ2002-REG	04 JAN 2001	11:45	40 ml VOA VIAL	3 HCl<pH 2	Volatiles by 8260B		N
	XQ2002	TA6CBH-SW/SD02-SW-XQ2002-REG	04 JAN 2001	11:45	1 L Amb. Glass	2 None except cool to 4 C	Semivolatiles by 8270C		N
	XQ2002	TA6CBH-SW/SD02-SW-XQ2002-REG	04 JAN 2001	11:45	1 L HDPE	1 HNO3<pH 2	TAL Metals by 6010B/7470A - Water		N
	XQ2002	TA6CBH-SW/SD02-SW-XQ2002-REG	04 JAN 2001	11:45	1 L Amb. Glass	2 None except cool to 4 C	Nitroaromatics by 8330		N

1003

**APPENDIX B**  
**SURVEY DATA**

## Appendix B

### Survey Data Blue Hole, Training Area 6C Fort McClellan, Calhoun County, Alabama

<b>Sample Location</b>	<b>Northing</b>	<b>Easting</b>	<b>Ground Elevation (ft msl)</b>
TA6CBH-SW/SD01	1169738.02	623878.79	576.58
TA6CBH-SW/SD02	1169660.04	624022.05	579.75

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

Elevations referenced to the North American Vertical Datum of 1988.

ft msl - Feet above mean sea level

**APPENDIX C**  
**SUMMARY OF VALIDATED ANALYTICAL DATA**

Summary of Validated Surface Water Data  
Pelham Range Training Area 6C Bluehole  
Fort McClellan, Alabama

Report Date: 03/09/01

Page 1 of 6

<i>Location Code:</i>	TA6CBH-SW/SD01	TA6CBH-SW/SD02
<i>Associated Site:</i>	TA6	TA6
<i>Sample No.:</i>	XQ2001	XQ2002
<i>Sample Date:</i>	11-JAN-01	11-JAN-01

*User Test Group*

*Lab Method*

<i>Parameter</i>	<i>Flt</i>	<i>Units</i>	<i>Result</i>	<i>Qual</i>	<i>VQual</i>	<i>Result</i>	<i>Qual</i>	<i>VQual</i>
<b>METALS</b>								
SW6010B								
Aluminum		mg/L	.328			.247		
Antimony		mg/L	.0276	J	J	.1	U	U
Arsenic		mg/L	.01	U	U	.01	U	U
Barium		mg/L	.0727			.0345		
Beryllium		mg/L	.001	U	U	.001	U	U
Cadmium		mg/L	.01	U	U	.01	U	U
Calcium		mg/L	8.78			14.9		
Chromium		mg/L	.01	U	U	.01	U	U
Cobalt		mg/L	.02	U	U	.02	U	U
Copper		mg/L	.02	U	U	.02	U	U
Iron		mg/L	.84			.842		
Lead		mg/L	.01	U	U	.01	U	U
Magnesium		mg/L	5.62			8.71		
Manganese		mg/L	.158			.43		
Nickel		mg/L	.02	U	U	.02	U	U
Potassium		mg/L	5	U	U	5	U	U
Selenium		mg/L	.01	U	U	.00193	J	J
Silver		mg/L	.01	U	U	.01	U	U
Sodium		mg/L	.727	J	J	.886	J	J
Thallium		mg/L	.01	U	U	.01	U	U
Vanadium		mg/L	.01	U	U	.01	U	U
Zinc		mg/L	.0161	J	J	.0239		
SW7470A								
Mercury		mg/L	.0005	U	U	.0005	U	U
<b>NITROAROMATI</b>								
SW8330								
1,3,5-Trinitrobenzene		mg/L	.0004	U	U	.0004	U	U
1,3-Dinitrobenzene		mg/L	.0004	U	U	.0004	U	U
2,4,6-Trinitrotoluene		mg/L	.0004	U	U	.0004	U	U
2,4-Dinitrotoluene		mg/L	.0004	U	U	.0004	U	U

Summary of Validated Surface Water Data  
 Pelham Range Training Area 6C Bluehole  
 Fort McClellan, Alabama

Report Date: 03/09/01

Page 2 of 6

<i>Location Code:</i>	TA6CBH-SW/SD01	TA6CBH-SW/SD02
<i>Associated Site:</i>	TA6	TA6
<i>Sample No.:</i>	XQ2001	XQ2002
<i>Sample Date:</i>	11-JAN-01	11-JAN-01

*User Test Group*  
*Lab Method*

<u>Parameter</u>	<u>Flt</u>	<u>Units</u>	<u>Result</u>	<u>Qual</u>	<u>VQual</u>	<u>Result</u>	<u>Qual</u>	<u>VQual</u>
<b>NITROAROMATI</b>								
SW8330								
2,6-Dinitrotoluene		mg/L	.0004	U	U	.0004	U	U
2-Amino-4,6-dinitrotoluene		mg/L	.0004	U	U	.0004	U	U
2-Nitrotoluene		mg/L	.0004	U	U	.0004	U	U
3-Nitrotoluene		mg/L	.0004	U	U	.0004	U	U
4-Amino-2,6-dinitrotoluene		mg/L	.0004	U	U	.0004	U	U
HMX		mg/L	.001	U	U	.001	U	U
Nitrobenzene		mg/L	.0004	U	U	.0004	U	U
RDX		mg/L	.0004	U	U	.0004	U	U
Tetryl		mg/L	.0004	U	U	.0004	U	U
p-Nitrotoluene		mg/L	.0004	U	U	.0004	U	U
<b>SEMIVOLATILES</b>								
SW8270C								
1,2,4-Trichlorobenzene		mg/L	.0094	U	U	.0096	U	U
1,2-Dichlorobenzene		mg/L	.0094	U	U	.0096	U	U
1,3-Dichlorobenzene		mg/L	.0094	U	U	.0096	U	U
1,4-Dichlorobenzene		mg/L	.0094	U	U	.0096	U	U
2,4,5-Trichlorophenol		mg/L	.0094	U	U	.0096	U	U
2,4,6-Trichlorophenol		mg/L	.024	U	U	.024	U	U
2,4-Dichlorophenol		mg/L	.0094	U	U	.0096	U	U
2,4-Dimethylphenol		mg/L	.0094	U	U	.0096	U	U
2,4-Dinitrophenol		mg/L	.024	U	U	.024	U	U
2,4-Dinitrotoluene		mg/L	.0094	U	U	.0096	U	U
2,6-Dinitrotoluene		mg/L	.0094	U	U	.0096	U	U
2-Chloronaphthalene		mg/L	.0094	U	U	.0096	U	U
2-Chlorophenol		mg/L	.0094	U	U	.0096	U	U
2-Methylnaphthalene		mg/L	.0094	U	U	.0096	U	U
2-Methylphenol		mg/L	.0094	U	U	.0096	U	U
2-Nitroaniline		mg/L	.024	U	U	.024	U	U
2-Nitrophenol		mg/L	.0094	U	U	.0096	U	U
3,3'-Dichlorobenzidine		mg/L	.024	U	U	.024	U	U

Summary of Validated Surface Water Data  
 Pelham Range Training Area 6C Bluehole  
 Fort McClellan, Alabama

Report Date: 03/09/01

Page 3 of 6

<i>Location Code:</i>	TA6CBH-SW/SD01	TA6CBH-SW/SD02
<i>Associated Site:</i>	TA6	TA6
<i>Sample No:</i>	XQ2001	XQ2002
<i>Sample Date:</i>	11-JAN-01	11-JAN-01

*User Test Group*

*Lab Method*

<u>Parameter</u>	<u>Flt</u>	<u>Units</u>	<u>Result</u>	<u>Qual</u>	<u>VQual</u>	<u>Result</u>	<u>Qual</u>	<u>VQual</u>
<b>SEMIVOLATILES</b>								
SW8270C								
3-Nitroaniline		mg/L	.024	U	U	.024	U	U
4,6-Dinitro-2-methylphenol		mg/L	.024	U	U	.024	U	U
4-Bromophenyl phenyl ether		mg/L	.0094	U	U	.0096	U	U
4-Chloro-3-methylphenol		mg/L	.0094	U	U	.0096	U	U
4-Chloroaniline		mg/L	.0094	U	U	.0096	U	U
4-Chlorophenyl phenyl ether		mg/L	.0094	U	U	.0096	U	U
4-Methylphenol		mg/L	.0094	U	U	.0096	U	U
4-Nitroaniline		mg/L	.0094	U	U	.0096	U	U
4-Nitrophenol		mg/L	.024	U	U	.024	U	U
Acenaphthene		mg/L	.0094	U	U	.0096	U	U
Acenaphthylene		mg/L	.0094	U	U	.0096	U	U
Anthracene		mg/L	.0094	U	U	.0096	U	U
Benzo(a)anthracene		mg/L	.0094	U	U	.0096	U	U
Benzo(a)pyrene		mg/L	.0094	U	U	.0096	U	U
Benzo(b)fluoranthene		mg/L	.0094	U	U	.0096	U	U
Benzo(ghi)perylene		mg/L	.0094	U	U	.0096	U	U
Benzo(k)fluoranthene		mg/L	.0094	U	U	.0096	U	U
Butyl benzyl phthalate		mg/L	.0094	U	U	.0096	U	U
Carbazole		mg/L	.0094	U	U	.0096	U	U
Chrysene		mg/L	.0094	U	U	.0096	U	U
Di-n-butyl phthalate		mg/L	.0094	U	U	.0096	U	U
Di-n-octyl phthalate		mg/L	.0094	U	U	.0096	U	U
Dibenz(a,h)anthracene		mg/L	.0094	U	U	.0096	U	U
Dibenzofuran		mg/L	.0094	U	U	.0096	U	U
Diethyl phthalate		mg/L	.0094	U	U	.0096	U	U
Dimethyl phthalate		mg/L	.0094	U	U	.0096	U	U
Fluoranthene		mg/L	.0094	U	U	.0096	U	U
Fluorene		mg/L	.0094	U	U	.0096	U	U
Hexachlorobenzene		mg/L	.0094	U	U	.0096	U	U
Hexachlorobutadiene		mg/L	.0094	U	U	.0096	U	U
Hexachlorocyclopentadiene		mg/L	.0094	U	U	.0096	U	U

Summary of Validated Surface Water Data  
 Pelham Range Training Area 6C Bluehole  
 Fort McClellan, Alabama

Report Date: 03/09/01

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<i>Location Code:</i>	TA6CBH-SW/SD01	TA6CBH-SW/SD02
<i>Associated Site:</i>	TA6	TA6
<i>Sample No:</i>	XQ2001	XQ2002
<i>Sample Date:</i>	11-JAN-01	11-JAN-01

*User Test Group*

*Lab Method*

<i>Parameter</i>	<i>Flt</i>	<i>Units</i>	<i>Result</i>	<i>Qual</i>	<i>VQual</i>	<i>Result</i>	<i>Qual</i>	<i>VQual</i>
<b>SEMIVOLATILES</b>								
SW8270C								
Hexachloroethane		mg/L	.0094	U	U	.0096	U	U
Indeno(1,2,3-cd)pyrene		mg/L	.0094	U	U	.0096	U	U
Isophorone		mg/L	.0094	U	U	.0096	U	U
Naphthalene		mg/L	.0094	U	U	.0096	U	U
Nitrobenzene		mg/L	.0094	U	U	.0096	U	U
Pentachlorophenol		mg/L	.024	U	U	.024	U	U
Phenanthrene		mg/L	.0094	U	U	.0096	U	U
Phenol		mg/L	.0094	U	U	.0096	U	U
Pyrene		mg/L	.0094	U	U	.0096	U	U
bis(2-Chloroethoxy)methane		mg/L	.0094	U	U	.0096	U	U
bis(2-Chloroethyl)ether		mg/L	.0094	U	U	.0096	U	U
bis(2-Chloroisopropyl)ether		mg/L	.0094	U	U	.0096	U	U
bis(2-Ethylhexyl)phthalate		mg/L	.0094	U	U	.0096	U	U
n-Nitroso-di-n-propylamine		mg/L	.0094	U	U	.0096	U	U
n-Nitrosodiphenylamine		mg/L	.0094	U	U	.0096	U	U

**VOLATILES**

SW8260B

1,1,1,2-Tetrachloroethane		mg/L	.005	U	U	.005	U	U
1,1,1-Trichloroethane		mg/L	.005	U	U	.005	U	U
1,1,2,2-Tetrachloroethane		mg/L	.005	U	U	.005	U	U
1,1,2-Trichloroethane		mg/L	.005	U	U	.005	U	U
1,1-Dichloroethane		mg/L	.005	U	U	.005	U	U
1,1-Dichloroethene		mg/L	.005	U	U	.005	U	U
1,1-Dichloropropene		mg/L	.005	U	U	.005	U	U
1,2,3-Trichlorobenzene		mg/L	.005	U	U	.005	U	U
1,2,3-Trichloropropane		mg/L	.005	U	U	.005	U	U
1,2,4-Trichlorobenzene		mg/L	.005	U	U	.005	U	U
1,2,4-Trimethylbenzene		mg/L	.005	U	U	.005	U	U
1,2-Dibromo-3-Chloropropane		mg/L	.01	U	U	.01	U	U
1,2-Dibromoethane		mg/L	.005	U	U	.005	U	U

Summary of Validated Surface Water Data  
 Pelham Range Training Area 6C Bluehole  
 Fort McClellan, Alabama

Report Date: 03/09/01

Page 5 of 6

<i>Location Code:</i>	TA6CBH-SW/SD01	TA6CBH-SW/SD02
<i>Associated Site:</i>	TA6	TA6
<i>Sample No:</i>	XQ2001	XQ2002
<i>Sample Date:</i>	11-JAN-01	11-JAN-01

*User Test Group*

*Lab Method*

<i>Parameter</i>	<i>Flt</i>	<i>Units</i>	<i>Result</i>	<i>Qual</i>	<i>VQual</i>	<i>Result</i>	<i>Qual</i>	<i>VQual</i>
<b>VOLATILES</b>								
SW8260B								
1,2-Dichlorobenzene		mg/L	.005	U	U	.005	U	U
1,2-Dichloroethane		mg/L	.005	U	U	.005	U	U
1,2-Dichloropropane		mg/L	.005	U	U	.005	U	U
1,2-Dimethylbenzene		mg/L	.005	U	U	.005	U	U
1,3,5-Trimethylbenzene		mg/L	.005	U	U	.005	U	U
1,3-Dichlorobenzene		mg/L	.005	U	U	.005	U	U
1,3-Dichloropropane		mg/L	.005	U	U	.005	U	U
1,4-Dichlorobenzene		mg/L	.005	U	U	.005	U	U
2-Butanone		mg/L	.02	U	U	.02	U	U
2-Hexanone		mg/L	.02	U	U	.02	U	U
4-Methyl-2-pentanone		mg/L	.01	U	U	.01	U	U
Acetone		mg/L	.02	U	U	.016	J	J
Benzene		mg/L	.005	U	U	.005	U	U
Bromobenzene		mg/L	.005	U	U	.005	U	U
Bromochloromethane		mg/L	.005	U	U	.005	U	U
Bromodichloromethane		mg/L	.005	U	U	.005	U	U
Bromoform		mg/L	.005	U	U	.005	U	U
Bromomethane		mg/L	.005	U	U	.005	U	U
Carbon disulfide		mg/L	.005	U	U	.005	U	U
Carbon tetrachloride		mg/L	.005	U	U	.005	U	U
Chlorobenzene		mg/L	.005	U	U	.005	U	U
Chloroethane		mg/L	.005	U	U	.005	U	U
Chloroform		mg/L	.005	U	U	.005	U	U
Chloromethane		mg/L	.005	U	U	.005	U	U
Cumene		mg/L	.005	U	U	.005	U	U
Dibromochloromethane		mg/L	.005	U	U	.005	U	U
Dibromomethane		mg/L	.005	U	U	.005	U	U
Dichlorodifluoromethane		mg/L	.005	U	U	.005	U	U
Ethylbenzene		mg/L	.005	U	U	.005	U	U
Hexachlorobutadiene		mg/L	.005	U	U	.005	U	U
Methylene chloride		mg/L	.0018	J	B	.005	U	U

Summary of Validated Surface Water Data  
Pelham Range Training Area 6C Bluehole  
Fort McClellan, Alabama

Report Date: 03/09/01

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<i>Location Code:</i>	TA6CBH-SW/SD01	TA6CBH-SW/SD02
<i>Associated Site:</i>	TA6	TA6
<i>Sample No:</i>	XQ2001	XQ2002
<i>Sample Date:</i>	11-JAN-01	11-JAN-01

*User Test Group*

*Lab Method*

<i>Parameter</i>	<i>Flt</i>	<i>Units</i>	<i>Result</i>	<i>Qual</i>	<i>VQual</i>	<i>Result</i>	<i>Qual</i>	<i>VQual</i>
<b>VOLATILES</b>								
SW8260B								
Naphthalene		mg/L	.005	U	U	.005	U	U
Styrene		mg/L	.005	U	U	.005	U	U
Tetrachloroethene		mg/L	.005	U	U	.005	U	U
Toluene		mg/L	.005	U	U	.005	U	U
Trichloroethene		mg/L	.005	U	U	.005	U	U
Trichlorofluoromethane		mg/L	.005	U	U	.005	U	U
Vinyl chloride		mg/L	.005	U	U	.005	U	U
cis-1,2-Dichloroethene		mg/L	.005	U	U	.005	U	U
cis-1,3-Dichloropropene		mg/L	.005	U	U	.005	U	U
m,p-Xylenes		mg/L	.01	U	U	.01	U	U
n-Butylbenzene		mg/L	.005	U	U	.005	U	U
n-Propylbenzene		mg/L	.005	U	U	.005	U	U
o-Chlorotoluene		mg/L	.005	U	U	.005	U	U
p-Chlorotoluene		mg/L	.005	U	U	.005	U	U
p-Cymene		mg/L	.005	U	U	.005	U	U
sec-Butylbenzene		mg/L	.005	U	U	.005	U	U
sec-Dichloropropane		mg/L	.005	U	U	.005	U	U
tert-Butylbenzene		mg/L	.005	U	U	.005	U	U
trans-1,2-Dichloroethene		mg/L	.005	U	U	.005	U	U
trans-1,3-Dichloropropene		mg/L	.005	U	U	.005	U	U

Summary of Validated Sediment Data  
 Pelham Range Training Area 6C Bluehole  
 Fort McClellan, Alabama

Report Date: 03/09/01

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<i>Location Code:</i>	TA6CBH-SW/SD01	TA6CBH-SW/SD02
<i>Associated Site:</i>	TA6	TA6
<i>Sample No:</i>	XQ1001	XQ1002
<i>Sample Date:</i>	11-JAN-01	11-JAN-01
<i>Sample Depth:</i>	0 - .5	0 - .5

*User Test Group*  
*Lab Method*

<i>Parameter</i>	<i>Units</i>	<i>Result</i>	<i>Qual</i>	<i>VQual</i>	<i>Result</i>	<i>Qual</i>	<i>VQual</i>
<b>METALS</b>							
SW6010B							
Aluminum	mg/kg	13300			17500		
Antimony	mg/kg	16.1	U	U	11.1	U	U
Arsenic	mg/kg	89.1			14.9		
Barium	mg/kg	96.4			76.7		
Beryllium	mg/kg	1.1	J	J	1.99		
Cadmium	mg/kg	.803	U	U	.556	U	U
Calcium	mg/kg	1670			1070		
Chromium	mg/kg	27.1			72.6		
Cobalt	mg/kg	10.2			9.86		
Copper	mg/kg	14.1			7.81		
Iron	mg/kg	25500			41200		
Lead	mg/kg	38.2			16.6		
Magnesium	mg/kg	787			704		
Manganese	mg/kg	1080			1040		
Nickel	mg/kg	14.9			11.4		
Potassium	mg/kg	370	J	J	332	J	J
Selenium	mg/kg	.812	J	J	.514	J	J
Silver	mg/kg	1.61	U	U	1.11	U	U
Sodium	mg/kg	161	U	U	35.8	J	J
Thallium	mg/kg	1.4	J	J	2.22	U	U
Vanadium	mg/kg	54.6			104		
Zinc	mg/kg	62.1			35.6		
SW7471A							
Mercury	mg/kg	.053	J	J	.111	U	U

**NITROAROMATI**

SW8330

1,3,5-Trinitrobenzene	mg/kg	.4	U	U	.4	U	U
1,3-Dinitrobenzene	mg/kg	.4	U	U	.4	U	U
2,4,6-Trinitrotoluene	mg/kg	.4	U	U	.4	U	U
2,4-Dinitrotoluene	mg/kg	.4	U	U	.4	U	U

Summary of Validated Sediment Data  
Pelham Range Training Area 6C Bluehole  
Fort McClellan, Alabama

Report Date: 03/09/01

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<i>Location Code:</i>	TA6CBH-SW/SD01	TA6CBH-SW/SD02
<i>Associated Site:</i>	TA6	TA6
<i>Sample No:</i>	XQ1001	XQ1002
<i>Sample Date:</i>	11-JAN-01	11-JAN-01
<i>Sample Depth:</i>	0 - .5	0 - .5

*User Test Group*  
*Lab Method*

<u>Parameter</u>	<u>Units</u>	<u>Result Qual VQual</u>			<u>Result Qual VQual</u>		
<b>NITROAROMATI</b>							
SW8330							
2,6-Dinitrotoluene	mg/kg	.4	U	U	.4	U	U
2-Amino-4,6-dinitrotoluene	mg/kg	.4	U	U	.4	U	U
2-Nitrotoluene	mg/kg	.4	U	U	.4	U	U
3-Nitrotoluene	mg/kg	.4	U	U	.4	U	U
4-Amino-2,6-dinitrotoluene	mg/kg	.4	U	U	.4	U	U
HMX	mg/kg	.4	U	U	.4	U	U
Nitrobenzene	mg/kg	.4	U	U	.4	U	U
RDX	mg/kg	.4	U	U	.4	U	U
Tetryl	mg/kg	.4	U	U	.4	U	U
p-Nitrotoluene	mg/kg	.4	U	U	.4	U	U
<b>SEMIVOLATILES</b>							
SW8270C							
1,2,4-Trichlorobenzene	mg/kg	.53	U	U	.37	U	U
1,2-Dichlorobenzene	mg/kg	.53	U	U	.37	U	U
1,3-Dichlorobenzene	mg/kg	.53	U	U	.37	U	U
1,4-Dichlorobenzene	mg/kg	.53	U	U	.37	U	U
2,4,5-Trichlorophenol	mg/kg	.53	U	U	.37	U	U
2,4,6-Trichlorophenol	mg/kg	1.3	U	U	.92	U	U
2,4-Dichlorophenol	mg/kg	.53	U	U	.37	U	U
2,4-Dimethylphenol	mg/kg	.53	U	U	.37	U	U
2,4-Dinitrophenol	mg/kg	.53	U	U	.37	U	U
2,4-Dinitrotoluene	mg/kg	.53	U	U	.37	U	U
2,6-Dinitrotoluene	mg/kg	.53	U	U	.37	U	U
2-Chloronaphthalene	mg/kg	.53	U	U	.37	U	U
2-Chlorophenol	mg/kg	.53	U	U	.37	U	U
2-Methylnaphthalene	mg/kg	.53	U	U	.37	U	U
2-Methylphenol	mg/kg	.53	U	U	.37	U	U
2-Nitroaniline	mg/kg	1.3	U	U	.92	U	U
2-Nitrophenol	mg/kg	.53	U	U	.37	U	U
3,3'-Dichlorobenzidine	mg/kg	1.3	U	U	.92	U	U

Summary of Validated Sediment Data  
Pelham Range Training Area 6C Bluehole  
Fort McClellan, Alabama

Report Date: 03/09/01

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<i>Location Code:</i>	TA6CBH-SW/SD01	TA6CBH-SW/SD02
<i>Associated Site:</i>	TA6	TA6
<i>Sample No:</i>	XQ1001	XQ1002
<i>Sample Date:</i>	11-JAN-01	11-JAN-01
<i>Sample Depth:</i>	0 - .5	0 - .5

*User Test Group*  
*Lab Method*

<u>Parameter</u>	<u>Units</u>	<u>Result</u>	<u>Qual</u>	<u>VQual</u>	<u>Result</u>	<u>Qual</u>	<u>VQual</u>
<b>SEMIVOLATILES</b>							
SW8270C							
3-Nitroaniline	mg/kg	1.3	U	U	.92	U	U
4,6-Dinitro-2-methylphenol	mg/kg	1.3	U	U	.92	U	U
4-Bromophenyl phenyl ether	mg/kg	.53	U	U	.37	U	U
4-Chloro-3-methylphenol	mg/kg	.53	U	U	.37	U	U
4-Chloroaniline	mg/kg	.53	U	U	.37	U	U
4-Chlorophenyl phenyl ether	mg/kg	.53	U	U	.37	U	U
4-Methylphenol	mg/kg	.53	U	U	.37	U	U
4-Nitroaniline	mg/kg	.53	U	U	.37	U	U
4-Nitrophenol	mg/kg	1.3	U	U	.92	U	U
Acenaphthene	mg/kg	.53	U	U	.37	U	U
Acenaphthylene	mg/kg	.53	U	U	.37	U	U
Anthracene	mg/kg	.53	U	U	.37	U	U
Benzo(a)anthracene	mg/kg	.53	U	U	.37	U	U
Benzo(a)pyrene	mg/kg	.53	U	U	.37	U	U
Benzo(b)fluoranthene	mg/kg	.53	U	U	.37	U	U
Benzo(ghi)perylene	mg/kg	.53	U	U	.37	U	U
Benzo(k)fluoranthene	mg/kg	.53	U	U	.37	U	U
Butyl benzyl phthalate	mg/kg	.53	U	U	.37	U	U
Carbazole	mg/kg	.53	U	U	.37	U	U
Chrysene	mg/kg	.53	U	U	.37	U	U
Di-n-butyl phthalate	mg/kg	.53	U	U	.37	U	U
Di-n-octyl phthalate	mg/kg	.53	U	U	.37	U	U
Dibenz(a,h)anthracene	mg/kg	.53	U	U	.37	U	U
Dibenzofuran	mg/kg	.53	U	U	.37	U	U
Diethyl phthalate	mg/kg	.53	U	U	.37	U	U
Dimethyl phthalate	mg/kg	.53	U	U	.37	U	U
Fluoranthene	mg/kg	.53	U	U	.37	U	U
Fluorene	mg/kg	.53	U	U	.37	U	U
Hexachlorobenzene	mg/kg	.53	U	U	.37	U	U
Hexachlorobutadiene	mg/kg	.53	U	U	.37	U	U
Hexachlorocyclopentadiene	mg/kg	.53	U	U	.37	U	U

Summary of Validated Sediment Data  
 Pelham Range Training Area 6C Bluehole  
 Fort McClellan, Alabama

Report Date: 03/09/01

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<i>Location Code:</i>	TA6CBH-SW/SD01	TA6CBH-SW/SD02
<i>Associated Site:</i>	TA6	TA6
<i>Sample No:</i>	XQ1001	XQ1002
<i>Sample Date:</i>	11-JAN-01	11-JAN-01
<i>Sample Depth:</i>	0 - .5	0 - .5

*User Test Group*

*Lab Method*

<i>Parameter</i>	<i>Units</i>	<i>Result</i>	<i>Qual</i>	<i>VQual</i>	<i>Result</i>	<i>Qual</i>	<i>VQual</i>
<b>SEMIVOLATILES</b>							
SW8270C							
Hexachloroethane	mg/kg	.53	U	U	.37	U	U
Indeno(1,2,3-cd)pyrene	mg/kg	.53	U	U	.37	U	U
Isophorone	mg/kg	.53	U	U	.37	U	U
Naphthalene	mg/kg	.53	U	U	.37	U	U
Nitrobenzene	mg/kg	.53	U	U	.37	U	U
Pentachlorophenol	mg/kg	1.3	U	U	.92	U	U
Phenanthrene	mg/kg	.53	U	U	.37	U	U
Phenol	mg/kg	.53	U	U	.37	U	U
Pyrene	mg/kg	.53	U	U	.37	U	U
bis(2-Chloroethoxy)methane	mg/kg	.53	U	U	.37	U	U
bis(2-Chloroethyl)ether	mg/kg	.53	U	U	.37	U	U
bis(2-Chloroisopropyl)ether	mg/kg	.53	U	U	.37	U	U
bis(2-Ethylhexyl)phthalate	mg/kg	.53	U	U	.37	U	U
n-Nitroso-di-n-propylamine	mg/kg	.53	U	U	.37	U	U
n-Nitrosodiphenylamine	mg/kg	.53	U	U	.37	U	U
<b>VOLATILES</b>							
SW8260B							
1,1,1,2-Tetrachloroethane	mg/kg	.0075	U	U	.0049	U	U
1,1,1-Trichloroethane	mg/kg	.0075	U	U	.0049	U	U
1,1,2,2-Tetrachloroethane	mg/kg	.0075	U	U	.0049	U	U
1,1,2-Trichloroethane	mg/kg	.0075	U	U	.0049	U	U
1,1-Dichloroethane	mg/kg	.0075	U	U	.0049	U	U
1,1-Dichloroethene	mg/kg	.0075	U	U	.0049	U	U
1,1-Dichloropropene	mg/kg	.0075	U	U	.0049	U	U
1,2,3-Trichlorobenzene	mg/kg	.0075	U	U	.0049	U	U
1,2,3-Trichloropropane	mg/kg	.0075	U	U	.0049	U	U
1,2,4-Trichlorobenzene	mg/kg	.0075	U	U	.0049	U	U
1,2,4-Trimethylbenzene	mg/kg	.0075	U	U	.0049	U	U
1,2-Dibromo-3-Chloropropane	mg/kg	.015	U	U	.0098	U	U
1,2-Dibromoethane	mg/kg	.0075	U	U	.0049	U	U

Summary of Validated Sediment Data  
 Pelham Range Training Area 6C Bluehole  
 Fort McClellan, Alabama

Report Date: 03/09/01

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<i>Location Code:</i>	TA6CBH-SW/SD01	TA6CBH-SW/SD02
<i>Associated Site:</i>	TA6	TA6
<i>Sample No.:</i>	XQ1001	XQ1002
<i>Sample Date:</i>	11-JAN-01	11-JAN-01
<i>Sample Depth:</i>	0 - .5	0 - .5

*User Test Group*  
*Lab Method*

<i>Parameter</i>	<i>Units</i>	<i>Result</i>	<i>Qual</i>	<i>VQual</i>	<i>Result</i>	<i>Qual</i>	<i>VQual</i>
<b>VOLATILES</b>							
SW8260B							
1,2-Dichlorobenzene	mg/kg	.0075	U	U	.0049	U	U
1,2-Dichloroethane	mg/kg	.0075	U	U	.0049	U	U
1,2-Dichloropropane	mg/kg	.0075	U	U	.0049	U	U
1,2-Dimethylbenzene	mg/kg	.0075	U	U	.0049	U	U
1,3,5-Trimethylbenzene	mg/kg	.0075	U	U	.0049	U	U
1,3-Dichlorobenzene	mg/kg	.0075	U	U	.0049	U	U
1,3-Dichloropropane	mg/kg	.0075	U	U	.0049	U	U
1,4-Dichlorobenzene	mg/kg	.0075	U	U	.0049	U	U
2-Butanone	mg/kg	.016	J	J	.019	J	J
2-Hexanone	mg/kg	.03	U	U	.02	U	U
4-Methyl-2-pentanone	mg/kg	.015	U	U	.0098	U	U
Acetone	mg/kg	.19			.19		
Benzene	mg/kg	.0075	U	U	.0049	U	U
Bromobenzene	mg/kg	.0075	U	U	.0049	U	U
Bromochloromethane	mg/kg	.0075	U	U	.0049	U	U
Bromodichloromethane	mg/kg	.0075	U	U	.0049	U	U
Bromoform	mg/kg	.0075	U	U	.0049	U	U
Bromomethane	mg/kg	.0075	U	U	.0049	U	U
Carbon disulfide	mg/kg	.0075	U	U	.0049	U	U
Carbon tetrachloride	mg/kg	.0075	U	U	.0049	U	U
Chlorobenzene	mg/kg	.0075	U	U	.0049	U	U
Chloroethane	mg/kg	.0075	U	U	.0049	U	U
Chloroform	mg/kg	.0075	U	U	.0049	U	U
Chloromethane	mg/kg	.0075	U	U	.0049	U	U
Cumene	mg/kg	.0075	U	U	.0049	U	U
Dibromochloromethane	mg/kg	.0075	U	U	.0049	U	U
Dibromomethane	mg/kg	.0075	U	U	.0049	U	U
Dichlorodifluoromethane	mg/kg	.0075	U	U	.0049	U	U
Ethylbenzene	mg/kg	.0075	U	U	.0049	U	U
Hexachlorobutadiene	mg/kg	.0075	U	U	.0049	U	U
Methylene chloride	mg/kg	.0023	J	B	.0016	J	B

Summary of Validated Sediment Data  
 Pelham Range Training Area 6C Bluehole  
 Fort McClellan, Alabama

Report Date: 03/09/01

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<i>Location Code:</i>	TA6CBH-SW/SD01	TA6CBH-SW/SD02
<i>Associated Site:</i>	TA6	TA6
<i>Sample No:</i>	XQ1001	XQ1002
<i>Sample Date:</i>	11-JAN-01	11-JAN-01
<i>Sample Depth:</i>	0 - .5	0 - .5

*User Test Group*  
*Lab Method*

<u>Parameter</u>	<u>Units</u>	<u>Result</u>	<u>Qual</u>	<u>VQual</u>	<u>Result</u>	<u>Qual</u>	<u>VQual</u>
<b>VOLATILES</b>							
SW8260B							
Naphthalene	mg/kg	.0075	U	U	.0049	U	U
Styrene	mg/kg	.0075	U	U	.0049	U	U
Tetrachloroethene	mg/kg	.0075	U	U	.0049	U	U
Toluene	mg/kg	.0075	U	U	.0049	U	U
Trichloroethene	mg/kg	.0075	U	U	.0049	U	U
Trichlorofluoromethane	mg/kg	.0075	U	U	.0049	U	U
Vinyl chloride	mg/kg	.0075	U	U	.0049	U	U
cis-1,2-Dichloroethene	mg/kg	.0075	U	U	.0049	U	U
cis-1,3-Dichloropropene	mg/kg	.0075	U	U	.0049	U	U
m,p-Xylenes	mg/kg	.015	U	U	.0098	U	U
n-Butylbenzene	mg/kg	.0075	U	U	.0049	U	U
n-Propylbenzene	mg/kg	.0075	U	U	.0049	U	U
o-Chlorotoluene	mg/kg	.0075	U	U	.0049	U	U
p-Chlorotoluene	mg/kg	.0075	U	U	.0049	U	U
p-Cymene	mg/kg	.0075	U	U	.0049	U	U
sec-Butylbenzene	mg/kg	.0075	U	U	.0049	U	U
sec-Dichloropropane	mg/kg	.0075	U	U	.0049	U	U
tert-Butylbenzene	mg/kg	.0075	U	U	.0049	U	U
trans-1,2-Dichloroethene	mg/kg	.0075	U	U	.0049	U	U
trans-1,3-Dichloropropene	mg/kg	.0075	U	U	.0049	U	U

**APPENDIX D**

**SUMMARY STATISTICS FOR BACKGROUND MEDIA,  
FORT McCLELLAN, ALABAMA**

**Table 4-10. Summary Statistics for Background Surface Water  
Fort McClellan, Alabama**

Run Time: 5:11:42 PM

Run Date: 7/9/98

Exposure Unit: WS

Parameter	Units	Total	Total	Frequency of Detection	NonDetects		Detects		Arithmetic Mean <sup>a</sup>	Standard Deviation <sup>a</sup>	Distribution <sup>b</sup>	Exposure		2x Arithmetic Mean <sup>a</sup>
		Number of Samples	Number of Detects		Min CRL	Max CRL	Minimum	Maximum				95% UCL of Arith. Mean <sup>a</sup>	Point Concentration <sup>c</sup>	
Aluminum	µg/L	67	57	85%	50	141	65	47,800	2,629.59	7.921	Lognormal	17,831	17,831	5,259
Arsenic	µg/L	65	9	14%	1.1	2.4	1.4	11	1.08	1.5	Lognormal	1.5	1.5	2.17
Barium	µg/L	67	67	100%	--	--	11	200	37.68	35	Lognormal	55	55	75.36
Beryllium	µg/L	56	9	16%	0.20	0.20	0.20	3.2	0.19	0.43	Lognormal	0.22	0.22	0.39
Bicarbonate	µg/L	56	40	71%	5,000	5,000	6,000	172,000	53,178.57	57,480	Lognormal	449,171	172,000	# 106,357
Cadmium	µg/L	67	10	15%	0.20	6.8	0.20	1.5	0.57	0.91	Lognormal	1.4	1.4	1.13
Calcium	µg/L	67	67	100%	--	--	179	64,100	12,583.19	13,701	Lognormal	218,721	64,100	# 25,166
Chloride	µg/L	56	56	100%	--	--	467	10,100	1,943.05	1,815	Lognormal	2,656	2,656	3,886
Chromium	µg/L	64	1	2%	6.0	17	14	14	5.56	1.7	Undetermined	6.3	6.3	11.13
Copper	µg/L	56	8	14%	5.0	8.1	7.1	72	6.35	13	Lognormal	8.1	8.1	12.70
Fluoride	µg/L	56	6	11%	100	200	128	579	107.86	85	Lognormal	139	139	215.71
Iron	µg/L	67	64	96%	45	78	74	232,000	9,814.08	37,961	Lognormal	46,205	46,205	19,628
Lead	µg/L	66	34	52%	0.60	4.5	0.60	47	4.33	8.3	Lognormal	19	19	8.67
Magnesium	µg/L	67	67	100%	--	--	171	24,400	5,486.16	5,916	Lognormal	34,551	24,400	# 10,972
Manganese	µg/L	67	64	96%	5.0	9.7	5.5	6,060	282.42	840	Lognormal	1,153	1,153	564.85
Nickel	µg/L	67	3	4%	15	34	40	70	11.23	11	Lognormal	14	14	22.46
Nitrate,Nitrite	µg/L	56	44	79%	10.0	10.0	11	838	106.09	181	Lognormal	507	507	212.18
Potassium	µg/L	67	61	91%	1,240	1,240	330	7,120	1,281.85	1,157	Lognormal	1,940	1,940	2,564
Sodium	µg/L	66	66	100%	--	--	296	15,200	1,718.44	2,043	Lognormal	2,401	2,401	3,437
Sulfate	µg/L	56	56	100%	--	--	1,060	62,400	4,313.57	8,203	Lognormal	5,784	5,784	8,627
Thallium	µg/L	59	1	2%	0.100	125	4.2	4.2	1.24	8.1	Undetermined	0.56	0.56	2.49
Total Alkalinity	µg/L	56	40	71%	5,000	5,000	6,000	172,000	53,178.57	57,480	Lognormal	449,171	172,000	# 106,357
Total Phosphorous	µg/L	56	24	43%	10.0	14	11	655	38.82	99	Lognormal	87	87	77.64
Vanadium	µg/L	63	5	8%	10.0	28	13	36	7.60	5.7	Lognormal	9.8	9.8	15.21
Zinc	µg/L	66	6	9%	18	30	27	182	20.17	26	Lognormal	24	24	40.35

<sup>a</sup>Results of duplicate analyses were averaged and nondetects were treated as one-half the detection limit in the calculation of the arithmetic mean, standard deviation, and 95% UCL.

<sup>b</sup>For the calculation of exposure point concentrations (EPCs):

If fewer than four samples are available, or the standard deviation of the data set is zero, the distribution is undetermined.

If the probability plot correlation coefficient of the untransformed data is > or = to the critical value, the distribution is normal.

In all other cases, the distribution assumed for the EPC calculation was lognormal.

<sup>c</sup>The exposure point concentration (EPC) is the 95% upper confidence (UCL) of the arithmetic mean, unless the 95% UCL exceeds the maximum detected value.

If the latter is true, the maximum detected value is substituted as the EPC (denoted by a "#" next to the EPC).

-- Parameter detected in all samples.

**Table 4-11. Summary Statistics for Background Sediment  
Fort McClellan, Alabama**

Run Time: 5:01:01 PM														
Run Date: 7/9/98														
Exposure Unit: DS														
Parameter	Units	Total	Total	Frequency of Detection	NonDetects		Detects		Arithmetic Mean <sup>a</sup>	Standard Deviation <sup>a</sup>	Distribution <sup>b</sup>	95% UCL of	Exposure	2x Arithmetic Mean <sup>a</sup>
		Number of Samples	Number of Detects		Min CRL	Max CRL	Minimum	Maximum				Arith. Mean <sup>a</sup>	Point Concentration <sup>c</sup>	
Aluminum	ug/g	65	65	100%	--	--	657	17,400	4,296.32	3,138	Lognormal	6,591	6,590.77	8,593
Antimony	ug/g	59	40	68%	0.11	1.00	0.12	1.2	0.36	0.25	Lognormal	0.77	0.77	0.73
Arsenic	ug/g	58	58	100%	--	--	0.21	20	5.67	5.0	Lognormal	13	13.34	11.33
Barium	ug/g	65	65	100%	--	--	5.4	272	49.46	44	Lognormal	86	85.64	98.91
Beryllium	ug/g	55	55	100%	--	--	0.069	1.2	0.49	0.30	Lognormal	0.83	0.83	0.97
Cadmium	ug/g	65	47	72%	0.020	1.2	0.020	2.4	0.22	0.39	Lognormal	0.67	0.67	0.43
Calcium	ug/g	65	61	94%	60	99	88	2,810	555.76	557	Lognormal	1,370	1,369.94	1,111.51
Chromium	ug/g	65	65	100%	--	--	1.1	63	15.57	14	Lognormal	30	29.80	31.15
Cobalt	ug/g	64	59	92%	0.24	2.5	0.40	22	5.51	4.5	Lognormal	15	14.80	11.01
Copper	ug/g	61	60	98%	2.8	2.8	0.73	59	8.56	8.8	Lognormal	16	15.75	17.12
Iron	ug/g	65	65	100%	--	--	683	57,500	17,633.26	12,838	Lognormal	36,392	36,391.61	35,267
Lead	ug/g	62	61	98%	7.4	7.4	1.7	110	18.91	20	Lognormal	35	35.40	37.82
Magnesium	ug/g	65	65	100%	--	--	30	3,270	452.97	686	Lognormal	952	952.13	905.94
Manganese	ug/g	64	62	97%	4.2	5.0	8.7	2,050	356.15	385	Lognormal	1,735	1,735.37	712.31
Mercury	ug/g	65	37	57%	0.024	0.061	0.047	0.28	0.06	0.042	Lognormal	0.087	0.09	0.11
Nickel	ug/g	65	43	66%	2.1	5.3	2.4	33	6.51	6.9	Lognormal	14	14.02	13.02
Potassium	ug/g	65	46	71%	100	151	118	4,810	506.74	842	Lognormal	1,273	1,272.69	1,013.48
Selenium	ug/g	65	4	6%	0.25	1.2	0.72	1.9	0.36	0.29	Lognormal	0.44	0.44	0.72
Silver	ug/g	65	37	57%	0.018	0.80	0.021	1.1	0.16	0.21	Lognormal	0.73	0.73	0.32
Sodium	ug/g	65	57	88%	39	60	173	738	346.14	152	Lognormal	942	738.00	# 692.29
Thallium	ug/g	56	56	100%	--	--	0.012	0.22	0.06	0.047	Lognormal	0.098	0.10	0.13
Vanadium	ug/g	65	65	100%	--	--	2.6	67	20.44	13	Lognormal	34	33.66	40.87
Zinc	ug/g	65	58	89%	5.3	6.9	6.0	111	26.37	24	Lognormal	56	55.67	52.74

<sup>a</sup>Results of duplicate analyses were averaged and nondetects were treated as one-half the detection limit in the calculation of the arithmetic mean, standard deviation, and 95% UCL.

<sup>b</sup>For the calculation of exposure point concentrations (EPCs):

If fewer than four samples are available, or the standard deviation of the data set is zero, the distribution is undetermined.

If the probability plot correlation coefficient of the untransformed data is > or = to the critical value, the distribution is normal.

In all other cases, the distribution assumed for the EPC calculation was lognormal.

<sup>c</sup>The exposure point concentration (EPC) is the 95% upper confidence (UCL) of the arithmetic mean, unless the 95% UCL exceeds the maximum detected value.

If the latter is true, the maximum detected value is substituted as the EPC (denoted by a "#" next to the EPC).

-- Parameter detected in all samples.

**APPENDIX E**  
**PRELIMINARY RISK ASSESSMENT**

# Technical Memorandum

From: Paul F. Goetchius, DVM

To: Blue Hole within Training Area 6C at Pelham Range, Fort McClellan, Calhoun County, Alabama  
Preliminary Risk Assessment File

Date: 1 August 2002

Subject: **PRELIMINARY RISK ASSESSMENT FOR SUBJECT SITE, REVISED**

This memorandum provides a Preliminary Risk Assessment (PRA) for exposure to surface water and sediment at the Blue Hole within Training Area 6C at Pelham Range, hereinafter referred to as the Blue Hole. The purpose of the PRA is to support a recommendation for no further action proposed by the Sampling Summary Report for this site (IT, 2002). The PRA approach is a shortened version of the Streamlined Risk Assessment (SRA) protocol developed as a uniform and economical approach to evaluating hundreds of similar sites at Fort McClellan (FTMC). It is assumed that the reader is familiar with FTMC and the fundamentals of the SRA protocol. The reader is referred to the Installation-Wide Work Plan (IT, 1998) for more detail. All the comparison and computational operations of the PRA are performed within EXCEL<sup>®</sup> spreadsheet tables. The results of each step are described below.

***Media of Interest and Data Selection.*** Media of interest are limited to the surface water and sediment in a small slough into which burning smoke pots may have been cast following training operations. Surface water is present only intermittent in the slough, generally related to storm events. Only two small accumulations of surface water were present at the time of sampling. However, they were located at the lowest points on the site, which would be expected to receive highest concentrations of potential contaminants that might accumulate from runoff or erosion. Surface water and sediment samples were taken from both locations and were analyzed for volatile organic compounds, semivolatile organic compounds, nitroaromatic and nitramine explosives, and metals. It is judged that the two samples reflect both the greatest potential for exposure to surface water and sediment, and also that the samples were located appropriately to capture the highest levels of contamination. The validated data for chemicals detected in surface water and sediment are summarized in Tables 2 and 3, respectively, in the Sampling Summary Report.

***Site-Related Chemical Selection.*** Site-related chemicals are those presumed to be released because of activities performed by the army during operation of FTMC. They are identified in Table 1 (surface water) and Table 2 (sediment) by comparing the maximum detected concentration (MDC) of each chemical with its background screening criterion (BSC), computed as two times the mean of the background data set, in accordance with EPA (2001) Region IV guidance. BSCs were taken from Tables 2 and 3 of the Sampling Summary Report. Upper tolerance limits (UTL), the highest metal concentrations reasonably considered to be within background, are also included in Tables 1 and 2 for information, but were not used to select site-

related chemicals. The UTL provides a more refined statistical approach than the BSC for comparing site and background data. UTLs were developed for the entire FTMC facility, combining data from the Main Post and Pelham Range.

***Chemical of Potential Concern Selection.*** Chemicals of potential concern (COPC) are site-related chemicals whose MDCs exceed their site-specific screening levels (SSSL), and which may contribute significantly to risk. The SSSLs are receptor-, medium-, and chemical-specific risk-based concentrations that capture all the exposure assumptions and toxicity assessment of a full-blown baseline risk assessment. COPCs are selected for both cancer risk and noncancer effects when the data permit (Tables 1 and 2).

***Receptor Scenario Selection.*** Recent information indicates that the Blue Hole is included in the area to be released to the National Guard. Should this occur, the National Guardsperson would be the most plausible receptor. It is also possible that the site could be used for passive recreation, especially in the period before it is released to the National Guard. In this case the recreational site user also would be a plausible receptor. Also, by agreement FTMC sites are generally evaluated for residential use in order to obtain the perspective from assessing the upper bound on exposure. It is assumed that the National Guardsperson is unlikely to be repeatedly or consistently exposed to surface water or sediment (Goetchius, 2001), therefore, SSSLs are not available for National Guardsperson exposure to these media and risks were not quantified for this receptor. The assumptions for residential and recreational site user exposure to surface water and sediment are identical; therefore, only the recreational site user was evaluated for exposure to these media.

***Risk Characterization.*** Risk characterization combines the exposure assumptions and toxicity assessment (incorporated in the SSSLs) with the exposure-point concentration (EPC) to quantify the incremental lifetime cancer risk (ILCR) and noncancer hazard index (HI). ILCR and HI estimates are computed for each chemical in each medium, and are summed to yield a total ILCR and total HI for each receptor scenario. The PRA differs from an SRA in that no attempt is made to estimate an EPC that reflects a conservative estimate of average concentration for use in risk assessment. The 95 percent upper confidence limit on the mean (UCL) is usually used for this purpose. For this evaluation, the MDC is adopted as the EPC, which imparts a conservative bias to the PRA.

EPA (1990) considers ILCR estimates below  $1E-6$  to be negligible, ILCR estimates from  $1E-6$  to  $1E-4$  to fall within a risk management range, and ILCR estimates above  $1E-4$  to be generally unacceptable. EPA (1989) states that risk values should be rounded to one significant figure to reflect the uncertainty about their estimation. For example, a calculated ILCR of  $9.50E-7$  would be rounded to  $1E-6$  and interpreted as falling within the risk management range. Similarly, a calculated ILCR of  $1.49E-4$  would be rounded to  $1E-4$  and interpreted as falling within, but not exceeding, the risk management range. Also, an HI of  $1.49E+0$  would be rounded to 1 and interpreted as not exceeding the threshold level of 1. Risk estimates in this document are presented in scientific notation with two places to the right of the decimal. Rounding is done only if needed to facilitate interpretation.

Antimony was selected as the only COPC in surface water because its MDC ( $2.76E-2$  mg/L)

exceeds its noncancer-based SSSL (5.83E-3 mg/L) (Table 1). Assuming antimony is site-related (background data were not available for this metal), an HI of 4.72E-1 is calculated. The HI for exposure to surface water is less than the threshold limit of 1. No chemicals were selected as COPCs based on cancer risk; therefore, no ILCR was estimated for exposure to surface water.

Arsenic was selected as the only COPC for the recreational site user exposure to sediment, because its MDC exceeds its cancer-based SSSL (Table 2). An ILCR of 1.60E-6 is calculated, which falls near the low end of the risk management range. No chemicals were selected as noncancer-based COPCs; therefore, no HI was estimated for exposure to sediment.

The total ILCR for the recreational site user summed across surface water and sediment is 1.60E-6, which falls within the risk management range, and the total HI summed across both media is 4.72E-1, which falls below the threshold level of 1. It is concluded that exposure to surface water and sediment poses no unacceptable risk of adverse effects for the recreational site user. Since the exposure assumptions for the recreational site user and on-site resident are identical, it is concluded also that exposure poses no unacceptable risk to the on-site resident. Although the National Guardsperson was not evaluated, his exposure and risk would be somewhat less than the estimates for the recreational site user. Thus, the PRA supports the recommendation for no further action proposed by the Sampling Summary Report for this site.

#### **References:**

Goetchius, P.F., 2001, "National Guardsperson at Pelham Range," Memorandum to FTMC Risk Assessment File, 11 October.

IT Corporation (IT), 1998, *Installation-Wide Work Plan*, Final, Fort McClellan, Calhoun County, Alabama, Prepared for U.S. Army Corps of Engineers, Mobile District, August\*

IT Corporation (IT), 2002, *Final Sampling Summary Report for the Blue Hole, Training Area 6C*, Revision 1, Fort McClellan, Calhoun County, Alabama, Prepared for U.S. Army Corps of Engineers, Mobile District, August.

U.S. Environmental Protection Agency (EPA), 1989, *Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A)*, Interim Final, Office of Emergency and Remedial Response, Washington, DC, EPA/540/1-89/002, December.

U.S. Environmental Protection Agency (EPA), 1990, "National Oil and Hazardous Substances Pollution Contingency Plan," *Federal Register* 55(46): 8666-8865.

U.S. Environmental Protection Agency (EPA), 2001, *Region 4 Human Health Risk Assessment Bulletins – Supplement to RAGS, Interim Human Health Risk Assessment Bulletins*, Waste Management Division, EPA Region 4, Atlanta, GA, on line.

\*Note: the Installation-Wide Work Plan was revised in September 2001 but has not yet been released for distribution. The description of the protocol and application of the SRA, however, was not substantively changed.

Table 1

**Preliminary Risk Evaluation for Exposure to Surface Water  
Blue Hole, Training Area 6C  
Fort McClellan, Calhoun County, Alabama**

Chemical	MDC	BSC	UTL	Site-Related Chemical? <sup>a</sup>	Recreational Site-User SW SSSL-c <sup>b</sup>	Recreational Site-User SW SSSL-n <sup>c</sup>	Recreational Site-User Cancer COPC? <sup>d</sup>	Recreational Site-User Noncancer COPC? <sup>e</sup>	Recreational Site-User ILCR <sup>f</sup>	Recreational Site-User HI <sup>g</sup>
<b>Metals</b>										
Aluminum	3.28E-01	5.26E+00	1.70E+01		NA	1.53E+01				
Antimony	2.76E-02	NA	NA	2.76E-02	NA	5.85E-03		2.76E-02		4.72E-01
Barium	7.27E-02	7.53E-02	1.13E-01		NA	1.10E+00				
Calcium	1.49E+01	2.52E+01	6.41E+01		NA	NA				
Iron	8.42E-01	1.96E+01	4.12E+01		NA	4.70E+00				
Magnesium	8.71E+00	1.10E+01	2.44E+01		NA	NA				
Manganese	4.30E-01	5.65E-01	1.83E+00		NA	6.40E-01				
Selenium	1.93E-03	NA	NA	1.93E-03	NA	7.82E-02				
Sodium	8.86E-01	3.44E+00	1.52E+01		NA	NA				
Zinc	2.39E-02	4.03E-02	1.82E-01		NA	4.65E+00				
<b>Volatile Organic Compounds</b>										
Acetone	1.60E-02	NA		1.60E-02	NA	1.57E+00				
Methylene chloride	1.80E-03	NA		1.80E-03	1.42E-01	9.15E-01				
<b>Total ILCR, HI</b>									<b>NA</b>	<b>4.72E-01</b>

All concentrations expressed as mg/L.

MDC = maximum detected concentration; BSC = background screening criterion ; UTL = 95% Upper Tolerance Limit.

NA = Not available.

<sup>a</sup> MDC presented only if it exceeds BSC, or no BSC is available.

<sup>b</sup> Site-specific screening level (SSSL) based on cancer risk for recreational site user exposure to surface water.

<sup>c</sup> Site-specific screening level based on noncancer hazard for recreational site user exposure to surface water.

<sup>d</sup> MDC presented only if it exceeds SSSL-c.

<sup>e</sup> MDC presented only if it exceeds SSSL-n.

<sup>f</sup> Incremental lifetime cancer risk for recreational site user exposed to chemical in surface water.

<sup>g</sup> Hazard index for noncancer effects for recreational site user exposed to chemical in surface water.

Table 2

Preliminary Risk Evaluation for Exposure to Sediment  
Blue Hole, Training Area 6C  
Fort McClellan, Calhoun County, Alabama

Chemical	MDC	BSC	UTL	Site-Related Chemical? <sup>a</sup>	Recreational Site-User Sed SSSL-c <sup>b</sup>	Recreational Site-User Sed SSSL-n <sup>c</sup>	Recreational Site-User Cancer COPC? <sup>d</sup>	Recreational Site-User Noncancer COPC? <sup>e</sup>	Recreational Site-User ILCR <sup>f</sup>	Recreational Site-User HI <sup>g</sup>
<b>Metals</b>										
Aluminum	1.75E+04	8.59E+03	1.43E+04	1.75E+04	NA	1.15E+06				
Arsenic	8.91E+01	1.13E+01	2.01E+01	8.91E+01	5.58E+01	3.59E+02	8.91E+01		1.60E-06	
Barium	9.64E+01	9.89E+01	1.91E+02		NA	8.36E+04				
Beryllium	1.99E+00	9.70E-01	1.24E+00	1.99E+00	NA	1.50E+02				
Calcium	1.67E+03	1.11E+03	2.81E+03	1.67E+03	NA	NA				
Chromium <sup>h</sup>	7.26E+01	3.12E+01	6.33E+01	7.26E+01	NA	2.79E+03				
Cobalt	1.02E+01	1.10E+01	2.19E+01		NA	6.72E+04				
Copper	1.41E+01	1.71E+01	3.68E+01		NA	4.74E+04				
Iron	4.12E+04	3.53E+04	5.19E+04		NA	3.59E+05				
Lead	3.82E+01	3.78E+01	7.64E+01		NA	4.00E+02				
Magnesium	7.87E+02	9.06E+02	2.20E+03		NA	NA				
Manganese	1.08E+03	7.12E+02	2.05E+03		NA	4.38E+04				
Mercury	5.30E-02	1.10E-01	1.75E-01		NA	2.99E+02				
Nickel	1.49E+01	1.30E+01	3.16E+01		NA	1.76E+04				
Potassium	3.70E+02	1.01E+03	2.79E+03		NA	NA				
Selenium	8.12E-01	7.20E-01	1.88E+00		NA	5.96E+03				
Sodium	3.58E+01	6.92E+02	7.38E+02		NA	NA				
Thallium	1.40E+00	1.30E-01	2.11E-01		NA	7.78E+01				
Vanadium	1.04E+02	4.09E+01	6.67E+01		NA	4.83E+03				
Zinc	6.21E+01	5.27E+01	1.11E+02		NA	3.44E+05				
<b>Volatile Organic Compounds</b>										
2-Butanone	1.90E-02	NA		1.90E-02	NA	6.23E+05				
Acetone	1.90E-01	NA		1.90E-01	NA	1.03E+05				
Methylene chloride	2.30E-03	NA		2.30E-03	9.84E+03	6.33E+04				
<b>Total ILCR, HI</b>									<b>1.60E-06</b>	<b>NA</b>

All concentrations expressed as mg/kg.

MDC = maximum detected concentration; BSC = background screening criterion; UTL = 95% Upper Tolerance Limit.

NA = Not available.

<sup>a</sup> MDC presented only if it exceeds BSC, or no BSC is available.

<sup>b</sup> Site-specific screening level (SSSL) based on cancer risk for recreational site user exposure to sediment.

<sup>c</sup> Site-specific screening level based on noncancer hazard for recreational site user exposure to sediment.

<sup>d</sup> MDC presented only if it exceeds SSSL-c.

<sup>e</sup> MDC presented only if it exceeds SSSL-n.

<sup>f</sup> Incremental lifetime cancer risk for recreational site user exposed to chemical in sediment.

<sup>g</sup> Hazard index for noncancer effects for recreational site user exposed to chemical in sediment.

<sup>h</sup> SSSL based on chromium VI.

**RESPONSE TO COMMENTS ON THE SAMPLING SUMMARY REPORT  
FOR THE BLUE HOLE, TRAINING AREA 6C**

- 1. EPA**
- 2. ADEM**

## **EPA COMMENTS**

**RESPONSE TO COMMENTS FROM THE  
U.S. ENVIRONMENTAL PROTECTION AGENCY  
ON THE DRAFT SAMPLING SUMMARY REPORT FOR THE  
BLUE HOLE, TRAINING AREA 6C  
FORT McCLELLAN, CALHOUN COUNTY, ALABAMA**

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*Comments from Doyle T. Brittain, Senior Remedial Project Manager, dated June 8, 2001.*

***General Comments***

**Comment 1:**      **The Environmental Protection Agency (EPA) has reviewed and approves the subject document.**

**Response 1:**      Comment noted.

## **ADEM COMMENTS**

**RESPONSE TO COMMENTS FROM THE  
ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
ON THE FINAL SAMPLING SUMMARY REPORT FOR THE  
BLUE HOLE, TRAINING AREA 6C, DATED AUGUST 6, 2001  
FORT McCLELLAN, CALHOUN COUNTY, ALABAMA**

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*Comments from Stephen A. Cobb, Chief, Hazardous Waste Branch, Land Division, dated July 25, 2002.*

***General Comments***

**Comment 1:**     **The Alabama Department of Environmental Management (ADEM or the Department) has reviewed the above referenced document. Draft findings related to the subject document were discussed at the Base Realignment and Closure Team (BCT) review meeting on May 3, 2002. During the meeting, the Department provided its comments on the Blue Hole Training Area 6C in an interactive manner so that the Army and its consultants could begin resolving the Department's comments. As documented in the meeting minutes issued August 6, 2001 by IT Corporation, the Army recommended a No Further Action (NFA) designation for this site. Based on elevated contaminant levels detected in environmental media at the site, ADEM stated that it was premature to make such a designation and recommended that Fort McClellan conduct further sampling to support the Army's request for an NFA designation. Fort McClellan concluded that further sampling was not warranted but elected to perform a Human Health and Ecological (HH/Eco) Risk Assessment.**

**Response 1:**     The following is a chronology of the investigation of the Blue Hole, Training Area 6C (as documented in the BCT minutes):

**May 2001** – BCT agreed to conditional NFA, pending site inspection to confirm that everyone agrees on the location of the Blue Hole. The site visit confirmed that the Blue Hole is located within area 6C. After visiting the site, EPA and ADEM agreed that NFA was appropriate for this site.

**December 2001** – ADEM requests that additional samples be collected. The meeting minutes reflect that both the Army and EPA disagree with ADEM. They both feel the site has been adequately investigated and support the NFA agreed to at the May 2001 meeting.

**June 2002** – Although the site was discussed, the BCT agreed to put off a “final” decision until the July 2002 meeting.

**RESPONSE TO COMMENTS FROM THE  
ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
ON THE FINAL SAMPLING SUMMARY REPORT FOR THE  
BLUE HOLE, TRAINING AREA 6C, DATED AUGUST 6, 2001  
FORT McCLELLAN, CALHOUN COUNTY, ALABAMA**

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**July 2002** – The BCT agreed that IT would revise the final report to indicate the BCT’s site management decision not to collect additional samples and to release the site for military training reuse rather than unrestricted reuse. It was also agreed that the PRA would be revised to explain the biased sampling.

The week following the July 2002 BCT meeting, ADEM issued written comments requesting additional samples. It should be noted that the preliminary risk assessment (PRA) was performed at the request of ADEM and EPA – not Fort McClellan. Furthermore, the PRA only evaluated potential human health risk. No ecological risk issues were identified by the BCT because of the site’s small areal extent, close proximity to a road, and projected reuse as a military training area.

**Comment 2:**       **Concentrations of certain metals (aluminum, barium, and manganese) exceeded ESVs but were below established background levels. Chromium and lead were detected at concentrations exceeding ESVs and established background levels. Based on its relatively high concentration levels in sediment samples, arsenic appears to be the major constituent of concern at the Blue Hole site. In sediment samples, the arsenic concentration exceeded the SSSL, ESV and background level.**

**Response 2:**       As noted by the reviewer, arsenic is the only COC identified in sediment in the Blue Hole. Arsenic was quantified at 14.9 mg/kg and 89.1 mg/kg in the two samples of sediment taken for this evaluation. The lower concentration falls within the range of background, but the higher concentration exceeds the range of background by approximately four-fold, resulting in the selection of arsenic as a site-related chemical, although no rationale is apparent for its release at this site. Also as noted by the reviewer, the concentration exceeded the SSSL for recreational site user or residential exposure, resulting in arsenic being selected as a COPC and being evaluated in the PRA. The PRA, however, showed that the cancer risk fell within the risk management range, supporting the recommendation for no further action.

***Additional Comments***

**Comment 1:**       **ADEM believes additional sampling is necessary for Fort McClellan to properly characterize the site.**

**RESPONSE TO COMMENTS FROM THE  
ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
ON THE FINAL SAMPLING SUMMARY REPORT FOR THE  
BLUE HOLE, TRAINING AREA 6C, DATED AUGUST 6, 2001  
FORT McCLELLAN, CALHOUN COUNTY, ALABAMA**

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**Response 1:** The reviewer provides no reason for the belief that additional sampling is necessary, nor is any information provided regarding the medium or media to sample, the number of samples to take, or the location(s) for the additional sampling. Please see response to General Comment 1, which details the chronology of the BCT deliberations. The reference to “biased sampling” in the July 2002 minutes refers to discussions in which it was shown that the surface water and sediment samples were taken from the two areas where surface water was most persistent. These are the areas where exposure to surface water and sediment is likely to be most frequent and most intense, and where the highest levels of constituents from runoff or erosion are most likely to be found. In other words, the risk estimates are likely to be biased high by limiting sampling to these two areas. Additional sampling, particularly if spread over a larger area, would most likely reduce the risk estimates for two reasons: (1) It is likely that most samples would yield arsenic concentrations lower than the maximum of 89.1 mg/kg from sample location TA6CBH-SW/SD01, and (2) a larger number of samples would permit calculating a conservative estimate of average for use in the PRA, rather than defaulting to the maximum detection.

Based on discussions with ADEM and EPA during the July 2002 BCT meeting, no additional sampling will be conducted at the Blue Hole.

**Comment 2:** **All sediment and surface water samples were collected within the boundary of the Blue Hole. Samples should also be collected from the surface drainage creek upgradient of the Blue Hole.**

**Response 2:** This appears to be a request to collect upgradient samples for the purpose of establishing site-specific background. It is unclear why site-specific background would need to be established. It is possible that site-specific background would show that the levels of arsenic identified in sediment were naturally occurring, which the site-wide background data base does not do, but the PRA was sufficient to show that the arsenic did not represent an unacceptable risk.

**Comment 3:** **Although a comparison is made to SSSLs, no site-specific background samples were actually collected at this site. It is unclear if the established SSSLs adequately represent this site.**

**RESPONSE TO COMMENTS FROM THE  
ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
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- Response 3:** There is no relationship between the representativeness of SSSLs and background; site-specific or otherwise. The SSSLs are as representative for the Blue Hole as for any site, unless site-specific physical characteristics are such that exposure is likely to be significantly greater or lesser than that on which the recreational and residential site-user scenario is based.
- Comment 4:** **Quality Assurance/Quality Control (QA/QC) samples should be collected during the investigation.**
- Response 4:** Based on discussions with ADEM and EPA during the July 2002 BCT meeting, no additional sampling will be conducted at the Blue Hole.
- Comment 5:** **Based on the revised sampling data set, Fort McClellan should re-assess its recommendation for this site and prepare an updated risk assessment.**
- Response 5:** Please see responses to Additional Comments 1 and 2.
- Comment 6:** **Fort McClellan should particularly resolve the elevated arsenic levels found to be present at this site.**
- Response 6:** It is unclear what would constitute resolution in this context. The source of arsenic is unlikely to be proven, and additional sampling is unlikely to help. As stated in the Final Sampling Summary Report, arsenic is not associated with the fire pots previously used at the site. Small naturally occurring localizations of high levels of arsenic are common where small amounts of various sulfide minerals are found (ATSDR, 2000). In addition, benthic sediment is known to adsorb naturally occurring arsenic from overlying surface water (ATSDR, 2000). As noted above, the sediment samples were taken from the locations where water is most persistent and this phenomenon is most likely to result in elevated arsenic concentrations. The investigation, however, is adequate to resolve the issue of toxicity associated with arsenic in sediment. The PRA demonstrated that adverse effects are unlikely.

***Reference:***

Agency for Toxic Substances and Disease Registry (ATSDR), 2000, *Update Toxicological Profile for Arsenic*, U.S. Department of Health and Human Services, Atlanta, Georgia, September, on line.