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Final

BACKGROUND METALS SURVEY WORK PLAN

U.S. Army Environmental Center

FORT McCLELLAN
Delivery Order 0005
Contract Number DAAA-015-91-D-0017

FINAL

Prepared for:

U.S. Army Environmental Center
Restoration and Oversight Branch-Section A
SFIM-AEC-RPO
Aberdeen Proving Ground, Maryland 21010-5401

Prepared by:

Science Applications International Corporation
1710 Goodridge Drive
McLean, Virginia 22102

July 1997

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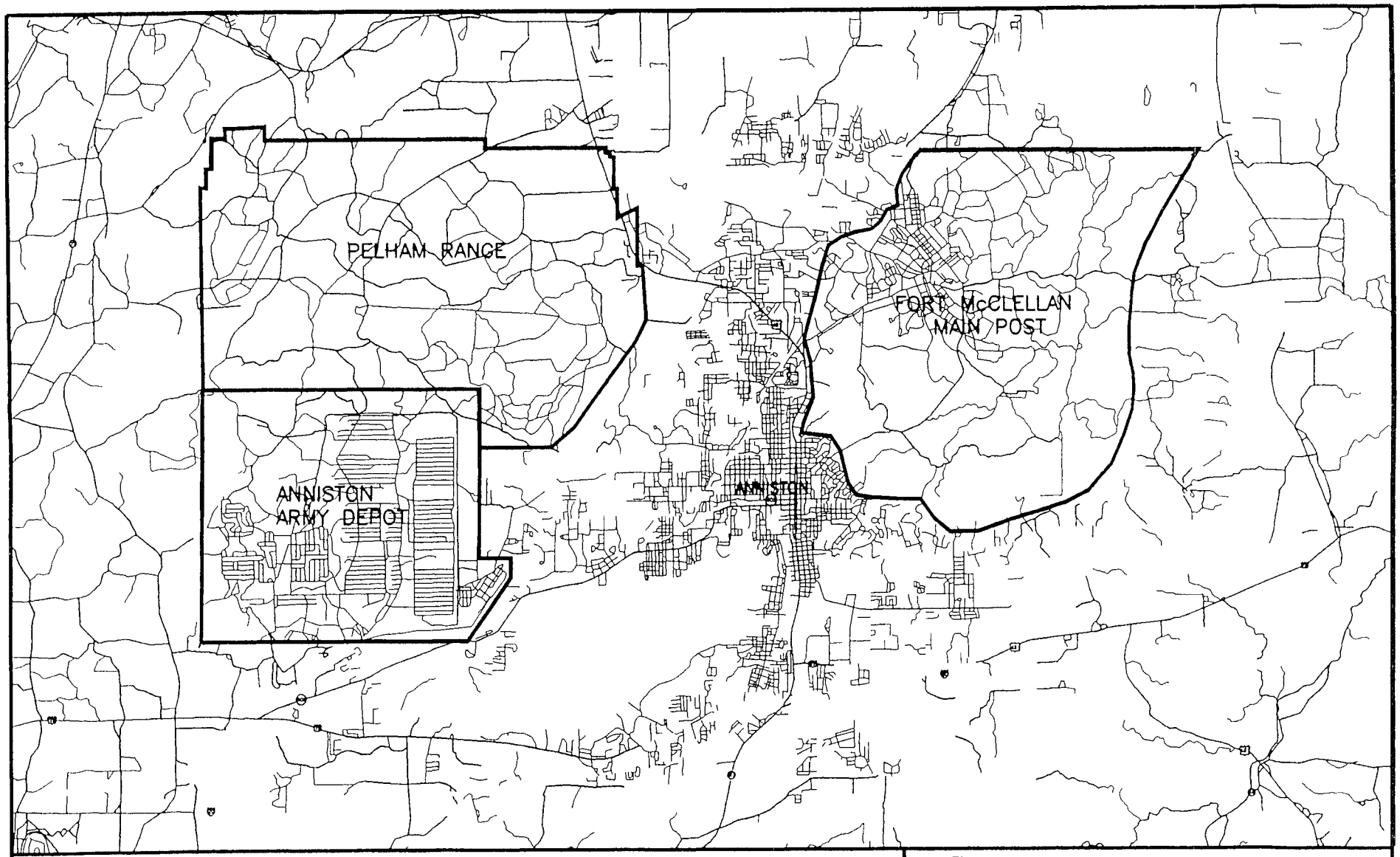
1. INTRODUCTION

The Background Metals Survey work plan is prepared to provide an assessment of the existing environmental background data for Fort McClellan, Alabama and to document the sampling requirements and rationale for the collection of additional background data needed to support base closure environmental investigations. The overall objective for the background study is to establish statistically robust background concentrations for Target Analyte List (TAL) metals in environmental media (surface water, sediments, surface soil, subsurface soil, groundwater) to be used throughout the BRAC environmental process. The area included in the background investigation is shown in Figure 1-1.

1.1 PURPOSE AND SCOPE

Elemental constituents (metals) occurring in natural environmental media (surface and subsurface soil, surface water, sediments, and groundwater) are regarded as "background" concentrations that are characteristic of uncontaminated conditions to the extent that site activities have not adversely impacted these media. The background concentrations are typically used during the assessment of site-related contamination (including risk estimates) to ensure that naturally-occurring and non-site related constituents are not unnecessarily carried forward through the assessments. Organic compounds are typically taken as site related because many of these chemicals do not readily occur in nature, although some compounds (polynuclear aromatic hydrocarbons, pesticides) are comparatively widespread and may be considered anthropogenic background. Many metals-bearing compounds occur in nature and cannot readily be distinguished from site-related contamination without knowledge of metals concentrations in the unaffected (background) environmental media.

Information regarding the metals concentrations in environmental media for Fort McClellan and Pelham Range has been obtained for groundwater, surface water, soil, and sediment media during Site Investigation (SI) and Remedial Investigation (RI) studies (SAIC 1993,1995) conducted at the Post and at the adjacent Anniston Army Depot (SAIC 1996) between 1991 and 1996. The U.S. Geological Survey (1995) has obtained quantitative analysis of metals concentrations in streams and springs and semi-quantitative analysis of rock and soil on the Main Post and Pelham Range. However, because of enhancements in laboratory analytical detection limits and methods over time, changes in chemical concentrations that are of regulatory concern, and insufficient numbers of background samples for the purposes of statistical evaluation, additional background sampling is necessary to complete the data assessments for the ongoing and future investigations on the Post. This work plan provides data summaries and a usability assessment for the existing information and also describes the rationale and approach for additional field sampling and reporting. The additional data collected under this work plan will be combined with the usable, existing data to comprise the environmental background data base for Fort McClellan and Pelham Range.



U.S. ARMY ENVIRONMENTAL CENTER
ABERDEEN PROVING GROUND, MARYLAND

SITE LOCATION MAP
Fort McClellan, Alabama

Figure No.	Project No.	File Name	Date
1-1	01-0827-03-65-20-025	/DWG/SITE-LOC	04-02-97

2. EXISTING BACKGROUND DATA BASE ASSESSMENT

The existing background data base for Fort McClellan and Pelham Range consists of samples collected on Post between 1991 and 1995 and incorporates data collected during an ongoing remedial investigation at the Anniston Army Depot between 1994 and 1996. These investigations were conducted under the U.S. Army Environmental Center's 1990 QA/QC program. However, because the chemical investigations were conducted independently and by different analytical laboratories, laboratory detection limits vary for each study. In addition, regulatory criteria for evaluating environmental data were revised in 1995 and it is necessary to evaluate the existing chemical data against these criteria to ensure that the data are suitable for inclusion in a comprehensive background data set.

The utility of the existing background database of information will be evaluated by comparison of the laboratory reporting limits (CRL) for the existing data to risk-based concentrations (RBC's) as calculated by USEPA Region III, USEPA Region IV ecological screening values, published ecological benchmarks, and calculated ecological screening values for sediment and soil. Detection limits that exceed the RBC or screening values by greater than a factor of two will be excluded from the background data set to the extent that laboratory analytical methods are capable of achieving the RBC or ecological screening concentrations. The factor of two criteria is recommended as a conservative limiting value for the existing data set because non-detect values are typically utilized in quantitative risk assessment at one half of the detection limit. Because human health risk and ecological assessments (and screenings) are conducted independently of each other and the risk-based criteria are different for these assessments, some of the surface water or sediment data that is questionable for human health assessment may be usable for ecological assessment or vice versa. Background concentrations for human and ecological receptors will be established incorporating the existing data that meets the most stringent criteria established for either type of assessment. Because groundwater is not evaluated as a pathway for ecological assessments, detection limits for analyses in these media will only be compared to human health RBC's. A flow diagram showing the steps associated with the existing data assessment is shown in Figure 2-1.

2.1 Risk-Based and Ecological Screening Values

One of the initial stages in the assessment of chemical data from hazardous waste sites is the screening of detected constituents against established health-based or ecological benchmark concentrations and background concentrations to identify contaminants that exceed thresholds and are regarded as site related. The health-based concentrations are also used to evaluate laboratory detection limits to identify analytes that exceed these health-based threshold concentrations and would result in artificially elevated risk estimates associated with the constituent. Detection limits that exceed the risk-based or ecological screening concentrations for individual constituents may result in estimated risk levels that will require risk management.

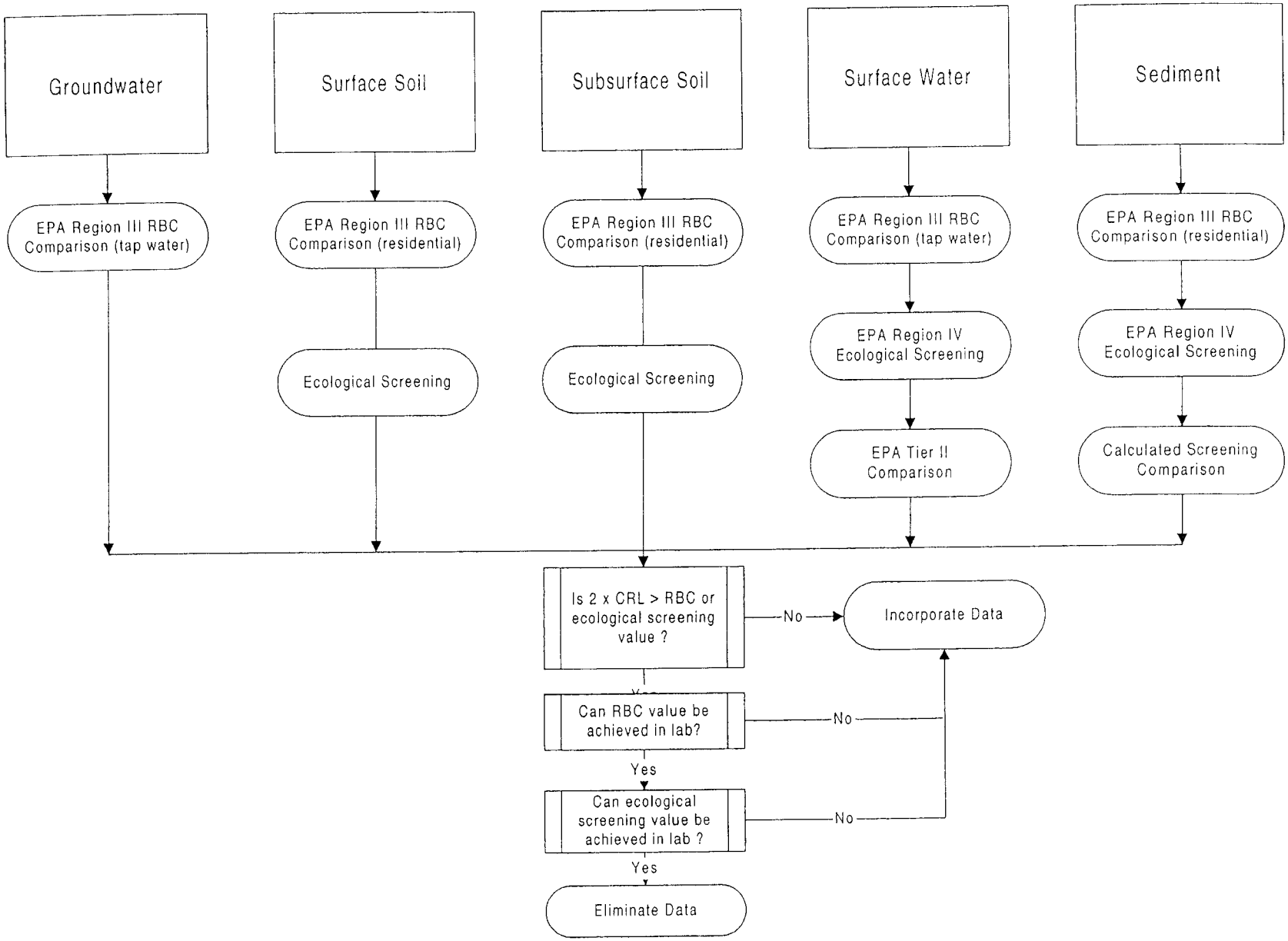


Figure 2-1. Data Assessment Flow Diagram

The regulatory thresholds for TAL metals in consumable water (as groundwater), surface water, residential soil (surface and subsurface), and sediments as obtained from published guidance are shown in Table 2-1. The primary sources of regulatory limits for the purpose of detection limit evaluation are the EPA Region III RBC table (EPA 1996) and the EPA Region IV Ecological Screening Values (EPA 1995). The EPA Region III guidance will be used to assess detection limits for groundwater (as tap water), surface and subsurface soil (as residential soil), sediments (as residential soil), and surface water (as tap water) as conservative indicators of human health exposures. The EPA Region IV ecological screening guidance, supplemented by additional literature values and calculated screening values for sediment and soil, will be used to assess the laboratory detection limits for ecological surface water, soil, and sediment exposures. Nutrient constituents in sediment including calcium, magnesium, potassium, and sodium will be incorporated into the background data without comparison to the laboratory reporting limit.

2.1.1 USEPA Region III Risk-Based Concentrations (RBCs)

Risk based concentration (RBC) values are calculated and published by USEPA Region III and provide a conservative benchmark for estimation of human health risk associated with chemical constituents in groundwater (as tap water), surface water (as tap water), sediments (as residential soil), residential soil, and industrial soil. The RBC values are derived for human health assessments and are calculated using default assumptions for exposure that result in a 1×10^{-6} cancer risk target and a hazard index (HI) value of 1.0 for non-cancer risk. Detection limits exceeding the established RBC values will have a directly proportional impact on the estimated carcinogenic and non-carcinogenic risk that is attributable to an individual element. The conservative risk-based concentrations for consumable water and residential soil will be used to assess the usability of the existing background groundwater, surface water, sediment, surface soil, and subsurface soil data. The surface water and sediment data will also be assessed against ecological benchmarks. The USEPA Region III (EPA 1996) RBC values for the TAL metals are shown on Table 2-1.

2.1.2 Ecological Screening Concentrations

Available regulatory guidance for metals concentrations (EPA 1995, Suter and Tsao 1996) in surface water and sediments will be used as benchmarks to identify detection limits that exceed chemical concentrations of ecological concern in the existing data. The EPA (1995) ecological screening levels are based on chemical concentrations that are associated with a low probability of unacceptable risk to ecological receptors. The surface water values were obtained by EPA from Water Quality Criteria documents and represent the chronic ambient water quality criteria values for the protection of aquatic life. The sediment screening values were derived by EPA from statistical interpretation of effects databases obtained from published literature. The EPA guidance currently provides screening values for

Table 2-1. Risk-Based Concentrations (RBCs) and Ecological Screening Concentrations

	Soil		Sediment		Groundwater	Surface Water	
Metal	Human Health[1] USEPA Region III RBC mg/kg	Ecological[5] Screening Value Soil mg/kg	Ecological[2] USEPA Region IV Sediment ppm	Ecological[4] Screening Value Sediment mg/kg	Human Health[1] USEPA Region III RBC (ppb)	Ecological[2] USEPA Region IV Surface Water (ug/L)	Ecological[3] Tier II (ug/L)
Aluminum	78000	10.5		27.95	37000	87	
Antimony	31	0.7	2		15	160	
Arsenic	0.43	0.7	7.24		0.045	190	
Barium	5500	63.8		229.86	2600		4
Beryllium	0.15	8.3		20.72	0.016	0.53	
Cadmium	39	2.6	0.676		18	0.66	
Calcium	Nutrient		Nutrient		Nutrient		116,000
Chromium $^{3+}$	78000	1.7		118.89	37000	117.32	
Chromium $^{6+}$	390	1.7		57.65	180	11	
Cobalt	4700	112.4		0.23	2200		23
Copper	3100	85.4	18.7		1500	6.54	
Cyanide	390	858.8		3354.49	180	5.2	
Iron	23000	800		3.95	11000	1000	
Lead	400	0.9	30.2		15	1.32	
Magnesium	Nutrient		Nutrient		Nutrient		82,000
Manganese	390	374.2		3515.52	180		120
Mercury	7.8	0.4	0.13		3.7	0.012	
Nickel	1600	140.7	15.9		730	87.71	
Potassium	Nutrient		Nutrient		Nutrient		53,000
Selenium	390	0.8		1.03	180	5	
Silver	390	1750	0.733		180	0.012	
Sodium	Nutrient		Nutrient		Nutrient		680,000
Thallium	5.5	0.1		0.03	2.6	4	
Vanadium	550	2		4.19	260		20
Zinc	23000	228.1	124		11000	58.91	

Blanks indicate that regulatory value is not available for the constituent.

[1]Human health risk assessment RBC values from USEPA Region III Internet website.

[2]USEPA Region IV ecological screening values from "*Ecological Screening Values*", Ecological Risk Assessment Bulletin #2, November, 1995.

[3]Tier II values from "*Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision;* Suter II, G.W. and Tsao,C.L., ES/ER/TM-96/R2.

[4]$_{\text{Screening Value}}$=(TRV*BW/(Ia*BSF+Is), where:

TRV=scaled NOAEL values from Sample et al, 1996
BW=6.7 for raccoon; 2.336 for heron
Ia= 0.729 kg (raccoon); 0.105 kg (heron); EPA 1993.
Is= 0.0656 kg (raccoon); 0.0 kg (heron); EPA 1993.
BSF=Bio-sediment factor (kg sed/kg tissue)

[5]Soil screening values calculated by SAIC, 1997.

17 TAL metals (including speciated chromium) in fresh surface water and 9 TAL metals in sediment. These values will be used as the primary concentrations for evaluation of existing detection limits for surface water and sediment samples against ecological thresholds (see Table 2-1).

Chemical constituents in surface water that are not listed in referenced guidance have been evaluated (Suter and Tsao 1996) using the Tier II method as described in the EPA's *Proposed Water Quality Guidance for the Great Lakes System*. The Tier II values were developed so that aquatic benchmarks could be established for constituents having less available ecotoxicological data than are required for the National Ambient Water Quality Criteria (NAWQC). The Tier II values are concentrations that would be expected to be higher than NAWQC in no more than 20% of cases. The available Tier II values will be used for surface water constituents that are not addressed by other published ecological screening guidance. Tier II values are available for 8 TAL metals in surface water.

2.1.2.1 Calculated Ecological Sediment Screening Values

Because screening criteria are not available for all TAL elemental metals in sediment, screening concentrations were calculated for this work plan using a conservative food-chain model assuming that raccoons and herons, as representatives of terrestrial mammals and bird predators of sediment-exposed biota, eat nothing but sediment invertebrates. The approach of proposing screening values for contaminants not available in guidance is recommended by EPA (1995). The equation used to calculate the screening value in sediment is:

$$\text{Screening Value} = TRV \times BW / (Ia \times BSF + Is)$$

where:

TRV= Toxicity reference value
BW= Body weight (kg)
Ia= Daily ingestion of animal prey (kg/d)
Is= Daily incidental ingestion of sediment (kg/d)
BSF= Bio-sediment factor (kg sediment/kg tissue)

In the model, chemical constituents in sediment are transferred to prey at a rate given by available (Cain et al 1992) bio-sediment factors (BSFs). Additional BSF values are those used for the transfer of contaminants from soil to earthworms (HAZWRAP 1994). Rates of food and soil ingestion and body weights were taken from EPA 1993. Screening values were calculated for 10 metals constituents (including speciated chromium) in sediments for which published guidance is not available (see Table 2-1). Direct sediment toxicity benchmarks do not exist for cobalt and iron. However, an estimated screening benchmark may be derived by combining an estimated sediment/pore water distribution with a toxicity benchmark for aquatic invertebrates. This derivation assumes that sediment pore water is in equilibrium with sediment particles, so the partitioning coefficient K_D can be used to calculate the concentration of a contaminant in sediment when its pore water concentration equals a toxicity benchmark for an aquatic invertebrate. In this case, the benchmark is the lowest chronic value (LCV) for

daphnids (Suter and Tsao 1996). The derivation is as follows:

$$K_D = [C_{sed} \text{ concentration in sediment (mg/kg)}] / [\text{concentration in water (mg/L)}].$$

$$Csed_{scr} = K_D \times LCV.$$

Screening values were not calculated for common nutrient metals including calcium, magnesium, potassium, and sodium. These metals will be assessed against the USEPA RBC values for residential soil.

2.1.2.2 Calculated Ecological Soil Screening Values

Screening levels were established by calculating the dietary exposure of screening receptors to contaminants in soil and using published NOAELs to derive a risk-based dietary benchmark. The screening intake equation, based on *EPA Region IV Guidance for Wildlife Screening Values* (EPA 1995), conservatively assumes that the entire diet of the receptor consists of soil, all of which contains a uniform concentration of the analyte. Receptors are not unit-specific but, instead, are the animals used in the analyte-specific toxicity studies. However, since small omnivorous mammals and songbirds will be used as unit-specific terrestrial receptors for risk assessment, toxicity tests using species most closely related to them (e.g., mice and rats rather than primates, or doves rather than ducks) were used when they were available. Benchmarks were derived for both mammals and birds. The dietary benchmark equation is derived below:

$SI = Cs_{scr} \times f / w$ where:

- SI= Screening intake in milligrams per kilogram body weight per day (mg/kg/d)
- Cs_{scr}= Screening soil concentration in mg/kg
- f= Feeding rate of test animal in kg/d, and
- w= Body weight of test animal in kg.

The screening benchmark is the soil concentration at which the screening intake is equal to the No Observed Adverse Effects Level (NOAEL in mg/kg/d). Therefore,

$$(Cs_{scr})\ (f/w) = \text{NOAEL and,}$$
$$Cs_{scr} = (\text{NOAEL})\ (w/f)$$

Toxicity benchmarks reflecting a dietary NOAEL are used preferentially for benchmarks in the soil screening. Where NOAEL tests could not be found, other tests with endpoints of lowest observed adverse effect level (LOAEL) are used, and the LOAEL is divided by 10 to substitute for a NOAEL. Feeding rates and body weights of the animals used in the toxicity tests, as well as results of the toxicity screening for inorganics other than iron and silver, are published in summaries of the toxicity tests (Sample et al. 1996). Few toxicity data are available for iron and silver. No adverse effect was reported

when dogs were given 800 mg $FeCl_2$ daily by oral administration. Assuming a body weight of 10 kg, this corresponds to a NOAEL of 36 mg Fe/kg/d. Using an allometric relationship (Nagy 1987), food intake by the dog was calculated as 0.45 kg/g:

$$FIR=(0.0687)(BW^{0.822}) = (0.0687)(10^{0.822})= (0.0687)(6.65)= 0.45 \quad \text{where:}$$

FIR= food ingestion rate (kg/d)
BW= body weight (kg)

In animals deficient in selenium and vitamin E, chronic silver ingestion appears to exacerbate selenium deficiency, resulting in hepatic damage. However, in rats that were not deficient in selenium and vitamin E, exposures of 140 mg/kg/d were well tolerated (Bunyan et al. 1968). Therefore, a NOAEL of 140 mg/kg/d for rats was used to derive the screening level for silver.

2.2 Existing Background Data

The existing background data base for Fort McClellan and Pelham Range consists of samples collected on Post between 1991 and 1995 and incorporates data collected during a remedial investigation at the Anniston Army Depot between 1994 and 1996. Table 2-2 summarizes the laboratory reporting limits for metals during each study. The availability of the existing chemical data for inclusion in the overall background data set is based on the comparison of laboratory detection limits to conservative human health and ecological thresholds. These thresholds have been described in Section 2.1. Detection limits for individual parameters that exceed the human health and ecological screening values by greater than a factor of two will be excluded from the background data set to the extent that current laboratory analytical methods are capable of achieving the RBC or ecological screening concentrations.

2.2.1 Fort McClellan Main Post Data

Summary statistics for existing data for background surface water, sediment, surface soil, and groundwater from the Main Post on Fort McClellan are provided in Tables 2-3 to 2-6. Sample locations are shown on Plate 1. Analytical data for samples comprising the existing background data for these media are provided in Appendix A.

Analytical data for thallium in surface water and groundwater will be eliminated from the data set because the detection limit exceeds the RBC value by a factor of 48 and analytical methods are available to achieve the regulatory criteria. Detection limits for arsenic and beryllium in surface water and groundwater exceed the RBC values, however, the RBC concentrations cannot be attained by laboratory analytical methods therefore the arsenic and beryllium data for waters will not be eliminated from the data set. Analytical detection limits for cadmium, copper, lead, mercury, and silver in surface water exceed the ecological screening criteria, but do not exceed the human health RBC's. Analytical

Table 2-2. Comparison of Laboratory Reporting Limits for Background Studies Fort McClellan, Alabama

	Fort McClellan					Anniston	
Metal	*SI CRL Soil ug/g*	*SI CRL Water ug/L*	*RI CRL Soil ug/g*	*RI CRL Water ug/L*	*USGS Water ug/L*	*RI CRL Soil ug/g*	*RI CRL Water ug/L*
Aluminum	11.2	112	11.2	112	0.1	2.35	141
Antimony	19.6	60	3	3	0.1	7.14	3.03
Arsenic	2.5	2.35	2.5	2.35	0.6	0.25	2.54
Barium	3.29	2.82	3.29	2.82	¤	5.18	5
Beryllium	0.427	1.12	0.427	1.12	1	0.5	5
Cadmium	1.2	6.78	1.2	4	3	0.7	4.01
Calcium	25.3	105	25.3	105	¤	100	500
Chromium	1.04	16.8	1.04	16.8	0.9	4.05	6.02
Cobalt	2.5	25	2.5	25	0.1	1.42	25
Copper	2.84	18.8	2.84	18.8	0.6	0.965	8.09
Iron	6.66	77.5	6.66	77.5	10	3.68	38.8
Lead	7.44	43.4	0.467	4.47	0.5	0.177	1.26
Magnesium	10.1	135	10.1	135	¤	100	500
Manganese	9.87	9.67	9.87	9.67	0.4	2.05	2.75
Mercury	0.05	0.1	0.05	0.1	NA	0.05	0.243
Nickel	2.74	32.1	2.74	32.1	0.3	1.71	34.3
Potassium	131	1240	131	1240	¤	100	375
Selenium	0.449	2.53	0.449	2.53	NA	0.25	3.02
Silver	0.803	10	0.803	10	0.1	0.589	4.6
Sodium	38.7	279	38.7	279	¤	100	500
Thallium	34.3	125	34.3	1	0.6	6.62	81.4
Vanadium	1.14	27.6	1.14	27.6	0.2	3.39	11
Zinc	2.34	18	2.34	18	3	8.03	21.1

¤ = Detection Limit not provided in report.
NA= Analysis not conducted.
ND= Values not available.

data for these elements will be retained because the screening concentrations cannot be attained by laboratory analytical methods.

Analytical detection limits for arsenic, beryllium, and thallium in surface soil and sediment exceed the RBC criteria and laboratory methods are available to achieve lower detection limits, therefore these data will be eliminated from the database.

2.2.2 Pelham Range Data

Comparatively fewer multimedia background samples have been previously obtained on Pelham Range as compared to the Fort McClellan Main Post and the Anniston Army Depot. Summary statistics for existing data for background groundwater are provided on Table 2-7 and sample locations are shown on Plate 2. Analytical data for samples comprising background groundwater are provided in Appendix A (Table A-5). The detection limits for arsenic and beryllium in groundwater exceed the RBC values. However, the RBC concentrations cannot be attained by laboratory analytical methods and the arsenic and beryllium data will not be eliminated from the background data set.

Table 2-3. Summary Statistics for Background Groundwater - Main Post
Fort McClellan RI, Anniston Alabama

Run Time: 10:03:10
Run Date: 04/02/97
Exposure Unit: BK__WDM

Parameter	Units	Total Number of Samples	Total Number of Detects	Frequency of Detection	NonDetects Min CRL	NonDetects Max CRL	Detects Minimum	Detects Maximum	Arithmetic Mean[a]	Standard Deviation	Distribution[b]
Aluminum	µg/L	14	10	71%	112	112	158	8740	1880	2550	Lognormal
Antimony	µg/L	12	0	0%	5	10	0	0	3.75	0	Undetermined
Arsenic	µg/L	14	0	0%	2.35	2.35	0	0	1.18	0	Undetermined
Barium	µg/L	14	14	100%	-	-	14.5	114	35.9	27.2	Lognormal
Beryllium	µg/L	14	5	36%	1.12	1.12	1.11	2.37	0.946	0.607	Lognormal
Cadmium	µg/L	12	0	0%	5	5	0	0	2.5	0	Undetermined
Calcium	µg/L	14	14	100%	-	-	217	35200	14100	12500	Normal
Chromium	µg/L	14	0	0%	16.8	16.8	0	0	8.4	0	Undetermined
Cobalt	µg/L	14	0	0%	25	25	0	0	12.5	0	Undetermined
Copper	µg/L	14	0	0%	18.8	18.8	0	0	9.4	0	Undetermined
Iron	µg/L	14	12	86%	77.5	77.5	150	25800	6810	9450	Lognormal
Lead	µg/L	12	3	25%	4.47	4.47	5.05	9.71	3.42	2.38	Lognormal
Magnesium	µg/L	14	14	100%	-	-	176	21900	8990	6560	Normal
Manganese	µg/L	14	11	79%	9.67	9.67	9.83	1550	279	481	Lognormal
Mercury	µg/L	14	0	0%	0.1	0.1	0	0	0.05	0	Undetermined
Nickel	µg/L	14	0	0%	32.1	32.1	0	0	16.1	0	Undetermined
Potassium	µg/L	14	8	57%	1240	1240	1520	8980	2690	2670	Lognormal
Selenium	µg/L	14	2	14%	2.53	2.53	5	5.32	1.82	1.42	Lognormal
Silver	µg/L	14	0	0%	10	10	0	0	5	0	Undetermined
Sodium	µg/L	14	14	100%	-	-	1150	16200	5320	6000	Lognormal
Thallium	µg/L	12	3	25%	2	2.71	3.69	10.5	2.42	2.76	Lognormal
Vanadium	µg/L	14	0	0%	27.6	27.6	0	0	13.8	0	Undetermined
Zinc	µg/L	14	8	57%	18	18	22.5	442	70.6	121	Lognormal

[a]Results of duplicate analyses were not included in the calculation of the arithmetic mean, standard deviation.
Nondetects were treated as one-half the detection limit in the calculationof the arithmetic mean, standard deviation.
[b] Distributions were determined to be either normal or lognormal. Distributions were determined by the use of probability plot correlation coefficients.

Table 2-4. Summary Statistics for Background Surface Water -Main Post
Fort McClellan RI, Anniston Alabama

Run Time: 10:02:38
Run Date: 04/02/97
Exposure Unit: BK__WSM

Parameter	Units	Total Number of Samples	Total Number of Detects	Frequency of Detection	NonDetects Min CRL	NonDetects Max CRL	Detects Minimum	Detects Maximum	Arithmetic Mean[a]	Standard Deviation	Distribution[b]
Aluminum	µg/L	7	4	57%	112	112	134	5140	909	1880	Lognormal
Antimony	µg/L	6	0	0%	10	10	0	0	5	0	Undetermined
Arsenic	µg/L	7	1	14%	2.35	2.35	5.41	5.41	1.78	1.6	Lognormal
Barium	µg/L	7	7	100%	-	-	16.2	101	32.5	30.4	Lognormal
Beryllium	µg/L	7	1	14%	1.12	1.12	1.13	1.13	0.641	0.215	Lognormal
Cadmium	µg/L	6	0	0%	5	5	0	0	2.5	0	Undetermined
Calcium	µg/L	7	7	100%	-	-	292	27900	8370	10300	Normal
Chromium	µg/L	7	0	0%	16.8	16.8	0	0	8.4	0	Undetermined
Cobalt	µg/L	7	0	0%	25	25	0	0	12.5	0	Undetermined
Copper	µg/L	6	0	0%	18.8	18.8	0	0	9.4	0	Undetermined
Iron	µg/L	7	6	86%	77.5	77.5	152	10300	1760	3780	Lognormal
Lead	µg/L	6	1	17%	4.47	4.47	8.02	8.02	3.2	2.36	Lognormal
Magnesium	µg/L	7	7	100%	-	-	338	15600	4350	5800	Lognormal
Manganese	µg/L	7	5	71%	9.67	9.67	11.9	162	71.1	75.7	Lognormal
Mercury	µg/L	7	0	0%	0.1	0.1	0	0	0.05	0	Undetermined
Nickel	µg/L	7	0	0%	32.1	32.1	0	0	16.1	0	Undetermined
Potassium	µg/L	7	3	43%	1240	1240	1670	2190	1180	716	Lognormal
Selenium	µg/L	7	0	0%	2.53	2.53	0	0	1.27	0	Undetermined
Silver	µg/L	7	0	0%	10	10	0	0	5	0	Undetermined
Sodium	µg/L	7	7	100%	-	-	902	1520	1120	202	Normal
Thallium	µg/L	4	1	25%	2	2	4.18	4.18	1.8	1.59	Lognormal
Vanadium	µg/L	7	0	0%	27.6	27.6	0	0	13.8	0	Undetermined
Zinc	µg/L	7	2	29%	18	18	27.3	41	16.2	12.9	Lognormal

[a]Results of duplicate analyses were not included in the calculation of the arithmetic mean, standard deviation.
Nondetects were used as one-half the detection limit in the calculation of the arithmetic mean, standard deviation.

[b] Distributions were determined to be either normal or lognormal. Distributions were determined by the use of probability plot correlation coefficients.

Table 2-5. Summary Statistics for Background Sediment - Main Post
Fort McClellan RI, Anniston Alabama

Run Time: 10:04:06
Run Date: 04/02/97
Exposure Unit: BK__DSM

Parameter	Units	Total Number of Samples	Total Number of Detects	Frequency of Detection	NonDetects Min CRL	NonDetects Max CRL	Detects Minimum	Detects Maximum	Arithmetic Mean[a]	Standard Deviation	Distribution[b]
Aluminum	µg/g	7	7	100%	-	-	4790	17400	8630	4510	Normal
Antimony	µg/g	6	0	0%	1	1	0	0	0.5	0	Undetermined
Arsenic	µg/g	6	4	67%	2.5	2.5	4.88	14.9	7.71	6.2	Normal
Barium	µg/g	7	7	100%	-	-	11.3	124	69.3	44.3	Normal
Beryllium	µg/g	7	4	57%	0.427	0.427	0.882	1.26	0.704	0.481	Normal
Cadmium	µg/g	7	1	14%	1.2	1.2	2.37	2.37	0.853	0.669	Lognormal
Calcium	µg/g	7	7	100%	-	-	88.8	1460	585	580	Normal
Chromium	µg/g	7	7	100%	-	-	7.68	51	23.4	16.1	Normal
Cobalt	µg/g	7	4	57%	2.5	2.5	4.13	7.64	3.8	2.64	Normal
Copper	µg/g	7	6	86%	2.84	2.84	4.77	58.6	15.5	19.6	Lognormal
Iron	µg/g	7	7	100%	-	-	10200	45700	28300	12500	Normal
Lead	µg/g	6	6	100%	-	-	3.94	260	51.1	102	Lognormal
Magnesium	µg/g	7	7	100%	-	-	153	2440	857	829	Lognormal
Manganese	µg/g	7	7	100%	-	-	103	309	183	64.7	Normal
Mercury	µg/g	7	0	0%	0.05	0.05	0	0	0.025	0	Undetermined
Nickel	µg/g	7	4	57%	2.74	2.74	5.35	17.5	6.46	6	Normal
Potassium	µg/g	7	6	86%	131	131	482	4810	1930	1760	Normal
Selenium	µg/g	7	1	14%	0.449	0.449	0.722	0.722	0.296	0.188	Lognormal
Silver	µg/g	7	0	0%	0.803	0.803	0	0	0.402	0	Undetermined
Sodium	µg/g	7	0	0%	38.7	38.7	0	0	19.4	0	Undetermined
Thallium	µg/g	3	0	0%	34.3	34.3	0	0	17.2	0	Undetermined
Vanadium	µg/g	7	7	100%	-	-	7.76	40.1	21.3	11	Normal
Zinc	µg/g	7	7	100%	-	-	7.92	111	35	36.1	Lognormal

[a]Results of duplicate analyses were not included in the calculation of the arithmetic mean, standard deviation.
Nondetects were treated as one-half the detection limit in the calculation of the arithmetic mean, standard deviation.

[b]Distributions were determined to be either normal or lognormal. Distributions were determined by the use of probability plot correlation coefficients.

Table 2-6. Summary Statistics for Background Surface Soils - Main Post
Fort McClellan RI, Anniston Alabama

Surface
Run Time: 10:03:37
Run Date: 04/02/97
Exposure Unit: BK__SSM

Parameter	Units	Total Number of Samples	Total Number of Detects	Frequency of Detection	NonDetects Min CRL	NonDetects Max CRL	Detects Minimum	Detects Maximum	Arithmetic Mean[a]	Standard Deviation	Distribution[b]
Aluminum	µg/g	4	4	100%	-	-	22900	39900	28300	7850	Normal
Antimony	µg/g	3	0	0%	1	1	0	0	0.5	0	Undetermined
Arsenic	µg/g	4	3	75%	2.5	2.5	3.2	7.97	4.34	2.85	Normal
Barium	µg/g	4	4	100%	-	-	115	283	172	76.9	Normal
Beryllium	µg/g	4	4	100%	-	-	0.939	1.97	1.43	0.422	Normal
Cadmium	µg/g	4	0	0%	1.2	1.2	0	0	0.6	0	Undetermined
Calcium	µg/g	4	4	100%	-	-	633	5840	2030	2540	Lognormal
Chromium	µg/g	4	4	100%	-	-	14.4	27.3	20.6	5.78	Normal
Cobalt	µg/g	4	4	100%	-	-	7.96	14.6	11.1	2.72	Normal
Copper	µg/g	4	4	100%	-	-	8.82	23.5	14.3	6.65	Normal
Iron	µg/g	4	4	100%	-	-	20800	41700	31900	8590	Normal
Lead	µg/g	3	3	100%	-	-	15.1	36	28.7	11.8	Normal
Magnesium	µg/g	4	4	100%	-	-	1070	3860	2350	1340	Normal
Manganese	µg/g	4	4	100%	-	-	393	985	747	251	Normal
Mercury	µg/g	4	1	25%	0.05	0.05	0.322	0.322	0.0993	0.149	Lognormal
Nickel	µg/g	4	4	100%	-	-	8.02	21.8	13.7	6.08	Normal
Potassium	µg/g	4	4	100%	-	-	1830	6010	3840	1900	Normal
Selenium	µg/g	4	0	0%	0.449	0.449	0	0	0.225	0	Undetermined
Silver	µg/g	4	0	0%	0.803	0.803	0	0	0.402	0	Undetermined
Sodium	µg/g	4	0	0%	38.7	38.7	0	0	19.4	0	Undetermined
Thallium	µg/g	3	0	0%	34.3	34.3	0	0	17.2	0	Undetermined
Vanadium	µg/g	1	1	100%	-	-	24.1	24.1	24.1	0	Lognormal
Zinc	µg/g	4	4	100%	-	-	34.1	209	88.1	82.2	Normal

[a]Results of duplicate analyses were not included in the calculation of the arithmetic mean, standard deviation.
Nondetects were used at one-half the detection limit in the calculation of the arithmetic mean, standard deviation.
[b] Distributions were determined to be either normal or lognormal. Distributions were determined by the use of probability plot correlation coefficients.

Table 2-7. Summary Statistics for Background Groundwater - Pelham Range

Pelham Range, Fort McClellan, Anniston Alabama

Run Time: 10:16:20
Run Date: 04/02/97
Exposure Unit: BK__WDM

Parameter	Units	Total Number of Samples	Total Number of Detects	Frequency of Detection	NonDetects Min CRL	NonDetects Max CRL	Detects Minimum	Detects Maximum	Arithmetic Mean[a]	Standard Deviation	Distribution[b]
Aluminum	µg/L	10	3	30%	112	112	418	9600	1340	3040	Lognormal
Antimony	µg/L	9	0	0%	5	10	0	0	3.61	0	Undetermined
Arsenic	µg/L	11	1	8%	2.35	2.35	4.16	4.16	1.47	0.900	Lognormal
Barium	µg/L	10	10	100%	-	-	14.6	653	197	259	Lognormal
Beryllium	µg/L	10	5	50%	1.12	1.12	1.17	2.12	1.01	0.548	Lognormal
Cadmium	µg/L	9	0	0%	2	5	0	0	2	0	Undetermined
Calcium	µg/L	10	10	100%	-	-	5850	55400	31100	17200	Normal
Chromium	µg/L	10	0	0%	16.8	16.8	0	0	8.4	0	Undetermined
Cobalt	µg/L	10	0	0%	25	25	0	0	12.5	0	Undetermined
Copper	µg/L	10	2	20%	18.8	18.8	207	207	48.9	83.3	Lognormal
Iron	µg/L	10	6	60%	77.5	77.5	814	22900	7060	9130	Lognormal
Lead	µg/L	11	2	18%	4.47	4.47	9.96	12.4	3.86	3.66	Lognormal
Magnesium	µg/L	10	10	100%	-	-	481	15200	7900	4690	Normal
Manganese	µg/L	10	6	60%	9.67	9.67	225	464	238	214	Lognormal
Mercury	µg/L	11	0	0%	0.1	0.1	0	0	0.05	0	Undetermined
Nickel	µg/L	10	0	0%	32.1	32.1	0	0	16.1	0	Undetermined
Potassium	µg/L	10	7	70%	1240	1240	1420	8140	2850	2600	Normal
Selenium	µg/L	11	0	0%	2.53	2.53	0	0	1.27	0	Undetermined
Silver	µg/L	10	0	0%	10	10	0	0	5	0	Undetermined
Sodium	µg/L	10	10	100%	-	-	2920	43700	11200	14000	Lognormal
Thallium	µg/L	9	1	11%	2	10	2.51	2.51	2.57	1.87	Lognormal
Vanadium	µg/L	10	0	0%	27.6	27.6	0	0	13.8	0	Undetermined
Zinc	µg/L	10	7	70%	18	18	27.7	1520	366	621	Lognormal

[a]Results of duplicate analyses were not included in the calculation of the arithmetic mean, standard deviation.
Nondetects were treated as one-half the detection limit in the calculation of the arithmetic mean, standard deviation.

[b] Distributions were determined to be either normal or lognormal. Distributions were determined by the use of probability plot correlation coefficients.

2.2.3 Anniston Army Depot Data

Background data obtained for the RI at Anniston Army Depot (south of Pelham Range) are compiled in Appendix A. Summary statistics for the existing data for background surface water, sediment, surface soil, subsurface soil, and groundwater are provided in Tables 2-8 to 2-12 and sample locations are shown on Figure 2-2.

Analytical data for thallium in groundwater and surface water will not be included in the background data set because the detection limit exceeds the RBC value and laboratory methods are available to achieve lower detection limits. Analytical detection limits for arsenic and beryllium in groundwater and surface water exceed the RBC criteria, however, the RBC concentrations cannot be attained by laboratory analytical methods and the arsenic and beryllium data will not be eliminated from the background data set. Cadmium and mercury in surface water can be practically detected at the ecological screening thresholds and the existing data will be eliminated from the ecological background data set. The detection limit for silver exceeds the ecological screening criteria, however, the screening value (0.012 ug/L) cannot be achieved in the laboratory therefore the existing data will be retained in the background ecological data base for surface water.

Beryllium will be eliminated in the surface soil, subsurface soil, and sediment data set because analytical methods are available to achieve the RBC and ecological screening criteria for beryllium in these media. The detection limit for antimony in sediment exceeded the ecological screening criteria. Analytical data for antimony will not be included in the background data set because analytical methods are available to achieve the screening concentrations.

2.2.4 U.S. Geological Survey Data

Analytical data obtained by the U.S. Geological Survey on the Main Post and Pelham Range is provided in Appendix B for informational purposes. These data will not be incorporated into the background data set for Fort McClellan because of the lack of available QA/QC information for the water sampling and the semi-quantitative nature of the chemical analyses of soil and rock samples.

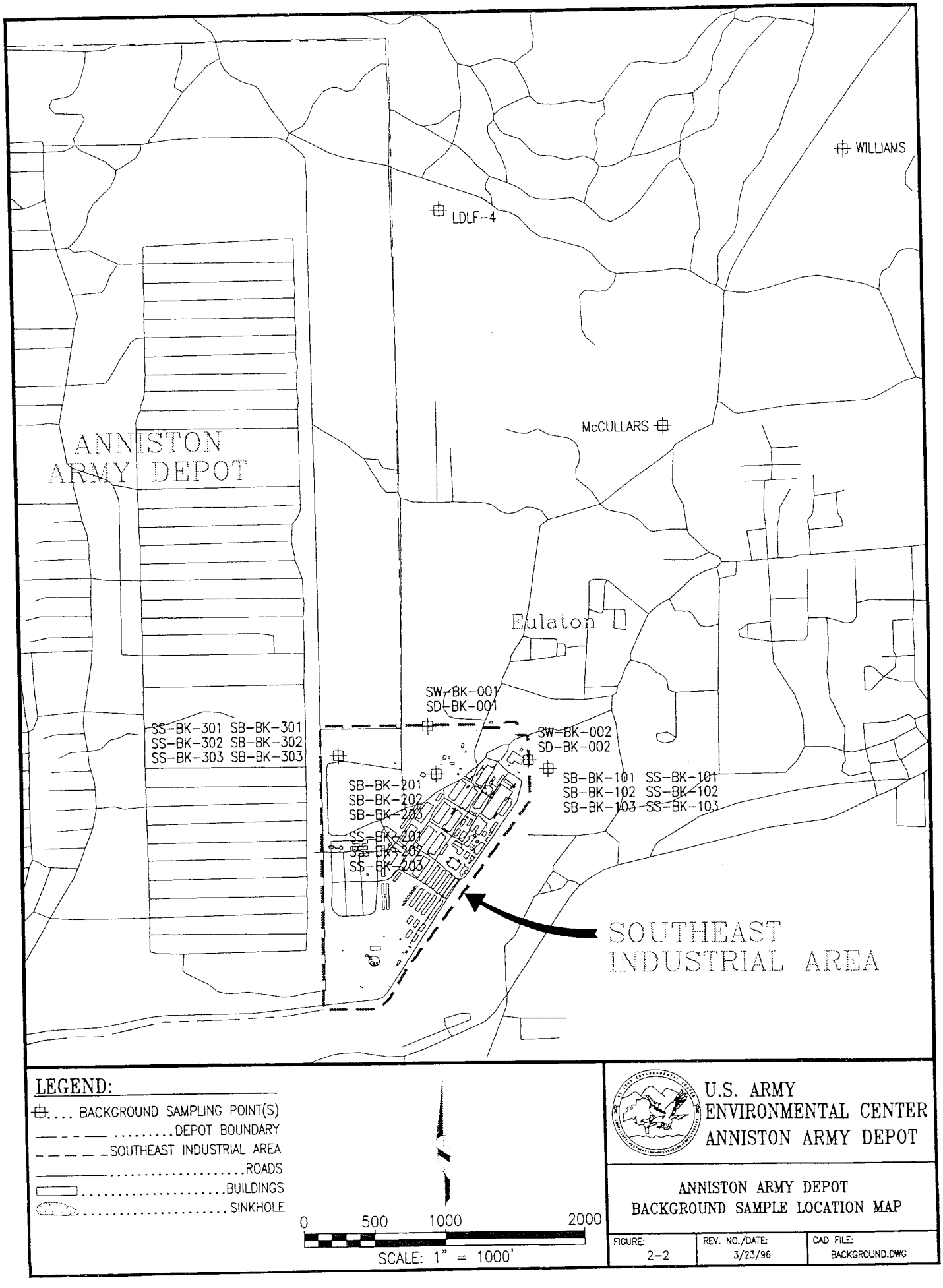

WILLIAMS
LDLF-4
McCULLARS
ANNISTON ARMY DEPOT
Eulaton
SW-BK-001
SD-BK-001
SS-BK-301 SB-BK-301
SS-BK-302 SB-BK-302
SS-BK-303 SB-BK-303
SW-BK-002
SD-BK-002
SB-BK-101 SS-BK-101
SB-BK-102 SS-BK-102
SB-BK-103 SS-BK-103
SB-BK-201
SB-BK-202
SB-BK-203
SS-BK-201
SS-BK-202
SS-BK-203
SOUTHEAST INDUSTRIAL AREA
LEGEND:
BACKGROUND SAMPLING POINT(S)
DEPOT BOUNDARY
SOUTHEAST INDUSTRIAL AREA
ROADS
BUILDINGS
SINKHOLE
0 500 1000 2000
SCALE: 1" = 1000'
U.S. ARMY
ENVIRONMENTAL CENTER
ANNISTON ARMY DEPOT
ANNISTON ARMY DEPOT
BACKGROUND SAMPLE LOCATION MAP
FIGURE: 2-2
REV. NO./DATE: 3/23/96
CAD FILE: BACKGROUND.DWG

Table 2-8. Summary Statistics for Background Groundwater - AAD
Anniston Army Depot - Southeast Industrial Area

Run Time: 09:59:48
Run Date: 04/02/97
Exposure Unit: BK__WDM

Parameter	Units	Total Number of Samples	Total Number of Detects	Frequency of Detection	NonDetects Min CRL	NonDetects Max CRL	Detects Minimum	Detects Maximum	Arithmetic Mean[a]	Standard Deviation	Distribution[b]
Aluminum	µg/L	3	2	67%	141	141	1220	1340	877	701	Normal
Antimony	µg/L	3	0	0%	3.03	3.03	0	0	1.52	0	Undetermined
Arsenic	µg/L	3	0	0%	2.54	2.54	0	0	1.27	0	Undetermined
Barium	µg/L	3	3	100%	-	-	10.5	21.9	16.9	5.84	Normal
Beryllium	µg/L	3	0	0%	5	5	0	0	2.5	0	Undetermined
Cadmium	µg/L	3	0	0%	4.01	4.01	0	0	2.01	0	Undetermined
Calcium	µg/L	3	2	67%	500	500	7650	25400	11100	12900	Normal
Chromium	µg/L	3	0	0%	6.02	6.02	0	0	3.01	0	Undetermined
Cobalt	µg/L	3	0	0%	25	25	0	0	12.5	0	Undetermined
Copper	µg/L	3	2	67%	8.09	8.09	21.3	235	86.8	129	Normal
Iron	µg/L	3	3	100%	-	-	1130	14700	6110	7470	Normal
Lead	µg/L	3	2	67%	1.26	1.26	2.06	26.9	9.86	14.8	Normal
Magnesium	µg/L	3	3	100%	-	-	522	14500	6180	7360	Normal
Manganese	µg/L	3	3	100%	-	-	13.3	291	108	159	Lognormal
Mercury	µg/L	3	0	0%	0.243	0.243	0	0	0.122	0	Undetermined
Nickel	µg/L	3	0	0%	34.3	34.3	0	0	17.2	0	Undetermined
Potassium	µg/L	3	3	100%	-	-	810	1440	1090	321	Normal
Selenium	µg/L	1	1	0%	-	-	0	0	0	0	Lognormal
Silver	µg/L	3	0	0%	4.6	4.6	0	0	2.3	0	Undetermined
Sodium	µg/L	3	3	100%	-	-	555	6130	3410	2790	Normal
Thallium	µg/L	3	0	0%	81.4	81.4	0	0	40.7	0	Undetermined
Vanadium	µg/L	3	0	0%	11	11	0	0	5.5	0	Undetermined
Zinc	µg/L	3	2	67%	21.1	21.1	42	908	320	509	Normal

[a]Results of duplicate analyses were not included in the calculation of the arithmetic mean, standard deviation.
Nondetects were treated as one-half the detection limit in the calculation of the arithmetic mean, standard deviation.

[b] Distributions were determined to be either normal or lognormal. Distributions were determined by the use of probability plot correlation coefficients.

Table 2-9. Summary Statistics for Background Surface Water - AAD
Anniston Army Depot - Southeast Industrial Area

Run Time: 09:59:25
Run Date: 04/02/97
Exposure Unit: BK__WSM

Parameter	Units	Total Number of Samples	Total Number of Detects	Frequency of Detection	NonDetects Min CRL	NonDetects Max CRL	Detects Minimum	Detects Maximum	Arithmetic Mean[a]	Standard Deviation	Distribution[b]
Aluminum	µg/L	2	1	50%	141	141	299	299	185	162	Lognormal
Antimony	µg/L	2	0	0%	3.03	3.03	0	0	1.52	0	Undetermined
Arsenic	µg/L	2	0	0%	2.54	2.54	0	0	1.27	0	Undetermined
Barium	µg/L	2	2	100%	-	-	14.4	19.3	16.9	3.46	Lognormal
Beryllium	µg/L	2	0	0%	5	5	0	0	2.5	0	Undetermined
Cadmium	µg/L	2	0	0%	4.01	4.01	0	0	2.01	0	Undetermined
Calcium	µg/L	2	2	100%	-	-	11500	14000	12800	1770	Lognormal
Chromium	µg/L	2	0	0%	6.02	6.02	0	0	3.01	0	Undetermined
Cobalt	µg/L	2	0	0%	25	25	0	0	12.5	0	Undetermined
Copper	µg/L	2	0	0%	8.09	8.09	0	0	4.05	0	Undetermined
Iron	µg/L	2	2	100%	-	-	124	343	234	155	Lognormal
Lead	µg/L	2	0	0%	1.26	1.26	0	0	0.63	0	Undetermined
Magnesium	µg/L	2	2	100%	-	-	5230	6370	5800	806	Lognormal
Manganese	µg/L	2	2	100%	-	-	21.9	60.9	41.4	27.6	Lognormal
Mercury	µg/L	2	0	0%	0.243	0.243	0	0	0.122	0	Undetermined
Nickel	µg/L	2	0	0%	34.3	34.3	0	0	17.2	0	Undetermined
Potassium	µg/L	2	2	100%	-	-	645	1240	943	421	Lognormal
Selenium	µg/L	2	0	0%	3.02	3.02	0	0	1.51	0	Undetermined
Silver	µg/L	2	0	0%	4.6	4.6	0	0	2.3	0	Undetermined
Sodium	µg/L	2	2	100%	-	-	2810	5210	4010	1700	Lognormal
Thallium	µg/L	2	0	0%	81.4	81.4	0	0	40.7	0	Undetermined
Vanadium	µg/L	2	0	0%	11	11	0	0	5.5	0	Undetermined
Zinc	µg/L	2	0	0%	21.1	21.1	0	0	10.6	0	Undetermined

[a]Results of duplicate analyses were not included in the calculation of the arithmetic mean, standard deviation.
Nondetects were treated as one-half the detection limit in the calculation of the arithmetic mean, standard deviation.
[b] Distributions were determined to be either normal or lognormal. Distributions were determined by the use of probability plot correlation coefficients.

Table 2-10. Summary Statistics for Background Sediment - AAD
Anniston Army Depot - Southeast Industrial Area

Run Time: 10:01:08
Run Date: 04/02/97
Exposure Unit: BK__DDM

Parameter	Units	Total Number of Samples	Total Number of Detects	Frequency of Detection	NonDetects Min CRL	NonDetects Max CRL	Detects Minimum	Detects Maximum	Arithmetic Mean[a]	Standard Deviation	Distribution[b]
Aluminum	µg/g	2	2	100%	-	-	2470	3010	2740	382	Lognormal
Antimony	µg/g	2	0	0%	7.14	7.14	0	0	3.57	0	Undetermined
Arsenic	µg/g	2	2	100%	-	-	2.04	11.8	6.92	6.9	Lognormal
Barium	µg/g	2	2	100%	-	-	39.9	43.6	41.8	2.62	Lognormal
Beryllium	µg/g	2	0	0%	0.5	0.5	0	0	0.25	0	Undetermined
Cadmium	µg/g	2	0	0%	0.7	0.7	0	0	0.35	0	Undetermined
Calcium	µg/g	2	2	100%	-	-	237	1650	944	999	Lognormal
Chromium	µg/g	2	2	100%	-	-	28.5	63.4	46	24.7	Lognormal
Cobalt	µg/g	2	2	100%	-	-	6.61	7.57	7.09	0.679	Lognormal
Copper	µg/g	2	2	100%	-	-	2.72	5.58	4.15	2.02	Lognormal
Cyanide	µg/g	2	0	0%	0.92	0.92	0	0	0.46	0	Undetermined
Iron	µg/g	2	2	100%	-	-	25900	33700	29800	5520	Lognormal
Lead	µg/g	2	2	100%	-	-	10.4	23	16.7	8.91	Lognormal
Magnesium	µg/g	2	2	100%	-	-	145	657	401	362	Lognormal
Manganese	µg/g	2	2	100%	-	-	616	882	749	188	Lognormal
Mercury	µg/g	2	0	0%	0.05	0.05	0	0	0.025	0	Undetermined
Nickel	µg/g	2	2	100%	-	-	6.42	11.1	8.76	3.31	Lognormal
Potassium	µg/g	2	1	50%	100	100	167	167	109	82.7	Lognormal
Selenium	µg/g	2	0	0%	0.25	0.25	0	0	0.125	0	Undetermined
Silver	µg/g	2	0	0%	0.589	0.589	0	0	0.295	0	Undetermined
Sodium	µg/g	2	2	100%	-	-	355	419	387	45.3	Lognormal
Thallium	µg/g	2	0	0%	6.62	6.62	0	0	3.31	0	Undetermined
Vanadium	µg/g	2	2	100%	-	-	29.4	43.4	36.4	9.9	Lognormal
Zinc	µg/g	2	2	100%	-	-	28.9	48.8	38.9	14.1	Lognormal

[a]Results of duplicate analyses were not included in the calculation of the arithmetic mean, standard deviation.
Nondetects were treated as one-half the detection limit in the calculation of the arithmetic mean, standard deviation.
[b] Distributions were determined to be either normal or lognormal. Distributions were determined by the use of probability plot correlation coefficients.

Table 2-11. Summary Statistics for Background Surface Soils (0-1 ft. BLS) - AAD
Anniston Army Depot - Southeast Industrial Area

Run Time: 10:00:17
Run Date: 04/02/97
Exposure Unit: BK__SSM

Parameter	Units	Total Number of Samples	Total Number of Detects	Frequency of Detection	NonDetects Min CRL	NonDetects Max CRL	Detects Minimum	Detects Maximum	Arithmetic Mean[a]	Standard Deviation	Distribution[b]
Aluminum	µg/g	9	9	100%	-	-	7080	15700	11100	2860	Normal
Antimony	µg/g	9	0	0%	7.14	7.14	0	0	3.57	0	Undetermined
Arsenic	µg/g	9	9	100%	-	-	2.11	18	6.09	5.99	Lognormal
Barium	µg/g	9	9	100%	-	-	24.3	127	58.7	40.1	Lognormal
Beryllium	µg/g	9	2	22%	0.5	0.5	0.632	0.684	0.341	0.18	Lognormal
Cadmium	µg/g	9	0	0%	0.7	0.7	0	0	0.35	0	Undetermined
Calcium	µg/g	9	7	78%	100	100	161	998	410	364	Normal
Chromium	µg/g	9	9	100%	-	-	7.75	50.4	24.6	19.1	Lognormal
Cobalt	µg/g	9	7	78%	1.42	1.42	2.59	10.8	5.7	3.54	Normal
Copper	µg/g	9	9	100%	-	-	4.92	9.91	7.2	1.79	Normal
Cyanide	µg/g	9	0	0%	0.92	0.92	0	0	0.46	0	Undetermined
Iron	µg/g	9	9	100%	-	-	7710	45200	21600	15700	Lognormal
Lead	µg/g	9	9	100%	-	-	17	26.2	21.6	2.74	Normal
Magnesium	µg/g	9	9	100%	-	-	189	440	304	75.1	Normal
Manganese	µg/g	9	9	100%	-	-	273	1850	827	576	Normal
Mercury	µg/g	9	1	11%	0.05	0.05	0.0822	0.0822	0.0314	0.0191	Lognormal
Nickel	µg/g	9	9	100%	-	-	3.74	8.18	6.07	1.4	Normal
Potassium	µg/g	9	9	100%	-	-	160	286	222	43.1	Normal
Selenium	µg/g	9	0	0%	0.25	0.25	0	0	0.125	0	Undetermined
Silver	µg/g	9	1	11%	0.589	0.589	0.891	0.891	0.361	0.199	Lognormal
Sodium	µg/g	9	9	100%	-	-	297	402	357	35.5	Normal
Thallium	µg/g	9	0	0%	6.62	6.62	0	0	3.31	0	Undetermined
Vanadium	µg/g	9	9	100%	-	-	16.8	96.7	46.1	34.5	Lognormal
Zinc	µg/g	9	8	89%	8.03	8.03	14	19.9	16	4.85	Lognormal

[a]Results of duplicate analyses were not included in the calculation of the arithmetic mean, standard deviation.
Nondetects were treated as one-half the detection limit in the calculation of the arithmetic mean, standard deviation.

[b] Distributions were determined to be either normal or lognormal. Distributions were determined by the use of probability plot correlation coefficients.

Table 2-12. Summary Statistics for Background Subsurface Soils - AAD

Anniston Army Depot - Southeast Industrial Area

Run Time: 10:00:48
Run Date: 04/02/97
Exposure Unit: BK__SDM

Parameter	Units	Total Number of Samples	Total Number of Detects	Frequency of Detection	NonDetects Min CRL	NonDetects Max CRL	Detects Minimum	Detects Maximum	Arithmetic Mean[a]	Standard Deviation	Distribution[b]
Aluminum	µg/g	12	12	100%	-	-	3350	11400	6430	2140	Normal
Antimony	µg/g	12	0	0%	7.14	7.14	0	0	3.57	0	Undetermined
Arsenic	µg/g	11	10	91%	0.25	0.25	0.774	7.76	2.3	2.19	Lognormal
Barium	µg/g	12	12	100%	-	-	7.81	4500	392	1290	Lognormal
Beryllium	µg/g	12	2	17%	0.5	0.5	0.694	0.797	0.333	0.194	Lognormal
Cadmium	µg/g	12	1	8%	0.7	0.7	1.28	1.28	0.428	0.268	Lognormal
Calcium	µg/g	12	2	17%	100	200	158	168	73	44.5	Lognormal
Chromium	µg/g	12	12	100%	-	-	7.7	34.2	21.9	8.62	Normal
Cobalt	µg/g	12	6	50%	1.42	1.42	2.29	96.2	11.5	27.3	Lognormal
Copper	µg/g	12	12	100%	-	-	4.9	60.9	18.2	15.8	Lognormal
Cyanide	µg/g	12	0	0%	0.92	0.92	0	0	0.46	0	Undetermined
Iron	µg/g	12	12	100%	-	-	15800	45800	26200	8470	Normal
Lead	µg/g	12	12	100%	-	-	5.6	500	54.6	140	Lognormal
Magnesium	µg/g	12	5	42%	100	200	163	276	127	90.6	Lognormal
Manganese	µg/g	12	12	100%	-	-	47.1	19000	1710	5450	Lognormal
Mercury	µg/g	12	1	8%	0.05	0.05	0.0588	0.0588	0.0278	0.00976	Lognormal
Nickel	µg/g	12	9	75%	1.71	1.71	2.39	29.2	5.76	7.78	Lognormal
Potassium	µg/g	12	12	100%	-	-	203	353	286	53.1	Normal
Selenium	µg/g	12	0	0%	0.25	0.25	0	0	0.125	0	Undetermined
Silver	µg/g	12	0	0%	0.589	1.2	0	0	0.32	0.0882	Undetermined
Sodium	µg/g	12	12	100%	-	-	347	531	415	52.8	Normal
Thallium	µg/g	12	1	8%	6.62	6.62	23.5	23.5	4.99	5.83	Lognormal
Vanadium	µg/g	12	12	100%	-	-	15.5	98.6	53.5	22.3	Normal
Zinc	µg/g	12	7	58%	8.03	8.03	11.1	56.1	17.1	16.2	Lognormal

[a]Results of duplicate analyses were not included in the calculation of the arithmetic mean, standard deviation.
Nondetects were treated as one-half the detection limit in the calculation of the arithmetic mean, standard deviation.

[b] Distributions were determined to be either normal or lognormal. Distributions were determined by the use of probability plot correlation coefficients.

3. SUPPLEMENTAL BACKGROUND SAMPLING

Additional background surface soil, subsurface soil, surface water, and sediment samples will be obtained from 25 locations on the Main Post and 25 locations on Pelham Range as shown on Plates 1 and 2. Groundwater samples will be obtained from sixteen locations on the Main Post and fourteen locations on (and around) Pelham Range. Environmental samples will be collected in accordance with procedures contained in applicable sections of the U.S. EPA Region IV *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual* (EPA 1996b).

3.1 Sampling Rationale

The surface geologic map of the Main Post (USGS 1995) indicates that the area is underlain predominantly by residuum derived from the weathering of sedimentary rocks comprising the Chilhowee Group and the Athens Shale with fault-bounded fensters (predominantly in the developed Post area) exposing Cambrian-Ordovician carbonate rocks of the Little Oak and Newala Limestone Formations of the Knox Group and Cambrian Shady Dolomite. Relatively few exposures of these rock units occur on the Main Post because of cultural development and deep residuum formation. The general soil map of Calhoun County (SCS 1961) indicates that the majority of the Main Post is underlain by soils of the Stony rough land association with localized areas of the western portion of the Main Post underlain by soils of the Anniston-Allen-Decatur-Cumberland association and the Rarden-Montevallo-Lehew association. Pelham Range is predominantly underlain by carbonate rocks of the Cambrian-Ordovician Knox Group and the Cambrian Conasauga Formation. The Conasauga Formation consists of argillaceous limestone with interbedded dark gray shale. Karst features have been observed in the Knox Group carbonate rocks that underly the majority of Pelham Range and Anniston Army Depot.

3.1.1. Sample Locations and Protocols

The locations for the collection of the additional background samples (Plates 1 and 2) were selected to obtain spatial coverage of surface water bodies and land area that has not been affected (or has been minimally affected) by training activities on both Main Post and Pelham Range. Because it is not possible to state unequivically that areas on the Main Post or Pelham Range have not been impacted by previous training activity, sample locations were selected surrounding the developed portion of the Main Post because of the reduced history of military training in these areas. Sample locations were also sited in less disturbed areas within the cantonment area. The sediment and surface water sample locations were selected to obtain samples near the headwater portions of mapped streams upgradient from the developed Post area and from major surface water bodies on the Post. As suggested by the BCT, sediment samples will be obtained from areas of deposition within a streambed with emphasis on the collection of fine grained sediments to the extent that they are available within the stream. Surface water and sediment sampling will be conducted in accordance with Sections 10 and 11 of the

EISOPQAM (EPA 1996b). Surface soil samples will be obtained from the interval 0.0 to 1.0 feet below land surface (BLS) and subsurface soil samples will be composited over the interval between 1.0 feet and 10.0 feet BLS as requested by the BCT. Soil sampling will be conducted in accordance with Section 12 of the EISOPQAM (EPA 1996b). The locations for additional sample collection on the Main Post and Pelham Range are shown on Plates 1 and 2.

Background groundwater samples will be obtained from existing wells on the Main Post and Pelham Range and from eight newly installed wells. Background wells on the Main Post include the well at Reilly Lake (BK-G03), upgradient wells MW-5-94 (BK-G04), LF1-G01, LF2-G01, T24A-G03, and well BK-G06, five upgradient UST wells within the cantonment area, and five new well placements (BK-YAHOU, BK-G07, BK-G08, BK-G09, and BK-G10).

Background groundwater for Pelham Range will be obtained from two existing City of Weaver wells (CW-G01, CW-G02), existing Army wells at Rideout Hall (GW-P8802), the SOT Testing Area (GW-P8607), the SOT Administrative Area (GW-P8203), and Range 57 (GW-P8415), three designated background locations (see Figure 2-2) for Anniston Army Depot (LDLF-4, McCullers Well, and Williams Well), two upgradient wells from Range L (RL-G01) and the Old Water Hole (OWH-G02) sites, and three newly installed well placements (GW-BKPR01, GW-BKPR02, GW-BKPR03). Groundwater samples from potable water supply wells will be obtained in accordance with Section 8 of the EISOPQAM (EPA 1996b). The locations of the background wells for the Main Post and Pelham Range are shown on Plates 1 and 2.

3.1.2. Number of Additional Samples

The number of additional samples necessary to produce a statistically robust background data set for the Main Post was estimated using existing analytical data from the Fort McClellan RI and procedures outlined in *Guidance for Data Useability in Risk Assessment* (EPA 1992a) and *Guidance for Planning for Data Collection in Support of Environmental Decision-Making Using the Data Quality Objectives Process* (EPA 1993c). The estimate is provided as backup for the BCT-mandated sample size of 25 samples per medium. The approach used to evaluate the proposed sample size is based on defining an acceptable level of statistical confidence (probability of avoiding a false positive) and power (probability of avoiding a false negative). Benchmarks for statistical confidence (80%) and power (90%) have been established by EPA (1992). At a given level of confidence and power the number of samples that would be required to detect a difference in concentration between site samples and the background reference data set can be estimated. The Minimum Detectable Relative Difference (MDRD) is the minimum difference (expressed as a percentage) necessary to demonstrate a statistically significant difference between the data sets. The EPA (1992) recommends that MDRD's of 10 to 20 percent are appropriate targets for sampling efforts.

The observed concentration variations for arsenic, lead, manganese, and vanadium in soil were calculated using the analytical data available for Fort McClellan soils. The number of additional samples was estimated using a one-tailed student t-test in conjunction with the EPA-recommended confidence level, power, and MDRD range. The data was tested using a probability plot correlation coefficient (Appendix C). Manganese and vanadium were determined to be log-normally distributed and the arsenic and lead distribution (normal or lognormal) was inconclusive. Risk assessment convention assumes that the inconclusive tests were lognormally distributed. The number of samples needed for a range of MDRD's between 10% and 40% are shown on Table 3-1. Based on these results, between 4 and 35 (average 16) multimedia samples would be needed to achieve an MDRD of 15%. The Fort McClellan BCT has recommended and approved the collection and analysis of 25 samples to be obtained from surface water, sediment, surface soil, and subsurface soil on each of the Main Post and Pelham Range. Background groundwater samples will be obtained from 30 locations on the Main Post, Pelham Range, the City of Weaver, and Anniston Army Depot.

3.1.3 Sample Surveying

The precise sample locations will be field-determined base on the approximate map locations and the physical features encountered in the field. The approximate locations are shown on Plates 1 and 2. The sampled locations will be staked and surveyed by the Fort McClellan Environmental Management Office personnel using the Global Positioning System (GPS). Survey coordinates will be in the Alabama State Plane Coordinate System (east).

Table 3-1. Estimated Number of Background Soil Samples Required to AchieveTarget MDRD
Fort McClellan, Alabama

Analyte	Power (%)	Confidence Level (%)	Measured Coefficient of Variation (%)	Minimum Detectable Relative Difference (MDRD)				
				10%	15%	20%	30%	40%
Arsenic	90%	80%	41.70%	79	35	20	9	5
		90%	41.70%	115	52	29	14	8
		95%	41.70%	150	68	39	18	11
	95%	80%	41.70%	108	48	27	12	7
		90%	41.70%	150	67	38	17	10
		95%	41.70%	190	85	48	22	13
	99%	80%	41.70%	165	74	42	19	11
		90%	41.70%	216	96	55	25	14
		95%	41.70%	263	118	67	30	18
Lead	90%	80%	19.30%	17	8	5	2	1
		90%	19.30%	25	12	7	4	2
		95%	19.30%	33	16	9	5	3
	95%	80%	19.30%	23	11	6	3	2
		90%	19.30%	33	15	9	4	3
		95%	19.30%	42	19	11	6	4
	99%	80%	19.30%	36	16	9	4	3
		90%	19.30%	47	21	12	6	4
		95%	19.30%	57	26	15	8	5
Manganese	90%	80%	27.10%	33	15	9	4	2
		90%	27.10%	49	22	13	6	4
		95%	27.10%	64	29	17	8	5
	95%	80%	27.10%	46	21	12	5	3
		90%	27.10%	64	29	17	8	5
		95%	27.10%	81	37	21	10	6
	99%	80%	27.10%	70	31	18	8	5
		90%	27.10%	92	41	24	11	7
		95%	27.10%	112	51	29	14	8
Vanadium	90%	80%	13.90%	9	4	3	1	1
		90%	13.90%	14	6	4	2	2
		95%	13.90%	18	9	5	3	2
	95%	80%	13.90%	12	6	3	2	1
		90%	13.90%	17	8	5	3	2
		95%	13.90%	22	11	7	4	3
	99%	80%	13.90%	19	8	5	2	1
		90%	13.90%	25	11	7	3	2
		95%	13.90%	30	14	9	5	3

Transition metals concentrations from Main Post soil data. Distributions determined to be lognormal based on goodness-of-fit testing using probability plot correlation coefficient.
EPA recommends a target of 80 percent for confidence, 90 percent for power, and 10 to 20 percent for MDRD.

The following documents were used to support the statistical sampling analysis:

(1) Guidance for Data Useability in Risk Assessment (Part A) (EPA 1992b).

(2) Guidance For Planning for Data Collection in Support of Environmental Decision Making Using the Data Quality Objectives Process, Interim Final (EPA 1993b).

4. CHEMICAL ANALYSIS PROGRAM

Environmental samples to be collected during the background sampling will analyzed for Target Analyte List (TAL) metals (including speciated chromium) in all media and including common anion (SO^{4-}, HCO^{3-}, Cl^-, Br^-, F^-, CO^{3-}, NO^{3-}, PO^{4-}) analyses in groundwater, using USEPA SW-846 analytical methods. Analyses for mercury will be conducted using cold vapor atomic absorption (CVAA) and analyses for antimony, arsenic, lead, selenium, and thallium will be analyzed by graphite furnace atomic absorption (GFAA). Target detection limits for the metals analyses and a comparison to regulatory limits are shown in Table 4-1.

Table 4-1. Laboratory Detection Limits and Regulatory Limits

Parameter	Soil/Sediment: Laboratory Reporting Limit (mg/kg)	Soil/Sediment: USEPA III RBC Residential Soil (mg/kg)	Soil/Sediment: Lower Ecological Screening Soil (mg/kg)	Soil/Sediment: USEPA IV-Ecological Sediment (ppm)	Soil/Sediment: Ecological Screening Sediment (mg/kg)	Groundwater/Surface Water: Laboratory Reporting Limit (ug/L)	Groundwater/Surface Water: USEPA III RBC Tap water (ug/L)	Groundwater/Surface Water: USEPA IV-Ecological Surface Water (ug/L)	Groundwater/Surface Water: Ecological Tier II Surface Water (ug/L)
Aluminum	10	78,000	10.5		28	25	37,000	87	
Antimony	0.05	31	0.7	2	2.1	0.5	15	160	
Arsenic	0.1	0.43	0.7	7.24		1	0.045	190	
Barium	0.5	5,500	63.8		230	0.5	2,600		4
Beryllium	0.02	0.15	8.3		21	0.2	0.016	0.53	
Calcium	50	Nutrient				50	Nutrient		116,000
Cadmium	0.02	39	2.6	0.676		0.1	18	0.66	
Chromium^{total}	0.2	78,000	1.7	52.3		1	37,000	117.3	
Chromium^{6+}	0.02	390	1.7	52.3		2	180	11	
Cobalt	0.2	4,700	112.4		0.23	0.5	2,200		23
Copper	0.2	3,100	85.4	18.7		0.5	1,500	6.54	
Cyanide	1	390	858.8		3,355	10	180	5.2	
Iron	25	23,000	800		3.95	10	11,000	1,000	
Lead	0.2	400	0.9	30.2		0.5	15	1.32	
Magnesium	20	Nutrient				10	Nutrient		82,000
Manganese	2.5	390	374.2		3,516	0.5	180		120
Mercury	0.1	7.8	0.4	0.13		0.025	3.7	0.012	
Nickel	0.2	1,600	140.7	15.9		1	730	87.7	
Potassium	50	Nutrient				200	Nutrient		53,000
Selenium	0.2	390	0.8		1	2	180	5	
Silver	0.05	390	1750	0.733		0.1	180	0.012	
Sodium	10	Nutrient				100	Nutrient		680,000
Thallium	0.01	5.5	0.1		0.03	0.1	2.6	4	
Vanadium	0.2	550	2.0		4.19	1	260		20
Zinc	2	23,000	228.1		615	1	11,000	58.91	

[ ]=Highlighted cells indicate that one-half of the laboratory detection limit exceeds the regulatory limit or screening value for human health or ecological effects.

Laboratory RL's from ES&E Laboratories, April 1997.

USEPA Region III RBC values obtained from Region III internet site March 1997.

USEPA Region IV ecological screening values from *"Draft Ecological Screening Values"*, Ecological Risk Assessment Bulletin No. 2, November, 1995; USEPA 1995.

Ecological screening values calculated by SAIC, 1997.

Tier II ecological values for surface water from *"Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision"*, Suter II, G.W. and Tsao, C.L., June 1996.

5. BACKGROUND CONCENTRATION DERIVATION

Summary statistics for each sampled medium will be prepared using the usable existing data combined with the new analytical data. The summary statistics will tabulate the total number of samples, detections, frequency of detection (%), the range of detected values, the arithmetic mean and standard deviation, and characterization of the constituent statistical distribution (normal, lognormal). The summary statistics tabulation will also present calculations of the background threshold as twice the arithmetic mean , the 95% Upper Confidence Limit (UCL) on the mean, and exposure point concentrations.

5.1 Data Validation

Environmental data used to construct the background data sets (human and ecological receptors) has been collected between 1991 and 1997. Prior to 1996, the data has been validated in accordance with U.S. Army Environmental Center (USAEC) protocols (USATHAMA 1990) and using the IRDMIS data validation. Analytical data obtained using non-Army methods were validated using National Functional Guidelines. During the validation process, data were qualified based on the results of the QA/QC samples (e.g., laboratory and field blanks). The data to be obtained under the current sampling plan will be analyzed exclusively using EPA methods and will be validated under the National Functional Guidelines. Data found to be unsuitable by data validation will be excluded from the background data set.

5.2 Calculation of Summary Statistics

The arithmetic mean for each TAL metal will be calculated using the laboratory data incorporated into the overall database. The results of duplicate samples collected to evaluate field precision will not be used in the calculation of the arithmetic mean or standard deviation. Non-detected values will be used at one-half of the analytical detection level in the calculation of the arithmetic mean and standard deviation. The range (minimum and maximum) of CRL's and detected concentrations will be summarized for all inorganic TAL constituents. A background threshold established as twice the arithmetic mean will also be calculated for each TAL metal.

The underlying sample distribution (normal or lognormal) for each inorganic constituent will be evaluated using the probability plot correlation coefficient (EPA 1992a). The probability plot correlation coefficient is a measure of the linearity of points on a scatter diagram with higher coefficients indicating a greater degree of correlation supporting the determination of the underlying distribution. The resulting correlation coefficient (R) is compared to a tabulation of critical values for the appropriate number of samples at a 95 percent confidence level. If the coefficient for the untransformed data is greater than the

critical value, then the data are determined to be normally distributed. If the coefficient is less than the critical value then the calculation is repeated using logarithmically transformed data with the result again compared to the critical value. If the resulting correlation coefficient for the transformed data is greater than the critical value then the data are lognormally distributed.

5.3 Derivation of Exposure Point Concentrations

Exposure point concentrations (EPC's) are the concentrations of chemical constituents in a given medium to which human or ecological receptors are exposed at the point of contact. Exposure point concentrations will be developed for each TAL metal in the background analytical data according to medium. The EPC concentrations will be calculated in accordance with EPA's *Supplemental Guidance to RAGS: Calculating the Concentration Term* (EPA 1992b). Methods used to derive exposure point concentrations are dependent on the underlying shape of the distribution of the data set. If the data were found to be normally distributed, the exposure point concentration will be calculated as the 95% upper confidence limit (UCL) on the arithmetic mean of the data using the Student's t-statistic. If the data are found to be lognormally distributed or a distribution cannot be defined, the exposure point concentration will be calculated as the 95% UCL on the arithmetic mean using the H-statistic (EPA 1992b). The H-statistic is used to compute a one-sided 95% UCL on a lognormal mean (Gilbert 1987). In accordance with EPA guidance, if the 95% UCL exceeds the maximum value observed in the data set for the individual constituent, the maximum value will be used as the exposure point concentration. Non-detected results will be used at one-half the certified reporting limit and included in the calculations of the UCL values. Field duplicates analytical results will not included in the calculation of the exposure point concentrations.

5.4 Background Metals Survey Report

The results of the background sampling and analysis proposed for Fort McClellan will be compiled in a Background Metals Survey Report. The report volume will contain information regarding the sampling rationale, field methods, sample locations (including survey data), field observations, data validation, analytical results, and summary statistics for the background data set for each environmental medium. The report will be issued in draft form and will be revised in a final document to reflect BCT comments. Subsequent modifications to the background data set for Fort McClellan will be at the discretion of the BCT.

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Appendix A

Table A-1. Data Summary Table: Groundwater - Background, Fort McClellan RI, Anniston Alabama

Site ID				BK-G03	BK-G03	BK-G04	BK-G04	BK-G06
Field Sample Number				SAIC01	SAIC03	SAIC01	SAIC02	SAIC01
Site Type				WELL	WELL	WELL	WELL	WELL
Collection Date				7/13/94	1/30/95	7/13/94	2/5/95	7/15/94
Depth (ft)				0	0	13	13.2	17.5
Associated Field QC Sample - Site ID								
Associated Field QC Sample - Field Sample No.								
Associated Field QC Sample - Site ID								
Associated Field QC Sample - Field Sample No.								
METALS/WATER/GFAA (µg/L)								
Laboratory ID Number								
Parameter	Units	CRL	RBC					
Antimony	µg/L	5	15	LT 10**	LT 5**	LT 10**	LT 5**	LT 10**
Arsenic	µg/L	2.35	0.045	LT 2.35**	LT 2.35**	LT 2.35**	LT 2.35**	LT 2.35**
Lead	µg/L	4.47	15	LT 4.47**	**6.15****	**9.71****	LT 4.47**	LT 4.47**
Selenium	µg/L	2.53	180	LT 2.53**	LT 2.53**	LT 2.53**	LT 2.53**	LT 2.53**
METALS/WATER/CVAA (µg/L)								
Laboratory ID Number								
Parameter	Units	CRL	RBC					
Mercury	µg/L	0.1	11	LT .1**	LT .1**	LT .1**	LT .1**	LT .1**
METALS/WATER/ICP (µg/L)								
Laboratory ID Number								
Parameter	Units	CRL	RBC					
Aluminum	µg/L	112	37000	LT 112**	LT 112**	**8740****	**898****	**5450****
Barium	µg/L	2.82	2600	**14.5****	**18.9****	**40.1****	**14.6****	**53.1****
Beryllium	µg/L	1.12	0.016	LT 1.12**	**1.93****	**2.37****	LT 1.12**	LT 1.12**
Cadmium	µg/L	4	18	LT 5**	LT 5**	LT 5**	LT 5**	LT 5**
Calcium	µg/L	105		**31900****	**35200****	**2250****	**735****	**234****
Chromium	µg/L	16.8	180	LT 16.8**	LT 16.8**	LT 16.8**	LT 16.8**	LT 16.8**
Cobalt	µg/L	25	2200	LT 25**	LT 25**	LT 25**	LT 25**	LT 25**
Copper	µg/L	18.8	1500	LT 18.8**	LT 18.8**	LT 18.8**	LT 18.8**	LT 18.8**
Iron	µg/L	77.5	11000	LT 77.5**	**234****	**21700****	**1920****	**25800****
Magnesium	µg/L	135		**19900****	**21900****	**3900****	**923****	**435****
Manganese	µg/L	9.67	840	LT 9.67**	**9.83****	**551****	**75.2****	**59.3****
Nickel	µg/L	32.1	730	LT 32.1**	LT 32.1**	LT 32.1**	LT 32.1**	LT 32.1**
Potassium	µg/L	1240		LT 1240**	LT 1240**	**5890****	**1680****	**6280****
Silver	µg/L	10	180	LT 10**	LT 10**	LT 10**	LT 10**	LT 10**
Sodium	µg/L	279		**1420****	**1450****	**1940****	**1840****	**1370****
Vanadium	µg/L	27.6	260	LT 27.6**	LT 27.6**	LT 27.6**	LT 27.6**	LT 27.6**
Zinc	µg/L	18	11000	**442****	**222****	**60.7****	LT 18**	**25.9****

Table A-1. Data Summary Table: Groundwater - Background, Fort McClellan RI, Anniston Alabama

Site ID				BK-G06		LF1-G01		LF1-G01		LF2-G01		LF2-G01
Field Sample Number				SAIC03		SAIC01		SAIC03		SAIC01		SAIC03
Site Type				WELL		WELL		WELL		WELL		WELL
Collection Date				2/2/95		7/13/94		2/1/95		7/4/94		1/31/95
Depth (ft)				14.6		30		29.9		20.6		19.32
Associated Field QC Sample - Site ID												
Associated Field QC Sample - Field Sample No.												
Associated Field QC Sample - Site ID												
Associated Field QC Sample - Field Sample No.												
METALS/WATER/GFAA (µg/L)												
Laboratory ID Number												
Parameter	Units	CRL	RBC									
Antimony	µg/L	5	15	LT	5**	LT	10**	LT	5**	LT	10**	LT 5**
Arsenic	µg/L	2.35	0.045	LT	2.35** M	LT	2.35**	LT	2.35**	LT	2.35**	LT 2.35**
Lead	µg/L	4.47	15	LT	4.47**	LT	4.47**	LT	4.47**	LT	4.47**	LT 4.47**
Selenium	µg/L	2.53	180	LT	2.53**	LT	2.53**	LT	2.53**	LT	2.53**	LT 2.53**
METALS/WATER/CVAA (µg/L)												
Laboratory ID Number												
Parameter	Units	CRL	RBC									
Mercury	µg/L	0.1	11	LT	.1**	LT	.1**	LT	.1**	LT	.1**	LT .1**
METALS/WATER/ICP (µg/L)												
Laboratory ID Number												
Parameter	Units	CRL	RBC									
Aluminum	µg/L	112	37000		1010**		1580**		1440**		1850**	714**
Barium	µg/L	2.82	2600		26.8**		27.2**		41.9**		17.8**	17**
Beryllium	µg/L	1.12	0.016	LT	1.12**	LT	1.12**		1.31**	LT	1.12**	1.11**
Cadmium	µg/L	4	18	LT	5**	LT	5**	LT	5**	LT	5**	LT 5**
Calcium	µg/L	105			217**		14100**		26700**		4680**	6300**
Chromium	µg/L	16.8	180	LT	16.8**	LT	16.8**	LT	16.8**	LT	16.8**	LT 16.8**
Cobalt	µg/L	25	2200	LT	25**	LT	25**	LT	25**	LT	25**	LT 25**
Copper	µg/L	18.8	1500	LT	18.8**	LT	18.8**	LT	18.8**	LT	18.8**	LT 18.8**
Iron	µg/L	77.5	11000		3560**		3080**		1870**		3280**	937**
Magnesium	µg/L	135			176**		10300**		9750**		6210**	7780**
Manganese	µg/L	9.67	840		21.7**		275**		153**		39.1**	28.8**
Nickel	µg/L	32.1	730	LT	32.1**	LT	32.1**	LT	32.1**	LT	32.1**	LT 32.1**
Potassium	µg/L	1240			3230**		2480**	LT	1240**	LT	1240**	LT 1240**
Silver	µg/L	10	180	LT	10**	LT	10**	LT	10**	LT	10**	LT 10**
Sodium	µg/L	279			1150**		13900**		13700**		13700**	16200**
Vanadium	µg/L	27.6	260	LT	27.6**	LT	27.6**	LT	27.6**	LT	27.6**	LT 27.6**
Zinc	µg/L	18	11000	LT	18**		37.7**	LT	18**	LT	18**	LT 18**

Table A-1. Data Summary Table: Groundwater - Background, Fort McClellan RI, Anniston Alabama

Site ID					T24A-G03		T24A-G03			FMP001		FMP001	
Field Sample Number					SAIC01		SAIC03			FMP001		FMP003	
Site Type					WELL		WELL			TAPW		TAPW	
Collection Date					10/23/94		2/1/95			2/27/92		6/5/92	
Depth (ft)					18.5		12.8			0		0	
Associated Field QC Sample - Site ID													
Associated Field QC Sample - Field Sample No.													
Associated Field QC Sample - Site ID													
Associated Field QC Sample - Field Sample No.													
METALS/WATER/GFAA (µg/L)													
Laboratory ID Number													
Parameter	Units	CRL	RBC										
Antimony	µg/L	5	15	LT	10**		LT	5**		~~LT~~	~~60**~~	~~LT~~	~~60**~~
Arsenic	µg/L	2.35	0.045	LT	2.35**		LT	2.35**	M	LT	2.35**	LT	2.35**
Lead	µg/L	4.47	15	LT	4.47**		LT	4.47**		~~LT~~	~~43.4**~~	~~LT~~	~~43.4**~~
Selenium	µg/L	2.53	180	LT	2.53**		LT	2.53**		LT	2.53**		5.32** 7
METALS/WATER/CVAA (µg/L)													
Laboratory ID Number													
Parameter	Units	CRL	RBC										
Mercury	µg/L	0.1	11	LT	.1**		LT	.1**		LT	.1**	LT	.1**
METALS/WATER/ICP (µg/L)													
Laboratory ID Number													
Parameter	Units	CRL	RBC										
Aluminum	µg/L	112	37000		2080**			1220**		LT	112**	LT	112**
Barium	µg/L	2.82	2600		68**			40.9**			21.6**		29.4**
Beryllium	µg/L	1.12	0.016	LT	1.12**		LT	1.12**		LT	1.12**	LT	1.12**
Cadmium	µg/L	4	18	LT	5**		LT	5**		LT	6.78**	LT	6.78**
Calcium	µg/L	105			776**			822**			22700**		23500**
Chromium	µg/L	16.8	180	LT	16.8**		LT	16.8**		LT	16.8**	LT	16.8**
Cobalt	µg/L	25	2200	LT	25**		LT	25**		LT	25**	LT	25**
Copper	µg/L	18.8	1500	LT	18.8**		LT	18.8**		LT	18.8**	LT	18.8**
Iron	µg/L	77.5	11000		10600**			10200**			150**	LT	77.5**
Magnesium	µg/L	135			7200**			7190**			11000**		11500**
Manganese	µg/L	9.67	840		762**			771**		LT	9.67**	LT	9.67**
Nickel	µg/L	32.1	730	LT	32.1**		LT	32.1**		LT	32.1**	LT	32.1**
Potassium	µg/L	1240		LT	1240**		LT	1240**			1520**	LT	1240**
Silver	µg/L	10	180	LT	10**		LT	10**		LT	10**	LT	10**
Sodium	µg/L	279			1150**			1280**			1190**		1340**
Vanadium	µg/L	27.6	260	LT	27.6**		LT	27.6**		LT	27.6**	LT	27.6**
Zinc	µg/L	18	11000		21.9**			22.5**			22.5**		47**

Table A-1. Data Summary Table: Groundwater - Background, Fort McClellan RI, Anniston Alabama

Site ID
Field Sample Number
Site Type
Collection Date
Depth (ft)
Associated Field QC Sample - Site ID
Associated Field QC Sample - Field Sample No.
Associated Field QC Sample - Site ID
Associated Field QC Sample - Field Sample No.

Footnotes:

[redacted] - CRL exceeds RBC value. RBC value cannot be achieved in laboratory.

Zinc - Data will not be included in data base.

* - Data collected from chemical transfer file (Phase I)
** - Data collected from AEC Pyramid system (Phase III)
CRL - Certified reporting limits
ID - Identification
N/A - Not applicable
N/F - Analysis requested, not yet received
QC - Quality control
TICs - Tentatively Identified Compound : number of TICs (total value)

Boolean Codes
LT - Less than the certified reporting limit / method detection level

Flagging Codes
9 - Non-demonstrated/validated method performed for USAEC.
B - Analyte found in the method blank or QC blank as well as the sample.
C - Analysis was confirmed.
I - Interfaces in sample make quantitation and/or identification to be susp
J - Value is estimated.
K - Reported results are affected by interfaces or high background.
Q - Sample interference obscured peak of interest.
T - Non-target compound analyzed for but not detected (non-GC/MS methods).
U - Analysis is unconfirmed.

Data Qualifiers
I - The low-spike recovery is high.
J - The low-spike recovery is low.
M - The high-spike recovery is high.
N - The high-spike recovery is low.

Table A-2. Data Summary Table: Surface Water - Background, Fort McClellan RI, Anniston Alabama

Site ID					BK-W01		BK-W02		BK-W03		BK-W04		T5-W02	
Field Sample Number					BK-W01		SAIC01		SAIC01		SAIC01		SAIC01	
Site Type					CREK		CREK		LAKE		CREK		CREK	
Collection Date					4/13/92		6/23/94		6/20/94		6/20/94		6/8/94	
Depth (ft)					0		0		0		0		0	
Associated Field QC Sample - Site ID														
Associated Field QC Sample - Field Sample No.														
Associated Field QC Sample - Site ID														
Associated Field QC Sample - Field Sample No.														
METALS/WATER/GFAA (µg/L)														
Laboratory ID Number														
Parameter	Units	CRL	RBC	ECOL										
Antimony	µg/L	10	15	160	~~LT~~	~~60**~~	LT	10**	LT	10**	LT	10**	LT	10**
Arsenic	µg/L	2.35	0.045	190	LT	2.35**	LT	2.35**	LT	2.35**	LT	2.35**	LT	2.35**
Lead	µg/L	4.47	15	1.32	~~LT~~	~~43.4**~~	LT	4.47**	LT	4.47**	LT	4.47**	LT	4.47**
Selenium	µg/L	2.53	180	5	LT	2.53** H	LT	2.53**	LT	2.53**	LT	2.53**	LT	2.53**
~~Thallium~~	~~µg/L~~	~~125~~	~~2.6~~	~~4~~									~~LT~~	~~125**~~
METALS/WATER/CVAA (µg/L)														
Laboratory ID Number														
Parameter	Units	CRL	RBC	ECOL										
Mercury	µg/L	0.1	3.7	0.012	LT	.1**	LT	.1**	LT	.1**	LT	.1**	LT	.1**
METALS/WATER/ICP (µg/L)														
Laboratory ID Number														
Parameter	Units	CRL	RBC	ECOL										
Aluminum	µg/L	112	37000	87	LT	112**	LT	112**	LT	112**		134**		721**
Barium	µg/L	2.82	2600	4		20.3**		21**		24.1**		18.5**		26.1**
Beryllium	µg/L	1.12	0.016	0.53	LT	1.12**	LT	1.12**	LT	1.12**		1.13**	LT	1.12**
Cadmium	µg/L	5	18	0.66	LT	6.78**	LT	5**	LT	5**	LT	5**	LT	5**
Calcium	µg/L	105		116000		292**		389**		27900**		485**		5000**
Chromium	µg/L	16.8	11		LT	16.8**	LT	16.8**	LT	16.8**	LT	16.8**	LT	16.8**
Cobalt	µg/L	25	2200	23	LT	25**	LT	25**	LT	25**	LT	25**	LT	25**
Copper	µg/L	18.8	1500	6.54			LT	18.8**	LT	18.8**	LT	18.8**	LT	18.8**
Iron	µg/L	77.5	11000	1000	LT	77.5**		152**		185**		212**		1130**
Magnesium	µg/L	135		82000		338**		377**		15600**		444**		1330**
Manganese	µg/L	9.67	180	120	LT	9.67**	LT	9.67**		130**		11.9**		161**
Nickel	µg/L	32.1	730	87.71	LT	32.1**	LT	32.1**	LT	32.1**	LT	32.1**	LT	32.1**
Potassium	µg/L	1240		53000		1930**		2190**	LT	1240**		1670**	LT	1240**
Silver	µg/L	10	180	0.012	LT	10**	LT	10**	LT	10**	LT	10**	LT	10**
Sodium	µg/L	279		680000		1060**		1130**		1170**		1090**		948** 7
Vanadium	µg/L	27.6	260	20	LT	27.6**	LT	27.6**	LT	27.6**	LT	27.6**	LT	27.6**
Zinc	µg/L	18	11000	58.91	LT	18**	LT	18**	LT	18**	LT	18**		27.3**

Table A-2. Data Summary Table: Surface Water - Background, Fort McClellan RI, Anniston Alabama

Site ID						LF1-W01			LF2-W01	
Field Sample Number						SAIC01			SAIC01	
Site Type						CREK			CREK	
Collection Date						6/8/94			6/19/94	
Depth (ft)						0			0	
Associated Field QC Sample - Site ID										
Associated Field QC Sample - Field Sample No.										
Associated Field QC Sample - Site ID										
Associated Field QC Sample - Field Sample No.										
METALS/WATER/GFAA (µg/L)										
Laboratory ID Number										
Parameter	Units	CRL	RBC	ECOL						
Antimony	µg/L	10	15	160	LT	10**			LT	10**
Arsenic	µg/L	2.35	0.045	190		**5.41****			LT	2.35**
Lead	µg/L	4.47	15	1.32		**8.02****			LT	4.47**
Selenium	µg/L	2.53	180	5	LT	2.53**			LT	2.53**
~~Thallium~~	~~µg/L~~	~~1~~	~~2.6~~	~~4~~	~~LT~~	~~125**~~				
METALS/WATER/CVAA (µg/L)										
Laboratory ID Number										
Parameter	Units	CRL	RBC	ECOL						
Mercury	µg/L	0.1	3.7	0.012	LT	.1**			LT	.1**
METALS/WATER/ICP (µg/L)										
Laboratory ID Number										
Parameter	Units	CRL	RBC	ECOL						
Aluminum	µg/L	112	37000	87		**5140****				**201****
Barium	µg/L	2.82	2600	4		**101****				**16.2****
Beryllium	µg/L	1.12	0.016	0.53	LT	1.12**			LT	1.12**
Cadmium	µg/L	5	18	0.66	LT	5**			LT	5**
Calcium	µg/L	105		116000		**9220****				**15300****
Chromium	µg/L	16.8	11		LT	16.8**			LT	16.8**
Cobalt	µg/L	25	2200	23	LT	25**			LT	25**
Copper	µg/L	18.8	1500	6.54	LT	18.8**			LT	18.8**
Iron	µg/L	77.5	11000	1000		**10300****				**329****
Magnesium	µg/L	135		82000		**3740****				**8650****
Manganese	µg/L	9.67	180	120		**162****				**23.4****
Nickel	µg/L	32.1	730	87.71	LT	32.1**			LT	32.1**
Potassium	µg/L	1240		53000	LT	1240**			LT	1240**
Silver	µg/L	10	180	0.012	LT	10**			LT	10**
Sodium	µg/L	279		680000		**1520**** 7	I			**902****
Vanadium	µg/L	27.6	260	20	LT	27.6**			LT	27.6**
Zinc	µg/L	18	11000	58.91		**41****			LT	18**

Footnotes:
- * - Data collected from chemical transfer file (Phase I)
- ** - Data collected from AEC Pyramid system (Phase III)
- CRL - Certified reporting limits
- ID - Identification
- N/A - Not applicable
- N/F - Analysis requested, not yet received
- QC - Quality control
- TICs - Tentatively Identified Compound : number of TICs (total value)
- [ ] - Data exceeds RBC or ecological screening criteria.
- ~~Thallium~~ - Data will be eliminated from data base.

Boolean Codes
- LT - Less than the certified reporting limit / method detection level

Flagging Codes
- C - Analysis was confirmed.
- I - Interfaces in sample make quantitation and/or identification to be susp
- J - Value is estimated.
- K - Reported results are affected by interfaces or high background.

Data Qualifiers
- I - The low-spike recovery is high.
- J - The low-spike recovery is low.
- M - The high-spike recovery is high.
- N - The high-spike recovery is low.

Table A-3. Data Summary Table: Sediment - Background, Fort McClellan RI, Anniston Alabama

Site ID						BK-D01		BK-D02		BK-D03		BK-D04		T5-D02	
Field Sample Number						BK-D01		SAIC01		SAIC01		SAIC01		SAIC01	
Site Type						CREK		CREK		LAKE		CREK		CREK	
Collection Date						4/13/92		6/19/94		6/19/94		6/19/94		6/6/94	
Depth (ft)						0		0		0		0		0	
Associated Field QC Sample - Site ID															
Associated Field QC Sample - Field Sample No.															
Associated Field QC Sample - Site ID															
Associated Field QC Sample - Field Sample No.															
METALS/SOIL/CVAA (µg/g)															
Laboratory ID Number															
Parameter	Units	CRL	Human RBC	ECOL											
Mercury	µg/g	0.05	7.8	0.13	LT	.05**	LT	.05**	LT	.05**	LT	.05**	LT	.05**	
METALS/SOIL/GFAA (µg/g)															
Laboratory ID Number															
Parameter	Units	CRL	RBC	ECOL											
Antimony	µg/g	1	31	2			LT	1**	LT	1**	LT	1**	LT	1**	
~~Arsenic~~	~~µg/g~~	~~2.5~~	~~0.43~~	~~7.24~~			~~LT~~	~~2.5**~~		~~9.45**~~	~~LT~~	~~2.5**~~		~~14.5**~~	
Lead	µg/g	0.467	400	30.2	LT	7.44**		5.83**		12.3**		3.94**		260**	
Selenium	µg/g	0.449	390	1.03	LT	.449**	LT	.449**	LT	.449**	LT	.449**	LT	.449**	
METALS/SOIL/ICP (µg/g)															
Laboratory ID Number															
Parameter	Units	CRL	RBC	ECOL											
Aluminum	µg/g	11.2	78000	27.95		11900**		7750**		6760**		5490**		6330**	
Barium	µg/g	3.29	5500	230		82.9**		92.1**		112**		35**		27.8**	
~~Beryllium~~	~~µg/g~~	~~0.427~~	~~0.15~~	~~20.72~~		~~1.26**~~		~~1.24**~~		~~.882**~~	~~LT~~	~~.427**~~	~~LT~~	~~.427**~~	
Cadmium	µg/g	1.2	39	0.676	LT	1.2**	LT	1.2**	LT	1.2**	LT	1.2**		2.37**	
Calcium	µg/g	25.3				88.8**		145**		1460**		116**		388**	
Chromium	µg/g	1.04	52.3			12.3**		7.9**		36.4**		7.68**		26.9**	
Cobalt	µg/g	2.5	47000			4.79**		4.13**		7.64**	LT	2.5**	LT	2.5**	
Copper	µg/g	2.84	3100	18.7		4.77**		6.95**		14**	LT	2.84**		58.6**	
Iron	µg/g	6.66	23000			23700**		42300**		31600**		10200**		20400**	
Magnesium	µg/g	10.1				543**		499**		1540**		291**		153**	
Manganese	µg/g	9.87	390	3516		172**		309**		203**		189**		163**	
Nickel	µg/g	2.74	1600	15.9		5.35**		8.52**		9.71**	LT	2.74**	LT	2.74**	
Potassium	µg/g	131				4810**		3910**		1280**		1460**	LT	131**	
Silver	µg/g	0.803	390	0.733	LT	.803**	LT	.803**	LT	.803**	LT	.803**	LT	.803**	
Sodium	µg/g	38.7			LT	38.7**	LT	38.7**	LT	38.7**	LT	38.7**	LT	38.7**	
~~Thallium~~	~~µg/g~~	~~34.3~~	~~5.5~~	~~0.03~~			~~LT~~	~~34.3**~~	~~LT~~	~~34.3**~~	~~LT~~	~~34.3**~~	~~LT~~	~~34.3** 7~~	~~JR~~
Vanadium	µg/g	1.14	550	4.19		13.8**		12.2**		22.2**		7.76**		26**	
Zinc	µg/g	2.34	23000	124		15.1**		20**		34.7**		7.92**		111**	

Table A-3. Data Summary Table: Sediment - Background, Fort McClellan RI, Anniston Alabama

Site ID						LF1-D01			LF2-D01	
Field Sample Number						SAIC01			SAIC01	
Site Type						CREK			CREK	
Collection Date						6/9/94			6/9/94	
Depth (ft)						0			0	
Associated Field QC Sample - Site ID										
Associated Field QC Sample - Field Sample No.										
Associated Field QC Sample - Site ID										
Associated Field QC Sample - Field Sample No.										
METALS/SOIL/CVAA (µg/g)										
Laboratory ID Number			Human							
Parameter	Units	CRL	RBC	ECOL						
Mercury	µg/g	0.05	7.8	0.13	LT	.05**		LT	.05**	
METALS/SOIL/GFAA (µg/g)										
Laboratory ID Number										
Parameter	Units	CRL	RBC	ECOL						
Antimony	µg/g	1	31	2	LT	1**		LT	1**	
~~Arsenic~~	~~µg/g~~	~~2.5~~	~~0.43~~	~~7.24~~		~~4.88**~~			~~14.9**~~	
Lead	µg/g	0.467	400	30.2		14.6**			10.2**	
Selenium	µg/g	0.449	390	1.03	LT	.449**			.722**	
METALS/SOIL/ICP (µg/g)										
Laboratory ID Number										
Parameter	Units	CRL	RBC	ECOL						
Aluminum	µg/g	11.2	78000	27.95		17400**			4790**	
Barium	µg/g	3.29	5500	230		124**			11.3**	
~~Beryllium~~	~~µg/g~~	~~0.427~~	~~0.15~~	~~20.72~~		~~.904**~~		~~LT~~	~~.427**~~	
Cadmium	µg/g	1.2	39	0.676	LT	1.2**		LT	1.2**	
Calcium	µg/g	25.3				1330**			567**	
Chromium	µg/g	1.04	52.3			21.4**			51**	
Cobalt	µg/g	2.5	47000			6.32**		LT	2.5**	
Copper	µg/g	2.84	3100	18.7		14.9**			7.56**	
Iron	µg/g	6.66	23000			24300**			45700**	
Magnesium	µg/g	10.1				2440**			530**	
Manganese	µg/g	9.87	390	3516		103**			140**	
Nickel	µg/g	2.74	1600	15.9		17.5**		LT	2.74**	
Potassium	µg/g	131				1510**			482**	
Silver	µg/g	0.803	390	0.733	LT	.803**		LT	.803**	
Sodium	µg/g	38.7			LT	38.7**		LT	38.7**	
~~Thallium~~	~~µg/g~~	~~34.3~~	~~5.5~~	~~0.03~~	~~LT~~	~~34.3** 7~~	~~JR~~	~~LT~~	~~34.3** 7~~	~~JR~~
Vanadium	µg/g	1.14	550	4.19		27.1**			40.1**	
Zinc	µg/g	2.34	23000	124		45.3**			11**	

Footnotes:
- * - Data collected from chemical transfer file (Phase I)
- ** - Data collected from AEC Pyramid system (Phase III)
- CRL - Certified reporting limits
- ID - Identification
- N/A - Not applicable
- N/F - Analysis requested, not yet received
- QC - Quality control
- TICs - Tentatively Identified Compound : number of TICs (total value)

Boolean Codes
- LT - Less than the certified reporting limit / method detection level

Data Qualifiers
- J - The low-spike recovery is low.
- R - Data is rejected.
- ~~Zinc~~ - Data will be eliminated from database.

Table A-4. Data Summary Table: Surface Soil - Background, Fort McClellan RI, Anniston Alabama

Site ID															
Field Sample Number					BK-S01			BK-S02			BK-S03			BK-S04	
Site Type					BK-S01			SAIC01			SAIC01			SAIC01	
Collection Date					BORE			BORE			BORE			BORE	
Depth (ft)					4/13/92			4/12/94			4/12/94			4/12/94	
Associated Field QC Sample - Site ID					1			1			1			0	
Associated Field QC Sample - Field Sample No.								BK-S02			BK-S02			BK-S04	
Associated Field QC Sample - Site ID								SAICTB02			SAICTB02			SAICTB03	
Associated Field QC Sample - Field Sample No.								BK-S02			BK-S02			BK-S02	
								SAICRB01			SAICRB01			SAICRB01	
METALS/SOIL/CVAA (µg/g)															
Laboratory ID Number															
Parameter	Units	CRL	RBC												
Mercury	µg/g	0.05	7.8	LT	.05**		LT	.05**			.322**		LT	.05**	
METALS/SOIL/GFAA (µg/g)															
Laboratory ID Number															
Parameter	Units	CRL	RBC												
Antimony	µg/g	1	31				LT	1**		LT	1**		LT	1**	
~~Arsenic~~	~~µg/g~~	~~2.5~~	~~0.43~~		~~9.2**~~		~~LT~~	~~2.5**~~			~~4.93**~~			~~7.97**~~	
Lead	µg/g	0.467	400		28.8**			15.1**			36**			35**	
Selenium	µg/g	0.449	390	LT	.449**		LT	.449**		LT	.449**		LT	.449**	
METALS/SOIL/ICP (µg/g)															
Laboratory ID Number															
Parameter	Units	CRL	RBC												
Aluminum	µg/g	11.2	78000		26400**			22900**			24100**			39900**	
Barium	µg/g	3.29	5500		283**			165**			115**			126**	
~~Beryllium~~	~~µg/g~~	~~0.427~~	~~0.15~~		~~1.97**~~			~~.939**~~			~~1.42**~~			~~1.38**~~	
Cadmium	µg/g	1.2	39	LT	1.2**		LT	1.2**		LT	1.2**		LT	1.2**	
Calcium	µg/g	25.3			689**			633**			5840**			970**	
Chromium	µg/g	1.04	78000		17.5**			14.4**			23.3**			27.3**	
Cobalt	µg/g	2.5	4700		10.7**			7.96**			14.6**			11**	
Copper	µg/g	2.84	3100		10.1**			8.82**			14.8**			23.5**	
Iron	µg/g	6.66	23000		31900**			20800**			33300**			41700**	
Magnesium	µg/g	10.1			1380**			1070**			3860**			3100**	
Manganese	µg/g	9.87	390		811**			393**			985**			797**	
Nickel	µg/g	2.74	1600		10.2**			8.02**			14.6**			21.8**	
Potassium	µg/g	131			6010**			2740**			1830**			4780**	
Silver	µg/g	0.803	390	LT	.803**		LT	.803**		LT	.803**		LT	.803**	
Sodium	µg/g	38.7		LT	38.7**		LT	38.7**		LT	38.7**		LT	38.7**	
~~Thallium~~	~~µg/g~~	~~34.3~~	~~5.5~~				~~LT~~	~~34.3**~~		~~LT~~	~~34.3**~~		~~LT~~	~~34.3**~~	
Vanadium	µg/g	1.14	550		24.1**			22.8** 7	JR		45.5** 7	JR		56.5** 7	JR
Zinc	µg/g	2.34	23000		38.8**			34.1**			209**			70.5**	

Footnotes:

* - Data collected from chemical transfer file (Phase I)
** - Data collected from AEC Pyramid system (Phase III)
CRL - Certified reporting limits
ID - Identification
N/A - Not applicable
N/F - Analysis requested, not yet received
QC - Quality control
TICs - Tentatively Identified Compound : number of TICs (total value)

Boolean Codes
LT - Less than the certified reporting limit / method detection level
Flagging Codes
C - Analysis was confirmed.
Data Qualifiers
J - The low-spike recovery is low.
R - Data is rejected.
~~Zinc~~ -Data will be eliminated from data base.

Table A-5. Data Summary Table: Groundwater - Background, Pelham Range, Fort McClellan, Anniston Alabama

Site ID				CW-G01		CW-G01		CW-G02		CW-G02		FPR001
Field Sample Number				SAIC01		SAIC03		SAIC01		SAIC02		001
Site Type				WELL		WELL		WELL		WELL		TAPW
Collection Date				7/18/94		2/3/95		7/18/94		2/3/95		1/12/94
Depth (ft)				0		0		0		0		0
Associated Field QC Sample - Site ID												
Associated Field QC Sample - Field Sample No.												
Associated Field QC Sample - Site ID												
Associated Field QC Sample - Field Sample No.												
METALS/WATER/GFAA (µg/L)												
Laboratory ID Number												
Parameter	Units	CRL	RBC									
Antimony	µg/L	10	15	LT	10**	LT	5**	LT	10**	LT	5**	LT 10**
Arsenic	µg/L	2.35	0.045	LT	2.35**	LT	2.35**	LT	2.35**	LT	2.35**	LT 2.35**
Lead	µg/L	4.47	15	LT	4.47**	LT	4.47**	LT	4.47**	LT	4.47**	LT 4.47**
Selenium	µg/L	2.53	180	LT	2.53**	LT	2.53**	LT	2.53**	LT	2.53**	LT 2.53**
METALS/WATER/CVAA (µg/L)												
Laboratory ID Number												
Parameter	Units	CRL	RBC									
Mercury	µg/L	0.1	11	LT	.1**	LT	.1**	LT	.1**	LT	.1**	LT .1**
METALS/WATER/ICP (µg/L)												
Laboratory ID Number												
Parameter	Units	CRL	RBC									
Aluminum	µg/L	112	37000	LT	112**	LT	112**	LT	112**	LT	112**	LT 112**
Barium	µg/L	2.82	2600		**67.6****		**69.4****		**23.5****		**22****	**653****
Beryllium	µg/L	1.12	0.016	LT	1.12**		**1.6****	LT	1.12**		**2.12****	**1.21****
Cadmium	µg/L	5	18	LT	5**	LT	5**	LT	5**	LT	5**	LT 6.78**
Calcium	µg/L	105			**40300****		**41600****		**55400****		**55100****	**29800****
Chromium	µg/L	16.8	180	LT	16.8**	LT	16.8**	LT	16.8**	LT	16.8**	LT 16.8**
Cobalt	µg/L	25	2200	LT	25**	LT	25**	LT	25**	LT	25**	LT 25**
Copper	µg/L	18.8	1500	LT	18.8**	LT	18.8**	LT	18.8**	LT	18.8**	**207****
Iron	µg/L	77.5	11000	LT	77.5**	LT	77.5**	LT	77.5**	LT	77.5**	**22900****
Magnesium	µg/L	135			**14900****		**15200****		**6200****		**6030****	**9270****
Manganese	µg/L	9.67	840	LT	9.67**	LT	9.67**	LT	9.67**	LT	9.67**	**447****
Nickel	µg/L	32.1	730	LT	32.1**	LT	32.1**	LT	32.1**	LT	32.1**	LT 32.1**
Potassium	µg/L	1240			**2480****		**2350****	LT	1240**	LT	1240**	**1420****
Silver	µg/L	10	180	LT	10**	LT	10**	LT	10**	LT	10**	LT 10**
Sodium	µg/L	279			**3320****		**3410****		**3120****		**2920****	**7150****
Vanadium	µg/L	27.6	260	LT	27.6**	LT	27.6**	LT	27.6**	LT	27.6**	LT 27.6**
Zinc	µg/L	18	11000	LT	18**	LT	18**		**38.3****	LT	18**	**1520****

Table A-5. Data Summary Table: Groundwater - Background, Pelham Range, Fort McClellan, Anniston Alabama

Site ID																
Field Sample Number					FPR001		OWH-G02		OWH-G02		RL-G01		RL-G01			
Site Type					FPR001		SAIC01		SAIC02		SAIC01		SAIC02			
Collection Date					TAPW		WELL		WELL		WELL		WELL			
Depth (ft)					2/27/94		2/8/95		5/1/95		2/6/95		4/25/95			
Associated Field QC Sample - Site ID					0		81.81		41.83		40.81		29.25			
Associated Field QC Sample - Field Sample No.																
Associated Field QC Sample - Site ID																
Associated Field QC Sample - Field Sample No.																
METALS/WATER/GFAA (µg/L)																
Laboratory ID Number																
Parameter	Units	CRL	RBC													
Antimony	µg/L	5	15	~~LT~~	~~60**~~		LT	5**		LT	5**		LT	5**		
Arsenic	µg/L	2.35	0.045	LT	2.35**		LT	2.35**			4.16**		LT	2.35**		LT 2.35**
Lead	µg/L	4.47	15	~~LT~~	~~43.4**~~		LT	4.47**			12.4**			9.96**		LT 4.47**
Selenium	µg/L	2.53	180	LT	2.53**		LT	2.53**		LT	2.53**		LT	2.53**		LT 2.53**
METALS/WATER/CVAA (µg/L)																
Laboratory ID Number																
Parameter	Units	CRL	RBC													
Mercury	µg/L	0.1	11	LT	.1**		LT	.1**		LT	.1**		LT	.1**		LT .1**
METALS/WATER/ICP (µg/L)																
Laboratory ID Number																
Parameter	Units	CRL	RBC													
Aluminum	µg/L	112	37000	LT	112**			418**			9600**			2940**		
Barium	µg/L	2.82	2600		351**			14.6**			54.4**			65.1**		
Beryllium	µg/L	1.12	0.016	LT	1.12**		LT	1.12**			1.17**		LT	1.12**		
Cadmium	µg/L	5	18	LT	6.78**		LT	5**		LT	2**		LT	5**		LT 2**
Calcium	µg/L	105			26000**			5850**			17700**			9840**		
Chromium	µg/L	16.8	180	LT	16.8**		LT	16.8**		LT	16.8**		LT	16.8**		
Cobalt	µg/L	25	2200	LT	25**		LT	25**	I	LT	25**		LT	25**	I	
Copper	µg/L	18.8	1500	LT	18.8**		LT	18.8**		LT	18.8**		LT	18.8**		
Iron	µg/L	77.5	11000		5850**			814**			7620**			10400**		
Magnesium	µg/L	135			8740**			2690**			6230**			481**		
Manganese	µg/L	9.67	840		461**			225**			464**			320**		
Nickel	µg/L	32.1	730	LT	32.1**		LT	32.1**		LT	32.1**		LT	32.1**		
Potassium	µg/L	1240		LT	1240**			5930**			4870**			8140**		
Silver	µg/L	10	180	LT	10**		LT	10**		LT	10**		LT	10**		
Sodium	µg/L	279			7170**			29600**			43700**			3980**		
Vanadium	µg/L	27.6	260	LT	27.6**		LT	27.6**		LT	27.6**		LT	27.6**		
Zinc	µg/L	18	11000		431**			27.7**			56.3**	IO		36.6**		

Table A-5. Data Summary Table: Groundwater - Background, Pelham Range, Fort McClellan, Anniston Alabama

Site ID	RL-G01
Field Sample Number	SAIC03
Site Type	WELL
Collection Date	4/25/95
Depth (ft)	29.25
Associated Field QC Sample - Site ID	
Associated Field QC Sample - Field Sample No.	
Associated Field QC Sample - Site ID	
Associated Field QC Sample - Field Sample No.	

METALS/WATER/GFAA (µg/L)

Laboratory ID Number					
Parameter	Units	CRL	RBC		
Antimony	µg/L	5	15		
Arsenic	µg/L	2.35	0.045	LT	2.35**
Lead	µg/L	4.47	15	LT	4.47**
Selenium	µg/L	2.53	180	LT	2.53**

METALS/WATER/CVAA (µg/L)

Laboratory ID Number					
Parameter	Units	CRL	RBC		
Mercury	µg/L	0.1	11	LT	.1**

METALS/WATER/ICP (µg/L)

Laboratory ID Number					
Parameter	Units	CRL	RBC		
Aluminum	µg/L	112	37000		
Barium	µg/L	2.82	2600		
Beryllium	µg/L	1.12	0.016		
Cadmium	µg/L	2	18	LT	2**
Calcium	µg/L	105			
Chromium	µg/L	16.8	180		
Cobalt	µg/L	25	2200		
Copper	µg/L	18.8	1500		
Iron	µg/L	77.5	11000		
Magnesium	µg/L	135			
Manganese	µg/L	9.67	840		
Nickel	µg/L	32.1	730		
Potassium	µg/L	1240			
Silver	µg/L	10	180		
Sodium	µg/L	279			
Vanadium	µg/L	27.6	260		
Zinc	µg/L	18	11000		

Footnotes:
- * - Data collected from chemical transfer file (Phase I)
- ** - Data collected from AEC Pyramid system (Phase III)
- CRL - Certified reporting limits
- ID - Identification
- N/A - Not applicable
- N/F - Analysis requested, not yet received
- QC - Quality control
- TICs - Tentatively Identified Compound : number of TICs (total value)

Boolean Codes
- LT - Less than the certified reporting limit / method detection level

Flagging Codes
- 9 - Non-demonstrated/validated method performed for USAEC.
- B - Analyte found in the method blank or QC blank as well as the sample.
- C - Analysis was confirmed.
- K - Reported results are affected by interfaces or high background.
- U - Analysis is unconfirmed.

Data Qualifiers
- I - The low-spike recovery is high.
- J - The low-spike recovery is low.
- M - The high-spike recovery is high.
- N - The high-spike recovery is low.
- O - Low spike recoveries excessively different.
- P - High spike recoveries excessively different.

Table A-6. Data Summary Table: Groundwater - Background, Anniston Army Depot - Southeast Industrial Area

Site ID				LDLF-4	MCCULLERS	WILLIAMS
Field Sample Number				SAIC02	SAIC02	SAIC02
Site Type				WELL	WELL	WELL
Collection Date				4/1/96	3/31/96	3/31/96
Depth (ft)				0	0	0
Associated Field QC Sample - Site ID						
Associated Field QC Sample - Field Sample No.						
Associated Field QC Sample - Site ID						
Associated Field QC Sample - Field Sample No.						
METALS/WATER/GFAA (µg/L)						
Laboratory ID Number				ANWE*114	ANWE*112	ANWE*111
Parameter	Units	CRL	RBC			
Arsenic	µg/L	2.54	0.045	LT 2.54*	LT 2.54*	LT 2.54*
Lead	µg/L	1.26	15	LT 1.26*	**26.9***	**2.06***
Selenium	µg/L	3.02	180	LT 3.02*	LT 3.02*	LT 3.02*
METALS/WATER/CVAA (µg/L)						
Laboratory ID Number				ANWE*114	ANWE*112	ANWE*111
Parameter	Units	CRL				
Mercury	µg/L	0.243	11	LT 0.243*	LT 0.243*	LT 0.243*
METALS/WATER/ICP (µg/L)						
Laboratory ID Number				ANWE*114	ANWE*112	ANWE*111
Parameter	Units	CRL				
Aluminum	µg/L	141	37000	**1220***	LT 141*	**1340***
Antimony	µg/L	3.03	15	LT 3.03*	LT 3.03*	LT 3.03*
Barium	µg/L	5	2600	**21.9***	**10.5***	**18.4***
Beryllium	µg/L	5	0.016	LT 5*	LT 5*	LT 5*
Cadmium	µg/L	4.01	18	LT 4.01*	LT 4.01*	LT 4.01*
Calcium	µg/L	500		LT 500*	**25400***	**7650***
Chromium	µg/L	6.02	180	LT 6.02*	LT 6.02*	LT 6.02*
Cobalt	µg/L	25	2200	LT 25*	LT 25*	LT 25*
Copper	µg/L	8.09	1500	LT 8.09*	**235***	**21.3***
Iron	µg/L	38.8	11000	**1130***	**2510***	**14700***
Magnesium	µg/L	500		**522***	**14500***	**3510***
Manganese	µg/L	2.75	840	**18.2***	**13.3***	**291***
Nickel	µg/L	34.3	730	LT 34.3*	LT 34.3*	LT 34.3*
Potassium	µg/L	375		**810***	**1020***	**1440***
Silver	µg/L	4.6	180	LT 4.6*	LT 4.6*	LT 4.6*
Sodium	µg/L	500		**6130***	**3540***	**555***
~~Thallium~~	~~µg/L~~	~~81.4~~	~~2.6~~	~~LT 81.4*~~	~~LT 81.4*~~	~~LT 81.4*~~
Vanadium	µg/L	11	260	LT 11*	LT 11*	LT 11*
Zinc	µg/L	21.1	11000	LT 21.1*	**908***	**42***

Footnotes:
* - Data collected from chemical transfer file (IRDMIS Phase I)
CRL - Certified reporting limits
ID - Identification
N/A - Not applicable (analysis not requested)
QC - Quality control
LT - Less than the certified reporting limit / method detection level

Table A-7. Data Summary Table: Surface Water - Background, Anniston Army Depot - Southeast Industrial Area

Site ID						SW-BK-001		SW-BK-002
Field Sample Number						SAIC01		SAIC01
Site Type						CREK		CREK
Collection Date						2/1/95		2/1/95
Depth (ft)						0		0
Associated Field QC Sample - Site ID								
Associated Field QC Sample - Field Sample No.								
Associated Field QC Sample - Site ID								
Associated Field QC Sample - Field Sample No.								
METALS/WATER/GFAA (µg/L)								
Laboratory ID Number			Human	Ecological		SANWA*73		SANWA*74
Parameter	Units	CRL	RBC					
Arsenic	µg/L	2.54	0.045	190	LT	2.54**	LT	2.54**
Lead	µg/L	1.26	15	1.32	LT	1.26**	LT	1.26**
Selenium	µg/L	3.02	180	5	LT	3.02**	LT	3.02**
METALS/WATER/CVAA (µg/L)								
Laboratory ID Number			Human	Ecological		SANWA*73		SANWA*74
Parameter	Units	CRL	RBC					
Mercury	µg/L	0.243	3.7	0.012	LT	.243**	LT	.243**
METALS/WATER/ICP (µg/L)								
Laboratory ID Number			Human	Ecological		SANWA*73		SANWA*74
Parameter	Units	CRL	RBC					
Aluminum	µg/L	141	37000	87	LT	141**		**299****
Antimony	µg/L	3.03	15	160	LT	3.03**	LT	3.03**
Barium	µg/L	5	2600	4		**19.3****		**14.4****
Beryllium	µg/L	5	0.016	0.53	LT	5**	LT	5**
Cadmium	µg/L	4.01	18	0.66	LT	4.01**	LT	4.01**
Calcium	µg/L	500		116000		**14000****		**11500****
Chromium	µg/L	6.02	11		LT	6.02**	LT	6.02**
Cobalt	µg/L	25	2200	23	LT	25**	LT	25**
Copper	µg/L	8.09	1500	6.54	LT	8.09**	LT	8.09**
Iron	µg/L	38.8	11000	1000		**124****		**343****
Magnesium	µg/L	500		82000		**5230****		**6370****
Manganese	µg/L	2.75	180	120		**60.9****		**21.9****
Nickel	µg/L	34.3	730	87.71	LT	34.3**	LT	34.3**
Potassium	µg/L	375		53000		**1240****		**645****
Silver	µg/L	4.6	180	0.012	LT	4.6**	LT	4.6**
Sodium	µg/L	500		680000		**5210****		**2810****
~~Thallium~~	~~µg/L~~	~~81.4~~	~~2.6~~	~~4~~	~~LT~~	~~81.4**~~	~~LT~~	~~81.4**~~
Vanadium	µg/L	11	260	20	LT	11**	LT	11**
Zinc	µg/L	21.1	11000	58.91	LT	21.1**	LT	21.1**
METALS/WATER/TECHNICON (µg/L)								
Laboratory ID Number			Human	Ecological		SANWA*73		SANWA*74
Parameter	Units	CRL	RBC					
Hexavalent Chromium	µg/L	2.5	180	11	LT	2.5**	LT	2.5**

Footnotes:
** - Data collected from AEC Pyramid system (IRDMIS Phase III)
CRL - Certified reporting limits
ID - Identification
QC - Quality control
Boolean Codes
LT - Less than the certified reporting limit / method detection level

-CRL exceeds RBC or ecological screening criteria.
~~Thallium~~ -Data will not be included in Data set.

Table A-8. Data Summary Table: Sediment - Background, Anniston Army Depot - Southeast Industrial Area

Site ID					SD-BK-001			SD-BK-002	
Field Sample Number					SAIC01			SAIC01	
Site Type					CREK			CREK	
Collection Date					2/1/95			2/1/95	
Depth (ft)					1			1	
Associated Field QC Sample - Site ID									
Associated Field QC Sample - Field Sample No.									
Associated Field QC Sample - Site ID									
Associated Field QC Sample - Field Sample No.									
METALS/SOIL/GFAA (µg/g)									
Laboratory ID Number									
Parameter	Units	CRL	Human RBC	Ecological		SANSA'90			SANSA'91
Arsenic	µg/g	0.25	0.43	7.24		11.8**			2.04**
Lead	µg/g	0.177	400	30.2		23**	J		10.4** J
Mercury	µg/g	0.05	7.8	0.13	LT	.05**		LT	.05**
Selenium	µg/g	0.25	390	1.03	LT	.25**		LT	.25**
METALS/SOIL/ICP (µg/g)									
Laboratory ID Number									
Parameter	Units	CRL	Human RBC	Ecological		SANSA'90			SANSA'91
Aluminum	µg/g	2.35	78000	27.95		3010**			2470**
Antimony	µg/g	7.14	31	2	LT	7.14**		LT	7.14**
Barium	µg/g	5.18	5500	230		39.9**			43.6**
~~Beryllium~~	~~µg/g~~	~~0.5~~	~~0.15~~	~~20.72~~	~~LT~~	~~.5**~~		~~LT~~	~~.5**~~
Cadmium	µg/g	0.7	39	0.676	LT	.7**		LT	.7**
Calcium	µg/g	100				1650**			237**
Chromium	µg/g	4.05	52.3			28.5**			63.4**
Cobalt	µg/g	1.42	4700			7.57**			6.61**
Copper	µg/g	0.965	3100	18.7		5.58**			2.72**
Iron	µg/g	3.68	23000			25900**			33700**
Magnesium	µg/g	100				657**			145**
Manganese	µg/g	2.05	390	3516		882**			616**
Nickel	µg/g	1.71	1600	15.9		6.42**			11.1**
Potassium	µg/g	100				167**		LT	100**
Silver	µg/g	0.589	390	0.733	LT	.589**		LT	.589**
Sodium	µg/g	100				419**			355**
Thallium	µg/g	6.62	5.5	0.03	LT	6.62**	J	LT	6.62** J
Vanadium	µg/g	3.39	550	4.19		29.4**			43.4**
Zinc	µg/g	8.03	23000	124		28.9**			48.8**
METALS/SOIL/TECHNICON (µg/g)									
Laboratory ID Number									
Parameter	Units	CRL	Human RBC	Ecological		SANSA'90			SANSA'91
Hexavalent Chromium	µg/g	0.514	390	52.3	LT	.514**		LT	.514**

Footnotes:

** - Data collected from AEC Pyramid system (IRDMIS Phase III)
CRL - Certified reporting limits
ID - Identification
QC - Quality control
LT - Less than the certified reporting limit / method detection level
J - The low-spike recovery is low.

[ ] - CRL exceeds RBC or ecological screening criteria.
~~Beryllium~~ - Data will be deleted from data set.

Table A-9 . Data Summary Table: Surface Soil - Background, Anniston Army Depot - Southeast Industrial Area

Site ID					SB-BK-101				SB-BK-102				SB-BK-201				SB-BK-202				SB-BK-301	
Field Sample Number					SAIC01				SAIC01				SAIC01				SAIC01				SAIC01	
Site Type					BORE				BORE				BORE				BORE				BORE	
Collection Date					5/10/95				5/10/95				5/11/95				5/11/95				5/17/95	
Depth (ft)					0				0				0				0				0	
Associated Field QC Sample - Site ID																						
Associated Field QC Sample - Field Sample No.																						
Associated Field QC Sample - Site ID																						
Associated Field QC Sample - Field Sample No.																						
METALS/SOIL/GFAA (µg/g)																						
Laboratory ID Number					ANSA*525				ANSA*521				ANSA*534				ANSA*531				ANSA*535	
Parameter	Units	CRL	RBC																			
Arsenic	µg/g	0.25	0.43		18**				4.12**				4.03**				3.38**				2.39**	
Lead	µg/g	0.177	400	LT	0.177			LT	0.177			LT	0.177			LT	0.177			LT	0.177	
Mercury	µg/g	0.05	7.8	LT	.05**			LT	.05**			LT	.05**			LT	.05**			LT	.05**	
Selenium	µg/g	0.25	390	LT	.25**			LT	.25**			LT	.25**			LT	.25**			LT	.25**	
METALS/SOIL/ICP (µg/g)																						
Laboratory ID Number					ANSA*525				ANSA*521				ANSA*534				ANSA*531				ANSA*535	
Parameter	Units	CRL	RBC																			
Aluminum	µg/g	2.35	78000		15700**				13500**				12000**				9240**				10100**	
Antimony	µg/g	7.14	31	LT	7.14**			LT	7.14**			LT	7.14**			LT	7.14**			LT	7.14**	
Barium	µg/g	5.18	5500		31.6**				36.6**				39.8**				33.5**				109**	
~~Beryllium~~	~~µg/g~~	~~0.5~~	~~0.15~~	~~LT~~	~~.5**~~			~~LT~~	~~.5**~~			~~LT~~	~~.5**~~			~~LT~~	~~.5**~~				~~.632**~~	
Cadmium	µg/g	0.7	39	LT	.7**			LT	.7**			LT	.7**			LT	.7**			LT	.7**	
Calcium	µg/g	100			275**				315**			LT	100**				161**				821**	
Chromium	µg/g	4.05	78000		50.3**				50.4**				17.9**				12.2**				9.81**	G
Cobalt	µg/g	1.42	4700	LT	1.42**				2.59**				10.8**				7.84**				8.03**	
Copper	µg/g	0.965	3100		9.91**				8.02**				7.81**				6.81**				7.14**	
Iron	µg/g	3.68	23000		41700**				45200**				16600**				13700**				9440**	
Magnesium	µg/g	100			317**				279**				310**				265**				391**	
Manganese	µg/g	2.05	390		290**				486**				664**				459**				1850**	
Nickel	µg/g	1.71	1600		8.18**				7.5**				6.88**				5.46**				6.02**	
Potassium	µg/g	100			282**				239**				211**				193**				286**	
Silver	µg/g	0.589	390	LT	.589**				.891**			LT	.589**			LT	.589**			LT	.589**	
Sodium	µg/g	100			306**				363**				384**				361**				347**	
Thallium	µg/g	6.62	5.5	LT	6.62**			LT	6.62**			LT	6.62**			LT	6.62**			LT	6.62**	
Vanadium	µg/g	3.39	550		90.7**				96.7**				33.4**				27.1**				21.2**	
Zinc	µg/g	8.03	23000		17.3**				18.1**				19.9**				18.2**				19.2**	
METALS/SOIL/TECHNICON (µg/g)																						
Laboratory ID Number					N/A				N/A				ANSA*534				ANSA*531				ANSA*535	
Parameter	Units	CRL	RBC																			
Hexavalent Chromium	µg/g	0.514	180		N/A				N/A			LT	.514**	IOMP		LT	.514**	IOMP		LT	.514**	LM

Table A-9 . Data Summary Table: Surface Soil - Background, Anniston Army Depot - Southeast Industrial Area

Site ID					SB-BK-302			SS-BK-103			SS-BK-103			SS-BK-203			SS-BK-203	
Field Sample Number					SAIC01			SAIC01			SAIC02			SAIC01			SAIC02	
Site Type					BORE			SURF			SURF			SURF			SURF	
Collection Date					5/17/95			5/10/95			1/30/96			5/11/95			1/27/96	
Depth (ft)					0			0			0			0			0	
Associated Field QC Sample - Site ID																		
Associated Field QC Sample - Field Sample No.																		
Associated Field QC Sample - Site ID																		
Associated Field QC Sample - Field Sample No.																		
METALS/SOIL/GFAA (µg/g)																		
Laboratory ID Number					ANSA*538			ANSA*524			SANSB*87			ANSA*528			SANSB*45	
Parameter	Units	CRL	RBC															
Arsenic	µg/g	0.25	0.43		2.11**			15**			6.56**			3.32**			3.6*	
Lead	µg/g	0.177	400		17**	M	LT	0.177		LT	0.177			22**	M	LT	0.177	
Mercury	µg/g	0.05	7.8	LT	.05**			.0822**		LT	.05**		LT	.05**			.066**	
Selenium	µg/g	0.25	390	LT	.25**		LT	.25**		LT	.25**		LT	.25**		LT	.25**	
METALS/SOIL/ICP (µg/g)																		
Laboratory ID Number					ANSA*538			ANSA*524			SANSB*87			ANSA*528			SANSB*45	
Parameter	Units	CRL	RBC															
Aluminum	µg/g	2.35	78000		10400**			13700**			7900**			7080**			8030**	
Antimony	µg/g	7.14	31	LT	7.14**		LT	7.14**		LT	7.14**		LT	7.14**		LT	7.14**	
Barium	µg/g	5.18	5500		127**			24.3**			62.9**			29.8**			31.2**	
~~Beryllium~~	~~µg/g~~	~~0.5~~	~~0.15~~		~~.664**~~		~~LT~~	~~.5**~~		~~LT~~	~~.5**~~		~~LT~~	~~.5**~~		~~LT~~	~~.5**~~	
Cadmium	µg/g	0.7	39	LT	.7**		LT	.7**		LT	.7**		LT	.7**		LT	.7**	
Calcium	µg/g	100			998**			215**			704**		LT	100**			1080**	
Chromium	µg/g	4.05	78000		10.1** G			48.6**			18.7**			14.1**			30.4**	
Cobalt	µg/g	1.42	4700		7.6**		LT	1.42**			14.1**			6.38**			2.82**	
Copper	µg/g	0.965	3100		5.16**			9.47**			4.36**			4.92**			7.21**	
Iron	µg/g	3.68	23000		9860**			39600**			12500**			10300**			20100**	
Magnesium	µg/g	100			440**			246**			295**			189**			362**	
Manganese	µg/g	2.05	390		1610**			273**			1670**			672**			364**	
Nickel	µg/g	1.71	1600		5.54**			6.65**			4.46**			4.63**			6.29**	
Potassium	µg/g	100			229**			223**			219**			177**			239**	
Silver	µg/g	0.589	390	LT	.589**		LT	.589**		LT	.589**		LT	.589**		LT	.589**	
Sodium	µg/g	100			402**			361**			360**			388**			472**	
Thallium	µg/g	6.62	5.5	LT	6.62**		LT	6.62**		LT	6.62**		LT	6.62**		LT	6.62**	
Vanadium	µg/g	3.39	550		21.1**			87.2**			27**			20.8**			46.8**	
Zinc	µg/g	8.03	23000		14**			17.9**			11.2**		LT	8.03**			48.6**	
METALS/SOIL/TECHNICON (µg/g)																		
Laboratory ID Number					ANSA*538			N/A			N/A			ANSA*528			N/A	
Parameter	Units	CRL	RBC															
Hexavalent Chromium	µg/g	0.514	180	LT	.514**	LM		N/A			N/A		LT	.514**	IOMP		N/A	

Table A-9 . Data Summary Table: Surface Soil - Background, Anniston Army Depot - Southeast Industrial Area

Site ID					SS-BK-203				SS-BK-303			SS-BK-303
Field Sample Number					SAIC03				SAIC01			SAIC02
Site Type					SURF				SURF			SURF
Collection Date					1/27/96				5/17/95			1/28/96
Depth (ft)					0				0			0
Associated Field QC Sample - Site ID												
Associated Field QC Sample - Field Sample No.												
Associated Field QC Sample - Site ID												
Associated Field QC Sample - Field Sample No.												
METALS/SOIL/GFAA (µg/g)												
Laboratory ID Number					ANSB*203				ANSA*541			SANSB*64
Parameter	Units	CRL	RBC									
Arsenic	µg/g	0.25	0.43		2.46**	D	I		2.42**			3.76**
Lead	µg/g	0.177	400	LT	0.177			LT	0.177		LT	0.177
Mercury	µg/g	0.05	7.8		.059**	D		LT	.05**		LT	.05**
Selenium	µg/g	0.25	390	LT	0.25*	D		LT	.25**		LT	.25**
METALS/SOIL/ICP (µg/g)												
Laboratory ID Number					ANSB*203				ANSA*541			SANSB*64
Parameter	Units	CRL	RBC									
Aluminum	µg/g	2.35	78000		6630**	D			7960**			7720**
Antimony	µg/g	7.14	31	LT	7.14**	D		LT	7.14**		LT	7.14**
Barium	µg/g	5.18	5500		32.2**	D			96.5**			42**
~~Beryllium~~	~~µg/g~~	~~0.5~~	~~0.15~~	~~LT~~	~~.5**~~	~~D~~		~~LT~~	~~.5**~~		~~LT~~	~~.5**~~
Cadmium	µg/g	0.7	39	LT	.7**	D		LT	.7**		LT	.7**
Calcium	µg/g	100			1060**	D			809**		LT	100**
Chromium	µg/g	4.05	78000		32**	D			7.75**			22.2**
Cobalt	µg/g	1.42	4700		3.54**	D			6.67**			8.24**
Copper	µg/g	0.965	3100		7.6**	D			5.6**			9.21**
Iron	µg/g	3.68	23000		21600**	D			7710**			26000**
Magnesium	µg/g	100			330**	D			296**			225**
Manganese	µg/g	2.05	390		385**	D			1140**			699**
Nickel	µg/g	1.71	1600		4.79**	D			3.74**			9.63**
Potassium	µg/g	100			178**	D			160**			305**
Silver	µg/g	0.589	390		1.82**	D		LT	.589**		LT	.589**
Sodium	µg/g	100			451**	D			297**			361**
Thallium	µg/g	6.62	5.5	LT	6.62**	D		LT	6.62**		LT	6.62**
Vanadium	µg/g	3.39	550		47.8**	D			16.8**			38.9**
Zinc	µg/g	8.03	23000		46.3**	D			15.1**			22.8**
METALS/SOIL/TECHNICON (µg/g)												
Laboratory ID Number					N/A				ANSA*541			N/A
Parameter	Units	CRL	RBC									
Hexavalent Chromium	µg/g	0.514	180		N/A			LT	.514**	LM		N/A

Footnotes:

** - Data collected from AEC Pyramid system (IRDMIS Phase III)
CRL - Certified reporting limits
ID - Identification
N/A - Not applicable (analysis not requested)
QC - Quality control

Boolean Codes
LT - Less than the certified reporting limit / method detection level

Flagging Codes
D - Duplicate analysis.
G - Analyte found in rinse blank as well as in sample.

Data Qualifiers
I - The low-spike recovery is high.
L - Missed holding time for samole analysis.
M - The high-spike recovery is high.

-CRL exceeds RBC or ecological screening criteria.
~~Beryllium~~ -Data will be deleted from data set.

Table A-10. Data Summary Table: Subsurface Soil - Background, Anniston Army Depot - Southeast Industrial Area

Site ID				SB-BK-101		SB-BK-101		SB-BK-102		SB-BK-201		SB-BK-201	
Field Sample Number				SAIC02		SAIC03		SAIC02		SAIC02		SAIC03	
Site Type				BORE		BORE		BORE		BORE		BORE	
Collection Date				5/10/95		5/10/95		5/10/95		5/11/95		5/11/95	
Depth (ft)				5		10		5		5		10	
Associated Field QC Sample - Site ID													
Associated Field QC Sample - Field Sample No.													
Associated Field QC Sample - Site ID													
Associated Field QC Sample - Field Sample No.													
METALS/SOIL/GFAA (µg/g)													
Laboratory ID Number				ANSA*526		ANSA*527		ANSA*522		ANSA*533		ANSA*532	
Parameter	Units	CRL	RBC										
Arsenic	µg/g	0.25	0.43	7.76**		4.7**		3.07**		1.68**		1.48**	
Lead	µg/g	0.177	400					8.6**	M	9.8**	M	11**	M
Mercury	µg/g	0.05	7.8	LT .05**		LT .05**		.0588**		LT .05**		LT .05**	
Selenium	µg/g	0.25	390	LT .25**		LT .25**		LT .25**		LT .25**		LT .25**	
METALS/SOIL/ICP (µg/g)													
Laboratory ID Number				ANSA*526		ANSA*527		ANSA*522		ANSA*533		ANSA*532	
Parameter	Units	CRL	RBC										
Aluminum	µg/g	2.35	78000	11400**		4410**		5430**		5720**		5210**	
Antimony	µg/g	7.14	31	LT 7.14**		LT 7.14**		LT 7.14**		LT 7.14**		LT 7.14**	
Barium	µg/g	5.18	5500	4500**		52.9**		9.15**		8.8**		7.81**	
~~Beryllium~~	~~µg/g~~	~~0.5~~	~~0.15~~	~~.694**~~		~~LT .5**~~		~~LT .5**~~		~~LT .5**~~		~~LT .5**~~	
Cadmium	µg/g	0.7	39	1.28**		LT .7**		LT .7**		LT .7**		LT .7**	
Calcium	µg/g	100		LT 200**		LT 100**		LT 100**		LT 100**		LT 100**	
Chromium	µg/g	4.05	78000	32.9**		18.1**		27.8**		18.8**		16.9**	
Cobalt	µg/g	1.42	4700	96.2**		5.35**		LT 1.42**		LT 1.42**		LT 1.42**	
Copper	µg/g	0.965	3100	60.9**		19.4**		10.7**		16.6**		20.5**	
Iron	µg/g	3.68	23000	36700**		24000**		30200**		24900**		26100**	
Magnesium	µg/g	100		LT 200**		LT 100**		LT 100**		LT 100**		LT 100**	
Manganese	µg/g	2.05	390	19000**		348**		104**		52.1**		85.6**	
Nickel	µg/g	1.71	1600	29.2**		8.83**		2.39**		2.92**		5.16**	
Potassium	µg/g	100		331**		293**		272**		294**		335**	
Silver	µg/g	0.589	390	LT 1.2**		LT .589**		LT .589**		LT .589**		LT .589**	
Sodium	µg/g	100		348**		399**		446**		380**		531**	
Thallium	µg/g	6.62	5.5	23.5**		LT 6.62**		LT 6.62**		LT 6.62**		LT 6.62**	
Vanadium	µg/g	3.39	550	98.6**		55.9**		66.1**		51**		51.8**	
Zinc	µg/g	8.03	23000	56.1**		35.8**		LT 8.03**		13.7**		20.6**	
METALS/SOIL/TECHNICON (µg/g)													
Laboratory ID Number				N/A		N/A		N/A		ANSA*533		ANSA*532	
Parameter	Units	CRL	RBC										
Hexavalent Chromium	µg/g	0.514	180	N/A		N/A		N/A		LT .514**	IOMP	LT .514**	IOMP

Table A-10. Data Summary Table: Subsurface Soil - Background, Anniston Army Depot - Southeast Industrial Area

Site ID				SB-BK-202		SB-BK-202		SB-BK-301		SB-BK-301		SB-BK-302	
Field Sample Number				SAIC02		SAIC03		SAIC02		SAIC04		SAIC02	
Site Type				BORE		BORE		BORE		BORE		BORE	
Collection Date				5/11/95		5/11/95		5/17/95		5/17/95		5/17/95	
Depth (ft)				5		10		5		10		5	
Associated Field QC Sample - Site ID													
Associated Field QC Sample - Field Sample No.													
Associated Field QC Sample - Site ID													
Associated Field QC Sample - Field Sample No.													
METALS/SOIL/GFAA (µg/g)													
Laboratory ID Number				ANSA*530		ANSA*529		ANSA*536		ANSA*537		ANSA*539	
Parameter	Units	CRL	RBC										
Arsenic	µg/g	0.25	0.43		.774**		1.17**		.881**		1.67**	LT	.25**
Lead	µg/g	0.177	400		8.2**	M			10**	M	16**	M	5.6** M
Mercury	µg/g	0.05	7.8	LT	.05**	LT	.05**	LT	.05**	LT	.05**	LT	.05**
Selenium	µg/g	0.25	390	LT	.25**	LT	.25**	LT	.25**	LT	.25**	LT	.25**
METALS/SOIL/ICP (µg/g)													
Laboratory ID Number				ANSA*530		ANSA*529		ANSA*536		ANSA*537		ANSA*539	
Parameter	Units	CRL	RBC										
Aluminum	µg/g	2.35	78000		6870**		6850**		7750**		6390**		5110**
Antimony	µg/g	7.14	31	LT	7.14**	LT	7.14**	LT	7.14**	LT	7.14**	LT	7.14**
Barium	µg/g	5.18	5500		8.76**		8.17**		25.5**		24.2**		20.9**
~~Beryllium~~	~~µg/g~~	~~0.5~~	~~0.15~~	~~LT~~	~~.5**~~	~~LT~~	~~.5**~~	~~LT~~	~~.5**~~		~~.797**~~	~~LT~~	~~.5**~~
Cadmium	µg/g	0.7	39	LT	.7**	LT	.7**	LT	.7**	LT	.7**	LT	.7**
Calcium	µg/g	100		LT	100**	LT	100**		168**		158**	LT	100**
Chromium	µg/g	4.05	78000		34.2**		25.6**		26.9** G		28** G		9.71** G
Cobalt	µg/g	1.42	4700	LT	1.42**	LT	1.42**		2.29**		3.02**		5.11**
Copper	µg/g	0.965	3100		22.8**		31.7**		6.88**		4.9**		6.14**
Iron	µg/g	3.68	23000		30000**		45800**		22900**		19200**		15800**
Magnesium	µg/g	100		LT	100**		163**		276**		245**		222**
Manganese	µg/g	2.05	390		58.4**		77.5**		47.1**		72.1**		68.1**
Nickel	µg/g	1.71	1600		5.96**		5.92**		2.68**	LT	1.71**	LT	1.71**
Potassium	µg/g	100			353**		353**		293**		213**		273**
Silver	µg/g	0.589	390	LT	.589**	LT	.589**	LT	.589**	LT	.589**	LT	.589**
Sodium	µg/g	100			419**		456**		370**		347**		413**
Thallium	µg/g	6.62	5.5	LT	6.62**	LT	6.62**	LT	6.62**	LT	6.62**	LT	6.62**
Vanadium	µg/g	3.39	550		59.8**		78.9**		35.4**		54.7**		15.5**
Zinc	µg/g	8.03	23000		23.8**		24.2**	LT	8.03**	LT	8.03**	LT	8.03**
METALS/SOIL/TECHNICON (µg/g)													
Laboratory ID Number				ANSA*530		ANSA*529		ANSA*536		ANSA*537		ANSA*539	
Parameter	Units	CRL	RBC										
Hexavalent Chromium	µg/g	0.514	180	LT	.514** IOMP	LT	.514** IOMP	LT	.514** LM	LT	.514** LM	LT	.514** LM

Table A-10. Data Summary Table: Subsurface Soil - Background, Anniston Army Depot - Southeast Industrial Area

Site ID	SB-BK-302
Field Sample Number	SAIC04
Site Type	BORE
Collection Date	5/17/95
Depth (ft)	10
Associated Field QC Sample - Site ID	
Associated Field QC Sample - Field Sample No.	
Associated Field QC Sample - Site ID	
Associated Field QC Sample - Field Sample No.	

METALS/SOIL/GFAA (µg/g)

Laboratory ID Number					ANSA*540	
Parameter	Units	CRL	RBC			
Arsenic	µg/g	0.25	0.43		**2.01****	
Lead	µg/g	0.177	400			
Mercury	µg/g	0.05	7.8	LT	.05**	
Selenium	µg/g	0.25	390	LT	.25**	

METALS/SOIL/ICP (µg/g)

Laboratory ID Number					ANSA*540	
Parameter	Units	CRL	RBC			
Aluminum	µg/g	2.35	78000		**8710****	
Antimony	µg/g	7.14	31	LT	7.14**	
Barium	µg/g	5.18	5500		**25.5****	
~~Beryllium~~	~~µg/g~~	~~0.5~~	~~0.15~~	~~LT~~	~~.5**~~	
Cadmium	µg/g	0.7	39	LT	.7**	
Calcium	µg/g	100		LT	100**	
Chromium	µg/g	4.05	78000		**7.7****	G
Cobalt	µg/g	1.42	4700		**21.7****	
Copper	µg/g	0.965	3100		**6.37****	
Iron	µg/g	3.68	23000		**19200****	
Magnesium	µg/g	100			**214****	
Manganese	µg/g	2.05	390		**551****	
Nickel	µg/g	1.71	1600		**3.51****	
Potassium	µg/g	100			**203****	
Silver	µg/g	0.589	390	LT	.589**	
Sodium	µg/g	100			**408****	
Thallium	µg/g	6.62	5.5	LT	6.62**	
Vanadium	µg/g	3.39	550		**25.5****	
Zinc	µg/g	8.03	23000	LT	8.03**	

METALS/SOIL/TECHNICON (µg/g)

Laboratory ID Number					ANSA*540	
Parameter	Units	CRL	RBC			
Hexavalent Chromium	µg/g	0.514	180		.74**	LM

Footnotes:

** - Data collected from AEC Pyramid system (IRDMIS Phase III)
CRL - Certified reporting limit
ID - Identification
N/A - Not applicable (analysis not requested)
QC - Quality control
LT - Less than the certified reporting limit / method detection level
G - Analyte found in rinse blank as well as in sample.

Data Qualifiers
I - The low-spike recovery is high
L - Missed holding time for sample analysis
M - The high-spike recovery is high.

[ ] -Data exceeds RBC or ecological screening value.
~~Zinc~~ -Data will not be incorporated into background data set.

Appendix B

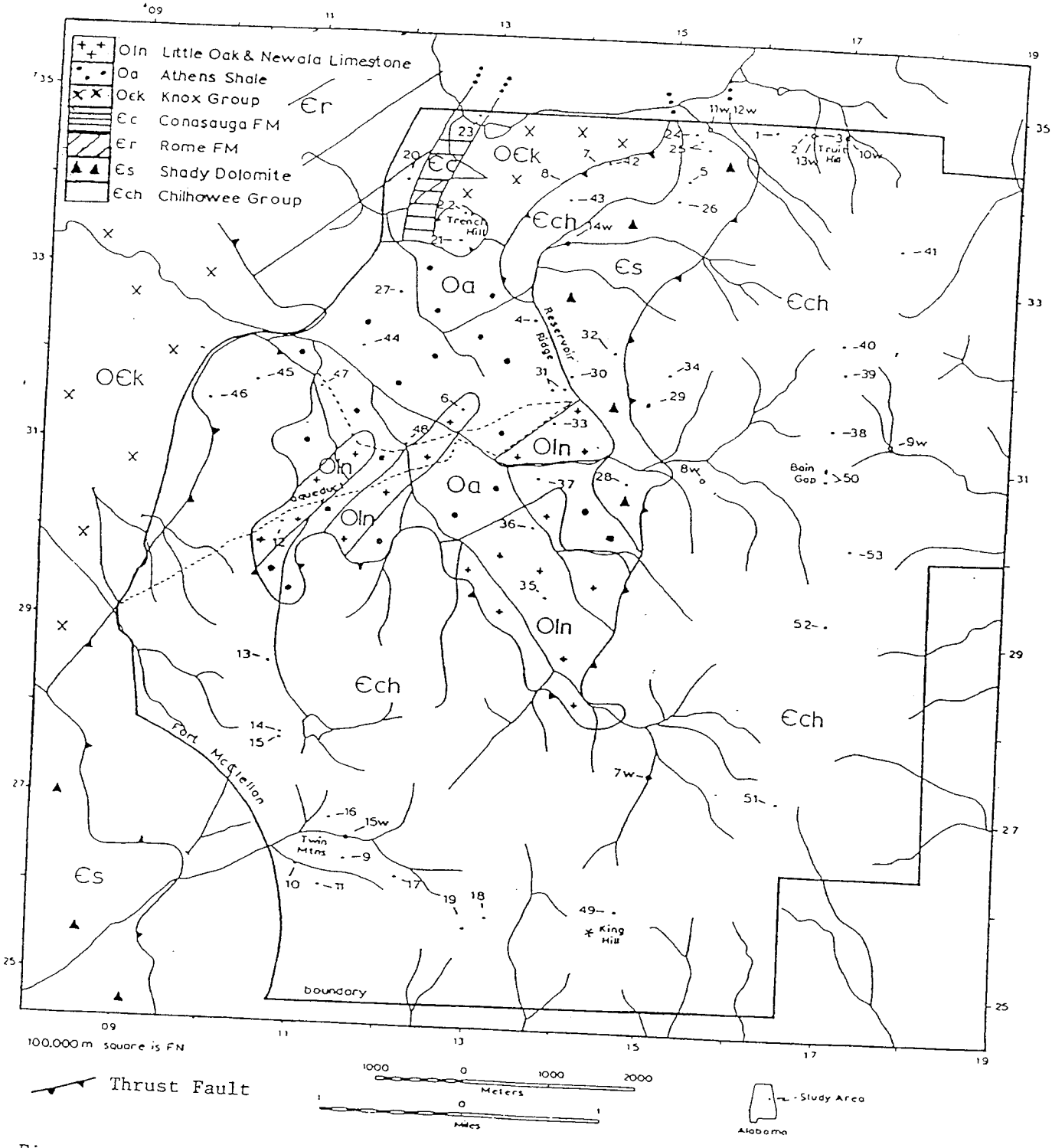


Figure 1. Geologic map and the rock, soil, and water sample locations on Fort McClellan, AL.

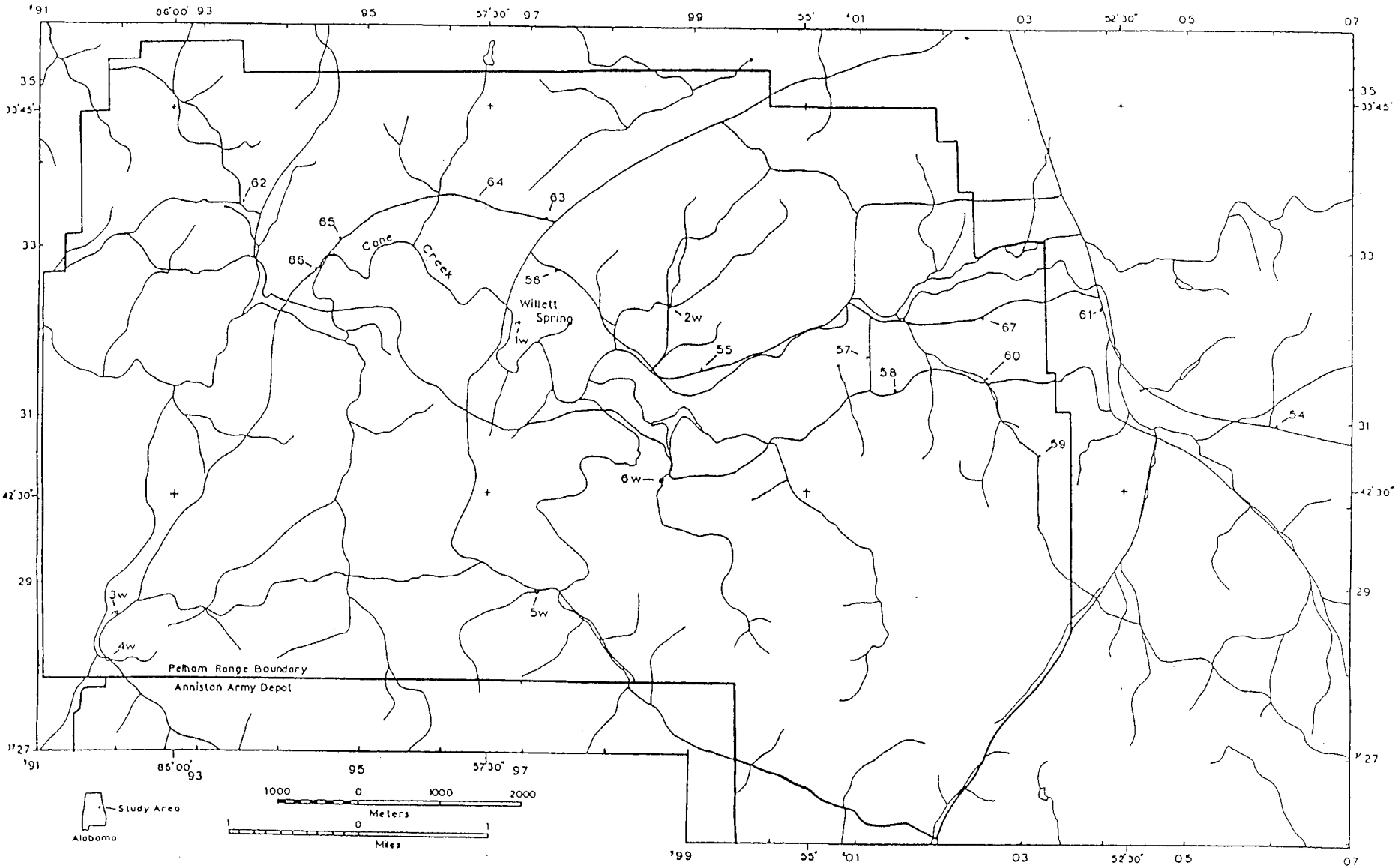


Figure 2. Rock and soil and water sample locations on Pelham Range, Fort McClellan, AL.

ANALYTICAL PROCEDURES

a. Rock and soils.

The rock and soil samples were analyzed by the six-step D.C.-arc semiquantitative emission spectrographic method (Grimes and Maranzino, 1968) for 35 elements. All of the analytical values are reported as six steps per order of magnitude (1, 1.5, 2, 3, 5, 7 or multiples of 10). These values approximate the geometric midpoints of successive concentration ranges (Grimes and Maranzino, 1968).

This analytical method compares a series of elemental standards against the elemental concentrations in the sample. The elemental concentration in the sample is visually compared with the standards. The largest source of error is interpolating a sample concentration that lies between two standards. The six-step D.C.-arc emission spectrographic method provides reproducibility within one geometric interval of the reported value approximately 86 percent of the time and within two geometric intervals of the reported value approximately 96 percent of the time (Motooka and Grimes, 1976).

If a sample contains elemental concentrations above the highest standard used, the elemental concentration is represented by a "G" in front of the upper standard. If a sample contains elemental concentrations below the lowest standard, the concentrations can have two code designations. If the sample concentration is slightly below the lowest standard, the elemental concentration is represented by an "L" in front of the lowest standard. If the sample concentration is not detected, an "N" is used. The gold analysis was done using the flameless atomic absorption method described in the USGS standard methods manual (O'Leary and Meier, 1986).

Table 1 lists the analytical results for the rock samples. Table 2 lists the analytical results for the soil samples. Duplicate samples have a "D" after the sample number. The duplicate sample analyses are within the precision of this analytical method. The variations for some elements in sample 37R probably reflects the mineralized nature of the rock and not heterogeneity in the sample or the analytical method.

b. Waters.

Water temperature and pH were measured at the sample site. The following constituents were analyzed from the untreated sample: sulfate, fluoride, chloride, nitrate, alkalinity, and specific conductance. Alkalinity measures the total acid-neutralizable constituents in water and is generally due to the presence of carbonate and bicarbonate ions. Table 3 gives the specific methods used for each analysis.

The concentrations of calcium, magnesium, sodium, potassium, silica, and iron were measured from the filtered and acidified sample using flame atomic absorption spectrophotomety. The concentrations of all other metal ions were measured using the Inductively Coupled Plasma-Atomic Emission Spectrometer (ICP-AES). Table 4 lists the concentrations of the species determined for this study.

The results of charge balance calculations are listed in Table 4. For the three samples with detectable HCO3, the charge balance is under 5%, indicating the analyses are very good. A value of 7 ppm for HCO3 was used for the other samples. The charge balance for all but three samples is still under the acceptable range of 10%. Adjusting the HCO3 value a few ppm for the three samples brings their charge balance under 10% also.

Table 3. Analytical methods used for water analysis, Fort McClellan study area, Fort McClellan, AL

Constituent	Method	Reference
Alkalinity	Gran's plot potentiometric titration	Orion Research Inc (1975)
Sulfate	Ion chromatography	Smee and Hall (1978)
Chloride	Ion chromatography	Smee and Hall (1978)
Fluoride	Ion chromatography	Smee and Hall (1978)
Calcium	Flame atomic absorption spectrophotometry	Perkin-Elmer Corp. (1976)
Magnesium	Flame atomic absorption spectrophotometry	Perkin-Elmer Corp. (1976)
Sodium	Flame atomic absorption spectrophotometry	Perkin-Elmer Corp. (1976)
Potassium	Flame atomic absorption spectrophotometry	Perkin-Elmer Corp. (1976)
Aluminum	Flame atomic absorption spectrophotometry	Perkin-Elmer Corp. (1976)
Iron	Flame atomic absorption spectrophotometry	Perkin-Elmer Corp. (1976)
Silica	Flame atomic absorption spectrophotometry	Perkin-Elmer Corp. (1976)
Specific Conductance	Conductivity bridge	Brown and others (1970)
All other cations	ICP-AES	Environmental Protection Agency, SW 846 methods 620

Table 4. Summary of inorganic constituents from stream and spring waters collected from Fort McClellan and Pelham Range, Fort McClellan, AL.

Sample	place	UTM FN	Cond M/S	pH	Temp C	Charge Balance	PPM							
							Ca	Na	K	Mg	Cl	SO4	NO3	Alkalinity
FMW 01	Willet Spring, PR	9692 3203	225	7.6	16	-1.4	25	0.92	0.33	14	1.6	0.99	1.1	140
dup ICP	Willet Spring, PR	9692 3203												
FMW 02	brook, north PR	9874 3232	17	8.3	19	-2.9*	2.2	0.57	0.40	0.7	1.0	2.3	<0.2	<10
FMW 03	spring, central PR	9201 2861	254	6.3	14	1.9	28	0.68	0.40	16	1.1	1.8	<0.2	170
FMW 04	stream, south PR	9195 2808	180	7.0	17	3.8	19	0.71	0.41	11	1.2	2.0	<0.2	120
FMW 05	brook, south PR	9726 2891	19	6.7	19	-5.8*	2.2	0.66	0.45	1.0	0.97	3.1	<0.2	<10
FMW 06	brook, central PR	9867 3025	18	6.4	20	-4.9*	2.2	0.57	0.32	0.9	0.76	2.9	<0.2	<10
FMW 07	brook, Range 24A	1506 2752	18	7.3	18	1.2*	1.4	0.87	1.9	0.6	1.1	3.1	<0.2	<10
FMW 08	spring, Range 21	1550 3083	14	6.7	19	0.98*	1.3	0.83	1.5	0.4	0.98	1.6	<0.2	<10
FMW 09	brook, Bain Gap	1774 3126	17	6.6	19	1.2*	1.5	0.72	1.6	0.6	0.99	2.8	<0.2	<10
FMW 10	brook, Truitt Hill	1690 3476	15	7.0	18	15*	1.1	0.60	0.77	0.7	1.0	3.4	<0.2	<10
FMW 11	stream, north FM	1532 3475	20	7.4	18	-11*	2.2	0.66	0.85	1.1	1.1	2.6	<0.2	<10
dup ICP	stream, north FM	1532 3475												
FMW 12D	duplicate of W11	1532 3475	20	7.4	18	-11*	2.2	0.65	0.85	1.1	1.1	2.6	<0.2	<10
FMW 13	brook, French Hill	1647 3476	15	6.3	18	10*	1.3	0.63	0.30	0.6	1.1	1.8	<0.2	<10
FMW 14	stream, Res Ridge	1360 3335	13	6.7	20	7.0*	1.4	0.62	0.55	0.7	1.1	2.3	<0.2	<10
FMW 15	brook, Twin Peaks	1160 2660	15	6.7	18	2.6*	1.4	0.64	1.1	0.7	1.0	2.4	<0.2	<10

* Assumed a HCO3 concentration of 7 ppm. For samples 10 and 13, decreasing the HCO3 to 5 ppm reduced the charge balance to 6.7% and 0.39% respectively. For sample 11, increasing the HCO3 to 8 ppm decreased the charge balance to -7.3%.

$$\text{charge balance} = \frac{A - C}{A + C} \times 100 \qquad A = \frac{(Cl)}{35.5} + \frac{(SO4)}{48} + \frac{(HCO3)}{61} + \frac{(NO3)}{62} \qquad C = \frac{(Na)}{23} + \frac{(K)}{39.1} + \frac{(Ca)}{20} + \frac{(Mg)}{12.2}$$

The following elements were not detected at the 0.1 ppb level unless noted, number in parentheses is the detection limit or the sample where the element was detected and the value: Ag, As (0.6), Au, Be (1), Bi (1), Cd (3), Cr (0.9), Cs (W2 and W6 at 0.2), Dy, Er, Eu, Ga, (0.3), Ge (0.4), Hf, Ho, Li (2), Nb (1), Nd (0.2) and W2 at 0.6), Pr (W2 at 0.2), Re, Sm, Sn (1), Ta, Tb, Te (2), Ti (1), Th (0.8), Tl (0.6), Tm, U (0.2), V (0.2, W1 and W3 at 0.2, W2 and W4 at 0.3), W, Yb, Zr (W2 at 0.3).

Table 4. Summary of inorganic constituents from stream and spring waters collected from Fort McClellan and Pelham Range, Fort McClellan, AL.

		PPB					PPM		PPB									
Sample	place	Cu	Pb	Zn	Mo	Mn	Fe	SiO2	Co	Ni	Y	Ba	Rb	Sr	Sb	La	Ce	Al
FMW 01	Willet Spring, PR	0.6	<0.5	6	0.5	7.9	<.01	8	<0.1	0.8	<0.1	12	0.4	17	<0.1	0.3	<.01	<.1
dup ICP	Willet Spring, PR	<0.6	<0.5	<3	0.3	<0.4			<0.1	0.8	<0.1	11	0.4	16	<0.1	0.2	<.01	
FMW 02	brook, north PR	0.9	<0.5	6	<0.2	27	0.08	7	<0.1	0.6	0.6	22	1.0	10	<0.1	0.5	1.7	<.1
FMW 03	spring, central PR	<0.6	<0.5	<3	0.3	2.4	<.01	7	<0.1	0.8	0.2	13	0.4	18	<0.1	0.2	<.01	<.1
FMW 04	stream, south PR	2.5	<0.5	7	0.5	75	0.05	7	0.2	1.0	<0.1	26	0.3	22	<0.1	0.2	<.01	<.1
FMW 05	brook, south PR	0.8	0.6	8	<0.2	24	<.01	8	0.1	0.5	<0.1	25	0.8	9.7	<0.1	0.1	0.3	<.1
FMW 06	brook, central PR	4.2	<0.5	9	<0.2	7.4	<.01	8	<0.1	0.9	0.2	17	0.6	8.3	<0.1	0.2	0.5	<.1
FMW 07	brook, Range 24A	<0.7	<0.5	3	<0.2	7.6	0.07	11	<0.1	0.4	<0.1	19	2.0	6.0	<0.1	0.2	0.2	<.1
FMW 08	spring, Range 21	6.1	16	4	<0.2	5.5	0.08	13	0.2	<0.3	<0.1	13	2.3	4.6	0.5	0.1	0.2	<.1
FMW 09	brook, Bain Gap	<0.6	<0.5	<3	<0.2	2.3	<.01	11	<0.1	<0.3	0.1	22	2.1	8.9	<0.1	0.2	0.2	<.1
FMW 10	brook, Truitt Hill	<0.6	<0.5	3	<0.2	10	<.01	6	<0.1	0.3	0.2	24	1.2	7.6	<0.1	<.1	0.2	<.1
FMW 11	stream, north FM	<0.6	<0.5	<3	<0.2	29	0.03	7	0.3	0.5	0.2	28	1.7	6.7	<0.1	0.2	0.3	<.1
dup ICP	stream, north FM	<0.6	<0.5	<3	<0.2	26			0.2	1.1	0.2	27	1.6	6.6	<0.1	0.2	0.2	
FMW 12D	duplicate of W11	<0.6	<0.5	<3	<0.2	27	0.02	7	0.2	0.5	0.2	29	1.4	5.9	<0.1	0.1	0.2	<.1
FMW 13	brook, French Hill	<0.6	<0.5	3	<0.2	54	0.05	6	0.1	2.4	0.7	20	0.6	6.0	<0.1	0.2	0.6	<.1
FMW 14	stream, Res Ridge	2.4	2	4	<0.2	15	0.03	7	0.2	0.4	0.3	20	0.9	8.9	0.3	0.2	0.4	<.1
FMW 15	brook, Twin Mtns	<0.6	<0.5	<3	<0.2	10	0.02	8	0.1	<0.3	0.1	19	1.7	6.3	0.2	0.1	0.2	<.1

The following elements were not detected at the 0.1 ppb level unless noted, number in parentheses is the detection limit or the sample where the element was detected and the value: Ag, As (0.6), Au, Be (1), Bi (1), Cd (3), Cr (0.9), Cs (W2 and W6 at 0.2), Dy, Er, Eu, Ga (0.3), Ge (0.4), Hf, Ho, Li (2), Nb (1), Nd (0.2 and W2 at 0.6), Pr (W2 at 0.2), Re, Sm, Sn (1), Ta, Tb, Te (2), Ti (1), Th (0.8), Tl (0.6), Tm, U (0.2), V (0.2, W1 and W3 at 0.2, W2 and W4 at 0.3), W, Yb, Zr (W2 at 0.3).

Table 1. Analytical results from the rock samples collected in the Fort McClellan-Pelham Range study area, Fort McClellan, AL.

Sample	UTM-FN	Au ppb	Ag	Cu	Pb	Zn	Fe %	Ba	Mn	Mo	Be	Ca %	Mg %	Na %	Ti %	B	Co	Cr	Ga	La	Ni	Sc	V	Y	Zr
FM 1R1	1616 3475	L1	N0.5	N5	N10	N200	0.3	20	50	N5	N1	L0.05	0.03	N0.2	0.1	L10	N10	L10	L5	N50	L5	N5	10	20	500
FM 3R1	1660 3477	50	1	20	100	700	G20	30	100	N5	3	N0.05	0.15	N0.2	0.1	L10	15	70	15	N50	30	30	200	70	20
FM 3R2	1660 3477	240	0.7	20	70	N200	20	70	30	20	1.5	N0.05	0.1	N0.2	0.1	10	N10	50	70	N50	20	20	100	15	20
FM 4R1	1355 3251	2	N0.5	100	70	200	7	700	3000	10	3	N0.05	0.3	L0.2	0.3	30	100	100	70	L50	150	20	150	30	70
FM 4R2	1355 3251	4	N0.5	15	150	N200	5	70	300	N5	3	L0.05	0.07	N0.2	0	L10	10	15	5	N50	20	5	70	10	15
FM 5R1	1520 3413	2	N0.5	10	N10	N200	1.5	30	150	N5	1	N0.05	0.03	N0.2	0.1	20	15	N10	5	N50	20	N5	30	L10	70
FM 5R2	1520 3413	L1	0.5	20	70	N200	10	70	150	7	2	L0.05	0.03	N0.2	0	L10	50	50	15	N50	70	N5	20	15	30
FM 6R1	1278 3145	1	N0.5	30	50	L200	3	500	150	L5	2	L0.05	1	1.5	0.3	30	50	100	70	L50	50	10	70	20	50
FM 7R1	1384 3415	1	N0.5	15	50	N200	5	70	15	L5	N1	N0.05	0.07	N0.2	0.3	15	N10	100	50	L50	20	7	70	15	150
FM 7R2	1384 3415	1	1.5	30	150	N200	15	L20	150	10	1	N0.05	0.07	N0.2	0	N10	30	30	50	N50	30	7	30	20	50
FM 7R3	1384 3415	L1	N0.5	N5	N10	N200	0.15	L20	L10	N5	N1	N0.05	L0.02	N0.2	0.2	L10	N10	L10	N5	N50	L5	N5	L10	N10	150
FM 7R4	1384 3415	L1	N0.5	7	N10	N200	0.7	20	L10	N5	1	N0.05	0.07	N0.2	0.2	L10	N10	15	L5	N50	5	L5	20	L10	300
FM 8R1	1376 3405	3	N0.5	15	100	N200	5	1000	5000	N5	1.5	N0.05	0.07	N0.2	0.1	10	70	30	15	L50	30	10	50	20	50
FM 8R2	1376 3405	L1	N0.5	7	N10	N200	1	30	30	N5	N1	N0.05	0.03	N0.2	0.5	10	N10	30	5	N50	7	L5	50	15	500
FM 8R3	1376 3405	2	N0.5	30	150	N200	7	200	500	N5	1	L0.05	0.1	N0.2	0.3	30	L10	70	30	50	30	15	100	30	200
FM 8R4	1376 3405	1	N0.5	20	50	N200	3	200	700	N5	L1	L0.05	0.07	N0.2	0.3	20	N10	70	20	L50	15	7	100	20	200
FM 9R1	1162 636	15	N0.5	30	50	N200	20	1000	3000	N5	3	N0.05	0.05	N0.2	0	N10	200	50	50	N50	50	10	70	50	10
FM 10R1	1109 2626	L1	N0.5	20	15	N200	2	50	30	N5	1	N0.05	0.05	N0.2	0.2	15	L10	30	30	N50	15	5	50	15	100
FM 12R1	1079 3013	1	N0.5	30	50	L200	7	150	100	L5	1.5	L0.05	0.5	N0.2	0.3	50	15	70	30	N50	30	15	100	30	150
FM 12R2	1079 3013	1	N0.5	L5	L10	N200	0.3	50	20	N5	N1	L0.05	0.03	N0.2	0.03	N10	N10	10	N5	N50	7	N5	10	N10	10
FM 12R3	1079 3013	1	N0.5	30	10	N200	3	70	70	N5	L1	L0.05	0.3	N0.2	0.2	20	L10	70	10	N50	20	10	50	L10	100
FM 13R1	1068 2836	L1	N0.5	10	30	N200	3	70	50	N5	1	L0.05	L0.02	N0.2	0.7	20	N10	100	50	N50	N5	15	150	50	700
FM 13R2	1068 2836	L1	N0.5	N5	N10	N200	0.2	70	10	N5	N1	L0.05	L0.02	N0.2	0.1	N10	N10	15	N5	N50	L5	N5	L10	N10	100
FM 14R1	1084 2776	2	N0.5	20	50	N200	7	150	50	N5	2	N0.05	0.2	N0.2	0.3	30	N10	100	50	L50	15	20	150	30	300
FM 14R2	1084 2776	L1	N0.5	15	30	N200	20	L20	500	N5	1.5	L0.05	0.05	N0.2	0.2	N10	L10	50	30	N50	15	15	50	50	500
FM 15R1	1085 2770	L1	N0.5	N5	N10	N200	0.7	100	10	N5	N1	L0.05	0.02	N0.2	0.05	N10	N10	15	N5	N50	7	N5	L10	10	70
FM 16R1	1144 2681	L1	N0.5	20	70	N200	3	1000	50	N5	1	L0.05	0.05	N0.2	0.5	20	N10	70	50	100	5	20	150	70	700
FM 16R2	1144 2681	L1	N0.5	N5	N10	N200	0.2	70	L10	N5	N1	L0.05	L0.02	N0.2	0.07	N10	N10	10	N5	N50	5	N5	L10	L10	150
FM 17R1	1222 2618	1	N0.5	20	20	N200	5	200	50	N5	2	L0.05	0.3	N0.2	0.5	50	L10	100	30	L50	20	15	100	50	500
FM 17R2	1222 2618	1	N0.5	10	10	N200	15	70	70	N5	5	N0.05	0.2	N0.2	0.03	N10	N10	10	30	N50	20	L5	10	10	100
FM 18R1	1327 2574	1	N0.5	10	30	N200	10	150	70	N5	7	N0.05	0.2	N0.2	0.7	50	N10	70	30	100	10	20	100	150	G1000
FM 18R2	1327 2574	2	N0.5	10	30	N200	1.5	200	L10	N5	1.5	N0.05	0.1	N0.2	0.7	20	N10	20	30	L50	7	7	50	50	700
FM 18R3	1327 2574	1	N0.5	30	50	N200	20	200	500	N5	5	N0.05	0.2	N0.2	0.2	50	30	70	50	N50	20	10	50	20	70
FM 18R4	1327 2574	L1	N0.5	5	N10	N200	1.5	70	50	N5	L1	N0.05	0.03	N0.2	0.03	10	N10	L10	5	N50	15	N5	15	10	100
FM 19R1	1301 2561	L1	N0.5	5	10	N200	0.2	100	15	N5	N1	L0.05	0.02	N0.2	0.15	L10	N10	L10	N5	N50	5	N5	15	L10	300
FM 22R1	1266 3370	1	N0.5	70	100	N200	G20	50	700	15	2	L0.05	0.1	N0.2	0.03	N10	30	.200	30	N50	50	7	100	20	N10
FM 22R2	1266 3370	1	N0.5	50	100	L200	7	700	5000	N5	7	L0.05	0.2	N0.2	0.2	50	50	70	30	70	50	20	100	70	100
FM 22R3	1266 3370	35	3	100	70	N200	>20	50	70	30	N1	N0.05	L0.02	N0.2	.005	N10	N10	15	30	N50	50	N5	100	N10	N10
FM 22R4	1266 3370	2	N0.5	70	100	L200	5	1500	300	N5	2	0.3	1.5	L0.2	0.5	100	20	150	50	50	70	20	150	30	100

Table 1. (continued) Analytical results from the rock samples collected in the Fort McClellan-Pelham Range study area, Fort McClellan, AL.

Sample	UTM-FN	Au ppb	Ag	Cu	Pb	Zn	Fe %	Ba	Mn	Mo	Be	Ca %	Mg %	Na %	Ti %	B	Co	Cr	Ga	La	Ni	Sc	V	Y	Zr
FM 22R5	1266 3370	3	N0.5	70	150	L200	5	300	G5000	N5	3	L0.05	0.2	N0.2	0.15	20	200	70	20	50	70	15	100	50	70
FM 23R1	1280 3480	1	N0.5	50	70	N200	7	150	100	N5	2	L0.05	0.7	N0.2	0.5	150	L10	100	50	L50	30	15	150	20	150
FM 24R1	1527 3471	L1	N0.5	30	70	N200	3	300	700	N5	L1	L0.05	0.07	N0.2	1	30	20	70	15	L50	20	7	150	50	G1000
FM 25R1	1544 3451	L1	1.5	5	N10	N200	0.3	70	30	N5	L1	L0.05	0.07	N0.2	0.07	10	N10	10	L5	N50	L5	L5	30	N10	30
FM 25R2	1544 3451	L1	0.5	50	150	200	5	200	70	L5	3	L0.05	0.5	N0.2	0.5	30	50	100	20	50	70	20	300	30	150
FM 26R1	1510 3392	L1	N0.5	L5	N10	N200	0.3	100	20	N5	N1	L0.05	0.02	N0.2	0.5	N10	N10	10	L5	L50	L5	N5	15	15	700
FM 27R1	1202 3277	1	N0.5	50	50	L200	5	700	50	L5	2	0.05	0.7	N0.2	0.5	50	10	100	50	50	30	15	150	30	150
FM 28R1	1468 3072	L1	N0.5	7	15	N200	0.3	200	200	N5	N1	0.05	0.07	N0.2	0.02	N10	N10	L10	N5	N50	15	N5	15	N10	10
FM 28R1	1468 3072	1	N0.5	30	30	N200	5	300	70	N5	2	L0.05	0.7	N0.2	0.5	70	L10	100	30	50	30	15	150	30	300
FM 28R2	1468 3072	1	N0.5	30	30	N200	5	200	70	N5	2	L0.05	1	N0.2	0.5	70	L10	100	30	50	30	15	150	30	200
FM 28R3	1468 3071	L1	N0.5	10	L10	N200	0.7	150	200	N5	L1	0.05	0.1	N0.2	0.05	L10	N10	L10	N5	N50	15	N5	15	N10	15
FM 29R1	1486 3159	1	N0.5	20	30	N200	5	500	70	N5	1.5	N0.05	0.15	N0.2	0.7	50	10	150	50	70	20	15	100	50	300
FM 29R2	1486 3159	L1	N0.5	10	20	N200	15	1000	150	N5	2	L0.05	0.07	N0.2	0.5	15	10	20	20	70	15	20	150	100	700
FM 30R1	1395 3190	L1	N0.5	20	N10	N200	1	700	500	L5	2	L0.05	0.07	N0.2	0.02	N10	10	15	5	N50	30	N5	15	L10	20
FM 30R2	1395 3190	L1	N0.5	10	L10	N200	1	200	700	N5	2	0.05	0.07	N0.2	0.03	N10	N10	15	L5	N50	20	N5	20	N10	15
FM 31R1	1393 3171	1	N0.5	70	30	N200	7	1000	50	7	1.5	0.07	0.5	N0.2	0.7	70	L10	100	50	50	20	20	200	30	150
FM 32R1	1448 3215	1	N0.5	50	30	N200	3	700	70	N5	2	L0.05	1	L0.2	0.5	50	15	100	50	50	50	10	100	20	150
FM 32R2	1448 3215	1	N0.5	10	20	N200	5	300	70	N5	2	L0.05	0.7	N0.2	0.5	100	15	150	30	L50	30	15	150	30	150
FM 33R1	1380 3135	1	N0.5	50	50	N200	7	700	70	10	2	L0.05	0.7	N0.2	0.5	70	15	100	50	50	50	20	150	30	150
FM 33R1	1380 3135	1	N0.5	70	70	N200	5	700	50	10	2	L0.05	0.5	L0.2	0.5	50	N10	100	50	50	20	15	150	30	150
FM 34R1	1510 3196	L1	L0.5	N5	N10	N200	0.2	70	10	N5	N1	L0.05	L0.02	N0.2	0.2	N10	N10	L10	N5	N50	L5	N5	15	15	150
FM 34R1	1510 3196	1	N0.5	N5	N10	N200	0.2	70	15	N5	N1	L0.05	L0.02	N0.2	0.15	N10	N10	15	N5	N50	L5	N5	10	L10	200
FM 35R1	1378 2940	L1	N0.5	L5	N10	N200	0.7	70	300	N5	L1	L0.05	0.02	N0.2	0.15	N10	N10	L10	N5	N50	L5	L5	15	L10	200
FM 37R1	1376 3072	2	N0.5	50	50	N200	2	1000	50	15	1	L0.05	0.5	N0.2	0.5	30	N10	100	30	50	7	15	300	30	150
FM 37R1	1376 3072	3	N0.5	150	50	N200	7	1000	30	7	1	L0.05	0.5	N0.2	0.3	30	N10	150	50	50	7	15	200	20	100
FM 38R1	1700 3143	L1	N0.5	20	15	N200	5	1000	700	N5	1.5	L0.05	0.3	N0.2	0.7	30	20	70	30	50	30	15	70	50	700
FM 39R1	1710 3210	1	N0.5	15	15	N200	7	700	70	N5	3	L0.05	0.07	N0.2	0.2	15	L10	50	15	L50	10	7	50	30	700
FM 39R2	1710 3210	1	N0.5	100	30	N200	20	3000	G5000	N5	5	L0.05	0.02	N0.2	0.2	N10	100	70	30	200	30	20	50	100	700
FM 40R1	1710 3236	L1	N0.5	N5	N10	N200	0.7	100	100	N5	N1	L0.05	L0.02	N0.2	0.15	N10	N10	15	N5	N50	L5	N5	15	10	300
FM 41R1	1766 3350	1	N0.5	30	20	N200	7	300	300	N5	3	N0.05	0.7	N0.2	0.5	70	20	100	50	70	50	20	100	50	150
FM 41R2	1766 3350	2	N0.5	30	30	N200	3	150	50	N5	3	L0.05	0.2	N0.2	0.5	50	L10	100	30	50	20	15	150	50	300
FM 41R3	1766 3350	L1	N0.5	L5	N10	N200	0.7	70	20	N5	N1	L0.05	L0.02	N0.2	0.07	N10	N10	10	N5	N50	7	N5	10	L10	100
FM 42R1	1416 3426	L1	N0.5	20	30	N200	7	150	100	N5	1	L0.05	0.15	N0.2	0.3	30	15	70	15	L50	30	15	100	20	500
FM 42R2	1416 3426	L1	N0.5	30	70	N200	7	200	700	N5	3	L0.05	0.15	N0.2	0.2	20	30	50	15	50	50	15	70	50	500
FM 42R3	1416 3426	1	N0.5	15	30	L200	15	500	G5000	N5	3	L0.05	0.03	N0.2	0.03	N10	150	L10	20	N50	50	7	15	50	15
FM 43R1	1386 3389	L1	N0.5	N5	N10	N200	0.5	70	500	N5	N1	L0.05	L0.02	N0.2	0.1	N10	N10	10	N5	N50	7	N5	10	15	300
FM 44R1	1161 3217	2	N0.5	50	30	L200	5	700	300	7	1.5	L0.05	1	1	0.3	50	30	150	50	70	70	15	150	50	150
FM 44R1	1161 3217	1	N0.5	50	30	L200	5	700	500	N5	1.5	L0.05	1	0.7	0.3	30	30	100	30	50	70	15	150	30	100

Table 1. (continued) Analytical results from the rock samples collected in the Fort McClellan-Pelham Range study area, Fort McClellan, AL.

Sample	UTM-FN	Au ppb	Ag	Cu	Pb	Zn	Fe %	Ba	Mn	Mo	Be	Ca %	Mg %	Na %	Ti %	B	Co	Cr	Ga	La	Ni	Sc	V	Y	Zr
FM 48R1	1212 3104	1	N0.5	70	50	L200	5	1000	300	7	2	0.2	1	1	0.3	50	30	100	50	70	70	15	200	30	100
FM 48R2	1212 3104	L1	N0.5	N5	L10	N200	0.15	20	70	N5	N1	20	0.5	N0.2	.015	L10	N10	L10	N5	N50	L5	N5	15	N10	L10
FM 48R3	1212 3104	2	N0.5	30	70	N200	1.5	150	100	7	L1	15	2	0.3	0.15	30	15	70	20	N50	70	5	70	L10	50
FM 49R1	1478 2588	1	N0.5	10	20	N200	1	1000	10	N5	L1	0.15	0.1	L0.2	0.5	10	L10	50	20	L50	7	7	50	30	700
FM 49R2	1478 2588	1	N0.5	30	15	N200	3	500	70	N5	5	L0.05	0.7	N0.2	0.7	50	20	100	50	70	50	15	100	50	200
FM 50R1	1693 3098	1	N0.5	70	30	N200	G20	700	1000	N5	5	L0.05	L0.02	N0.2	0.01	N10	50	10	50	N50	30	10	15	15	15
FM 50R2	1693 3098	2	N0.5	30	50	N200	20	200	50	N5	3	N0.05	0.15	N0.2	0.5	50	L10	100	50	L50	20	10	50	30	200
FM 50R3	1693 3098	4	L0.5	50	50	N200	15	150	150	N5	3	L0.05	L0.02	N0.2	0.03	L10	15	15	30	N50	20	7	20	20	100
FM 50R4	1693 3098	3	N0.5	150	15	300	2	5000	G5000	N5	2	L0.05	0.05	N0.2	0.1	L10	500	15	10	L50	200	7	30	70	100
FM 50R5	1693 3098	3	N0.5	50	100	N200	15	1000	5000	N5	5	L0.05	0.1	N0.2	0.3	20	50	20	30	100	50	10	70	150	200
FM 51R1	1652 2718	1	N0.5	30	50	N200	5	700	100	N5	1.5	L0.05	0.5	N0.2	1	30	10	150	30	70	20	15	100	100	700
FM 51R1	1652 2718	L1	N0.5	20	20	N200	5	1000	70	N5	2	L0.05	0.7	N0.2	1	50	N10	100	50	70	15	15	150	50	300
FM 52R1	1704 2920	1	N0.5	5	N10	N200	1	70	30	N5	N1	L0.05	0.05	N0.2	0.7	10	N10	20	5	N50	N5	L5	20	15	1000
FM 53R1	1723 3006	L1	N0.5	5	30	N200	15	500	100	N5	1.5	N0.05	0.07	N0.2	0.15	10	N10	15	30	N50	L5	7	70	20	700
FM 53R2	1726 3006	1	N0.5	10	N10	N200	5	100	70	N5	2	L0.05	L0.02	N0.2	0.1	L10	N10	10	7	N50	10	N5	10	10	100
FM 54R1	0606 3096	8	N0.5	50	20	700	G20	N20	1000	N5	5	L0.05	0.07	N0.2	0.02	L10	200	50	30	N50	300	10	70	70	N10
FM 55R1	9914 3156	L1	N0.5	7	N10	N200	1	100	70	N5	N1	L0.05	0.03	N0.2	.007	20	N10	15	N5	N50	7	N5	15	N10	10
FM 55R2	9914 3156	1	N0.5	30	20	N200	10	70	300	L5	L1	L0.05	0.05	N0.2	0.03	10	20	50	20	N50	30	L5	20	20	10
FM 57R1	0112 3173	L1	N0.5	70	70	500	G20	100	1500	5	1.5	N0.05	0.07	N0.2	0.03	N10	100	2000	100	N50	200	15	150	70	150
FM 57R2	0112 3173	4	N0.5	5	N10	N200	1	50	50	N5	N1	L0.05	0.05	N0.2	0.05	20	N10	20	5	N50	10	N5	20	N10	30
FM 58R1	0146 3134	1	N0.5	30	50	N200	5	70	100	7	1	L0.05	0.15	N0.2	0.2	20	L10	50	20	50	30	10	100	10	70
FM 60R1	0257 3150	L1	N0.5	50	50	L200	7	100	300	N5	2	L0.05	0.7	N0.2	0.3	50	20	100	30	50	70	15	150	150	150
FM 60R2	0257 3150	1	N0.5	L5	N10	N200	0.3	50	70	N5	N1	L0.05	0.03	N0.2	0.01	15	N10	10	N5	N50	5	N5	10	L10	L10
FM 61R1	0396 3230	12	N0.5	50	L10	N200	3	50	100	N5	L1	L0.05	0.1	N0.2	0.1	20	10	15	5	N50	15	10	70	L10	30
FM 62R1	9350 3350	1	0.5	30	100	200	2	150	70	N5	1.5	0.05	0.3	N0.2	0.3	20	20	150	15	70	150	10	100	100	1000
FM 62R2	9350 3350	1	N0.5	5	L10	N200	0.3	20	10	N5	N1	L0.05	0.07	N0.2	0.3	15	N10	20	5	N50	20	7	15	30	G1000
FM 64R1	9637 3354	3	N0.5	20	30	N200	1.5	500	15	7	1	L0.05	0.3	N0.2	0.5	30	N10	100	30	50	7	15	150	20	100
FM 64R2	9637 3352	3	N0.5	70	100	300	20	300	200	N5	1.5	L0.05	0.15	N0.2	0.2	30	70	100	70	N50	20	15	100	10	30
FM 64R3	9637 3354	1	N0.5	5	L10	N200	0.7	50	20	N5	N1	L0.05	0.05	N0.2	0	10	N10	20	5	N50	7	N5	15	N10	20
FM 65R1	9470 3310	14	1	7	150	N200	0.7	1000	15	100	1	L0.05	0.15	N0.2	0.7	50	20	70	15	50	100	7	70	20	300
FM 65R2	9470 3310	1	N0.5	7	L10	N200	3	200	15	5	1	L0.05	0.05	N0.2	0.1	10	20	20	7	N50	50	5	30	20	300
FM 67R1	0252 3220	L1	N0.5	L5	L10	N200	0.3	20	20	N5	N1	0.05	0.02	N0.2	0	10	N10	15	N5	N50	5	N5	10	N10	10
FM 67R2	0252 3220	5	N0.5	700	500	200	1.5	5000	G5000	15	2	0.15	0.07	N0.2	0.1	10	200	20	N5	N50	500	70	100	20	30

Table 2. Analytical results from the soil samples collected in the Fort McClellan-Pelham Range study area, Fort McClellan, AL.

Sample	Fe %	Cu	Pb	Au ppb	Mn	Ba	Ni	Co	V	Ca%	Mg %	P%	Ti%	B	Be	Cr	Ga	La	Nb	Sc	Y	Zr
FM 01S	0.7	15	20	3	150	100	7	N10	30	L0.05	0.07	L0.2	0.3	15	L1	30	7	N50	L20	L5	15	300
FM 02S	3	20	30	2	200	100	30	10	100	N.05	0.1	N0.2	0.3	20	1.5	70	15	L50	L20	10	20	150
FM 03S1	3	15	15	5	10	15	15	L10	100	N.05	0.03	N0.2	0.1	15	1.5	20	7	N50	N20	30	7	30
FM 03S2	1.5	15	50	2	300	300	5	N10	70	L0.05	0.07	L0.2	1	30	L1	50	10	50	20	7	30	1500
FM 04S	15	50	70	2	1500	500	100	70	70	N.05	0.3	L0.2	0.1	50	5	50	50	N50	N20	15	30	30
FM 05S	3	30	70	2	300	150	30	15	50	L0.05	0.1	L0.2	0.2	20	1.5	30	15	L50	L20	5	20	300
FM 08S	3	50	100	2	3000	500	50	15	100	L0.05	0.1	L0.2	0.7	30	1.5	70	20	100	20	7	50	500
FM 11S	1	15	15	L1	30	100	10	L10	30	L0.05	0.05	L0.2	1	15	N1	30	7	L50	L20	5	20	700
FM 12S	0.7	15	20	2	300	300	10	10	70	L0.05	0.1	L0.2	1	30	L1	30	7	L50	20	7	30	1000
FM 13S	1	10	30	2	70	150	5	N10	70	L0.05	0.05	L0.2	1	20	L1	15	10	50	30	7	50	1500
FM 15S	1.5	15	30	2	70	200	5	N10	70	L0.05	0.07	L0.2	0.7	30	L1	50	20	50	20	7	50	1500
FM 18S	1.5	5	10	L1	100	300	5	N10	70	L0.05	0.07	L0.2	1	20	1	20	10	70	30	7	50	1500
FM 20S	3	20	30	1	300	200	50	L10	100	L0.05	0.3	L0.2	0.7	30	1.5	30	20	50	L20	7	30	300
FM 21S	3	20	30	2	700	150	50	L10	150	L0.05	0.15	L0.2	0.7	50	2	50	30	50	20	10	30	300
FM 22S	3	20	20	1	700	300	30	10	100	0.05	0.15	L0.2	0.7	30	1.5	50	15	50	20	7	30	700
FM 23S	2	20	30	1	300	150	20	N10	70	L0.05	0.15	L0.2	0.7	30	1	30	30	L50	L20	7	30	500
FM 24S	3	20	150	1	1000	300	30	20	100	L0.05	0.2	L0.2	1	50	1	100	30	50	20	10	70	1000
FM 25S	1.5	7	7	1	100	200	10	N10	70	L0.05	0.1	L0.2	1	50	L1	30	10	L50	30	7	30	1000
FM 26S	2	10	10	5	70	300	10	N10	100	L0.05	0.07	L0.2	1	30	L1	70	10	50	20	7	70	1500
FM 28S	1.5	10	15	L1	70	500	15	N10	70	L0.05	0.15	L0.2	1	70	L1	70	15	L50	20	7	30	1000
FM 28SD	1.5	10	15	L1	70	500	15	N10	70	L0.05	0.15	L0.2	1	70	L1	70	15	50	20	7	50	700
FM 30S	1.5	15	15	L1	300	300	10	N10	70	L0.05	0.1	L0.2	1	50	1	70	15	L50	30	7	30	1000
FM 30SD	2	20	15	1	500	500	30	L10	100	L0.05	0.15	L0.2	1	50	1	70	15	50	30	7	50	700
FM 31S	3	30	20	1	70	500	30	15	150	L0.05	0.2	L0.2	1	50	1.5	50	20	70	30	10	30	500
FM 32S	1.5	7	15	L1	300	300	10	L10	70	L0.05	0.1	L0.2	G1	30	L1	70	10	L50	30	7	70	1500
FM 34S	1.5	15	30	L1	100	300	10	N10	70	L0.05	0.1	0.2	G1	30	1.5	70	20	100	30	10	70	1000
FM 35S	2	20	20	1	700	300	30	10	100	0.05	0.15	L0.2	1	30	1	70	15	L50	30	7	70	1500
FM 36S	2	20	10	L1	300	500	20	L10	100	0.05	0.15	L0.2	G1	30	L1	70	10	L50	30	7	70	1500
FM 37S	2	30	30	12	500	300	L5	10	100	L0.05	0.1	L0.2	1	30	1	50	15	L50	L20	5	30	700
FM 37SD	5	50	30	1	100	700	20	L10	200	0.05	0.3	L0.2	1	50	1	100	30	50	20	10	30	700

Table 2. (continued) Analytical results form the soil samples collected in the Fort McClellan-Pelham Range study area, Fort McClellan, AL.

Sample	Fe %	Cu	Pb	Au ppb	Mn	Ba	Ni	Co	V	Ca%	Mg %	P%	Ti %	B	Be	Cr	Ga	La	Nb	Sc	Y	Zr
FM 40S	2	20	50	1	70	300	10	N10	100	L0.05	0.15	L0.2	1	20	L1	100	30	50	L20	7	50	1000
FM 41S	2	20	30	1	70	150	15	N10	70	L0.05	0.15	L0.2	1	30	L1	70	20	50	20	7	50	1500
FM 42S	3	30	30	1	300	500	50	15	100	L0.05	0.15	L0.2	1	30	L1	70	30	70	20	10	70	1000
FM 43S	0.7	50	500	L1	300	300	15	N10	50	0.05	0.1	L0.2	0.7	15	1	30	10	L50	L20	5	20	500
FM 44S	5	50	100	1	100	500	30	10	150	L0.05	0.7	L0.2	1	50	2	150	70	70	20	15	30	300
FM 45S	0.7	10	10	L1	200	200	L5	N10	70	L0.05	0.07	L0.2	1	20	L1	30	5	L50	30	7	30	1500
FM 46S	3	50	50	2	500	200	50	15	150	L0.05	0.15	L0.2	0.7	30	1	70	30	L50	20	10	30	500
FM 47S	1.5	15	15	L1	500	200	15	30	100	0.07	0.1	L0.2	G1	20	L1	50	5	50	30	7	50	1500
FM 49S	2	10	50	1	200	700	15	10	100	L0.05	0.2	L0.2	0.7	20	2	70	30	50	20	10	50	700
FM 50S	2	20	50	1	70	200	5	N10	100	L0.05	0.07	L0.2	0.7	15	1	50	20	50	20	7	50	700
FM 51S	2	20	70	L1	300	1000	15	L10	100	L0.05	0.3	L0.2	0.7	30	1.5	70	50	70	20	10	70	700
FM 51SD	3	20	50	L1	500	1000	20	L10	100	L0.05	0.5	L0.2	1	30	2	70	30	70	20	15	70	700
FM 52S	1.5	5	20	L1	150	500	15	N10	70	L0.05	0.1	L0.2	1	20	L1	70	7	50	20	7	30	1000
FM 53S	3	15	50	2	700	1000	15	L10	100	L0.05	0.2	L0.2	1	30	1.5	100	50	50	30	10	50	1000
FM 55S	1.5	20	150	L1	700	300	15	L10	70	0.07	0.1	L0.2	0.7	.20	1	70	7	70	20	5	50	700
FM 56S	2	30	150	1	3000	700	50	20	100	0.05	0.15	L0.2	1	30	1.5	70	30	100	20	10	100	500
FM 57S	3	30	50	2	500	150	50	15	100	L0.05	0.15	L0.2	0.7	30	1	50	20	L50	L20	7	100	300
FM 59S	2	30	30	2	2000	200	30	30	70	0.05	0.15	L0.2	1	30	1.5	50	20	L50	20	7	70	700
FM 63S	7	50	100	1	100	100	50	10	150	L0.05	0.15	L0.2	0.5	15	1	100	30	50	20	10	10	150
FM 64S	2	30	70	2	300	150	20	15	70	0.05	0.1	L0.2	0.3	15	L1	70	10	L50	L20	5	15	300
FM 65S	1.5	30	30	4	5000	500	30	15	50	0.05	0.05	0.3	0.2	15	1.5	30	L5	50	L20	5	30	200
FM 66S	1.5	15	L10	1	70	300	15	10	50	L0.05	0.07	L0.2	0.7	20	L1	30	5	L50	20	5	20	500
FM 67S	1.5	20	L10	3	100	100	15	10	70	0.05	0.1	L0.2	0.7	20	L1	50	7	L50	20	5	15	300

Appendix C

Estimated Number of Background Soil Samples Required to Achieve aTarget Minimum Detectable Relative Difference, Fort McClellan , Alabama

Naturally Occurring Nutrient Constituents

Analyte	Power (%)	Confidence Level (%)	Measured Coefficient of Variation (%)	Minimum Detectable Relative Difference (MDRD)				
				10%	15%	20%	30%	40%
Aluminum	90%	80%	4.30%	1	1	1	0	0
		90%	4.30%	2	1	1	1	1
		95%	4.30%	3	2	2	2	1
	95%	80%	4.30%	2	1	1	0	0
		90%	4.30%	2	2	1	1	1
		95%	4.30%	3	2	2	2	1
	99%	80%	4.30%	2	1	1	1	0
		90%	4.30%	3	2	1	1	1
		95%	4.30%	4	3	2	2	2
Barium	90%	80%	14.80%	10	5	3	1	1
		90%	14.80%	15	7	4	2	2
		95%	14.80%	20	10	6	3	3
	95%	80%	14.80%	14	6	4	2	1
		90%	14.80%	20	9	6	3	2
		95%	14.80%	25	12	7	4	3
	99%	80%	14.80%	21	10	6	3	2
		90%	14.80%	28	13	8	4	3
		95%	14.80%	34	16	10	5	3
Calcium	90%	80%	17.30%	14	6	4	2	1
		90%	17.30%	20	10	6	3	2
		95%	17.30%	27	13	8	4	3
	95%	80%	17.30%	19	9	5	2	2
		90%	17.30%	27	12	7	4	2
		95%	17.30%	34	16	9	5	3
	99%	80%	17.30%	29	13	7	4	2
		90%	17.30%	38	17	10	5	3
		95%	17.30%	46	21	13	6	4
Potassium	90%	80%	9.80%	5	2	1	1	1
		90%	9.80%	7	4	2	2	1
		95%	9.80%	10	5	3	2	2
	95%	80%	9.80%	6	3	2	1	1
		90%	9.80%	9	4	3	2	1
		95%	9.80%	12	6	4	3	2
	99%	80%	9.80%	9	4	3	1	1
		90%	9.80%	13	6	4	2	2
		95%	9.80%	16	8	5	3	2
Magnesium	90%	80%	10.40%	5	3	2	1	1
		90%	10.40%	8	4	3	2	1
		95%	10.40%	11	5	4	2	2
	95%	80%	10.40%	7	3	2	1	1
		90%	10.40%	10	5	3	2	1
		95%	10.40%	13	7	4	3	2
	99%	80%	10.40%	11	5	3	1	1
		90%	10.40%	14	7	4	2	2
		95%	10.40%	18	9	5	3	2

EPA recommends a target of 80 percent for confidence, 90 percent for power, and 10 to 20 percent for MDRD.
Nutrient metals concentrations composited from Main Post soil data. Distributions determined to be lognormal based on goodness-of-fit testing using probability plot correlation coefficient.
The following documents were used to support the statistical sampling analysis:

(1) Guidance for Data Useability in Risk Assessment (Part A) (EPA 1992b).
(2) Guidance For Planning for Data Collection in Support of Environmental Decision Making Using the Data Quality Objectives Process, Interim Final (EPA 1993b).

Estimated Number of Background Soil Samples Required to Achieve aTarget Minimum Detectable Relative Difference, Fort McClellan , Alabama
Transition Metals

Analyte	Power (%)	Confidence Level (%)	Measured Coefficient of Variation (%)	Minimum Detectable Relative Difference (MDRD)				
				10%	15%	20%	30%	40%
Arsenic	90%	80%	41.70%	79	35	20	9	5
		90%	41.70%	115	52	29	14	8
		95%	41.70%	150	68	39	18	11
	95%	80%	41.70%	108	48	27	12	7
		90%	41.70%	150	67	38	17	10
		95%	41.70%	190	85	48	22	13
	99%	80%	41.70%	165	74	42	19	11
		90%	41.70%	216	96	55	25	14
		95%	41.70%	263	118	67	30	18
Lead	90%	80%	19.30%	17	8	5	2	1
		90%	19.30%	25	12	7	4	2
		95%	19.30%	33	16	9	5	3
	95%	80%	19.30%	23	11	6	3	2
		90%	19.30%	33	15	9	4	3
		95%	19.30%	42	19	11	6	4
	99%	80%	19.30%	36	16	9	4	3
		90%	19.30%	47	21	12	6	4
		95%	19.30%	57	26	15	8	5
Manganese	90%	80%	27.10%	33	15	9	4	2
		90%	27.10%	49	22	13	6	4
		95%	27.10%	64	29	17	8	5
	95%	80%	27.10%	46	21	12	5	3
		90%	27.10%	64	29	17	8	5
		95%	27.10%	81	37	21	10	6
	99%	80%	27.10%	70	31	18	8	5
		90%	27.10%	92	41	24	11	7
		95%	27.10%	112	51	29	14	8
Vanadium	90%	80%	13.90%	9	4	3	1	1
		90%	13.90%	14	6	4	2	2
		95%	13.90%	18	9	5	3	2
	95%	80%	13.90%	12	6	3	2	1
		90%	13.90%	17	8	5	3	2
		95%	13.90%	22	11	7	4	3
	99%	80%	13.90%	19	8	5	2	1
		90%	13.90%	25	11	7	3	2
		95%	13.90%	30	14	9	5	3

Transition metals concentrations from Main Post soil data. Distributions determined to be lognormal based on goodness-of-fit testing using probability plot correlation coefficient.
EPA recommends a target of 80 percent for confidence, 90 percent for power, and 10 to 20 percent for MDRD.

The following documents were used to support the statistical sampling analysis:
(1) Guidance for Data Useability in Risk Assessment (Part A) (EPA 1992b).
(2) Guidance For Planning for Data Collection in Support of Environmental Decision Making Using the Data Quality Objectives Process, Interim Final (EPA 1993b).

Fort McClellan RI/FS Soil Data: Goodness-of-fit Testing (Probability Plot Correlation Coefficient)

SITE_ID	SITE_TYPE	FIELD_SAMP	Flag Code	TEST_NM	MEAS_B	Test for Normality: Value @0.5xLOD	Rank=i	m_i	M_i	$[Al]_{soil}*M_i$	M_i^2	Test for Lognormality: LN (Value @0.5xLOD)	Rank=i	m_i	M_i	$[Al]_{soil}*M_i$	M_i^2
OLF-S17	BORE	SAIC02		AL		11700	1	0.019	-2.07335	-24258.2	4.29877	9.3673	1	0.019	-2.0733	-19.4218	4.2988
OLF-S16	BORE	SAIC02		AL		12600	2	0.046	-1.68218	-21195.5	2.82973	9.4415	2	0.046	-1.6822	-15.8822	2.8297
T38-S09	BORE	SAIC03		AL		15500	3	0.074	-1.44831	-22448.8	2.09759	9.6486	3	0.074	-1.4483	-13.9741	2.0976
LF1-S02	BORE	SAIC03		AL		17600	4	0.101	-1.27438	-22429.0	1.62404	9.7757	4	0.101	-1.2744	-12.4579	1.6240
DIA-S02	BORE	DIA-S02		AL		18200	5	0.129	-1.13225	-20607.0	1.28200	9.8092	5	0.129	-1.1323	-11.1065	1.2820
OLF-S13	BORE	SAIC02		AL		19000	6	0.156	-1.00994	-19188.8	1.01997	9.8522	6	0.156	-1.0099	-9.9501	1.0200
LF1-S02	BORE	SAIC02	D	AL		19200	7	0.184	-0.90112	-17301.5	0.81202	9.8627	7	0.184	-0.9011	-8.8875	0.8120
LF1-S02	BORE	SAIC01		AL		19800	8	0.211	-0.80205	-15880.7	0.64329	9.8934	8	0.211	-0.8021	-7.9351	0.6433
LF1-S04	BORE	SAIC01		AL		20700	9	0.239	-0.71030	-14703.2	0.50452	9.9379	9	0.239	-0.7103	-7.0589	0.5045
OLF-S17	BORE	SAIC01		AL		22500	10	0.266	-0.62417	-14043.8	0.38959	10.0213	10	0.266	-0.6242	-6.2550	0.3896
BK-S02	BORE	SAIC01		AL		22900	11	0.294	-0.54244	-12421.9	0.29424	10.0389	11	0.294	-0.5424	-5.4455	0.2942
BK-S03	BORE	SAIC01		AL		24100	12	0.321	-0.46419	-11186.9	0.21547	10.0900	12	0.321	-0.4642	-4.6836	0.2155
OLF-S23	BORE	SAIC01		AL		24400	13	0.349	-0.38868	-9483.8	0.15107	10.1023	13	0.349	-0.3887	-3.9266	0.1511
BK-S01	BORE	BK-S01		AL		24600	14	0.376	-0.31533	-7757.2	0.09944	10.1105	14	0.376	-0.3153	-3.1882	0.0994
DIA-S01	BORE	DIA-S01	D	AL		25200	15	0.404	-0.24364	-6139.8	0.05936	10.1346	15	0.404	-0.2436	-2.4692	0.0594
LF1-S04	BORE	SAIC02		AL		25600	16	0.431	-0.17319	-4433.6	0.02999	10.1503	16	0.431	-0.1732	-1.7579	0.0300
BK-S01	BORE	BK-S01		AL		26400	17	0.459	-0.10358	-2734.5	0.01073	10.1811	17	0.459	-0.1036	-1.0545	0.0107
OLF-S11	BORE	SAIC02		AL		27300	18	0.486	-0.03447	-941.1	0.00119	10.2146	18	0.486	-0.0345	-0.3521	0.0012
DIA-S01	BORE	DIA-S01		AL		28200	19	0.514	0.03447	972.1	0.00119	10.2471	19	0.514	0.0345	0.3532	0.0012
LF1-S01	BORE	SAIC02		AL		28900	20	0.541	0.10358	2993.4	0.01073	10.2716	20	0.541	0.1036	1.0639	0.0107
T38-S09	BORE	SAIC02	D	AL		30700	21	0.569	0.17319	5316.8	0.02999	10.3320	21	0.569	0.1732	1.7894	0.0300
LF1-S01	BORE	SAIC01		AL		31200	22	0.596	0.24364	7601.7	0.05936	10.3482	22	0.596	0.2436	2.5213	0.0594
LF1-S03	BORE	SAIC02		AL		32000	23	0.624	0.31533	10090.7	0.09944	10.3735	23	0.624	0.3153	3.2711	0.0994
DIA-S02	BORE	DIA-S02		AL		34700	24	0.651	0.38868	13487.3	0.15107	10.4545	24	0.651	0.3887	4.0635	0.1511
OLF-S20	BORE	SAIC01		AL		35800	25	0.679	0.46419	16617.9	0.21547	10.4857	25	0.679	0.4642	4.8673	0.2155
LF1-S03	BORE	SAIC01		AL		37800	26	0.706	0.54244	20504.2	0.29424	10.5401	26	0.706	0.5424	5.7173	0.2942
DIA-S01	BORE	DIA-S01		AL		38000	27	0.734	0.62417	23718.4	0.38959	10.5453	27	0.734	0.6242	6.5821	0.3896
T38-S09	BORE	SAIC01		AL		38700	28	0.761	0.71030	27488.5	0.50452	10.5636	28	0.761	0.7103	7.5033	0.5045
OLF-S21	BORE	SAIC01		AL		38800	29	0.789	0.80205	31119.7	0.64329	10.5662	29	0.789	0.8021	8.4746	0.6433
OLF-S11	BORE	SAIC01		AL		39300	30	0.816	0.90112	35414.0	0.81202	10.5790	30	0.816	0.9011	9.5329	0.8120
BK-S04	BORE	SAIC01		AL		39900	31	0.844	1.00994	40296.5	1.01997	10.5941	31	0.844	1.0099	10.6994	1.0200
OLF-S13	BORE	SAIC01		AL		43500	32	0.871	1.13225	49253.0	1.28200	10.6805	32	0.871	1.1323	12.0930	1.2820
OLF-S16	BORE	SAIC01		AL		51300	33	0.899	1.27438	65375.5	1.62404	10.8454	33	0.899	1.2744	13.8212	1.6240
OLF-S22	BORE	SAIC01		AL		65100	34	0.926	1.44831	94284.8	2.09759	11.0837	34	0.926	1.4483	16.0526	2.0976
T38-S06	BORE	SAIC01		AL		74000	35	0.954	1.68218	124481.2	2.82973	11.2118	35	0.954	1.6822	18.8603	2.8297
OLF-S22	BORE	SAIC02	D	AL		78000	36	0.981	2.07335	161721.1	4.29877	11.2645	36	0.981	2.0733	23.3552	4.2988

Number of Samples	36	SD =	15454.34648883	SUM	483582	33	SD =	0.44220185	SUM	14.81506	33
Number of Detects	36										
Frequency of Detects	100%	Therefore, r =	0.925				Therefore, r =	0.990			
		$R_{.05,36}$ = 0.968					$R_{.05,36}$ = 0.968				

CONCLUSION:

Since R > r, the data are ***NOT*** normally distributed

Since R < r, the data are ***lognormally*** distributed

Fort McClellan RI/FS Soil Data: Goodness-of-fit Testing (Probability Plot Correlation Coefficient)

						Test for Normality						Test for Lognormality					
SITE_ID	SITE_TYPE	FIELD_SAMP	Flag Code	TEST_NM	MEAS_B	Value @0.5xLOD	Rank=i	m_i	M_i	$[As]_{soil}*M_i$	M_i^2	LN (Value @0.5xLOD)	Rank=i	m_i	M_i	$[As]_{soil}*M_i$	M_i^2
BK-S02	BORE	SAIC01		AS	LT	1.250	1	0.019	-2.07335	-2.6	4.29877	0.2231	1	0.019	-2.0733	-0.4627	4.2988
LF1-S02	BORE	SAIC03		AS	LT	1.250	2	0.046	-1.68218	-2.1	2.82973	0.2231	2	0.046	-1.6822	-0.3754	2.8297
LF1-S03	BORE	SAIC01		AS	LT	1.250	3	0.074	-1.44831	-1.8	2.09759	0.2231	3	0.074	-1.4483	-0.3232	2.0976
LF1-S03	BORE	SAIC02		AS	LT	1.250	4	0.101	-1.27438	-1.6	1.62404	0.2231	4	0.101	-1.2744	-0.2844	1.6240
OLF-S11	BORE	SAIC01		AS	LT	1.250	5	0.129	-1.13225	-1.4	1.28200	0.2231	5	0.129	-1.1323	-0.2527	1.2820
OLF-S11	BORE	SAIC02		AS	LT	1.250	6	0.156	-1.00994	-1.3	1.01997	0.2231	6	0.156	-1.0099	-0.2254	1.0200
OLF-S13	BORE	SAIC01		AS	LT	1.250	7	0.184	-0.90112	-1.1	0.81202	0.2231	7	0.184	-0.9011	-0.2011	0.8120
OLF-S16	BORE	SAIC02		AS	LT	1.250	8	0.211	-0.80205	-1.0	0.64329	0.2231	8	0.211	-0.8021	-0.1790	0.6433
OLF-S17	BORE	SAIC02		AS	LT	1.250	9	0.239	-0.71030	-0.9	0.50452	0.2231	9	0.239	-0.7103	-0.1585	0.5045
OLF-S20	BORE	SAIC01		AS	LT	1.250	10	0.266	-0.62417	-0.8	0.38959	0.2231	10	0.266	-0.6242	-0.1393	0.3896
OLF-S17	BORE	SAIC01		AS		2.900	11	0.294	-0.54244	-1.6	0.29424	1.0647	11	0.294	-0.5424	-0.5775	0.2942
BK-S01	BORE	BK-S01		AS		3.200	12	0.321	-0.46419	-1.5	0.21547	1.1632	12	0.321	-0.4642	-0.5399	0.2155
BK-S01	BORE	BK-S01		AS		3.260	13	0.349	-0.38868	-1.3	0.15107	1.1817	13	0.349	-0.3887	-0.4593	0.1511
OLF-S16	BORE	SAIC01		AS		3.280	14	0.376	-0.31533	-1.0	0.09944	1.1878	14	0.376	-0.3153	-0.3746	0.0994
LF1-S02	BORE	SAIC02	D	AS		3.450	15	0.404	-0.24364	-0.8	0.05936	1.2384	15	0.404	-0.2436	-0.3017	0.0594
OLF-S23	BORE	SAIC01		AS		3.530	16	0.431	-0.17319	-0.6	0.02999	1.2613	16	0.431	-0.1732	-0.2184	0.0300
LF1-S01	BORE	SAIC01		AS		4.290	17	0.459	-0.10358	-0.4	0.01073	1.4563	17	0.459	-0.1036	-0.1508	0.0107
BK-S03	BORE	SAIC01		AS		4.930	18	0.486	-0.03447	-0.2	0.00119	1.5953	18	0.486	-0.0345	-0.0550	0.0012
OLF-S21	BORE	SAIC01		AS		6.140	19	0.514	0.03447	0.2	0.00119	1.8148	19	0.514	0.0345	0.0626	0.0012
LF1-S02	BORE	SAIC01		AS		7.070	20	0.541	0.10358	0.7	0.01073	1.9559	20	0.541	0.1036	0.2026	0.0107
LF1-S04	BORE	SAIC02		AS		7.130	21	0.569	0.17319	1.2	0.02999	1.9643	21	0.569	0.1732	0.3402	0.0300
LF1-S01	BORE	SAIC02		AS		7.390	22	0.596	0.24364	1.8	0.05936	2.0001	22	0.596	0.2436	0.4873	0.0594
T38-S09	BORE	SAIC01		AS		7.390	22	0.596	0.24364	1.8	0.05936	2.0001	22	0.596	0.2436	0.4873	0.0594
OLF-S13	BORE	SAIC02		AS		7.930	24	0.651	0.38868	3.1	0.15107	2.0707	24	0.651	0.3887	0.8048	0.1511
BK-S04	BORE	SAIC01		AS		7.970	25	0.679	0.46419	3.7	0.21547	2.0757	25	0.679	0.4642	0.9635	0.2155
T38-S09	BORE	SAIC03		AS		8.070	26	0.706	0.54244	4.4	0.29424	2.0882	26	0.706	0.5424	1.1327	0.2942
OLF-S22	BORE	SAIC01		AS		8.200	27	0.734	0.62417	5.1	0.38959	2.1041	27	0.734	0.6242	1.3133	0.3896
LF1-S04	BORE	SAIC01		AS		8.760	28	0.761	0.71030	6.2	0.50452	2.1702	28	0.761	0.7103	1.5415	0.5045
OLF-S22	BORE	SAIC02	D	AS		9.080	29	0.789	0.80205	7.3	0.64329	2.2061	29	0.789	0.8021	1.7694	0.6433
T38-S06	BORE	SAIC01		AS		9.840	30	0.816	0.90112	8.9	0.81202	2.2865	30	0.816	0.9011	2.0604	0.8120
DIA-S02	BORE	DIA-S02		AS		11.000	31	0.844	1.00994	11.1	1.01997	2.3979	31	0.844	1.0099	2.4217	1.0200
DIA-S01	BORE	DIA-S01		AS		16.700	32	0.871	1.13225	18.9	1.28200	2.8154	32	0.871	1.1323	3.1878	1.2820
DIA-S01	BORE	DIA-S01		AS		17.300	33	0.899	1.27438	22.0	1.62404	2.8507	33	0.899	1.2744	3.6329	1.6240
T38-S09	BORE	SAIC02	D	AS		18.700	34	0.926	1.44831	27.1	2.09759	2.9285	34	0.926	1.4483	4.2414	2.0976
DIA-S01	BORE	DIA-S01	D	AS		18.900	35	0.954	1.68218	31.8	2.82973	2.9392	35	0.954	1.6822	4.9442	2.8297
DIA-S02	BORE	DIA-S02		AS		21.800	36	0.981	2.07335	45.2	4.29877	3.0819	36	0.981	2.0733	6.3899	4.2988
					SD =	5.74977920			SUM	178.57070	33	SD = 0.95429004			SUM	30.70465	33

Number of Samples	36
Number of Detects	26
Frequency of Detects	72%

Therefore, r = 0.918

$R_{.05,36}$ = 0.968

Since R > r, the data are *NOT* normally distributed

Therefore, r = 0.951

$R_{.05,36}$ = 0.968

Since R > r, the data are *NOT* lognormally distributed

CONCLUSION:

Fort McClellan RI/FS Soil Data: Goodness-of-fit Testing (Probability Plot Correlation Coefficient)

SITE_ID	SITE_TYPE	FIELD_SAMP	Flag Code	TEST_NM	MEAS_B	Test for Normality: Value @0.5xLOD	Rank=i	m_i	M_i	$[Ba]_{soil}*M_i$	M_i^2	Test for Lognormality: LN (Value @0.5xLOD)	Rank=i	m_i	M_i	$[Ba]_{soil}*M_i$	M_i^2
OLF-S17	BORE	SAIC02		BA		9.930	1	0.019	-2.07335	-20.6	4.29877	2.2956	1	0.019	-2.0733	-4.7595	4.2988
T38-S09	BORE	SAIC03		BA		29.600	2	0.046	-1.68218	-49.8	2.82973	3.3878	2	0.046	-1.6822	-5.6988	2.8297
OLF-S16	BORE	SAIC02		BA		36.000	3	0.074	-1.44831	-52.1	2.09759	3.5835	3	0.074	-1.4483	-5.1900	2.0976
T38-S09	BORE	SAIC02	D	BA		39.000	4	0.101	-1.27438	-49.7	1.62404	3.6636	4	0.101	-1.2744	-4.6688	1.6240
OLF-S11	BORE	SAIC02		BA		39.800	5	0.129	-1.13225	-45.1	1.28200	3.6839	5	0.129	-1.1323	-4.1711	1.2820
LF1-S01	BORE	SAIC02		BA		52.800	6	0.156	-1.00994	-53.3	1.01997	3.9665	6	0.156	-1.0099	-4.0059	1.0200
T38-S06	BORE	SAIC01		BA		60.600	7	0.184	-0.90112	-54.6	0.81202	4.1043	7	0.184	-0.9011	-3.6985	0.8120
OLF-S13	BORE	SAIC02		BA		61.900	8	0.211	-0.80205	-49.6	0.64329	4.1255	8	0.211	-0.8021	-3.3089	0.6433
OLF-S20	BORE	SAIC01		BA		65.200	9	0.239	-0.71030	-46.3	0.50452	4.1775	9	0.239	-0.7103	-2.9672	0.5045
OLF-S16	BORE	SAIC01		BA		69.000	10	0.266	-0.62417	-43.1	0.38959	4.2341	10	0.266	-0.6242	-2.6428	0.3896
DIA-S01	BORE	DIA-S01	D	BA		69.600	11	0.294	-0.54244	-37.8	0.29424	4.2428	11	0.294	-0.5424	-2.3014	0.2942
DIA-S01	BORE	DIA-S01		BA		71.400	12	0.321	-0.46419	-33.1	0.21547	4.2683	12	0.321	-0.4642	-1.9813	0.2155
DIA-S02	BORE	DIA-S02		BA		77.900	13	0.349	-0.38868	-30.3	0.15107	4.3554	13	0.349	-0.3887	-1.6929	0.1511
LF1-S02	BORE	SAIC03		BA		80.000	14	0.376	-0.31533	-25.2	0.09944	4.3820	14	0.376	-0.3153	-1.3818	0.0994
OLF-S23	BORE	SAIC01		BA		82.800	15	0.404	-0.24364	-20.2	0.05936	4.4164	15	0.404	-0.2436	-1.0760	0.0594
OLF-S17	BORE	SAIC01		BA		84.100	16	0.431	-0.17319	-14.6	0.02999	4.4320	16	0.431	-0.1732	-0.7676	0.0300
DIA-S02	BORE	DIA-S02		BA		88.000	17	0.459	-0.10358	-9.1	0.01073	4.4773	17	0.459	-0.1036	-0.4638	0.0107
LF1-S02	BORE	SAIC02	D	BA		97.900	18	0.486	-0.03447	-3.4	0.00119	4.5839	18	0.486	-0.0345	-0.1580	0.0012
DIA-S01	BORE	DIA-S01		BA		98.000	19	0.514	0.03447	3.4	0.00119	4.5850	19	0.514	0.0345	0.1581	0.0012
OLF-S21	BORE	SAIC01		BA		106.000	20	0.541	0.10358	11.0	0.01073	4.6634	20	0.541	0.1036	0.4830	0.0107
T38-S09	BORE	SAIC01		BA		113.000	21	0.569	0.17319	19.6	0.02999	4.7274	21	0.569	0.1732	0.8187	0.0300
BK-S03	BORE	SAIC01		BA		115.000	22	0.596	0.24364	28.0	0.05936	4.7449	22	0.596	0.2436	1.1561	0.0594
LF1-S01	BORE	SAIC01		BA		115.000	22	0.596	0.24364	28.0	0.05936	4.7449	22	0.596	0.2436	1.1561	0.0594
LF1-S04	BORE	SAIC02		BA		115.000	23	0.624	0.31533	36.3	0.09944	4.7449	23	0.624	0.3153	1.4962	0.0994
BK-S04	BORE	SAIC01		BA		126.000	25	0.679	0.46419	58.5	0.21547	4.8363	25	0.679	0.4642	2.2449	0.2155
LF1-S04	BORE	SAIC01		BA		132.000	26	0.706	0.54244	71.6	0.29424	4.8828	26	0.706	0.5424	2.6486	0.2942
OLF-S11	BORE	SAIC01		BA		133.000	27	0.734	0.62417	83.0	0.38959	4.8903	27	0.734	0.6242	3.0524	0.3896
OLF-S13	BORE	SAIC01		BA		133.000	28	0.761	0.71030	94.5	0.50452	4.8903	28	0.761	0.7103	3.4736	0.5045
BK-S02	BORE	SAIC01		BA		165.000	29	0.789	0.80205	132.3	0.64329	5.1059	29	0.789	0.8021	4.0952	0.6433
LF1-S03	BORE	SAIC01		BA		175.000	30	0.816	0.90112	157.7	0.81202	5.1648	30	0.816	0.9011	4.6541	0.8120
LF1-S02	BORE	SAIC01		BA		182.000	31	0.844	1.00994	183.8	1.01997	5.2040	31	0.844	1.0099	5.2557	1.0200
OLF-S22	BORE	SAIC02	D	BA		194.000	32	0.871	1.13225	219.7	1.28200	5.2679	32	0.871	1.1323	5.9645	1.2820
OLF-S22	BORE	SAIC01		BA		198.000	33	0.899	1.27438	252.3	1.62404	5.2883	33	0.899	1.2744	6.7392	1.6240
LF1-S03	BORE	SAIC02		BA		204.000	34	0.926	1.44831	295.5	2.09759	5.3181	34	0.926	1.4483	7.7023	2.0976
BK-S01	BORE	BK-S01		BA		259.000	35	0.954	1.68218	435.7	2.82973	5.5568	35	0.954	1.6822	9.3476	2.8297
BK-S01	BORE	BK-S01		BA		283.000	36	0.981	2.07335	586.8	4.29877	5.6454	36	0.981	2.0733	11.7050	4.2988

Number of Samples	36	SD =	63.46485639	SUM	2059.65293	33	SD =	0.66900210	SUM	21.21713	33
Number of Detects	36										
Frequency of Detects	100%	Therefore, r =	0.960				Therefore, r =	0.938			
		$R_{.05,36}$ = 0.968					$R_{.05,36}$ = 0.968				

CONCLUSION:

Since R > r, the data are *NOT* normally distributed

Since R > r, the data are *NOT* lognormally distributed

Fort McClellan RI/FS Soil Data: Goodness-of-fit Testing (Probability Plot Correlation Coefficient)

						Test for Normality						Test for Lognormality					
SITE_ID	SITE_TYPE	FIELD_SAMP	Flag Code	TEST_NM	MEAS_B	Value @0.5xLOD	Rank=i	m_i	M_i	$[Ca]_{soil}*M_i$	M_i^2	LN (Value @0.5xLOD)	Rank=i	m_i	M_i	$[Ca]_{soil}*M_i$	M_i^2
OLF-S17	BORE	SAIC01		CA		89.100	1	0.019	-2.07335	-184.7	4.29877	4.4898	1	0.019	-2.0733	-9.3088	4.2988
LF1-S01	BORE	SAIC01		CA		92.900	2	0.046	-1.68218	-156.3	2.82973	4.5315	2	0.046	-1.6822	-7.6228	2.8297
DIA-S02	BORE	DIA-S02		CA		109.000	3	0.074	-1.44831	-157.9	2.09759	4.6913	3	0.074	-1.4483	-6.7945	2.0976
OLF-S16	BORE	SAIC02		CA		112.000	4	0.101	-1.27438	-142.7	1.62404	4.7185	4	0.101	-1.2744	-6.0131	1.6240
OLF-S16	BORE	SAIC01		CA		197.000	5	0.129	-1.13225	-223.1	1.28200	5.2832	5	0.129	-1.1323	-5.9819	1.2820
OLF-S13	BORE	SAIC02		CA		215.000	6	0.156	-1.00994	-217.1	1.01997	5.3706	6	0.156	-1.0099	-5.4240	1.0200
T38-S09	BORE	SAIC03		CA		255.000	7	0.184	-0.90112	-229.8	0.81202	5.5413	7	0.184	-0.9011	-4.9933	0.8120
T38-S06	BORE	SAIC01		CA		287.000	8	0.211	-0.80205	-230.2	0.64329	5.6595	8	0.211	-0.8021	-4.5392	0.6433
OLF-S20	BORE	SAIC01		CA		306.000	9	0.239	-0.71030	-217.4	0.50452	5.7236	9	0.239	-0.7103	-4.0654	0.5045
OLF-S13	BORE	SAIC01		CA		330.000	10	0.266	-0.62417	-206.0	0.38959	5.7991	10	0.266	-0.6242	-3.6196	0.3896
DIA-S01	BORE	DIA-S01	D	CA		356.000	11	0.294	-0.54244	-193.1	0.29424	5.8749	11	0.294	-0.5424	-3.1868	0.2942
DIA-S01	BORE	DIA-S01		CA		359.000	12	0.321	-0.46419	-166.6	0.21547	5.8833	12	0.321	-0.4642	-2.7310	0.2155
BK-S01	BORE	BK-S01		CA		375.000	13	0.349	-0.38868	-145.8	0.15107	5.9269	13	0.349	-0.3887	-2.3037	0.1511
OLF-S17	BORE	SAIC02		CA		393.000	14	0.376	-0.31533	-123.9	0.09944	5.9738	14	0.376	-0.3153	-1.8837	0.0994
OLF-S11	BORE	SAIC02		CA		410.000	15	0.404	-0.24364	-99.9	0.05936	6.0162	15	0.404	-0.2436	-1.4658	0.0594
DIA-S02	BORE	DIA-S02		CA		538.000	16	0.431	-0.17319	-93.2	0.02999	6.2879	16	0.431	-0.1732	-1.0890	0.0300
BK-S02	BORE	SAIC01		CA		633.000	17	0.459	-0.10358	-65.6	0.01073	6.4505	17	0.459	-0.1036	-0.6681	0.0107
BK-S01	BORE	BK-S01		CA		689.000	18	0.486	-0.03447	-23.8	0.00119	6.5352	18	0.486	-0.0345	-0.2253	0.0012
OLF-S11	BORE	SAIC01		CA		798.000	19	0.514	0.03447	27.5	0.00119	6.6821	19	0.514	0.0345	0.2303	0.0012
LF1-S04	BORE	SAIC01		CA		835.000	20	0.541	0.10358	86.5	0.01073	6.7274	20	0.541	0.1036	0.6968	0.0107
BK-S04	BORE	SAIC01		CA		970.000	21	0.569	0.17319	168.0	0.02999	6.8773	21	0.569	0.1732	1.1911	0.0300
DIA-S01	BORE	DIA-S01		CA		1060.000	22	0.596	0.24364	258.3	0.05936	6.9660	22	0.596	0.2436	1.6972	0.0594
T38-S09	BORE	SAIC01		CA		1100.000	23	0.624	0.31533	346.9	0.09944	7.0031	23	0.624	0.3153	2.2083	0.0994
LF1-S03	BORE	SAIC01		CA		1110.000	24	0.651	0.38868	431.4	0.15107	7.0121	24	0.651	0.3887	2.7255	0.1511
OLF-S22	BORE	SAIC02	D	CA		1180.000	25	0.679	0.46419	547.7	0.21547	7.0733	25	0.679	0.4642	3.2833	0.2155
OLF-S22	BORE	SAIC01		CA		1220.000	26	0.706	0.54244	661.8	0.29424	7.1066	26	0.706	0.5424	3.8549	0.2942
LF1-S01	BORE	SAIC02		CA		1360.000	27	0.734	0.62417	848.9	0.38959	7.2152	27	0.734	0.6242	4.5035	0.3896
LF1-S02	BORE	SAIC02	D	CA		1510.000	28	0.761	0.71030	1072.5	0.50452	7.3199	28	0.761	0.7103	5.1993	0.5045
T38-S09	BORE	SAIC02	D	CA		1510.000	29	0.789	0.80205	1211.1	0.64329	7.3199	29	0.789	0.8021	5.8709	0.6433
LF1-S02	BORE	SAIC01		CA		1520.000	30	0.816	0.90112	1369.7	0.81202	7.3265	30	0.816	0.9011	6.6020	0.8120
LF1-S02	BORE	SAIC03		CA		1800.000	31	0.844	1.00994	1817.9	1.01997	7.4955	31	0.844	1.0099	7.5700	1.0200
LF1-S03	BORE	SAIC02		CA		2310.000	32	0.871	1.13225	2615.5	1.28200	7.7450	32	0.871	1.1323	8.7693	1.2820
LF1-S04	BORE	SAIC02		CA		2330.000	33	0.899	1.27438	2969.3	1.62404	7.7536	33	0.899	1.2744	9.8810	1.6240
OLF-S21	BORE	SAIC01		CA		5630.000	34	0.926	1.44831	8154.0	2.09759	8.6359	34	0.926	1.4483	12.5074	2.0976
BK-S03	BORE	SAIC01		CA		5840.000	35	0.954	1.68218	9823.9	2.82973	8.6725	35	0.954	1.6822	14.5887	2.8297
OLF-S23	BORE	SAIC01		CA		6610.000	36	0.981	2.07335	13704.8	4.29877	8.7963	36	0.981	2.0733	18.2379	4.2988
						SD = 1589.65036560			SUM	43238.78508	33	SD = 1.12570115			SUM	37.70126	33

Number of Samples	36
Number of Detects	36
Frequency of Detects	100%

Therefore, r = 0.804

$R_{.05,36}$ = 0.968

Since R > r, the data are *NOT* normally distributed

Therefore, r = 0.990

$R_{.05,36}$ = 0.968

Since R > r, the data are *lognormally* distributed

CONCLUSION:

Fort McClellan RI/FS Soil Data: Goodness-of-fit Testing (Probability Plot Correlation Coefficient)

SITE_ID	SITE_TYPE	FIELD_SAMP	TEST_NM	MEAS_B	Test for Normality: Value @0.5xLOD	Rank=i	m_i	M_i	$[K]_{soil}*M_i$	M_i^2	Test for Lognormality: LN (Value @0.5xLOD)	Rank=i	m_i	M_i	$[K]_{soil}*M_i$	M_i^2
DIA-S02	BORE	DIA-S02	K		624.000	1	0.019	-2.07335	-1293.8	4.29877	6.4362	1	0.019	-2.0733	-13.3444	4.2988
T38-S09	BORE	SAIC01	K		715.000	2	0.046	-1.68218	-1202.8	2.82973	6.5723	2	0.046	-1.6822	-11.0558	2.8297
T38-S06	BORE	SAIC01	K		827.000	3	0.074	-1.44831	-1197.7	2.09759	6.7178	3	0.074	-1.4483	-9.7294	2.0976
DIA-S01	BORE	DIA-S01	K		829.000	4	0.101	-1.27438	-1056.5	1.62404	6.7202	4	0.101	-1.2744	-8.5641	1.6240
T38-S09	BORE	SAIC02	K		850.000	5	0.129	-1.13225	-962.4	1.28200	6.7452	5	0.129	-1.1323	-7.6373	1.2820
OLF-S17	BORE	SAIC01	K		990.000	6	0.156	-1.00994	-999.8	1.01997	6.8977	6	0.156	-1.0099	-6.9662	1.0200
LF1-S04	BORE	SAIC01	K		1040.000	7	0.184	-0.90112	-937.2	0.81202	6.9470	7	0.184	-0.9011	-6.2601	0.8120
DIA-S01	BORE	DIA-S01	K		1070.000	8	0.211	-0.80205	-858.2	0.64329	6.9754	8	0.211	-0.8021	-5.5947	0.6433
OLF-S13	BORE	SAIC02	K		1170.000	9	0.239	-0.71030	-831.0	0.50452	7.0648	9	0.239	-0.7103	-5.0181	0.5045
OLF-S16	BORE	SAIC02	K		1190.000	10	0.266	-0.62417	-742.8	0.38959	7.0817	10	0.266	-0.6242	-4.4202	0.3896
LF1-S02	BORE	SAIC01	K		1270.000	11	0.294	-0.54244	-688.9	0.29424	7.1468	11	0.294	-0.5424	-3.8767	0.2942
LF1-S02	BORE	SAIC03	K		1310.000	12	0.321	-0.46419	-608.1	0.21547	7.1778	12	0.321	-0.4642	-3.3318	0.2155
LF1-S01	BORE	SAIC02	K		1450.000	13	0.349	-0.38868	-563.6	0.15107	7.2793	13	0.349	-0.3887	-2.8293	0.1511
LF1-S04	BORE	SAIC02	K		1570.000	14	0.376	-0.31533	-495.1	0.09944	7.3588	14	0.376	-0.3153	-2.3205	0.0994
LF1-S02	BORE	SAIC02	K		1610.000	15	0.404	-0.24364	-392.3	0.05936	7.3840	15	0.404	-0.2436	-1.7991	0.0594
DIA-S02	BORE	DIA-S02	K		1680.000	16	0.431	-0.17319	-291.0	0.02999	7.4265	16	0.431	-0.1732	-1.2862	0.0300
DIA-S01	BORE	DIA-S01	K		1750.000	17	0.459	-0.10358	-181.3	0.01073	7.4674	17	0.459	-0.1036	-0.7735	0.0107
BK-S03	BORE	SAIC01	K		1830.000	18	0.486	-0.03447	-63.1	0.00119	7.5121	18	0.486	-0.0345	-0.2590	0.0012
LF1-S01	BORE	SAIC01	K		1970.000	19	0.514	0.03447	67.9	0.00119	7.5858	19	0.514	0.0345	0.2615	0.0012
T38-S09	BORE	SAIC03	K		2090.000	20	0.541	0.10358	216.5	0.01073	7.6449	20	0.541	0.1036	0.7919	0.0107
LF1-S03	BORE	SAIC01	K		2700.000	21	0.569	0.17319	467.6	0.02999	7.9010	21	0.569	0.1732	1.3683	0.0300
BK-S02	BORE	SAIC01	K		2740.000	22	0.596	0.24364	667.6	0.05936	7.9157	22	0.596	0.2436	1.9286	0.0594
OLF-S23	BORE	SAIC01	K		3210.000	23	0.624	0.31533	1012.2	0.09944	8.0740	23	0.624	0.3153	2.5460	0.0994
OLF-S22	BORE	SAIC01	K		3280.000	24	0.651	0.38868	1274.9	0.15107	8.0956	24	0.651	0.3887	3.1466	0.1511
OLF-S13	BORE	SAIC01	K		3350.000	25	0.679	0.46419	1555.0	0.21547	8.1167	25	0.679	0.4642	3.7677	0.2155
LF1-S03	BORE	SAIC02	K		3810.000	26	0.706	0.54244	2066.7	0.29424	8.2454	26	0.706	0.5424	4.4726	0.2942
OLF-S20	BORE	SAIC01	K		4360.000	27	0.734	0.62417	2721.4	0.38959	8.3802	27	0.734	0.6242	5.2307	0.3896
OLF-S11	BORE	SAIC01	K		4510.000	28	0.761	0.71030	3203.4	0.50452	8.4141	28	0.761	0.7103	5.9765	0.5045
OLF-S22	BORE	SAIC02	K		4550.000	29	0.789	0.80205	3649.3	0.64329	8.4229	29	0.789	0.8021	6.7556	0.6433
OLF-S16	BORE	SAIC01	K		4750.000	30	0.816	0.90112	4280.3	0.81202	8.4659	30	0.816	0.9011	7.6288	0.8120
BK-S04	BORE	SAIC01	K		4780.000	31	0.844	1.00994	4827.5	1.01997	8.4722	31	0.844	1.0099	8.5564	1.0200
OLF-S21	BORE	SAIC01	K		5550.000	32	0.871	1.13225	6284.0	1.28200	8.6216	32	0.871	1.1323	9.7618	1.2820
BK-S01	BORE	BK-S01	K		6010.000	33	0.899	1.27438	7659.0	1.62404	8.7012	33	0.899	1.2744	11.0886	1.6240
BK-S01	BORE	BK-S01	K		6150.000	34	0.926	1.44831	8907.1	2.09759	8.7242	34	0.926	1.4483	12.6353	2.0976
OLF-S17	BORE	SAIC02	K		6810.000	35	0.954	1.68218	11455.6	2.82973	8.8261	35	0.954	1.6822	14.8472	2.8297
OLF-S11	BORE	SAIC02	K		11900.000	36	0.981	2.07335	24672.8	4.29877	9.3843	36	0.981	2.0733	19.4569	4.2988

Number of Samples	36	SD =	2357.95834660	SUM	71623.57521	33	SD =	0.75431788	SUM	25.15470	33
Number of Detects	36										
Frequency of Detects	100%	Therefore, r =	0.898				Therefore, r =	0.985			
		$R_{.05,36}$ = 0.968					$R_{.05,36}$ = 0.968				

CONCLUSION:

Since R > r, the data are *NOT* normally distributed

Since R > r, the data are *lognormally* distributed

Fort McClellan RI/FS Soil Data: Goodness-of-fit Testing (Probability Plot Correlation Coefficient)

SITE_ID	SITE_TYPE	FIELD_SAMP	TEST_NM	MEAS_B	Test for Normality: Value @0.5xLOD	Rank=i	m_i	M_i	$[Mg]_{soil}*M_i$	M_i^2	Test for Lognormality: LN (Value @0.5xLOD)	Rank=i	m_i	M_i	$[Mg]_{soil}*M_i$	M_i^2
T38-S09	BORE	SAIC02	MG		540.000	1	0.019	-2.07335	-1119.6	4.29877	6.2916	1	0.019	-2.0733	-13.0446	4.2988
DIA-S02	BORE	DIA-S02	MG		757.000	2	0.046	-1.68218	-1273.4	2.82973	6.6294	2	0.046	-1.6822	-11.1518	2.8297
OLF-S13	BORE	SAIC02	MG		808.000	3	0.074	-1.44831	-1170.2	2.09759	6.6946	3	0.074	-1.4483	-9.6958	2.0976
DIA-S01	BORE	DIA-S01	MG		814.000	4	0.101	-1.27438	-1037.3	1.62404	6.7020	4	0.101	-1.2744	-8.5408	1.6240
DIA-S01	BORE	DIA-S01	MG		927.000	5	0.129	-1.13225	-1049.6	1.28200	6.8320	5	0.129	-1.1323	-7.7355	1.2820
OLF-S17	BORE	SAIC01	MG		1020.000	6	0.156	-1.00994	-1030.1	1.01997	6.9276	6	0.156	-1.0099	-6.9964	1.0200
T38-S06	BORE	SAIC01	MG		1050.000	7	0.184	-0.90112	-946.2	0.81202	6.9565	7	0.184	-0.9011	-6.2687	0.8120
BK-S02	BORE	SAIC01	MG		1070.000	8	0.211	-0.80205	-858.2	0.64329	6.9754	8	0.211	-0.8021	-5.5947	0.6433
T38-S09	BORE	SAIC03	MG		1090.000	9	0.239	-0.71030	-774.2	0.50452	6.9939	9	0.239	-0.7103	-4.9678	0.5045
OLF-S16	BORE	SAIC02	MG		1140.000	10	0.266	-0.62417	-711.6	0.38959	7.0388	10	0.266	-0.6242	-4.3934	0.3896
T38-S09	BORE	SAIC01	MG		1230.000	11	0.294	-0.54244	-667.2	0.29424	7.1148	11	0.294	-0.5424	-3.8593	0.2942
BK-S01	BORE	BK-S01	MG		1240.000	12	0.321	-0.46419	-575.6	0.21547	7.1229	12	0.321	-0.4642	-3.3063	0.2155
DIA-S01	BORE	DIA-S01	MG		1300.000	13	0.349	-0.38868	-505.3	0.15107	7.1701	13	0.349	-0.3887	-2.7869	0.1511
BK-S01	BORE	BK-S01	MG		1380.000	14	0.376	-0.31533	-435.2	0.09944	7.2298	14	0.376	-0.3153	-2.2798	0.0994
DIA-S02	BORE	DIA-S02	MG		1600.000	15	0.404	-0.24364	-389.8	0.05936	7.3778	15	0.404	-0.2436	-1.7975	0.0594
LF1-S04	BORE	SAIC01	MG		1860.000	16	0.431	-0.17319	-322.1	0.02999	7.5283	16	0.431	-0.1732	-1.3038	0.0300
OLF-S13	BORE	SAIC01	MG		2110.000	17	0.459	-0.10358	-218.6	0.01073	7.6544	17	0.459	-0.1036	-0.7928	0.0107
LF1-S02	BORE	SAIC03	MG		2520.000	18	0.486	-0.03447	-86.9	0.00119	7.8320	18	0.486	-0.0345	-0.2700	0.0012
OLF-S20	BORE	SAIC01	MG		2560.000	19	0.514	0.03447	88.2	0.00119	7.8478	19	0.514	0.0345	0.2705	0.0012
OLF-S23	BORE	SAIC01	MG		2750.000	20	0.541	0.10358	284.8	0.01073	7.9194	20	0.541	0.1036	0.8203	0.0107
OLF-S22	BORE	SAIC01	MG		2810.000	21	0.569	0.17319	486.7	0.02999	7.9409	21	0.569	0.1732	1.3753	0.0300
OLF-S16	BORE	SAIC01	MG		2910.000	22	0.596	0.24364	709.0	0.05936	7.9759	22	0.596	0.2436	1.9433	0.0594
LF1-S02	BORE	SAIC02	MG		2970.000	23	0.624	0.31533	936.5	0.09944	7.9963	23	0.624	0.3153	2.5215	0.0994
BK-S04	BORE	SAIC01	MG		3100.000	24	0.651	0.38868	1204.9	0.15107	8.0392	24	0.651	0.3887	3.1247	0.1511
LF1-S02	BORE	SAIC01	MG		3210.000	25	0.679	0.46419	1490.0	0.21547	8.0740	25	0.679	0.4642	3.7479	0.2155
LF1-S03	BORE	SAIC01	MG		3310.000	26	0.706	0.54244	1795.5	0.29424	8.1047	26	0.706	0.5424	4.3963	0.2942
OLF-S11	BORE	SAIC01	MG		3330.000	27	0.734	0.62417	2078.5	0.38959	8.1107	27	0.734	0.6242	5.0625	0.3896
OLF-S22	BORE	SAIC02	MG		3420.000	28	0.761	0.71030	2429.2	0.50452	8.1374	28	0.761	0.7103	5.7800	0.5045
BK-S03	BORE	SAIC01	MG		3860.000	29	0.789	0.80205	3095.9	0.64329	8.2584	29	0.789	0.8021	6.6237	0.6433
OLF-S21	BORE	SAIC01	MG		4300.000	30	0.816	0.90112	3874.8	0.81202	8.3664	30	0.816	0.9011	7.5391	0.8120
OLF-S17	BORE	SAIC02	MG		6620.000	31	0.844	1.00994	6685.8	1.01997	8.7979	31	0.844	1.0099	8.8853	1.0200
LF1-S04	BORE	SAIC02	MG		7820.000	32	0.871	1.13225	8854.2	1.28200	8.9644	32	0.871	1.1323	10.1500	1.2820
OLF-S11	BORE	SAIC02	MG		8220.000	33	0.899	1.27438	10475.4	1.62404	9.0143	33	0.899	1.2744	11.4877	1.6240
LF1-S01	BORE	SAIC01	MG		8310.000	34	0.926	1.44831	12035.4	2.09759	9.0252	34	0.926	1.4483	13.0713	2.0976
LF1-S01	BORE	SAIC02	MG		9660.000	35	0.954	1.68218	16249.8	2.82973	9.1757	35	0.954	1.6822	15.4352	2.8297
LF1-S03	BORE	SAIC02	MG		10200.000	36	0.981	2.07335	21148.1	4.29877	9.2301	36	0.981	2.0733	19.1373	4.2988
				SD =	2674.13346178			SUM	80751.86775	33	SD = 0.80078793			SUM	26.58576	33

Number of Samples	36
Number of Detects	36
Frequency of Detects	100%

Therefore, r = 0.892

$R_{.05,36}$ = 0.968

Since R > r, the data are *NOT* normally distributed

Therefore, r = 0.981

$R_{.05,36}$ = 0.968

Since R > r, the data are *lognormally* distributed

CONCLUSION:

Fort McClellan RI/FS Soil Data: Goodness-of-fit Testing (Probability Plot Correlation Coefficient)

SITE_ID	SITE_TYPE	FIELD_SAMP	Flag Code	TEST_NM	MEAS_B	Value @0.5xLOD	Rank=i	m_i	M_i	$\{Mn\}_{soil}*M_i$	M_i^2	LN (Value @0.5xLOD)	Rank=i	m_i	M_i	$\{Mn\}_{soil}*M_i$	M_i^2
						Test for Normality						Test for Lognormality					
OLF-S13	BORE	SAIC02		MN	LT	4.935	1	0.019	-2.07335	-10.2	4.29877	1.5964	1	0.019	-2.0733	-3.3098	4.2988
OLF-S17	BORE	SAIC01		MN		14.900	2	0.046	-1.68218	-25.1	2.82973	2.7014	2	0.046	-1.6822	-4.5442	2.8297
LF1-S02	BORE	SAIC02	D	MN		21.900	3	0.074	-1.44831	-31.7	2.09759	3.0865	3	0.074	-1.4483	-4.4702	2.0976
LF1-S02	BORE	SAIC03		MN		24.700	4	0.101	-1.27438	-31.5	1.62404	3.2068	4	0.101	-1.2744	-4.0867	1.6240
OLF-S13	BORE	SAIC01		MN		29.800	5	0.129	-1.13225	-33.7	1.28200	3.3945	5	0.129	-1.1323	-3.8434	1.2820
OLF-S20	BORE	SAIC01		MN		31.300	6	0.156	-1.00994	-31.6	1.01997	3.4436	6	0.156	-1.0099	-3.4778	1.0200
OLF-S16	BORE	SAIC01		MN		55.100	7	0.184	-0.90112	-49.7	0.81202	4.0091	7	0.184	-0.9011	-3.6127	0.8120
DIA-S02	BORE	DIA-S02		MN		65.800	8	0.211	-0.80205	-52.8	0.64329	4.1866	8	0.211	-0.8021	-3.3579	0.6433
OLF-S17	BORE	SAIC02		MN		68.300	9	0.239	-0.71030	-48.5	0.50452	4.2239	9	0.239	-0.7103	-3.0002	0.5045
LF1-S03	BORE	SAIC01		MN		74.700	10	0.266	-0.62417	-46.6	0.38959	4.3135	10	0.266	-0.6242	-2.6923	0.3896
LF1-S04	BORE	SAIC01		MN		76.700	11	0.294	-0.54244	-41.6	0.29424	4.3399	11	0.294	-0.5424	-2.3541	0.2942
LF1-S03	BORE	SAIC02		MN		96.700	12	0.321	-0.46419	-44.9	0.21547	4.5716	12	0.321	-0.4642	-2.1221	0.2155
LF1-S01	BORE	SAIC01		MN		98.100	13	0.349	-0.38868	-38.1	0.15107	4.5860	13	0.349	-0.3887	-1.7825	0.1511
OLF-S11	BORE	SAIC02		MN		107.000	14	0.376	-0.31533	-33.7	0.09944	4.6728	14	0.376	-0.3153	-1.4735	0.0994
LF1-S02	BORE	SAIC01		MN		165.000	15	0.404	-0.24364	-40.2	0.05936	5.1059	15	0.404	-0.2436	-1.2440	0.0594
LF1-S01	BORE	SAIC02		MN		194.000	16	0.431	-0.17319	-33.6	0.02999	5.2679	16	0.431	-0.1732	-0.9123	0.0300
OLF-S21	BORE	SAIC01		MN		208.000	17	0.459	-0.10358	-21.5	0.01073	5.3375	17	0.459	-0.1036	-0.5529	0.0107
DIA-S01	BORE	DIA-S01		MN		210.000	18	0.486	-0.03447	-7.2	0.00119	5.3471	18	0.486	-0.0345	-0.1843	0.0012
T38-S09	BORE	SAIC03		MN		221.000	19	0.514	0.03447	7.6	0.00119	5.3982	19	0.514	0.0345	0.1861	0.0012
DIA-S01	BORE	DIA-S01		MN		235.000	20	0.541	0.10358	24.3	0.01073	5.4596	20	0.541	0.1036	0.5655	0.0107
LF1-S04	BORE	SAIC02		MN		248.000	21	0.569	0.17319	43.0	0.02999	5.5134	21	0.569	0.1732	0.9548	0.0300
T38-S06	BORE	SAIC01		MN		263.000	22	0.596	0.24364	64.1	0.05936	5.5722	22	0.596	0.2436	1.3576	0.0594
T38-S09	BORE	SAIC02	D	MN		310.000	23	0.624	0.31533	97.8	0.09944	5.7366	23	0.624	0.3153	1.8089	0.0994
DIA-S01	BORE	DIA-S01	D	MN		363.000	24	0.651	0.38868	141.1	0.15107	5.8944	24	0.651	0.3887	2.2910	0.1511
BK-S02	BORE	SAIC01		MN		393.000	25	0.679	0.46419	182.4	0.21547	5.9738	25	0.679	0.4642	2.7730	0.2155
DIA-S02	BORE	DIA-S02		MN		428.000	26	0.706	0.54244	232.2	0.29424	6.0591	26	0.706	0.5424	3.2867	0.2942
T38-S09	BORE	SAIC01		MN		461.000	27	0.734	0.62417	287.7	0.38959	6.1334	27	0.734	0.6242	3.8283	0.3896
OLF-S23	BORE	SAIC01		MN		477.000	28	0.761	0.71030	338.8	0.50452	6.1675	28	0.761	0.7103	4.3808	0.5045
OLF-S16	BORE	SAIC02		MN		510.000	29	0.789	0.80205	409.0	0.64329	6.2344	29	0.789	0.8021	5.0003	0.6433
OLF-S11	BORE	SAIC01		MN		629.000	30	0.816	0.90112	566.8	0.81202	6.4441	30	0.816	0.9011	5.8069	0.8120
BK-S01	BORE	BK-S01		MN		738.000	31	0.844	1.00994	745.3	1.01997	6.6039	31	0.844	1.0099	6.6696	1.0200
BK-S04	BORE	SAIC01		MN		797.000	32	0.871	1.13225	902.4	1.28200	6.6809	32	0.871	1.1323	7.5644	1.2820
BK-S01	BORE	BK-S01		MN		811.000	33	0.899	1.27438	1033.5	1.62404	6.6983	33	0.899	1.2744	8.5361	1.6240
BK-S03	BORE	SAIC01		MN		985.000	34	0.926	1.44831	1426.6	2.09759	6.8926	34	0.926	1.4483	9.9827	2.0976
OLF-S22	BORE	SAIC02	D	MN		3700.000	35	0.954	1.68218	6224.1	2.82973	8.2161	35	0.954	1.6822	13.8209	2.8297
OLF-S22	BORE	SAIC01		MN		3900.000	36	0.981	2.07335	8086.1	4.29877	8.2687	36	0.981	2.0733	17.1440	4.2988

Number of Samples	36	SD =	858.07662430	SUM	20190.43185	33	SD =	1.46095840	SUM	48.93664	33
Number of Detects	35										
Frequency of Detects	97%	Therefore, r =	0.695				Therefore, r =	0.990			
		$R_{.05,36}$ = 0.968					$R_{.05,36}$ = 0.968				

CONCLUSION:

Since R > r, the data are *NOT* normally distributed

Since R > r, the data are ***lognormally*** distributed

Fort McClellan RI/FS Soil Data: Goodness-of-fit Testing (Probability Plot Correlation Coefficient)

SITE_ID	SITE_TYPE	FIELD_SAMP	Flag Code	TEST_NM	MEAS_B	Test for Normality: Value @0.5xLOD	Rank=i	m_i	M_i	$[Pb]_{soil}*M_i$	M_i^2	Test for Lognormality: LN (Value @0.5xLOD)	Rank=i	m_i	M_i	$[Pb]_{soil}*M_i$	M_i^2
OLF-S16	BORE	SAIC02		PB		3.270	1	0.019	-2.07335	-6.8	4.29877	1.1848	1	0.019	-2.0733	-2.4565	4.2988
OLF-S11	BORE	SAIC02		PB		6.540	2	0.046	-1.68218	-11.0	2.82973	1.8779	2	0.046	-1.6822	-3.1590	2.8297
OLF-S16	BORE	SAIC01		PB		7.610	3	0.074	-1.44831	-11.0	2.09759	2.0295	3	0.074	-1.4483	-2.9393	2.0976
DIA-S02	BORE	DIA-S02		PB		10.100	4	0.101	-1.27438	-12.9	1.62404	2.3125	4	0.101	-1.2744	-2.9470	1.6240
OLF-S17	BORE	SAIC01		PB		11.700	5	0.129	-1.13225	-13.2	1.28200	2.4596	5	0.129	-1.1323	-2.7849	1.2820
OLF-S13	BORE	SAIC02		PB		11.900	6	0.156	-1.00994	-12.0	1.01997	2.4765	6	0.156	-1.0099	-2.5011	1.0200
BK-S01	BORE	BK-S01		PB		14.800	7	0.184	-0.90112	-13.3	0.81202	2.6946	7	0.184	-0.9011	-2.4282	0.8120
LF1-S03	BORE	SAIC01		PB		15.000	8	0.211	-0.80205	-12.0	0.64329	2.7081	8	0.211	-0.8021	-2.1720	0.6433
BK-S02	BORE	SAIC01		PB		15.100	9	0.239	-0.71030	-10.7	0.50452	2.7147	9	0.239	-0.7103	-1.9282	0.5045
DIA-S02	BORE	DIA-S02		PB		15.400	10	0.266	-0.62417	-9.6	0.38959	2.7344	10	0.266	-0.6242	-1.7067	0.3896
T38-S09	BORE	SAIC02	D	PB		15.500	11	0.294	-0.54244	-8.4	0.29424	2.7408	11	0.294	-0.5424	-1.4867	0.2942
DIA-S01	BORE	DIA-S01		PB		15.800	12	0.321	-0.46419	-7.3	0.21547	2.7600	12	0.321	-0.4642	-1.2812	0.2155
LF1-S01	BORE	SAIC01		PB		15.800	13	0.349	-0.38868	-6.1	0.15107	2.7600	13	0.349	-0.3887	-1.0728	0.1511
OLF-S17	BORE	SAIC02		PB		16.000	14	0.376	-0.31533	-5.0	0.09944	2.7726	14	0.376	-0.3153	-0.8743	0.0994
LF1-S02	BORE	SAIC02	D	PB		16.200	15	0.404	-0.24364	-3.9	0.05936	2.7850	15	0.404	-0.2436	-0.6785	0.0594
LF1-S02	BORE	SAIC03		PB		16.600	16	0.431	-0.17319	-2.9	0.02999	2.8094	16	0.431	-0.1732	-0.4865	0.0300
OLF-S20	BORE	SAIC01		PB		17.100	17	0.459	-0.10358	-1.8	0.01073	2.8391	17	0.459	-0.1036	-0.2941	0.0107
T38-S09	BORE	SAIC03		PB		17.200	18	0.486	-0.03447	-0.6	0.00119	2.8449	18	0.486	-0.0345	-0.0981	0.0012
T38-S06	BORE	SAIC01		PB		17.400	19	0.514	0.03447	0.6	0.00119	2.8565	19	0.514	0.0345	0.0985	0.0012
T38-S09	BORE	SAIC01		PB		17.700	20	0.541	0.10358	1.8	0.01073	2.8736	20	0.541	0.1036	0.2976	0.0107
OLF-S13	BORE	SAIC01		PB		18.000	21	0.569	0.17319	3.1	0.02999	2.8904	21	0.569	0.1732	0.5006	0.0300
OLF-S11	BORE	SAIC01		PB		18.400	22	0.596	0.24364	4.5	0.05936	2.9124	22	0.596	0.2436	0.7096	0.0594
LF1-S04	BORE	SAIC01		PB		20.000	23	0.624	0.31533	6.3	0.09944	2.9957	23	0.624	0.3153	0.9447	0.0994
LF1-S02	BORE	SAIC01		PB		20.400	24	0.651	0.38868	7.9	0.15107	3.0155	24	0.651	0.3887	1.1721	0.1511
LF1-S03	BORE	SAIC02		PB		26.000	25	0.679	0.46419	12.1	0.21547	3.2581	25	0.679	0.4642	1.5124	0.2155
BK-S01	BORE	BK-S01		PB		28.200	26	0.706	0.54244	15.3	0.29424	3.3393	26	0.706	0.5424	1.8114	0.2942
DIA-S01	BORE	DIA-S01	D	PB		28.300	27	0.734	0.62417	17.7	0.38959	3.3429	27	0.734	0.6242	2.0865	0.3896
LF1-S04	BORE	SAIC02		PB		30.000	28	0.761	0.71030	21.3	0.50452	3.4012	28	0.761	0.7103	2.4159	0.5045
LF1-S01	BORE	SAIC02		PB		34.000	29	0.789	0.80205	27.3	0.64329	3.5264	29	0.789	0.8021	2.8283	0.6433
OLF-S21	BORE	SAIC01		PB		34.000	30	0.816	0.90112	30.6	0.81202	3.5264	30	0.816	0.9011	3.1777	0.8120
BK-S04	BORE	SAIC01		PB		35.000	31	0.844	1.00994	35.3	1.01997	3.5553	31	0.844	1.0099	3.5907	1.0200
OLF-S23	BORE	SAIC01		PB		35.000	32	0.871	1.13225	39.6	1.28200	3.5553	32	0.871	1.1323	4.0256	1.2820
BK-S03	BORE	SAIC01		PB		36.000	33	0.899	1.27438	45.9	1.62404	3.5835	33	0.899	1.2744	4.5668	1.6240
OLF-S22	BORE	SAIC01		PB		40.000	34	0.926	1.44831	57.9	2.09759	3.6889	34	0.926	1.4483	5.3426	2.0976
OLF-S22	BORE	SAIC02	D	PB		46.000	35	0.954	1.68218	77.4	2.82973	3.8286	35	0.954	1.6822	6.4405	2.8297
DIA-S01	BORE	DIA-S01		PB		52.100	36	0.981	2.07335	108.0	4.29877	3.9532	36	0.981	2.0733	8.1963	4.2988
					SD =	11.28786338			SUM	363.94461	33	SD = 0.56494262			SUM	18.42229	33

Number of Samples	36
Number of Detects	36
Frequency of Detects	100%

Therefore, r = 0.953

$R_{.05,36}$ = 0.968

Since R > r, the data are *NOT* normally distributed

Therefore, r = 0.9635

$R_{.05,36}$ = 0.968

Since R > r, the data are *NOT* lognormally distributed

CONCLUSION:

Fort McClellan RI/FS Soil Data: Goodness-of-fit Testing (Probability Plot Correlation Coefficient)

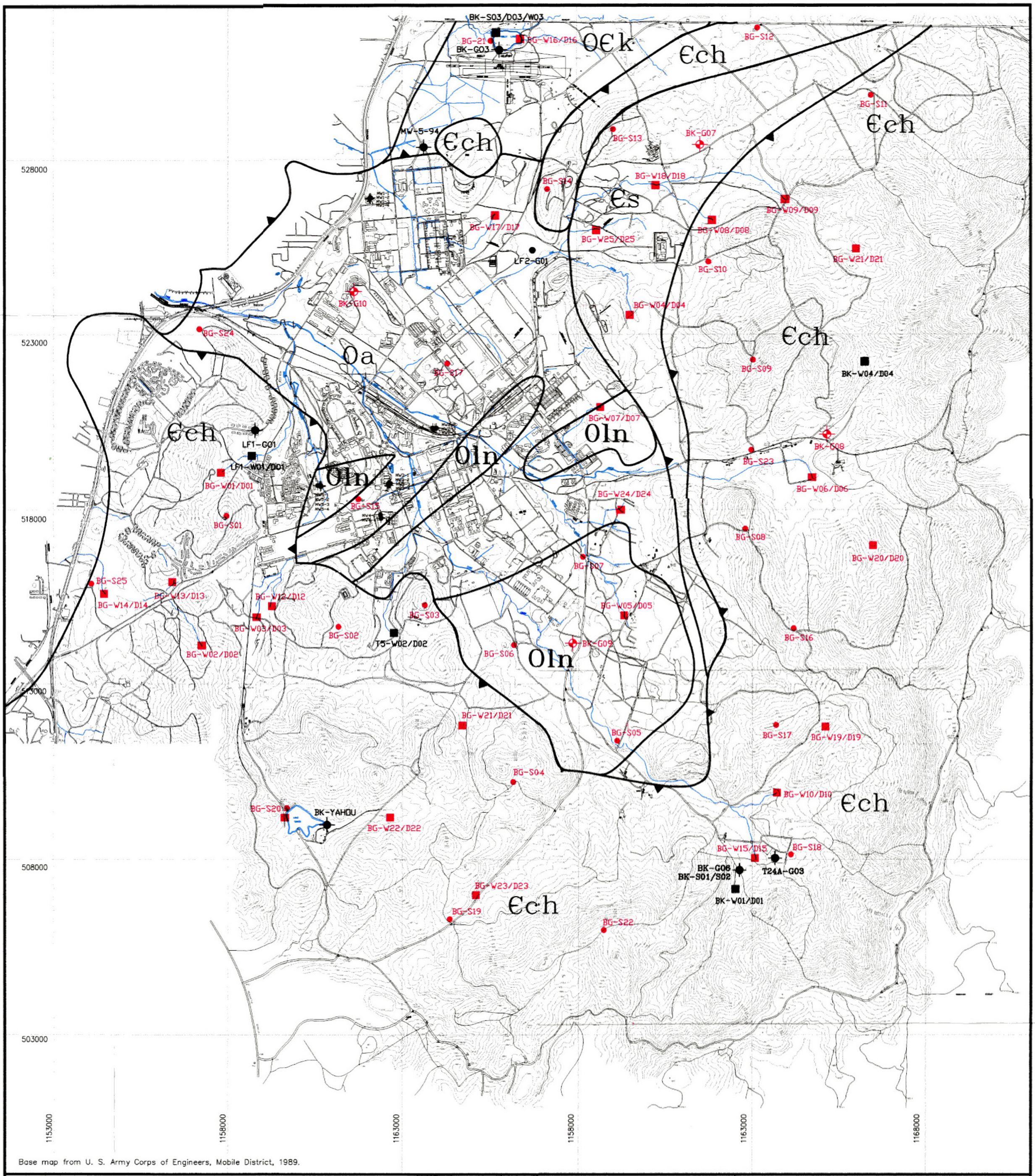
SITE_ID	SITE_TYPE	FIELD_SAMP	TEST_NM	MEAS_B	Test for Normality: Value @0.5xLOD	Rank=i	m_i	M_i	$[V]_{soil}*M_i$	M_i^2	Test for Lognormality: LN (Value @0.5xLOD)	Rank=i	m_i	M_i	$[V]_{soil}*M_i$	M_i^2
LF1-S02	BORE	SAIC03	V		10.200	1	0.019	-2.07335	-21.1	4.29877	2.3224	1	0.019	-2.0733	-4.8151	4.2988
OLF-S13	BORE	SAIC02	V		16.700	2	0.046	-1.68218	-28.1	2.82973	2.8154	2	0.046	-1.6822	-4.7360	2.8297
BK-S01	BORE	BK-S01	V		22.200	3	0.074	-1.44831	-32.2	2.09759	3.1001	3	0.074	-1.4483	-4.4899	2.0976
BK-S02	BORE	SAIC01	V		22.800	4	0.101	-1.27438	-29.1	1.62404	3.1268	4	0.101	-1.2744	-3.9847	1.6240
LF1-S02	BORE	SAIC02	V		23.900	5	0.129	-1.13225	-27.1	1.28200	3.1739	5	0.129	-1.1323	-3.5936	1.2820
BK-S01	BORE	BK-S01	V		24.100	6	0.156	-1.00994	-24.3	1.01997	3.1822	6	0.156	-1.0099	-3.2138	1.0200
OLF-S16	BORE	SAIC02	V		24.900	7	0.184	-0.90112	-22.4	0.81202	3.2149	7	0.184	-0.9011	-2.8970	0.8120
OLF-S17	BORE	SAIC02	V		28.400	8	0.211	-0.80205	-22.8	0.64329	3.3464	8	0.211	-0.8021	-2.6840	0.6433
OLF-S11	BORE	SAIC02	V		33.900	9	0.239	-0.71030	-24.1	0.50452	3.5234	9	0.239	-0.7103	-2.5027	0.5045
DIA-S02	BORE	DIA-S02	V		34.400	10	0.266	-0.62417	-21.5	0.38959	3.5381	10	0.266	-0.6242	-2.2083	0.3896
LF1-S01	BORE	SAIC02	V		35.900	11	0.294	-0.54244	-19.5	0.29424	3.5807	11	0.294	-0.5424	-1.9423	0.2942
OLF-S23	BORE	SAIC01	V		37.100	12	0.321	-0.46419	-17.2	0.21547	3.6136	12	0.321	-0.4642	-1.6774	0.2155
LF1-S01	BORE	SAIC01	V		37.300	13	0.349	-0.38868	-14.5	0.15107	3.6190	13	0.349	-0.3887	-1.4066	0.1511
OLF-S17	BORE	SAIC01	V		38.500	14	0.376	-0.31533	-12.1	0.09944	3.6507	14	0.376	-0.3153	-1.1512	0.0994
OLF-S13	BORE	SAIC01	V		42.600	15	0.404	-0.24364	-10.4	0.05936	3.7519	15	0.404	-0.2436	-0.9141	0.0594
OLF-S20	BORE	SAIC01	V		42.600	16	0.431	-0.17319	-7.4	0.02999	3.7519	16	0.431	-0.1732	-0.6498	0.0300
LF1-S02	BORE	SAIC01	V		43.700	17	0.459	-0.10358	-4.5	0.01073	3.7773	17	0.459	-0.1036	-0.3913	0.0107
LF1-S04	BORE	SAIC01	V		44.100	18	0.486	-0.03447	-1.5	0.00119	3.7865	18	0.486	-0.0345	-0.1305	0.0012
BK-S03	BORE	SAIC01	V		45.500	19	0.514	0.03447	1.6	0.00119	3.8177	19	0.514	0.0345	0.1316	0.0012
LF1-S03	BORE	SAIC02	V		46.400	20	0.541	0.10358	4.8	0.01073	3.8373	20	0.541	0.1036	0.3975	0.0107
OLF-S16	BORE	SAIC01	V		47.200	21	0.569	0.17319	8.2	0.02999	3.8544	21	0.569	0.1732	0.6675	0.0300
DIA-S01	BORE	DIA-S01	V		48.600	22	0.596	0.24364	11.8	0.05936	3.8836	22	0.596	0.2436	0.9462	0.0594
DIA-S02	BORE	DIA-S02	V		50.000	23	0.624	0.31533	15.8	0.09944	3.9120	23	0.624	0.3153	1.2336	0.0994
LF1-S04	BORE	SAIC02	V		51.800	24	0.651	0.38868	20.1	0.15107	3.9474	24	0.651	0.3887	1.5343	0.1511
DIA-S01	BORE	DIA-S01	V		53.200	25	0.679	0.46419	24.7	0.21547	3.9741	25	0.679	0.4642	1.8447	0.2155
LF1-S03	BORE	SAIC01	V		54.600	26	0.706	0.54244	29.6	0.29424	4.0000	26	0.706	0.5424	2.1698	0.2942
OLF-S21	BORE	SAIC01	V		55.000	27	0.734	0.62417	34.3	0.38959	4.0073	27	0.734	0.6242	2.5012	0.3896
BK-S04	BORE	SAIC01	V		56.500	28	0.761	0.71030	40.1	0.50452	4.0342	28	0.761	0.7103	2.8655	0.5045
DIA-S01	BORE	DIA-S01	V		57.600	29	0.789	0.80205	46.2	0.64329	4.0535	29	0.789	0.8021	3.2511	0.6433
T38-S09	BORE	SAIC03	V		59.800	30	0.816	0.90112	53.9	0.81202	4.0910	30	0.816	0.9011	3.6865	0.8120
T38-S09	BORE	SAIC01	V		61.600	31	0.844	1.00994	62.2	1.01997	4.1207	31	0.844	1.0099	4.1616	1.0200
OLF-S11	BORE	SAIC01	V		62.200	32	0.871	1.13225	70.4	1.28200	4.1304	32	0.871	1.1323	4.6766	1.2820
OLF-S22	BORE	SAIC01	V		80.300	33	0.899	1.27438	102.3	1.62404	4.3858	33	0.899	1.2744	5.5891	1.6240
T38-S06	BORE	SAIC01	V		85.200	34	0.926	1.44831	123.4	2.09759	4.4450	34	0.926	1.4483	6.4377	2.0976
OLF-S22	BORE	SAIC02	V		93.800	35	0.954	1.68218	157.8	2.82973	4.5412	35	0.954	1.6822	7.6391	2.8297
T38-S09	BORE	SAIC02	V		186.000	36	0.981	2.07335	385.6	4.29877	5.2257	36	0.981	2.0733	10.8348	4.2988

Number of Samples	36	SD =	29.81160369	SUM	853.19380	33	SD =	0.52223148	SUM	17.18012	33
Number of Detects	36	Therefore, r =	0.846				Therefore, r =	0.972			
Frequency of Detects	100%	$R_{.05,36}$ = 0.968					$R_{.05,36}$ = 0.968				

CONCLUSION:

Since R > r, the data are *NOT* normally distributed

Since R > r, the data are *lognormally* distributed



Base map from U. S. Army Corps of Engineers, Mobile District, 1989.

LEGEND:

- Proposed Background Surface Water/ Sediment Sample Location
- Proposed Background Surface/Subsurface Soil Sample Location
- Existing Background Surface Water/Sediment/Soil Sample Location
- Existing Background Groundwater Well
- New Background Groundwater Well
- Geologic Contact
- Thrust Fault
- Reservation boundary
- Roads
- Trails

Oa Athens Shale
Oln Little Oak and Newala Limestones, Undifferentiated
OЄk Knox Group, Undifferentiated
Єs Shady Dolomite
Єch Chilhowee Group, Undifferentiated

NOTE: Geologic contacts from Osborn and Szabo Geologic Survey of Alabama Circular 117 plate 1, 1983

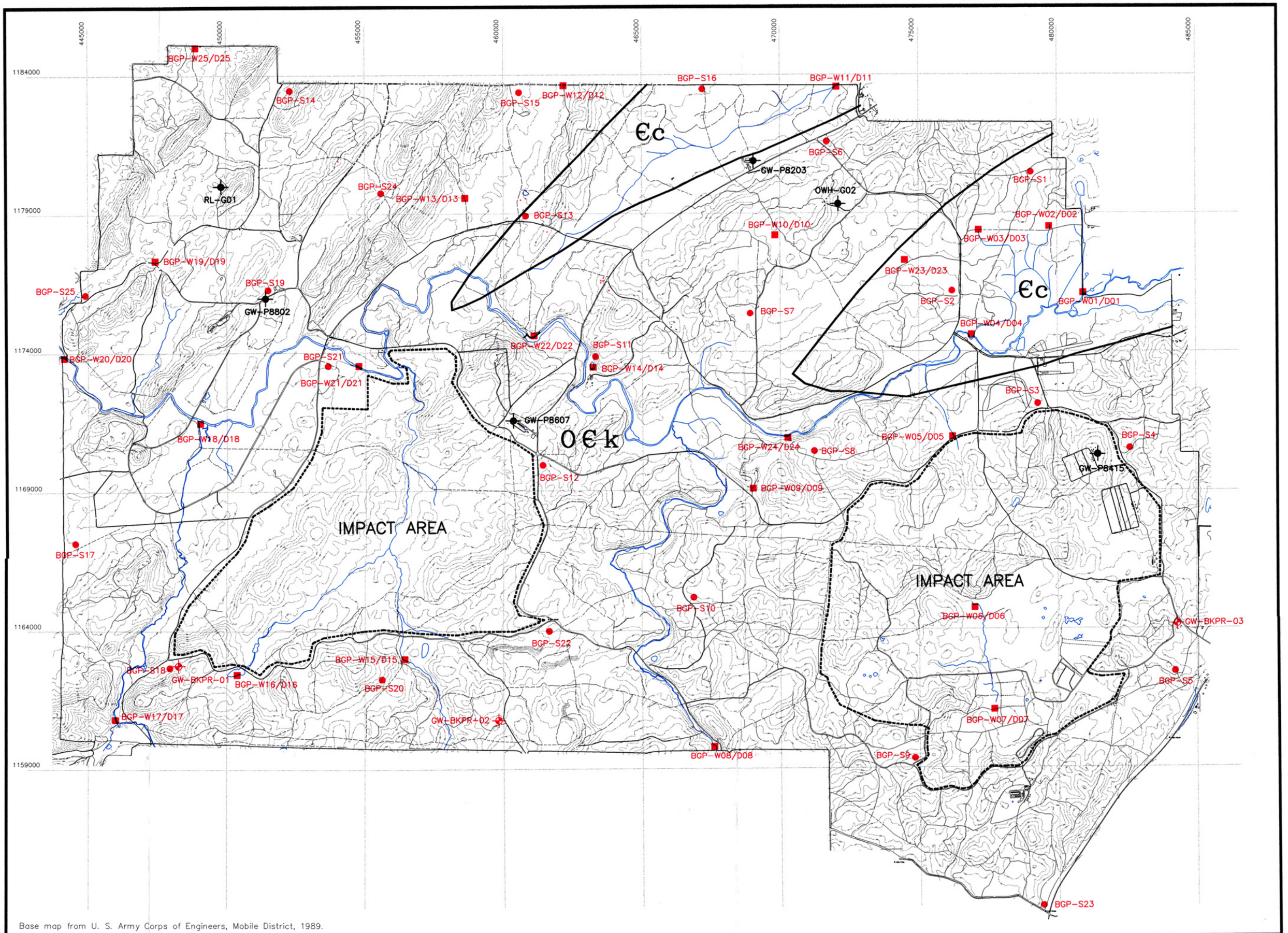
0 500 1000 1500 3000
SCALE: 1" = 1500'

Aberdeen Proving Ground, Maryland
U.S. Army Environmental Center

SUPPLEMENTAL BACKGROUND SAMPLE LOCATIONS

Fort McClellan, Alabama

Plate	Project:	File:	Date:
1	01-0827-03-6520-008	\DWG\BASEMAP1	06-20-97



Base map from U. S. Army Corps of Engineers, Mobile District, 1989.

LEGEND:

- Proposed Background Surface Water/ Sediment Sample Location
- Proposed Background Surface/Subsurface Soil Sample Location
- Existing Background Groundwater Well
- New Background Groundwater Well
- Geologic Contact
- Єc Conasauga Formation
- ЄCK Knox Group, Undifferentiated
- BGP Background Pelham
- S Soil
- W Surface Water
- D Sediment
- Approximate Impact Area Boundary
- Reservation boundary
- Roads
- Trails

NOTE: Geologic contacts from Osborn and Szabo Geologic Survey of Alabama Circular 117 plate 1, 1983

0 1000 2000 4000
SCALE: 1" = 2000'

Aberdeen Proving Ground, Maryland
U.S. Army Environmental Center

BACKGROUND SAMPLE LOCATIONS
PELHAM RANGE

Fort McClellan, Alabama

Plate	Project:	File:	Date:
2	01-0827-03-6520-025	\DWG\GSALL-1	06-27-97